ARCHITECTURE AND DISASTER: A HOLISTIC AND RISK-BASED BUILDING INSPECTION PROFESSIONAL TRAINING MODEL FOR PRACTICING ARCHITECTS IN TURKEY

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ABSTRACT

ARCHITECTURE AND DISASTER: A HOLISTIC AND RISK-BASED BUILDING INSPECTION PROFESSIONAL TRAINING MODEL FOR PRACTICING ARCHITECTS IN TURKEY

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Interaction of human-induced factors with natural hazards results in diverse uncertainties and risks among the built environment. Impacts of disaster events experienced in Turkey have revealed the vulnerability of the social, economic, and physical environments along with the various insufficiencies of awareness, legislation, practice and building inspection concepts. The shift towards risk-based disasters policy among the international agenda influences the national disaster policies and efforts. Parallel to this, it is expected from practicing architects to enhance their capacities through disaster risk-based professional training programs in order to develop disaster resilient built environments.

Building Inspection System (BIS) is one of the important components of risk reduction approach which ensures the safety of built environment and occupants. The effective BIS has important gaps and deficiencies within the administrative, legal, and technical structures which results in failure of building production process in Turkey. Among the other problems, the main concern related to the ongoing BIS is its fragmented and missing risk-based understanding.

The critical analysis indicates the deficient points of administrative and technical issues within the BIS conducted with the certification and professional training model which are not consistent with shifting comprehensive disasters policy and risk-based understanding in Turkey, and proposing a holistic and risk-based certification and training model for practicing architects in Turkey which focuses on disaster resilient built environment development through the comparison of some international best-practiced training model examples with Turkish context.

The proposed professional training model has a three-step knowledge acquisition levels (awareness-detailed knowledge-advanced knowledge) which aims to approach to the architectural built environment problems, develop awareness, build-up knowledge and support practice through the holistic disaster risk reduction understanding, and in addition to attend on the complementary and supportive strategies (such as building and environment, building and material, structure and construction contexts) between related issues.

Key Words: Disaster, Holistic and Risk-based, Architectural Professional Training, Building Inspection System

ÖZ

MİMARLIK VE AFET: TÜRKİYE'DE PROFESYONEL MİMARLAR İÇİN BÜTÜNCÜL VE RİSK ANLAYIŞINA DAYALI BİR YAPI DENETİMİ MESLEKİ EĞİTİM MODELİ

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Doğal tehlikeler ile birleşen insan kaynaklı etkenler fiziki yapılı çevrelerde çeşitli belirsizlikler ve riskler oluşturmaktadır. Türkiye'de afet olaylarının etkileri sosyal, ekonomik ve fiziki çevrenin dirençsizliğini ve beraberindeki farkındalık, mevzuat, uygulama ve denetim konularındaki çeşitli yetersizlikleri ortaya çıkarmıştır. Uluslararası alanda risk anlayışına dayalı afetler politikasına yönelik değişim ulusal afet politikaları ve uğraşılarını da etkilemektedir. Buna paralel olarak profesyonel mimarların da afete dirençli fiziksel çevreler oluşturmak için afet risklerini temel alan mesleki gelişim programları üzerinden kapasitelerini arttırmaları beklenmektedir.

Yapı Denetim Sistemi (YDS) yapılı çevre ve kullanıcılarının güvenliğini sağlamada en önemli risk azaltma yaklaşımı bileşenlerinden birisidir. Mevcut YDS Türkiye'de yapı üretim sürecinde başarısızlıklara neden olan yönetimsel, hukuksal ve teknik alanlarda önemli boşluklar ve eksiklikler içermektedir. Diğer problemlerin yanında, mevcut YDS'nin temel sorunu parçalı oluşu ve riske dayalı anlayış eksikliğidir.

Bu tezin amacı Türkiye'de özellikle değişen kapsamlı afetler politikası ve riske dayalı anlayış ile uyuşmayan YDS'ni ve beraberinde öngörülen mimari sertifikasyon ve mesleki eğitim modelini eleştirel anlamda analiz ederek uluslararası bazı iyi mesleki eğitim modellerini Türkiye bağlamında karşılaştırmalı olarak irdeleyip uygulayıcı mimarlar için Türkiye'de YDS bünyesinde afet dirençli yapılı çevre oluşturma odaklı bütüncül ve risk anlayışına dayalı bir sertifika ve eğitim modeli önermektir.

Önerilen mesleki eğitim modeli bütüncül afet risk azaltımı anlayışı ile mimari fiziki çevre problemlerine yaklaşmayı, farkındalık kazandırmayı, bilgi arttırmayı ve uygulamayı destekleyici ayrıca ilgili konular arasında birbirlerini tamamlayıcı ve destekleyici stratejileri (yapı ve çevre, yapı ve malzeme, yapı ve inşaa bağlamları gibi) gözeten üç aşamalı bilgi kazanma düzeyine (farkındalık yaratma - detaylı bilgilenme- ileri düzeyde bilgilenme) bağlı bir modeldir.

Anahtar Kelimeler: Afet, Bütüncül ve Riske Dayalı, Mimari Mesleki Eğitim, Yapı Denetim Sistemi

To My Daughter and Wife
Derin and Melda A. Özden

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TABLE OF CONTENTS

LIST OF TABLES

TABLES

LIST OF FIGURES

FIGURES

ABBREVIATIONS

AIA ....American Institute of Architects
ARE ....Architect Registration Examination
AFAD .... Afet ve Acil Durum Yönetimi Başkanlığı
BIS .... Building Inspection System
BIL ....Building Inspection Law
BIT .... Building Inspection Training
CPD .... Continuing Professional Development
CRED .... Centre for Research on the Epidemiology of Disasters
CPDC ....Continuing Professional Development Center
CES ....Continuing Education System
CAT .... Chamber of Architects of Turkey
DRR.. Disaster Risk Reduction
DMS .... Disaster Management System
DRM .... Disaster Risk Management
FEMA .... Federal Emergency Management Agency
HDRR .... Holistic Disaster Risk reduction
HTM-BIS ....Holistic Training Model for Building Inspection System
HSW ....Health, Safety and Welfare
HFA .... Hyogo Framework for Action
IFRCRCS .... International Federation of Red Cross and Red Crescent Societies
IDNDR .... International Decade for Natural Disaster Reduction
JICA .... Japan International Cooperation Agency
KSA .... Knowledge, Skill and Ability
MCE .... Mandatory Continuing Education
OECD .... Organization for Economic Co-operation and Development
RIBA .... Royal Institute of British Architects
RIAI .... The Royal Institute of The Architects of Ireland
SMGM .... Sürekli Mesleki Gelişim Merkezi
TBMM .... Türkiye Büyük Millet Meclisi
TAR .... Technical Application Responsible
UP-PKSA .... Utilization and Processing of Professional Knowledge, Skill and Ability
US ....The United States
UN-ISDR .... United Nations-International Strategy for Disaster Reduction
UN ....United Nations
WHO ....World Health Organization
YDK .... Yapı Denetim Kanunu
YÖK .... Yüksek Öğretim Kurumu (Higher Education Institute)

CHAPTER 1

Introduction

1.1 Preamble

Due to natural and human-induced causes as varied as geography, uncontrolled urban development approaches, and poor performing buildings, Turkey has proved ineffective before, during and after the disasters. The disasters experienced within the last two decades which caused significant human, physical and financial losses in urban areas have particularly revealed the high levels of risk inherent in the country. In addition, the 1999 East Marmara Earthquake has brought out the truth that the urban areas form risk pools due to unauthorized building processes.

It is becoming increasingly difficult for national and international institutions to cope with the effects of disasters on environment and people, as well as on economic systems. Traditional disaster coping approaches mainly focusing on response and recovery efforts have proved ineffective at times of disasters. These led to international developments in 1990s in disasters policies, which entailed an important paradigm shift towards '*disaster risk mitigation*' approach. Unfortunately, however, Turkey has failed to adopt this approach. The rapidly changing and fragile balance between the environment and human activities in parallel with the transforming risk concept draws greater attention to risk mitigation efforts. '*Disaster risk reduction*' is one of the important components of risk mitigation understanding.

A '*building inspection system,'* [1] which controls the built environmental systems to ensure the safety of buildings and occupants, is an important tool for efficient risk reduction. Although Turkey owns a building inspection system, it has been rendered ineffective due to its fragmented structure and missing risk-based understanding. This system needs to be re-structured in compliance with the shifting disasters policies and a '*holistic*' and '*risk-based*' understanding. Building professionals who deal with inspection practices need to raise awareness of a holistic and risk-based understanding. Building inspection systems and continuing professional development programs are considered an effective approach to '*holistic disaster risk reduction*' (HDRR) for particularly practicing architects. Continuing professional development system is currently inefficient as it does not take a holistic risk reduction approach. This hinders architects' capacity development practices through building inspection training. Ongoing professional training model of building inspection system needs a more holistic and risk-based understanding in accord with shifting disaster policies, and risk complexities and uncertainties accumulating within the built environment.

This study hypothesizes that "in order to cope with and reduce the growing disaster risks and uncertainties accumulating in the built environment, a holistic and risk-based building inspection training approach is needed" (*Hypothesis-I*). It is also claimed that "the ongoing continuing professional training program of building inspection provided for practicing architects does not meet the capacity development needs due to its having a fragmented structure and missing a risk-based conception" (*Hypothesis-II*).

The study aims to analyze the ongoing deficient risk-based building inspection training model used in Turkey in the light of shifting international disaster policies and best-practice examples of continuing professional training programs. It is hoped that this analysis will be helpful to re-structure the training model for practicing architects in Turkey. The proposed model offers professional certification and has a training approach which adopts a holistic risk reduction understanding within the building inspection system.

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[1] *Building Inspection* term used throughout the study denotes the supervision of whole building production process which encompasses sequential steps of project inspection, construction inspection, and final product inspection. It is important to note that inspection term also needs to cover post-occupancy inspection activity which aims to develop routine checks for the existing buildings in order to control the code compliance during the inhabitance period.

1.2 Definition of the Problem

International organizations such as United Nations (UN), Organization for Economic Co-operation and Development (OECD), HABITAT (UN), World Bank – Global Facility for Disaster Reduction and Recovery (WB-GFDRR) and International Federation of Red Cross and Red Crescent Societies (IFRCRCS), as well as leading global re-insurance industries such as SwissRe and MunichRe have been warning people and all local, national and regional institutions against the rapidly growing effects of natural and human-induced hazards and disasters which have catastrophic impacts on both built and natural environments. It is well known that natural hazards are generally unavoidable; however, "they only become disasters when communities' coping mechanisms are exceeded and they are unable to manage their impacts" (World Disasters Report, 2009:7). On the other hand, human-induced hazards can be avoided if only root causes are identified and mitigated.

A key concept, the '*risk,*' associated with hazard and disaster terminology and defined as *"*the probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions" (UN-ISDR, 2003)[2] has a growing importance in the international agenda in terms of understanding and coping with the destructive effects of disasters.

The shift in the policies regarding coping with disasters from 'traditional disaster management' approach to 'disaster risk management' approach has actually been high on the international and national agenda in the last two decades. This indicates that the pre-disaster attempts [*risk mitigation and preparedness*] should be given greater priority than the post-disaster efforts [*response and recovery*] in reducing the diverse affects of disasters. The acts reflecting the change in policies over the last two decades are summarized below (Şahin, 2009; OECD, 2010; Balamir, 2004, 2007, 2009, 2011; UN-ISDR, 2012; UN-CSD, 2012):

1- United Nations (UN) declared the period 1990-2000 as the International Decade for Natural Disaster Reduction (IDNDR).
2- The Johannesburg Plan of Implementation was published in 1992 in South Africa by one of the major UN organizations, the World Summit on Sustainable Development (WSSD). It is noted within the publication that "an integrated, multi-hazard, inclusive approach to address vulnerability, risk assessment and disaster management, including prevention, mitigation, preparedness, response and recovery, is an essential element of a safer world in the twenty first century."
3- In the International Organization of Yokohama Conference in 1994, new strategies and principles regarding coping with natural disasters were developed, and in the same year, 'the Yokohama Strategy and Plan of Action for a Safer World' was adopted at the World Conference on Natural Disasters.
4- International Strategy for Disaster Reduction (ISDR) was developed in 1999 as a new branch of UN in order to implement the new principles of coping with natural disasters developed in the Yokohama Conference. The United Nations General Assembly Resolution A/RES/54/219 adopted ISDR and established its secretariat (UN-ISDR) with the purpose of ensuring the implementation of Yokohama strategy and principles.
5- Millennium Development Goals (MDGs) were declared in the 8th plenary meeting of UN in 2000 whereby urgent action "to intensify cooperation to reduce the number and effects of natural and man-made disasters" was called for.
6- OECD Report, "Large-Scale Disasters, Lessons Learned", was published and disseminated in 2004.
7- United Nations Development Program (UNDP) Report of 2004 "Reducing Disaster Risk – A Challenge for Development" was prepared.
8- In 2003 and 2004, the secretariat of the UNISDR carried out a review of the 'Yokohama Strategy and Plan of Action for a Safer World'. The Yokohama Review formed the basis of 'the Hyogo Framework for Action (HFA)' and was submitted at the World Conference on Disaster Reduction in Kobe, Japan, in January 2005.

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[2] UN-ISDR, *Terminology on disaster risk reduction (working document)*, United Nations International Strategy for Disaster Reduction, 2003. Available from: http://www.adrc.asia/publications/terminology/top.htm#R (accessed in 2006).

9- International Kobe Conference was organized in 2005. The period 2005-2015 was decided to be the new decade of natural disaster risk reduction acting (Hyogo Framework for Action – HFA).
10- UN-ISDR Report of 2005 "Living with Risk-A Global Review of Disaster Reduction Initiatives" was prepared.
11- A biennial 'Global Platform' on disaster risk reduction was established to support the implementation of 'the Hyogo Framework for Action' by the UN General Assembly in 2007.
12- Incheon Conference and Declaration 'Building a Local Government Alliance for Disaster Risk Reduction' was organized by UN in 2009 in South Korea. The declaration defines the aim of the conference and following steps as follows:

> *The Conference participants have come to an agreement to actively move the disaster risk reduction and climate change adaptation agenda forward through an Alliance of Local Governments for Disaster Risk Reduction, with 200 participants from national to local government levels, local authorities, associations and networks, professional and technical organizations, academia, the private sector and civil society, and the UN present*[3].

13- OECD Policy Handbook on Natural Hazard Awareness and Disaster Risk Reduction Education was prepared in 2010. It pointed out the following:

> *The increased vulnerability and exposure of people and assets to natural perils are, in significant part, due to the growing concentration of people and values in conurbations, inadequate land-use zoning and planning, inadequate construction standards, environmental degradation, the inability to adapt to climate change, and an insufficient level of disaster risk preparedness. Changes in patterns of human behaviour and decision-making at all levels of government and society could, therefore, lead to a substantial reduction in disaster risk.*

14- The Shanghai Forum on 'Disaster Prevention, Post-Disaster Reconstruction and International Cooperation: Learning from both Japanese and Chinese Experiences' was organized in 27-28 October, 2011.

The 1999 East Marmara Earthquakes experienced in Turkey drew attention to the poor performance of the built environment. The disaster, along with the shift in disasters policy among the international agenda which has been highlighting the importance of risk reduction advances, has flared the debate on the ineffectiveness of the traditional disaster management system in Turkey.

The ongoing Building Inspection System[4] (BIS), which was put into effect through the Law No: 4708 by the year 2001, intends to handle the deficiencies of the former system. The BIS aims to supervise building professionals' performance in order to ensure building safety. The purpose of the BIS is defined as "the arrangement of the life and asset safety through the inspection of design and building in order to achieve quality in construction which obeys the rules of related building plan, science, art and health standards" (YDK, 2001).

The new BIS has not ended many of the problems caused by the former system, which affect a wide range of areas changing from administrative structure to the technical issues. The structure of the BIS is based solely on the professional knowledge of structural aspects in a pure technical and partial way, which necessitates the adoption of risk-based understanding. The BIS is concerned with only seismic hazard and safety concepts, excluding the other hazards which associated with natural and human-induced sources. This view of the BIS leads to an ineffective and fragmented inspection practice, and a lack of a multi-hazard approach.

Practicing architects participating in the ongoing BIS are expected to perform an important role in the development of safe built environment in Turkey. The deficient BIS approach adversely affects the performance and professional development of practicing architects. Insufficient and obscuring 'utilization and processing of professional knowledge, skill and ability' (UP-PKSA) influences the reliability and quality of the entire building production process in Turkey.

The continuing professional development (CPD) approach is argued as one of the most important problems which hinder the transfer of 'knowledge, skill and ability' (KSA) of professional architects to practice. The professional training system is accepted as deficient due to its fragmented structure

[3] The Incheon Declaration, available from: http://www.preventionweb.net/files/10962_IncheonDeclarationFinal28Aug09.pdf (accessed in 2011).
[4] Building Inspection System term is used as the equivalent of "Yapı Denetim Sistemi" in Turkish through the study.

which excludes the integrated strategies and formations of design and building approaches from a HDRR view-point.

Insufficient CPD model which does not meet the effective strategies of KSA transfer results in ineffective professional participation of practicing architects to the safe built environment struggles in Turkey. Thus, it is needed to re-structure the CPD model in order to support the capacity development of practicing architects. This study aims to analyze the deficiencies of certification and training program within the CPD system in general. Particularly, the need to employ a more holistic and risk-based CPD approach for BIS training emerges as a result of the analysis. Ultimately, a continuing professional training model for BIS which adopts HDRR approach is proposed.

The problems related to the integration of BIS and HDRR approaches in general are framed under two subtitles. The problems within the current BIS are briefly specified from the architecture view-point as follows:

1- *Problems related to the Administrative Structure and Process of the ongoing BIS*

a) Management Problems: It refers to insufficient and unorganized coordination and communication between building professionals participating in the BIS, and inadequate description of practicing architects' responsibilities.
b) Legislative Problems: These are caused by the insufficient guiding capacity of the legislative documents to integrate holistic and risk-based understanding with BIS. This insufficiency affects the practice of BIS, which in turn results in deficient building code compliance practices. The existing legislative documents are insufficient to transfer standard, coherent and valid forms of code compliance issues to the practice. The lack of a liability insurance system in BIS also indicates that the legal system is fragmented.
c) Governmental Problems: Institutions and building professionals' not effectively and collectively participating in BIS limit the public control on the overall building production process.
d) Integration Problems of Traditional Building Production Approach and BIS: The traditional building production system is not in accord with the shifting disaster policies with greater risk-based understanding. In such a system, the parties in the building production process are not engaged in real dialogue with each other. This causes serious failures in the integration of structural-constructional and design formative strategies. The legal and administrative systems do not support a participative approach to building production and inspection activities in terms of ensuring integrated building safety.

Figure 1.1 illustrates the 'Administrative Problems of the BIS' and their interconnectedness within the building production process in Turkey.

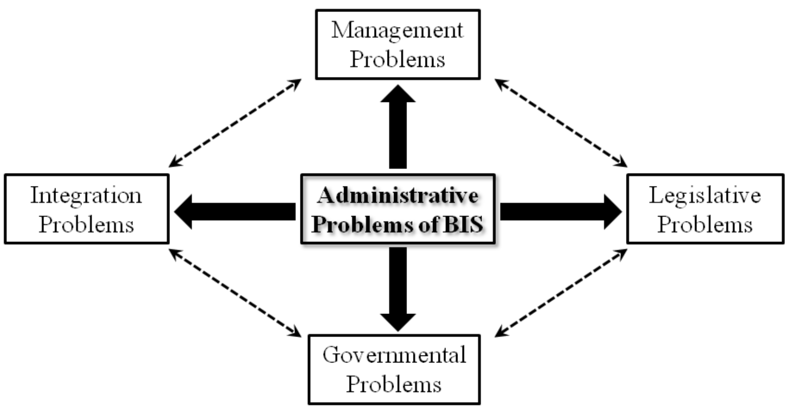

Figure 1.1: Administrative problems of Building Inspection System from Holistic Disaster Risk Reduction (HDRR) point of view

2- *Problems related to the Technical (Practice) Process of the ongoing BIS*

a) Integration of Inspection Practice with Risk Concept: It is argued that the UP-PKSA is insufficient to enhance risk awareness and assessment through the BIS among practicing architects. The level of UP-PKSA is significant in determining the level of building professional's competency in integrating HDRR approach into the BIS. The conceptual deficiency and a missing understanding of a holistic and risk-based approach within the BIS result in defective application and control mechanisms. Thus, practicing architects need an integrated inspection practice from HDRR view-point.

b) Interdisciplinary Participation Problems: Interdisciplinary efforts are insufficient because an integrated inspection understanding, and a sound administrative BIS structure do not exist. A lack of interdisciplinary practice causes the fragmented view of the BIS, which excludes the 'risk' concept. Providing a safe environment requires an understanding and evaluation of the 'risk' concept in a holistic approach, which prioritizes interdisciplinary and participatory practice.

c) Training and Certification Problems: Among the other components of capacity enhancement approaches, professional certification and training programs are very important. The ongoing CPD model is ineffective in developing an integrated BIS approach from HDRR view-point in Turkey. The gaps related to the ongoing CPD system obscure the integration of structural, constructional and design formative strategies within the BIS practice. The CPD program particularly designed for BIS certification and training needs to be analyzed, re-evaluated and re-structured according to the changing international disaster policies and holistic risk-based approach.

Figure 1.2 illustrates the 'Technical (Practice) Problems of the BIS' and their interconnectedness within the building production process in Turkey.

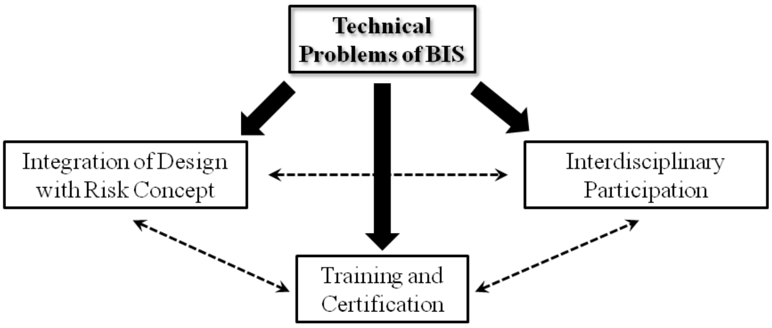

Figure 1.2: Technical problems of Building Inspection System from Holistic Disaster Risk Reduction (HDRR) point of view

The vulnerable structure and the high exposure of built environment to hazardous events in Turkey necessitate a sound and reliable BIS system so that fewer failures will be experienced. This study mainly focuses on the problems of UP-PKSA from a holistic and risk-based understanding, and the ineffective professional certification and training approach provided for the BIS. Figure 1.3 points out the main problem area of this study.

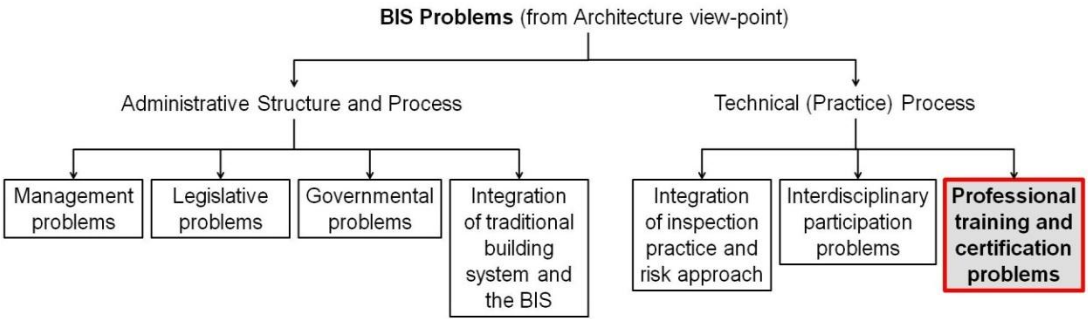

Figure 1.3: The focus of the study, professional training and certification, which indicates the main problem area of the thesis

1.3 Aim and Boundary of the Thesis

Growing uncertainties and risks due to the vulnerability of built environments, as well as natural and human-induced hazards, bring forth the vitality of UP-PKSA of practicing architects who deal with developing safe built environments. The UP-PKSA needs to be improved and encouraged to achieve HDRR approach. To this end, the CPD system is determined as the core concept of this study. It enhances the capacity of practicing architects, achieving reliable and effective UP-PKSA.

To comprehend the major problems due to insufficient and disintegrated view of professional knowledge development as to hazard, disaster, risk, safety and inspection concepts, which practicing architects deal with through the ongoing BIS in Turkey, this study asks:

1- Do professional architects enhance the utilization and processing of professional knowledge, skill and ability (UP-PKSA) through the ongoing building inspection training model?
2- Does the ongoing building inspection training model enable practicing architects to meet the challenges of shifting paradigm towards disaster risk reduction approach, specifically paid attention to following the devastating 1999 East Marmara Earthquakes in Turkey?

In order to seek answers to the above questions, the study addresses the following questions as well:

1. What training model could be implemented to improve the UP-PKSA in terms of capacity enhancement of practicing architects through the ongoing BIS in Turkey from HDRR view-point?
2. How could the professional certification and training model be used effectively? That is, how could it be used to enhance the competency of practicing architects through a more holistic and participative model comprising a risk-based understanding?

The aim of this study is to define the major issues related to the effectiveness of professional training approach provided for practicing architects through the BIS in regard to integrated building safety approach. The study specifically investigates the deficient development of KSA through the CPD model provided for architects. The missing holistic and risk-based understanding within the conceptual, administrative and technical concepts of the ongoing BIS is focused on.

The ‘holistic’ term used in the present study can be defined as emphasizing the importance of the whole system and the interdependence of its parts. The term stresses the significance of assessment and reduction of risks pertaining to natural and/or man-made sources which cause failure through building inspection process. Holistic approach supports a more integrated and participative way of thinking for practicing architects through the professional training model.

It is claimed in this study that an effective continuing professional training model for practicing architects can be achieved if the training model is structured with a holistic, participative and risk-based understanding ensuring the building and public safety through BIS. This view and the analyses throughout the study led to the proposal of a professional training model regarding multi-hazard, risk, and safety concepts. The proposed model aims at awareness development, detailed knowledge and advanced knowledge on hazard, risk, and safety concepts through an effective holistic and risk-based training approach.

To recap, the aim of the study is as follows:

1- To analyze the shifting international disasters policy from a traditional disaster management to a disaster risk management, and to highlight the significance of risk mitigation endeavors to develop safe built environments,
2- To compare the Continuing Professional Development (CPD) designed for architects in Turkey with those in the US and some other countries,
3- To examine the certification and training model of the ongoing BIS in Turkey to identify the insufficiencies of UP-PKSA, for this is important in creating a dialogue between structural and constructional systems as well as architectural design formative strategies from a HDRR perspective,
4- To propose a certification and training model which aims to develop and encourage risk reduction conception among the practicing architects dealing with BIS.

1.4 Methodological Issues and Structure of the Thesis

The present study intends to re-structure a professional training model based on the results of an analytical survey and a critical evaluation. The analytical survey is carried out to understand and reveal the conceptual gaps and deficiencies of the ongoing traditional Disaster Management System (DMS), which mainly concentrates on post-disaster efforts. The history of the disaster phenomena, definition of terms related to the traditional system, disaster statistics and country profiles, the Turkey context and susceptibility of the country to disasters are the main concerns of the analytical survey. The existing literature and the survey findings are the main data sources.

The critical evaluation identifies and reveals the deficiencies of the ongoing DMS in practice and the shifting approach in international disasters policy towards Disaster Risk Management (DRM). This evaluation intends to establish the need for a holistic and risk-based professional training model through building inspection approach in Turkey. A needs assessment is used to propose a model for the Turkish context in the final step. The critical evaluation covers brief chronological analyses of disaster histories and legal advancements of the US and Turkey in regard to evolution of building safety and inspection concepts, and the examination of ongoing Continuing Professional Development (CPD) models. It includes professional training course objectives and contents of the US and Turkey contexts, personal experiences, semi-structured interviews conducted with building professionals dealing with risk mitigation and building safety concepts, and evaluation and comparison of CPD programs conducted in different countries and Turkey.

Finally, depending on the findings of the analytical survey and critical evaluation, the demand for a holistic and risk-based CPD model for practicing architects in Turkey is revealed. As a result, a training and certification model is proposed.

The study consists of seven chapters. Chapter 1 makes an introduction and Chapter 2 focuses on the theoretical background of disaster phenomena and disaster coping efforts in general. Definitions of terms related to the traditional disaster coping approach are presented within this chapter. Disaster trends and profiles of countries in general, particularly Turkey's disaster profile, is also given. The traditional coping mechanism with disasters, named as disaster management system, is presented from a critical evaluation view-point. The problems of traditional disaster management system in the Turkish context are explored with a particular focus on chronological disaster-safety evolution and the ongoing legal system in Turkey.

Chapter 3 concentrates on the evolution and importance of the shifting international disasters policy approach towards disaster risk management conception. Specific terms related to the shifting disaster understanding are defined here. Conceptual emergence and evolution of the shift in the understanding of particularly Holistic Disaster Risk Reduction (HDRR) conception is analyzed. The demand for HDRR approach is revealed through the conceptual analysis and critical evaluation of arguments on shifting disasters policy. The need to adopt HDRR in Turkey particularly is also explored. Integration of HDRR with the Building Inspection System (BIS) is examined in order to identify the deficient points in the ongoing BIS, which lacks a risk-based and comprehensive understanding.

Chapter 4 focuses on the deficiencies of the continuing professional training model through the Continuing Professional Development (CPD) system of Turkey from integration of HDRR and BIS view-point. BIS is further analyzed to find out the deficiencies within the overall system in Turkey. A brief analysis of graduate studies conducted in Turkey related to BIS and its problems is presented. This analysis aims to disclose the major concentration of graduate researches and the areas to which little attention has been given regarding the training of practicing architects among the ongoing BIS. The content and the objectives of CPD program provided for practicing architects are evaluated, and the inconsistency with the HDRR and BIS integration is underlined. This examination consists of literature survey, BIS training experience of the researcher in the ongoing CPD system, and semi-structured interviews with building professionals in Turkey participating in the ongoing BIS.

Chapter 5 analyzes a best-practice CPD model example provided for practicing architects in the USA. A brief history of building safety and inspection struggles in the US is presented from a historical perspective. The major ongoing legislative system related to disaster risk mitigation understanding, the 'Robert Stafford Act' or 'Mitigation Act', is analyzed. A critical evaluation of the ongoing mitigation system in the US as regards inspection and professional training model provided for practicing architects is made. A literature survey, experiences of building professionals obtained through semi-structured interviews, and 35th Annual Natural Hazards Research and Applications Workshop serve as the main data sources in this evaluation. The CPD program or Continuing Education System (CES) provided for practicing architects in the USA is analyzed through CES structure and course contents as well as course objectives, all of which are related to building safety and inspection. The chapter concludes with an overall comparison of Turkey and the US CPD systems.

Chapter 6 re-structures the continuing professional training model for BIS practicing architects receive in Turkey. This structured on a HDRR understanding. The evolution of the professional training idea is analyzed. To better assess the expectations from a training model, some best-practice CPD model examples from other countries are presented. These examples are compared with the ongoing CPD model of Turkey. The model proposed in this chapter is based on the findings of analytical survey and critical evaluation conducted in the study. The model covers both the certification process and the continuing training program designed for practicing architects. The structure of the model and course contents are presented in this chapter.

Chapter 7 is the conclusion part of the study, which covers a summary and general evaluation of the research, and recommendations.

The proposed training model re-structured in this study makes the following contributions:

1. It develops a holistic perspective in and raises awareness of disaster risk reduction approach within the BIS among the practicing architects who confront many challenges as to the rapidly changing risk and safety concepts in the built environment production process.
2. It reveals the significance of effective participation of building professionals in the BIS for the success of HDRR approach,
3. It indicates the critical effect of the continuing professional training model particularly for the capacity building of practicing architects through the BIS.

Although the study investigates the BIS development from a historical perspective in regard to disasters history of Turkey and building safety struggles in general, it particularly probes the shifting coping policies towards risk mitigation following the 1999 East Marmara Earthquakes in Turkey. Among the other CPD models and courses provided for professional architects, the proposed model focuses on the re-structuring of BIS training through the CPD system designed for practicing architects. This study does not propose a new BIS for Turkey but critically analyzes the existing system and reveals the underlying problems which result in the ineffective capacity development of practicing architects. The legal system related to disaster and development concepts in Turkey is briefly analyzed for the main purpose of concentrating on the building inspection law and regulation deficiencies. The proposed model is exclusively for practicing architects but can be broadened for other building professionals and parties participating in the BIS in Turkey.

CHAPTER 2

Historical Overview, Definitions and Evaluation of Traditional Disaster Coping Approach

2.1 Introduction

This chapter reviews and identifies the disaster phenomena and how it influences both human life and built environment. It primarily explores the insufficient and fragmented approach of traditional disaster coping strategy fails to motivate institutions and the society. The development of disaster perception historically and related terms are also examined. Disaster statistics which point out the increasing impacts of disaster events on human life and built environment are analyzed. The efforts to cope with disasters, particularly disaster management system (hereafter DMS), are evaluated. Finally, the deficiencies of the DMS approach are identified, and a new vision – a paradigm shift – within disaster phenomena is called for.

2.2 Understanding Disaster Phenomena

Throughout the history, human beings have been trying to find answers to some mysterious natural events such as earthquakes and volcanic eruptions. Although in the past, some attempts were made to understand and define the disaster phenomena in relation to human-nature interface, most of the views among the communities hinged on the supernatural forces and theology.

In the ancient Greece, Aristotle (who lived around 600 B.C.) thought that the small earthquakes were occurring because of the winds which were blowing and penetrating through the subterranean caves. A strong earthquake meant very strong winds were blowing between the caves and trying to escape a hole on the ground (Levi and Salvadori, 2000). The Classical Antiquity also produced some other thoughts on earthquake mechanism such as the theory of Thales from Miletus in Minor Asia. According to Thales, the earth is a disk swimming on water. Earthquakes are the result of temporary motions of the water which tilts the earth (Figure 2.1) (Oeser, 1992).

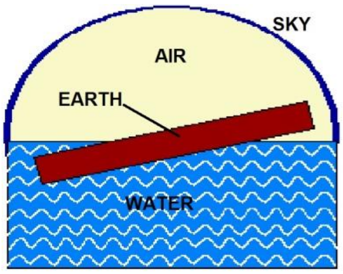

Figure 2.1**:** Earthquake Mechanism Theory of Thales (reproduced from Oeser, 1992; p. 13 and http://www.univie.ac.at)

According to from New Zealand, when the earthquake God, Ruaimoko, is grumbling, the fuming earth is shaken, and mountains erupt lava, as a result of which volcanos form (Levi and Salvadori, 2000). American Indians believe that the earth is carried by a gigantic turtle, and when this creature moves, the earth is shaken (Levi and Salvadori, 2000).

Japanese folk and mythology narrations which go back to 18th century attributed earthquakes to the movement of a giant creature which support the earth (Smits, 2006). Namazu, a kind of catfish, is one of the best known creatures that were linked to seismic movements in Japanese belief (Barnikel and Vetter, 2012; Schnytzer and Schnytzer, 2011). This giant catfish lives under the earth and is controlled by a Japanese God (Figure 2.2).

Figure 2.2: Namazu is believed to be the cause of earthquakes when it is beyond of control (Silva, 2003; Bates, 2007) in Japan mythology (http://pinktentacle.com/2011/04/namazu-e-earthquake-catfish-prints/)

Myths and legends combined with religious beliefs shape and guide even today's understanding and justification of disaster events in many communities.

It was not until the 18th century that a strong and more collective thinking on disasters from scientific reasoning point of view has began. When the Lisbon city was destructed heavily by a strong seismic movement and a tsunami occurred in 1755, the Western society for the first time was awaken by discussions on the reasons for the disaster. Many researchers point out that Lisbon earthquake was accepted as the milestone which brought the modern understanding and arguments on the root causes of disaster phenomena (Oeser, 1992; Dynes 1999; Güvel 2001; May 2003; Larsen, 2006). Through the enlightenment process which influenced the shift towards a modern society, awareness of the various factors that cause devastating disasters has been increasing.

The environmental mismanagement and underinvestment in infrastructure and housing (Fay et al., 2010), rapidly growing populations, mass migration from rural to urban areas, inequitable income distribution, weak and vulnerable social and security systems, low education level, and detrimental effects of development activities are the key threats to life and environment on earth. What results from the failure in coping efforts with hazards and disasters "are the burden of poorly constructed, badly maintained, and aging infrastructure and housing in many countries which are also regarded as ill-suited conditions to cope with storms, heat waves, or floods, much less to protect populations from the impacts of such extreme events" (Fay et al., 2010: p.2).

Human induced events[5] that combine with earth's natural processes (such as earthquakes, volcanic eruptions, tsunami, hurricanes etc.) augment the adverse effects of natural phenomena on the built and natural environment particularly following the industrialization period of the 18th century. Human induced or man-made events increase imbalances and uncertainties which, in turn, cause local and global crisis. For instance, the Chernobyl disaster[6] which had not only regional but also global impacts is a remarkable example for the man-made disasters.

The impacts of natural disasters cannot be separated from human actions and social events, which actually are "the product of social, political and economic environments" (Wisner et al., 2004: p.4). They also make the following claim:

> *Many aspects of the social environment are easily recognized: people live in adverse economic situations that oblige them to inhabit regions and places that are affected by natural hazards, be they the flood plains of rivers, the slopes of volcanoes or earthquake zones. However, there are many other less obvious political and economic factors that underlie the impact of hazards. These involve the manner in which assets, income and access to other resources, such as knowledge and information, are distributed between different social groups, and various forms of discrimination that occur in the allocation of*

[5] Examples to the human induced events (which also cause man-made disasters): subnormal increasing level of carbon gases in the atmosphere, depletion of ozone layer, green-house effect, uncontrolled urban development practices specifically on vulnerable lands, degradation of natural sources, wars and conflicts, migration, poverty, unhealthy living environments.

[6] A nuclear power plant accident which resulted in an explosion and fire that released a huge amount of radioactive contamination to the atmosphere which spreaded over much of Europe in 1986 in Ukraine.

welfare and social protection ... These two aspects—the natural and the social—cannot be separated from each other: to do so invites a failure to understand the additional burden of natural hazards, and it is unhelpful in both understanding disasters and doing something to prevent or mitigate them. (Wisner et al., 2004: p.5)

Although development activities and technology ease and enhance the quality of life, they are accompanied with new threats, hazardous formations and uncertainties. Hence, it is necessary to take into account the important human factors (such as social, economic and political) which generate and increase exposure to disaster and intensify the impacts of natural phenomena (Handmer and Dovers, 2007: p.11). The demand for a more inclusive planning and management approach in disaster coping strategies has been growing due to the increasing complexity, cohesion and uncertainty among the natural and human induced events. Before examining the ongoing hazard reduction and disaster coping approaches and strategies, it is important to define and clarify some critical terms related to this issue.

Definition of Terms: disaster, hazard, vulnerability, disaster management system (mitigation, preparedness, response, recovery)

Disaster

According to Oxford Dictionary (1986), 'disaster' is defined as a great or sudden misfortune; terrible accident (eg. a great flood or fire, an earthquake, a serious defeat in war). Espon (2003) defines 'disaster' as an impact of a hazard on a community or area which overwhelms capacity to cope with. In addition, disasters are hazardous events which effect communities in such adverse ways that essential social structures and functions are disrupted (Disaster Terminology, 2005). JICA (Japan International Cooperation Agency, 2004) and Schmidt-Thomé (et al., 2007) explain 'disaster' as an emergency event, natural or man-made origin, of catastrophic proportion that results in serious disruption of the normal functioning of a society by causing widespread human, material or environmental losses that exceeds the ability of the affected society to cope by using only its resources. In a similar way with JICA and Schmidt-Thomé (et al.) definitions, McNeill (1984; p.1) emphasizes that disaster is composed of sequential events which disrupt established routines of human life and may result in human casualties.

For Lindell (2011: p.2) a disaster is "an event concentrated in time and space, in which a society or one of its subdivisions undergoes physical harm and social disruption, such that all or some essential functions of the society or subdivision are impaired".

According to UN-ISDR (Terminology on DRR, 2009); "disasters are often described as a result of the combination of: the exposure to a hazard; the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences. Disaster impacts may include loss of life, injury, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation."

Disaster event has generally distressing and multifaceted results which need to be evaluated from a comprehensive view-point. Gordon (2004: p.23) illustrates this multifaceted view of the disaster event through a model (Figure 2.3), and explains the model as "a graph of community functioning shown falling at impact and as it rises in the subsequent recovery period is met by a series of other disaster-related repercussions, which impede recovery and reduce community functioning in each case. Successful recovery anticipates, prepares for and meets these repercussions as the emergency reverberates through the community systems."

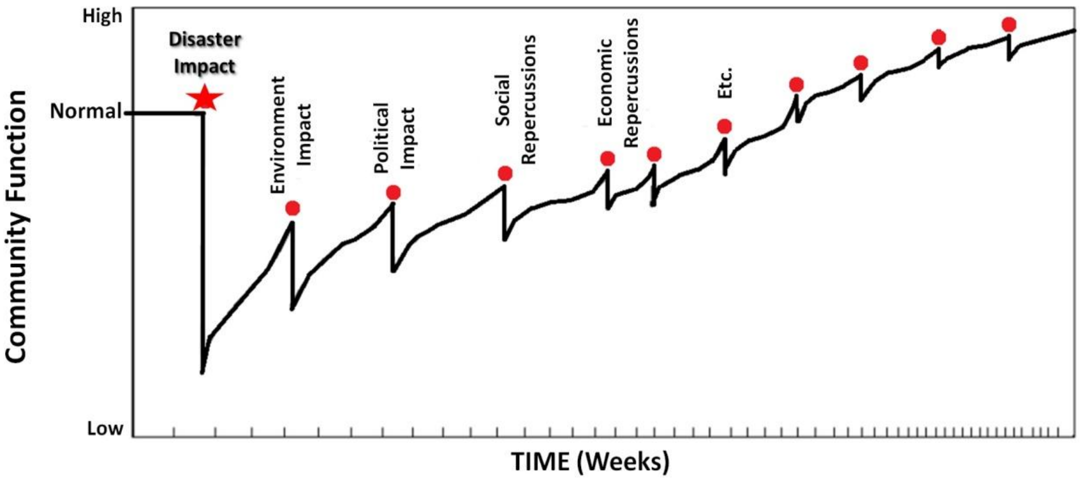

Figure 2.3: Process of disaster repercussion with multiple impacts. Reproduced from Gordon (2004).

Hazard

Hazard and disaster terms have notably different meanings and usages. Hazard is defined as a source of potential harm, danger, damaging physical event, phenomenon or human activity that may result in considerable loss of life or injury, property damage, social and economic disruption, political unrest or environmental degradation (Princeton, 2006; Edisonwetlands, 2006; UN-ISDR, 2006; Peercenter, 2006; NOAA, 2006; Disaster Terminology, 2005). Hazards symbolize latent conditions which may represent future threats and can have different origins ranging from natural to human-induced events (UN-ISDR, 2006).

Vulnerability

ADRC (2005) defines the 'vulnerability' as a "condition resulting from physical, social, economic, and environmental factors or processes, which increases the susceptibility of a community to the impact of a hazard". Similarly ISDR (2009) defines that "there are many aspects of vulnerability, arising from various physical, social, economic, and environmental factors. Examples may include poor design and construction of buildings, inadequate protection of assets, lack of public information and awareness, limited official recognition of preparedness measures, and disregard for wise environmental management".

Vulnerability covers a wide range of area including community, built environment, ecosystem which are measured by potential losses and disproportionate suffering due to their fragility and exposure degree to as well as coping and recovering capacity from the consequences of a disaster (Blaikie et.al. 1994; Handmer and Wisner, 1999; Alexander, 2000; Alwang et al., 2001; Schmidt-Thomé et al., 2007).

By another definition, "vulnerability concept consists of two opposing forces: On one hand, the processes that cause vulnerability that can be observed; on the other hand, the physical exposure to hazards such as earthquakes, storms, and floods" (Blaikie et.al. 1994: p.275). Vulnerability develops then from underlying reasons in the economic, demographic and political spheres into insecure conditions (fragile physical environment, instable local economy, vulnerable groups, lack of state or private precautions) through the so-called dynamic processes (e.g., lack of local institutions, under-developed markets, population growth, and urbanization)."

Disaster Management System (DMS)

Traditional DMS refers to separate and aggregate measures taken prior to or following a disaster to reduce the severity of the human and material damage caused by it (Disaster Terminology, 2005). In general, the conventional approach involves four sequential phases: *mitigation*, *preparedness*, *response* and *recovery* (Yan, 1999; Gülkan et al., 2003; Balamir, 2004c; Stager, 2009; Yücel, 2009; Döyen, 2012) (Figure 2.4). The mitigation and preparedness phases are pre-disaster efforts, also named as proactive approaches, whereas response and recovery phases are post-disaster works, also named as reactive approaches.

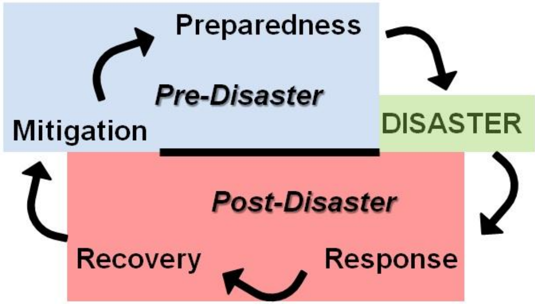

Figure 2.4: Conventional cycle[7] of traditional DMS symbolizes the fragmented standpoint to disaster phenomena.

Mitigation

Mitigation is defined as the set of activities for preventing, reducing or limiting the adverse impacts of hazards and related disasters by taking the necessary structural and non-structural measures (Heath, 2000; ISDR, 2009; Schmidt-Thomé et al., 2007; Döyen, 2012). Mitigation measures encompass a wide range of engineering techniques, policy, legislative mandates, professional practices, social adjustments and hazard-resistant construction as well as improved environmental policies and public awareness (Disaster Terminology, 2005; ISDR, 2009).

Preparedness

Preparedness refers to various mostly interlinked planning, training, and educational activities[8] designed to enhance the knowledge and capacities of governments, professional response and recovery organizations, communities and individuals so that they can effectively anticipate, and quickly respond to, and recover from, the likely impacts of hazard events or conditions (Heath, 2000; ISDR 2009; Döyen 2012).

Response

According to ISDR (2009), response activities are the provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected. Disaster response is predominantly focused on immediate and short-term needs and is sometimes called “disaster relief”. The objective of disaster response in the humanitarian relief chain is to rapidly provide relief (emergency food, water, medicine, shelter and supplies) to areas affected by large scale emergencies so as to minimize human suffering and death (Döyen, 2012: p.1).

Recovery (rehabilitation and reconstruction)

Mostly the recovery phase is composed of two tasks: *rehabilitation* and *reconstruction* of damaged structures and devastated community. These tasks of rehabilitation and reconstruction begin soon after the emergency phase has ended, and should be based on the pre-existing strategies and policies that facilitate clear institutional responsibilities for recovery action and enable public participation (ISDR, 2009). Recovery programmes, coupled with the heightened public awareness and engagement after a disaster, afford a valuable opportunity to apply the “build back better” principle (ISDR, 2009).

[7] More information can be obtained related to conventional cycle model of DMS:
http://www.viha.ca/emergency_management/emerg_mgmt_cycle.htm (accessed in 2011)
http://www.annapolis.gov/government/departments/emergencymanagement.aspx (accessed in 2011)
http://www.dallascounty.org/department/osem/planning.php (accessed in 2011)
http://www.hampton.va.us/eoc/cycle.html (accessed in 2011)
http://www.blackemergmanagersassociation.org/2012/04/richard-c-hazel-making-mitigation.html (accessed in 2012)

[8] Preparedness activites among the others comprehend; “the development of forecasting models and systems, the arrangement of shelters and emergency accommodation, stockpiling of equipment and supplies, the formulation, maintenance and testing of valid and up-to-date disaster scenarios and contingency planning, the organization of temporarily evacuation of people, materials and assets from a threatened area as well as the preparation of salvage and rescue operations, disaster relief and rehabilitation, the development of arrangements for coordination, public information, and associated training and field exercises” (Yan, 1999; Schmidt-Thomé et al., 2007; ISDR, 2009).

Analyzing the Impacts of Disaster Phenomena through Statistics and Country Profiles

In general, impact of a disaster is measured according to four parameters in which direct, indirect and secondary effects are calculated. These are the impact on human life, economy, built and natural environment, and social life.

It may not sometimes be possible to analyze the disaster impacts according to the above categorization because the disasters and their secondary impacts have complex and sometimes unpredictable effects on vulnerable systems. The consequences of hazardous events may be so extensive that they may not be monitored or recorded easily, and their long term impacts may not be predicted precisely. The following information reveals the trends and impacts of disasters in the world and in Turkey.

Disaster Trends in the World

According to Jarraud (2006) during the period 1992-2001, natural disasters killed over 622 000 and affected over two billion people in the world. During the 1990s, an annual average of around 200 million people were affected by natural disasters – nearly three times higher than during the 1970s (World Disaster Report, 2002; p. 9-10) (Table 2.1).

Table 2.1: Thirty years of "natural" disasters (adopted from World Disaster Report, 2002; p. 10)

Time period	People Reported Killed (million)	People Reported Affected (billion)	Economic Losses (US$ billions)	Number of Reported Disasters
1970-79	1.96	0.74	131	1,110
1980-89	0.80	1.45	204	1,987
1990-99	0.79	1.96	629	2,742

Statistics from the Centre for Research on the Epidemiology of Disasters (CRED) revealed that during the 1992-2001 period, about 90 percent of the natural disasters were of meteorological or hydrological origin; the economic loss they caused was estimated at US$ 446 billion, which accounted for about 65 percent of the damage caused by all natural disasters (Jarraud, 2006). According to Balamir (2009: p.69), "cities experienced significant disasters and increased losses (or greater obstructed gains) during the recent decades as compared to previous periods".

Table 2.2 summarizes the frequency and impact of natural disasters by region for the year 2008 and the period of 2000 – 2007 separately.

Table 2.2: Frequency and impact of natural disasters. Source; "Safer Homes, Stronger Communities: A Handbook for Reconstructing after Natural Disasters", p.341, published by the World Bank in January 2010. Available from: http://www.housingreconstruction.org/housing/ (accessed in 2011)

No. of natural Disasters - Year	**Africa**	**Americas**	**Asia**	**Europe**	**Oceania**	**Global**
Climatological - 2008	10	4	9	9	0	32
2000-2007 (Average)	9	14	13	19	2	57
Geophysical - 2008	3	8	18	2	1	32
2000-2007 (Average)	3	7	22	3	2	37
Hydrological - 2008	48	39	73	9	9	178
2000-2007 (Average)	42	39	82	28	5	196
Meteorological - 2008	10	44	43	13	2	112
2000-2007 (Average)	9	34	42	15	7	107
Total - 2008	71	95	143	33	12	354
2000-2007 (Average)	63	94	160	65	16	397
No. of Victims (in millions) - Year	**Africa**	**Americas**	**Asia**	**Europe**	**Oceania**	**Global**
Climatological - 2008	14.5	0.1	91.1	0	0	105.6
2000-2007 (Average)	9.6	1.1	68.4	0.3	0	79.5

Table 2.2: Frequency and impact of natural disasters (continuing)

Geophysical - 2008 2000-2007 (Average)	0 0.1	0.1 0.4	47.6 3.6	0 0	0 0	47.8 4.2
Hydrological - 2008 2000-2007 (Average)	1 2.5	15.9 1.3	27.7 101.7	0.2 0.4	0.1 0	44.9 105.9
Meteorological - 2008 2000-2007 (Average)	0.8 0.4	3.7 2.8	11.4 38	0 0.4	0 0	15.9 41.7
Total - 2008 2000-2007 (Average)	16.2 12.6	19.9 5.6	177.8 211.8	0.3 1.1	0.1 0.1	214.3 231.2
Damages (billions of 2008 US$) - Year	**Africa**	**Americas**	**Asia**	**Europe**	**Oceania**	**Global**
Climatological - 2008 2000-2007 (Average)	0.4 0.0	2.0 2.4	21.9 1.1	0.0 3.5	0.0 0.4	24.4 7.4
Geophysical - 2008 2000-2007 (Average)	0.0 0.8	0.0 1.0	85.8 9.5	0.0 0.3	0.0 0.0	85.8 11.6
Hydrological - 2008 2000-2007 (Average)	0.3 0.4	12.1 1.9	3.7 9.7	1.3 7.7	2.1 0.3	19.5 19.9
Meteorological - 2008 2000-2007 (Average)	0.1 0.1	50.0 38.6	6.8 10.7	3.4 3.0	0.5 0.3	60.7 52.6
Total - 2008 2000-2007 (Average)	0.9 1.3	64.0 43.8	118.2 31.0	4.7 14.5	2.5 1.0	190.3 91.6

In most developing countries, escalation of adversities caused by disasters seriously hindered development attempts. However, the numbers belong to recent statistics reveal the fact that not only the developing world but also the developed economies are affected by large scale disasters which cause significant economic and human losses (Table 2.3).

Table 2.3: A summarized table of economic impacts of disasters in 2011 for ten most affected countries (Adopted from CRED, 2012).

In absolute amounts (US$ billion)		**As percentage of GDP**	
Japan	211.8	Thailand	12.7
United States	58.3	New Zealand	11.8
Thailand	40.3	El Salvador	4.7
New Zealand	20.0	Cambodia	4.6
China	14.3	Japan	3.9
Colombia	5.9	Colombia	2.0
Pakistan	2.5	Sri Lanka	1.9
Australia	2.0	Pakistan	1.4
India	1.7	Tonga	0.9
Brazil	1.2	Puerto Rico	0.5

According to Table 2.3, large scale disasters recorded in middle and high-income indexed countries that have caused extensive economic losses in 2011 have revealed the fact that these disasters hit the communities who have more sophisticated and better disaster prevention resources than the other countries (CRED, 2012). On the other hand, the assessment according to country GDP statistics indicates that less developed or undeveloped countries are still the frontrunners in terms of economic losses. That is, disasters hit the developing and underdeveloped countries more. According to the IMF estimate the average economic cost for each individual large scale natural disaster event is over 5% of the Gross Domestic Product (GDP) in low-income countries between 1997 and 2001 (DFID, 2006).

Some disasters have ‘mass destruction weapon’ impact on human life. The Tangshan, China, earthquake of 1976 is officially reported to have caused 255,000 deaths: foreign observers say the total may be much more. The city of Tangshan was essentially leveled as if struck by an atomic bomb (FEMA, 2006). Similarly, the Haiti Earthquake of 2010 caused enormous numbers of human casualties reported to be between 46,000 and 85,000, whereas Haiti's government claimed about 316,000 were killed (BBC, 2011).

In a globalised economy, the domino effect of disasters among the global world sometimes goes beyond the physical impacts of the countries directly affected (OECD, 2006). In today’s society, disasters even result in chain reactions of economic depressions particularly among the vulnerable communities. According to OECD (2006) report, the losses are sometimes so high that, in most of the developing countries, the cost of compensating for the economic losses exceeds the local and national capacities. The other OECD report asserts the following:

> *Apart from immediate clean-up, relief and recovery operations, the ripple effects of a disaster may produce such indirect costs as higher insurance premiums, social security costs linked to death and disability benefits, tax deferrals/losses for businesses, plus the cost of measures to prevent such an accident from repeating itself. Huge costs can be reduced by being prepared, but this cannot simply consist of guidelines and procedures. Immediate decisions usually have to be made on the basis of incomplete information, in a context of utmost urgency, and with considerable human, economic and political stakes* (OECD, 2004).

Disaster Impacts and Profile of Turkey

The destructive events in Turkey have various causes. According to Habitat Report,

> *In Turkey, a destructive earthquake occurs every 1.5 years or less. The statistics of structural damage caused by natural disasters during the last seventy years show that the number of houses wrecked/damaged by natural disasters is estimated to be 600,000; 66 percent of the damage is caused by the earthquakes, 15 percent by floods, 10 percent by landslides, 7 percent by failing rocks, and 2 percent by avalanches and meteorological disasters.* (Habitat II National Report and Plan of Action, Turkey, June 1996)

The EM-DAT (The International Disaster Database, 2012) report demonstrates the country profile of Turkey related to the natural disasters (Table 2.4).

Table 2.4: Table of Natural Disasters in Turkey from 1900 to 2012. Adopted from EM-DAT (Emergency Disasters Data Base, http://www.emdat.be/result-country-profile, 2012)

Event Class	Event Type	Number of Events	Killed	Total Affected	Economic Loss *
Ground Shaking	Earthquake	76	89,236	6,924,005	24,685,400
Extreme Temperature	Cold Wave	3	69	-	-
	Extreme Winter Conditions	2	17	8,150	-
	Heat Wave	2	14	300	-
Flood	Unspecified	11	897	372,617	65,000
	Flash Flood	10	243	1,341,382	1,892,000
	General Flood	18	202	64,521	238,500
Mass Movement	Avalanche (dry)	1	261	1,069	-
	Avalanche (wet)	2	146	6	-
	Landslide	9	286	13,481	26,000
Storm	Unspecified	4	49	3	-
	Local Storm	5	51	13,636	2,200
Wildfire	Forest Fire	5	15	1,150	-

*000 USD ($)

The natural disaster profile percentage according to the extent, magnitude and impact on community can be listed in order as follows: Earthquake 61%, Land Slide 15%, Flood 14%, Rockfall 5%, Fire 4%, and Avalanches 1% (Göktürk and Yılmaz, 2001) (Figure 2.5).

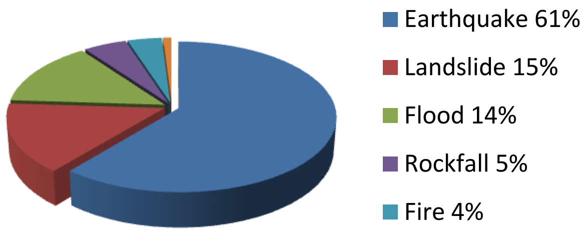

Figure 2.5: Disaster Profile Chart of Turkey. The chart is adapted from S. Emre Akdağ, *Mali Yapı ve Denetim Boyutlarıyla Afet Yönetimi*, Research Paper, Turkish Court of Accounts (T.C. Sayıştay), p. 97, March, Ankara, 2002.

Between the years 1991 and 1992, avalanches killed 397 people on the north-south belt of Turkey including Artvin, Mardin, Şırnak provinces. In 1992, an earthquake shaked Erzincan and killed 653 people. In 1995, a mud flood in Senirkent town and an earthquake in Dinar town killed hundreds of people. Following those disasters, in 1995, an urban flood killed 61 people in İzmir province whereas another earthquake which stroke Adana province in the same year caused hundreds of human loss (Göktürk and Yılmaz, 2001).

Balaban (2009: p.2) shows the severity of flood based disasters on DSİ (State Hydraulic Works) statistics. According to those records, 1232 people lost their lives in 1930 separate events and approximately 23 million hectares of land surface was inundated by flood-waters between1955 and 2008. Within that period, 36 floods occurred, 23 persons were killed and 430000 hectares were inundated annually at an average. Investigation and Planning Division of DSİ states that the financial loss caused by floods between 1989 and 2007 is approximately 2 Billion US Dollars.

As given in Table 2.5, in the last decade of the 20th century and by the beginning of 21st century, which makes a 15 year-period, 13 major disasters were experienced in Turkey. Those disasters caused a total of almost 20.000 deaths and 17.460.000 US-Dollars ($) of financial loss.

Table 2.5: The list of different types of disasters in Turkey between the years 1990 and 2005. The table is adopted from Oktay Ergünay, *Türkiye'nin Afet Profili*, TMMOB Afet Sempozyumu, Proceedings, p. 2, December 5-7, Ankara, 2007.

Event (and Location)	**Date**	**Killed**	**Wounded**	**Homeless**	**Total Affected**	**Financial Loss***
Earthquake (Erzincan)	March 13, 1992	653	3850	95.000	250.000	750
Avalanches (South Eastern Anatolia)	1992 (14 events)	328	53	11.600	30.000	25
Avalanches (East and South Eastern Anatolia)	1993 (31 events)	135	95	1.100	300	10
Mud Flood (Senirkent)	July 13, 1995	74	46	2.000	10.000	65
Earthquake (Dinar)	October 1, 1995	94	240	40.000	120.000	100
Flood (İzmir)	November 4, 1995	63	117	6.500	300.000	1.000
Earthquake (Çorum-Amasya)	August 14, 1996	-	6	9.000	17.000	30
Flood (Western Blacksea)	May 21, 1998	10	47	40.000	1.200.000	1.000
Earthquake (Ceyhan-Adana)	June 27, 1998	145	1.600	88.000	1.500.000	500
Earthquake (Marmara Region – Gulf of İzmit)	August 17, 1999	17.480	43.953	675.000	15.000.000	13.000
Earthquake (Düzce-Bolu)	November 12, 1999	763	4.948	35.000	600.000	750
Earthquake (Afyon-Sultandağı)	February 3, 2002	42	327	30.000	222.000	95
Earthquake (Bingöl)	May 1, 2003	177	520	45.000	245.000	135
TOTAL		**19.964**	**55.802**	**1.078.200**	**19.494.300**	**17.460**

* US Million Dollars ($)

Table 2.6 reveals the vulnerability of built environment where thousands buildings collapsed due to different disaster types experienced in Turkey in the period of 1900-2005.

Table 2.6: The list is giving the different types of disaster damage on buildings in Turkey between 1900 and 2005 in terms of collapsed building units. The table is adopted from Oktay Ergünay, *Türkiye'nin Afet Profili*, TMMOB Afet Sempozyumu, Proceedings, p. 3, December 5-7, Ankara, 2007.

Natural Disaster Type	Collapsed Building Number	Percentage
Earthquakes	495.000	76
Landslides	63.000	10
Floods	61.000	9
Rock Falls	26.500	4
Avalanches	5.154	1
TOTAL	**650.654**	**100**

Other than natural hazards and disasters, specifically in recent years, human-induced (or man-made) disasters which have caused considerable human and economic losses were experienced in Turkey. Table 2.7 presents a rough picture of human-induced hazards and disasters that took place in Turkey throughout a century.

Table 2.7: Human-induced Disasters in Turkey from 1900 to 2012. Adopted from EM-DAT (Emergency Disasters Data Base, http://www.emdat.be/result-country-profile, 2012)

Event Class	Event Type	Number of Events	Killed	Total Affected
Industrial Accident	Explosion	17	790	437
	Fire	2	69	20
	Poisoning	2	41	175
Miscellaneous Accident	Collapse	1	94	28
	Explosion	3	28	229
	Fire	8	2,310	366
	Other	1	44	600
Transport Accident	Air	9	498	99
	Rail	7	187	536
	Road	57	1,207	930
	Water	16	415	54

Note: In order for a disaster to be entered into the database, at least one of the following criteria has to be fulfilled (EM-DAT: The OFDA/CRED International Disaster Database, 2012):

- 10 or more people reported killed
- 100 people reported affected
- a call for international assistance
- declaration of a state of emergency

In Appendix A, the vulnerability of settlements to various hazards in Turkey is illustrated through some of the recent years' disaster experiences. The pictures presented in Appendix A reveal the fact that a more comprehensive disaster coping strategy is needed in order to cope with the increasing and diversifying impacts of hazards particularly in urban areas for Turkey. The traditional DMS approach seems ineffective in coping with disasters according to the recent disaster profile of the country.

Earthquake Hazard in Turkey

The foremost hazard posed to Turkey is the earthquake because the country is located in one of the most seismically active regions of the world (Figure 2.6: red color on the map points out the most hazardous regions whereas the white color demonstrates the least hazardous areas). The region is characterized by the tectonic plates (Eurasian-African-Arabic Plates) and active fault lines (North and East Anatolian Fault Lines) (Figure 2.7).

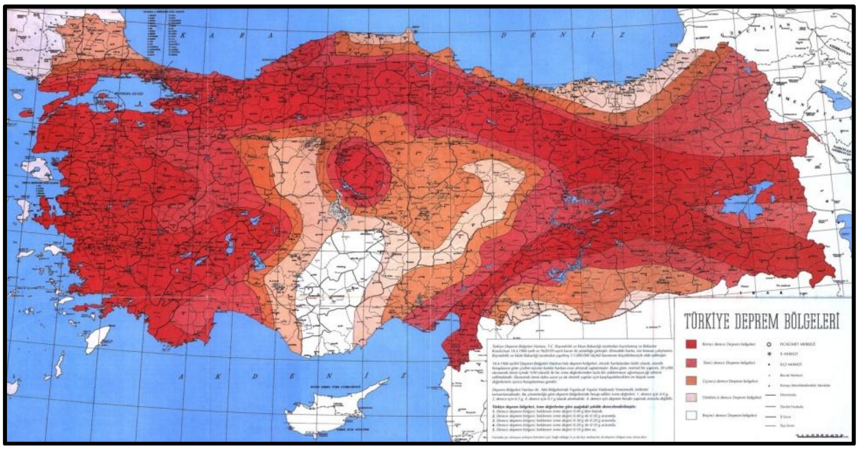

Figure 2.6: Most of the cities and towns in Turkey are located on the active seismic regions as shown on the Earthquake Zoning Map of Turkey which was prepared by Environment and Urbanization Ministry (formerly Ministry of Public Works and Settlement)[9]

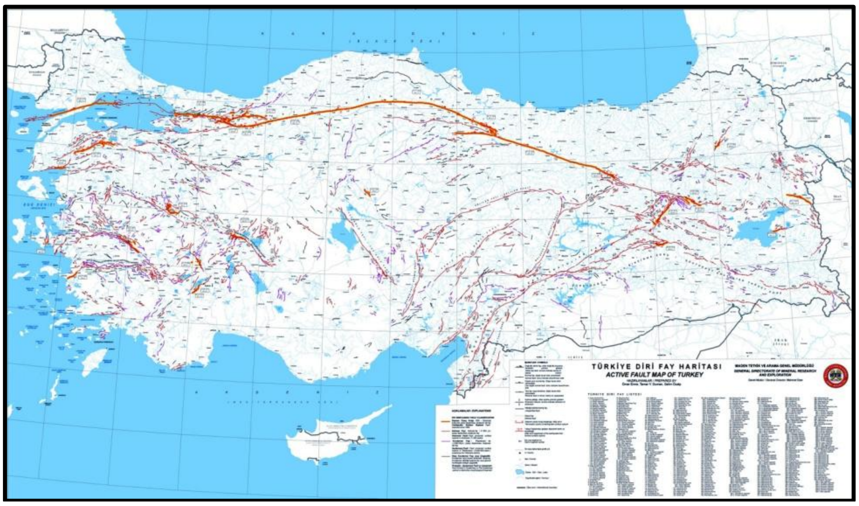

Figure 2.7: Map of Active Fault Lines of Turkey. Prepared by General Directorate of Mineral Research and Exploration in 2012. Available from www.mta.gov.tr [accessed in 2012].

On the current earthquake hazard map of Turkey (Figure 2.6), almost 96% of the national territory is located on seismically active regions with different risk levels ranging from first to fifth degree earthquake zones (I= highest risk – red zone and V= lowest risk – white zone). As indicated by Figure 2.6, almost 98% of the country's population live in earthquake hazard areas including 17 provinces (Adana, Ankara, Antalya, Balıkesir, Bursa, Diyarbakır, Gaziantep, Hatay, İçel, İstanbul, İzmir, Kayseri, Kocaeli, Konya, Manisa, Samsun, Şanlıurfa) each with a population exceeding 1 million (Genç, 2007, p. 205).

The statistics that belong to the last 60 years' period about the structural damages caused by natural disasters in Turkey indicates that the ratio of earthquake damages among all is 2/3 (DASK, 2006). Urban areas are highly vulnerable with their physical and socio-economic structures to seismic hazard. It is obvious that earthquakes have the biggest portion in the disaster profile of Turkey. According to Ergünay (2007), 137 devastating earthquakes that occurred between 1902-2003 killed 83.908 people, injured 171.283 people and destroyed 493.824 buildings heavily.

Past records and experiences indicate that nearly 70 percent of all the damage resulted from natural disasters in Turkey was caused by earthquakes (Yazıcı, 2007). On an average, in Turkey, a

[9] This map has been prepared by using the report named "A Seismic Zones Map of Turkey Derived from Recent Data" which was prepared by Polat Gülkan, Ali Koçyiğit, M.Semih Yücemen, Vedat Doyuran and Nesrin Başöz (METU Civil Engineering Dept. Earthquake Engineering Research Center) and presented to the Ministry of Public Works and Settlement, General Directorate of Disaster Affairs as a final report of project 92-03-03-18 in January 1993 (Available from: http://www.deprem.gov.tr/sarbis/Shared/haritaaciklama.aspx, accessed in 2010).

destructive earthquake occurs every 1.1 years (Selçuk, 2000), and an earthquake intensity of IX and X occurs on average, every 5 years (Şengezer and Kansu, 2001).

The earthquakes that shook and struck the urban areas of İzmit and Düzce in 1999, known as the East Marmara Earthquakes, not only took a terrible human toll (up to 20.000 people dead and 50.000 injured in North-western Turkey), they also cost the country around US$20 billion in damage alone _ equivalent to over 10 per cent of annual gross domestic product (GDP) (World Disaster Report, 2002).

The seismic activities which affected settlements severely in Turkey continued after the East Marmara Catastrophe. Many people suffered from the recent earthquakes[10] such as the 2003 Bingöl Earthquake, 2010 Elazığ Earthquake, and 2011 Van Earthquake. These recent earthquakes have once again revealed the vulnerability of built environment in Turkey to seismic hazard (Figure 2.8 and 2.9).

Figure 2.8: The pictures are related to the Simav-Kütahya Earthquake (Magnitude: 5.9) of May 19, 2011. Source: http://fotogaleri.hurriyet.com.tr/galeridetay.aspx?cid=47178&rid=2&p=1 (Accessed on May 2011).

Figure 2.9: The pictures are taken from the Erciş - Van Earthquake (Magnitude: 7.2) of October 23, 2011. Source: top line pictures, www.hurriyet.com.tr and www.milliyet.com.tr (Accessed on October 2011); bottom line pictures, Ali Tolga Özden (November, 2011).

2.3 Traditional DMS Approach: Pre- and Post-Disaster Efforts

Conventionally, hazardous events are tried to be managed through DMS, which is defined in the former section. As a four-phase cyclic model (mitigation, preparedness, response and recovery) (Tierney et al., 2001), disaster management approach is considered as a continuing system in many countries. In some countries such as United States (US), DMS is also named as ***emergency management***. The top responsible disaster management organization in the US is “Federal

[10] Death Toll of recent earthquakes:
2003 Bingöl Earthquake – 176
2010 Elazığ Earthquake – 41
2011 Van Earthquakes – 644

Emergency Management Agency" which is also well known for its acronym, FEMA. Turkey also has developed a FEMA-like organization in 2009 under the name of AFAD in Turkish, which is translated to English as *Disaster and Emergency Management Presidency*. Although all of the four phases of the DMS indicate interlinked approaches, it is generally classified according to 'before' and 'after' disaster efforts in traditional approach. Mitigation and preparedness phases are accepted as 'pre-disaster' activities, whereas response and recovery phases include the 'post-disaster' efforts. However, mostly in developing countries, post-disaster approach which is also named as *emergency response phase,* is given higher priority than the pre-disaster activities.

Evaluation and Brief Historical Overview of Traditional DMS

The evolution of coping efforts with disasters naturally follows the lessons and experiences gained from past disasters. Each emergency case and disaster leaves behind painful traces as well as some lessons in the affected communities. However, some of those events which can be classified as large-scale disasters or catastrophic events have much more effect on the evolution of mitigation strategies. Tierney (et al. 2001) points out some of those milestone events, all of which were disruptive and devastating. Some remarkable and large-scale examples are the 1979 Three Mile Island nuclear plant accident, the eruption of the Mt. St. Helens volcano in 1980, the Bhopal chemical industry explosion (in India) in 1984, the Mexico City earthquake of 1985, the Chernobyl nuclear disaster, the Loma Prieta and Northridge earthquakes, which occurred in California in 1989 and 1994, respectively, the 1988 Armenian earthquake, Hurricane Hugo and the Exxon oil spill in 1989, Hurricane Andrew in 1992, the 1993 Midwest floods in the US, and the 1995 Kobe earthquake in Japan. They all had considerable effects on the enhancement of DMS in different countries. In particular, the US and Japan, both of which have advanced DMSs, learned the most from these large-scale disasters, which led to the evolution and improvement of effective disaster coping models and strategies. .

Before the development of specialist organizations, civil defense and protection approach was used to cope with the adverse effects of disasters (see Appendix B for more information on civil defense approach). That approach was dealing with only post-disaster works which are generally limited with response (search and rescue) and relief (food and temporary shelter supply) activities. However, increasing populations have resulted in rapidly growing and uncontrolled human settlements. These settlements are dense in the most vulnerable areas. Thus, civil defense approach turned out to be insufficient due to the rapidly changing conditions of built environments. In order to cope with disaster phenomena through more effective preconditioned mechanisms, disaster management approach was replaced with civil defense approach in many countries. The demand for a more powerful disaster coping system has, thus, influenced the development of today's traditional DMS.

UNISDR (2004) defines the traditional DMS as a common state policy which controls all the authority and action related to all disasters for a long time. The disaster management is commonly accepted as efforts of providing relief to victims, recovery organizations, and rebuilding of damaged infrastructure by the state organizations and institutions all of which signify the consolidation of all command and control mechanisms by the state entirely. The main purpose of the state in the traditional model is to relocate the victims from the affected area(s) and/or disaster prone regions. Relocation of victims is also considered as a mitigation activity which is expected to reduce the future disaster impacts. Traditional DMS comprehends pre- and post-disaster efforts which are defined briefly in the previous section.

Although the conventional DMS policy encompasses both pre and post disaster efforts, the response and relief activities are accepted as the ruling parties for traditional approach which descends from inadequate civil defense understanding. The response activities generally represent the urgent relief organizations including search and rescue operations, securing of urgent needs of the affected populations such as medicine, food, water and temporary units, and the removal of the debris. Following the response phase, reconstruction and rehabilitation works which are also parts of post-disaster activity are typical of traditional DMS.

Figure 2.10 illustrates the simple and ideal model for post-disaster activities including response (emergency phase) and recovery (rehabilitation and reconstruction phases). However, this model is criticized due to the dominant role within the traditional DMS. International agenda debates on the ineffectiveness and potential problems of this model due to changing characteristics and growing magnitude of disasters which make today's communities more vulnerable than before. In fact, "modern disasters are more complex and diverse phenomena with a greater potential for adverse impact", which calls for a broader and comprehensive approach to disaster coping policy and strategies (McEntire et al. 2002: p.267).

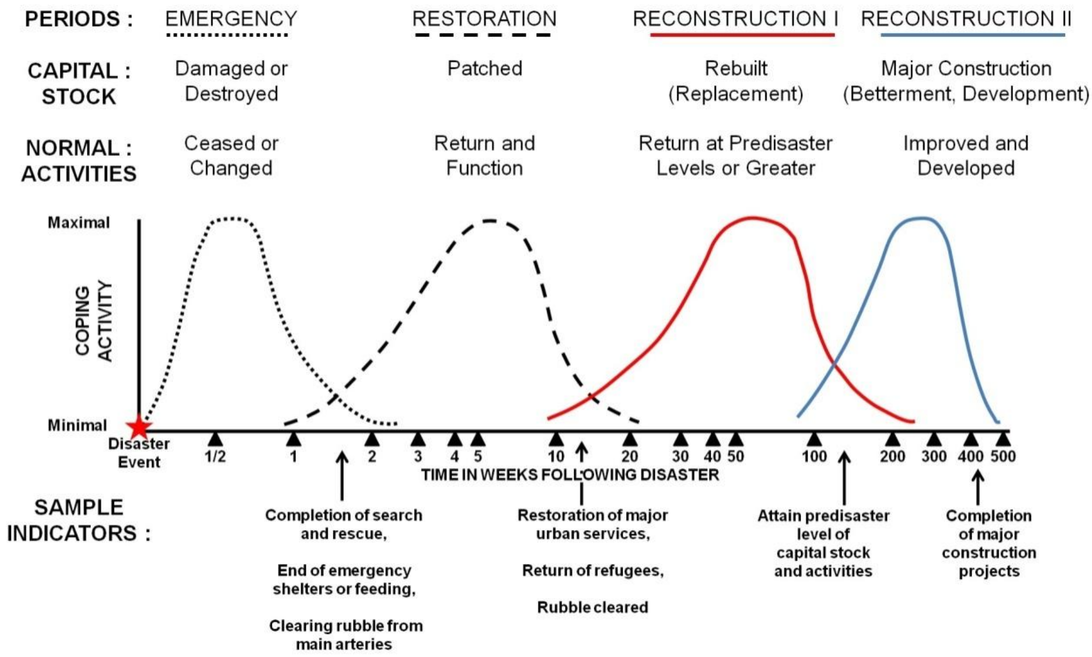

Figure 2.10: Post-disaster (Response & Recovery) Model which also symbolizes the dominant character of traditional DMS. Reproduced from Hass et al., 1977: p.4

Examples to Historical Evolution of Traditional DMS Approach from the US, Japan and Turkey Contexts

Due to distressing and unexpected results of modern disasters, many countries have started to focus on pre-disaster (mitigation and preparedness) efforts of traditional DMS. For instance, in the US, the Three Mile Island nuclear plant accident triggered the development and implementation of more effective mitigation and preparedness standards for chemical emergency legislations (Tierney et al., 2001; p. 3). A new federal oil spill management legislation was enacted as a direct result of the Exxon oil spill, and the problems that developed with the emergency response following Hurricane Andrew stimulated efforts to assess and overhaul the federal government's disaster management system. In addition, in order to cope with expanding disaster losses and mitigating future damage, hazard insurance is now encouraged as a pre-disaster mechanism (Tierney et al., 2001: p.3). Due to the increasing effects of disasters on natural and built environment, the US has developed a legislative document, *Robert T. Stafford Disaster Relief and Emergency Assistance Act*, or as more commonly known as Stafford Act, in 1988. The primary aim of this act is to reduce the impact of recurrent natural disasters such as hurricanes, floods, or earthquakes on human life and property, advanced planning to mitigate them, and to reduce the vulnerability of communities (Schneider, 2009: p.9). This law was amended in 2004 to strengthen pre-disaster efforts.

In Japan, the first disaster coping effort which mostly focused on post-disaster activities was the enactment of Disaster Relief Act in 1947 following the devastating earthquake of Nankai with a magnitude of 8.0 (Cabinet Office, 2009). However, the milestone in the disaster history and coping approaches of Japan was the year 1959. The Ise-wan Typhoon that hit the Japan land and caused more than 5.000 casualties triggered the first disaster management studies including the enactment of Basic Disaster Management Planning and establishment of Central Disaster Management Council which tried to unify both pre- and post-disaster efforts. Following the Niigata Earthquake (magnitude 7.5) in 1964, the Act of Earthquake Insurance as a pre-disaster mechanism has been put into effect. In 1978, Act on Special Measures for Large-Scale Earthquakes has been enacted in order to plan and implement mitigation and preparedness activities before large-scale seismic events. Tokai Earthquake Countermeasures Basic Plan was enacted in 1979 to also improve mitigation efforts. In 1980, the following year, another act which was basically targeted at developing a new financial mechanism in order to arrange earthquake damage prevention and rehabilitation was enacted (Cabinet Office, 2009). Due to the unexpected and considerable impacts of Great Hanshin-Awaji Earthquake (or known as Kobe Earthquake) in 1995, many new arrangements and amendments on legislative system were put into effect. The recent disaster of the 2011 Tohoku Earthquake has changed the view-point on DMS once more.

In Turkey, the first organized civil disaster response system is the Turkish Red Crescent Society, which was founded in the last decades of the Ottoman Empire. The main goal of the organization is to arrange and manage relief efforts after disasters and wars (Alarslan 2009). Untill the year 1944, most of the efforts implemented through the legal and administrative system in Turkey focused on post-disaster works, particularly relief activities. In 1944, a new law entitled as “The Law for the Measures that will be Taken Before and After the Earthquakes” (Law No. 4623) was put into effect in order to arrange both pre- and post-disaster efforts which included mitigation activities. Foundation of the General Directorate of Civil Defense in 1958 was very important because the main aim of this organization was to prepare the community for and protect it from wars and disasters (Appendix 2-B). In other words, this institution was a foremost organization responsible from post-disaster activities, particularly response efforts. In the following periods, a great extent of legislative documents which drove the disaster coping activities focused on the post-disaster works including rehabilitation, reconstruction, resettlement of affected regions, arrangements of financial issues and funds for post-disaster reconstruction and disaster housing issues. Few attempts were made to enforce and improve pre-disaster activities in these periods. Following the devastating impacts and losses of the 1999 East Marmara Earthquakes many legislative improvements and enactments have been put into effect. The establishment of the Earthquake Council (which was abolished in 2007), enactment of Mandatory Earthquake Insurance System and Building Inspection Law were some important mitigation approaches in this period. In 2009, AFAD (Prime Ministry Disaster and Emergency Management Presidency) was established, which aims to unify and improve a more comprehensive DMS. Therefore, the former three institutions[11] which were primarily responsible within the traditional DMS were abolished and unified under AFAD. A more comprehensive and chronological analysis of the evolution of traditional DMS in Turkey is presented in the following section.

2.4 Brief History of Safe Built Environment Development Struggles in Turkey

Although the building inspection concept from a technical view is not too old in Turkey, it is necessary for this study to historically analyze the disaster-building inspection relation through safe built environment approach. This is essential to evaluate the root causes of the ongoing deficiencies and the demand for a new vision which integrates the new approach with pre-disaster and building safety concepts. Such an analysis in a sense lays down the ‘disasters history’ of Turkey. Emergence of disaster and safe environment relation points out re-examining of disasters history, re-evaluation of the disaster concept, re-envision of the human behavior, disaster and coping effort linkages, and re-analysis of shifting disaster policies in Turkish context.

2.4.1 Disasters History and Coping Efforts in the Ottoman Period: Evolvements Between 16th and 20th Century Periods

The first written documents related to disaster coping approach date back to the year 1509, in which a strong earthquake stroke İstanbul. That earthquake was one of the most powerful earthquakes recorded in the seismic history of Turkey (Griffiths et al., 2007) (Figure 2.11). The magnitude of the earthquake was estimated between 7.6 and 8.0, and human loss was assumed as 13.000 (TBMM, 1999). Following the disaster, a mandate was published by the Ottoman Emperor, prohibiting construction of any building on filled ground of the coastal area. Timber housing construction was encouraged instead of heavy stone masonry buildings (TBMM, 1999).

[11] The institutions abolished in 2009 are:
General Directorate of Disaster Affairs,
General Directorate of Civil Defense,
General Directorate of Turkey Emergency Management (which was established in 1999).

Figure 2.11: A woodcut which belongs to 16th Century demonstrating The Marmara Sea Earthquake of 1509. Source: http://www.nytimes.com/slideshow/2010/02/14/science/earth/022510_QUAKE_index.html (accessed on September 2011)

Fires also posed threat to the community and caused significant problems for the Ottoman settlements in that period. "*Tulumbacı Ocağı*" was developed in 1720 to cope with fire (Eğilmezer, 2010). In 1766, another intensive earthquake and tsunami destroyed İstanbul. Mostly the buildings on the coastal areas and ports of İstanbul and neighbouring regions were badly damaged (Hebert et al., 2005). In 1817, the fire-wall system and related mandate was initiated (Özgür and Azaklı, 2001).

Industrial revolution and rapid urbanization urged the safety problems of buildings in the 19th century. "*Tanzimat Reforms*"[12] was an important catalyst for re-planning and organisation of urbanization ideas. Helmuth Von Moltke, a German planner, was invited to İstanbul to develop new urban plans in the period of 1836-1839 (Ayataç, 2007). Von Moltke proposed plans for the re-organization of the city transportation system including new measures against fire in İstanbul. The first official building code document which was entitled as "*İlmühaber*" was published in 1839. The main concerns of the document are summarized in a study by Özgür and Azaklı (2001): Stone or brick, or a composition of them, should be used as building materials, and they should comply with geometrical rules; Dead-end streets should be eliminated and prohibited; Roads should be wide enough or, if possible, should be widened; Buildings located on both sides of the roads should not be higher than three stories.

With the influence of European urban planing system, the first comprehensive Building Act ("*Ebniye Nizamnamesi*") was published in 1848 (Tekeli, 2006). The act comprised important arrangements such as limiting of timber framed housing construction, expropriation when necessary, building permit development, street and road widths, building inspection and building elevation. Most of these articles are considered as the basic developments to prevent fire hazards (Özgür and Azaklı, 2001; Anonymous, 2011).

"*Şehremaneti*"[13] and "*İntizam-ı Şehir Komisyonu*" (The Commission for the Order of the City) were developed in 1854 (Tekeli, 2006). The first municipal organization was established in İstanbul in 1857 under the name of "*Altıncı Daire-i Belediye*" (The Sixth Municipal District). In 1858, the following year, "*Sokak Nizamnamesi*" (Street Regulation) was published in which designing and widening of streets and roads were regulated in order to prevent fire hazards (Tekeli, 2006).

Following the "*Pera Fire*" (1870) in Galata, "*kargir*" (brick and/or stone) construction was made obligatory (Çelik, 1986: p. 46). After the great fire of 1865 (*Sirkeci-Hocapaşa Fire*), "*Islahat-ı Turuk*" (Development Commission for Streets and Roads), which covers regional maps, new construction regulations, subdivision of development zones, construction of infrastructure was established (Özgür and Azaklı, 2001; Çelik, 1986).

"*Turuk ve Ebniye Tüzüğü*" (Road and Building Legislation) was enacted in 1865 (Özgür and Azaklı, 2001). The new legislation put the former legislative issues together, and covered the enforcement and improvement of subdivisions, expropriation, road construction, building material preferences,

[12] Tanzimat Reforms: The political reformation movements and enacted laws which developed in 1839 and influenced the Ottoman State's political and military power, as well as society's daily routines.
[13] Şehremaneti: a municipality-like organization.

fire-wall construction between timber framed buildings, restrictions for new timber building construction etc.

In 1870, following the fire which destroyed a huge area from Galatasaray to Taksim and Tarlabaşı neighbourhoods, a commission of architects and engineers was established to produce new development plans (Tekeli, 1999). Another new regulation was published in 1875 entitled as "*İstanbul ve Belde-i Selasede yapılacak Ebniyenin Sureti-i İhsaniyesine Dair Nizamname*" (Regulation for the new building constructions in İstanbul and its towns) (Anonymous, 2011).

On the 5th of November, 1882, for the first time, a comprehensive legislative document entitled as "*Ebniye Kanunu*" was published and used until the first years of the Turkish Republic. Municipal works started to become widespread across the country through the *Ebniye Kanunu* (Tekeli, 2006).

On the 10th of July, 1894, a powerful and destructive seismic movement with a magnitude of 7.0 (Barış et al., 2005) shaked Marmara Region, as well as İstanbul city. This earthquake caused extensive human loss, which was estimated between 3000 and 5000 (Koçak, 2010). Ambraseys (2001) stresses that extensive damages observed on the masonry buildings were mainly due to deficient or missing application of basic seismic design principles of load bearing walls, floors and roofs which were poorly braced to each other.

Sort of a technical book named as "*Hidayet-ül Tarik-il İzalet-il Zelzelet-i vel-Harik*" was published by Namık Şükrü in 1896 in which seismic and fire hazards were defined for the first time (Tekeli, 2006; Es, 2009). Besides being a technical book in fire and seismic resistant design, it initated a discussion on insurance concept.

2.4.2 Disasters History and Coping Efforts in the Republic of Turkey Period: Evolvements Between 1923 and 2011 Period

After the foundation of the Republic of Turkey in 1923, important progresses were made in the improvement of settlements through the legal and administrative system. In that sense, *Village Law* (Law Number: 442), which was published in 1924, could be mentioned as the first comprehensive legislative document related to development issues. The 13th article of this law specifically organizes the assignments of the villagers which includes taking necessary precautions before the hazards such as flood, and epidemic. (Official Gazette, 1924a).

Following the Erzurum Earthquake (1924), a law was published in order to arrange the relief activities and rehabilitation works for the stricken area (Law Number: 516[14]) (Ergünay, 2011; Official Gazette, 1924b). In addition, the Law 516 can be accepted as the first disaster driven legislative document developed in the Turkish Republic history.

The Municipality Law (Law Number: 1580), which was enacted in 1930, involved more detailed concepts related to development and inspection activities, as well as disaster related concepts such as fire prevention. The 15th article (the paragraphs 12, 19 and 39) points out the construction and material inspection responsibility of municipalities (Official Gazette, 1930a). According to the 15th article (in paragraph 22), municipalities were assigned to take necessary preventive actions for fire hazard with the control of hazardous material production and storage facilities, construction of water pools in necessary areas in case of fire, and assurance and maintenance of firefighting tools as well as vehicles including fire trucks.

During the first decade of the Turkish Republic, some disaster coping organisations were established to modernize the existing system.

In the period of 1930 – 1945, new legal and administrative arrangements were made to ensure the safety of built environment. Table 2.8 explains the legal and administrative developments in relation to disaster coping approaches in this period.

[14] Law for Reconstruction and Rehabilitation Financial Activities Arranged for Victims Affected from the Earthquake Occurred in Erzurum and Neighboring Provinces.

Table 2.8: Legal and Administrative Developments in relation to Disaster Coping Understanding (between 1930 and 1940).

Date	Legal or administrative development	Disaster Coping Approach
1930	*The Public Sanitation Law* (Law Number: 1593): targeting to organize and put into order of health and sanitation issues all around the country (Official Gazette, 1930b).	Organization of protective health articles and issues in order to cope with epidemics and other health-related disasters.
1933	*The Municipality Building and Roads Law* (Law Number: 2290): production of urban development plans, new buildings, roads, obtaining building permit, technical responsibility (for the designers and inspectors participating in building production process), building inspection issues were all organized and enhanced in harmony with the contemporary urbanism approaches of the period (Official Gazette, 1933; TBMM, 1999).	Accepted as the primary law which would have been expected to guide and to be a ground for the following legal and administrative arrangements in coping with hazardous events. It was an important step in terms of securing the health, safety and orderly production of settlements and buildings although there was not any article within the law which was produced directly for disaster concept (METU, 1998; TBMM, 1997).
1939	Establishment of *Development Ministry* (under the law number of 3611) (METU, 1998)	Organization and inspection of all the development and construction issues.
1939	Establishment of *Building and Development Works Presidency* (under the Development Ministry): organized all development and construction activities under both the central and provincial governmental organizations (Official Gazette, 1939).	Employment of necessary administrative and technical professionals such as engineers and architects; aimed to clean up the fragmented view of development issues, and to combine construction activities under a central institution. In particular, it was tried to be provided of working more scientific and technical in order to secure the safety of built environment through the administrative system which had failed in former natural disaster experiences.
1939	**The Erzincan Earthquake[15]: recorded as the highest seismic movement in magnitude scale and deadliest disaster (Utsu, 2002) throughout the Turkish Republic History so far.**	**Erzincan province was shaken by a 7.9 magnitude earthquake on the 26th of December, 1939. Human casualty numbers were exceeding 32.000, whereas 116.720 buildings were damaged seriously.**
1940	*Post-Disaster Assistance Law for The Victims (of The Earthquake) Who Were Suffered from The Earthquake in Erzincan Province and Other Areas* (Law number: 3773): organize the assistance and other response and recovery works for the earthquake victims. It was a typical disaster driven - case specific legislative arrangement (Official Gazette, 1940).	Composed of eight articles and almost all articles were related to financial issues including, financial aid to the victims, moratorium arrangements for the victims, organizing the foreign aid etc. (Articles 1-6) (Official Gazette, 1940).

Table 2.9 explains the magnitude and extent of seismic disasters between 1939-1944.

Table 2.9 A series of earthquakes (1939-1944). Source: USGS (United States Geological Survey) and Boğaziçi University Kandilli Observatory and Earthquake Research Institute. http://earthquake.usgs.gov/earthquakes/world/world_deaths.php [accessed in March 2010]; http://www.koeri.boun.edu.tr/sismo/ [accessed in May 2009]

Date	Event	Explanation
26.12.1939	Erzincan Earthquake	Magnitude: 7.8; Killed: 32.962 people … Erzincan – Kelkit region was the most affected region, seismic movement was felt even in Cyprus Island, whereas some limited tsunami activities were observed in the specific regions of the Black Sea. Earthquake damaged 116.720 buildings.
20.12.1942	Niksar - Erbaa Earthquake	Magnitude: 7.3; Killed: 1.100 people … Earthquake damaged around 32.000 buildings.
20.06.1943	Adapazarı – Hendek Earthquake	Magnitude: 6.6; Killed: 336 people … Earthquake damaged around 2.240 buildings.
26.11.1943	Tosya - Ladik Earthquake	Magnitude: 7.6; Killed: 4.000 people … 75% of the buildings located in the Ladik – Vezirköprü region were destroyed. Total damaged building amount was estimated at 40.000.
01.02.1944	Bolu - Gerede Earthquake	Magnitude: 7.4; Killed: 3.959 people … Earthquake damaged around 20.864 buildings.

[15] More information on the Erzincan earthquake can be accessed from the following web sites: http://earthquake.usgs.gov/earthquakes/world/world_deaths.php (accessed in March 2010); http://www.koeri.boun.edu.tr/sismo/ (accessed in March 2010).

Table 2.10 summarizes the major advancements in the period 1940-1956.

Table 2.10: Legal and Administrative Developments in relation to the Disasters in Turkey (1940 – 1959 period).

Date	Legal or administrative development	Disaster Coping Approach
1944	*The Law for The Measures That Would be Taken Before and After The Earthquakes* (Law Number: 4623) (TBMM, 1997; Official Gazette, 1944): Identification of disaster-prone areas in terms of seismic hazards in Turkey; Determination of the ordinances and sanctions that should be forced to be implied to the constructions including critical facilities in earthquake hazard zones; Preperation and keeping available of first aid and SR (Search and Rescue) plans in cities and towns in case of emergency and/or crisis times; Rapid Damage and Safety Assessment after the disaster; Relocation of settlements from hazardous areas according to geological survey results and hazard maps; Enforcement of geological surveys by the municipalities in order to give permission for the new development areas; Various regulative approaches including expropriating, sanctions, organizational approaches and other financial issues.	It was (for the first time) an important step to be a comprehensive legislative and administrative guide for the building professionals, municipalities, public, and other related institutions who participate in building production process in order to develop safe and healthy environments.
1941 /1943	**Flood disasters were effective in this period.**	**Floods damaged built environments severly and caused considerable human casualties (TBMM, 1997).**
1943	*The Protection Law from River Floods and Inundations* (Law number: 4373) (Official Gazette, 1943): it was the first time to be established of a legislative and administrative approach for flood hazard in Turkey.	Arrangement of sort of mitigation activities including the identification of flood hazard areas, the cleaning of flood risky areas from hazardous buildings and other barriers that could cause and/or intensify the flooding, and early warning activities (Official Gazette, 1943). However, the law is still in use and it has not been much improvements on the original law. Therefore, it is criticized of being ineffective in terms of today's changing hazard and prevention understanding (Balaban, 2009)
1945	*Development of Earthquake Zones Map of Turkey*	Initial efforts for preparing "Seismic Hazard Map of Turkey" which was produced in ½.000.000 scale, and dividing the country into three seismic zones: extensively damaged areas, seismically hazardous zones, seismically safe areas (Pampal and Özmen, 2006).
1945	Publishing of the *Earthquake Zones Building Regulation of Turkey*: Revised and evolved into *Regulation for the Buildings that will be Constructed in the Disaster Zones* (in 1996, 1997, and 2007). However, another regulation which was published under the title of *Buildings That Will be Constructed in Earthquake Zones* has been also used and has revised in 2007 (Official Gazette 2007a; 2007b). Therefore, there are two regulations that are in use and both of them are pointing the same contents related to earthquake issue.	Protector State (Comprehensive Approach): takes into account of three natural disaster concepts; fire, flood and earthquake. However, the earthquake issue encompasses the great amount of the regulation with regarding mostly the structural building issues and excluding the other concepts of hazard and disaster phenomena (Official Gazette, 1996).
1946	**The Varto Earthquake**	**Although the magnitude was recorded as 5.9 which could be accepted as an intermediate-magnitude seismic movement, the death toll was considerably high with a number of 800 people[16] along with almost 3.000 destroyed buildings.**

[16] More information on the Varto Earthquake can be accessed from the following web sites: http://earthquake.usgs.gov/earthquakes/world/world_deaths.php (accessed in March 2010); http://www.koeri.boun.edu.tr/sismo/ (accessed in March 2010).

Table 2.10: Legal and Administrative Developments in relation to the Disasters in Turkey (1940 – 1959 period) (continuing)

1948	*The Buildings That Would be Constructed in Erzincan* (Law Number: 5243): Focusing on post-disaster activities and disaster driven legal development.	Organization of financial issues and loans related to post-disaster reconstruction activities following the Erzincan earthquake (Official Gazette, 1948).
1949	**The Bingöl-Karlıova Earthquake**	**A magnitude of 6.7 caused loss of 450 lives, and totally damaged almost 3.500 buildings[17].**
1950	*The Buildings That Would be Constructed for the Flood Victims in Eskişehir* (Law Number: 5663): Focusing on post-disaster activities and disaster driven legal development.	Organization of post-disaster reconstruction activities and indebtment issues for victims of the Eskişehir flood disaster (Official Gazette, 1950).
1953	Establishment of *Earthquake Office* (under the Building and Development Works Presidency of Public Works Ministry)	This office indicates the development of initial ideas related to understanding the importance of not only post-disaster issues but also pre-disaster concepts (Özden, 2011).
1953	**The Yenice-Gönen Earthquake**	**Çanakkale province was damaged by a 7.3 magnitude earthquake which caused 1.070 casualties along with thousands of severely damaged buildings.**
1953	*The Law About Building Construction Encouragement and Unauthorized Buildings* (Law number: 6188): aims to achieve two primary tasks: on the one side to support and increase the building and specifically housing construction in urban areas, on the other side to control, intervene and prohibit the illegal building practices which did not comply with the necessary building codes and planning ordinances.	Articles from 1 to 11 within the law were dealing on the appropriation of land to authorized civil building construction, and legal and administrative arrangements for determining the responsibility of the local governmental institutions in terms of construction and financial issues (Official Gazette, 1953). Article 12 specifically drew the attention to enforcement of the building codes of which the construction practices and buildings had to comply with.
1954	*The Law About the Re-location of Kale Town of Tavas District which Expose to Landslide*: Law Number 6409, arrangements for re-settlement process in a different area of a settlement due to landslide hazard (Official Gazette, 1954; Sipahioğlu and Alptekin, 1988).	Focusing on post-disaster activities and disaster driven legal development.
1955	*The Law About the Re-location of Neighborhoods in Lice Town which Expose to Rock fall Threat*: Law Number 6610, arrangements for re-settlement process in a different area of a settlement due to rock fall hazard (Sipahioğlu and Alptekin, 1988; Official Gazette, 1955).	Focusing on post-disaster activities and disaster driven legal development.
1955	Establishment of *DE-SE-YA* (Earthquake-Flood-Fire) *Office*: aimed to combine the coping efforts with three major hazards (of earthquake, flood and fire) all of which were threatening the built environment and community seriously for decades.	The new organization was important in terms of contributing to the shifting understanding of disaster coping strategies from a more integrated point of view including buildings inspection activities. The Earthquake Office, mentioned before, evolved into DE-SE-YA Office (Sipahioğlu and Alptekin, 1988; Erkan, 2010).
1956	*The Law About the Arrangement of Aids for People Who Were Suffered from the Fire in Gerze and the Floods in Lüleburgaz and İnece*: Law Number 6683 (Sipahioğlu and Alptekin, 1988; Official Gazette, 1956a)	Focusing on post-disaster activities and disaster driven legal development.
1956	The Law About the Arrangement of Aids for People Who Were Suffered from the Resultant Disasters Between 1955 and 1956 in the Provinces of Aydın, Balıkesir, Bilecik, Edirne, Eskişehir, Kırklareli, Konya and Denizli: Law Number 6746 (Sipahioğlu and Alptekin, 1988; Official Gazette, 1956b).	Focusing on post-disaster activities and disaster driven legal development.

[17] More information on the Bingöl-Karlıova Earthquake can be accessed from the following web sites:
http://earthquake.usgs.gov/earthquakes/world/world_deaths.php (accessed in March 2010);
http://www.koeri.boun.edu.tr/sismo/ (accessed in April 2010).

Table 2.10: Legal and Administrative Developments in relation to the Disasters in Turkey (1940 – 1959 period) (continuing)

1956	*Development Law* (Law Number: 6785): One of the first comprehensive legislative publications that comprised identification of natural hazards and hazardous areas as the criteria for site selection of new settlements, and bringing up Technical Application Responsibility System for building inspection (Official Gazette, 1956c).	It was important in terms of enforcing safe and healthy buildings through the necessary building codes, and this content made the law as a sort of important mitigation activity in terms of disaster coping policies. Importance of Land use decisions in developing safe environments also revealed through this legal arrangement.
1957	*The Law About the Arrangement of Aids for People Who Were Suffered from the Resultant Earthquakes in the Provinces of Muğla, Denizli, Bolu, Aydın and Sakarya*: Law Number 7010, a typical of legal development for recovery efforts (Sipahioğlu and Alptekin, 1988; Official Gazette, 1957)	Focusing on post-disaster activities and disaster driven legal development.
1958	Establishment of *Ministry of Development and Settlement* (under the law number of 7116)	Some of the main responsibilities of the institution; to take necessary measures before and after disasters; production of plans related to the provinces, towns and villages of the country; to find solutions for the housing and settlement problems; to improve the building materials and to prepare the quality standards (Official Gazette, 1958a).
1958	Establishment of *Civil Defense Law*: aimed to protect people not only in war times but also in natural disaster and large fire events in terms of lessening the human casualty, protecting the critical facilities and sustaining the service continuity through the necessary armless and preventive activities (Official Gazette, 1958b; Gülkan et al., 2003).	The following periods has shown that the civil defense forces have become the foremost response teams of governments in terms of "Search and Rescue" operations following natural disasters such as earthquakes, floods, fires, and avalanches.
1959	*The Law on Precautions and Aids for Disasters Influenced the Common Daily Life* (more commonly known as "Disaster Law" in Turkey, Law Number: 7269): It was the first law that had gathered all the other published laws and regulations related to hazards and disasters (Erkan, 2010). This law was accepted as an umbrella law and expected to develop an integrated point of view to the disaster phenomena.	Among the other contributions, it was proposing a disaster fund (within the articles between 33 and 46) (Official Gazette, 1959). The Regulation Related to Using the Disaster Fund was put into effect in 1970 only then. In addition, in order to support and increase the extent of the fund capacity, an earthquake fund was put into effect in 1972 (METU, 1998).

The 1956-1959 period could be assumed as very successful in terms of effective advancements in legal and administrative systems related to improving both development and construction practices, building codes and disaster coping capacities of legal framework and related institutions (Table 2.10).

Seismic activities recorded between the years 1966 and 1983 revealed the vulnerability of built environment (Table 2.11). Successful attempts were made, indeed, to enhance the legal and administrative structures in the previous term (of 1940-1959 period). However, these efforts were not reflected adequately on to the practice. The failure of the legal and administrative systems, among other reasons, were due to insufficient political will, missing disaster awareness and culture among the society, and lack of competent building professionals and local administrators dealing with safe and healthy environment production. The state policy in crisis events was directed by the disasters which is a typical of healer state approach. Reactive understanding focused on post-disaster activities which were organized through a top down DMS approach.

Table 2.11: Earthquakes shaked the different regions of Turkey in the period of 1966-1983. Source: USGS and Boğaziçi University Kandilli Observatory and Earthquake Research Institute.
http://earthquake.usgs.gov/earthquakes/world/world_deaths.php [accessed in March 2010]
http://www.koeri.boun.edu.tr/sismo/ [accessed in May 2009]

Date	Event	Explanation
19.08.1966	Varto – Hınıs (Muş) Earthquake	Magnitude: 6.8; Killed: 2.529 people … The most affected settlement was Varto; at least 20 villages were destroyed in Bingöl-Erzurum-Muş provinces; 1.500 people were wounded and 108.000 people became homeless. More than 20.000 buildings were destroyed.
28.03.1970	Gediz Earthquake	Magnitude: 7.2; Killed: 1.086 people … In the Gediz – Emet region, at least 12.000 housings were damaged severely (in total, almost 20.000 buildings were damaged). More than 50% of the buildings located in the 53 settlements of the region were destroyed. The earthquake triggered the fires and landslides as the secondary disasters in the region which also caused damages.
22.05.1971	Bingöl Earthquake	Magnitude: 6.8; Killed: 1.000 people … Bingöl province was almost destroyed. 90% of the structures in the city heavily damaged and 15.000 people became homeless. Totally, more than 9.000 buildings were believed to be damaged.
06.09.1975	Lice-Diyarbakır Earthquake	Magnitude: 6.6; Killed: 2.300 people … Hazro, Hani, Kulp, and Lice towns were destroyed severely; whereas 3.400 people were wounded. It was estimated that around 8149 buildings were damaged.
24.11.1976	Muradiye - Van Earthquake	Magnitude: 7.5; Killed: 5.000 people … A great amount of settlements located in Çaldıran, Muradiye and neighboring areas were damaged severely. Winter conditions affected the search and rescue activities negatively. It was stated that nearly 9232 buildings were damaged or became uninhabitable.
30.10.1983	Erzurum – Kars Earthquake	Magnitude: 6.9; Killed: 1.342 people … More than 25,000 people became homeless and 50 settlements in the region were damaged severely. It was stressed that 3.241 housings were damaged.

The General Directorate of Disasters Research Institute was established under the Ministry of Development and Settlement in 1970. This institute was converted to *Earthquake Research Institute* in 1971 and then evolved as an office of *Building Material and Earthquake Research General Directorate* in 1983. This directorate was dealing with seismic hazard broadly, and it did not take into account other types of hazards in detail.

In order to improve the development and building production process, as well as inspection activities, a new ministry was established (*Ministry of Public Works and Settlement*) in 1983 instead of the former one – *Ministry of Development and Settlement*, which was established in 1958 (Official Gazette, 1983). The first article of the foundation law related to the new ministry indicates the general aim of the legislation and the new institution: "providing and controlling of all building and infrastructure constructions and renovations, building materials, earthquake research, and disaster implementation services rapidly and consistent with the needs of the country…" (Official Gazette, 1983). The law covers various arrangements to enforce safe built environment development through legal and technical measures including building codes and inspection concepts. The measures include mostly structural systems of the buildings in a fragmented way. *General Directorate of Disaster Affairs* was founded under this ministry. The Ministry has evolved into *Environment and Urbanization Ministry* in 2009. Furthermore, in the same year, the General Directorate of Disaster Affairs was abolished and has embodied in Prime Ministry Disaster and Emergency Management Presidency (AFAD).

Table 2.12 summarizes the important issues and developments in the period of 1980 – 1999 with regard to disasters. Table 2.12 clearly shows that most of the improvements and innovative approaches to the legal and institutional system predominantly focused on post-disaster efforts and organizations.

Table 2.12: Legal and Administrative Development in relation to the Disasters in Turkey (1980 – 1999 period).

Date	Legal or administrative development	Disaster Coping Approach
1985	*Development Law* (Law Number: 3194): was one of the most comprehensive laws related to development issues and buildings codes up to that time.	The former experiences related to legal and administrative concepts as well as coping with disaster efforts have piled up a rich source in terms of lessons from the past failures. This law has been expected to have the capacity of guiding all professionals participating in building production process and has been expected to achieve best guiding practices on building inspection process in particular.
1988	*The Regulation of Disaster Related Emergency Assistance Organization and Planning Fundamentals* (Regulation Number: 88/12777)	The first article of the regulation was revealing the aim of the legislation: development of emergency assistance organizations are needed to sustain rapid and effective response to the disaster area in terms of first and emergency aid to the victims (Official Gazette, 1988).
1992	**The Erzincan Earthquake**	**A magnitude of 6.8 and 653 casualties along with the 8.057 damaged buildings.**
1992	*The Law For Running the Organization and Application of Services Related to the Damages which were Occurred After the Earthquake in Erzincan, Gümüşhane and Tunceli, as well as for the Damages Occurred in Şırnak and Çukurca* (Law Number: 3838)	A typical example of disaster driven, case specific and rehabilitative approach application for disaster stricken areas.
1995	**The Senirkent Mud Flood**	**Caused 74 casualties and left 300 demolished buildings in the town of Senirkent.**
1995	*The Law for Running Services Related to the Damage and Destruction Due to the Natural Disaster* (Law Number: 4123): post-disaster activity purposed law.	Organizing specifically the material and financial assistance to the disaster affected areas in terms of arrangement of credits, loans and debiting issues of the victims, reconstruction works and related issues etc. through the articles from one to nine (Official Gazette, 1995) all of which can be accepted as the continuing healer state and reactive perspective of governments to the disaster phenomena.
1995	**The Dinar-Afyon Earthquake**	**A magnitude of 6.1 earthquake killed 90 people along with 14.156 damaged buildings.**
1995	*The Law for Changing Some of the Articles within the Laws of 4123 and 7269, and Adding New Articles to Those Laws*: produced to meet the deficiencies of the former disaster related laws and regulations.	The new articles integrated to the ongoing laws were mainly related to post-disaster issues and concepts.
1996	*The Regulation for the Buildings That will be Constructed in the Disaster Prone Areas*: revised just one year after in 2nd of September, 1997 (Official Gazette, 1996; 1997a).	Aiming to guide building professionals and related institutions participating in building production process that includes all types of constructions in disaster prone areas. It comprises mainly three types of natural hazards; earthquake, fire and flood, whereas other types of hazards have not been included (Official Gazette, 1996; 1997a).
1997	Establishment of the *Prime Ministry Crisis Management Center* (under the regulation number 96/716).	Aiming to organize response and recovery efforts following hazardous events. The Crisis Management Center was responsible from the post-disaster activities in terms of slowing down the impacts of the disaster and rapid response to the affected regions and victims (Official Gazette, 1997b).
1998	**The Western Black Sea Region Floods**	**Large scale floods caused severe casualties and damages on built environment.**
1998	**The Ceyhan-Adana Earthquake**	**A magnitude of 6.2 earthquake killed 146 people along with 31.463 damaged buildings in the region.**

Table 2.12: Legal and Administrative Development in relation to the Disasters in Turkey (1980 – 1999 period) (continuing)

1999	**The Marmara Earthquake (August 17)**	**A magnitude of 7.6 earthquake killed at least 17.118 people. The earthquake produced a 130 kilometers long surface fault between Gulf of izmit and Düzce Province. The intensity of the seismic movement was so large that a number of provinces including Karamürsel, Gölcük, Değirmendere, Yalova, Adapazarı, Kocaeli, Düzce, Bolu, İstanbul, Bursa, Zonguldak and Eskişehir located in different geographical regions of Turkey were affected ranging from severe to slight damages.**
1999	**The Düzce-Bolu Earthquake (November 12)**	**A magnitude of 7.2 earthquake killed almost 1.000 people.**

The disasters (experienced between 1998-1999 period) forced the administration to adopt a new vision in coping efforts. Most of the legal advancements and improvements conducted through the decree law of 1999 (Law Number: 4452) comprised post-disaster issues and particularly recovery activities including arrangements of post-disaster aids, financial aids, resettlement development, construction, contracting, protection of cultural and natural assets, improvement of civil defence works, development of new funds, development of a natural disaster insurance system etc. (Official Gazette, 1999). Table 2.13 summarizes the developments in the period of 1999 - 2011.

Table 2.13: Legal and Administrative Developments in relation to the Disasters in Turkey (1999 – 2011 period).

Date	**Legal or administrative development**	**Disaster Coping Approach**
August 1999 -July 2000	Many legal and administrative documents were published (38 Laws and Decree Laws, 28 Enactments, 6 Regulations, 17 Statements, and 9 Circulars) (Ergünay, 2011).	Most of the legal documents comprised the legislative arrangements prepared for coping with disaster consequences in terms of organizing and running the recovery services and aids.
1999	Establishment of the *Mandatory Earthquake Insurance System* (through a decree law numbered: 587)	For the first time, a compulsory insurance system for hazard reduction has tried to be put into effect. In the following year (2000) the Natural Disaster Insurances Institution was established.
2000	Establishment of *Turkey Emergency Management General Directorate* (decree law number: 583) (Ergünay, 2011) .	Aiming to organize and manage the post-disaster activities.
2000	*Building Inspection* (Decree Law of 595): aimed to enhance and develop more effective inspection activities in order to secure urban safety and health.	Building inspection responsibility have been tried to be transferred from public institutions to the private sector. However, the decree law of 595 was cancelled by the Turkish court due to legal and administrative insufficiencies within the law.
2001	*Building Inspection Law* (Law number: 4708): effective only for 17 provinces until 2012. It is effective all over the country now.	Expectation from this legal and administrative advancement was very high. On the other hand, there have been important problems and gaps related to the law which have been argued among the community for years.
2003	**The Bingöl Earthquake**	**A magnitude of 6.4 earthquake killed 176 people and totally damaged almost 6.000 buildings.**
2009	**The İstanbul (İkitelli-Çatalca) Flood**	**Killed 31 people and destroy urban settlement including residential and industrial areas.**

Table 2.13: Legal and Administrative Developments in relation to the Disasters in Turkey (1999 – 2011 period) (continuing)

2009	Establishment of *AFAD* (*Prime Ministry, Disaster and Emergency Management Presidency*; Law Number: 5902): By this law, three major institutions working in disaster coping issues and which were established formerly were abolished. Those were; Civil Defense General Directorate, Disaster Affairs General Directorate, and Turkey Emergency Management Presidency.	Aiming not only the organization of post-disaster but also pre-disaster efforts such as mitigation and preparedness.
2010	**The Elazığ – Başyurt – Karakoçan Earthquake**	**A magnitude of 6.0 earthquake killed 41 people and totally damaged almost 8.154 buildings.**
2011	**The Van Earthquakes**	**Magnitudes of 7.2 and 5.9 earthquakes hit Erciş town, Van city and many rural settlements in October 23 and November 12 which caused 644 casualties and more than 2200 severly damaged buildings.**

Experiences from both the legal provisions and past disasters have contributed to the development of disaster coping mechanisms in Turkey throughout the history. However, among the other problems, constructing a comprehensive coping policy regarding conceptual shift towards prevention is missing in Turkish disaster and development context.

This section focuses on the chronological advancement and coping struggles with disasters in order to reveal the need for a more comprehensive disaster coping vision. In brief, this chronological order is evaluated under four main periods which are also proposed by several researchers (Şahin, 2009; Akyel, 2007; Şengün, 2007; Uzunbıçak, 2005; Koçak, 2004; Akdağ, 2002; Doğan, 2002; TBMM, 1999):

- The period before 1944,
- The period of 1944 – 1958,
- The period of 1958 – 1999 and,
- The period of 1999 – 2011.

In summary, Table 2.14 shows the evolution and changing policies as well as strategies of disaster coping approaches.

Table 2.14: Brief History of Disaster Policy Approaches in Turkey from 1509 to 2011

Time Period	**Disaster Policy**
Before 1944 (By the 1509 Istanbul Earthquake)	<u>Response activities + limited recovery policies including reconstruction efforts</u>: Dominant role of Healer State, Acts of God understanding, piecemeal planning efforts …
1944 – 1958 (By the enactment of *The Law for the Measures that will be Taken Before and After the Earthquakes*)	<u>Post-disaster policies (response and recovery driven efforts) + very initial and limited pre-disaster activities</u>: Emergence of Traditional DMS, Acts of God understanding, Dominant role of Healer State…
1958 – 1999 (By the establishment of *Ministry of Development and Settlement*)	<u>Post-disaster policies (response and recovery driven efforts) + progressing but insufficient and unintegrated pre-disaster activities</u>: Traditional DMS, shift towards Acts of Nature Understanding, Dominant role of Healer State but very initial ideas for Protector State...
1999 – 2011 (By the devastating and destructive consequences of 1999 East Marmara Earthquakes)	<u>Shifting post-disaster policies (in terms of more effective response, recovery and reconstruction) + shifting pre-disaster activities (in terms of mitigation and preperadness) + Integration attempts of post and pre-disaster activities</u>: Shift Towards Comprehensive DRM Approach, shift towards Acts of Nature Combine with Acts of Human understanding, Healer State shifting to Protector State (but there are very strong resistances to the change by the conventional approach)...

Before the 1944 period, the disaster policy was structured mainly on the relief activities, and highly limited recovery tasks (such as piecemeal planning of disaster stricken areas) were observed.

The period of 1944-1958 indicates the still dominant role of healer state understanding. By the establishment of Civil Defense understanding, traditional DMS started to settle in the country.

The period of 1958-1999 started with the establishment of Ministry of Development and Settlement, which signals the beginning of a more effective period in terms of disaster related concepts. The most distinctive characteristic of this period was the initial steps and policies to reduce the vulnerability of settlements to disasters in general, and to earthquakes in particular. Another important difference was the emergence of initial ideas in order to progress scientific and economic models to reduce the vulnerability of buildings. On the other hand, some attempts were made to integrate pre and post disaster efforts (e.g. publishing of *The Law on Precautions and Aids for Disasters Influenced the Common Daily Life*; establishment of *General Directorate of Disasters Research Institute* under the Ministry of Development and Settlement). Disaster driven-case specific policies and reactive approaches to the disasters continued as well.

Among the other concerns, deficient building code enforcement and integrated inspection approach, missing effective professional training, and highly limited investment on mitigation activities were the main insufficiencies of the 1958-1999 period. The planning and development systems were oriented by market actors which focused on rapid construction that resulted in poor performance of buildings.

The period of 1999-2011 started with the catastrophic events of East Marmara Earthquakes, which killed nearly 18.000 people and resulted in considerable amount of financial loss. The terrifying and dramatic picture of the ruins triggered a shift in disaster policies towards pre-disaster efforts. Among the other issues, building code ordinances and enforcements, as well as inspection processes, were mentioned as serious problematic areas.

Mandatory Earthquake Insurance System and *Building Inspection System* which have come into effect through the related legal instruments after 1999 earthquakes were the prominent progressions that reflect shifting policies towards prevention approach (Table 2.13). However, these developments have not met the demand for a more comprehensive view-point.

2.4.3 Brief Review of Ongoing Turkish Disaster and Development Legislations with regard to HDRR integration

This analysis aims to evaluate the effectiveness and capacity of the legal framework in regard to integration of shifting disasters policy and Turkish context. This analysis is important to develop and re-structure a professional training approach for practicing architects in regard to shifting disaster and hazard understanding in the following chapters.

The Law on Precautions and Aids for Disasters Influenced the Common Daily Life (Disaster Law), Law No. 7269, Issued on May 25, 1959

The first article starts with defining the aim of the law and disaster types such as earthquake, fire, flood, landslide, rock fall, avalanche, and subside.

The articles 2 and 3 arrange the responsibility of planning and development practices in hazard prone areas. However, hazard prone area is defined insufficiently and covers only specific hazards such as seismic hazard and flood hazard. The responsibility of public institutions related to planning and development in hazard prone areas is not clearly defined in the related articles.

Further, response plans and activities of institutions are presented (in articles 4, 6, 7, and 9). These activities mainly focus on search & rescue operations, and relief efforts.

It is seen that the works of observatory units are limited with post-disaster announcement responsibility (article 8).

For example, article 13 particularly focuses on the demolition and/or retrofitting of damaged buildings and temporary shelters following disasters.

Article 15 pertains to planning and land use in disaster prone areas or post-disaster resettlement areas. However, this article has a limited planning definition and does not allow for public participation. This once again demonstrates the piecemeal approach to planning following a disaster.

Article 16 is geared to organize the resettlement and post-disaster reconstruction approaches which are very typical of traditional DMS. Post-disaster reconstruction approach remains ineffective due to refusing comprehensive planning approach and deficient reconstruction activities which do not suit the victims' needs and environmental conditions.

The law includes the arrangement of financial issues including right ownership, indebtment, loans, aids and funds, and post-disaster reconstruction issues through many articles. However, these attempts which seem to be sole loss compensation do not help to reduce social, economic and physical vulnerabilities. Moreover, loss compensation approach does not bear any amelioration to raise the awareness and prevention capacity within the community. To sum up, the law is lack of 'mitigation' understanding wherein the dominant role of healer state approach is clearly observed.

Professional architects are charged with assessing damage when necessary through article 13 (item "a") of the law. This is the only case where the "architect" term is used. Parallel to the general aim and scope of the law, architects are mainly engaged in post-disaster works. The law does not really guide as to capacity development of architects in disaster coping efforts from a comprehensive mitigation view-point. Building professionals' responsibility and working area are only partially defined, excluding effective participation and interdisciplinary works. Designing, implementing and granting these buildings according to typical-projects which are determined by the related ministry are encouraged through the law (temporary article 13). Designing in accordance with economic, socio-cultural, climatic and environmental conditions is ignored, or limitedly included, in the typical-project approach. Involvement of local administrations and communities are totally excluded from resettlement and reconstruction works. Locals do not engage in any phase of reconstruction activities.

Development Law, Law No. 3194, Issued on May 09, 1985.

The document does not cover any of the shifting disaster understanding and coping approach in the international agenda, which is further discussed in the following chapter.

The first article defines the aim of the law related to the control of building production process through planning, science, health and environment. In this definition, one of the most important missing concepts is 'safety' term.

Both article 6 and article 8 define the planning types. However, they do not integrate any of them with the prevention approach in terms of mitigation planning. The law does not clearly define the responsible institution that will prepare and implement disaster mitigation plans and ordinances.

Article 9 and 10 organize the execution process of planning by related ministry and provincial organizations. Mainly it is focused on the bureaucratic system and execution tasks. Articles between 10 and 20 arrange the works related to expropriation of lands and buildings on those lands. Mitigation is not included in the process related to expropriation of land.

Article 20 and article 21 define the building permission process and inspection system. If any changes have been done to the building system following occupancy permission, structural re-inspection and re-permission documents are required to renew the building occupancy permission. In this case, there may be danger from various changes in the characteristics of the building ranging from functional use to non-structural building components including building exits, fire safety instruments, stairs etc. Considering only the structural issues and excluding other building components and characteristics from re-inspection and re-organizing building permission process is too risky. The law should enforce a more holistic approach for the safety of a building and its environment.

Article 26 organizes the building permit for public buildings including hospitals, municipality buildings, governmental buildings, housing units all of which are constructed by public institutions. Interestingly enough, those buildings are exempted from regular inspection and building permit process[18].

[18] Article 26 (in Turkish): "Kamu kurum ve kuruluşlarınca yapılacak veya yaptırılacak yapılara, imar planlarında o maksada tahsis edilmiş olmak, plan ve mevzuata aykırı olmamak üzere mimari, statik, tesisat ve her türlü fenni mesuliyeti bu kamu kurum ve kuruluşlarınca üstlenilmesi ve mülkiyetin belgelenmesi kaydıyla avan projeye göre ruhsat verilir… Devletin güvenlik ve emniyeti ile Türk Silahlı Kuvvetlerinin harekat ve savunması bakımından gizlilik arz eden yapılara; belediyeden alınan imar durumuna, kat nizamı, cephe hattı, inşaat derinliği ve toplam inşaat metrekaresine uyularak projelerinin

Article 27 arranges building permission issues related to buildings that will be constructed in villages. The same article also indicates that in village areas which do not have a regular development plan, many public buildings including schools, health facilities and security buildings do not have obey any development plans. Apparently, unplanned development practices and illegal buildings constructed without building permits are encouraged by the legislation. Article 26 and 27 indicate mainly buildings exempt from building permits. Nevertheless, these buildings are widely classified. Clearly, these articles are not consistent with the mitigation point of view, in particular comprehensive building inspection system (BIS) approach. A more detailed analysis related to 'exempt building process and approach' is presented in Chapter 4.

Article 28 focuses on the issues related to the responsibilities of building professionals (planners, engineers, architects etc.) and building contractors. Although providing safe built environment is one of the main responsibilities, the article does not cover or guide with any safety issues about building professionals' competency. This article arranges many bureaucratic concepts; however, these definitions and concepts blur the responsibility sharing and participative approaches as well as interdisciplinary studies. The responsibility of building professionals is defined separately according to different disciplines but comprehensive side of building production process is not taken into account. The same article only superficially describes the building inspection process, and the inspection responsibility of building professionals. However these definitions contradict with another major law's (Building Inspection Law; No. 4708) scope and contents.

Most of the other articles mainly focus on bureaucratic and regular concepts related to the enforcement of law.

Balamir (1999: p.99), who criticizes the current Development Law (Law 3194) as it does not include any community participation process, states, "major amendments need be made in the Development Law". He adds the following:

> *A general upgrading of control, a unification of powers of planning, structuring of a comprehensive hierarchy of interrelated plans, incorporating 'participation', 'protection', 'renewal', 'urban design', 'property management' processes into planning, as aspects omitted up to now will not only complement the existing planning functions but also improve the background for disaster management operations.*

Development Regulation (for Planned Areas), Issued on November 02, 1985

This regulation has developed to regulate and enforce the Development Law's scope and contents. Although the regulation has enacted to be implemented all over the country in the same way, every municipality has the responsibility and right to add necessary articles which they need to implement in their provinces due to specific characteristics of their regions (article 3 and article 6).

Article 5 indicates that the regulation has to be consistent with some other regulations[19] in terms of the effectiveness of building production process.

Article 7 exempts some buildings (example: industrial buildings) from the related articles of this regulation in terms of building scale and size such as depth and height.

Articles between 12 and 17 define the specific terms related to building and building site, as well as building professionals. Neither these definitions nor the previous articles comprehensively explain the terms or concepts related to safety issues. Item 28 (within the Article 16) defines the building professionals. However, the only criterion is to have a diploma in the related discipline. The regulation makes no mention of any other education and training concepts which enhance the capacity of building professionals. This approach also does not encourage capacity development

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kurumlarınca tasdik edildiği, statik ve tesisat sorumluluğunun kurumlarına ait olduğunun ilgili belediyesine veya valiliklere yazı ile bildirdiği takdirde, 22 nci maddede sayılan belgeler aranmadan yapı ruhsatı verilir."

[19] *Regulation for Fire Prevention of Buildings* (issued in 21.11.2007); *Regulation for Thermal Insulation* (issued in 08.05.2000); *The Regulation of Buildings in Earthquake Prone Areas* (issued in 06.03.2007); *The Regulation on Constructions in Disaster Areas* (issued in 14.07.2007).

practices through related training and certification models which are very important for building professionals.

Article 23 defines the hazardous areas which are prone to flood, landslide and rock fall. Other hazard types are not included within the regulation. This indicates a fragmented view which does not support capacity enhancement among building professionals in comprehensive safety understanding.

Most of the other articles are about technical details related to building components, building site and minimum approach distances related to neighboring sites, buildings and streets, building heights and depths, very limited and brief inspection concepts etc. Article 59 defines and determines the exempt buildings related to public institutions for obtaining regular building permits.

The Regulation on Constructions in Disaster Areas, Issued on July 14, 2007

This is a very short regulation which consists of nine articles (in Appendix D). The first two articles (articles 1 and 2) define the aim, scope and bases of the law. The regulation is produced according to and based on the Disaster Law (No. 7269). The last two articles (articles 8 and 9) cover the regulation enactment date and the responsible ministry.

The regulation is constructed on five natural hazard type: avalanche, landslide and rockfall (defined in article 4), flood (defined in article 5), fire (defined in article 6), and earthquake (defined in article 7) (in Appendix D. The concepts and issues related to technical and financial management of these hazards are referred to by mainly the Disaster Law and some other regulations such as *Building Materials Regulation*, *Regulation for Fire Prevention of Buildings*, and *The Regulation of Buildings in Earthquake Prone Areas*.

The regulation is not prepared in a holistic view-point and remains ineffective. It is very limited and does not give any reference to achieve any efficient mitigation issues properly.

The Regulation of Buildings in Earthquake Prone Areas, Issued on March 06, 2007

It is a very detailed and comprehensive technical document, but particularly focuses on structural issues from an engineering point of view.

The structural issues are organized according to earthquake resistant design tasks. Not only the new buildings but also the existing ones are subject to this regulation. It applies to concrete, steel and masonry building types. Building type definitions given in the article 2.12 (within the regulation) indicate the boundaries of the document related to buildings which are subject to the regulation. According to this definition, this regulation does not cover bridges, dams, harbor and coastal buildings, tunnels-subways, pipelines etc. (articles 1.1.5, 1.1.6, 1.1.7).

Section 2 of the regulation arranges the definitions and calculation methods related to disaster resistant structural systems. This calculation is used to classify irregular building types which are exposed to seismic forces and thus physically susceptible.

Section 3 focuses on earthquake resistant concrete structures. Section 4 arranges the issues and calculations for earthquake resistant steel structures. Section 5 organizes the rules related to earthquake resistant masonry structures. Section 6 is concerned with calculation methods for earthquake resistant foundation base and other foundation systems. Chapter 7 deals with assessing the strength of existing buildings by seismic retrofitting methods. In short, the regulation provides valuable information for and makes important contribution to structural performance of regular buildings. The regulation guides the building professionals through major calculation methods.

However, the most comprehensive regulation is structured on only earthquake hazard and reveals the important concepts from a structural point of view. Many issues including resistance of non-structural elements which need to be evaluated within the seismic design approach are excluded.

The regulation view is highly fragmented and incomprehensive. Beside some technical arguments and specific concerns related to structural issues, the regulation does not provide practicing architects with guidance for professional competency. The regulation is not consistent with the formation of architect which constitutes integration of structural, constructional and design formative approaches. Architects as one of the important participants in building production process need to understand and be aware of different hazards and safety concepts related to built environment. Single-hazard approach, fragmented view, and missing conceptual framework within this regulation result in ineffective participation of practicing architects in the building production and inspection concepts.

Disaster Insurances Law (Compulsory Earthquake Insurance), Issued on May 09, 2012

The law is composed of 18 articles. The primary aim of the law is the insurance of losses and damages caused by earthquake. Other disaster types are not defined clearly. 'Risk' term is used for the first time in a legislative document. The second article gives the definitions related to the law. However, many important concepts of disaster mitigation are missing such as hazard, risk, and mitigation planning. The definitions need to be broadened in order to make clear the scope and contents of the document, and provide standardization and integration through the terms used in other disaster and development related legislations.

From article 3 to 9, foundation, functions and responsibilities of the Turkish Catastrophe Insurance Pool (TCIP) are defined and arranged.

Article 10 establishes the extent of insurance and exempt buildings (public buildings-houses, buildings in villages etc.). It is emphasized that insurance and renewing it every year is obligatory for homeowners.

Article 11 defines the control mechanisms of insurance system and whether homeowners use the system or not. Accordingly, sanctions are defined. It is advised to develop also the control mechanisms for insurance renewal system, though its control mechanism is unclear.

Article 12 arranges the issues related to homeowner responsibility. Article 13 defines the assessment and utilization of insurance premiums. Articles 12 and 13 mainly focus on the structural system stability whereas other hazardous systems are not included.

Other articles are related to running of the law and bureaucratic issues.

This law is one of the most important advancements in disaster related legal arrangements made after the 1999 East Marmara Earthquakes. The main deficient points in this law are as follows:

- Insufficient and missing conceptual framework,
- Lack of standardization in conceptual approach with regard to other disaster and development related legislations,
- Lack of local administrative participation,
- Lack of public participation and encouragement mechanisms for homeowners and local governments,
- Missing integration with other legal documents,
- Deficient integration with other disaster mitigation components of shifting policy and disaster coping strategies,
- Poor definition and extent of exempt building types.

The laws and regulations mentioned and analyzed in this section cover the major disaster and development related legislative documents in Turkey. However, another important legislation, Building Inspection Law, which is determined as the core concept within this study, is analyzed in Chapter 4. Analysis of the legislative documents in this section will help to identify the insufficiencies of the building inspection and related law. It is hoped that these analyses will contribute to the re-structuring of the continuing professional development system for practicing architects in Turkey in the following chapters.

2.5 Problems and Critical Evaluation of Traditional DMS Approaches

The disasters experienced in different parts of the world and by different communities have considerable effects on improving disaster coping efforts. The social, economic, cultural and political structures of the communities influence the degree and characteristic of disaster perception, as well as coping efforts.

According to Geis (2000; p. 151),

> *we still think of these cataclysmic events as ''natural disasters,'' acts of God, over which we have little control. But in fact this is often not the case. More times than not these so called natural disasters are not natural at all, but rather human-made disasters—the result being less of the extreme natural event itself, than that of the inappropriate way we have designed and built our communities and buildings in the hazard-prone areas where they occur.*

The diverse impacts of disasters, changing characteristics of hazardous events, unpredictable structure of emergency and disaster situations combine with vulnerable structures of the communities in today's society. That combination reflects the weaknesses of the society and arouses suspicion on the effectiveness of DMSs.

According to Handmer and Dovers (2007: p.6), emergency and disaster-related institutions and policy processes such as traditional DMS or emergency management approach were not developed for achieving long-term strategic policies. Schneider (2009: p.15) argues that the traditional DMS "tended to be event or disaster driven, and its primary focus was on response and recovery with a narrow focus on technical capabilities". In that sense, for planning response purposes, disasters are seen to affect a specified area for a specified time (Handmer and Dovers, 2007: p.6). The traditional DMS is actually a more reactive and less strategic approach.

According to Chang (2012), the traditional DMS mainly concentrates on the resistance of the community to the hazards and disasters through mitigation planning and effective response and recovery efforts. Chang criticized the fragmented aspect of the traditional model, which solely considers physical mitigation activities whereas other social, cultural and political triggering agents and functional areas are not taken into account in coping strategies. This partial approach to the disaster management is the major weakness of the traditional system.

Alarslan (2009) asserts that the disaster resistance approach observed in the traditional DMS decreases the elasticity and flexibility of the system, making it difficult to meet the particular challenges of the various natural disasters. Alarslan adds that with regard to the uncertainty of natural disasters, traditional system reveals its deficient capacity to cope with hazardous events in a broader sense.

Feike (2010: p.36) explains the importance of vulnerability and disaster coping effort relation, and asserts that "in order to reduce the vulnerability of communities to disasters, it is important to understand what resources can be employed to minimize the adverse effects of hazardous situations". However, due to its disintegrated and heavily centralized structure that does not take into account public participation, the traditional DMS has a very limited capacity to evaluate disaster phenomena in a broader sense. It is emphasized that, because of this limited nature of the traditional system, which solely breeds response-based function and concerns limited responders, DMS cannot use long term planning strategies and cannot foster public participation within a large scale and comprehensive cycle, thus fails to cope with disasters (Schneider, 2009: p.4; Handmer and Dovers, 2007: p.6; Stager, 2009: p.28).

It is strongly required to change "the policies of today that rely heavily on sending assistance only after tragedy has occurred" Comfort (et al. 1999: p.39). The following is also contended:

> *Decisions taken in response to a specific disaster become defining elements for the (temporary) resolution of that crisis, but also likely steps toward the creation of the next crisis… Reconstruction efforts intended to restore the community only to its previous level before the disaster often perpetuate the conditions that create vulnerability. Little is done to prevent the recurrence of destructive consequences. Rather, typical actions recreate conditions that make an area vulnerable to the next disaster…*

Due to preparedness approach only for post-disaster activities (response & recovery phases), resources will be squandered, and cycles of blame will occur (Handmer and Dovers, 2007: p. 6).

To conclude, enhancement of the ineffective and deficient structure of traditional DMS, and development of a broader and more comprehensive vision on disaster understanding is on the international agenda.

Critical Evaluation of Traditional DMS in Turkish Context

The statistics presented in the previous sections related to disaster profile of Turkey reveals the expanding and diversifying impacts of natural and other disaster types on built environment. This indicates the scale, extent and multifacetedness of the problem area.

- **Problems related to land-use practices**

As some hazard prone areas are on lands attractive for transportation ease and productive soils, population may grow in seismically hazardous areas. These are sometimes very close to, or even on the fault lines or flood plain regions that are exposure to the flood threats such as inundation, mud-floods, landslides and rock falls or filled lands settled on sea sides and lake shores which are exposed to liquefaction. For instance, Balamir (2007: p.38) points out the inconvenience of the location of Bolu – Gerede province, which has been settled on one of the major fault lines, North Anatolia Fault Line (NAFL). Important buildings (such as prison, public buildings, hospital, schools, administrative and municipal buildings, trade center and industry) are located on the main road that continues from west to east direction, which is also following the NAFL. He (2001: 2007) also stresses that some of the other settlements in Turkey are on productive agricultural areas that are less safe in terms of seismic hazards.

Following the Second World War, a rapid urbanization has started which has also forced to change the overlook on to the urban and urbanization (Tekeli, 2006). Hence, this rapid urbanization period has increased the pressure on urban areas and brought out many problematic areas ranging from infrastructure to transportation and sanitary. Today’s fragile environment and vulnerable structure has descended from the previous ill-structured land use practices due to deficient development policy and strategies.

Traditional DMS in Turkey does not focus on the root causes of disaster impacts which are resulted from insufficient land use practices and deficient or missing planning decisions. Therefore, there are not effective mitigation approaches in order to regulate and control land use practices through effective planning and legislative mechanisms. The traditional DMS does not have any connection with the ongoing development related laws and regulations..

- **Problems related to administrative, organizational and institutional policies on disaster coping efforts**

Gülkan (2001) stresses that unsuccessful pre-disaster efforts including mitigation approaches in terms of legal, administrative and institutional systems indicate that Turkey is a country of legitimized irresponsibilities. These weaknesses of the DMS result in corruption and failure in case of disasters.

According to Alarslan (2009), the existing institutional organization and legislation mostly concentrate on disaster response and recovery activities. On the other hand, pre-disaster precautions are inadequate. Alarslan (2009: p.101) also asserts the other defective approaches even continuing aftermath of the 1999 earthquakes as follows: concentrating to improve the disaster response organizations, missing or insufficient public training, disaster recognition and awareness activities, and lack of effective quality control and construction standards.

Before the foundation of AFAD, which has unified all responsible DMS institutions under single authority, the DMS is criticized for being multi-headed. However, the current situation of AFAD still bears the former problems and critics in terms of deficient combination of cyclic structure of the DMS due to insufficient institutional and organizational constraints. On the other hand, the insufficiency of legislative system, including major laws (such as Disaster Law, Development Law and related regulations) does not correspond with the institutional organization of DMS.

- **Problems related to conceptual evolution and understanding of disaster phenomena through deficient disaster coping efforts**

Balamir (1999; p.96) asserts that traditional disaster policy of the state is a typical of “healer state” behavior. The healer state has a response strategy which is followed by ad hoc activities, rehabilitation and reconstruction efforts. In that sense, the main duty and the function of the state lays on urgent financial support including post-disaster housing programs and debt relief or suspension for the disaster area. On the other hand, all the post-disaster efforts are short term activities, and that means the community will not be prepared for the next crisis or disaster. In short, the government is spending a great deal of money on projects that are not well coordinated (Carafano, 2006). “Sending money” to disaster prone areas has been preferred instead of “setting all necessary standards” in disaster prone areas. Healer State standpoint reflects the immature evolution of the conceptual understanding of disaster phenomena among the political authorities.

Alarslan (2009) prioritizes the deficient point within the traditional DMS from conceptual evolution point of view. The existing legislations do not comprehend specific and important terms and concepts which are reflecting the diversifying and changing characteristics of disaster phenomena.

- **Problems related to participatory capacity of the traditional DMS**

Among the other problematic issues, the lack of professional and community participation before and after disasters are stressed as the missing parts of the traditional DMS.

The “healer state” which represents the single authority in dealing with disaster is associated with the symbolic representation of the vertical (top-down) management system. If the scope of a hazardous event exceeds the coping capacity of the state, the healer state image loses confidence very quickly and causes the growth of distrust and stress among the community. Therefore, the political approach and power strongly influences the success or failure of mitigation and recovering efforts (UNISDR, 2004; Hyogo Framework, 2005; World Disaster Report, 2002; OECD, 2006; Balamir, 2006; The Chamber of Turkish Geological Engineers, 2006; Ergünay, 1999;).

Alarslan (2009: p.102-103) claims that

> *several disaster mitigation activities revealed a lack of coordination between central and local authorities. There are some fundamental reasons behind it. First of all, Turkey is a central state with a strong central government. Secondly, many disaster-related responsibilities are bestowed on ministries and other central authorities due to the fact that central authorities have better financial resources and technical personnel than local authorities. Although local authorities are easier accessible and are more familiar with local conditions, central authorities in Turkey traditionally wield most powers. In order to improve cooperation and coordination among central and local authorities in the disaster mitigation process, a new system should be developed with devolution of competencies to local authorities, NGOs, and various organizations of local community.*

The healer state approach and lack of community participation in the mitigation activities results in production of an immobilized community which is symbolized through the “fatalist” term by Balamir (2005). “A community with no mitigation policy or practice could be identified as ‘fatalist’ where only actions for emergency conditions are accommodated” (Balamir, 2005; p.1).

Ergünay claims that

> *this is the most pervasive characteristic of the system, and certainly the most difficult attitude to correct. While the disaster management system in Turkey requires the integrated cooperation of a large number of ministries and other agencies, it does not contain instruments or mechanisms which would force the active participation of the communities face with hazards. It is highly paternalistic, and gives assurances to the people that the all-powerful state will eventually replace all lost property, rebuild every shop, and rehabilitate affected economic investments through low-interest loans, debt annulments and free credits* (1999; p.7).

Karancı (et al. 1996) assumes that the capacity of local community in coping with hazardous events is seen as an important factor to develop effective mitigation and preparedness, and adds that

> *in the long term, it is very important to have plans for disaster mitigation and to create community awareness for ... future disasters and to empower local communities and authorities by giving information on how to mitigate future disasters. For the sustainability of disaster management plans it is essential to institute community participation.* (Karancı et al., 1996: p.37)

- **Problems related to shifting resistance towards a more comprehensive and effective system**

There is a constant resistance to eliminating the deficiencies of the traditional DMS. As a matter of fact, Balamir (1999: p.101) states that

> *disaster management is one of such areas of activity that a case for more intensive planning control powers could have greater legitimacy...it will be appropriate to underline here the fact that the planning system in Turkey has no provision whatsoever for participation processes which would otherwise improve the nature of control in the system and to structure a more democratic process of arbitration, pulling the system away from a model of 'fatalism'.*

Correspondingly, Ergünay (1999: p.9) affirms the critical point of resistance to alteration of DMS through the ongoing Disaster Law:

> *The DMS in Turkey is defined in terms of an elaborately drawn up system of statutory regulations in accordance with a master plan contained in a comprehensive law passed in 1959. The system is centralistic in character, and is handled largely by the government and its agencies. The institutional character undermines the initiative and power of local governments, and limits community participation.*

- **Problems related to public awareness and professional training initiatives**

Several studies point out the deficient approaches of the traditional DMS in terms of capacity enhancement of both the public and professionals in disaster concept (METU, 1998; Gülkan et al., 1999; Gülkan et al., 2003; Balamir, 2001b, 2004b-c, 2011; Karaesmen et al., 2004). The problems related to public education and professional training (particularly competency and awareness enhancement of building professionals) are revealed deficient and many times missing approaches within the DMS. Institutional, legal, technical, ethical and social components of education and training approaches in order to construct disaster culture among the community are seen one of the foremost problematic areas.

In one of the recent studies, Balamir (2011: p. 1-7) claims that through an international campaign which was developed by United Nations (in Incheon Confererance of 2009), many local administrations that participated in this campaign focused on public education and training initiatives among the other important approaches.

Balamir (2001b) also asserts that "Disaster preparedness … is part of social policy; alertness is sustained through education, frequent exercises, training and inspections". He emphasizes the importance of a strong interaction between practice, research, and training activities for a more comprehensive vision of disaster phenomena.

Analysis of Graduate Studies Conducted in Turkey

In order to understand the conceptual development and approach to disaster concept through the graduate studies conducted in Turkey's universities, an analysis is carried out. To evaluate the trend of these studies particularly after the triggering affect of 1999 East Marmara Earthquakes, graduate studies related to the period of 1999-2012 are included within this analysis. Mainly two key words are searched within the thesis key words and abstracts; these are disaster and earthquake. The search is conducted through the Thesis Monitoring Center of Higher Education Institution of Turkey (*YÖK* in Turkish). YÖK National Thesis Database Center (available from: http://tez2.yok.gov.tr/) was visited several times between the years 2008-2012. Totally 524 theses (177 thesis related to 'disaster' term and 347 thesis related to 'earthquake' term) were found. Appendix C overviews the results of this analysis.

Among the other concepts, various graduate studies focused on the deficient approaches in traditional DMS. These studies drew attention to ineffective and missing points related to the current DMS in Turkey. Appendix C gives the main arguments and titles related to critical evaluation of traditional DMS approach which covers the main idea and structure of some of the graduate studies conducted in Turkey.

2.6 Conclusion and Evaluation of the Chapter

Ineffective, missing, deficient and discouraging points and concepts related to the traditional DMS have emerged in several studies (Balamir, 1999, 2000, 2001b, 2002a, 2004a-b-c, 2007b, 2009, 2011; METU, 1998; Gülkan et al., 1999; TBMM, 1999; Ergünay, 1999; Gülkan, 2002; Gülkan et al., 2003; Karaesmen et al., 2004; Genç, 2007; Erkan, 2010). These issues are critically evaluated in the previous section. Figure 2.12 summarized these evaluations and problem areas.

The chapter underlines the deficient and missing mechanisms of the traditional DMS through both international and national disaster related statistics, experiences, researches and critics including graduate studies conducted in Turkey. Following the brief analysis of problematic areas within the current disaster coping understanding in this chapter, it is revealed that traditional DMS remains insufficient to meet the changing characteristics of disaster phenomena due to its fragmented, lack of participatory and capacity enhancement approaches, and missing conceptual structure.

In particular, the traditional system is incapable of allocating and orienting its sources and mechanisms to re-define, re-organize, re-structure and transform itself according to shifting understanding and demand on a new vision to disaster coping system. One of the most important capacity development approaches is training of professionals. Particularly building professionals participating in pre-disaster works which mainly focused on mitigation activities have deficient and/or missing training advances. Capacity enhancement of building professionals through the training process remains one of the core problematic areas within the traditional DMS.

The traditional DMS which is dominated by response and recovery processes produces ill-structured and insufficient solutions which also obstruct the newly emerging conceptual and practical vision for coping with [modern] disasters. Therefore, the chapter summarizes the arguments underlying the need for a new vision and the clues of fundamental steps to develop that vision. The following chapter identifies, and explains the new vision and shifting approach towards more holistic and sustainable disaster coping understanding. In the following chapter, it is briefly revealed of missing professional capacity enhancement through training approach. This remains ineffective conceptual and practical understanding among the traditional DMS. A demand to re-conceptualizing disaster phenomena and coping strategies particularly for building professionals under the illumination of shifting understanding in disaster coping mechanisms is presented in the following chapter as well.

Figure 2.12: Briefly summarized view of deficient and missing concepts which result in ineffective traditional DMS approach in Turkey

CHAPTER 3

Towards a New Approach in Disaster Coping: A Paradigm Shift from Resistance to Resilience Approach

3.1 Introduction

The deficient approaches and low capacity of traditional DMS to cope with disasters are summarized in the previous chapter. The demand for a new vision has emerged from the insufficient capacities of the ongoing DMS. In order to cope with the disaster phenomena more effectively, institutions and governments have developed a new and more holistic vision..

A shift from reactive coping approach towards proactive coping understanding, which has emerged in 1990s in the world, is discussed in this chapter. The realization that it is more difficult to confront catastrophic losses with the traditional DMS led to a new vision, which is defined as holistic disaster coping approach, and has influenced the development of new concepts. The chapter explains these new concepts to clarify the holistic view. Following the key word definitions, a brief development story of the conceptual holistic disaster coping approach is presented. What follows is the explanation of fundamental components related to the new approach. Implications of the integration of this new vision with the Turkey context are discussed a from holistic disaster coping view-point. As an important component of the holistic approach, safety understanding in built environment development is described. Safety of built environment in general, and safety of buildings in particular are all directly associated with controlling or inspecting domain of building production system. The integration of the holistic disaster coping approach with the building inspection system is elaborated.

3.2 Definition of Terms in Holistic Disaster Coping Approach: risk (Disaster Risk Management-DRM, Disaster Risk Reduction-DRR), resilience and safety

Risk

Risk is defined as "the combination of the probability or frequency of occurrence of a defined hazard and the magnitude of the consequences of the occurrence" (UNSW, 2006). More specifically, risk is defined as "the probability or likelihood of harmful consequences, or expected particular level of loss of the elements (consist of lives, people injured, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human induced hazards" (Alexander, 2000; ESPON, 2003; ADRC, 2006; ISDR, 2009).

Risk is also defined as "the objective (mathematical) or subjective (inductive) probability that the hazard will become an event. Related risk factors are constituted by personal behaviors, life-styles, cultures, environmental factors, and inherited characteristics that are known to be associated with health-related questions" (Disaster Terminology, 2005).

ADRC (2005) and Hori (et.al. 2002) explain the disaster risk as a function of the hazard, exposure and vulnerability as follows:

"*Disaster Risk = function of (Hazard, Exposure, Vulnerability)*"

In addition, risk is very conventionally expressed through the equation of (UNDP, 2004):

"*Risk = Hazard x Vulnerability*"

[Disaster] Risk Management (DRM)

Schmidt-Thomé (et al., 2007) defines DRM as "the process of intervening to reduce risk; the making of public and private decisions regarding protective policies and actions that reduce the threat to life, property, and the environment posed by hazards". According to ISDR (2009) and Reliefweb (2008), DRM is “the systematic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards”.

In a broad sense (Disaster Terminology, 2005), DRM “encompasses choices and actions for communities and individuals which are designed to: a) stop increasing the risk to future elements that will be placed at risk to natural and technological hazards, b) start decreasing the risk to existing elements already at risk, and c) continue planning ways to respond to and recover from the inevitable natural and technological hazard, including the imponderable extreme situation or catastrophic event”.

In order to understand and evaluate the DRM, a more comprehensive standpoint is needed. As Balamir (2001; 2004; 2007) claims, traditional DMS proposes separate phases in the experience of a natural hazard and denies the need for a comprehensive disaster management policy and approach. Balamir also adds that the traditional policy still confines the pre-disaster activities including risk reduction as a separate phase and denies the cyclic structure of the mitigation approach. Figure 3.1 clarifies both the new policy of DRM and the new concepts which also include disaster risk reduction (hereafter DRR) phase.

[Disaster] Risk Reduction (DRR)
“The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards within the broad context of sustainable development” (Schmidt-Thomé et al., 2007). In other words, DRR indicates “selective applications of appropriate techniques and management principles to reduce either the likelihood of an occurrence or its consequences, or both” (Schmidt-Thomé et al., 2007).

ISDR (2009) defines the DRR as “action taken to reduce the risk of disasters and the adverse impacts of natural hazards, through systematic efforts to analyze and manage the causes of disasters, including through avoidance of hazards, reduced social and economic vulnerability to hazards, and improved preparedness for adverse events”. ISDR combines the DRR activities with the aims and outcomes of Hyogo Framework for Action (HFA). In that sense, “a comprehensive approach to reduce the risks of disasters is set out in the United Nations-endorsed HFA (in 2005). Its five priorities for action cover the following elements: (1) the necessary institutional basis for implementing disaster risk reduction, (2) risk assessment and early warning, (3) knowledge, innovation and education, (4) reduction of the underlying risk factors, (5) preparedness for response. The International Strategy for Disaster Reduction system provides a vehicle for cooperation by Governments, organizations and civil society actors toward achieving the Hyogo Framework for Action’s expected outcome, namely “The substantial reduction of disaster losses, in lives and the social, economic and environmental assets of communities and countries.” Note that while the term “disaster reduction” is often used, the term “disaster risk reduction” better helps recognize the ongoing risk of adverse events and the ongoing potential to reduce these risks” (HFA, 2005).

Balaban (2009: p.33) cited from IEMS (2002)[20] that “DRR efforts include measures that reduce or minimize the effects of disasters on a community. An initial assessment of hazard, vulnerability and risk ought to be carried out. In order to identify principles of suitable locations and high standard of constructions, to form the physical infrastructure of society, development of legal and economic methods ought to be fulfilled. Additionally, to mitigate impacts of disasters, necessary precautions that will be undertaken by individuals, local communities and organizations among the whole society ought to be defined. This can be achieved by institutional and educational methods”.

[20] IEMS (2002): International Emergency Management Symposium (IEMS) (2002) Output Report, Ankara.

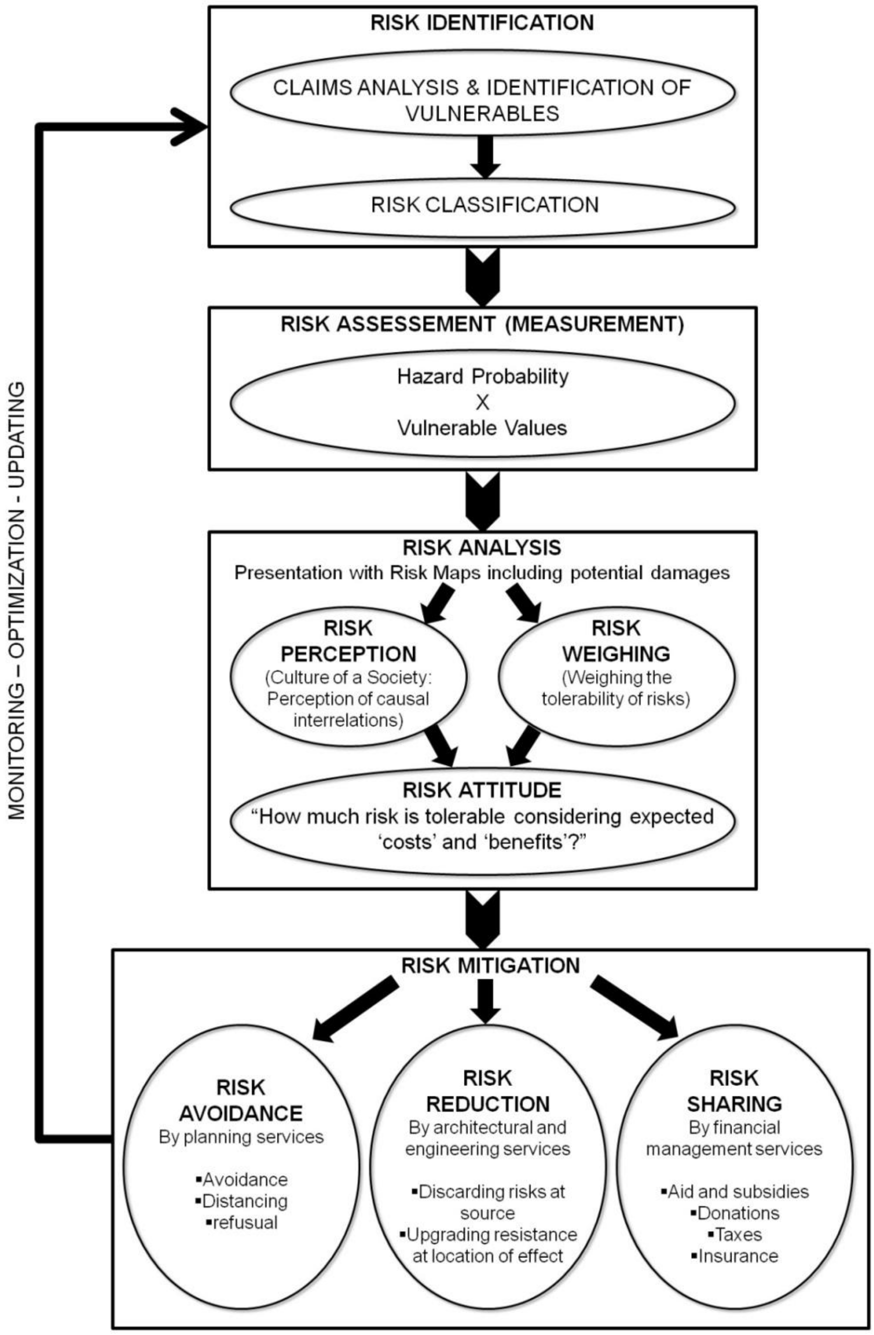

Figure 3.1: DRM Structure and phases illustrated in general. Reproduced from Balaban (2009: p. 43)

Resilience

Resilience term, which is also used as the opposite or inverse of vulnerability (Disaster Terminology, 2005) in disaster studies, is another significant concept that is needed to be clarified. It is defined as "the ability of a system, community or society exposed to hazards to withstand, absorb, accommodate to and recover from the effects or impacts of a hazard in a timely, faster and effective manner, including through the preservation and restoration of its essential basic structures and functions" (Department of Human Services, 2000; Schmidt-Thomé et al., 2007; Reliefweb, 2008; ISDR, 2009). In that sense, "resilience means the ability to 'resile from' or 'spring back from a shock'". The resilience of a community in respect to potential hazard events is determined by the degree to which the community has the necessary resources and is capable of organizing itself both prior to and during times of need" (ISDR, 2009). In other words, resiliency means (Disaster Terminology, 2005) "pliability, flexibility, or elasticity to absorb the event… As resiliency increases, so does the absorbing capacity of the society and/or the environment." Buckle (1998) explains the term as "the capacity that people or groups may possess to withstand or recover from emergencies and which can stand as a counterbalance to vulnerability".

From the above explanations, the human-hazard relation can be illustrated as in Figure 3.2 with regard to new concepts of DRM approach.

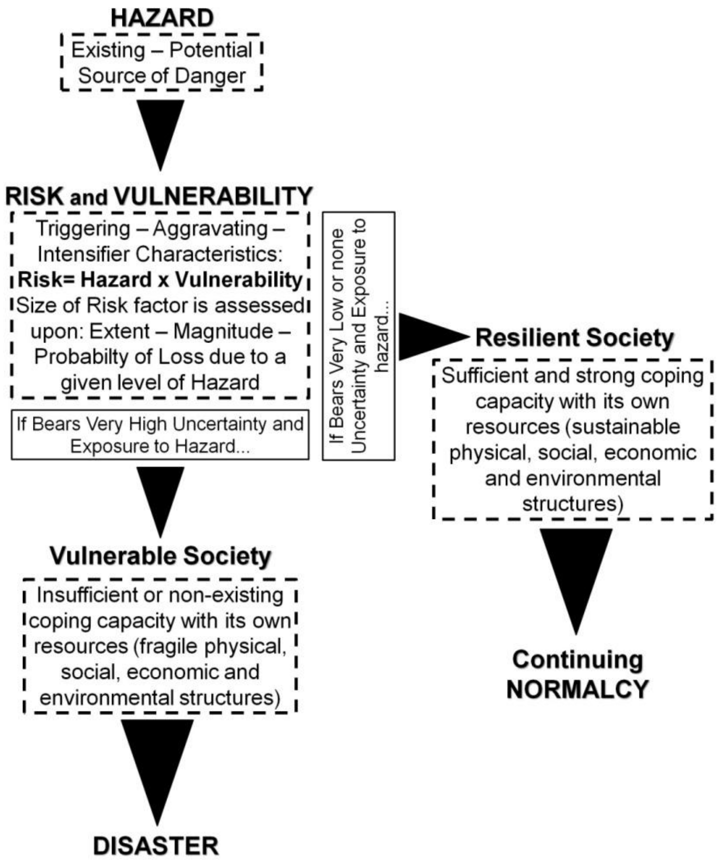

Figure 3.2**:** Hazard and Society relation structured through the new concepts of DRM approach.

Safety

In relation to disaster and other terms, *safety* is defined as "the condition of being safe from undergoing or causing hurt, injury, or loss" (Merriam-Webster, 2011). Nilsen (et al. 2004) cites the definition of safety as "a state or situation characterized by adequate control of physical, material, or moral threats'', and which ''contributes to a perception of being sheltered from danger". In addition he points out that,

> *a key point of the World Health Organization (WHO)'s definition of safety is that it has two dimensions: an objective dimension, which can be seen as behavioral and environmental factors measured against external criteria, and a subjective dimension, which can be variously defined as the individual's internal feelings or perceptions of being safe (which can be aggregated to the macro level, to represent the community's subjective safety perception)* (Nilsen et al. 2004: p. 71).

Various hazards threaten the safety of people in a built environment. Yung (2006) defines *safety* from a physical point of view, within the building scale. Yung (2006: p.2) points out that "our day-to-day life is closely related to our living built environment or housing and there is a strong relation with housing quality and safety". Indeed, "the safety of a building can be interpreted as the achievement of the building in safeguarding its occupants and the general public from physical, psychological, or material harm originated from the built environment, which in turn reduces injuries and deaths".

3.3 Development of the idea of Risk within DRM from Holistic view-point

Conceptual Emergence of Holistic Disaster Risk Reduction (HDRR) Approach in the International Agenda

The ‘holistic disaster risk’ concept, which can be defined as emphasizing the importance of the whole risks and the interdependence of their parts, indicates the significance of all hazards and risks stemming from various sources which interact with and intensify the magnitude and extent of disaster events. Before analyzing the holistic disaster risk concept and the shift towards disaster risk reduction (DRR) concept, it makes sense to clarify the related terms to better understand the conceptual framework of this study.

The term ‘Holistic’ comes from the ‘Holism’, which is a Greek word meaning *all, whole, entire, total*[21]. According to holism view-point, the universe and natural systems (specifically living nature) such as physical, biological, chemical, social, economic, mental, linguistic, etc. and their properties, have to be viewed and evaluated as interacting wholes, not as collections of mere parts or elementary particles.

Many researchers claim that Jan Smuts is the man who coined the term “holism” (Cook, 1983; Wulf, 1996; Clarkson, 1997; Looijen, 1998; Liebenberg, 2005; Freeman, 2005; Härkönen, 2007; Savory, 2010; Křeček, 2010). The emergence and popularization of this term goes back to 1920s. Smuts defined the term in his book ‘Holism and Evolution’, dated 1926. According to Smuts (1926: p. 88), there is an explicit tendency in nature to construct wholes (or sum of elements) which are greater and more important than the each separate elements of the wholes:

> *Both matter and life consist of unit structures whose ordered grouping produces natural wholes which we call bodies or organisms. This character of “wholeness” meets us everywhere and points to something fundamental in the universe. Holism is the term here coined for this fundamental factor operative towards the creation of wholes in the universe. Its character is both general and specific or concrete, and it satisfies our double requirement for a natural evolutionary starting-point* (1926: p.88).

Smuts tried to explain the importance of understanding a system as a whole in the universe. It is only possible to understand and evaluate the evolution process if philosophy and science could converge to understand the whole system(s). Smuts (1926: p. 90-91) argued that if science is divorced from the viewpoints and principles of philosophy, its structure becomes purely mechanism. In reverse, if philosophy is divorced from the actual concrete structural facts of science, general principles of philosophy remain in the air. In other words, he emphasized the following:

> *Mere structure is not enough, because it misses the generic, the universal in reality. General principles or tendencies are not enough, because they are not concrete such as natural reality is. The two must be blended in a new concept. And it may be found that the new concept is actually not a blend of them, but the original unity from which they have been dissociated, and that the synthesis produces more than a mere concept, reveals in fact an operative casual principle of fundamental significance* (1926: p.92).

Forbes (1996) asserts that holism and holistic perspective have become more popular after the second half of 20th century due to rapidly changing and disturbing issues which influence daily routines of people deeply. These disturbing issues are exemplified by Forbes (1996): “the ecological crisis, the prospect of nuclear annihilation, chemical and radiation pollution, the breakdown of the family, the disappearance traditional communities, and the disregard for traditional values and their institutions”. Therefore, a strong need for a new perspective to understand and “question the direction of the

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[21] http://en.wikipedia.org/wiki/Holism (accessed in 2011);
http://www.environment.gen.tr/holistic-view/111-what-is-holism.html (accessed in 2011);
http://www.merriam-webster.com/dictionary/holism (accessed in 2011);
http://www.oxforddictionnaries.com/definition/english/holism (accessed in 2012);
http://abyss.uoregon.edu/njs/glossary/holism.html (accessed in 2012);
http://www.collinsdictionary.com/dictionary/english/holism (accessed in 2012);
http://library.thinkquest.org/26026/Philosophy/holism.html (accessed in 2012).

modern western world and many of its central values" has been felt (Forbes, 1996). Holism and holistic perspective have become the focal point of this new argument.

Holism and holistic view-point are used by many disciplines in order to develop effective solutions for the problems which are specific to their areas. These disciplines range from health (e.g. psychiatry) (Wulf, 1996; Clarkson, 1997) to biology and ecology (Savory, 1986; Looijen, 1998; Křeček, 2010). One of the foremost disciplines which observe a holistic perspective is "education and training". In order to analyze the problems of education and professional training, many studies have been conducted which construct their theory on holistic education and/or training point of view (Forbes, 1996; Ott, 1999; Härkönen, 2007).

The disaster concept and holistic view-point were first held in the 1920 study of Samuel H. Prince," Catastrophe and Social Change: Based on a Sociological Study of the Halifax Disaster[22]". This study mainly focused on the post-disaster relief works. However, Prince's critical evaluation of disaster focused on the absence of a multifaceted vision of the disaster phenomena. He attempted to bridge pure scientific and sociological approaches through the disaster concept. He pointed out that "progress is a natural and an assured result of change. The point is that catastrophe always means social change. There is not always progress...change means any qualitative variation, whereas progress means 'amelioration, perfectionment'..." (1920: p. 21). Actually, he drew attention to sociology of disasters which had not been taken into account. He emphasized that "the principle thus appears to be that progress in catastrophe is a resultant of specific conditioning factors, some of which are subject to social control" (1920: p. 22). Many researchers believe that Prince's work of sociological view-point to disaster phenomena fostered the multidisciplinary and comprehensive approaches among the disaster studies, particularly in social sciences (Scanlon, 1988, 1997; Dynes and Quarentelli, 1992; Guzman, 2003).

Hovden (2003) asserts that combination of 'Risk' and 'Holistic Disaster' view-point goes back to comments of Jean Jacques Rousseau, The French philosopher, on the 1755 Lisbon Earthquake (which is mentioned before in the Chapter 2). According to Hovden, Rousseau blamed the human decision-making for more than 100 000 fatalities when he asked: "Why have we accumulated 20 000 houses with six to seven floors in a notably seismic location?". "That question gave birth to a philosophical basis of a science of risk" (Hovden, 2003). However, the revolution in the use of the risk term has started with the ideas of Ulrich Beck when he published his book entitled "Risk Society: Towards a new Modernity" in 1992.

Beck (1992; p. 21) claims that our society is living a transition from "modern" society to "risk" society. For him also risks are not an invention of modernity. Beck (1992) defends a holistic perspective to the hazards and disaster risks. For the author, conventional approaches cannot be successful in understanding as well as reducing risks.

The shift in perception of disaster events also points out individualization of hazard and disaster risks among today's society. According to Beck (2011), the events which disrupt the balance of an individual's life also points at a judgment and conception shift. In the former societies, the factors which affected the individuals directly or indirectly such as war, natural disaster, wife's death etc. were natural processes or acts of God (Beck, 2011: p. 206-207). Therefore, the individual did not feel responsible for whatever happened. However, today's individual has begun to feel responsible for the events that disturb his or her life stability.

Beck (2011) addresses the disasters' main sources in vulnerable social, economic and environmental structures. He asserts that there is a strong and systematic gravitation between extreme poverty and extreme risks. According to Beck (1992: p. 183), risks stem from human-induced hazardous actions. Similarly, Mileti (1999) states that disasters are natural hazards, and risks involved in these hazards are the result of collective policies and decisions made by different actors who are responsible for planning land use, design and construction of buildings and infrastructure.

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[22] Halifax Disaster: In December 1917, two ships one of which was full of explosives, collided in the harbor of Halifax town in Canada. The collision caused a devastating explosion which resulted in 2.000 of slain, 6.000 injured, 10.000 homeless, 35 million ($) property loss, and 300 acre (1 acre=4047 m^2) smoking waste left...(Prince, 1920: p. 26)

The terms *holistic*, *disaster* and *risk* have influenced each other through the time and framed the conceptual approach of the HDRR, which as this study underlines, reflects on the shift towards new vision in disaster coping efforts. Figure 3.3 conceptualizes the emergence and convergence of these terms.

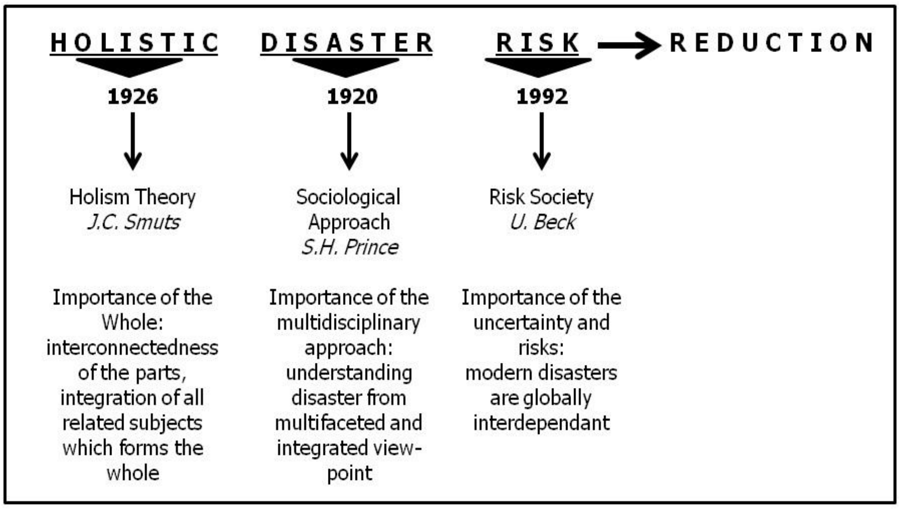

Figure 3.3**:** Conceptualization of Holistic Disaster Risk Reduction (HDRR).

Towards a new Vision in Disaster Coping Approach: the Demand for HDRR

Disaster and holistic perspective relation has been strengthening parallel to the shifting approach in disaster coping strategies, particularly since the 1990s. The traditional disaster management strategies mainly based on recovery policies are criticized after the shifting perception and awareness of risk and safety concepts among the communities. Thus, a stronger demand was for a new theoretical perspective and policy standpoint (McEntire, et al., 2002; p. 267). What produced this demand is directly related to the complexity and diversity of today's disaster phenomena, most of which result in considerable losses. "Accordingly, researchers have called for a broader view of the disaster problem and even a revolution in approach. Fortunately, there are a number of closely related initiatives showing the way ahead, indicating the sector is responsive to change. The most recognized academic paradigms and policy guides include disaster-resilient communities and sustainable hazard mitigation" (McEntire et al., 2002; p. 267).

The decentralization indicates strong will to change among governments and all other stakeholders in the UN report (UNISDR, 2004; p.81):

> *A change in the emphasis of government functions requires that a consensus be developed on the roles of government agencies, technical institutions, commercial interests, communities and individuals themselves. Governments have vital roles to play in DRM, ideally serving as a "central impulse" and serving to support sustainable efforts, but there is now widespread recognition that they also must focus their limited resources and serve as coordinating bodies if they are to become more effective. If they are to be relevant in such a role, there is a corresponding responsibility for subsidiary competencies and increasingly localized capabilities to come into force.*

Cardona (2003: p. 37) points out that the "ongoing disaster coping approach is accepted as very technocratic that it focuses upon the hazard solely but not upon the conditions that favour the occurance of crisis. Therefore, a far more holistic and encompassing approach is needed which goes well beyond issues of physical vulnerability".

He also stresses that "action and decision, implicit in the definition of risk, require the establishment of relationships between subjective risk perception and the scientific need for objective measurement. Due to scientific specialization, various notions of risk exist. For this reason it has been argued that a common language and a comprehensive or holistic theory of risk is needed ... the absence of a holistic theory of risk, from a disasters' point of view, has favoured, or at least partially contributed to, the problem growing faster than solutions can be found" (2003: p.45).

There is an international debate over the new perspective, Holistic Disaster Risk Reduction. The uncertainties and growing risk sectors within the built environment that result in considerable loss have oriented societies to consider the HDRR approach. Disaster impacts need to be evaluated from a more comprehensive perspective which takes into account diverse risk factors and sectors. The sources of disasters are more sociological, political, environmental and economic than physical or natural. All of these sources interact with each other resulting in complex problematic areas. According to HDRR view, disasters cannot be evaluated, analyzed or mitigated from one perspective or component of conventional coping approach (Weichselgartner, 2002, 2005; Guzman, 2003; Leduc, 2006; Aguirre, 2009; Chen et al. 2010). More holistic and interdisciplinary studies are needed to understand the root causes of the hazards and vulnerability of the communities. Therefore, a disaster phenomenon should be analyzed as a whole, which is made up of the interdependent and interacting elements of various hazards, risks and vulnerabilities.

The International Federation of Red Cross and Red Crescent Societies' report underlines the insufficiencies of traditional disaster coping mechanisms and asks for a new approach concerning risk reduction (World Disaster Report, 2002; p. 25):

> *National plans may mention longer-term mitigation and preparedness, but lack detail and dedicated resources. Disaster management is often viewed in a narrow, technical sense, rather than as part of a broader risk reduction strategy… efforts to reduce vulnerability often fail to engage the attention of top-policy makers at national and international level. Mounting social and economic pressures, often coupled with policies favoring the reduction of state services, can undermine governments' capacity to reduce risks…and... increase vulnerability to disaster through inadequate public health services, insecure livelihoods, poor housing in unsafe location, outdated government prevention and response structure, and a severely degraded environment.*

The demand and urgent need for a new policy in coping disasters have mainly emerged from the newly developing philosophical and theoretical views, as well as the rapidly increasing economic vulnerabilities and losses. The globalization of economies and rapid travelling of capital among the world societies have made it a necessity to reduce the vulnerabilities and disaster risks by means of more effective policies and strategies.

The growing uncertainties of hazards and social, physical, and economic vulnerabilities also have caused to think from a multi-disciplinary point of view. Therefore, by the last quarter of the 20th century, beside the engineering sciences, other disciplines such as social sciences, planning and health sciences have begun to intervene in the disaster studies, which are the primary signals of the shift towards a comprehensive DRM approach.

According to Güvel (2001: p.18), this shift cannot be ascribed to the changes in earth's structure and natural processes, but to the impact of different disciplines and professions dealing with disaster issues. According to Güvel (2001), particularly by the 1970s, following Prince's Halifax Disaster publication, social disciplines such as sociology, psychology, economics, and political sciences started to deal with natural disasters and disaster risks closely. Micro-economists, political analysts, and cost-benefit analysis started to emphasize the economic sides of various hazards and risks, as well. Political and administrative scientists now focused on the importance and effectiveness of theoretical decision making processes in hazard and disaster concepts.

Risks in today's society have two sources; one is the external risks (such as earthquakes, tsunami, and volcanic eruptions), whereas the other is the manufactured ones (such as human induced or man-made disasters). Risk society (the term coined by Beck in 1992) has to cope with the combination of both risk types many times. Beyond the natural disaster threats, the manufactured risks and uncertainties by the society affect the vulnerable structures beyond the limits and political boundaries, and those risks are felt in wide areas than ever (Beck, 2003; Beck, 2010). According to Beck (2006: p. 23) "despite their differences, however, ecological, economic and terrorist interdependency crises share one essential feature: they cannot be construed as external environmental crises but must be conceived as culturally manufactured actions, effects and insecurities". Beck also (2006: p. 22) points out that "we are confronted with risks that disregard the borders of the nation-state, and indeed boundaries as such: climate change, pollution and the hole in the ozone layer affect everyone".

Constructing a more holistic structure with the combination of different risk types

Balamir (2001; p.1) states that different, comprehensive, foresighted and innovative forms of policy approaches and tools are necessary due to intricate features, chain effects and irreversibilities of today's crises and hazards. Similar to Balamir, Beck (1992: p.21) asserts that a systematic way of dealing with these hazards and insecurities is required. Beck draws the frame of this systematic way in its most comprehensive form as the concept of risk.

Hovden (2003) describes the scope of risk and vulnerability research through Figure 3.4.

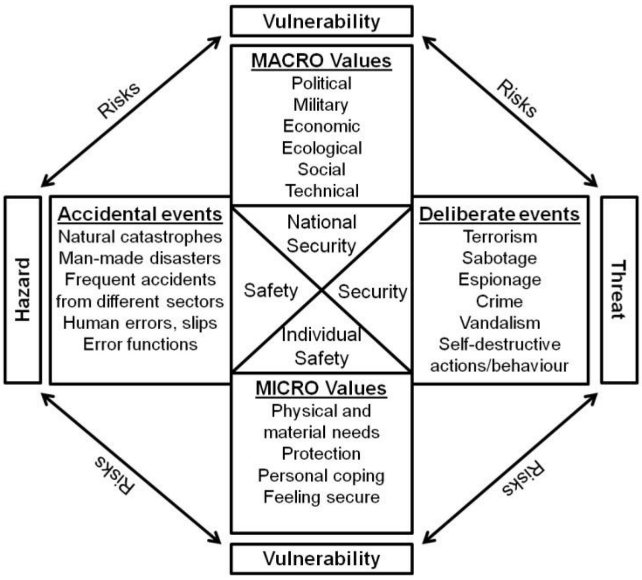

Figure 3.4: The vertical and horizontal perspective on risk sectors and combination of them through hazard-vulnerability-threat concepts (Reproduced and redrawn from Hovden, 2003)

The holistic structure of risk sectors is expressed in a cycle relation in Hovden's illustration. According to Hovden, the figure illustrates "a vertical and horizontal integration of different sectors, actors and factors on risk concept which differ the shifting approach from conventional approach". He explains the figure in his following words:

> *The vertical axis should give some associations to the model of socio-technical systems involved in risk management by Rasmussen (1997), i.e. the links between the global, international, national, regional, local and individual stressors and those actors at different levels dealing with the risks. The horizontal axis tells that the field covers everything from 'acts of God' type events and man-made, including technology caused disasters, to the intended, ill-natured acts against others and even self-destructive behavior.* (Hovden, 2003).

McEntire (2004), likewise, demonstrates the holistic structure and complexity of disaster concept in Figure 3.5.

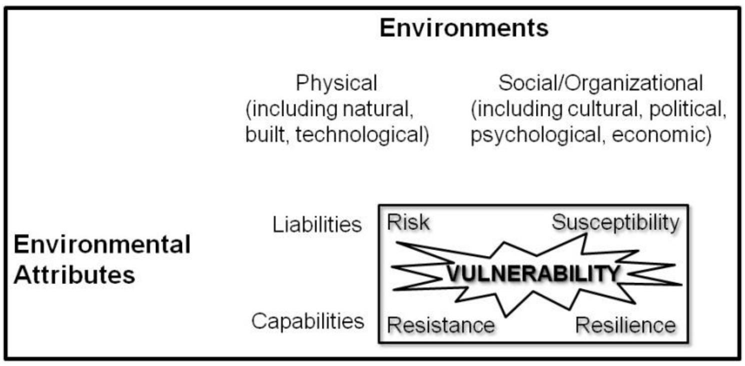

Figure 3.5: Vulnerability and Risk Perception (reproduced from McEntire, 2004; p.14)

As seen in the figure, the new holistic structure aims to constitute a networking and collaboration approach among the community. Holistic structure also shows that there is a strong demand for multidimensional organizations and collaborations (McEntire, 2004). Furthermore, McEntire argues that "organizing public, private and non-profit groups to work together before, during and after disasters is likely to reduce failures through liabilities and raise success level through improved capabilities". McEntire (2004; p.18) specifies the importance of collaboration and interdisciplinary works with an example; "encouraging developers and land-owners to support safe development will reduce liabilities while increased contact and cooperation among disaster response organizations will build capabilities".

As it is asserted in the United Nations' report (UNISDR, 2004) and Hyogo Framework (2005), in order to cope with disasters, international and regional collaborations are strictly needed. In the Hyogo Framework (2005; p.14), it is underlined that "all states should endeavor to undertake necessary tasks at the national and local levels, with a strong sense of ownership and in collaboration with civil society and other stakeholders, within the bounds of their financial, human and material capacities, and taking into account their domestic legal requirements and existing international instruments related to DRR". This approach indicates a holistic structure through collaboration and participation (or involvement) of all communities in the coping efforts for disaster prevention, mitigation and recovery programs, which is missing in the traditional DMS. Ergünay (1999; p. 7-8) stresses the holistic structure of disaster coping effort while underlying effective community participation as one of the possible objectives, strategies and components of a comprehensive program for disaster coping efforts.

UN Report (UNISDR, 2004; p.81) underpinned the issue of decentralization in the achievement of a holistic structure for disaster coping efforts:

> *While disaster management and response coordination can benefit from centralized command, there is a need to decentralize DRR efforts. Where the decentralization of power and devolution of governing authority is pursued, risk reduction at the local level also needs to be encouraged and supported. Responsibility for risk reduction has to be coordinated by municipalities, townships, wards or local communities.*

Wamsler (2004: p.13) points out the deficient pre-disaster or mitigation activities and stresses that "the limited disaster-related literature from an architectural and engineering perspective, focuses mainly on structural issues related to the post-disaster scenario of exceptionally large scale disasters, looking at general safety issues for reconstruction programs or large-scale engineering solutions".

Kamanga (2003: p. 197) mentions the narrow, technical view point of disaster coping approach and adds that "disaster studies have tended to be dominated by an interest in hazard-prone areas and in engineering and structural solutions. These generally ignore the scale and nature of vulnerable populations and the complexity of urban processes and their capacity to increase or decrease risks from disasters". Little (2004: p.56) emphasizes that although mitigation technology has advanced considerably over the years, the problems related to implementing successful disaster mitigation in the cities remain even in earthquake-prone California. Disaster mitigation activities such as seismic mitigation have important gaps because it is seen by many that risk reduction is a technical problem with a technical solution.

A demand for a new disaster policy: a holistic approach in Turkey through risk conception

In Turkey, urban areas are rapidly growing. This produces new risks for building stocks. Risk accumulation in urban areas is defined as "Deep Risk Pools" by Balamir (2007, p. 38).

Both the private and public buildings are at risk in Turkey in terms of different hazardous events, whereas the residential areas and buildings which constitute the major building stock have embodied most of the risk. Among the other factors and agents, what make residential buildings most risky can be stressed as the insufficient and incorrect planning, land use, design, construction and inspection policies and practices all of which are parts of comprehensive disaster risk mitigation.

The rapid urbanization in Turkey by the end of the Second World War shows that the quantity of housing stock has been increasing fast; however, the quality standards of those buildings have not been developing as fast as quantity values. Balamir (2004) also draws attention to the vulnerability of the building stock and adds that there is a

> *rapid production process of buildings with little or no supervision, and therefore the formation of a stock of high vulnerability. Under the circumstances given, most of the growth of this stock took place as urban spread, on seismically the least appropriate land. The powerful local families of local towns were also traditionally the owners of the more fertile and often (therefore) seismically most disadvantageous tracks of land, on which the urban plans were inevitably forced to extend. This eroded the technical and scientific basis of urban planning in practice, and led to the most susceptible settlement formations in the country. The 1999 earthquakes indeed have been the first observable wide-scale consequence of this unchecked performance of physical growth.*

Disasters are the convergence of hazards with vulnerabilities (Jha et al. 2010: p.339), both of which increase the extent and impact of risks. In addition, if there is an increase in physical, social, economic, political or environmental vulnerability among the society, it causes an increase in the frequency of disasters which can be accepted as unavoidable. “Unavoidable” and “not tolerable” risks need to be identified and quantified in terms of developing mitigation choices and strategies (Flanagan and Norman, 1993: p.46; Flanagan, 2003: p.27; Balamir, 2002: p.26).

This fatalist approach has been continuing for years, and it can be observed during and after all disasters in Turkey. In order to emphasize a demand for a new policy in Turkey, Balamir (2005) points out the polarities and contradictions in two different approaches to coping efforts with disaster. These extreme poles are the fatalist approach and the resiliency approach (Figure 3.6).

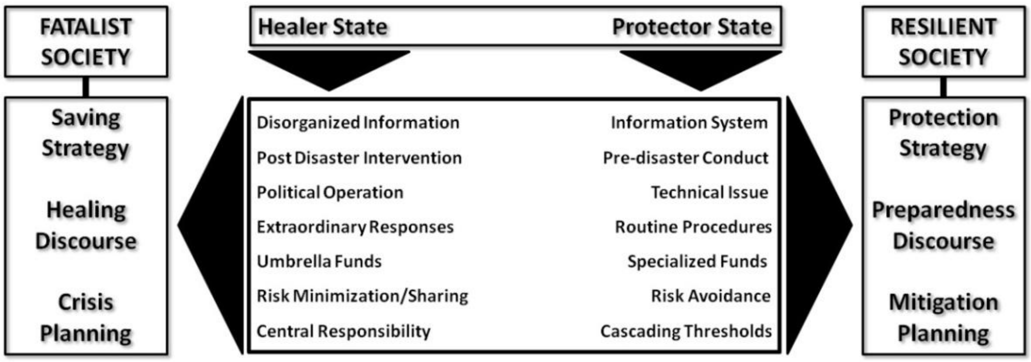

Figure 3.6: Attributes of the two extreme models of disaster coping strategy (reproduced from Balamir, 2005)

The figure shows that community and all other stakeholders are omitted in the fatalist approach. Particularly, local community participation process is not taken into account during the planning and application efforts (Balamir, 2006; p.19). This means that users and beneficiaries from these efforts are not aware of hazards and risks due to lack of participation. The less awareness of the environment means the higher vulnerability to the hazards. Balamir stresses the significance of the relationship between protection, preparedness and mitigation in a holistic way in a resilient society. Balamir (2005; p.1) claims, “a community that undertakes almost every mitigation effort would be least affected by the impacts of hazards and could be named as resilient”.

Karancı also points out that awareness and preparedness are the primary concerns in risk societies, and she adds that “in order to create awareness of future risks and to motivate preparedness it is fundamental to understand the attitudes, expectations, and political, economical and socio-cultural contexts of the communities living in risk areas” (Karancı et al., 1996; p.37).

There are many factors that endanger societies during disasters. These factors range from incorrect settlement decisions to scarce professional planning and inspection services and low standards of unauthorized building constructions (Balamir, 2005), some of which are identified in Chapter 2.

Balamir (2001, 2004, and 2007) also summarizes these risk factors for societies. These factors give strong clues and reveal the risk sectors where the vulnerable structures are accumulated. These risk factors are categorized under the following subtitles:

1. *Incorrect Settlement Decisions Interacting with Insufficient Planning Decisions and Implementations*

Topographical characteristics and location of urban and rural settlements that have been accumulated in hazardous areas due to historical, economic and social priorities and benefits (such as fertile agricultural fields, water resources, transportation axes, land speculation and rent income) increase the risks and vulnerabilities of the community.

2. *Rapid and Uncontrolled Urbanization Practices*

Following 1950s, the country has been experiencing rapid urbanization, enormous urban population growth, and migration from rural to urban areas. As a result, buildings were limitedly controlled, got in sufficient planning-engineering and architectural services, and were inspected. These aspects have contributed to the development of vulnerable urban building stocks against natural hazards.

3. *Incorrect and Inharmonious Functional Uses*

Land use planning for hazardous material production and storage facilities, as well as industrial facilities are insufficient, so these facilities have been located as nested with housing and other facility areas. The interaction between industrial and residential areas increases the amount of risk pools. In addition, the safety rules and protection measures of hazardous material facilities are insufficient, so they have been forming risk sources for their workers and environments.

4. *Socio-Cultural Factors*

Education and awareness level and perception of disaster risks among the society that determine the characteristics of disaster coping policies have been indicated as an important problem area.

5. *Political Factors*

The ‘Healing state’ approach of the political system has continued for years. This approach resists change towards a holistic risk reduction understanding. ‘Risk culture’ has not settled among the governmental institutions yet. Allocating and using scarce sources mostly for post-disaster activities render the system alienated from the root causes of disaster phenomena. Deficient approaches to developing mitigation funds result in producing ineffective short-term policies.

6. *Legal Factors*

Legal framework that comprises producing safe built environments depends on three major laws in Turkey: Development Law (No. 3194, came into effect on 1985), Disaster Law (No. 7269, came into effect in 1959), and Building Inspection Law (No. 4708, came into effect in 2001). The deficient and fragmented structures of these laws do not meet the demand and will for effective disaster coping capacity development. More detailed analysis is done through a critical evaluation of the ongoing legal system in Turkey in Chapter 4.

7. *Ethical Factors*

Corruption issue due to ill-structured development and inspection systems in Turkey are the main ethical problems. Legitimized irresponsibility is also defined by Balamir (2005, 2010) as a source for ethical deficiencies.

8. *Deficient Building and Inspection Practices through Missing DRR Approach*

Building inspection system within the building production process has remained ineffective although relatively tremendous changes have been made to the inspection system legally after the 1999 East Marmara Earthquakes. A new and holistic vision to inspection system is needed. The following chapter (Chapter 4) analyzes the ongoing building inspection system and its deficiencies from a holistic DRR point of view.

9. *Incompetency of Building Professionals through Insufficient Training and Certification Process*

Competency of building professionals remain ineffective and result in failure through safe built environment development practices. Among the other concerns, capacity development of building professionals is claimed as one of the core insufficient concepts. Professional training and certification process within the building production system in Turkey does not meet holistic view-point to the disaster risk concept. Chapter 4 examines and evaluates the ongoing capacity building approach through continuing professional development system in Turkey. Particularly, capacity enhancement of professional architects is analyzed in order to evaluate the effectiveness and integration potential of HDRR understanding within the ongoing inspection system.

10. Missing Liability and Safety Culture Development Through Ineffective Insurance System
Insurance mechanism, within the risk sharing approach, is an important component of disaster risk mitigation system (given in Figure 3.1). The new vision prioritizes insurance policies along with other risk mitigation components. In order to achieve an effective risk sharing understanding, a insurance mechanism should be constructed within a holistic standpoint. Hence, the insurance system has to comprehend different parts of the community, as well as various institutions. Building professionals need to be integrated into the insurance system in terms of liability concerns as well. In Turkey, neither the community nor the institutional levels integrate an effective insurance mechanism in order to develop a holistic disaster risk understanding. Insurance policies are also used to enhance the safety culture among the community. The deficient legislative and institutional approaches in Turkey do not utilize the insurance system effectively in order to develop the safety culture.

Balamir (2009: p. 75) draws attention to the gaps in the current disaster policies and stresses that "under conventional understanding of disasters, public authorities and some of the professional approaches tend to assume that cities are only agglomerations of individual buildings, and methods to achieve robust buildings would therefore suffice for maintaining seismic safety in a city. This is a misconception if not a deliberate distraction for the sake of assuring a monopoly in mitigation on behalf of specific professional interests".

To sum up, a demand for a new vision which adopts a holistic risk understanding deserves more comprehensive studies in Turkey. Due to deficient and failing systems which cause considerable amount of human and property as well as environmental losses in disasters, Turkey has to re-analyze, re-evaluate, re-conceptualize and re-organize its disaster coping system in general.

The main aim of analyzing, evaluating and conceptualizing risks is developing management strategies including transferring risks to another party or retaining them. As it is given in Figure 3.1 previously, disaster risk mitigation has three basic components or tasks: Risk Avoidance, Risk Reduction and Risk Sharing.

Balaban (2009: p.45) defines the necessary activities and efforts that each task or choice has to meet;

- Risk Avoidance: Land use planning involving a wide range changing from avoiding settling on vulnerable regions to prohibition of settlement decisions due to hazardous functions,
- Risk Reduction: Architectural and engineering practices comprising design, construction (for new buildings), inspection, retrofitting (for existing buildings) and post-occupancy evaluation(s),
- Risk Sharing: Diversified financial mechanisms including "insurance system, aids, donations, cross-financing and extra taxes" in order to reduce probable cost of risks to one party (such as homeowner or state).

Particularly, safety of built environment which depends on risk reduction understanding needs a more holistic approach which integrates building inspection system with HDRR concept. The more competent building inspectors mean more holistic and risk oriented inspection activities. The study focuses on the capacity development of building professionals through professional training system and models in order to manage effective and holistic risk reduction oriented inspection efforts.

3.4 Development of a Holistic Conceptualization: Integrating DRR approach to the Building Inspection Practice in Turkey

Balamir (2002) points out the importance of priority of the risk mitigation tasks or choices. According to Balamir's indication, Risk Avoidance has the first priority to implement. Risk Reduction and Risk Sharing mechanisms bear the following priorities respectively. However, this study focuses on the risk reduction component from an inspection point of view. Although holistic approach gives importance to the whole system (of DRM), the study takes into account one component (DRR component) of the whole.

The holistic approach to risk is clearly understood from the Figure 3.7, which illustrates the risk mitigation components and their interconnectedness within a cycling model. Question marks (**?**) on the figure symbolize the missing and/or deficient points.

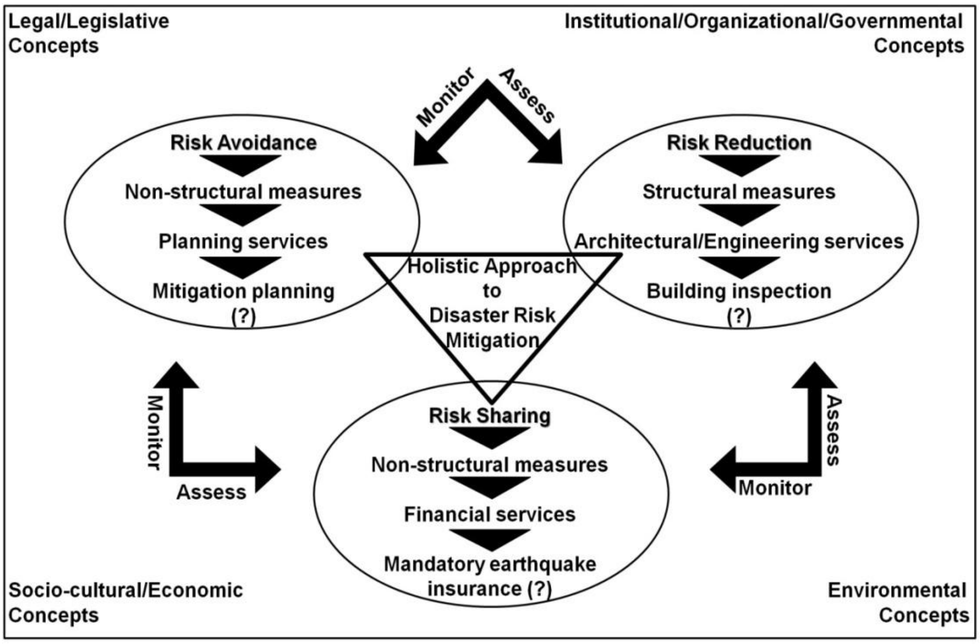

Figure 3.7: Conceptualization of holistic disaster risk mitigation which integrates structural and non-structural components.

The figure also points out the cycling relations between 'risk avoidance', 'risk reduction' and 'risk sharing'. It is obviously seen in the figure that the issue of building inspection has an important place in relation to structural and non-structural measures as well as planning / architectural-engineering / financial services. This indicates that within a holistic approach to risk based disaster coping efforts, the responsibility of building professionals is very important.

Building professionals deal with risk and disaster issues through the building production process. Practically building production process is composed of three major components which interact with each other as well as affecting the failure or success of the whole process. These components are building design, building construction and building inspection. Building inspection is one of the core issues within the holistic DRR approach given in the Figure 3.7.

Capacity development of building inspectors who are qualified to inspect and secure the safety of buildings as well as occupants has a crucial role among the enhancement of HDRR. There are important gaps in the inspection system in Turkey which cause failure when buildings face a disaster. The most deficient point in the building inspection system is its fragmented and missing conceptual vision in terms of HDRR approach. There is a demand for both theoretical and practical integration of inspection activities with HDRR.

Lawrence and Suresh (2012: p. 4524) point out that "organizations and agencies involved in Disaster Management find it necessary to recruit professionals having specific skills and knowledge, who can contribute to a more holistic understanding of the development, vulnerability and mitigation of disasters". Ott (1999: p. 52) asserts that holistic view-point to professional training "is not just oriented towards the acquisition of technical competencies". There is much to conceptualize and transfer as knowledge-skill-ability within the holistic training of professionals. Chen (et al., 2010) refers to holistic education and training approach in order to enhance the capacity of people to deal with complexity of natural disaster impacts. Aryal and Gadema (2008) underline that it can only be effective to implement a disaster mitigation act if it is designed and developed from a holistic perspective. This requires more holistic education, training and awareness approaches to cope with the complex hazards and disasters in today's society (Aryal and Gadema, 2008; Karnawati et al., 2010).

Although professional training is considered important for capacity building of building professionals in several studies in Turkey, very little attention has been paid to modeling holistic professional training approach to disaster risk.

Professional architects who have significant roles through the building inspection system have ineffective approach to the HDRR due to deficient and/or missing capacity development and awareness conceptualization in Turkey. It is needed to develop and improve HDRR understanding among the practicing architects. This indicates and requires re-conceptualizing and re-structuring of capacity development activities and strategies.

3.5 Evaluation of the Chapter

This chapter analyzed the new vision of disaster policy (Disaster Risk Management-DRM), which emerged in 1990s. The importance of a holistic view-point to DRM is emphasized. The critics on the demand of a need to a shift towards DRM are evaluated in both international and national context. Holistic disaster risk reduction is conceptualized in accordance with the paradigm shift of disaster coping approach.

It is revealed that there is a demand for a more holistic approach to disaster coping strategy. The vision initiated with DRM introduces the important concepts of ‘risk’, ‘resilience’, and ‘safety’. Risk is the key concept in the achievement of a more holistic approach to disasters. Risk avoidance, risk reduction, risk sharing are the other issues that should be considered. Risk reduction approach refers to structural measures in which building professionals participate. The need for a holistic risk reduction is conceptualized through the holistic risk mitigation cycle. Development of a holistic approach within the disaster risk reduction requires active participation of building professionals from a holistic view-point. To develop holistic awareness and capacity building in risk mitigation efforts requires well designed and conducted professional training strategy which regards holistic disaster risk reduction (HDRR).

CHAPTER 4

Capacity Development Analysis of Practicing Architects Through Continuing Professional Training System in Turkey with Regard to HDRR Approach

4.1 Introduction

Living in a vulnerable society who tend to suffer from the dramatic consequences of disasters makes it essential to internalize the Disaster Risk Reduction (DRR) concept in Turkey. The existence of extremely vulnerable structures in both urban and rural settlements pose great hazard; thus, building professionals' active participation in DRR of holistic nature is of vital importance. Therefore, the architect, in particular, is the focal point of this argument through the study.

Building inspection system (hereafter BIS) is one of the formest components of DRR approach as mentioned in the previous chapter. Although there are many studies focusing on the discussions related to the vulnerability and safety of physical environment, and BIS effectiveness, few attempts have been made to analyze professional competency and participation in BIS. This chapter analyzes the deficiencies of the ongoing BIS, with special emphasis on the ill-structured Continuing Professional Development (CPD) training of practicing architects. This chapter mainly argues that the fragmented structure of and the missing risk-based understanding in the ongoing building inspection certification and training model do not meet the capacity enhancement needs of practicing architects. This deficient capacity development hinders conceptual and technical transfer of Knowledge, Skill and Ability (KSA) to practice, which, thus, falls behind the shifting disaster coping understanding towards HDRR approach. Insufficient transfer of KSA to practice reduces the safety of the built environmental conditions and threatens the safety of occupants. The demand for re-structuring the CPD training of BIS from a holistic and risk-based understanding is revealed by the analysis results presented in this chapter.

This chapter investigates the capacity development of practicing architects in Turkey in a broad sense In particular, capacity development struggle in order to integrate HDRR approach into the BIS through the ongoing CPD system is the main objective of this investigation. It is mainly focused on to understand the nature and presence of specific concepts (*hazard, disaster, risk, safety, vulnerability, resilience*) and HDRR approach in training courses. Development and employment of building inspection training provided by the CPD system is given particular attention.

The ongoing BIS and related legal structure is critically evaluated from HDRR perspective. Evaluation of the CPD courses which teach hazard and disaster concepts follow the critical evaluation of BIS. Personal experiences reported in semi-structured interviews conducted in Turkey which analyze the capacity building of practicing architects through BIS and related continuing professional training are presented. Finally, the section makes an evaluation and critical analysis of the BIS and professional training model, which seem deficient to transfer KSA to practice, and which do not combine holistic and risk-based understandings.

Before analyzing the BIS and related legal document, a brief summary of the ongoing legal system of disaster and development in Turkey is presented. The summary displays the fragmented structure of the legal structure and the need to integrate these legal documents from HDRR view-point in regard to BIS.

4.2 Brief Summary of Ongoing Turkish Disaster and Development Legislations from HDRR Perspective

The analysis of existing Turkish Disaster and Development legislations through major laws and regulations from architecture view-point is presented within Chapter 2. The fragmented view of these documents indicates the necessity of employing an integrated and participative legal system, which comprehends risk-based understanding. The analysis summarizes the main deficient and missing concepts as to the following aspects:

policy, organization and conceptual

- Existing legislations are not parallel to the paradigm shift in international disasters policy in general and DRR approach in particular,
- They weakly give reference to each other in terms of policy, scope and contents,
- They do not comprehend and/or integrate planning processes, particularly mitigation planning which affects holistic DRR development negatively,
- They do not develop a standard terminology in regard to DRR concept,
- Integration of disaster risk mitigation components into practice through the existing legal system is very difficult due to its deficient structure, scope and extent.

administrative and technical

- Responsibility and participation of building professionals are not well-defined in disaster risk mitigation system,
- Many items (articles), particularly "exempt building" approach within the legislations affect the integrity of the building safety which results in failure of public control and unreliable inspection. This situation encourages unplanned and uninspected attempts,
- Controlling, inspecting and other participative mechanisms of local governmental organizations are excluded from disaster and development framework,
- It does not support public participation, e.g. NGOs and chambers of professions,
- Specific and vitally important concepts including "mitigation" and "safety" are not included in any of the legislative documents. Therefore, building professionals cannot benefit from or make reference to the laws and regulations in order to enhance their capacity and awareness in HDRR approach,
- Building inspection approach is mentioned in most of the legislations, but it is not defined properly and does not construct effective ties with other regulative documents,
- Among today's risk society, the legislations are far from defining any of DRM components such as risk identification, assessment, analysis and mitigation,
- The building concept is not defined in an integrated perspective. Building is just associated with structural system and its analysis on the building site regarding soil structure (geophysical and geotechnical view-point). In that sense, "risk" and "safety" concepts are too weak to be defined and understood within the HDRR process,
- Prioritization of emergency and transportation facilities all of which need to continue functioning following hazardous events as well as many other important public buildings including schools and hospitals is not well defined in order to ensure the safety before, during and after emergency events.

architecture

- Architect is solely seen as a professional who designs and prepares building projects without any concern on holistic thinking of building-human-environment relation in regard to risk and safety issues,
- Architect is assumed as a building profession who does not need to deal with disaster resistant built environment development. Engineers are accepted as the only responsible professionals from disaster resistant design and implementation,
- Architect's formation and professional competency are not defined properly within the building production process through the regulations. This view affects the quality and performance of building design and implementation from HDRR point of view,
- Collaboration between architects and other building professionals is not encouraged or guided through the laws and regulations,
- Professional architects cannot benefit from the existing legislations in terms of capacity enhancement in HDRR approach. Legislations are not structured as a guidance and reference source to canalize architects (or other professionals) into capacity development activities including professional training.

Building inspection law and related regulations are considered as important DRR tasks which are not studied in Chapter 2 in detail. The BIS is evaluated separately due to its relatively new structure which is integrated into the building production process following the devastating impacts of 1999

East Marmara Earthquakes. The role of professional architect in BIS needs to be evaluated according to this new structure.

Among the other problem areas of legal system and practice of disaster and development, BIS bears deficiencies in developing safe built environment. Deficient BIS structure and practice concern the performance of practicing architects who are involved in the inspection system. The next section categorizes insufficient points of BIS. This categorization focuses on understanding the capacity enhancement level of professional architects dealing with inspection practice from HDRR view-point.

4.3 BIS (Building Inspection System) of Turkey

Today’s settlements have been facing various hazards due to interaction of external (ex. natural) and manufactured (ex. human induced) sources. Impacts of the hazards exceed the coping capacity of society if effective disaster risk mitigation mechanisms have not been developed and implemented. Therefore, today’s BIS needs a more holistic and risk-based thinking, and participative practice in order to understand vulnerabilities, identify and assess risks, and implement appropriate risk mitigation instruments.

The focus of this chapter is the problems related to ‘utilization and processing of professional knowledge, skill and ability’ (UP-PKSA) and achievement of built environment safety, particularly by professional architect’s view-point in Turkey. The role and the capacity of professional architects do not seem to be considered effectively in the application process of BIS. Although a new BIS policy has been developed by the year of 2001 (Building Inspection Law of 4708), this system is based mainly on ensuring seismic resistance of structures. This limited approach results in considering only the structural aspects of buildings in a pure technical (from the point of engineering) way while excluding the strategies of architectural design formations and the constructional (tectonic) logic of buildings. Furthermore, the training and certification of professional architects through the Continuing Professional Development (CPD) model for BIS has problems due to its partial and fragmented structure which does not cover a risk-based understanding.

- **Building Inspection Law** Law No. 4708, Issued on July 13, 2001

BIS as an important DRR attempt aims to supervise building professionals’ performance in order to promote earthquake resistant buildings. Professional architects, one of the participants of BIS, play an important role in the production of safe built environment. The ongoing BIS in Turkey does not have the following:

a- a clear perception of HDRR approach to disaster risk mitigation,
b- an effective administrative and organizational system within the disaster risk mitigation process,
c- an effective and compatible UP-PKSA of different disciplines (such as civil-mechanical-electrical engineering, city planning, architecture, product design etc.) for the inspection and production of safe and resilient environments.

Building Inspection Law (BIL) (Law Number: 4708) was put into effect in 2001 in order to promote proactive efforts to reduce risks pertaining to different agents in built environment. The ‘BIS’ and ‘BIL’ abbreviations are used together and interchangeably within this section; BIS stands for the general system of inspection whereas BIL indicates the legal system and documents including law and regulation.

The BIL has been developed instead of the former inspection system which was conducted by the cooperation of technical application responsibles (engineers and architects) with the local municipalities. However, this system failed due to different factors (Gülkan, 2001; Gökçe, 2009; Ustaömer, 2009; Avcı, 2009). First of all, the municipalities do not employ sufficiently trained professionals, appropriate tools, and sufficient financial capacity to conduct the inspection system accurately. Secondly, the technical application responsibles (TARs) were chosen by the building contractors and paid by them as well. As a result, the system could be corrupted. In addition, the capacity of the professionals working as TARs were also deficient, and there was not a mechanism to improve their professional capacity (such as on-the-job training or continuing professional training systems). The TAR members and municipality staff responsible from inspection activity did not regularly visit the construction site in order to inspect the construction, and they usually just signed under the building approval documents even without inspecting the construction. Building permit documents were approved by incompetent technical staff who were not aware of hazards and risks. The former system was also incapable of keeping the records of the construction works.

The BIL has been developed in order to solve the aforementioned problems and combat corruption in the inspection process. Private Inspection Firms (PIFs) are the responsible body of inspection activity instead of TAR-Municipality cooperation of the former system. PIF is responsible from obtaining construction permit, approving projects, controlling the appropriate application of plans, inspecting geological and geotechnical surveys related to building site, inspecting constructions, carrying out laboratory tests (for building materials), informing the institutions in charge (Building Inspection Commission of Environment and Urbanization Ministry) about the inconsistencies with design project and building code violations, preparing the building occupancy permit.

There are almost 100 legislative documents (Table E.1 in Appendix E) that inspectors have to know in Turkish development and inspection legislation system. The major legislations are summarized in Chapter 2. The fragmented view and complexity of these documents make them difficult to integrate with BIL.

The BIL is composed of 15 articles, some of which were changed during the application period (by the year 2001) (in Appendix F). From 2001 to 2011, the law and the related regulations were applied as part of a pilot project in 19 provinces (Adana, Ankara, Antalya, Aydın, Balıkesir, Bolu, Bursa, Çanakkale, Denizli, Düzce, Eskişehir, Gaziantep, Hatay, İstanbul, İzmir, Kocaeli, Sakarya, Tekirdağ and Yalova). However, the rest of the provinces (62 provinces) were using the previous inspection system, which was blamed for the catastrophic consequences of 1999 earthquakes (Ustaömer, 2009).

The first article[23] of the BIL defines the aim of legislation. According to this explanation, building inspection law requires that projects and building processes should be inspected in terms of securing safety of occupants and assets regarding building codes, scientific, art and health concepts. This definition excludes holistic nature of inspection concept as it is restricted to project and construction inspection and excludes such components as mitigation planning, post-occupancy inspection and multi-hazard approach with a risk-based understanding.

The BIL is strongly and directly related with the Development Law because related articles of the BIL (such as article 12)[24] give reference to the Development Law (Çetinbaş, 2009). Consequently, two laws create complexity and contradictions in understanding concepts and processes. Moreover, it is difficult for building professionals to follow, evaluate and understand the details that are referenced or defined in two different laws. Balamir (2000) stresses that BIL can be only effective if it can be re-structured consistently with the other building related laws such as Development Law (of 3194) and Disaster Law (of 7269).

The law has an application regulation (*Building Inspection Application Regulation*) which organizes the administrative, technical and legislative issues. Article 3 (of the regulation) defines the concepts related to inspection system (Appendix G). Definitions reflect the general scope and extent of the legislation. For instance, two important terms are defined within the regulation as follows:

- <u>Structural System</u> ("*Taşıyıcı Sistem*" in Turkish): Foundation, reinforced concrete, timber, steel frame, wall, floor and roof of buildings which carry and/or transfer the load (load bearing systems).
- <u>Building Damage</u> ("*Yapı Hasarı*" in Turkish): Except the damages pertaining to the faulty user behavior, the other damages including inconsistent applications of scientific and art rules, deficient, faulty and defective applications which result in damages on the building, interruption of the building occupancy for some period and capital loss.

[23] Article 1 (in Turkish): "Bu Kanunun amacı; can ve mal güvenliğini teminen, imar plânına, fen, sanat ve sağlık kurallarına, standartlara uygun kaliteli yapı yapılması için proje ve yapı denetimini sağlamak ve yapı denetimine ilişkin usul ve esasları düzenlemektir" (BIL, 2001).

[24] Article 12 (in Turkish): "Bu Kanunda hüküm bulunmayan hallerde 3194 sayılı İmar Kanunu ve ilgili mevzuat hükümleri uygulanır" (In case of any missing judgments within this law, the provisions of Development Law_law no.3194_ and related legal documents are effective)

It is clear that the building inspection approach focuses on structural issues and is concerned mainly with structural damages. Risks and damages pertaining to non-structural deficiencies and faulty applications which cause considerable financial losses and human casualties (FEMA, 2011; ATC, 2008)[25] are not included within the regulation. Fire safety concept (e.g., use of fire resistant materials, fire sprinkler systems, fire walls and compartments, fire exits etc.) is not included within the law and regulation of BIS. Although there is an effective 'Fire Regulation' within the ongoing legislation system, BIL does not have any linkage to fire safety regulation. The regulation bears a strong impression that it has been developed for single hazard (earthquake) approach, and takes into account only structural building problems.

Among the others, main problematic areas related to the BIS and its implementation are classified under four subtitles: Legal and Administrative Problems, Technical Problems, Financial Problems, and Training and Certification Problems.

- **Legal and Administrative Problems of BIS:**

BIS has been criticized in terms of its deficient legislative structure (Gülkan, 2001; Gökçe, 2009; Ustaömer, 2009; Avcı, 2009).

The BIL and its application regulation overlap with the Development Law (of 3194) in terms of legislative provisions and judgments. This problem blurs the responsibility sharing of building professionals and other participants who participate in building production and inspection process. The interference of two laws can be determined as the scattering of the legislative structure in terms of uncoordinated responsibility, authority and competence.

Inspection works were tried to be decentralized in terms of legal and administrative systems due to responsibility transfer from public authority (municipal organizations) to private sector (building inspection firms). Inspection activity is accepted as a public service which has to be controlled by public within the social state standpoint. Municipal authorities are responsible for only approving some building permits including construction and occupancy permits. This limited and unreliable public control of inspection activities demonstrate the deficiency of the BIS. However, the nature of inspection idea necessitates holistic and participative efforts which include public-private partnership and community participation. Therefore, this partial public involvement shows the ineffectiveness of HDRR approach, which excludes collaborative works of all sectors in the inspection system.

The private building inspection firms are controlled by Building Inspection Commission of Environment and Urbanization Ministry. The system of "inspecting the inspectors" sometimes result in conflicts and ineffective practices. Again, the tasks and duties, as well as responsibilities are interfered. The capacity of building inspection commissions are also criticized.

Irresponsible behaviors and faulty applications of building inspection firms including code violations require sanctioning according to the BIL. However, the penal system is not clear and the legal stands are debatable, so both the inspectors and institutions do not have a complete and clear idea of legal procedures. This causes conflicts between private inspection firms, building contractors, and the responsible ministry commission.

Planning phase is totally excluded from the inspection system. Insurance mechanisms totally excluded from the system. Continuing inspection approach which also covers the occupancy period in order to control the functional, structural and other changes related to the building is not included. These deficient approaches result in failure to develop a holistic view-point of disaster risk mitigation.

[25] "Nonstructural failures have accounted for the majority of earthquake damage in several recent U.S. earthquakes. Thus, it is critical to raise awareness of potential nonstructural risks, the costly consequences of nonstructural failures, and the opportunities that exist to limit future losses. Nonstructural components of a building include all of those components that are not part of the structural system; that is, all of the architectural, mechanical, electrical, and plumbing systems, as well as furniture, fixtures, equipment, and contents. Windows, partitions, granite veneer, piping, ceilings, air conditioning ducts and equipment, elevators, computer and hospital equipment, file cabinets, and retail merchandise are all examples of nonstructural components that are vulnerable to earthquake damage." (FEMA, 2011)

- **Technical Problems of BIS:**

BIL and the related regulation organize the legislative and administrative issues by legal documents. However, technical concepts including strategies of reliable and effective building code compliance issues, and risk reduction are not specified in these documents. Inspectors cannot use the legislation as a technical and conceptual reference document in order to evaluate the projects and construction. Practicing architects need to rely on other legal documents such as development regulation which are also assumed as deficient. The fragmented view of technical concepts, missing conceptual development, and the complexity of these issues due to insufficient data and standardization given within the documents result in ineffective KSA transfer to the practice. It is needed to integrate building codes and building inspection under a more comprehensive structure which also guides conceptual and technical concepts and standardization from a HDRR view-point.

Due to various expertises and technical developments, well-trained and highly competent inspectors are needed. The safety concept covers a wide range of areas including seismic design principles, fire insulation, non-structural damage analysis, environmental issues, project inspection, health standards due to building materials, and other safety and security issues. Risks are also diverse due to the existence of different safety concepts. It is necessary to integrate safety and risk concepts with a holistic perspective. This integration needs to analyze, assess, and mitigate through participatory and risk-based works.

Most of the safety and security concepts (such as fire, landslide, rockfall, wind storms, hail storms, heavy snows, twisters, explosions due to industrial accidents or terrorist attacks etc.) are not taken into account in terms of building inspection. Therefore, technical view of the BIL is not consistent with the HDRR understanding.

One of the published circulars (Circular, 2006) by the Ministry of Environment and Urbanization, attempted to declare some of the deficient technical issues for building professionals as well as inspectors. Due to article 2 of that circular arranges the preparation of building occupancy permit for the buildings that were constructed previously but have not obtained the occupancy permit yet. The building safety is assessed only from structural integrity of these buildings, whereas other hazards are not included[26].

It is also underlined in the Article 3 (within the BIL) that building inspectors are not responsible from the natural hazards other than earthquakes which will be a threat for the building and environment. Safety responsibility for other hazards is transfered to the building owners and/or occupants[27].

Technical deficiencies of the inspection legislation result in the ineffective HDRR. It does not integrate risk mitigation tasks into the existing legal documents. Technically, the legal documents do not increase awareness and help capacity development of building professionals, particularly architects on holistic and risk-based understanding.

Moreover, building construction techniques and structural systems differ in designs as to technical, financial, aesthetic, functional, climatic and other factors. Inspecting a masonry building is different from inspecting a concrete frame building or steel structure building. In addition, different systems have different risks pertaining to system needs, material variations, user demands, and detailing. It is clear that functional characteristics affect the building safety in different ways. Inspecting a residential building is totally different from inspecting a shopping mall. A standard categorization is needed for different building types and functions. As a result, professional competency is very crucial in order to conduct an effective technical inspection through HDRR approach.

[26] …Bu yapılara yapı kullanma izin belgesi düzenlenmesi aşamasında; sorumluluğu yükümlenen ilgili teknik elemanlarca veya yapı denetim kuruluşunca yapı projelerinin ilgili yönetmelikler/standartlar, teknik şartnameler ve diğer mevzuat hükümlerine **deprem etkilerine uygunluğu değerlendirilerek yapı güvenliğine, ilişkin rapor düzenlenir**. Bu rapor ilgili idarece incelenerek onaylanır…(Circular, 2006, available from : http://www.cevresehircilik.gov.tr/turkce/dosya/genelgeler/1493.pdf, accessed in 2011).

[27] …Yapı denetim kuruluşu; yazılı ihtarına rağmen yapı sahibi tarafından önlemi alınmayan, parsel dışında meydana gelen ve yapıda hasar oluşturan yer kayması, çığ düşmesi, kaya düşmesi ve sel baskınından doğan hasarlardan sorumlu değildir. (BIL, Article 3).

Professional competency is not clearly defined in the BIL. Such a definition affects the architect's professional formation and technical capacity, which impairs the participation in the HDRR efforts. The criteria to become an inspector architect is a 'diploma' obtained from an architectural faculty, work experience of 12 years, and attendece to building inspection training once in every 5 year period[28].

Balamir (2000) points out similar critics and insufficiencies about the determination of professional competence:

- In the definition of the "Professional Competence" through the law (*mesleki yetkinlik*), the term "specialist" (*uzman*) is inapropriately used which can be misleading,
- In the production and inspection of earthquake resistant building, professional competency (of building professionals) is not required in seismic design and construction,
- Professional competence is seen as a qualification which is obtained for once and used for ever. However, in the contemporary professional practice approach, competency is a subject that must be revised, refreshed and improved over time as technical, scientific and public demands, as well as continous profession development policies, constantly change,
- In order to sign the documents related to professional works and applications, profession insurance is not required.

A critical legal and technical deficiency: exempt building approach within the BIS

The BIL is criticised in terms of exempt building aplications derived from the Development Law and regulation. Article 1 (within the BIL) defines the exempt buildings (Table 4.1). It is also criticised that the housing production administration of the state (TOKİ-Toplu Konut İdaresi) is one of the exempt institutions from the building inspection system (TMH, 2009)[29]. For instance, residential buildings in municipal settlements which have population under 5.000 people are exempted from the inspection system according to Article 1. Those kinds of settlements are mostly comprising towns and villages, and these numbers make 70% (in total) of municipal settlements in Turkey (SOBE, 2011).

The exempt building system is very different in Western countries. For example, in UK Building Regulation System, building exemption indicates none of the buildings other than the ones that are very limitedly used by people (such as ancillary buildings). Table 4.1 illustrates a comparison between Turkey and UK examples of exempt building categories. The comparison titles may not correspond exactly to the same types of buildings or occupancy examples, so the table draws a general idea of both systems.

[28] The requirement to become an inspector architect in Turkey (Building Inspection Law-Application regulation, Article 14).

- Denetçi belgesi aşağıdaki şartları haiz olup bunları belgelendiren mimar ve mühendislere verilir:
  Diplomasının veya yerine geçen belgenin aslı veya Komisyonca onaylı örneği,
  Mesleğinde fiilen en az on iki yıl çalıştığına ilişkin olarak ilgili kurum ve kuruluşlardan alınacak belgeler,
- Başvuru tarihi itibariyle bir kamu kuruluşunda çalışmakta olan mimar ve mühendislerin sahip oldukları mesleki deneyimleri, çalıştıkları mesleki ihtisas alanları ve çalışma süreleri belirtilecek şekilde görev yaptıkları kurumlardan alınacak belgeler ile belgelendirilir.
- Serbest olarak veya özel sektörde çalışan mühendis ve mimarların, mesleki deneyimleri ve çalışma süreleri, çalıştıkları özel kuruluşlardan alınan ve çalışma alanı ile ilgili kamu kurum ve
  kuruluşları veya kamu kurumu niteliğindeki meslek kuruluşlarınca onaylanan belge ile belgelendirilir.
- Verilen denetçi belgeleri beş yıl için geçerlidir. Bu sürenin sonunda vize edilmeyen denetçi belgesinin kullanımına izin verilmez.
- Denetçi belgesine sahip olan mimar ve mühendisler, Yapı Denetim Komisyonunun veya Komisyonca uygun görülen kurum ve kuruluşların açacakları hizmet içi eğitim programlarına katılmak zorundadırlar.

[29] "Kamu kuruluşu sıfatını taşıyan TOKİ'nin; gerekçesi ne olursa olsun denetim dışı bırakılması düşündürücüdür. TOKİ'nin sadece konut değil, insanların toplu halde bulunduğu okul, hastane, sosyal tesis vb. yapıları da ürettiği dikkate alındığında tehlikenin boyutunun katlanarak büyüyeceği açıktır..." (TMH, 2009).

Table 4.1: Exempt Buildings of Inspecting and Controlling Works; Comparison Between Turkey and England-Wales. The Table is derived from The BIL (Article-1), The Development Law (3194, Article 26 and 27), and Billington (et al., 2007: p. 2.14 and 2.15)

Building Inspection Law (Law No: 4708, year 2001)	**Building Act 1984 (The Building Regulations)**
Exempt Buildings in Turkey	*Exempt Buildings in England – Wales*
1- Public buildings or other buildings constructed by or for public institutions and organizations (including local governments). However, there is not any other legislations that are designed to inspect those buildings. The inspection system is being runned according to the former model of Technical Application Responsibility (TUS System in Turkish) which is found ineffective and deficient...	1- Buildings Controlled Under Other Legislation: • Buildings subject to the Explosives Acts 1875 and 1923, • Buildings (other than dwellings, offices or canteens) on a site licensed under the Nuclear Installations Act 1965, • Buildings scheduled under section 1 of the Ancient Monuments and Archaeological Areas Act 1979 ...
2- Detached single family houses of max. two floors high (not including basement floor) with a max. 200 square meters of total building construction area ...	2- Buildings not Frequented by People: • Detached buildings into which people do not normally go, • Detached buildings housing fixed plant or machinery, normally visited only intermittently for the purpose of inspecting or maintaining the plant, etc. Such buildings are only exempt where they are at least one-and-a-half times their own height from the boundary of the site or any other building frequented by people ...
3- Buildings for agriculture and livestock production that are not qualified as integrated plants ...	3- Greenhouses and Agricultural Buildings: • A building used as a greenhouse: A greenhouse is not exempted if the main purpose for which it is used is retailing, packing or exhibiting, e.g. one at a garden center, • A building used for agriculture which is: sited at a distance not less than one-and-a-half times its own height from any building containing sleeping accomodation, and; is provided with a fire exit not more than 30 m from any point within the building. The definition of agriculture includes horticulture, fruit growing, seed growing and fish farming. Agricultural buildings are not exempted if the main purpose for which they are used is retailing, packing or exhibiting ...
4- Confidentially and secrecy needed buildings for state's as well as Turkish Military Forces' security and safety ...	4- Temporary Buildings: • A building intended to remain where it is erected for 28 days or less, e.g. exhibition stands ...
5- In the municipal settlements with a total population of under 5.000 people that enclose municipality borders and contiguous areas: Dwellings of max. two floors high (not including basement and loft areas) and not exceeding 500 square meters (only one basement floor is not calculated in) of total building construction area. In addition to those dwellings, auxiliary buildings such as coal shed, parking and depot spaces which belong to those kinds of dwellings described above ...	5- Ancillary Buildings: • Buildings on a site intended to be used only in connection with the letting or sale of buildings or building plots on that estate, • Site buildings on all construction and civil engineering sites, provided they contain no sleeping accomodation, • Buildings, except those containing a dwelling or used as an office or showroom, erected in connection with a mine or quarry ...
6- Small town and\or village settlements, and the areas that are not belong to the municipality borders and contiguous areas, and accepted as non-residential areas: Dwellings of max. two floors high (not including basement and loft areas) and not exceeding 500 square meters (only one basement floor is not calculated in) of total building construction area. In addition to those dwellings, auxiliary buildings such as coal shed, parking and depot spaces which belong to those kinds of dwellings described above ...	6- Small Detached Buildings: • Detached single storey buildings of up to 30 m^2 floor area, with no sleeping accomodation (for the exemption to apply, such buildings must either be: situated more than 1 m from the boundary of their curtilage; or constructed substantially of non-combustible material), • Detached buildings of up to 30 m^2 intended to shelter people from the effects of nuclear, chemical or conventional weapons and not used for any ıother purpose. The excavation for the building must be no closer to any exposed part of another building or structure than a distance equal to the depth of the excavation plus one meter, • Detached buildings with a floor area not exceeding 15 m^2 and which do not contain sleeping accomodation, e.g. garden sheets ...

Table 4.1: Exempt Buildings of Inspecting and Controlling Works; Comparison Between Turkey and England-Wales (continuing)

7- In small town or village settlements, neighbourhoods, and fields that are not belong to the municipality borders and contiguous areas: Buildings for agriculture and livestock production that are not qualified as integrated plants and\or dwellings. In addition, the buildings all of which are constructed to meet the village residents' needs such as grocer, green grocer, hair dresser, village bakery, village coffee-house, restaurant, advertisement and exhibiting canteens, and management buildings that are belong to the cooperatives which are developed and operated by the villagers are all exempt buildings for the building inspection system...	7- Extensions: • Ground-level extensions of up to 30 m^2 floor area which are conservatories, porches, covered yards or ways or a carport open on at least two sites ...

There are four main differences in the building inspection system approaches in the two countries in terms of exempt building categorization which can be given as follows:

1- In the BIL, public institution and governmental organization buildings are exempted from BIS in Turkey whereas in UK BIS, such buildings are inspected by the certified inspectors.
2- In the UK BIS, the dwellings or other buildings that have sleeping accomodation are not exempted from the inspection system without any exception, whereas in the Turkish BIL some of the buildings and dwellings (as given in the items 2, 5 and 6 of Table 4.1) that have sleeping accomodations are exempted from building inspection system.
3- In the UK BIS, the buildings and\or structures that people use frequently (such as restaurants, gathering and meeting places, sales units) are not exempted; however, in the Turkish BIL, some kinds of buildings used by people frequently (as given in the item 7 of Table 4.1) are exempted from the building inspection system.
4- In the UK BIS, some specific buildings such as hazardous material production and/or storing facilities are exempted from the usual inspection system, but they are subjected to other special legislations (given in the item 1). In Turkey, the building regulations and inspection system do not seperate or specify those kinds of buildings in detail. There are not any special and specific inspection regulations for those kinds of buildings. The only regulative system which requires obtaining of an 'Environmental Impact Assessment Report' (in Turkish 'ÇED Raporu') from the related ministry is ineffective.

- **Financial Problems of BIS:**

One of the highly disputed issues has been the financial system of the BIS. Inspection firms are paid by building contractors whom they are inspecting. Article 5 (within the BIL) arranges the service contract (for building inspection works) which is signed by the building owner and private inspection firm. However, building owners generally assign the building contractor instead of himself illegally. Therefore, generally building contractors undertake the inspection expenses. Lack of an independent financial system (such as a 'financial funding pool') which stands-alone to arrange inspection activities cause serious failures and corruption throughout the system. Ill-structured financial system clouds the accuracy of inspecting activities, which means deficient HDRR approach.

There is a demand for an independent fund for inspection activities. This fund increases the reliability of inspection activities and eliminates the corruption as well as unfair competition. This fund needs to be supported by different insurance mechanisms.

Lack of liability insurance system for inspectors and contractors also causes failure in inspection activities. If the insurance model is integrated into the inspection system effectively, this improves both the insurance activities and community awareness, and increases the accuracy of the inspection system. Integration of insurance mechanisms into the inspection system means integration of risk mitigation components of risk reduction and risk sharing.

Encouraging homeowners is needed to achieve a more effective and continuing insurance system. Therefore, it is critical to develop effective means of control and bring incentives. The central authority needs to develop tools and mechanisms to encourage the local municipal governments as well as public in terms of participating to the insurance system.

- **Training and Certification Problems of BIS:**

The legal, technical and financial problems of BIS mentioned before cause the important gaps and insufficiencies, decreasing the reliability and accuracy of the overall system. However, training and certification issue is the other very important concept which has not been argued in detail among the national agenda yet. Improvement and continuity of a reliable inspection system can be achieved through the bottom-up participation and contribution of building professionals. Therefore, the more competent building inspectors are, the more effective and advance the inspection system is. Advancement of the BIS needs effective and holistic professional development model which relies on risk-based approach.

In Turkey, a bachelor’s degree received from a four-year undergraduate education in architecture is accepted as the only criterion to obtain the inspector architect certificate. Although there is an ongoing building inspector certification and training model, this model is ineffective as explained earlier. There is only one mandatory training course of inspection certification and training system, the ‘building inspection training course’ provided by Chamber of Architects of Turkey. A broader analysis of the inspection training system and the course is presented in the following section. Lack of a comprehensive training model for practicing architects results in incompetency. The insufficient professional training model makes it difficult to develop a HDRR approach. Development of risk awareness and risk culture among the professional architects increases the accuracy and success of a holistic BIS. Thus, the need for a more holistic and risk-based certification and training model is the major argument of this section and the overall study.

The demand for effective and holistic capacity development of practicing architects through professional training program in Turkey

Among the other problematic concepts (legal, administrative, technical, and financial) mentioned before, training and certification problems of building professionals, particularly practicing architects have been discussed by many reports and researchers (TBMM, 1999; Gülkan et al., 1999; Gülkan, 2001, 2002; Gülkan et al., 2003; Balamir, 2000, 2011; Akdağ, 2002; Karaesmen et al., 2004; TMH, 2009; Ustaömer, 2009; Gökçe, 2009; Çetinbaş, 2009; Erkan, 2010; Ergünay, 2011). In various conferences and symposiums, the deficiency of BIS and related training program have been discussed. Particularly at least three national symposiums were organized which focused on BIS and its problems. These symposiums were Building Inspection Symposium (November 19-20, 2009, İstanbul), Second Building Inspection Symposium (November 17-18, 2011, İstanbul), and Building Inspection Symposium (September 10, 2011, Gaziantep). Among these sources, there are also graduate studies on the BIS in Turkey. These studies are summarized in order to understand the concerns related to BIS.

Review on Graduate Studies Conducted in Turkey Related to Building Inspection Concept

The building inspection concept is analyzed through the graduate studies particularly conducted after the 1999 East Marmara Earthquakes. Figure 4.1 specifies the total number and the distribution of graduate studies conducted under building inspection key word. Table 4.2 indicates the titles, study area, degree and completion year of thesis studies conducted under building inspection concept.

Key Word: Building Inspection	Graduate Level		Discipline	Focusing on Training and/or Education
	Master	PhD		
4	2	2	Social Sciences	-
8	8	-	Architecture	-
-	-	-	City and Regional Plan.	-
9	8	1	Engineering	-
-	-	-	Medical Sciences	-
Total: 21	18	3		-

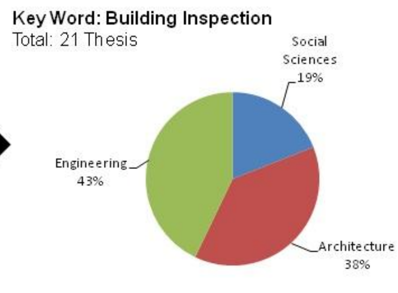

Figure 4.1: Thesis Studies conducted under the key word of “building inspection” in Turkey between 1996-2012 periods.
Source: YÖK National Thesis Database Center (http://tez2.yok.gov.tr/)

Table 4.2: Thesis Studies conducted under the key word of "building inspection" in different disciplines between 1996-2012 periods. Source: YÖK National Thesis Database Center (http://tez2.yok.gov.tr/)

No	Thesis Title	Study Area (Discipline)	Degree	Year
1	Yüksek binalarda kamu kontrolü ve İstanbul için öneriler	Architecture	Master	1996
2	Türkiye'de Yapı Denetim Sisteminin Oluşturulması Üzerine Bir Araştırma	Engineering	PhD	1996
3	Yapı denetiminin kalite üzerine etkisi ve Konya örneği	Engineering	Master	1998
4	Kent kooperatifçiliği kavramı ve yapı denetimi	Architecture	Master	1999
5	Yapı denetim sistemi ve yapı polisinin çalışma esasları üzerine bir araştırma	Architecture	Master	2000
6	İnşaat sektöründe müşavirlik ve Türkiye'de müşavirlik firmaları	Architecture	Master	2000
7	Yapı denetiminin dünyadaki uygulamaları ve Türkiye'deki gelişimi	Engineering	Master	2001
8	Yapıda denetim ve on yıllık sorumluluk sigortasının önemi	Social Sciences	Master	2001
9	İnşaat Sektöründe Teknik Müşavirlik ve Yapıda Kalite Kontrolü	Architecture	Master	2001
10	Türkiye ve Avrupa Birliği ülkelerinde planlama ve imar koşullarının karşılaştırılması	Engineering	Master	2001
11	Kalite yönetim sistemi ve örnek olarak bir kalite kontrol laboratuvarlarında kalite yönetim sisteminin kurulması	Engineering	Master	2002
12	Afet yönetiminde kurumsal ve hukuksal yeniden yapılanma: Yapı denetimi	Social Sciences	PhD	2003
13	Building inspection in Turkey	Engineering	Master	2003
14	Türkiye'de Konut Sektörünün Denetim Açısından İrdelenmesi ve Yapı Denetiminde Coğrafi Bilgi Sistemlerinin Kullanımı	Architecture	Master	2005
15	Dünyada ve Türkiye'de Yapı Denetim Sistemleri ile Sigorta Uygulamaları	Social Sciences	Master	2005
16	Türkiye'de Yapı Denetim Sistemi ile İlgili Yaklaşımlar	Architecture	Master	2005
17	Türkiye'de 1980'den Sonra Kent Planlaması Hizmetlerinin Özel Kesime Gördürülmesi Eğilimleri: Yapı Denetim Kuruluşları Örneği	Social Sciences	PhD	2006
18	İstanbul'da faaliyet gösteren yapı denetim şirketlerinin uygulamaya yönelik karşılaştıkları sorunlar ve çözüm önerilerine yönelik bir araştırma	Engineering	Master	2008
19	Yapı Denetim Sisteminde Yaşanan Sorunlar, 4708 Sayılı Yapı Denetim Hakkında Kanun'daki Eksiklikler ve Çözüm Önerileri	Engineering	Master	2008
20	Bina tasarım - denetim sürecinde e-belediye olanakları ve üç boyutlu kent modelinin oluşturulması	Architecture	Master	2010
21	4708 sayılı Yapı Denetim Kanununun denetimdeki verimliliği	Engineering	Master	2011

The researches concerning building inspection concept concentrate mainly on the development problems of legal, administrative and technical structures of building inspection firms and/or governmental institutions responsible from accuracy of inspection activity. The legal structure is criticised from different aspects. The gaps regarding building inspection in the building production system are also laid down. It is commonly asserted that failure in disaster events are directly associated with the ill-structured inspection system. Most of the researches also develop building inspection system comparisons between countries. A common research method utilized in thesis studies is surveys conducted with building professionals, public institutions and inspection firms. Social sciences studies mostly concantrate on the development of legal and governmental organization of building inspection approach, and particularly insurance issues. It is worth mentioning that two of the PhD studies conducted in social sciences discipline mainly concantrate on the shift of inspection responsibility and liability from public institutions to private sector and firms

Among the other issues, the following results and assumptions have found a common ground in understanding and critically evaluating the success or failure of inspection approach and system in Turkey. A great majority of the studies given in table 4.2 conclude the following:

- Parties participating in the building inspection system have serious collaboration and coordination problems,
- The new system (which enacted in 2001) does not meet the expected shift and success in practice in terms of effective inspection. It does not comply with the foundation aim in practice,
- The financial system developed for the inspection activity is ill-structured, so it causes serious illegal and unfair competiton between participating parties, particularly for private inspection companies. The financial system is criticised for being harmful for the whole inspection activity, and the corruption is a serious threat for that reason,
- The law and regulations related to inspection system are inconsistent with practice,
- It is argued that there is an urgent need to develop a data-bank in order to gather and protect the data and experiences as well as reports produced for inspection efforts for the future studies and inspection activities,
- It is claimed that the insurance and liability concepts are missing parts of the inspection system. Therefore, a re-organized and developed inspection system which encompasses the

liability and other insurance issues (such as building insurance, professional liability insurance etc.) is needed,

- The urgent need to develop and settle professional competency system is emphasized. In that sense, competent architects and engineers' not participating in the inspection activity is a core problem.

The problems related to training and certification of building inspection professionals are believed to be one of the main concerns that influence the success of the inspection system in general. The studies recommend developing and implementing effective and reliable training systems in general, continuing professional development models in particular.

According to Yılmaz (2006; p. 352), in order to enhance the standardization among the sectors and parties who participate in the building inspection system, professional training system should be re-organized. In addition, Yılmaz (2006; p. 355) asserts that it is important to develop a standard conceptual framework in order to make all participants to follow the inspection system effectively. Therefore, a training system which can be organized through a Building Inspection Institute is needed (Yılmaz, 2006; p. 355). However, Yılmaz also claims that the ongoing inspection system which excludes the involvement of professional chambers and training approach is seen as a deficient system (2006; p. 357). Özkan (2005; p. 37) argues that professional competency within the building inspection law needs to be defended strongly. Moreover, he (2005; p. 38) defends that professional competency which can be improved by professional training and practical experience enhance the development of safe, reliable and quality service through contemporary technical applications.

Yener (2003; p. 257) claims that institutional organizations in Turkey are ill-structured, and incompetent and unequppied people work in the construction sector. He also adds that building design is often in crisis due to the ill-structured organization of the legal system, which constitues a barrier to the improvement of professional capacity. The less than average quality of projects prepared under these conditions are inspected by the local governmental organizations and building inspection companies who do not possess sufficient competency themselves (2003; p. 257). Consequently, the reliability of the construction process is doubtful. Yener (2003; p. 262) claims that the new legal system of building inspection does not meet the criteria of building and inspection professionals competency. Yener agrees with Özkan (2005) in that effective mechanisms are needed to improve competency of building inspection professionals (2003; p. 265). He (2003; p. 267) specifies that, to develop common strategies in order to educate home owners, technical staff and local governers can be the first step to achieve safe and reliable building production process in inspection activities.

Pelenk (1996; p. 163) confirms that inspection professionals who are competent and compatible with rapidly changing environmental conditions can be trained through continuing professional training systems following the undergraduate education. On the other hand, Açıkel (1998; 104) suggests that building owners also need to be trained and aware of inspection quality in building production process through seminars.

Türker (2000; p. 60) asserts that building inspection professionals need to be determined by examination which evaluate their multi-directional and sophisticated thinking and coordination capacity, all of which can be developed through professional experience and training. Interestingly, Türker (2000; p. 62) recognizes that above the conventional hazards such as earthquake, there are some other hazards stemming from chemical and biological agents causing harmful effects to inhabitants. Therefore, the inspection professionals also need to be trained and awared of those kinds of hazard types due to future needs and demands in housing production process.

Hacıbaloğlu (2003; p. 144) asserts "Due to high level of knowledge and experience requiring nature of building inspection, qualification of technical staff to be employed by inspection organizations shall be subjected to a regulation defining the prerequisites of qualification like in America and Germany".

According to Karahan (2008; p. 72), through the building inspection process, the building professionals who are responsible from inspection issues and employed in local governmental organizations are not competent enough to achieve reliable and efficient inspection. Therefore, those professionals need to be trained through continuing professional development programs in order to enhance their technical and administrative knowledge of building inspection activity. In addition, Karahan (2008; p. 75) claims that professional architects and engineers have to be trained through professional training programs organized by the chamber of professionals of Turkey. Karahan adds that only after successfully completing a certification program, the professionals can have the inspector license. Karahan (2008; p. 76) asserts that the continuing professional training system has to be mandatory for the practicing building professionals who participate in building inspection system.

Sakallı (2008; p. 135) points out that building inspection system should be re-organized within a framework which has the capacity to develop its own technical and scientific structure, as well as training system in itself. Sakallı (2008; p. 136) agrees with Karahan (2008) in that professional training system, examination and certification of inspectors should be mandatory. Moreover, the training process and certification system have to be developed and organized by related ministry and chamber of professions. Sakallı (2008; p. 138), similar to Yılmaz (2006), claims that there is a need for standard conceptual framework to continue more effective inspection activity among all the parties who are involved in the building production process. Eminağa (2001) points out the importance and lack of the qualifications (e.g. experience, education, exam, recommendation letters, etc.). He also lists the minimum years of experience (12 years in Turkey, changeable in USA within education) for an architect or engineer to be eligible to work as a technical consultant in the building production process, and particularly in the building inspection system.

Because of the deficiencies, an effective capacity development approach in BIS is essential. Insufficient certification and training model of BIS, which results in incompetency among building professionals, is widely criticized. The importance of continuing professional development (CPD) is defended through several sources and graduate studies. However, these critics are of limited scope and generally presented subjectively. A detailed analysis of the training system of BIS and certification model does not exist. Similarly, no research on the enhancement of the ongoing professional training for practicing architects in Turkey from a holistic and risk-based understanding has been found in the literature. In order to evaluate the effectiveness of the training model in Turkey, the CPD system should be examined more closely.

4.4 Capacity Development of Practicing Architects Through Continuing Professional Development Approach: A Brief Analysis of Existing System in Turkey

In order to improve the capacity of practicing architects, a continous training model has come into effect through a regulation prepared by Chamber of Architects (CAT, 2005). According to this regulation, Continuing Professional Development Center (CPDC) ('Sürekli Mesleki Gelişim Merkezi' in Turkish) has been developed. The aim of this center is to enhance the capacity of practicing architects in a way to suit the general interests of public and architecture discipline. Therefore, it also aims to run the continous professional development, research and applications with the defined purposes, methods, principles, and circumstances by the CPDC (CAT, 2005: Article 1).

In 2004 (one year earlier than the establishment of CPDC), mandatory continuing professional training system was enacted by Chamber of Architects. According to this compulsory training system, if an architect wants to set up an architectural office or continue to run the exisiting one for any purpose, that is if he or she wants to remain a part of the building production process, he or she has to earn at least 15 credits annually[30]. The mandatory continuing professional training system offered various courses, seminars and some other learning activities to serve different professional fields and interests. The CPDC was responsible for developing, organizing, controling, and archiving the credits and participants' attendance to the continuing professional training system.

However, in 2008, a court decision (approved by State Council of Turkey) made the continuing professional training nonobligatory (or optional) for practicing architects[31]. It was based on an unfair practice that resulted in unfair competition in the mandatory creditting system developed for practicing architects.

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[30] 1 course credit equals to 1 hour course time in this system.
[31] The related court decision is: T.C. Danıştay İdari Dava Daireleri Kurulu, YD. İtiraz No: 2009/785. Available from: http://www.mo.org.tr/index.cfm?sayfa=Belge&Sub=detail&RecID=1444 (accessed 2011).

The court decision cancelled the compulsory training credit application. The major critisizms towards the creditting system which influenced the trial's decion are[32] as follows:

- The Turkish Republic Constitution does not give responsibility or any rights, preventing the architects from running their professions,
- The compulsory training credits are mandatory for only architects who want to run an architectural office; however, the credits are not compulsory for other architects (including academicians, architects working in architectural firms or public sector etc.),
- The training courses which are acknowledged by the credit system are the ones developed by the Chamber of Architects. Other alternative courses, seminars, conferences, academic and/or scientific researches etc. are not included in the training system. The variety of the courses and ways of attendance to the courses are very limited,
- The quality, scope, extent and the objectives of the courses are not well defined and well prepared. Those courses cannot meet the needs of practicing architects.

However, the cancellation of the compulsory training crediting system has caused the low rates of attendance to the continuing professional training activities. Ultimately, only two compulsory courses have left behind; "Building Inspection Course" and "Expropriation Expertise". These courses are compulsory by the requests from related ministries (Environment and Urbanization Ministry). If an architect wants to work in one of these sectors (inspection or expropriation), he or she has to attend the appropriate courses to obtain a certificate. It is mandatory to attend the "updating courses" annually.

The mandatory training course of building inspection is a two-day training which comprises 16 hours (8 + 8) of learning activity. The course content and lectures are mainly about legislative issues. In other words, issues including structural, technical, constructional, design formative, building components and materials, hazard and disaster, risk, mitigation, safety, health etc. are not covered sufficiently by the programme.

Disaster Risk Reduction (DRR) approach needs to be an integrated and participatory effort which combines hazard, risk, safety and building production processes. Building professionals are burdened with BIS, an important component of DRR. Therefore, practicing architects dealing with BIS needs to enhance their capacity continously to maintain their competency. This capacity enhancement can be achieved accurately if only the professional development system is structured in a holistic and risk-based understanding. The ongoing BIS and related professional training model are criticised in terms of deficient approaches and missing conceptual understanding which are not consistent with shifting demands and expectations towards a holistic and risk-based inspection system.

4.4.1 Brief Analysis of CPD Training Regarding Hazard and Safety Concepts

The CES (Continuing Education System) courses cover a wide range of professional areas changing from architectural theory to design and construction that are determined for the activity areas. According to this determination, the CPDC's activity areas of continuing professional training system are decided as[33]: Architectural Theory; Architectural Design and Building; Environment; Conservation (and Restoration); Law, Rights, and Professional Practice; Building Well-Being; Project and Construction Management; Safety and Architecture; Building Inspection; New Service Areas; Cultural Areas; Personal Development.

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[32] More detailed arguments and critics on the issue can be accessed from the following links (accessed several times in 2010 and 2011);

(1) http://v3.arkitera.com/news.php?action=displayNewsItem&ID=36459
(2) http://v3.arkitera.com/article.php?action=displayArticle&ID=249
(3) http://www.yapi.com.tr/Haberler/mimarlar-odasi-smgm-yoluna-devam-ediyor_65128.html
(4) http://www.mimarlikforumu.com/showthread.php/21840-SMGM-nin-serbest-mimarl%C4%B1k-yapmaya-getirdi%C4%9Fi-k%C4%B1s%C4%B1tlama-kald%C4%B1r%C4%B1ld%C4%B1.
(5) http://www.forumcad.com/forum/showthread.php?199-SMGM-nin-serbest-mimarlk-yapmaya-getirdii
(6) http://www.mimarizm.com/Haberler/HaberDetay.aspx?id=48961
(7) http://www.yenimimar.com/index.php?action=displayArticle&ID=811
(8) http://www.mo.org.tr/index.cfm?sayfa=Belge&Sub=detail&RecID=1444

[33] Source: Chamber of Architects of Turkey, Continuous Professional Development Center web site; http://www.mo.org.tr/smgm/index.cfm?sayfa=belge&sub=detail&RecID=123 (accessed on August 2010)

The CES courses provided by The Chamber of Architects of Turkey through the CPDC is categorized under four main titles in accordance with the hazard and safety related issues in Table 4.3. These are earthquake-architectural design related courses, courses on regulative system related to hazard and development concepts, courses on hazards and safety other than earthquake hazard, safety concept related courses.

Table 4.3: The CES Courses (provided by The Chamber of Architects of Turkey) which comprise hazard and safety related issues

CES Course Categorization According to Course Subjects			
A.Earthquake – architectural design courses	**B.Regulative system courses related to hazard and development concepts**	**C.Hazard and safety courses other than earthquake hazard**	**D.Safety related courses**
A1. Earthquake Factor in Building Design	**B1.**Building Inspection	**C1.**Fire Insulation	**D1.**Work Health and Safety in Construction Works
A2. Earthquake Factor in Architectural Design	**B2.**Development Law and Implementations	**C2.**Fire Safety in Buildings	
A3. Earthquake in Architectural Design	**B3.**Interrelation Between Development Legislation and Architectural Design	**C3.**Insulation Techniques Against Global Warming	
A4. Structural System Arrangement in Buildings			

Although ‘safety and architecture’ and ‘building inspection’ issues are considered within the CPDC’s CES activity areas, some other concepts such as hazard, risk, resiliency and mitigation which are very critical in a holistic and risk-based approach are not correlated with the main activity areas. As a result, there are very limited number of CPD courses provided for practicing architects in hazard and safety related concepts. A great majority of these courses (Group A and B courses in Table 4.3) focus on earthquake related concepts. There are two courses (Group C courses: C1 and C2 in Table 4.3) which focus particularly on fire safety concept.

Appendix H presents the course objectives and course contents of group A, B and C courses in order to evaluate the effectiveness of capacity development approach of practicing architects from a holistic and risk-based understanding.

4.4.2 Personal Experience: A Brief Evaluation of Building Inspection Training Course

The author attended the CES Course of Building Inspection from 18th to 19th of June (2011). The two-day training course was then evaluated. The course was conducted by two practicing architects. They lectured on the legislative issues mainly.The general problems related to law and legislation of building inspection were expressed. The current law was analyzed in terms of administrative formation and the responsibility of inspector architects within the law. The financial problems were also debated during the course period. The second and last day of the course was conducted in a similar way. The last part of the course duration was allocated to participants’ questions about different issues. However, most of the questions were inquiring the financial issues related to the ongoing BIS. The other issues concerning technical and application failures were not shown much interest.

The course profile did not cover a holistic inspection approach which encompasses different aspects of inspection activity from DRR perspective.The duration of the course was rather short, which did not allow for coverage of many core issues related to the legal, technical and financial concepts of the inspection system. As a result, the contribution of the course to the practicing architects in terms of knowledge, skill and ability (KSA) transfer to the practice was also limited due to insufficient structure and time-limitation of the course. At the end of the course, an examination was carried out. The questions were mainly on the basic legislative issues and were not representing an accurate pool of learning activity source which regard all aspects of inspection system ranging from technical issues to the administrative and financial issues. To pass this limited exam is accepted to suffice to obtain an inspector certificate and to be accepted a qualified inspector architect.

4.4.3 Interviews (with Professionals Participating in BIS)

A limited qualitative research approach is used in order to expose the deficient points of the ongoing BIS. Particularly, this analysis aims to disclose the problems related to the certification and training of practicing architects through the existing CPD approach. Experiences and views of professionals dealing with building production process and particularly inspection effort were collected through interviews.

The interviews are conducted with nine professionals between the years 2008 and 2012, and interviewees are the randomly selected working participants of Building Inspection Firms; The Presidency of Building Inspection Commission under the Ministry of Environment and Urbanization; Continuing Professional Development Center, Chamber of Architects of Turkey; Union of Municipalities of Turkey; General Directorate of Provincial Bank; and the Greater Municipality of Ankara (Appendix I). A qualitative research methodology comprising the in-depth interviews is used in order to collect the necessary data. The interview questions given in Appendix I probed building professionals' ideas concerning the administrative and application structure of BIS with regard to professional training and competency.

Evaluation of the Interviews

Problems related to BIS in general, and the implementation of the system to the practice in particular which were asserted by the inspection and administrative professionals mainly concentrate on the following issues:

1. Lacking and/or insufficient certification and continuing professional training for BIS (9 of 9 interviewees: %100),
2. Insufficient and obscuring structure of the inspection system which causes overlaps, conflicts, complexity, irresponsibility, and uncoordination among the professionals (8 of 9 interviewees: %89),
3. Lack of necessary awareness and knowledge (technical and legislative) of the BIS which also means lack of disaster risk reduction culture among the building professionals and administrations (8 of 9 interviewees: %89),
4. Insufficieny of the financial regulation through the ongoing legislative and administrative system which causes unfair competition and serious corruption among the building production and inspection activities (3 of 9 interviewees: %34).

Although the deficient points were predominantly given attention on the technical application process of the BIS, the interviewees intentionally revealed the gaps of the legislative and administrative system that result in failure of the technical implementation process.

Alexander (as cited in Blanchard, 2003) asserts that "although knowledge does not guarantee power over natural catastrophe, it is a prime requisite of disaster prevention." The general judgments agreed on the gaps and deficiencies of the BIS which indicate the need of professional training opportunities of practicing architects to meet the future challenges that will inevitably result from further disaster risks and mitigation efforts.

Analysis of interviews yielded that development and implication of 'culture of safety and resilient built environment approaches', and their organizational as well as interdisciplinary roles need to comprise a dialogue between building professionals and public from a holistic and risk-based understanding. To develop and apply this understanding can be achieved through efficient and effective training of professionals involved in the BIS. The training process is to be seen as a continuous process of sharing and transferring experiences and knowledge to the practice within the BIS.

The advancement of ongoing BIS toward a holistic risk reduction approach through the capacity enhancement of practicing architects encompasses two primary strategies – certification and accreditation. Efficient application of these strategies improves the capacity of practicing architects and motivates them to implement accurate inspection activity.

4.5 Evaluation of the Chapter

Emergence of shift towards disaster risk reduction understanding among the legal system in recent years, specifically following the traumatic impacts of the 1999 East Marmara Earthquakes, has reflected onto the BIS in Turkey. The chapter analyzes the disaster-legal system linkage in terms of shifting disasters policy towards risk mitigation. Deficiencies related to ongoing development and disaster laws and regulations are summarized and critically analyzed from HDRR point of view. BIS and related law and regulation are also analyzed. Capacity enhancement problems and deficient professional competency approach of practicing architects in BIS through CPD system is displayed through literature survey, legal system analysis, personal experience of BIS training and certification, and semi-structured interviews with building professionals. The results of this examination clearly shows that integration of shifting policy and disaster coping strategies under a holistic and risk-based approach has not settled yet in the legal and administrative system in Turkish context.

Among the other capacity enhancement problems, inadequate training model and strategies of practicing architects due to insufficient structure and missing conceptual development of the CPD system with regard to HDRR approach diminishes the effectiveness of inspection practices.

The chapter examines the capacity enhancement model of practicing architects engaged in building and inspection activities in Turkey through the CPD system. The CPD courses provided for practicing architects are presented and evaluated in order to analyze the effectiveness of HDRR approach. Problems which affect the efficiency of the training model are categorized under four parts: insufficient structure of the CPD system, missing conceptualization of CPD courses, deficient CPD course content and extent, lack of opportunities related to CPD learning activity utilization. Figure 4.2 summarizes the deficient points related to ongoing CPD system and courses from HDRR point of view.

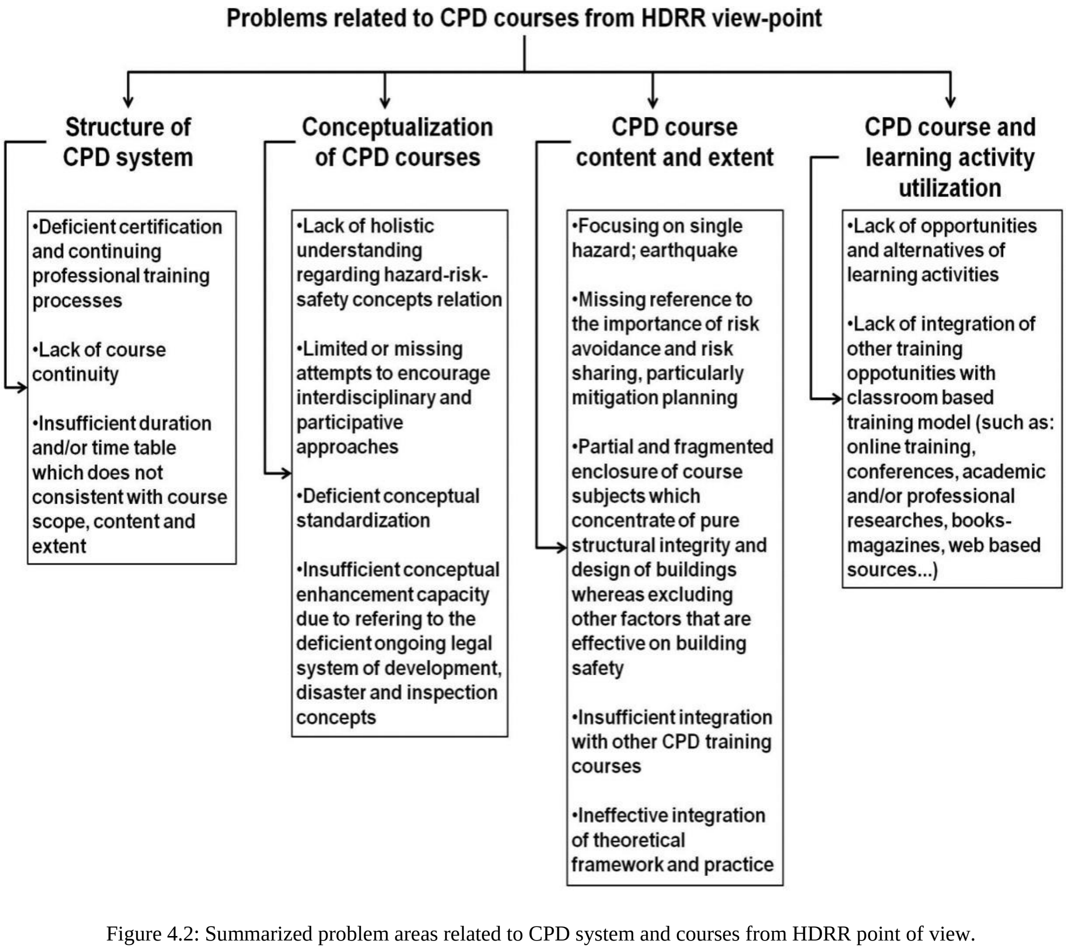

Figure 4.2: Summarized problem areas related to CPD system and courses from HDRR point of view.

These problems indicate a demand for a new vision for an effective and holistic professional training approach. Vulnerability of society and susceptibility of built environment to disasters in Turkey increase the demand for more competent inspector building professionals. This demand can be met by a more comprehensive hazard and safety related CPD system and training course design. The following chapter focuses on the analysis of CPD system and training courses in the US provided for practicing architects and building inspectors with regard to HDRR approach.

CHAPTER 5

Capacity Development Analysis of Practicing Architects Through Continuing Professional Training System in The United States with Regard to HDRR Approach

5.1 Introduction

The former chapter (Chapter 4) highlights the importance of professional training for capacity development of practicing architects. To this end, the necessity of a continuous training model to develop the HDRR approach among the practicing architects in Turkey is stresssed. In order to evaluate and compare the professional capacity development experiences, a best-practice example of the United States (hereafter US) training model is analyzed through this chapter. The US CPD model is evaluated according to its holistic and risk-based understanding, which prioritizes risk mitigation.This analysis helps to compare and contrast the Turkish and US contexts. The comparison of both country models helps better disclose Turkish CPD program deficiencies.

This chapter investigates the capacity development of practicing architects in the US with regard to hazard and safety concepts through the ongoing Continuing Education System (CES). In order to understand the capacity development process of practicing architects, a brief summary and analysis of building codes and legislative structure evolvement is presented. This is a chronological analysis done through the US disasters history and building safety attempts regarding HDRR approach. The continuing professional development (CPD) courses related to hazard and safety concepts are classified. Finally, a comparison between Turkey and the US contexts is generated. This comparison presents the contrasts and missing points between both countries' CPD systems and course design from a holistic and risk-based approach. The US model helps re-structure the Turkish building inspection training model for practicing architects as well.

5.2 Disasters and Building Safety: Development of a holistic view-point to maintain resiliency in the US

As it has been clearly seen in the earlier chapters, Building Inspection System (BIS) is one of the most important issues in Holistic Disaster Risk Reduction (HDRR) approach. This section discusses the evolution and development of building codes and building inspection system in the US in a chronological order where the attempts towards a holistic professional training model in the US are examined.

Dorris (1998) points out that there are strong relations between hazardous events and building code development. This unfortunately shows both collective experiences and mistakes of builders and designers over hundreds of years in the US. Dorris asserts that the first building code was developed and published officially in Chicago in 1875. This date is two years after the Great Chicago Fire, which caused considerable loss. Rosen (1986:29) exemplifies and claims that "it took many decades for architects to appreciate fully the fact that almost no substance was completely impervious to the extreme heats generated by city fires".

In the US, destructive natural disasters such as the 1906 San Francisco Earthquake and 1925 Santa Barbara Earthquake were the driving forces to develop and apply safety and building codes which were evolved early in the 20th century.

McCollum (2004:3) specifies that there were numerous and fragmented building codes and provisions all around the country which caused confusion and complexity in the early period of the 20th century, and it took years to develop a more holistic coding system.

May (et al., 1999) underlines that the participative approach to the problem of coding system was very important. The private sector, local building officials, contractors, and design professionals have all participated in this process. Hamburger and Kircher (2000) state that Pacific Coast Building Officials developed and published the first comprehensive set of seismic design principles in 1929.[34]

Mandatory regulations (entitled as ‘Riley Act’ and ‘Field Act’) were also put into effect following the 1933 Long Beach Earthquake which aimed to enhance building resistance for earthquakes. Whereas the Riley Act aims to “prohibit on a statewide basis the further construction of unreinforced masonry buildings and established a mandatory minimum lateral force design for all buildings”, the Field Act “established mandatory design standards, design review, and construction inspection requirements for public school construction” (Hamburger and Kircher, 2000:viii).

In 1960, SEAOC (Structural Engineers Association of California) published a book which is also known as ‘Blue Book’ that proposes a complete set of recommended earthquake provisions and supporting issues but more importantly, defines three vital criteria for the seismic performance of a building (Hamburger and Kircher, 2000);

1- To permit buildings to resist minor levels of earthquake ground-shaking without damage,
2- Moderate level of earthquake ground shaking without structural damage, but with some damage to nonstructural elements,
3- Intense levels of ground shaking without collapse or endangerment of life safety.

Today, there are five model codes in the U.S., each of which has a different geographical basis for adoption (Waugh and Hy, 1995; Drake and Bragagnolo, 2000; McCollum, 2004):

1- International Building Code [IBC] (used throughout the nation),
2- The Standard Building Code (most widely used in the southern United States),
3- The National Building Code (most widely used in states along the East Coast),
4- The Uniform Building Code (most widely used in the Midwest and western states),
5- A separate one- and two-family-dwelling code (used throughout the nation).

Inefficient code enforcement and compliance have caused tragic results in the US history such as skywalk disaster of Kansas City in 1981, Hurricane Andrew in 1992 and Hurricane Katrina in 2005. These were a few examples of natural and man-made disasters which were directly related to building regulatory enforcement and code appliance deficiencies in the US. Due to the adverse affects of hazards and disasters, “many attempts to challenge and reshape existing frameworks of design regulations and codes were developed” (Ben-Joseph, 2009:2700) in the US.

For example, ‘The Robert T. Stafford Disaster Relief and Emergency Assistance Act’ of 1988 which focuses primarily on post disaster efforts was criticized at the begining of 1990s, in parallel to the shifting understanding towards mitigation based approach and deficiencies of post-disaster efforts. The Stafford Act was amended and transformed into ‘Disaster Mitigation Act of 2000’. However, due to the demand for a more holistic and risk mitigation based system, the same act was amended in 2006. Former experiences and participative efforts in the US have revealed the importance of mitigation approach. This approach can be achieved through a comprehensive disaster act which encompasses both pre and post-disaster strategies within a cyclic and continuing structure. The following section analyzes the Stafford Act briefly to explain its contribution to the capacity enhancement of building professionals in disaster risk mitigation approach.

- **Robert T. Stafford Disaster Relief and Emergency Assistance Act,**

Public Law 93-288, as amended, 42 U.S.C. 5121-5207

This law is the driving regulation for mitigation approach and organizes both pre and post disaster efforts in the US. The regulation gives emphasis to integrated (holistic) and participative approach to disasters, and the professional training at the same time. One of the most important novelties brought

[34] “This set of procedures was proposed in the form of a non-mandatory appendix to the first edition of the Uniform Building Code (UBC). This early code included rudimentary seismic zonation, which included recognition of the effects of weak or infirm soils; simple prescriptive provisions regulating structural detailing; and a requirement to design buildings for lateral forces calculated using a base shear equation, dependent on the building’s weight. These basic code elements – zonation, detailing, and lateral resistance – remain as the foundation for seismic code provisions today” (Hamburger and Kircher, 2000: p.viii).

by the act is to encourage the involvement of local municipalities in disaster risk mitigation activities through ‘Multi Hazard Maps’. Financial strategies such as insurance system, which are disaster risk sharing attempts, are also included within the act.

The regulation consists of seven major sections: Title I - Findings, Declarations and Definitions; Title II - Disaster Preparedness and Mitigation Assistance (includes Federal and State Disaster Preparedness Programs, Disaster Warnings, Pre-disaster Hazard Mitigation, Interagency Task Force); Title III - Major Disaster and Emergency Assistance Administration (includes Nondiscrimination in Disaster Assistance, Insurance, Mitigation Planning); Title IV - Major Disaster Assistance Programs (includes Hazard Mitigation, Repair-Restoration and Replacement of Damaged Facilities); Title V - Emergency Assistance Programs; Title VI - Emergency Preparedness; Title VII – Miscellaneous.

Section 101 (within Title I) underlines the responsibility of the government as to precautions taken before disasters. Among the others, these measures and preventive approaches are as follows:

- achieving greater coordination and responsiveness of disaster preparedness and relief programs;
- encouraging individuals, States, and local governments to protect themselves by obtaining insurance coverage to supplement or replace governmental assistance;
- encouraging hazard mitigation measures to reduce losses from disasters, including development of land use and construction regulations.

Section 201 (within Title II) emphasizes the responsibility of central government as to the establishment of a program of disaster preparedness which utilizes services of all appropriate agencies and prepares for disasters as to mitigation, warning, emergency operations, rehabilitation, and recovery; training and exercises; post-disaster critiques and evaluations; annual review of programs; coordination of Federal, State, and local preparedness programs; application of science and technology; research.

In the same section (sec. 201), responsibility of technical assistance is defined. Within the scope of technical assistance is developing comprehensive plans and practicable programs for preparation against disasters, including hazard reduction, avoidance, and mitigation; assistance to individuals, businesses, and State and local governments following such disasters; and recovery of damages or destroyed public and private facilities.

Due to technical assistance reponsibility, special funds are allocated for these activities. These funds are categorized under the ‘Grants to States for development of plans and programs’ (which includes the development of plans, programs, and capabilities for disaster preparedness and prevention) and ‘Grants for improvement, maintenance, and updating of State plans’ (which includes mitigation plans).

Section 203 defines the ‘Pre-disaster Hazard Mitigation’ activities. Mitigation programs which aim to provide technical and financial assistance to States and local governments are to be cost-effective and designed to reduce injuries, loss of life, and damage and destruction of property, including damage to critical services and facilities under the jurisdiction of the States or local governments. This section defines the scope of technical and financial assistance service as “to support and encourage effective public-private natural disaster hazard mitigation partnerships; to improve the assessment of a community's vulnerability to natural hazards; to establish hazard mitigation priorities, and an appropriate hazard mitigation plan, for a community”.

Preparation of ‘Multi Hazard Advisory Maps’ and making those maps available for local governments and public are assumed as an important mitigation activity. Establishment of an ‘Interagency Task Force’ in order to coordinate the implementation of pre-disaster hazard mitigation programs administered by the Federal Government is another priority.

Risk term is used very often in order to define the importance of pre-disaster mitigation activities and arrangements. For instance, “informing the general public about the risks of natural hazards in the areas that are subject to commonly recurring (including flooding, hurricanes and severe winds, and seismic events)” is an important risk mitigation approach. In parallel to this, Section 322 (item a) draws the scope of the mitigation plan as “to outline processes for identifying the natural hazards, risks, and vulnerabilities of the area under the jurisdiction of the government”.

The law charges the FEMA (Federal Emergency Management Agency) to implement, assist, monitor and report about both pre and post-disaster activities and measures. According to section 503 (article b-1), the primary mission of the Agency is defined as "to reduce the loss of life and property and protect the Nation from all hazards, including natural disasters, acts of terrorism, and other man-made disasters, by leading and supporting the Nation in a 'risk-based', 'comprehensive' emergency management system of preparedness, protection, response, recovery, and mitigation". The role of FEMA in mitigation activities indicates the importance of long-term planning before disaster events which is also defined as "the reduction or elimination of long-term risks" (Section 504, article a-9-A).

To sum up, The Stafford Act is a comprehensive and risk-based mitigation prior disaster law, and it is open to critical evaluation for further developments in the US.

5.3 Critics on the ongoing building safety and inspection approaches in the US: importance of professional training

The problems and limitations of US building code enforcement and inspection activities were critically evalauted by different researchers (May et al. 1999; Burby et al. 2000; May and Wood, 2003; May, 2004a, 2004b; McCollum, 2004). These problems are mostly related to application of safety rules, control or monitoring mechanism of the regulations and the training of the professionals.

In order to emphasize the training of the professionals, Burby (et al., 2000:155) points that managing successful practices in the US requires more sofisticated building officials who are also well trained and competent plan-checking and field-inspection staffs in building sector. Burby (et al., 2000:155) also asserts that those staffs "have to be able not only to detect violations of the law, but also to bring about corrections of violations in ways that do not threaten the success of regulated businesses".

For May (2004b:23), performance-based approch which requires well trained professionals is important in the achievement of a succesful application of the safety and inspection rules. May (2004b:23) asserts that there is a need for the reform in building codes and safety regulations due to shifting understanding of building safety towards performance-based approachs and regulation complexity in the US. May (2004b:24) points out that "the roles of plan checkers and inspectors change from assessing compliance with specific, prescriptive provisions to certifying that overall compliance with expected performance has been adequately demonstrated". May (2004b) agrees with Burby (2000) and emphasizes that, due to this shift in code appliance and inspectors' performance, greater expertise and better trained staff are needed.

Other then the complexity of codes, May (2004a) points out the construction quality and communication problems of the professionals. These problems inevitably, requires to a well established training program from a holistic point of view.

According to US Department of Labor (DOL), to monitor compliance with regulations in the US, "inspectors make an initial inspection during the first phase of construction and follow up with further inspections throughout the construction project". However, it is obvious that no inspection is ever exactly the same. In areas where there are high hazard risks due to severe weather, climate and/or geology—such as earthquakes, floods, land-slides or hurricanes— inspectors have to monitor compliance with additional safety regulations and codes . Therefore, these requirements necessitate more trained inspectors who have sufficient awareness and knowledge of hazard, safety and disaster risk mitigation concepts from a holistic perspective.

Spence (2004:395) points out that "the training of sufficient professionals to undertake the task of code implementation and enforcement, and the training in earthquake awareness of the builders themselves are at least as important as the improvement of codes and creation of regulations about their application and enforcement". Professional training process cannot be separated from code development and implementing processes. Past experiences have shown that a more holistic training view-point is necessary to achieve more effective building code compliance and inspection activities.

In order to emphasize the insufficiencies in the professional training, Imrie and Street (2009b:2509) point out that there is limited knowledge or understanding of how building professionals, such as architects, interact with and understand rules and regulations relating to the construction of the built environment and how such interactions shape different elements of the design process (see also Imrie 2007).

In fact, building knowledge (designing – construction – inspection – monitoring – etc.) can be established through professional certification, training, and experience. Architects need to take into account the professional training which can be defined as "the systematic acquisition of skills, rules, concepts, or attitudes that result in improved performance in another environment" (Goldstein and Ford, 2002:1).

Infusion of a holistic and risk reduction understanding into professional traning seems to be a focal point in the achievement of built environment resiliency. Citherlet (2001:30) asserts that a holistic approach is not only recommended for new building design, but can also be used to assess the performance of existing buildings. It is vitally important to provide the continuity of the training of practicing architects in terms of inspection of both the existing and new buildings within a holistic and risk-based approach.

Britton and Clark (2000) assert that education in hazard management and emergency preparedness needs to complement skills-based training and be expanded to include interdisciplinary and integrated programs. According to McEntire (2004), training and educational opportunities are providing a more knowledgeable cadre of professionals to meet the future challenges that will inevitably result from further urbanization and modern infrastructure.

5.3.1 Collection of empiric data from the US professionals: Experiences of Professionals Dealing with Disaster Resilient Environment in the US

Collection of the data was realized during the writer's academic visit to the US between October 2009 and October 2010. The aim of the research was to collect general ideas of professionals about the recent codes of inspection system with reference to risk conception. These professionals were selected randomly from among university web pages in the US, AIA (American Institute of Architects) web sources, and participants of 35th Annual Natural Hazards Research and Applications Workshop (July 10-13, 2010, Colorado, US) who were listed in the workshop proceedings. Table J.1 (in Appendix J) summarizes these professionals' job descriptions and interests.

Professionals' opinions were collected by means of telephone and e-mail contacts. The author participated in the workshop mentioned before, which acted as a springboard for some of the ideas. The results of this analysis help to understand the building inspection practices in regard to hazard, safety and building code approaches in the US. Interviewees' opinions on, particularly, the capacity enhancement of practicing architects through the professional training approach was collected.

Professionals' opinions on problematic aspects within the building and inspection activities can be categorized under four subtitles: Administrative / Governmental / Organizational Problems; Planning and Technical Problems; Financial Problems; Training Problems.

Administrative / Governmental / Organizational Problems

- Complexity of urban vulnerability requiring a more holistic view-point to overcome the problems is a barrier for sustainable and resilient environments,
- Deficient participation and cooperation of scientists and policy makers in producing disaster policies and strategies result in vulnerable built environments,
- Insufficient conceptual understanding of shifting risks and uncertainties causes inadequate development of settlements and infrastructure susceptible to hazards,
- Responsibilities of architects and engineers in developing safe built environment particularly in seismic hazard prone areas still conflict ,
- Although laws (or acts) and regulations support and encourage participatory works, there are still communication problems among the building professionals and administrative organizations,

Planning and Technical Problems

- Professionals propose incomplete and ineffective solutions which are difficult for people to understand adopt in daily life,

- Land use decisions and planning have been structured on ineffective historical data which needs to be revised and developed according to changing hazards and risks, as well as communities' needs,
- Deficient professional intervention of architects particularly to the seismic design activities increases the failure of built environment safety,
- Ordinary and small scale buildings do not get adequate inspection services which result in increased risks particularly in seismic regions,

Financial Problems

- There are still insurance problems due to insufficient and fragmented view of insurance system which deficiently comprehends design and construction processes,
- Clients' demand for discount in building inspection services results in unqualified and unfair inspection works,

Training Problems

- Insufficient collaboration between different disciplines and professions in continuing professional training activities affects the quality and comprehensiveness of the training process,
- Lack of adequate training and education affects the adoption of mitigation activities which aim to improve resiliency,
- Inadequate number of training tools and publications for practicing architects which can be used to enhance capacity and awareness on hazards, risks and safety concepts,
- Low awareness of clients due to inadequate hazard and risk training, which causes inappropriate preferences with building codes and compliance issues that result in safety problems among the built environment,
- In client – architect relations, lack of communication due to ineffective professional training results in clients' low awareness of seismic risks.

It is seen in the above list that the hazard-safety issues in general, and seismic safety issues in particular, have still important gaps as regards planning and architectural design in the US. Almost all professionals mentioned about the problems of communication and training of professionals as the important factors in a succesfull application of regulations today. Major problems can be asserted as the communication problem between building professionals and the vulnerable community; insufficient solutions that affect the vulnerable communities to perceive, understand and implement the hazard mitigation solutions easily; insufficient interdisciplinary works between building professionals; incomprehensible building codes, laws and regulations; insufficient inspection system; problems related to sufficient training approaches for practicing architects; economic problems mainly due to poverty or scarce financial sources which affect the development and implementation of hazard mitigation projects.

Professional architect training is considered as one of the major concerns which obstruct the capacity enhancement of practicing architects and creation of safe built environments. A demand for a more participative and holistic training approach is emphasized. The following section analyzes the ongoing training process of professional architect and CES course design in the US context in order to make clear of professional capacity enhancement approach. Although the analysis show the weak sides of the US building and inspection system in general, the analysis on the training system helps to understand the strong sides of the ongoing professional capacity development model in comparison to Turkish context.

5.4 Understanding Continuing Education System (CES) Designed for Architects in the US

In order to enhance the capacity of practicing architects in the US, in most of the US states a mandatory continuing education system has been carried out. The American Institute of Architects (AIA) is one of the leading organizations participating in the training system. The training approach depends on a continuing process which is named as Continuing Education System (CES), and conducted by AIA. There are three main parties engaged in the training of practicing architects. The AIA is the organizer/coordinator and supervisor body, whereas the private/public firms and institutions (universities, research institutes etc.) are the provider bodies for training courses, and the practicing architects are the beneficiaries of professional training system. Figure 5.1 illustrates the relation of effective parties in capacity building of practicing architects.

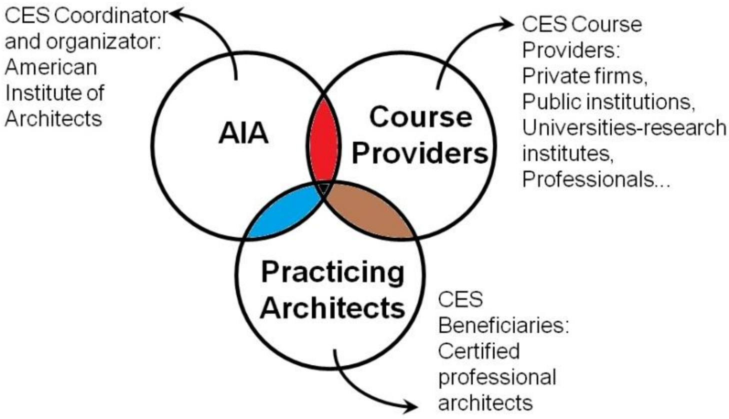

Figure 5.1: Illustration of capacity building of practicing architects in the US through CES.

A network of more than 2500 training providers made up AIA Chapters including affiliate organizations, firms, manufacturers, universities, non-profit organization, and government agencies[35] was built. These providers offer more than 25,000 training programs for practicing architects each year. The CES comprises the crucial steps for holding a license, improving the capacity, and monitoring the competency of practicing architects through the professional training system.

Architecture, like all professions, is continually changing with new societal demands, legal decisions and technological advancements[36], as well as growing affects of natural and other hazards and uncertainties. The National Council of Architectural Registration Board (NCARB) defines the role of practicing architects in built environment as follows:

> *Architects are certificated professionals trained in the art and science of the design and construction of buildings and structures that primarily provide shelter for communities. Additionally, architects may be involved with designing the total built environment—from how a building integrates with its surrounding landscape to architectural or construction details that involve the interior of the building to designing and creating furniture to be used in a specific space.*[37]

According to NCARB, the CES assists architects in keeping their professional skills and knowledge up to date through professional development programs and courses[38]. Continuing Education is required by the American Institute of Architects to maintain professional membership and to maintain the license as a practicing architect in any of the states. The CES can be demonstrated as the integral part of and the complementary tool for professional architects (who have already passed the Architect Registration Examination [ARE][39] and become certified architects). This structure of CES aims to facilitate knowledge, skill, and ability transfer to practice. The course providers from various governmental or private organizations support the development and continuation of learning activities for practicing architects.

AIA/CES "enables architects to keep current, master new knowledge and skills, plan for the future, and responsibly meet the role society entrusts to a professional" [40].

AIA/CES is mandatory in most of the states and Canadian Provinces in order to retain licensure. Each state has the legal right to establish its own guidelines and requirements in developing and implementing training course and license requirements for professional architects.

The training course design, implementation and expansion of the courses depend on the programming of AIA and the course provider(s). Standard definitions are used in course design and implementation

[35] http://continuingeducation.construction.com/faq.php, accessed; January 2010
[36] http://www.arch.uiuc.edu/admissions/undergrad/archprofession/, accessed; 2010
[37] http://www.ncarb.org/Becoming-an-Architect.aspx, accessed; January 2010
[38] http://www.ncarb.org/en/Continuing-Education.aspx, accessed; May 2011
[39] To become a licensed architect, one should attend the Architect Registration Examination (ARE) designed and conducted by National Council of Architectural Registration Boards (NCARB) in the US.
[40] http://continuingeducation.construction.com/faq.php, accessed; January 2010

in order to allocate a standard time period and extend the courses. Professional Development Hour (PDH), Learning Unit (LU), and Continuing Education Unit (CEU)[41] are the common terms which indicate the standardization of training course terminology through AIA/CES.

Both the AIA and state licensing boards (who have the authorization to ask for the necessary requirements to hold a license as a professional architect) base their programs on the contact hour. The list given in the Table K.1 (in Appendix K) illustrates the overview of Continuing Education System (CES) conducted in the US for practicing architects according to compulsory time period requirements. AIA requires an 18 Hour annual CES performance as a general policy which includes an 8 Hours of Health - Safety and Welfare (HSW-related) courses. In addition, Table 5.1 gives the HSW credit hours by which professional architects must attend the CES courses. Most of the US states require 8 contact hours of HSW. Self-reporting[42] for training performance and requirement is accepted in some states, but these reports have to be prepared under strict requirements. Due to the quality assurance issues posed by the states, the AIA does not accept self-designed activities for HSW credit. The HSW-related courses are assumed as the fundamentals of both ARE (Architect Registration Examination) and CES programs to improve the capacity of practicing architects.

AIA specifies the importance of HSW (Helath, Safety and Welfare) by explaining the following terms:

> **Health** addresses the aspects of architecture that have salutary effects among users of buildings or sites and address environmental concerns. Examples include appropriate air temperature, humidity, and quality, adequate provision of personal hygiene, use of nontoxic materials or finishes, accessibility, acoustical, energy efficiency, mechanical, plumbing, and electrical systems and materials.
> **Safety** addresses the aspects of architecture intended to limit or prevent accidental injury or death of building or site users. Examples include provision of fire-rated egress enclosures, automatic sprinkler systems, stairs with correct rise-to-run proportions, codes, regulations, natural hazards, life safety system—suppression, and detection–alarm standards.
> **Welfare** addresses the aspects of architecture that engender positive emotional responses among, or grant equal access to, users of buildings or sites. Examples include spaces with scale, proportion, materials, and color choice according to the intended use, spaces that afford natural light and views of nature, and spaces for users with disabilities, building design and materials, methods and systems, construction contracting, ethics and regulations governing the practice of architecture, preservation, adaptive reuse, and the study of environmental issues.

Different from other courses, HSW (Health – Safety and Welfare) courses address the core concepts within the AIA/CES which also include hazard and safety issues. AIA members require that at least 75% (which equals to at least 8 hours) of basic Learning Unit (LU) Hours on the HSW area be earned.

The common compilation of HSW subject areas as defined by various state licensing boards and AIA are listed in the Table 5.1.

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[41] **Professional Development Hour (PDH)** is defined as one contact hour of instruction, presentation or study. PDH cannot exceed the actual contact clock hours. No activity under a half hour will be accepted for credit. For example, a qualifying activity of 30 to 49 minutes would be reported as 0.5 PDH and an activity of 50 to 70 minutes would be reported as 1.0 PDH. PDH is sometimes called PDU (Professional Development Unit).
Learning Unit (LU) is used by American Institute of Architects' Continuing Education Systems (AIA/CES) and is based on a 60-minute hour. In order for programs to qualify for Health, Safety and Welfare (HSW) credit, providers must demonstrate that 75% of the content specifically addresses one or more HSW-related issues. Programs that qualify for HSW credit are identified as "AIA/CES Learning Unit (HSW)" or "AIA/CES LU (HSW)."
Continuing Education Unit (CEU) is a nationally recognized and uniform unit of measure for continuing education and training. One CEU is awarded for each 10 contact hours of instruction or study. Some organizations report one CEU of credit for each contact hour of instruction, which is equivalent to one PDH only.
Source: http://files.asme.org/Volunteer/Unit/18514.pdf, Accessed: January 2010

[42] **Self-reporting:** If a program is not offered by an AIA/CES Registered provider, members have the option of self reporting the program or activity. The intent of this activity must educational in nature and new knowledge in reference to their practice of architecture. Members must indicate whether the activity they are reporting is self-designed or a structured self-reported program.

Table 5.1: AIA/CES Course Subject areas related to HSW Based courses

AIA/CES requirement of HSW(-related) Course Subjects (Source: http://continuingeducation.construction.com/faq.php, Accessed; January 2010; http://www.aiacv.org/events/continuinged_info.htm, accessed on February 2010)
1- Accessibility
2- Acoustics
3- Building design
4- Code of ethics
5- Construction administration
6- Construction contract laws, legal aspects
7- Construction documents, services
8- Construction functions, materials, methods, and systems
9- Energy efficiency
10- Environmental: asbestos, lead-based paint, toxic emissions
11- Environmental analysis and issues of building materials and systems
12- Fire: building fire codes—flame spread, smoke contribution, explosives
13- Fire safety systems: detection and alarm standards
14- Insurance to protect the owners of property and injured parties
15- Interior design
16- Laws and regulations governing the practice of architecture
17- Life safety codes
18- Materials and systems: roofing/waterproofing, wall systems, etc.
19- Material use, function, and features
20- Mechanical, plumbing, electrical: system concepts, materials, and methods
21- Natural hazards (earthquake, hurricane, flood) related to building design
22- Preservation, renovation, restoration, and adaptive reuse
23- Security of buildings, design
24- Site and soils analysis
25- Site design
26- Specification writing
27- Structural issues

Capacity enhancement of practicing architects in design, construction, and inspection in general, and in hazard, risk, safety and security issues in particular are strongly connected with the successful application of HSW-related training courses, and knowledge-skill-ability transfer to the practice following the training process. Figure 5.2 illustrates the registration (certification) and training processes of practicing architects in a flow chart starting from ARE and ending with the knowledge-skill-ability transfer in practice.

Figure 5.2: The capacity enhancement flow chart of practicing architect in the US

Eight (8) professional fields are determined as the main activity areas of AIA/CES: Building Science & Performance; Design & Design Services; Legal Issues; Materials & Methods; Practice; Project Management; Project Types; Sustainable Design. The course contents and objectives are developed in accordance with these main activity areas but not limited with them.

Main training domains and sub-domains address a wide range of professional area including hazard and safety related issues. Some of the sub-domain training examples are; extreme conditions and disasters, failure and remediation, fire suppression, risk management, pollution control equipment. HSW related courses are given briefly in the following section.

5.4.1 Analysis of AIA/CES Course Contents from HDRR view-point

The AIA/CES has developed different courses related to hazard and safety issues in order to develop and improve the practicing architects' knowledge, skill and ability, which influence their performance in practice.

The key words of 'building inspection', 'hazard', 'disaster', 'earthquake', 'safety', 'security', 'building codes' are analyzed within the course contents and objectives set by AIA/CES. This analysis aims to understand the integration and quality of courses with regard to holistic and risk-based approach. According to these key words, the AIA course database system (online course directory[43]) lists a total of 158 course names. Table L.1 (in Appendix L) presents the title of these courses.

Diversity of courses is also part of the comprehensive approach. This diversification develops different focuses without being limited to structural aspects of building as regards hazard and safety concepts. Although the structural integrity is a foremost concept in achieving disaster resistant buildings, architectural integrity, quality of building materials, sufficient detailing, quality of design and construction inspection, harmony with the environment, understanding and evaluating various risks and safety issues are the other important aspects, all of which demonstrate a holistic attitude to cope with hazards and achieve safe built environments. In fact, while the course titled "*Structural Design and the Earthquake in Sichuan China*" deals with the structural aspects of buildings in terms of earthquake resistant design concept, another course *"Safe Room Importance Grows Near Schools"* deals with the architectural design and construction aspects of buildings in terms of hazard mitigation efforts. The course *"Reducing Flood Losses through the International Codes"* informs about the flood prevention standards and building codes in terms of legislative (laws and regulations) aspects to cope with flood hazards. *"Blast Hazard Mitigation"* focuses on the building facade design in terms of detailing and material quality in order to protect building and occupants from blast hazards including terrorist attacks (human-induced disaster) and strong wind effect (natural disaster).

5.4.2 Evaluation of Course Contents

The titles, contents and objectives of the AIA/CES courses (Table L.1-Appendix L) are explored in order to to assess the extent to which they adopt a holistic and risk-based understanding. The key words mentioned before are used to analyze the learning activity structure. This analysis aims to compare and contrast the CPD and training activities in the US and Turkey contexts (which is given in Chapter 4). The list of courses given in the Appendix M indicates the course contents and objectives of 62 AIA/CES courses selected among the list given in Table L.1 (in Appendix L). A great majority of the US courses analyzed within this section are structured under the HSW title.

The CES courses provide a variety of areas of hazard, risk and safety contexts. Architectural design, restoration, retrofitting, structural, non-structural and constructional aspects of building production process, building inspection are some of the hazard-safety-risk related fields. A considerable number of courses focus on the design and construction problems through the building codes and inspection activities. These courses aim to train particularly competent building inspectors from a holistic risk reduction view-point. In order to enhance the awareness of professionals for the accuracy of building code compliance practices, different aspects of inspection system are presented according to the changing demands of the legal system and the public.

In a broad sense, availability, access and range of courses support the holistic standpoint of the CES. These courses promote the capacity development practices of professional architects due to changing environmental conditions and increasing uncertainties. The newly emerging issues and amendments to the existing legal and governmental systems are followed through the training courses. Therefore, revision and improvement of course subjects and contents is vitaly important to sustain the continuity and integrity of any training system.

[43] http://aia.learnflex.net/users/index.aspx (accessed in 2010)

Gabrielli and Gardner (2010) structure the architectural discipline within two sets of definitions (Figure 5.3). One is the legal definitions which charge architects to safeguard the health, safety, and welfare of the public. The other is the cultural definitions which develop through social, aesthetic, and ethical aspects of built environment. In order to develop a holistic view-point within the training system, both sets of definitions should be provided for architects. The AIA/CES courses comprise both sets of disciplinary definitions.

The courses provided by The AIA/CES indicate linkages. It is possible to develop and present these courses in terms of sets of learning activities which are complementary parts of a whole. Integration of these parts within a reliable medium indicates a holistic perspective. Figures 5.4, 5.5 and 5.6 present different sets of learning activities which are paired up under sub-titles of building inspection set of courses, building codes set of courses, and hazard/disaster/safety set of courses.

Developing and analyzing the various courses provided by the CES in the US under sets of learning activities help to evaluate success of the course design from a holistic and risk-based understanding in general.

Figure 5.3: A holistic design approach and needs of incorporation of both sets of disciplinary definitions.

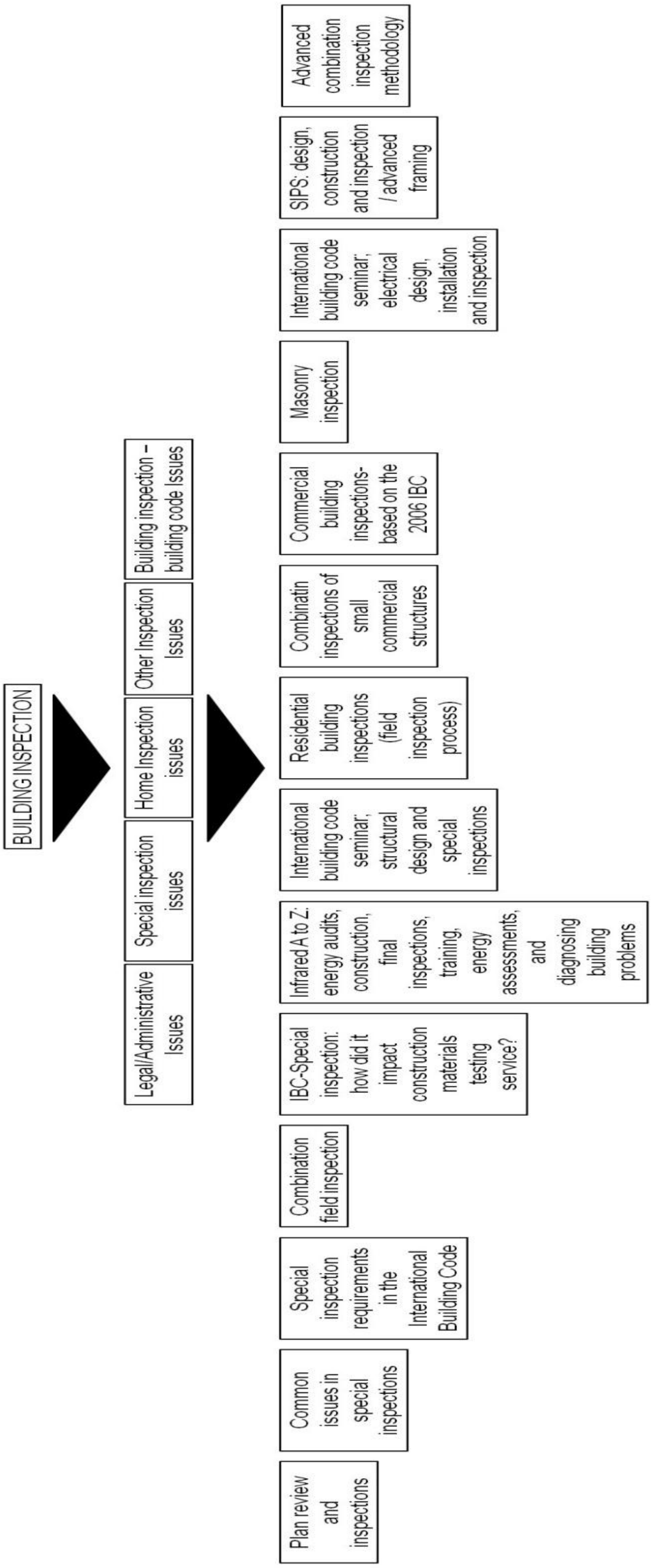

Figure 5.4: Building inspection set of courses

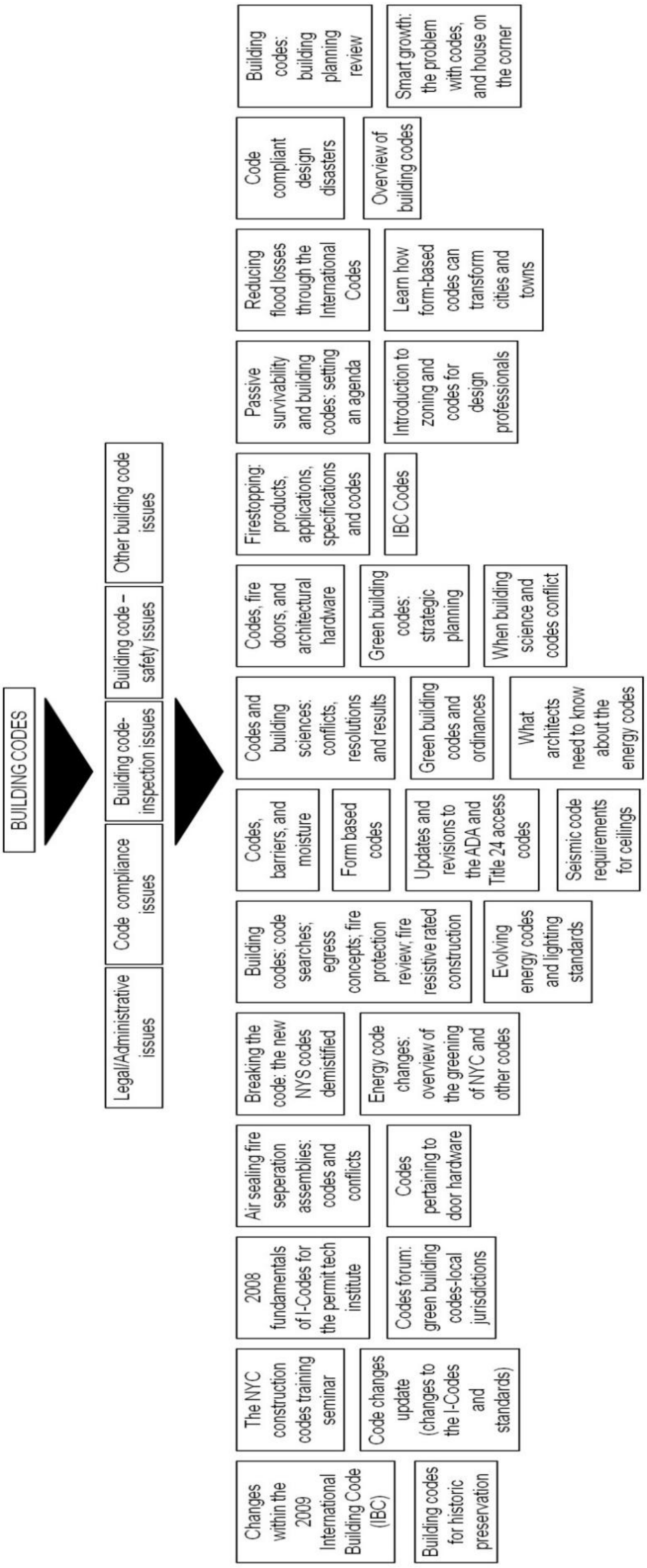

Figure 5.5: Building codes set of courses

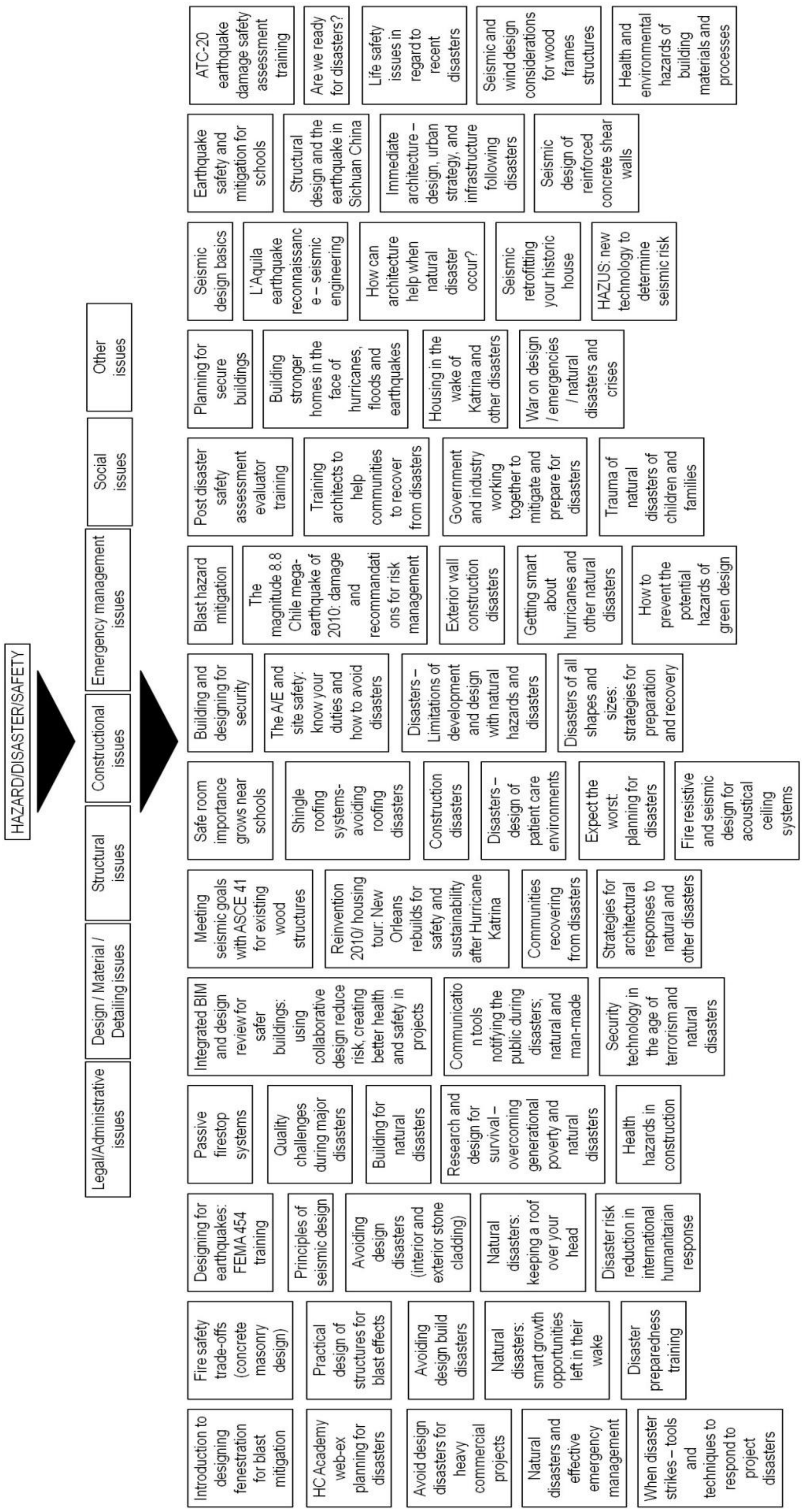

Figure 5.6: Hazard/Disaster/Safety set of courses

Figure 5.7 illustrates the holistic perspective of AIA/CES course design through sets of courses as regards architectural design, structural design, construction, and building materials and detailing.

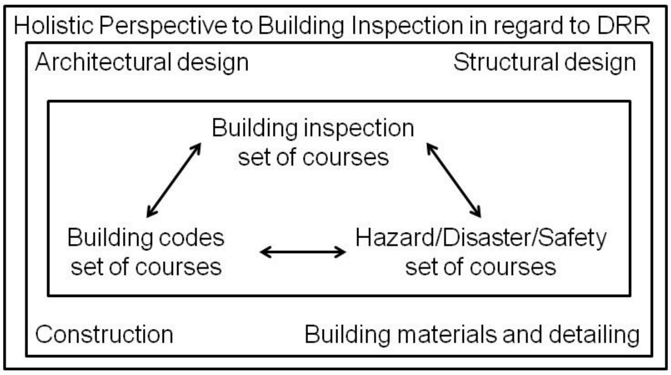

Figure 5.7: Holistic view of AIA/CES courses in terms of interlinked and complementary structure of course design.

5.5 Comparison of the CPD Approach Between the US and Turkish Systems and Evaluation of the Chapter

Effective DRR can be accomplished if the certification and training model is structured in a holistic and continuous way. This requires a dialogue between structural and constructional as well as architectural design knowledge and competency in risk-based aspects of building inspection process. For instance, Wada and Mori (2008) point out that seismic performance of a building indicates a wide range of aspects including life safety, functionality after seismic action, and damage mitigation, none of which is limited to structural performance and elements. On the contrary, they include all elements of forming a building.

Architectural design and building safety concepts are complementary subjects in building inspection process, which have to be unified from a holistic perspective. Therefore, training of professional architects in building inspection system is a critical step in achieving HDRR approach.

HDRR can be achieved if only all the aspects of built environmental conditions and risks are identified, assessed and mitigated by competent building professionals. This assessment and mitigative approach needs a holistic standpoint, as well as participatory works. In the US, past experiences had important contributions to the development of holistic perspective to the DRR development through the CPD system. Although Turkey has had many experiences, these have not turned into effective contributions within the CPD system yet. Table 5.2 compares the US and Turkish contexts from CPD approach, which reveals the level at which integration of hazard, safety, risk and inspection concepts is.

Table 5.2: Comparison of CPD approaches in the US and Turkish Contexts from professional architects' view-point

	The US CPD Approach	**Turkish CPD Approach**
CPD Structure	Requires professional accreditation and examination prior to attending CPD Programs	Does not require a reliable accreditation and examination
	Provides compulsory training	Provides noncompulsory training
	Incorporates various course providers	Comprises single course provider
	Supports participatory training model	Does not support participatory training model
	Supports professional competency in hazard, risk and safety concepts through HSW related learning activities	Does not support competency but a very limited specialization which remains ineffective
CPD Learning Activity Design	A wide range of fields and professional areas	Very limited fields and professional areas
	Focuses on various aspects of hazard, risk, safety and inspection issues	Focus on mainly structural safety issues
	Deals with different hazards from multi-hazard approach	Deals with only seismic hazard
	Supports and improves interdisciplinary works and learning activities	Does not support any interdisciplinary works or courses
	Regularly revises changes in legal and administrative systems and brings in these changes through the course contents	Very limited revisions related to legal and administrative system developments due to scarce course variations and deficient course contents
	Supports and provides field trips for HSW related learning activities	Does not support any field trips
	Supports to develop risk culture approach among professionals	Does not support development of risk culture among professionals
	Includes risk-based course contents	Does not include risk-based course contents
CPD Learning Activity Providing Methods and Tools	Various learning activities providing methods including classroom type courses, web-based and online activities, personal or group researches, various publications, conferences etc.	Mainly classroom based methods
	Supports personal development and self-reporting	Does not support personal development and self-reporting
	Uses e-learning methods and web-based technology actively which facilitates access to the course documents	Does not support web-based technologies and methods actively

CHAPTER 6

A holistic and risk based CPD model: Developing a training system for practicing architects through the BIS in Turkey

6.1 Introduction and Scope of the Chapter

As it has been discussed and proposed earlier (Chapters 4 and 5), practicing architects who are involved in the building inspection process have to consider the environment and the society from a holistic and risk-based perspective. Inefficient professional development opportunities after obtaining the bachelor degree in architecture in Turkey has made a more comprehensive and effective CPD program necessary.

This chapter proposes a holistic professional training model for practicing architects dealing with building inspection activity. The model proposed has a risk-based understanding. The ongoing BIS in Turkey applied in the present building production process has conceptual and practical problems. Actually, it does not have a holistic and risk-based understanding. It is somewhat ineffective as explained in Chapter 4. The model proposed here, first of all, aims to eliminate the conceptual deficiencies and missing approaches within the ongoing ineffective and fragmented CPD model. It also aims to develop a holistic and risk-based training approach to the enhancement of disaster risk reduction understanding in accordance with the new disaster policy discussed in Chapter 3. The proposed model ultimately aims to increase the accuracy of building inspection system by training more competent practicing architects in Turkey.

6.2 Training Idea and Continuing Professional Development (CPD) Approach

Prior to the discussion of the proposed training model, it is worth reviewing the basic requirements of the professional training process.

Lambert (1986) relates the development history of professional training idea to a simple human need on any subject. This need-based view is defined through some simple combination of fundamental steps which operated the training process in its evolution period (Lambert, 1986:2). Figure 6.1 illustrates these steps.

Figure 6.1: Evolution of training process through fundamental steps of need-based view (Adopted from Lambert, 1986:2)

Goldstein and Ford (2001:1) define the (professional) training term as "the systematic achievement of skills, rules, concepts, or attitudes that result in improved performance in another environment". If the training is a systematic approach, then it must be an intentional training organization, the expectations from which need to be clear. Goldstein and Ford (2001:22) point out the following about professional training:

> *It is being conducted to meet a perceived need. Learning and development concerns the building of expertise as a function of these systematic training efforts. Learning outcomes can include changes in knowledge, skills, or attitudes (KSAs[44]). Improvement is measured by the extent to which the learning that results from training leads to meaningful changes in the work environment. Therefore, a critical issue is the extent to which the KSAs are transferred to the job and improve individual effectiveness.*

Simona and Sunhilde (2007:1259-1261) state that professional training has two major components: professional development and professional improvement. Professional development refers to gaining new KSAs whereas professional improvement refers to enhancing the existing ones. Continuing professional training system encompasses both KSA developments through participative and varied learning activities.

According to Caldwell (et al. 2007: 519), the aim of the continuing professional development is "to ensure professionals remain competent and committed practitioners".

Training mainly depended on the apprenticeship in the past. However, the first response to the insufficiency of that kind of professional training which is based on solely apprenticeship goes back to the nineteenth century. Perry (2012), as cited in Cremin (1978), points out that it was between 1870-1910 when professional training in the fields of law, medicine, and education emerged as a response to dissatisfaction with the apprenticeship-based training model. These attempts sought a way to design more reliable and respectable professional training by the beginning of the 20th

[44] **Knowledge (K)** is the foundation on which abilities and skills are built. Knowledge refers to an organized body of knowledge, usually of a factual or procedural nature, which, if applied, makes adequate job performance possible.
Skill (S) refers to the capability to perform job operations with ease and precision. Most often skills refer to psychomotor-type activities. The specification of a skill implies a performance standard that is usually required for effective job operations.
Ability (A) usually refers to cognitive capabilities necessary to perform a job function. Most often abilities require the application of some knowledge base (Goldstein and Ford, 2001:65).

century. Training of more competent professionals through various formal and informal systems have become an important part of professional life.

Here it is seen that professional training (unlike education) has to directly deal with practical application of knowledge, skill and ability. According to Yamnill and McLean (2001), ineffective professional training results in failure of the trainee who cannot transfer training (or KSA) to practice.

Achievement of KSA transference to practice does not depend on only the personal characteristics of the trainee, but it also is related to the success of the KSA transfer system. Thus, the training system needs to be organized and reviewed carefully by both institutions and participants. Carefully designed and evaluated professional training system meets the expectations of both the institutions and the individual trainees (Goldstein and Ford, 2001:11). Due to changing expectations and needs, a training program as a systematic approach continuously needs revisions and evaluations remain effective (Goldstein and Ford, 2001). In that perspective, determination of tasks and KSAs in terms of the relevancy to the profession and practice becomes very important.

Continuing Professional Development (CPD) approach is the important component of gaining and improving KSA which the practicing people need for successful pratice. King (2004:4) points out that CPD has to be assumed as routine of professional life, self-directed and planned activity, composed of various learning environments and activities, and colloborative approach.

The benchmark for developing effective adult learning strategy indicates the 'life long learning' approach. The Western Society, particularly in European countries, has focused on the life long learning approaches by the 1990s. The Sorbonne Joint Declaration (Paris, May 25, 1998) was an important starting point for considering and debating on the life long learning approach. The Bologna Declaration (of 19 June, 1999), the Prague Communique (of May 19, 2001), and the Berlin Communique (of 19 September, 2003) were the other touchstones following the Sorbonne Declaration in order to develop, enhance and place the life long learning policies and strategies among the communities. Among these benchmarks, one of the initial thinking on developing effective adult learning strategy goes back to the beginning of 20th century. A report prepared by The British Committee of the Ministry of Reconstruction refers to the significance of adult learning and life long learning approaches. This report, known as 'The 1919 Report' indicates that "Adult education is a permanent national necessity, an insaparable aspect of citizenship, and it should therefore be universal and lifelong" (cited by Hake, 1999:53).

Development and acquisition of disaster risk awareness and risk culture among the public and particularly building professionals cannot be accepted as a static process. It needs a continuous approach and policy which indicates a cyclic process leading each other. Life long learning approach is therefore important to achieve this continuos and cyclic process of adult learning strategies.

Professionals who deal with hazard, disaster and emergency issues also need to receive well-designed and reliable training through CPD programs. Mostly professional training of these people is conducted through hazard and disaster related organizations. For instance, in the US, FEMA mainly develops and facilitates professional training approaches for practicing disaster and/or emergency management people.

According to Blanchard (2003), a professional emergency manager needs to develop some basic KSAs through professional training which encompasses *Personal, Interpersonal and Political Skills, Traits and Values* (e.g, listening, communicating and presentation skills, negotiating, mediation, and conflict resolution skills, bureaucratic, organizational, public policy and political skills, proactive, progressive, open to change and new ideas, life-long learner, problem solving, critical thinking, decision making, flexibility, adaptability skills, strategic thinking and planning, visionary, ability to anticipate); *Administrative, Management, Public Policy Knowledge, Skills and Principles*; *Subject Matter Knowledge, Skills, and Abilities* (e.g., hazards and disasters, related terms and definitions, hazard taxonomies or categorization schemes such as natural, technological, intentional, hazards foundation, and exposure, risk, vulnerability, risk communication treatment, hazard/risk/emergency/ management scope/approaches, public and private sectors, including traditional technocratic, social vulnerability, risk-based approaches, sustainable development, community organization, and urban and regional planning, legal, ethical, social, economic, ecological, political dimensions and context);

Technical Skills and Standards (e.g., technological tools such as. computers and software, GIS, mapping, modeling, simulations).

Similarly in the field of architecture, professional training is very important. CPD is one of the effective system approaches followed to enhance the capacity of professional architects with regard to meeting society's needs. Different architectural organizations and institutes of many countries have been developing and conducting CPD programs. Basically, professional organizations such as chamber of architects develop training approaches for practicing architects. Most of these organizations have Continuing Professional Development Centers (CPDC). In Turkey, Chamber of Architects has also a CPDC which is discussed in Chapter 4. These organizations determine the scope, implementation and facilitation of professional training and related learning activities through Continuing Professional Development (CPD) programs.

For example, RIBA (Royal Institute of British Architects) defines the CPD as programs designed to "help to make sure that professional architects always have the skills they need to stay competent and to protect theirself and their practice"[45]. The RIAI's (The Royal Institute of The Architects of Ireland) definition, it is[46]; "The systematic maintenance, improvement and broadening of knowledge and skill and the development of personal qualities necessary for the execution of professional and technical duties throughout the practitioner's working life."

The Chamber of Architects (in Turkey) defines the CPD as a lifelong education approach which ensures, protects and develops the knowledge and ability of an architect according to the community needs[47]. The AIA (The American Institute of Architects) determines the CPD (or "CES-Continuing Education System" in the US) as a crucial approach which helps to enhance and advance the profession[48]. JIA (The Japan Institute of Architects) assumes the CPD as a foremost activity which "helps architects to keep up-to-date, gain and improve necessary knowledge-ability and skill all of which contribute to protect the properties and lives of the nation's people and design beautiful and comfortable environments where people are able to lead an active life and participate socially[49]".

In this section, before proposing the training model, CPD programs of different countries are presented. These are CPD programs of Japan, United Kingdom and Ireland. These countries are determined according to accessibility to their CPD program information through different means including mostly web-based ones. The aim of this brief analysis is to reveal the CPD program approaches and particularly hazard-safety related course concepts of different countries. This analysis is used to compare the CPD programs of different countries with the Turkish context in terms of hazar-risk-safety related course extent from a holistic view-point.

CPD Approach in the United Kingdom

The responsible institution from the training and capacity building of practicing architects is The Royal Institute of The British Architects (RIBA)[50].

The CPD curriculum has specified 10 mandatory topics. Some of the guiding subjects and training areas are given in Table N.1 (in Appendix N).

The participants enhance their capacity within the CPD system through three different levels of knowledge which are given in Figure 6.2. This figure determines the capacity enhancement level of the practicing architect in terms of knowledge scope, extent and detail that is accessed by the participant.

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[45] RIBA CPD, available from: http://www.architecture.com/EducationAndCareers/CPD/CPDAtTheRIBA.aspx (Accessed in 2011).
[46] RIAI CPD, available from: http://www.riai.ie/cpd/ (Accessed in 2011).
[47] Chamber of Architects of Turkey (Mimarlar Odası-SMG) CPD: "Sürekli Mesleki Gelişim ile kastedilen, mimarların bilgi ve becerilerinin toplumun ihtiyaçlarına uygun olmasını garantiye alan, bunların yitirilmemesini veya artırılmasını sağlayan ve yaşam boyu süren bir öğrenme sürecidir" (available from: http://www.mo.org.tr/smgm/index.cfm?sayfa=belge&sub=detail&RecID=11) (Accessed in 2011).
[48] AIA CPD, available from: http://www.aia.org/education/ces/AIAB088935 (Accessed in 2011).
[49] JIA CPD, available from: http://www.jia.or.jp/english/about.html (Accessed in 2011).
[50] CPD System and programs at the RIBA, source: Official web site of RIBA, http://www.architecture.com/EducationAndCareers/CPD/NewCPDCoreCurriculum.aspx (Accessed in 2011).

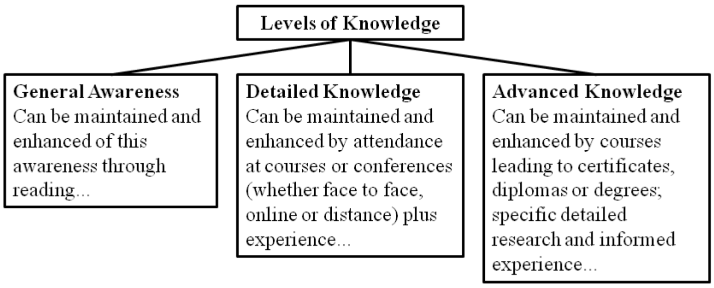

Figure 6.2: Capacity enhancement through the CPD in terms of knowledge levels. Source: Derived from the CPD Rules of The Royal Institute of British Architects (RIBA), available from; http://www.architecture.com/EducationAndCareers/CPD/CPDrules/LearningLevels.aspx (accessed on 2011)

The general awareness level is representing the architect's preliminary knowledge on a subject. This level is, according to RIBA (2007), "keeping up to date with changes in professional practice particularly in the areas of legislation and regulations, and changes in the industry, as well as knowing where to go for further advice and information". The second level, detailed knowledge level, is more comprehensive and application-specific. Therefore, this level can be achieved through learning, experience and advice from others (RIBA, 2007). The third and the most comprehensive level is the advanced knowledge level, which requires specialty on a specific field that can be marketed within the general practice of architecture (RIBA, 2007).

The CPD system represents not only the courses (such as classroom-based training) but also all the other learning activities that are relevant to the needs of participants and the RIBA policy as well as the CPD rules. Table 6.1 displays this variety of learning activities, methods, and sources.

Table 6.1.: The list and categorization of the CPD activity types provided or counted by RIBA (. Source: Derived from What counts as CPD of The Royal Institute of British Architects (RIBA), available from; http://www.architecture.com/EducationAndCareers/CPD/WhatcountsasCPD.aspx (accessed on 2011)

Structured CPD Learning Activity Method and Sources	**Informal CPD Learning Activity Method and Sources**
Method: Structured CPD is often based in a classroom and can be carried out in-house, at other venues or online. Structured CPD will have clear learning aims and outcomes given to the participant by the learning provider. Examples of structured CPD activities include lunchtime seminars, conferences, courses and gaining some extra relevant qualifications.	**Method:** Informal CPD covers everything else participant might do to learn, and will usually mean it is self-directed and learning aims will not have been provided for participant.
Source: • seminars from RIBA's nations and regions, • the RIBA CPD Providers Network, • the RIBA Online CPD, • RIBA CPD Roadshows, • NBS Learning Channels, • universities and colleges, • other professional bodies, • research organisations such as BRE, • Business Link, • Training companies, • Conference organizers, • seminars and workshops from other suppliers…	**Source:** • Using RIBA Knowledge Communities, • Using RIBA LinkedIn and Facebook pages, • Using RIBA net, • Reading books, journals and technical material, • Reading weekly RIBA or trade press emails, • Visiting trade shows and exhibitions, • Researching relevant websites, • Using relevant social media, • Sharing knowledge, • Mentoring, • Carrying out site visits and study tours, • Listening to podcasts, • Carrying out relevant voluntary activities…

Figure 6.3 illustrates the structure of RIBA/CPD course design due to learning activity system.

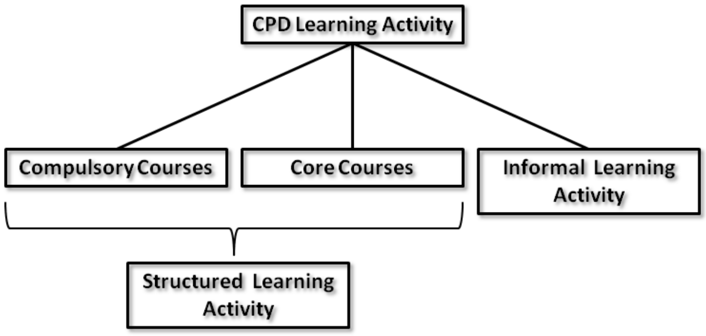

Figure 6.3: RIBA/CPD Learning Activities

The RIBA/CPD policy makes the risk-safety-health subjects compulsory as part of structured learning activities since "health and safety matters are integral to every part of the design process" and "there are various elements to the health and safety requirements that architects might consider" (RIBA, 2007).

RIBA members are required to complete 35 hours of CPD annually, 19.5 hours of which should come from the Core Curriculum. In addition, it is compulsory to study health and safety themes for least 2 hours out of the 19.5 hours of CPD courses.

The RIBA has developed the main course requirements which are expected from practicing architects for each year:

- 35 hours of CPD
- 100 points given to self-reflection activities
- At least half of, preferably structured, CPD activity,
- At least 20 hours of CPD on core curriculum topics (at least two hours on each topic each year)(Table N.1 in Appendix N)[51]
- A record of her/his CPD online by using RIBA'S CPD recording manager.

CPD Approach in Ireland

The institution responsible for training and capacity building of practicing architects is The Royal Institute of The Architects of Ireland (RIAI)[52]. According to RIAI (2010), CPD has an important role as it serves "to provide Architects and Architectural Technicians/Technologists with the intellectual and technical support they need to continue delivering an effective service to society". RIAI determines the major purposes of the CPD: To support architects and architectural technologists in the production of high quality architecture; to protect the consumer; to protect the public interest; to increase client satisfaction; to increase effectiveness (for the practice); to increase job satisfaction (for the architect or architectural technologist); to promote career advancement (for the employee); to promote the performance and the reputation of the profession.

The CPD policy of RIAI which has been in effect since 2009 indicates a mandatory training and crediting system for professional architects. According to this system, the RIAI puts the minimum

[51] RIBA CPD Core training Curriculum topics are determined as follows:
1. Being safe: health and safety
2. Climate: sustainable architecture
3. External management: clients, users and delivery of services
4. Internal management: professionalism, practice, business + management
5. Compliance: legal, regulatory and statutory frameworks and processes
6. Procurement and contracts
7. Designing and building it: design, construction, technology and engineering
8. Where people live: communities, urban + rural design and the planning process
9. Context: the historic environment and its setting
10. Access for all: universal/inclusive design

[52] CPD System and programs at the RIAI, source: official web site of RIAI, http://www.riai.ie/cpd/ (Accessed on 2011)

standards that are required for architects and architectural technicians/technologists in terms of 'Standards of Knowledge, Skill and Competence' (RIAI, 2010)[53].

The RIAI (2010) requires the following minimum level of CPD involvement.
1) In the course of each year, each registrant/member must accumulate a total of 40 hours of CPD activity, divided as follows:
a. 20 hours Structured CPD
b. 20 hours Unstructured CPD

- The year runs from October to September.
- 1 hour of learning time = 1 CPD point unless otherwise specified by the RIAI
- Up to 20 excess hours in one cycle may be carried over into the next cycle.
- Structured CPD is a learning activity for which the learning outcomes are identified in advance. (A 'learning outcome' is a statement of what the learner is expected to know, understand or be able to do on successful completion of the activity.)
- Structured CPD does not have to be provided, approved or accredited by the RIAI.

The RIBA/CPD allocates 2 hours of credited training (at least) for health and safety issues whereas there are not any hours allocated specifically for the health and safety concepts within the RIAI CPD system. On the other hand, there is a variety of courses or other learning activities which encompass the safety and risk concepts among the RIAI training course lists[54]. Some examples are as follows: A Sure Fire Decision; Automatic Doors - benefits and concerns; Fire Retardant Protection for Timber; Firestop Seminar; Glass for Fire Resistance; Radon Protection - New Buildings; Specification of safety floor coverings.

CDP Approach in Japan

The institution responsible for the training and capacity building of practicing architects is The Japan Institute of Architects (JIA)[55]. The Japan Institute of Architects (JIA) has been functioning as Japan's only professional organization of architects since 1987 (JIA, 2008).

'Kenchikushi Law' ('Architects Law' in English) defines the professional qualifications of both architects and building engineers in Japan. The 'Qualification System of Architects' was amended in 2003 to enhance the qualifications of practicing architects in building design, construction and inspection works. JIA has developed a "Continuing Professional Development" (CPD) system to identify and monitor the professional training needs of practicing architects in Japan consistently with 'Kenchikushi law' and 'Qualification System of Architect'.

The CPD system (JIA, 2008) requires a mandatory total of 36 course credits annually. Each credit generally equals to one hour of learning activity which is quite similar to the former CPD examples (of Ireland and United Kingdom). These credits can be earned through a two alternative learning activity system approach (Figure 6.4). JIA/CPD offers two ways of obtaining CPD credits; structured training activity and unstructured (self-motivating) system which the practicing architects are expected to follow by themselves. Self-motivating learning activity is attached importance due to JIA policy which pays attention to motivating practicing architects and enhancing their knowledge..

[53] According to RIAI (2010), the standards and responsibility of the practicing architects and other professionals are described as: "While the Standards represent the baseline requirements that can be expected of a general practitioner at a given level, registrant/members can be expected to have greater expertise in certain areas, and indeed additional areas of expertise according to their specialism and/or career progression. The Standards provide a benchmark against which registrant/members can measure themselves and thus identify areas where development may be required or desirable".
[54] Available from: http://www.riai.ie/cpd/network-courses/ (accessed on 2011).
[55] Available from the official web site of JIA: http://www.jia.or.jp/english/ (accessed on 2011)

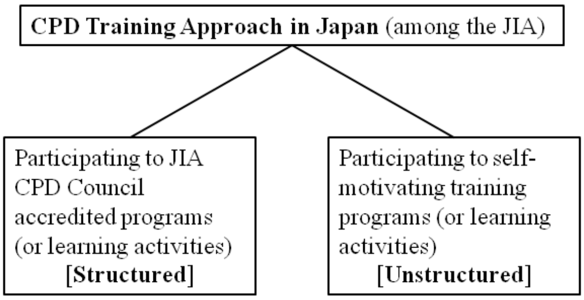

Figure 6.4: CPD Learning Activity participation approach in Japan

There are various programs and training sources such as seminars and newsletters/journals participants can benefit from.

6.3 Evaluation and comparison of CPD approaches with Turkish CPD system designed for practicing architects

In Chapter 4, Turkish CPD system for professional architects is proposed and evaluated. Chapter 5 briefly explains the CPD approach of professional architects in the. The present chapter summarizes some other countries' CPD programs (United Kingdom, Ireland and Japan) utilized for practicing. In this section, these CPD programs are compared in order to emphasize the insufficient and missing points related to the Turkish context.

The variety of courses and other learning opportunities other than classroom-based ones including web-pages, newspapers-magazines, podcasts, TV programs, online-courses are provided and encouraged by the US, United Kingdom, Ireland and Japan CPD systems. These types of learning activites and environments are assumed as complementary to a holistic training in these countries' CPD programs. On the other hand, face-to-face interaction is still commonly used method for the training programs (such as seminars, conferences, classroom-based training etc.). In addition, attending certification and degree programs such as master or PhD programs, specialist-certification courses, long-duration courses (which can last more than one day, even one week) etc. are also encouraged and credited under high quality (or advanced knowledge) learning activity in these countries.

AIA and RIBA CPD programs also give importance to self-motivated or unstructured training and learning activities. The duration of an activity, or Learning Unit (LU), is determined in a similar way. It generally equals to an hour (1 LU = 1 Hour) within all CPD programs including the one in Turkey. However, some of the self-motivating activities cannot be credited according to basic and standard rules because it is not always easy to count learning units of self-motivating activities such as reading a book or journal, writing an article related to the learning objective etc. These kinds of activites constitute only some part of annual training requirements, and generally cannot exceed one third (1/3) of the total credits. In the Turkish CPD system, there are not any self-motivated learning activities supported by the professional training program.

Table 6.2 compares the CPD program annual credit requirments through the mentioned examples.

Table 6.2: Comparison of different countries' CPD systems in terms of CPD hour allocations. "?" refers to undetermined information, "X" refers to non-existent information

Country	CPD Hours or Learning Units requirement in Total (annually)	Structured Learning Activity requirement among the CPD System (annually)	Health and Safety related learning activity requirement among the CPD System (annually)
United Kingdom	35	20	2
Ireland	40	20	?
Japan	36	?	?
The USA	18	16	12
Turkey	X	X	X

The unique characteristics and deficiencies in Turkish CPD program comapred to other countries in terms of program structure and learning activity design are briefly summarized.

Lack of Reliable and Holistic CPD Program Structure

In Turkey, professional training programs, that is attending learning activities and obtaining training credits, are not compulsory. That is why little interset is shown in the training program(s) for capacity development.

The course providers are not limited with the responsible architectural organization(s), rather other organizations also provide training programs and sources consistently with the set learning areas and contents in the programs in the sample. However, in Turkey, the only training activity provider is determined as the Chamber of Architects, and there is not another official institution which in charge of course development. This indicates that the development of holistic and participative training in Turkish CPD approach is immature.

The course structures are generally constructed on two types of learning activity systems: Structured (or formal) and unstructured (or informal) learning activities. The Turkish CPD program, however, does not differentiate between particularly hazard-safety related concepts. As a result, informal and self-motivating learning activity alternatives do not attract attention in, and are not supported by the CPD system in Turkish context. The deficient structured learning activity areas result in ineffective development and transfer of KSA to practice from holistic and risk-based understanding.

Insufficient CPD Learning Activity Design with Missing Comprehensive Safety Approach

Due to insufficient design of the CPD program structure, the course contents are limited in Turkey. For instance, building inspection concept has to cover a wide range of area from legislative issues including building codes to architectural design and engineering works. In Turkish CPD program, building inspection training is provided through a single course which is completed in a two-day training period, and covers mainly the legal issues related to ongoing building inspection law and regulation. A holistic inspection activity is missing, or insufficient, in the ongoing training approach.

Hazard and safety concepts are the main foci in seismic design courses, which only consider structural analysis and design concepts in Turkish CPD approach. Other examples over the world reveal that there are various courses related to hazard, disaster and safety concepts which prioritize the risk mitigation concept. The narrow vision to seismic design concept is not consistent with holistic and risk-based approach.

The insufficient learning activity sources related to hazard, safety and risk concepts in the Turkish context place obstacles in the way of developing a HDRR approach through the BIS.

Self-reporting approach within the crediting system in other countries, particularly in the AIA and RIBA CPD systems, constitute an important part of the whole CPD process. However, in Turkish CPD system, the attendees are not asked to evaluate the course they have completed.. Evaluation reports is a requirement in the training process, useful for improving the KSA development for practicing architects. Self-reporting is also an important component of holistic training and learning activity.

In Table 6.3, it is compared of CPD programs of USA, UK, Japan, Ireland, and Turkey.

Table 6.3: Comparison of CPD systems of the USA, United Kingdom, Japan, Ireland and Turkey as regards CPD program structures and learning activity designs

	CPD Program Comparison	Available (**A**) – Not-Available or Very Limited (**NA-VL**)				
		The USA	United Kingdom	Japan	Ireland	Turkey
CPD Program Structure	Availability of a responsible architectural organization for professional training of practicing architects	A (AIA)	A (RIBA)	A (JIA)	A (RIAI)	A (CAT)
	Availability of a CPDC	A	A	A	A	A
	Availability of a CPD Program	A	A	A	A	A
	Compulsory requirement of professional training credit	A	A	A	A	NA-VL
	Providing large variety of learning activity sources	A	A	A	A	NA-VL
	Participation of different organizations, institutions and people to the CPD programs	A	A	A	A	NA-VL
	Integration of structured (formal) and unstructured (informal) learning activity	A	A	A	A	NA-VL
	Training and certification system based on professional competency	A	A	A	A	NA-VL
	Encouragement of self motivating learning activities	A	A	A	A	NA-VL
	A reliable and efficient examination for certification	A	A	A	A	NA-VL
CPD Learning Activity Design	Providing large variety of learning activity/course contents	A	A	A	A	NA-VL
	Holistic approach to course objectives and contents	A	A	A	A	NA-VL
	Encouraging participative works through learning activities	A	A	A	A	NA-VL
	Providing sufficient and effective time/period for learning activities	A	A	A	A	NA-VL
	Integration of theoretical and technical concepts within the learning activities	A	A	A	A	NA-VL
	Prioritizing hazard, safety and risk concepts within the learning activity sources	A	A	A	A	NA-VL
	Supporting and encouraging multi-hazard approach within the learning activity programs	A	A	A	A	NA-VL
	Encouraging self-reporting preparation and submission following accomplishment of training activity	A	A	?*	A	NA-VL

*? refers to undetermined data

6.4 Developing a Holistic and Risk-based Training Model for Practicing Architects through the BIS

The analysis conducted through this research reveals that ongoing CPD model and particularly the BIS training is ineffective and fragmented in Turkey. A holistic and risk-based approach should be adopted in training practicing architects. It is crucial for ensuring safety in built environments and developing HDRR view-point.

Practicing architects need to understand and aware of different risk types and agents through the building inspection process in order to develop a successful building code compliance and safety in built environment. This approach needs to be evaluated from a holistic perspective in which risks are analyzed and mitigated, and risk reduction activities are supervised effectively by competent practicing architects. The CPD program needs a more integrated and participatory approach regarding risk issues in all phases of building production and inspection processes.

6.4.1 Structuring the CPD Model in regard to Holistic Building Inspection Training

The proposed model in this study regards shifting concepts of risk awareness and safety approaches from a holistic building inspection process view-point, and explores more effective understanding to the problematic issues of ongoing CPD model provided for practicing architects in Turkey. The professional training model proposal covers the different aspects of building inspection process in regard to Structural, Constructional, Legal-Administrative, Environmental, and Financial concepts from a holistic and participative risk-based view-point.

A demand for a reliable and efficient examination and certification emerged in the findings of the analysis given in Chapter 2, 3, 4 and 5. Competency of practicing architects is criticized in Turkish context due to deficient professional training system. Re-structuring the training model needs to cover pre-licensing training which prepares the inspector architects for the examination and certification processes. In the Chapter 5, the US example proposes this examination and certification processes. Pre-certificate training supports and enhance the practicing architects' KSAs in order to ensure and guide their preparation for the certification examination. Continuing professional training follows the pre-certification and examination processes. Figure 6.5 presents the flow of the building inspection training through CPD model.

Figure 6.5: CPD System flow from pre-certificate training to continuing training

Continuing building inspection training mainly bases on three sets of learning activites which are also considered as modules. These modules are: set of courses related to building inspection concept; set of courses related to hazard/risk/safety and building inspection concepts; set of courses related to building codes and building inspection activities. The problems related to building code compliance and inspection system in Turkey critically evaluated in Chapter 2 and 4. The shift towards risk reduction understanding is proposed in Chapter 3. The best application example of the US CPD context is presented briefly in Chapter 5. Due to these analysis, the training modules are developed under three main titles which is illustrated in Figure 6.6.

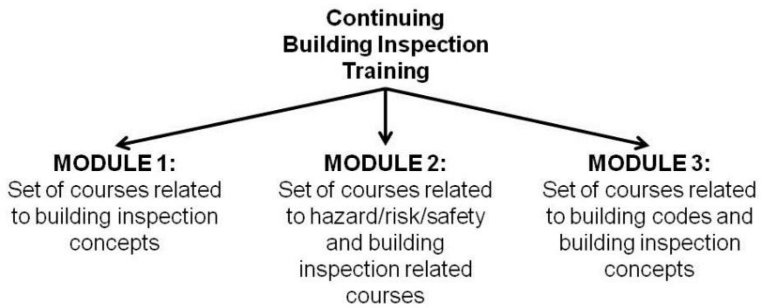

Figure 6.6: learning activity Modules for building inspection training

Each module aims to achieve two types of learning activity programs which are proposed for the CPD model: 1- Structured (or Formal) CPD learning activities, and 2- Unstructured (or Informal) CPD learning activities. The practicing architects are expected to attend to and integrate these training activities in order to meet the CPD training annual requirements. The missing points related to the variation and comprehensiveness of the learning activities in Turkish CPD model is analyzed in Chapters 4 and 6. Due to these insufficiencies and some other country CPD model examples (the USA, United Kingdom, Japan, and Ireland) which are proposed briefly in Chapters 5 and 6, the proposed model in this chapter aims to develop and integrate the structured and informal learning activities through Training Modules as presented in Figure 6.7.

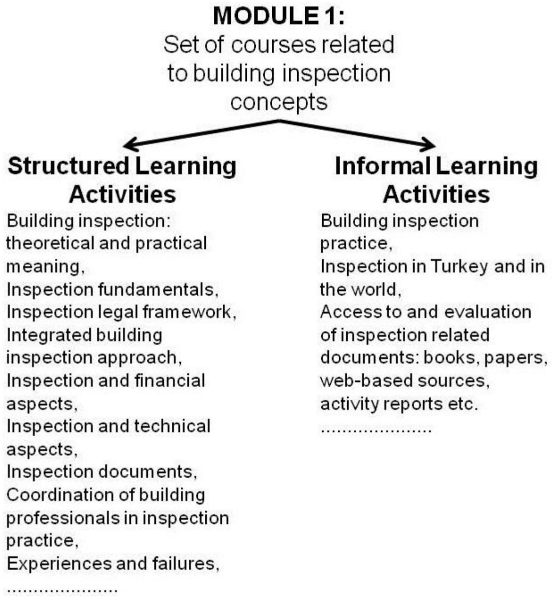

Figure 6.7: Structured and informal learning activity integration through CPD Modules

Structured (or Formal) CPD Programs ranges from face-to-face and interactive training activities (such as in-class courses, on-line training programs etc.) to conference, symposium, and similar activities. The following list examplifies very brief learning activity sources that are determined as structured training activites (adapted from RIAI, 2010):

- Relevant conferences, lectures, seminars and workshops (including in-house CPD sessions),
- ‘CPD designated’ Chamber of Architects (CA of Turkey) events (including educational events organized by Local Branches of CA, etc.),
- Structured events recommended or listed by the CA and other course organizers,
- Professional Practice Lecture Series such as Building Inspection Pre-licensing Series,
- Online seminars incorporating assessment,
- Relevant educational events run by TMMOB and other professional organizations,
- Relevant courses/programs run by recognized educational institutions,
- Structured site visits and study tours delivered by a third party,
- Technical demonstrations,
- Network seminars and visits,
- Service on professional Council or on an appropriate CA Committee or Taskforce,
- Active participation on relevant non-CA committees (e.g. Türk Müşavir Mühendisler ve Mimarlar Birliği, Türkiye Hazır Beton Birliği, Türkiye Çimento Müstahsilleri Birliği, Türk Prefabrik Birliği, Deneme Bilim Merkezi, Kalite Derneği, Mimar ve Mühendisler Grubu, Türk Tesisat Mühendisleri Derneği, Türk Akustik Derneği, Teknik Elemanlar Derneği, Endüstri Ürünleri Tasarımcıları Meslek Kuruluşu, Isıtma Soğutma Klima İmalatçıları Derneği, İzoder, Aydınlatma Gereçleri Üreticileri Derneği, Mimarlık Vakfı, İMSAD İnşaat Malzemesi Sanayicileri Derneği, Yapısal Çelik Derneği, Ulusal Ahşap Derneği, Tesisat İnşaat Sanayi Malzemecileri Derneği, Türkiye Deprem Vakfı, etc.)
- Case studies, other than for course requirements,
- Participation in structured and recorded QA or Peer reviews (routine in-house design reviews are excluded),
- Participation in formal mentoring sessions or organized study/discussion groups,
- Original research,
- Study/Investigation of new or unfamiliar concepts, systems, materials, processes, etc. for project purposes,
- Preparation of lectures/training materials for first, but not subsequent, delivery (promotional lectures about one’s own practice excluded),
- Writing for publication (promotional books/articles about one’s own practice excluded),
- Setting and marking examinations,
- Attendance at relevant court cases, oral hearings, etc.

The other method to meet CPD requirement and support the structured training activities is to attend Unstructured (or Informal) CPD Programs. The following list gives some of these activities very briefly. The practicing architects have the opportunity to report any other activity that may be excepted as unstructured training activity. The examples of informal activities are (adapted from RIAI, 2010):

- Reading CA (Chamber of Architects) and TMMOB Journals, Bulletins, e-bulletins, and other publications,
- Unstructured Site visits (site visits to one's own projects are excluded) and Study Tours,
- Reading relevant books, journals, technical literature, etc.
- Videos, TV, distance learning or online programs without assessment.

The course participants cannot register their (professional) working activities as a CPD training activity. However, if she/he prepares a research or study in order to enhance one's knowledge, skill and ability to carry out the job, this activity is accepted as a training activity.

If the participants who attend and accomplished a training activity, whether structured or unstructured, she/he is expected to deliver a self-reporting which summarizes briefly the aim and methods of the activity, and contribution of the activity to the participant in terms of transferring knowledge, skill and ability to the practice. Self-reporting is integral part of the training system. A reliable and accurate training model necessitates self-reporting in order to evaluate both the trainee performance and course content efficiency in terms of transferring KSAs to the practice. Figure 6.8 proposes the self-reporting component of the CPD system.

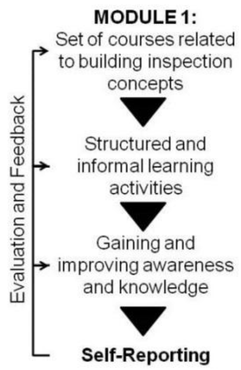

Figure 6.8: Integral part of the CPD system, self-reporting

Within this proposed model, the Chamber of Architects of Turkey (CAT) is determined as the CPD system organizer and controller. The role of the CAT can be defined as follows;

- Determining the CPD rules and curriculum (in terms of training objectives, development of structured and unstructured or informal learning tools, legal issues, training standards, compulsory and core training areas, etc.),
- Providing learning activities (including courses, seminars, leaflets, conferences, media programs etc.),
- Guiding to architects in terms of finding and understanding what kind of professional knowledge-skill and ability they need to improve and/or gain,
- Organizing the other learning activity providers (web-based sources, private firms, public institutes, universities, research centers, independent researchers etc.) in order to integrate into the CPD program development and progression,
- Keeping records of the practicing architects in terms of crediting and self-reporting systems,
- Developing and improving collaborative approaches between different disciplines participating in building inspection process through the CPD programs,
- Developing and enhancing a standard conceptual framework for both CPD programs and building inspection activities within the CPD program as regards HDRR approach.

The CAT needs to take into account the Risk-Hazard-Safety concepts as the compulsory and core training activity. In order to enhance the capacity of practicing architects and secure the UP-PKSA (utilization and processing of professional knowledge, skill and ability) in safe built environment inspection, the credit counting system has to determine multi-hazard and holistic risk reduction view-points through the building inspection training model.

The learning activity design is needed to be taken into account the building inspection course as a compulsory learning activity with other complementary training activities which support to enhance the capacity of architects (Figure 6.9).

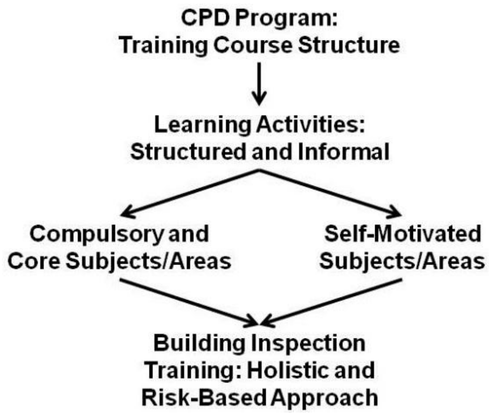

Figure 6.9: The General Model Structure proposed for CPD Learning Activities for practicing architects participating to the Building Inspection System in Turkey

6.4.2 The Building Inspection Training Model for practicing architects in regard to HDRR view-point

This training model aims to:

- develop a holistic understanding to risk-based approaches in inspection practice among the practicing architects,
- enhance DRR awareness development among the practicing architects,
- promote participatory (and interdisciplinary) works through the building inspection system,
- contribute to the standardization of conceptual framework within the holistic risk-based building inspection training.

The Building Inspection Training (hereafter BIT) model is structured under different modules (or sets of courses) mentioned before, all of which are complementary to each other in terms of HDRR approach. Each module refers to different subjects which are crucial for the accuracy of building inspection process from a holistic standpoint. These modules can be categorized as set of courses related to Building Inspection (BI) concepts; set of courses related to Hazard/Risk/Safety and BI concepts; and set of courses related to Building Codes and BI concepts. Figure 6.10 illustrates the main structure of BIT. The first step is to attend a pre-certificate training. At the end of this training, the attendee should pass a certification examination in order to be a professional building inspector. Having the inspector certificate makes the participant eligible to attend annual BIT system and meet the required credits.

Figure 6.10 shows the basic steps in holistic BIT regarding DRR understanding. Each module (set of courses) within BIT provides three types of knowledge levels; awareness, detailed, and advanced. Each learning activity can be accomplished through the preparation of self-reporting by the participant.

Different building types need distinctive inspection approaches due to building functions, structural characteristics, building components and materials. The inspector architect needs to be aware of this challenge. Inspecting different building types necessitates competency on these buildings and their characteristics. Building inspectors have to obtain their inspection certificate according to building type which they will deal with (such as residential building; commercial building; mix-type building;

public building; critical facilities including fire stations, hospitals; transportation structures etc.). Therefore, building inspector certification is arranged according to building type.

Being a building inspector architect also requires the completion of a pre-certification training which can be completed within one year period. This training process is proposed as a pre-requisite training before having the inspector certification examination to become a certified inspector architect.

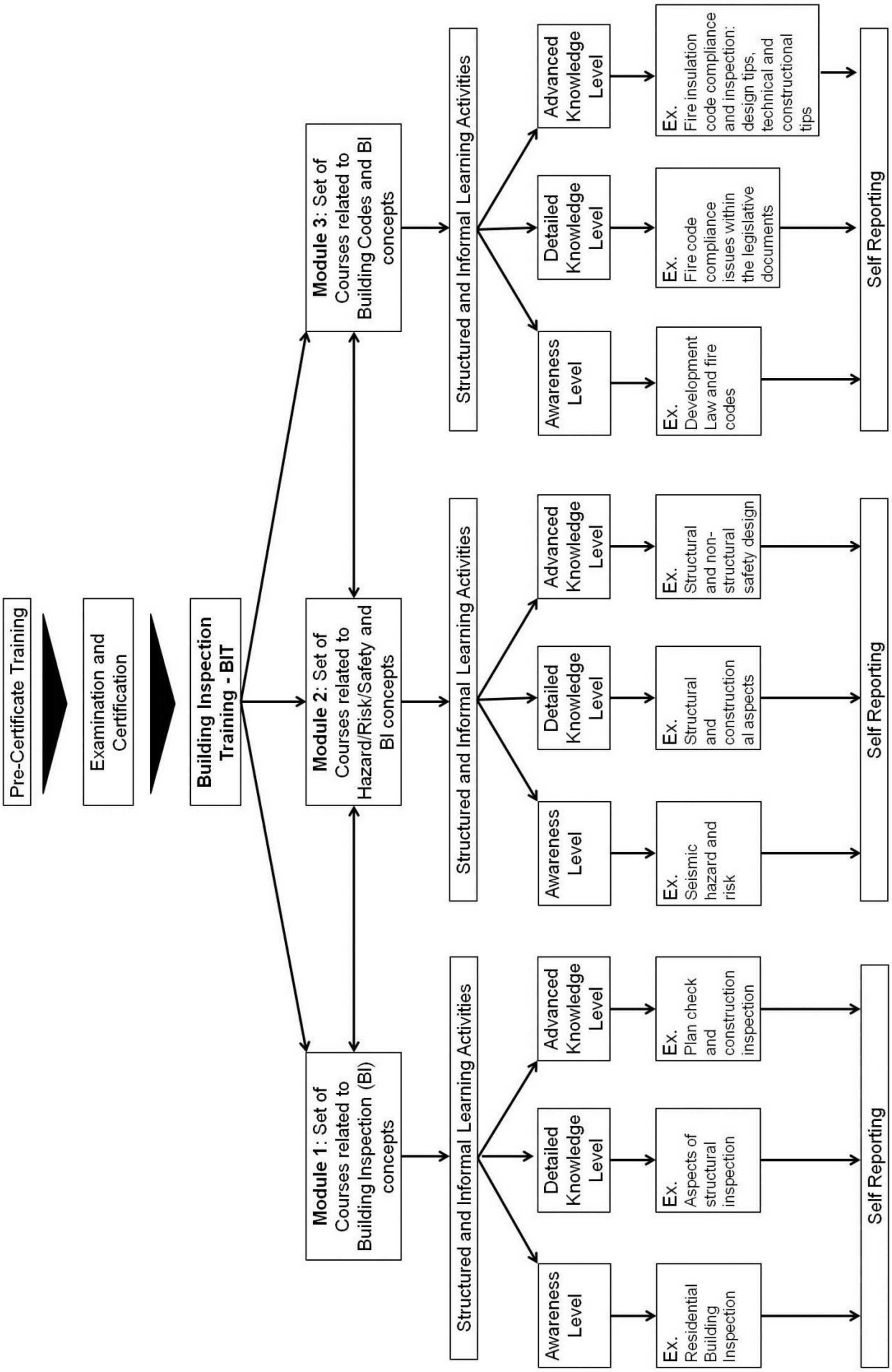

Figure 6.10: The proposed model for Holistic and Risk-based Building Inspection Training

6.4.3 Certification and BIT Process

The holistic and risk-based BIT is mainly based on a three-step system which is conducted in a sequence (Figure 6.10). Following are these steps:

- Pre-certification Training – 158 hours (must be accomplished in a one-year period)
- Examination and Certification (following the accomplishment process of pre-certificate training)
- Attending CPD Program and Training Activities (40 hours annually, following the obtainment of inspection certification)

Pre-certification Training

The objective of this training is to raise the awareness and knowledge level of the participants in different aspects of hazard - risk - safety and building inspection concepts within the CPD program, and prepare them for building inspector examination and certification. It is underlined that inspection activity is a holistic approach which starts by the planning decisions and continues through the post-occupancy inspection period. Therefore, inspector architects need to improve their capacity from an integrated design and application point of view. In that sense, inspector architects are not only responsible for new buildings but also for the existing ones. In addition, post-occupancy evaluation and inspection is also required by clients, and functional change, which can affect the structural and other components of the building and environment (or neighbourhood areas), revisions on the former building codes and other legislative and technical issues. Design, application and post-occupancy inspection processes determine the holistic structure of the inspection system.

As part of the pre-certification training, practicing architects attend structured CPD programs which are designed and/or provided by the CPD Training Activity specialists. These training activities deliver the Structural, Constructional and Non-structural, Legal-Administrative concepts of inspection system from a holistic and risk-based view-point. The mandatory and core course subjects are developed from the analysis of the existing Turkish model presented in Chapter 4 and the USA model presented in Chapter 5, as well as some other country examples presented within this chapter.

Pre-certification Training Activities and courses are categorized under the following concepts:

<u>Architectural-Structural Issues regarding hazard-risk-safety and health concepts (58 Hours of Total):</u>

- Structural System Inspection – 6 + 6 hours (General Awareness, with some extent of Detailed Knowledge): Mainly it aims to develop the fundamental aspects of structural integrity and safety of a building among inspector architects from HDRR view-point. This aim is achieved by means of building code compliance procedures and legal system concepts which encompass technical and legislative issues. This training course aims to transfer the necessary information about the rules and codes to the architects to enhance their capacity in inspecting and assessing safe building design due to appropriate structural system selection. This course improves the basic and necessary structural inspection principles of buildings. In the first section of the course, general rules and specifications related to structural systems used in different building types are mentioned. The second section covers the basic specifications of structural system and building relation from HDRR view-point.

- Reinforced Concrete Structural Systems – 4 Hours (General Awareness, with some extent of Detailed Knowledge): Although a general awareness course is given under the title of "Structural System Inspection", this course provides a more detailed knowledge and understanding on the reinforced concrete structural systems of buildings from HDRR view-point. Hazards and risks are evaluated from a multi-hazard perspective. Experiences and examples are shared throughout the course period.

- Steel Structural Systems – 4 Hours (General Awareness, with some extent of Detailed Knowledge): Fundamentals and useful tips of inspecting steel structure building systems is provided by this course from HDRR view-point. Hazards and risks are evaluated from a multi-hazard perspective. Experiences and examples are shared through the course period.

- Other Structural Systems – 4 Hours (General Awareness, with some extent of Detailed Knowledge): This course provides the structural system inspection criteria other than reinforced concrete and steel structural systems. Composite systems, timber residential houses and masonry building structures are some examples of other structural systems. This course is vital to inspect single family buildings and low-rise buildings some of which are constructed other than concrete and steel structural systems, and it is also important to evaluate the deficiencies of rural buildings most of which are constructed as masonry and timber structure. Those buildings are not resistant enough against the natural and other hazards in Turkey. However, more detailed knowledge is provided within the CPD training activities after the completion of pre-licencing courses.

- Understanding Earthquake Factor in Structural System Design and Inspection Criteria – 4 + 4 Hours (General Awareness and to some extent of Detailed Knowledge): This course is a complementary course for the structural system inspection courses. On the other hand, it provides more detailed knowledge related to the affects of seismic risks on the building structure.

- Understanding Fire Hazard and Fire Resistant Design through Inspection criteria – 4 + 4 Hours (General Awareness, with some extent of Detailed Knowledge): The effects of fire on the structural system can be disastrous, and it can cause damages on the buildings ranging from slight damages to complete collapse. This course raises awareness and provides some detailed knowledge about fire hazard protection of structural systems.

- Understanding Hazard (including storm, flood, landslide, rockfalls, explosions etc.) Effects on Structural System Design and Inspection Criteria – 4 + 4 Hours (General Awareness, with some extent of Detailed Knowledge): The natural and built environment has become more hazardous due to external and manufactured risks. Risks accumulate in built environment due to different factors and uncertainties. Safety of building concept has become more complex than ever. This course provides general awareness and some basic knowledge on the risks pertaining to nature and human interaction in built environment, as well as human induced hazard risks. Accordingly, this course guides the practicing architects and inspectors through HDRR.

- Inspection of Foundation (walls) and Columns (or piers) – 4 Hours (General Awareness, with some extent of Detailed Knowledge): Foundation of buildings is an integral part of a building structure. Thus, it deserves specific attention. The failure of the foundation affects the whole structure, and it is very difficult to repair the consequent faults. Practicing architects and inspector architects need to examine the foundation (and foundation walls), columns (or piers) not only in reinforced concrete structures but also other ones such as steel, timber, and masonary structures. This course aims to provide information on the design and inspection criteria of building foundations as regards architectural design and building code compliance.

- Inspection of Adaptive Reuse: Structural-Architectural Interaction in Historic Buildings – 6 Hours (General Awareness, with some extent of Detailed Knowledge): Some buildings constructed in urban or rural areas have historical and cultural characteristics that have to be preserved for the next generations. Protection of historical and cultural heritage is an important responsibility of building professionals in general and practicing architects in particular. Restoration, renovation and reconstruction approaches that are parts of cultural heritage protection need competency and certification in these fields. However, practicing architects dealing with building inspection activity need to be aware of historical building structure protection during adaptive reuse (change in function of the building). This course helps inspectors gain awareness of and detailed knowledge in adaptive reuse approaches and applications.

Architectural-Constructional and Non-structural Issues regarding hazard-risk-safety and health concepts (72 Hours of Total):

- Roofing Inspection – 4 Hours (General Awareness, with some extent of Detailed Knowledge): This course informs the inspector of how to understand and perform the roofing systems as well as roofing structures of buildings. It overviews different types of roof systems. The hazards and risks pertaining to deficient design and constrution of roof systems cause damages on both inhabitants and assets. Past examples reveal the hazardous affects of insufficient inspection practices on roof systems and structures. Some of the common roof failures are deficient design of roof structural systems, insufficient application of roof materials, collapse of parapet walls, weak and unstable roof systems in natural hazards such as winds, earthquakes, heavy snow and/or rain falls etc. Illustrations and experiences are provided for the course participants. Participants gain general awareness and detailed knowledge to some extent in sufficient and safe roof systems from HDRR view-point.

- HVAC Inspection – 4 Hours (General Awareness, with some extent of Detailed Knowledge): Although the HVAC (Heating, Ventilation, and Air Conditioning) systems are seen as the field of mechanical engineering, the deficient applications of these systems on the buildings result in serious risks. This course gives a general awareness to the inspector in order to understand and inspect the HVAC system of buildings. It includes a review of the components of common HVAC systems that may be present during inspection, including warm-air, hydronic, steam and electric heating systems, air conditioning systems, and heat pump systems[56] (InterNACHI, 2011). The safety and health hazards pertaining to HVAC systems need to be differentiated by the inspectors. This course raises general awareness of HVAC based risks from the architectural design and construction point of view.

- Exterior Inspection – 4 Hours (General Awareness, with some extent of Detailed Knowledge): Hazards, safety and health problems due to building exterior are directly related to the insufficient design and construction practices. Inspector architects need to perform a sufficient inspection approach to identify the probable hazards pertaining to building exterior design and construction. Some of the fundamental components and materials of building exterior subject to inspection activity are siding types, site drainage, moisture intrusion issues, windows and doors, flashing, exterior structures, garage, and other exterior systems and components (InterNACHI, 2011)[57]. Insufficient design and application practices pose different types risks for people and properties. For instance, falling of building exterior materials (such as siding, exterior facing tiles, advertisment signboards etc.) during hazardous events threatens both life and asset safety. The aim of this course is to provide accurate and useful information regarding hazard, risk, safety and health concepts that are important in the inspection of building exterior ranging from single family house to multi-story residential and/or commerical buildings.

- Insulation, Ventilation and Interior Inspection – 6 + 6 Hours (General Awareness, with some extent of Detailed Knowledge): The aim of this course is to provide detailed information regarding hazard, risk, safety and health concepts necessary for performing the inspection of the insulation, ventilation and interior of both new and existing buildings. In most cases, user comfort, safety and health are affected by insufficient interior, ventilation and insulation designs and implementations. Deficient water, air and sound insulation directly affect not only the comfort conditions but also health conditions of the inhabitants. Several aspects of safe and healthy interior, insulation and ventilation inspection are worth developing. Mostly in residential buildings, interior-insulation and ventilation are important issues. Some of the critical areas related to these inspection activities are given in Appendix O. Practicing inspector architects need to be aware of and develop detailed knowledge on the aspects of interior-insulation-ventilation applications from a HDRR point of view.

- Green Building Concept and Inspecting Green Building Features in Buildings – 4 Hours (General Awareness, with some extent of Detailed Knowledge): the green building concept has

[56] Adapted from *"How to Inspect HVAC Systems" course*, InterNACHI (The International Association of Certified Home Inspectors). Available from: http://www.nachi.org/hvaccourse.htm (Accessed on 2011).
[57] Adapted from *"How to Perform Exterior Inspections" course*, InterNACHI (The International Association of Certified Home Inspectors). Available from: http://www.nachi.org/exteriorcourse.htm (Accessed on 2011).

increasingly become popular internationally . This course aims to enhance awareness and knowledge of practicing architects on basic principles of the green building concept from energy efficieny and sustainability view-points. The most important aspects of a green building approach is categorized under three titles: energy-efficiency, sustainable materials and practices, and healthy homes (InterNACHI, 2011). The course enhances professional architects' capacity of recognizing the green building features and systems necessary for residential building inspection. This course also teaches the practicing architects to assess the Energy performance of Buildings, which has become mandatory for residential buildings in Turkey through the law number 5627 (The Energy Efficiency Law – Enerji Verimliliği Kanunu).

- Other Building Hazards – 6 + 6 Hours (General Awareness, with some extent of Detailed Knowledge): Some hazards specifically apply to residential buildings rather than well known large scale hazards. These are potential safety and health risks for buildings and inhabitants, caused by lack of appropriate design and application activities as well as poor inspection efforts such as insufficient material preferences, unhealthy material usage, unharmanious building component and material coalescence, incompatible detailing and application. These residential building hazards range from algae and similar types of microorganism threats to condensation or ultraviolet degradation, some of which are defined in Appendix P. This course is vital to raise the awareness and develop detailed knowledge for the inspector architects with regard to specific residential building hazards and risks for both new and existing buildings.

- Radon (gas) and other hazardous gases measurement and inspection – 4 Hours (General Awareness, with some extent of Detailed Knowledge): This course raises awareness and detailed knowledge of hazardous gas threats building users may face. According to medical researches, radon gas accumulation inside the residential buildings (and other types of buildings) cause serious health problems such as lung cancer (NCI, 2011; ScienceDaily, 2009, 2010; EPA, 2009). Radon gas level of interior spaces should thus be measured. Inspection of radon gas (and other harmful gases) insulation (or mitigation) systems, as well as natural and artifical ventilation systems are very important issues in order to secure the health of inhabitants. This course gives the general idea of the concept and reminds the importance of hazardous gas measurement, and inspection techniques.

- Fire Emergency Exit and Means of Egress Inspection – 4 Hours (General Awareness, with some extent of Detailed Knowledge): Building evacuation in case of fire (or other emergency) situation is an important safety and health concept. Some of the buildings such as multi-story housing blocks, large-scale commercial buildings, education and health facilities, public buildings etc. need specific designs, construction and inspection approaches for a safe emergency evacuation. The course stresses whether emergency or standard exterior exits are safely and easily accessible from any space in the building should be inspected. Inspector architects are expected to be capable of calculating the occupant load, exit capacities, and exit discharge in any case, and particularly in emergency case through this course.

- Fire Systems Inspection – 4 + 4 Hours (General Awareness, with some extent of Detailed Knowledge): This course provides the inspection options of available automatic fire alarm and suppression systems, including sprinklers, heat and smoke detectors. Participants also gain awareness and some detailed knowledge on fire protection and fire resistant systems required by building codes and legislations such as exterior walls, fire barriers, fire walls, smoke barriers, smoke partitions, shafts, floor construction, roof construction, penetration protection, interior finishes etc. It is vital for inspectors to learn fire specific terminology in order to construct a standard core terminology. The course presents a brief evolution history of firestop system and standards. This course needs to be integrated with 'Fire Regulation'.

- Climate Change Affects on Buildings and Adaptation Process – 4 Hours (General Awareness, with some extent of Detailed Knowledge): The risks due to climate change have been growing all over the world. Turkey is one of the most susceptible countries to climate change impacts. This course raises general awareness of climate change effects on the built environment. In particular, the adaptation to the climate change concept significant for the buildings and environment is explored. Reducing human-induced impacts which trigger the climate change through the design and construction processes is also a concern of this course. Participants are expected to develop awareness and knowledge of climate change adaptation and inspection concepts through a holistic risk-based approach.

- Building Safety and Security; protection of assets from assaults and other kinds of security threats - 4 Hours (General Awareness, with some extent of Detailed Knowledge): The occupants feel safe if there are necessary precuations implemented in and around a building (such as entrances, corridors, elevators, emergency exits, fire stairs, parking areas etc.). Thus, standards for such kind of safety and security tools and systems sould be developed. This course identify the safety and security needs of occupants in terms of technical and psychological aspects. The course particularly helps to improve security and safety systems for residential buildings. Participants are expected to gain awareness on these systems and their application to the built environment, which shows much is expected of a quality building inspection.

- Construction Site Safety - 4 Hours (General Awareness, with some extent of Detailed Knowledge): Accidents cause fatalities in construction sites. Inspectors are responsible from the safety of construction sites. Inspector architects need to be aware of safety rules and applications in construction sites. This course briefs the participants on construction site safety rules in accordance with the related legislative documents.

- Introduction to Inspection of Fenestration for Hazard Mitigation - 4 Hours (General Awareness, with some extent of Detailed Knowledge): Building fenestration systems are susceptible to various hazards which have harmful effects on people safety in Turkey. The deficient detailing and construction practices, faulty material preferences result in damages in hazardous events. Earthquakes, storms, fires, blasts stemming from accidents and/or attacks cause fenestration failures. The materials and structures related to fenestration systems such as cladding systems, windows etc. are needed to be inspected in terms of material and structure stability. The course explores and provides awareness and detailed knowledge on the durability and resistance of fenestration system in case of hazards.

<u>Architectural-Legal-Administrative-Financial Issues regarding hazard-risk-safety and health concepts (40 Hours of Total):</u>

Courses provided under legal-administrative module aim to enhance the inspectors' knowledge, skill and ability to analyze the necessary legislative documents related to inspection activity. The legislative documents are analyzed, and the responsibility of the inspectors are explored through the documents. It is also aimed to foster effective communication with different parties of building production process including home owners from a participative view-point. The courses offer general awareness and to some extent of detailed knowledge of legislative documents and shifting approaches in risk, safety and health concepts among both the international and national agenda from a holistic and multi-hazard perspective.

- Building Inspection Law – 4 Hours
- Development Law – 4 Hours
- Disaster Law – 4 Hours including Multi-Hazard Mapping, Mitigation Planning and related funds
- Disaster Insurances Law – 4 Hours
- Professional Liability and Insurance Law – 4 Hours
- Other Legal and Administrative Documents – 4 + 4 Hours
- Communication and Customer Service for Inspectors – 4 Hours
- Climate Change Adaptation Issues in terms of Legal and Administrative International Agenda – 4 Hours including Climate-Change Mitigation Funds
- Understanding and Following the Shifting Building Safety and Health Approach and Concepts, as well as Policies in International Agenda - 4 Hours

Examination and Certification

Following the pre-licensing training period, participants go through an assessment. The certification process of inspector architect is finalized by the examination process. The examination items selected from a wide pool, which covers the training course contents and related issues regarding HDRR concepts. The exam report and the self-reporting documents delivered after each training activity makes the final grade of the practicing architect. If the participant has met the requirements of both the exam and self-reporting, she/he obtains the inspector certificate.

Attending to CPD Program and Training Activities

Within the professional life, professional architects are expected to attend and meet the requirements of CPD program. Professional inspector architects are required to obtain annualy 40 hours (or learning units) of continuing professional development credits. Inspector architects are required to attend at least 20 hours of structured and 20 hours of unstructured (or informal) training activity annualy.

Self-reporting system which is assumed as complementary to the CPD program is required following each training activity. Self-motivated training activities are encouraged through the CPD program. Inspection concept needs a holistic and risk-based approach due to shifting conceptual understanding and growing uncertainties on the hazard-risk-safety concepts among the built environment. Building inspection training has to meet this conceptual need. CPD program aims to be a flexible system which can adapt itself to changing demands and shifting approach to the inspection activity. If the practicing architects have to keep up-to-date, the CPD program also has to keep to be up-to-date. Therefore, program structure and learning activities need to be monitored, assessed and modified according to changing built environmental conditions, needs and human capacities.

If the inspector architect cannot meet the annual requirements of CPD program, which equals to 40 hours of training activities, she/he is expected to complete the missing credits in the grace period of eight months. Figure 6.11 summarizes the whole BIT proposal for CPD system in Turkey.

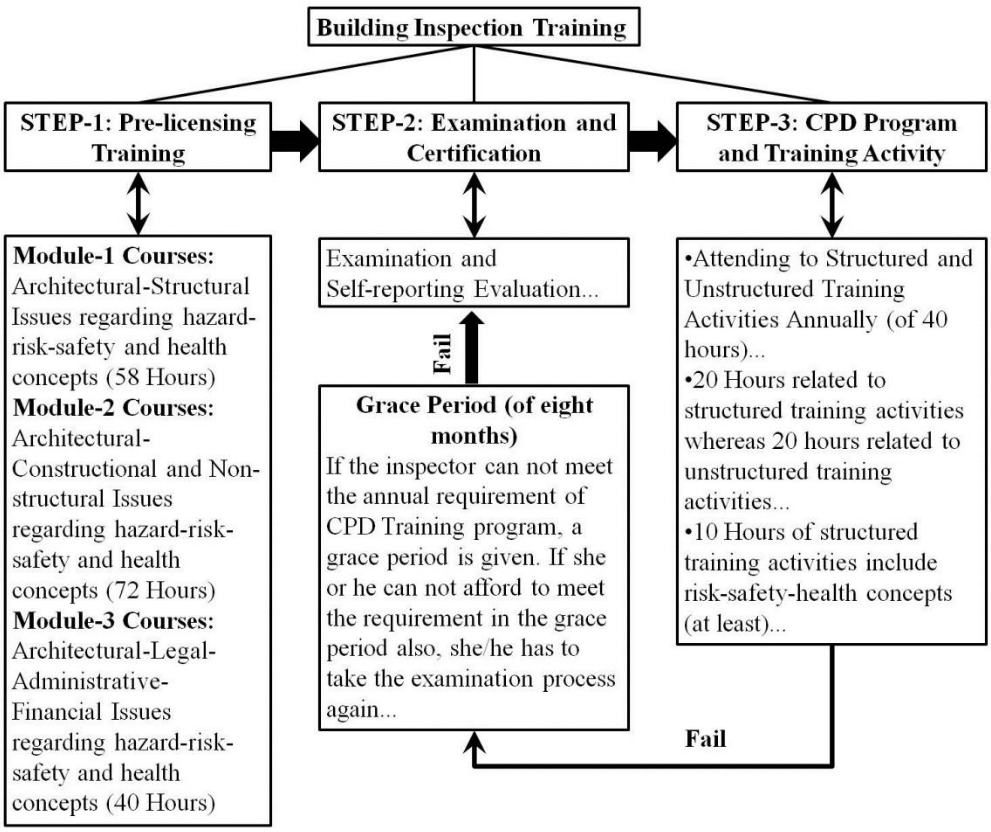

Figure 6.11: The whole BIT proposal for Turkey through CPD Programs

6.5 Evaluation of the Chapter

In this chapter, the evolution of the training idea, in general, professional training approach in particular is briefly analyzed. Different countries' (United Kingdom, Ireland and Japan) CPD systems developed for practicing architects were included in the analysis. CPD systems of the sample countries are compared with that in Turkey in terms of training requirments, training structure and learning activity design. As a result of the analysis and evaluations, a training model is proposed for practicing inspector architects in Turkey. In doing so, the demands and the changing understanding towards HDRR approach are considered.

The BIT model proposed for inspector architects observes a holistic perspective within the building production process. The failures and deficiencies in the building inspection system in Turkey point at the need for a holistic and participative professional training within the CPD system. This training model aims to enhance the capacity of practicing architects in not only structural aspects of buildings but also other aspects of building production system regarding holistic risk-based understanding. It is also proposed in the model that the inspection activities should be categorized according to building and construction types and characteristics. It is necessary to be competent on different building types due to different cataegorization of building inspection which needs a more detailed and comprehensive, as well as participative training and certification processes.

Chamber of Architects of Turkey (CAT) draws attention to the need to revise and restructure the ongoing CPD system according to changing needs and built environmental conditions (CAT, 2012). According to CAT the shifting approach of CPD needs to meet, develop, enhance and encourage;

- Better participative training activities,
- More flexible and varied learning activities,
- Increasing competency training activities in different areas,
- Growing colloboration with public institutes, universities and private sector in training organizations
- Implementing self-motivated and informal learning activities,
- E-training programs.

Apparently, a holistic and participative training model is essential for practicing architects.

This model exhibits the need to adopt a participative and holistic risk-based inspection training approach that is in accord with the international examples. The failures of the ongoing training system in case of hazards and disasters is clear evidence of low professional awareness of and poor performance in hazard-safety-risk and health concepts. To conclude, successful utilization of professional knowledge, skill and ability (UP-PKSA) can be achieved only through a systematic, participative, holistic and risk-based inspection training in Turkey.

CHAPTER 7

Conclusion

This chapter summarizes the method of the research and results of the analysis. Following the summary, viability of the proposed training model for the CPD system of practicing architects through BIS is discussed with reference to Turkish context. Finally the chapter concludes with the suggestions for further studies.

7.1 Summary and Evaluation of the Study

The study is constructed on the hypothesis that "in order to cope efficiently with and reduce the growing disaster risks and uncertainties accumulating in built environment, a holistic and risk-based building inspection training approach is needed".

The study asks the following questions:

- Does the ongoing Building Inspection System (BIS) training meet the safety requirements of the practicing architects in Turkey?
- Is the ongoing BIS certification and training in Turkey consistent with the disaster policies globallly changing towards risk mitigation?
- Does the ongoing Continuing Professional Development (CPD) system provide an effective awareness and capacity development model for practicing architects in terms of holistic and risk-based building inspection?
- Do the practicing architects transfer necessary Knowledge, Skill and Ability (KSA) successfully to the building inspection practice through the ongoing BIS training of CPD?

The analysis of the study is structured based on the hypothesis and research questions. It aims to propose a training model for practicing architects which covers a participatory approach within the BIS from a holistic and risk-based perspective.

An analytical survey is conducted in order to identify the deficiencies of the ongoing traditional disaster coping efforts which mainly concentrate on post-disaster efforts in Turkey. These insufficient efforts affect the accuracy of the building production process, and particularly the building inspection system. Thus, the survey is designed to understand and evaluate the implications of insufficient building inspection systems. A brief historical analysis and the debates on the deficient conceptual and perceptive approaches related to disaster phenomena among the international agenda are presented. The analysis of the disaster trends which increasingly affect human life and settlements in both international and national contexts is made based on statistical information. Exposure to disaster events in general, and particularly seismic events in Turkey, is explained. The analytical survey explores the traditional disaster coping approach in the light of the analysis mentioned above. The summary of traditional Disaster Management System (DMS) is folowed by the disclosure of problem areas related to traditional DMS. Critical analysis of traditional DMS both in international and Turkish contexts are presented in order to highlight the deficiencies of the ongoing system and the demand to a new approach.

A critical evaluation and assessment is made to analyze the underlying factors which make the traditional DMS ineffective. The conceptual framework of the shifting policy, Disaster Risk Management, is briefly summarized. The necessity of a more holistic and risk-based approach, Holistic Disaster Risk Reduction (HDRR) approach, to reduce the disaster risks is established. The critical evaluation focuses on the ineffective Disaster Risk Reduction (DRR) strategy and practices in Turkey. Disclosure of deficient and missing points within the existing legal system reveals the need for a more holistic and risk-based approach. A critical DRR approach, the ongoing Building Inspection System (BIS) is disscussed from HDRR approach. The deficient points of BIS, which result in low capacity development among the practicing architects, is explained. The capacity development practices of architects in Turkey through Continuing Professional Development (CPD) system is briefed from a critical evaluation view-point. Personal experiences obtained by semi-structured interviews conducted with building professionals participating in the ongoing BIS are presented in order to evaluate the ongoing professional training model of CPD system designed for architects. The weaknesses of the ongoing training model which stem from the lack of a holistic and risk-based approach are pointed out through the training structure and learning activity design.

The analysis of the best practices in the international setting is the complementary part of critical evaluation and assessment of the research. The US CPD example is analyzed. The CPD structure and learning activity design of the US model are analyzed from HDRR view-point. Some other best practices in Japan and European countries are also presented. The comparison between the best practice examples from the US, the United Kingdom, Ireland and Japan, and those from Turkey is presented in order to reveal the deficiencies within the ongoing professional training model.

Among the other parties, it is may be the building professionals who need to enhance their BIS capacity the most as international policies toward risk mitigation change significantly. Practicing architects have a crucial role in the BIS in Turkey. However, their role has been ineffective so far due to the lack of efficient capacity development approaches to disaster risk mitigation. The analysis conducted in this study reveals that CPD model assumed to be foremost tools in capacity development of practicing architects is insufficient for BIS training. This deficiency among the other reasons is directly related to the lack of holistic and risk-based approach within the professional training system. The analysis lays stress on the demand for an efficient building inspection training within the ongoing CPD system which is as yet fragmented due to a lack of holistic and risk-based approach.

The study proposes a professional training model of BIS for practicing architects through the re-construction of holistic and participatory training system which takes into account the priority of DRR approach. The model is re-constructed on the analytical survey results and the findings of the critical evaluation and assessement.

The proposed model aims to do the following:

- Developing a holistic understanding of risk-based approaches in inspection practice,
- Enhancing and encouraging DRR awareness development among practicing architects,
- Developing and encouraging participatory (and interdisciplinary) works through the building inspection system,
- Contributing to the standardization of conceptual framework within the holistic and risk-based building inspection training.

7.2 Evaluation and Recommendations for Turkish Context

Susceptibility of the physical environment and vulnerability of the Turkish society in case of hazardous events indicate the ineffective disaster coping strategies. The experiences of various former disasters such as the devastating 1999 East Marmara Earthquakes have strenghtened the need for more holistic and risk-based mitigation efforts. This study explores the deficient and missing points of the present disaster coping approaches, and particularly ineffective development of disaster risk reduction system, which is not in accord with the shifting international policy.

Based on the findings of the analysis conducted in this study, the certification and training model of BIS for practicing architects is re-structured. Although the legal framework is commonly assumed as the main factor which affects the success of risk mitigation activities in Turkey, other important underlying factors need to be analyzed in order to develop solutions for the problems. Development and enhancement of a reliable and efficient legal system is needed to handle the safety and risk-based problems. However, building professionals do not participate in the legal system development. Not observing a participatory understanding, this system does not develop sufficiently and function effectively. A more reliable and effective legal system development needs more bottom-up process enabling participation and consensus of building professionals. In addition, the missing capacity development mechanisms of building professionals affect the achievement of efficient legal system. There are not any reliable and continuing supporting or encouraging systems for capacity development of professionals. Therefore, re-structuring and enhancing the CPD system aim to contribute to not only effective capacity development of practicing architects but also improvement of the legal system.

The recommendations for a holistic and participative training approach necessitate fundamental steps through the different systems related to disaster and development. These fundamental and urgent steps are laid down:

- *Enhancing and integrating legal and administrative system*

The laws and regulations related to disaster and development practices remain ineffective and fragmented. These legal system components do not meet the requirements of the shifting approach to hazard, risk and safety concepts in the international and national agenda. The primary laws of Development, Disaster, Building Inspection and Insurance need to be integrated for a more holistic approach which covers multi-hazard and risk-based applications. It would be more beneficial if the administrative parties including AFAD are re-organized according to holistic and risk-based understanding in disaster and development legal system. For this, local governments and the society need to be involved in the decision making and mitigation activities covering risk avoidance, risk reduction, and risk sharing. The Stafford Act (of the US) presented in Chapter 5 can be accepted as one of the best examples of the shifting approach to disaster policy and mitigation understanding, thus a good reference in the development of Turkish disaster legal system.

- *Settling and improving HDRR approach among the built environment development practices*

Safe built environmental conditions need a holistic and participative approach. Prioritizing risk reduction understanding as an important component of risk mitigation system is essential for the related governmental institutions. Participation of such varied sectors as universities, chamber of professions, NGOs, and private sector in the DRR system needs to be encouraged and supported by both central and local governments. The urgency of re-structuring inspecting, monitoring and assessment strategies, methods and tools according to the shifting understanding of hazard, safety, risk and health concepts is to be taken into account. Building professionals need to be encouraged to enhace their capacity and awareness level in HDRR approach through effective training models.

Continuing professional development approaches need to be assumed as integral and complimentary parts of practice. The participative and interdisciplinary works need to be encouraged for a more effective CPD system.

- *Developing necessary and flexiable funds to support risk mitigation efforts*

The financial sources including disaster funds need to be rearranged and allocated to pre-disaster activities which prioritize risk mitigation efforts. It is necessary to develop multi-hazard and risk maps among the public and private institutions to stress the importance of prioritizing these activities and to benefit from these funds. These maps have to be put into service of public through local governments. The utilization of and access to the maps can be supported through these funds.

In order to support and encourage the mitigation efforts of local governments, these funds can be used along with some other financial mechanisms such as promotions, awards, and competitions. Private sector should also encourage people to be active in these mitigation fund development mechanisms. They can use their own funds to support the mitigation activities as well. Mitigation funds can be also used to develop, implement and extend public awareness education and professional training efforts.

- *Building inspection system*

The ongoing BIS leaves the inspection activity area completely to the private sector and market actors. Inspection power and responsibility of public have been entirely demolished in the current system. However, in a holistic approach, public and private sectors can participate equally in the inspection system. In respect to this holistic participative view, the inspection mechanism needs to be re-structured and re-organized. The role of public and private sectors can be re-defined within the inspection system.

The roles of building professionals within the BIS also need to be re-defined according to holistic and risk-based approach. Competency of building professionals through accreditation, certification and training mechanisms need to depend upon a more effective, accurate, and reliable CPD system.

In order to re-structure a holistic BIS, mitigation planning and post-occupancy inspection processes are to be integrated into the inspection system. After the beginning of occupancy period, inspection mechanisms can be developed for existing buildings periodically. This post-occupancy inspection period can be determined according to building types and functions. The risks pertaining to building occupancy, functional changes or other factors need to be identified to develop proper risk mitigation method(s). Post-occupancy inspection also contributes to the recording and monitoring of building stock and helps to keep up-to-date building data.

During the finalizing period of this study, a new ‘draft’ Building Inspection Law has been developed by the Environment and Urbanization Ministry. This draft law has sent to the agenda of Turkish parliament by the second half of 2012. The debate on this draft has been continuing among the public institutions, building professionals, inspection firms and chambers of professions of Turkey. The draft law is analyzed by the researcher in order to evaluate and understand if there are any innovative and progressive approaches within the draft. Unfortunately, the draft law is not promising and encouraging in terms of introducing effective and to the point solutions to meet the gaps and insufficiencies of the existing law and the BIS. Particularly for the certification and professional training approaches, the draft does not meet any of the needs which indicate development of a holistic and risk-based understanding. This view of the draft law makes it by no means advanced than the existing one.

7.3 Recommendations for Further Studies

The general view of the traditional disaster coping system in Turkey and its deficiencies have been studied through many researches and dissertations. These studies have made invaluable contributions to the awareness development among the society. However, more detailed research on the different and complimentary parts of the whole disaster and risk related system is needed. Holistic approach brings forth the importance of the whole disaster risk management system, and facilitates the analysis of the deficient factors in the interdependent parts (such as DRR) which affect the whole system efficiency. Therefore, the interdependent parts of a holistic risk mitigation system, risk avoidance, risk reduction and risk sharing, should be studied seperately to underscore the importance of each part and the interlinkages between these parts.

This study limits the scope of the research with re-structuring BIS training from a HDRR approach for practicing architects. Further research is needed to expand the integration and enhancement of risk mitigation studies and building inspection training systems. Indeed, the following research topics need to be focused on:

- How to develop and improve inspector competency according to different types of buildings such as residential, commercial, and critical facilities etc
- How to integrate public building stocks into a holistic inspection system
- How to use mitigation funds to improve and support inspection efforts
- How to integrate mitigation planning and post-occupancy inspection with the BIS
- How to develop and utilize multi-hazard and risk maps for building inspection
- How to integrate legal system and BIS to achieve HDRR approach,
- How to integrate some of the basic CPD modules into formal education of architect(s) in order to enhance the awareness of students particularly in disaster, risk, resilience, multi-hazard approach, and building codes,
- How to develop and enhance integrative strategies to bring together of the architecture and engineering disciplines through the CPD programs,
- How to integrate formal education of architects and CPD training to ensure lifelong professional learning.

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APPENDIX A

The Vulnerability of Settlements which Expose to Various Hazards in Turkey

Figure A.1 shows a very typical hazard type and disaster impact for Turkey. The floods very often damage many settlements in not only urban areas but also rural areas.

Figure A.1: The pictures are taken from the Serik - Antalya Flash Flood of October 9, 2011. Source: http://www.hurriyet.com.tr/gundem/18951008.asp (Accessed on October 2011).

Urban areas are threatened by different hazards due to vulnerable and insufficient infrastructures. Figure A.2 indicates a flood disaster in the city center of Ankara experienced in 2011. The divers were looking for probable missing people who were trapped in their vehicles when they were driving through an underpass road.

Figure A.2: Ankara hailstorm and flood of June 16, 2011. Source: http://www.hurriyet.com.tr/gundem/18046531.asp?gid=381 (Accessed on June 2011).

Figure A.3 illustrates a very typical urban flood which has been observed frequently in recent years. Ordu, a Blacksea region city, experienced a flood which caused considerable damages including hundreds of residential buildings, shops, schools and hospitals in 2011. Those scenes have become very familiar for flood-prone areas in urban settlements of the country.

Figure A.3: Ordu flood disaster of August 19, 2011. Source: http://gundem.milliyet.com.tr/ordu-sele-teslim/gundem/gundemdetay/19.08.2011/1428788/default.htm (Accessed on August 2011).

Although Turkey is not located on a region which is vulnerable to tropical winds, storms and cyclones, strong winds and twisters can be observed from time to time in different parts of the country. According to Kadıoğlu (2012), in recent years, the affects of twisters and strong winds on human settlements have been increasing due to climate change impacts in connection with defective land use decisions and practices. Figure 2.9 indicates a storm affect on a school building with a population of 150 students in Cizre town. The building was totally damaged. However there were not any casualties because the storm hit the region very late at night when the school was not opened yet.

Figure A.4: Cizre town storm of May 19, 2011. Source: http://gundem.milliyet.com.tr/deprem-degil-ruzgar-yikti/gundem/gundemdetay/20.05.2011/1392420/default.htm (Accessed on May 2011).

Due to incorrect settlement decisions and vulnerability of development practices, landslides and rock falls have been observed in Turkey. Figure A.5 illustrates landslide and rock fall hazard for settlements in Turkey. An apartment building which was composed of tens of flats was destroyed heavily due to a rock fall event triggered by a landslide.

Figure A.5: Zonguldak-Ereğli rock fall on April 21, 2011. The 7-story building and the cars parking around the building were damaged severly, as well as the road was closed due to falling rocks. Source: http://www.dha.com.tr/dhaalbumdetay.asp?kat=12353&page_number=1 (Accessed on April 2011).

Human-induced hazards which are associated with mismanagement and deficient inspection processes of building systems or hazardous materials located in buildings cause serious damages and human losses. Figure A.6 illustrates a typical human-induced hazard in a residential building in Diyarbakır. A boiler was exploded and damaged the structural system of the building heavily. Figure A.7 shows another explosion event in a residential building. The LPG bottled tube exploded at midnight in a café located at the basement floor of a residential building. At the time of the explosion, the café was empty; however the structural system of the building was heavily damaged and the building was evacuated for safety concerns.

Figure A.6: Boiler explosion in Diyarbakır on April 20, 2011. Source: http://www.dha.com.tr/dhaalbumdetay.asp?kat=12338&page_number=1 (Accessed on April 2011).

Figure A.7: The LPG bottled tube explosion in Antalya on November 9, 2009. Pictures are from Ali Tolga Özden's archieve (2011).

Industrial accidents which are classified under man-made disasters, as well as technological disasters have been increasing and causing considerable amount of human losses in Turkey in recent years (Özden, 2012). Figures A.8 and A.9 indicate the technological hazards for Turkey. Both figures show the devastating impacts of industrial accidents on buildings.

Figure A.8: Industrial explosion in Kahramanmaraş on April 13, 2012. A jean-painting factory exploded and almost 2/3 of the building collapsed killing 4 workers. Source: www.hurriyet.com.tr; http://www.ntvmsnbc.com; http://www.stargazete.com (Accessed on April 2012).

Figure A.9: Industrial facility explosions in Ankara. In the OSTİM region; two separate buildings exploded on the same day (of February 3, 2011). Beside the extensive damages on the buildings, totally 20 workers were killed in both facilities. Pictures are from Ali Tolga Özden's archieve (2011).

APPENDIX B

Civil Defense Understanding in Disaster Coping Efforts

Civil Defense or Civil Protection Systems are the basic and fundamental examples for the organized efforts for disaster coping strategies which also constitute the grounds of traditional DMS. The main purpose of civil defense is to protect the civilians from attacks of the enemy, and to organize them for acting before and in the meantime of an enemy invasion. The emergence of civil protection goes back to the cold war threat (after the Second World War) which was widely effective and dominating the policies all over the world during most of the second half of 20th century. According to Alexander (2002, p. 209);

> *Civil protection has gradually and rather haltingly emerged from the preceding philosophy of civil defense. Here, 'defense' implies the management of civilian populations in the face of actual or potential aggression. As with all means of directing operations under the duress of warfare and conflict, it gives considerable emphasis to authoritarian management techniques and the restriction of individual freedoms.*

Likewise, Dynes (1998) bounds the roots of civil defense to the cold war period and explains the main purpose of this model as command and control of chaos.

Actually, the fundamental and first changing policy during the cold war period (1950s-1990s) over using and organizing civil defense forces other than war concept has started within the natural disaster response activities. In the meantime of a natural disaster event, civil defense forces which were directed and professionally employed by civil defense directories responded to the crisis area. They intervened to the emergency activities including search and rescue operations, as well as relief works in disaster stricken area. The transform of civil defense for war to civil defense for natural disaster response has become an important and dominating part of traditional DMS.

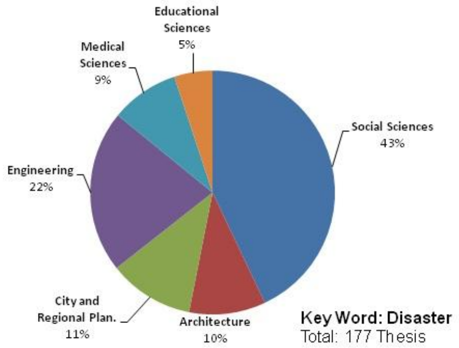
> *Over the past 30 years, there has been a continuous evolution in the practice of crisis or disaster management. These bodies of practice have been known, variously, as civil defense, emergency assistance, disaster response and relief, humanitarian assistance, emergency management, civil protection, disaster mitigation and prevention...* (UNISDR, 2004)

Turkey was also using civil defense forces which were developed under the Civil Defense General Directorate until 2009. This unit was abolished and has been re-organized under the AFAD by 2009.

APPENDIX C

Academic Researches some of which Concerned on Critical Evaluation of Post-Disaster Policies and Traditional DMS Approach through the Graduate Studies Conducted in Turkey

Key Word: Disaster	Graduate Level		Discipline	Focusing on Training and/or Education
	Master	PhD		
76	60	16	Social Sciences	8 master
18	14	4	Architecture	1 master
20	16	4	City and Regional Plan.	-
38	33	5	Engineering	-
16	10	6	Medical Sciences	2 Master, 1 phD
9	9	-	Educational Sciences	9 master
Total: 177	142	35		21



Key Word: Earthquake	Graduate Level		Discipline	Focusing on Training and/or Education
	Master	PhD		
10	9	1	Social Sciences	3 master
26	18	8	Architecture	1 master
4	2	2	City and Regional Plan.	-
306	243	63	Engineering	-
1	1	-	Medical Sciences	-
Total: 347	273	74		4

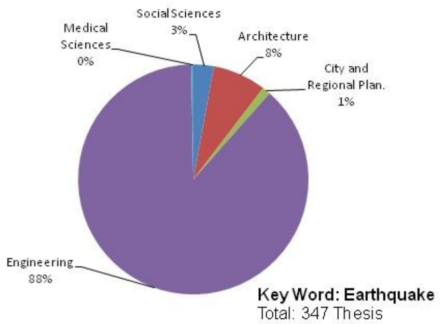


Figure C.1: Graduate studies conducted in Turkey particularly by the 1999 and which encompasses 'disaster' and 'earthquake' key terms within the abstracts and/or titles.

Among the other studies, several graduate researches were conducted in Turkey in order to evaluate the traditional DMS approach in general, and particularly post-disaster strategies. Most of the post-disaster related researches are focused on the rehabilitation and reconstruction phases of recovery period (Oliver, 1987; Oliver-Smith, 1992; Enginöz, 2004; Özden et. al., 2003; Özden, 2004; Dikmen, 2006). Table C.1 presents the graduate studies focusing on post-disaster activity cases and problems in Turkey.

Table C.1: Thesis studies conducted in Turkey which focus on post-disaster reconstruction process, particularly after the 1999 earthquakes. Source: YÖK National Thesis Database Center (http://tez2.yok.gov.tr/)

No	Thesis Title	Degree	Year
1	Afet konutları sorunu ve deprem örneğinde incelenmesi	Master	1999
2	Afet sonrası barınakların ve geçici konutların analizi ve değerlendirilmesi	Master	2000
3	Marmara depremi sonrası konut üretimi organizasyonu ve Kocaeli-örneği	Master	2001
4	Afet sonrası acil ve geçici barınak ihtiyacının karşılanmasına yönelik bir araştırma	Master	2002
5	Ev/ yaşama mekanı: Afet sonrası gereksinimler	Master	2002
6	Evaluation of post earthquake permanent residences built in Kocaeli-Döngel	Master	2002
7	Design and production of industrialized houses. Prototype house design in the post earthquake period	Master	2002
8	Senirkent'de afet sonrası kalıcı konut uygulamalarının değerlendirilmesi	Master	2004
9	Türkiye'de afet sonrası sürdürülebilir barınma sistemi yaklaşımı	PhD	2004
10	A study on "Temporary post disaster housing unit" constructed with -light gauge steel framing- (LGSF) system	Master	2004

Table C.1: Thesis studies conducted in Turkey which focus on post-disaster reconstruction process, particularly after the 1999 earthquakes (continuing)

11	Deprem bölgelerinde betonarme taşıyıcı sistem tasarımı ve Marmara depremi sonrası yapılan kalıcı konutların değerlendirilmesi	Master	2005
12	"Production of space" in the post earthquake region: Three cases from Düzce	Master	2005
13	A provision model and design guidelines for permanent post-disaster housing in rural areas of Turkey based on an analysis of reconstruction projects in Çankırı	PhD	2005
14	Afet sonrası uygulanacak ve geçiciden kalıcıya dönüştürülecek konut tasarımları için Türkiye koşullarına uygun yapım sistemlerinin irdelenmesi	PhD	2008
15	Afet sonrası kalıcı konutlarda esneklik kavramının değerlendirilmesi: Gölyaka-Düzce	PhD	2008
16	Afet sonrası yeniden yapılanma sürecinin yere bağlılık, yer değiştirme ve bilişsel haritalama olguları açısından irdelenmesi	PhD	2009
17	Afet sonrası rehabilitasyon aşamasında barınma uygulamalarının sürdürülebilirlik doğrultusunda irdelenmesi	Master	2010
18	Acil durum barınakları ve bir barınak olarak acil durum konteynır öneri modeli	Master	2010
19	Sürdürülebilir yapı tasarımının Sakarya-Ferizli ilçesi afet sonrası kalıcı konut uygulamalarında irdelenmesi	Master	2011

The failure in post-disaster projects and applications has revealed the deficient and missing points of the traditional DMS. According to Dikmen (2006) likewise Oliver, 1987; Oliver-Smith, 1992; Özden et. al., 2003; and Özden, 2004 who came up with similar results, the failure of post-disaster reconstruction approach mainly depends on the following points;

1. Distance between the new settlements and the old ones,
2. New settlements are difficult to reach due to the distance from the villages and/or lack of proper roads,
3. New settlements are not suitable for the animals,
4. Victims cannot afford to construct cattle sheds and straw sheds,
5. There is not enough space for cattle shed and a straw shed on the lot,
6. Typical Designs are not suitable for an extended family,
7. Construction of the post-disaster housing is not accomplished because of the contractor's default.

Dikmen explains the failure of post-disaster reconstruction project in particular, and traditional DMS approach in general as follows;

> *Possible sites for relocation are not discussed with the beneficiaries. Lack of architects and planners in the site selection teams and lack of beneficiary participation in the selection process also lead to refusal of the new sites. Furthermore, decisions on post-disaster reconstruction projects are taken after the disaster occurs in Turkey. So decisions on the house provision method, design of the houses and new locations have to be taken quickly*. (Dikmen, 2006)

In particular, there are also several studies mainly concentrated on the critical evaluation of traditional and ongoing DMS in Turkey. Table C.2 presents these studies. Deficient points and missing understandings in traditional DMS are revealed within these researches. Moreover, in order to propose improved or completely renewed models related to DMS for Turkey are aimed through the researches.

Table C.2: Thesis studies conducted in Turkey which particularly focus on traditional DMS, and proposing improved and/or new system models for effective DMS which are adapted to country conditions. Source: YÖK National Thesis Database Center (http://tez2.yok.gov.tr/)

No	Thesis Title	Degree	Year
1	Bir doğal afet olarak depreme hazırlıklı olma bilinci ve katılım: ABD, Japonya ve Türkiye (Afyon ili örneği)	PhD	2004
2	Yerleşim yerlerinde afet ve risk yönetimi	PhD	2005
3	Afet yönetimi sistemi ve Marmara depremi sonrasında yaşanan sorunlar	PhD	2007
4	Afet yönetim sistemi: Türk afet yönetiminde karşılaşılan sorunların tespit ve çözümüne ilişkin bir araştırma	PhD	2007
5	Türkiye' de afet yönetimi uygulaması ve yeni bir model önerisi	PhD	2008
6	Kentsel afet risklerine yönelik zarar azaltma stratejilerinin geliştirilmesi	PhD	2009
7	Sürdürülebilir afet yönetimi ve kadın	PhD	2009
8	Disaster mitigation and humanitarian relief logistics	PhD	2012

The concerns, critics and reviews related to traditional DMS approach which pointed out within the thesis studies have come up similar results with the international and national agenda reviews. According to Şengün (2007), the Law 7269 (Disaster Law, enacted in 1959) is still very deficient although there have been so many modifications to the legal document in different times. It is not effective to solve many problems even for post-disaster works. Therefore, Şengün claims that following many earthquake disasters (such as Erzincan-1992, Dinar-1995, Bingöl-2003 earthquakes), in order to organize post-disaster activities, case specific new legal arrangements were made and new laws were put into effect. Those new arrangements were also related to recovery works and did not cover any mitigation or preparedness approaches. Şengün also criticizes the traditional DMS approach through the Disaster Law and indicates that the current system takes into account of mainly post-disaster activities and arrangements.

Gündüz (2008) claims that the traditional DMS accepts in advance that managing crisis and emergency situations can be achieved only by the central organizations' power and capacity, local ones do not have chance to cope with disaster events in through local capacities. As a result, this ill-structured approach results in a top down DMS which takes into account mainly post-disaster activities.

Taylan (2009: p.1) likewise Koçak (2004), Uzunbıçak (2005), Şengün (2007), Akyel (2007), Gündüz (2008), Balaban (2009), Hançer (2009), criticizes the ineffectiveness of disaster coping policy and Disaster Law which emphasize the DMS as post-disaster policy approach. Taylan concerns that;

> *This conventional model discouraged pre-disaster … mitigation both at administrative and household levels. Indeed, limits of post-disaster emphasis and the sole responsibility of the State is understood as loss compensation. This understanding has been subject to critical views after immense physical destruction and grave socio-economic impacts of 1999 Kocaeli and Düzce Earthquakes that slowed down the country's development.*

Çakır (2010) reveals the fact that traditional DMS approach focuses on recovery and reconstruction in the post-disaster phase which is also claimed by Taylan (2009), Gündüz (2008) and Şengün (2007). In addition, Çakır (2010: p.37) emphasizes that "efforts of the traditional approach have been usually at local level and required instant interventions. However, both occurrence and impacts of disasters cannot be evaluated locally anymore".

Şahin (2009) agrees with the deficient points of traditional DMS, but also particularly he claims that building inspection approach has important gaps as an important tool of mitigation activities. Participation and training system of building professionals in the traditional DMS bear important deficiencies.

APPENDIX D

The Regulation on Building Constructions in Disaster Areas

Issued in 14.07.2007, No. 26582

YÖNETMELİK

Bayındırlık ve İskan Bakanlığından:

AFET BÖLGELERİNDE YAPILACAK YAPILAR HAKKINDA YÖNETMELİK

BİRİNCİ BÖLÜM
Amaç, Kapsam ve Dayanak

Amaç ve kapsam

MADDE 1 – (1) Bu Yönetmeliğin amacı; 7269 sayılı Umumi Hayata Müessir Afetler Dolayısıyla Alınacak Tedbirlerle Yapılacak Yardımlara Dair Kanunun 2 nci maddesine göre tespit ve ilan edilen afet bölgelerinde yeniden yapılacak, değiştirilecek, onarılacak veya güçlendirilecek resmi ve özel tüm binaların ve bina türü yapıların teknik şartlarını belirlemektir.

Dayanak

MADDE 2 – (1) Bu Yönetmelik, 15/5/1959 tarihli ve 7269 sayılı Umumi Hayata Müessir Afetler Dolayısıyla Alınacak Tedbirlerle Yapılacak Yardımlara Dair Kanunun 3 üncü maddesinin birinci fıkrasına dayanılarak hazırlanmıştır.

İKİNCİ BÖLÜM
Deprem, Yangın, Su Baskını Afetlerinde Uygulanacak Esaslar

Uygulanacak esaslar

MADDE 3 – (1) Afet bölgelerinde yapılacak yapıların, yapı malzemelerinin taşıması gereken özellikler bakımından 8/9/2002 tarihli ve 24870 sayılı Resmî Gazete'de yayımlanan Yapı Malzemeleri Yönetmeliği (89/106/EEC) ile Türk Standartları uygulanır. Türk Standartlarının bulunmaması hâlinde ise uluslararası geçerliliği kabul edilen standartlara uygun olması şarttır.

Üzerine bina yapılmayacak arazi

MADDE 4 – (1) 7269 sayılı Kanunun 14 üncü maddesine göre yapı ve ikamet için yasak bölge sayılan yerlerde bina yapılamaz ve mevcut binalar onarılamaz. Ayrıca yapay dolgu zeminler üzerinde, inceleme ve değerlendirme yapılarak özel önlem alınmadıkça bina yapılamaz.

(2) Çığ düşmesi, kaya düşmesi veya yer kayması afetlerinden herhangi birine uğrayan ve bu afetlerden biri için 7269 sayılı Kanunun 2 nci ve 14 üncü maddelerine göre afet bölgesi olduğu kararname ile tesbit ve ilân edilen yerlerde bina yapılamaz ve mevcut binalar onarılamaz.

Su baskını afetinden korunma

MADDE 5 – (1) Su baskınına uğramış ve afet bölgesi kararnamesi kapsamına alınmış ve 7269 sayılı Kanunun 14 üncü maddesine göre yapı ve ikamet için yasak bölge ilân edilen yerlerin dışında kalan yerlerde, ikinci fıkrada belirtilen şartlara uyulmak kaydı ile bina yapılabilir ve mevcut binalar onarılabilir.

(2) Temel zemininin su altında kalma ihtimali var ise, gerekli teknik tedbirler alınır. Değiştirilecek, büyütülecek, onarılacak veya güçlendirilecek binalarda; yeniden yapılacak veya değiştirilecek her bir kısmın, binanın su baskınına dayanıklılığını arttıracak biçimde olması gerekir.

Yangın afetinden korunma

MADDE 6 – (1) 7269 sayılı Kanunun 2 nci maddesine göre yangın afetine uğraması muhtemel saha olarak belirlenecek yerlerde yapılacak binalar ile yangından sonra onarılacak binalarla ilgili olarak 12/6/2002 tarihli ve 2002/4390 sayılı Bakanlar Kurulu Kararı ile yürürlüğe konulan Binaların Yangından Korunması Hakkında Yönetmelik hükümleri uygulanır.

Deprem afetinden korunma[58]

MADDE 7 – (1) 7269 sayılı Kanunun 2 nci maddesine göre tesbit ve ilân olunan deprem bölgelerinde yeniden yapılacak, değiştirilecek, büyütülecek resmî ve özel bütün binaların ve bina türü yapıların tamamının veya bölümlerinin depreme dayanıklı tasarımı ve yapımı ile mevcut binaların deprem öncesi veya sonrasında performanslarının değerlendirilmesi ve güçlendirilmesi hakkında 6/3/2007 tarihli ve 26454 sayılı Resmî Gazete'de yayımlanan Deprem Bölgelerinde Yapılacak Binalar Hakkında Yönetmelik hükümleri uygulanır.

ÜÇÜNCÜ BÖLÜM
Son Hükümler

Yürürlük

MADDE 8 – (1) Bu Yönetmelik 6/3/2007 tarihinden itibaren geçerli olmak üzere yayımı tarihinde yürürlüğe girer.

Yürütme

MADDE 9 – (1) Bu Yönetmelik hükümlerini Bayındırlık ve İskan Bakanı yürütür.

[58] 'The Regulation on Building Constructions in Disaster Areas' refers the section of "protection from earthquake disaster" (in article 7) to another regulation which is named as 'Regulation on Building Constructions in Earthquake Areas' (issued in 6/3/2007 under the number of 26454 within the Official Gazette). That regulation is composed of six articles; however the attachment of the regulation provides a very wide document which covers about 159 pages. This attachment mainly focuses on the engineering calculations of new building constructions and retrofitting issues of existing ones, and covers very basic and brief architectural building configurations.

APPENDIX E

The Legislative Documents which are Effective in Building Production Processes in Turkey

The legislative documents include laws, decree laws and regulations;

Table E.1: [Adopted from Taş, 2003: p. 76-77, and The official web page of Ministry of Environment and Urbanization, Available from: http://www.cevresehircilik.gov.tr/turkce/sayfa.php?Sayfa=kanunlistesi (accessed in 2011)].

Laws (Total number: 62)	Regulations (Total number: 36)
• **3194** Sayılı İmar Kanunu • **2981** ve **3290** Sayılı İmar Affı kanunu • **6235** Sayılı Türk Mühendis ve Mimar Odaları Birliği Kanunu • **3458** Sayılı Mühendislik ve Mimarlık Hakkında Kanun • **5846** Sayılı Fikir ve Sanat Eserleri Kanunu • **1164** Sayılı Arsa Ofisi Kanunu • **2872** Sayılı Çevre Kanunu • **4734** Sayılı Devlet İhale kanunu • **775** Saylı Gecekondu Kanunu • **2510** Sayılı İskan Kanunu • **3402** Sayılı Kadastro Kanunu • **2942** Sayılı Kamulaştırma Kanunu • **634** Sayılı Kat Mülkiyeti kanunu • **3621** Sayılı Kıyı Kanunu • **2985** Sayılı Toplu Konut Kanunu • **1163** Sayılı Kooperatifler Kanunu • **2863** Sayılı Kültür ve Tabiat Varlıklarını Koruma Kanunu • **2634** Sayılı Turizmi Teşvik Kanunu • **7269** Sayılı Umumi Hayata Müessir Afetler Dolayısıyla Alınacak Tedbirlerle Yapılacak Yardımlara Dair Kanun • **1580** Sayılı Belediye Kanunu • **3030** Sayılı Büyükşehir Belediyelerinin Yönetimi Hakkında Kanun • **4708** Sayılı Yapı Denetimi Kakkında Kanun • **587** Sayılı Zorunlu Deprem Sigortasına Dair Kanun Hükmünde Kararname • **5983** Kooperatifler Kanunu İle Bazı Kanun ve Kanun Hükmünde Kararnamelerde Değişiklik Yapılmasına Dair Kanun • **5836** Birleşmiş Milletler İklim Değişikliği Çerçeve Sözleşmesine Yönelik Kyoto Protokolüne Katılmamızın Uygun Bulunduğuna Dair Kanun • **5831** Tapu Kanunu İle Bazı Kanunlarda Değişiklik Yapılmasına Dair Kanun • **5782** Tapu Kanunda Değişiklik Yapılmasına Dair Kanun • **5711** Kat Mülkiyeti Kanunda Değişiklik Yapılmasına İlişkin Kanun • **5627** Enerji Verimliliği Kanunu • **5578** Toprak Koruma ve Arazi Kullanımı Kanununda Değişiklik Yapılması Hakkında Kanun • **5368** Lisanslı Harita Kadastro Mühendisleri ve Büroları Hakkında Kanun • **5355** Mahalli İdare Birlikleri Kanunu • **5327** Denizli-Buldan ve Çevresinde, Hakkari'de, Bingöl-Karlıova ve Çevresi İle Erzurum-Çat'da Meydana Gelen Deprem Afetlerine ve Bazı Kanunlarda Değişiklik Yapılmasına Dair Kanun • **5304** Kadastro Kanununda Değişiklik Yapılması Hakkında Kanun	• 03.06.2010 Tarihli 5983 Sayılı Kanunun 5 inci Maddesi Uyarınca Yapı Kooperatiflerinin ve Ticaret Bakanlığınca Bayındırlık ve İskan Bakanlığına Devrine İlişkin Usul Ve Esas • 27787 Sayılı Resmi: Yapı Müteahhitlerinin Kayıtları İle Şantiye Şefleri ve Yetki Belgeli Ustalar Hakkında Yönetmelik • 2859 Sayılı Kanuna 590 Sayılı Kanun Hükmünde Kararname İle Eklenen Ek 1 inci ve 2 inci Maddelerin Uygulanmasina Dair Yönetmelik • 3030 Sayılı Kanun Kapsamı Dışında Kalan Belediyeler Tip İmar Yönetmeliği • Binalarda Isı Yalıtımı Yönetmeliği • Binaların Yangından Korunması Hakkında Yönetmelik • Bayındırlık ve İskan Bakanlığı Bütçesinde Yer Alan Mahalli İdarelere Yapılacak Yardımlar Ödeneğinin Kullanım Esasları Hakkında Yönetmelik • Belediyelerin Arsa, Konut ve İşyeri Üretimi, Tahsisi, Kiralaması ve Satışına Dair Genel Yönetmelik • Binalarda Enerji Performansı Yönetmeliği • Deprem Bölgelerinde Yapılacak Binalar Hakkında Yönetmelik (Yeni) • Enerji Kaynaklarının ve Enerjinin Kullanımında Verimliliğin Artırılmasına Dair Yönetmelik • Gecekondu Kanunu Uygulama Yönetmeliği • Harita Mühendislik Hizmetlerini Yükümlenecek Müellif ve Müellif Kuruluşlarının Ehliyet Durumlarına Ait Yönetmelik • İmar Kanununun 18. Maddesi Uyarınca Yapılacak Arazi ve Arsa Düzenlemesi ile ilgili Esaslar Hakkında Yönetmelik • İmar Kanununun 38. Maddesinde Sayılan mühendisler, mimarlar ve şehir plancıları dışında kalan fen adamlarının görev ve sorumlulukları hakkında yönetmelik • İskan Kanunu Uygulama Yönetmeliği • Kadastro Haritalarının Sayısallaştırılması Hakkında Yönetmelik • Kadastro Haritalarının Yeniden Düzenlenmesi ıe Tapu Sicilinde Gerekli Düzeltmelerin Yapılmasında Uyulacak Usül ve Esaslara İlişkin Yönetmelik • Kadastro Sırasında veya Sonrasında Yapılan İşlemlerle Geometrik Durumları Kesinleşmiş Olan Taşınmazlarda Ölçü, Sınırlandırma, Tersimat ve Hesaplamalardan Doğan Hataların Düzeltilmesi • Kıyı Kanununun Uygulanmasına Dair Yönetmelik • Kıyı Kanununun Uygulanmasına Dair Yönetmelikte Değişiklik Yapılmasına Dair Yönetmelik • Lisanslı Harita Kadastro Mühendisleri ve Büroları Hakkında Yönetmelik • Otopark Yönetmeliği (Otopark Yönetmeliği Hakkında Genel Tebliğ)

• **5302** İl Özel İdaresi Kanunu • **5273** Arsa Ofisi Kanunu ve Toplu Konut Kanununda Değişiklik • **5272** Belediye Kanunu • **5237** Türk Ceza Kanunu • **5178** Mera Kanunu İle Bazı Kanunlarda Değişiklik Yapılması Hakkında Kanun • **5104** Sayılı Kuzey Ankara Girişi Kentsel Dönüşüm Projesi Kanunu • **4999** Orman Kanununda Değişiklik Yapılmasına Dair Kanun • **4966** Bazı Kanunlarda ve Bayındırlık ve İskân Bakanlığının Teşkilât ve Görevleri Hakkında KHK'de Değişiklik Yapılmasına Dair Kanun • **4706** Hazineye Ait Taşınmaz Mallarının Değerlendirilmesi ve Katma Değer Vergisi Kanununda Değişiklik Yapılması Hakkında Kanun • **4650** Kamulaştırma Kanununda Değişiklik Yapılması Hakkında Kanun • **4342** Mera Kanunu • **4123** Tabi Afet Nedeniyle Meydana Gelen Hasar ve Tahribata İlişkin Hizmetlerin Yürütülmesine Dair Kanun • **3621** Kıyı Kanunu • **3402** Kadastro Kanunu • **3213** Maden Kanunu • **3091** Taşınmaz Mal Zilyetliğine Yapılan Tecavüzlerin Önlenmesi Hk. Kanun • **3045** Tapu ve Kadastro Genel Müdürlüğü Kuruluş ve Görevleri Hk. Kanun • **2981** İmar ve Gecekondu Mevzuatına Aykırı Yapılara Uygulanacak Bazı İşlemler ve 6785 Sayılı İar Kanunun 1. Maddesinin Hk. Kanunu • **2960** Bağaziçi Kanunu • **2942** Kamulaştırma Kanunu • **2873** Milli Park Kanunu • **2589** Tapulama ve Kadastro Paftalarının Yenilenmesi Hk. Kanun • **634** Kat Mülkiyet Kanunu • **6831** Orman Kanunu • **4759** İller Bankası Kanunu • **2644** Tapu Kanunu • **2510** İskan Kanunu • **442** Köy Kanunu	• Plan Yapımına Ait Esaslara Dair Yönetmelik • Plan Yapımını Yükümlenecek Müelliflerin Yeterliği Hakkında Yönetmelik • Planlı Alanlar Tip İmar Yönetmeliği • Plansız Alanlar İmar Yönetmeliği • Sığınak Yönetmeliği • Tapulama ve Kadastro Paftalarını Yenileme Yönetmeliği • Toplu Yapılarda Kat Mülkiyeti ve Kat İrtifaki Tesisine Dair Yönetmelik • Yabancı Sermayeli Şirketlerin Taşınmaz Edinimine İlişkin Yönetmelik • Yapı Denetimi Uygulama Yönetmeliği • Yapı Malzemeleri Yönetmeliği • Yapı Malzemelerinin Tabi Olacaği Kriterler Hakkında Yönetmelik • Yapı Tesis Onarım İşleri İhalelerine Katılma Yönetmeliği • Yapılarda Özürlülerin Kullanımına Yönelik Proje Tadili Komisyonların Teşkili, Çalışma Usül ve Esaslari Hakkında Yönetmelik

APPENDIX F

Yapi Denetimi Hakkında Kanun (Building Inspection Law)

Kanun Numarası (Law Number) : 4708
Kabul Tarihi (Acceptance Date) : 29/6/2001
Yayımlandığı R. Gazete (Put into Effect Date): Tarih : 13/7/2001 Sayı : 24461
Yayımlandığı Düstur : Tertip : 5, Cilt : 40, Sayfa :
Amaç, kapsam ve tanımlar (Aim, content and definitions)

Madde 1 – Bu Kanunun amacı; can ve mal güvenliğini teminen, imar plânına, fen, sanat ve sağlık kurallarına, standartlara uygun kaliteli yapı yapılması için proje ve yapı denetimini sağlamak ve yapı denetimine ilişkin usul ve esasları düzenlemektir.

(Değişik ikinci fıkra: 8/8/2011-KHK-648/24 md.) Bu Kanun;

a) 3194 sayılı İmar Kanununun 26 ncı maddesinde belirtilen kamuya ait yapı ve tesisler ile 27 nci maddesinde belirtilen ruhsata tabi olmayan yapılar,

b) Bodrum katı dışında en çok iki katlı ve yapı inşaat alanı toplam 200 metrekareyi geçmeyen müstakil yapılar,

c) Entegre tesis niteliğinde olmayan tarım ve hayvancılık amaçlı yapı ve tesisler,

d) Köy yerleşik alanlarında, belediye ve mücavir alan sınırları içinde olmayan iskân dışı alanlarda ve nüfusu 5000'in altında olan belediyelerin belediye ve mücavir alan sınırları içinde bodrum katı ve çatı arası dışında en çok iki katlı ve yalnızca bir bodrum katın inşaat alanı hesaba katılmaksızın toplam inşaat alanı 500 metrekareyi geçmeyen konut yapıları ile bunların kömürlük, otopark, depo gibi müştemilatı,

hariç olmak üzere, belediye ve mücavir alan sınırları içinde ve dışında kalan yerlerde yapılacak yapıların denetimini kapsar. Ruhsata tabi olup, bu Kanun hükümlerine tabi olmayan yapılarda denetime yönelik fenni mesuliyet 3194 sayılı İmar Kanununun 26 ncı ve 28 inci maddelerine göre mimar ve mühendislerce üstlenilir. Birden fazla müstakil yapının bulunduğu parsellerde, bütün yapıların toplam yapı inşaat alanının 200 metrekareyi geçmesi halinde de bu Kanun uygulanır. Yalnızca bir bodrum katın inşaat alanı hesaba katılmaksızın toplam inşaat alanı 500 metrekareyi geçmeyen yapılarda geçici yapı müteahhidi yetki belgesi almak ve mimar veya mühendis unvanlı şantiye şefi bulundurmak, yapı müteahhitliğine ilişkin bütün sorumlulukları üstlenmek şartıyla parsel maliki kendi yapısını inşa edebilir. Ancak bu yapılarda da mimar veya mühendis unvanlı şantiye şefi bulundurulması zorunludur. Parsel malikinin veya hissedarlardan birinin mimar veya mühendis olması halinde ayrıca şantiye şefi aranmaz.

Bu Kanunun uygulanmasında;

a) Bakanlık :Bayındırlık ve İskân Bakanlığını,

b) İlgili idare :Belediye ve mücavir alan sınırları içindeki uygulamalar için büyükşehir belediyeleri ile diğer belediyeleri, bu alanlar dışında kalan alanlarda valilikleri, yapı ruhsatı ve kullanma izin belgesi verme yetkisine sahip diğer idareleri,

c) Yapı sahibi : Yapı üzerinde mülkiyet hakkına sahip olan gerçek ve tüzel kişileri,

d) Yapım süresi :Yapı sahibinin, yapı ruhsatını aldığı tarih ile yapı kullanma iznini aldığı tarih arasındaki dönemi,

e) Yapı inşaat alanı : Işıklıklar hariç, bodrum kat, asma kat ve çatı arasında yer alan mekanlar ve ortak alanlar dahil yapının inşa edilen tüm katlarının alanını,

f) Yapı yaklaşık maliyeti :Binalarda, Bakanlıkça her yıl yayımlanan mimarlık ve mühendislik hizmet bedellerinin hesabına esas yapı yaklaşık birim maliyetlerine ilişkin ilgili mevzuatta belirtilen birim maliyet ile yapı inşaat alanının çarpımından elde edilen bedeli;binalarda yapılacak değiştirme, güçlendirme ve esaslı onarım işlerinin ve bina dışında kalan yapılarda ise yapının keşif bedelini,

g) Taşıyıcı sistem :Yapıların; temel, betonarme, ahşap, çelik karkas, duvar, döşeme ve çatı gibi yük taşıyan ve aktaran bölümlerini ve istinat yapılarını,

h) Yapı hasarı : Kullanımdan doğan hasarlar hariç, yapının fen ve sanat kurallarına aykırı, eksik, hatalı ve kusurlu yapılması nedeniyle yapıda meydana gelen ve yapının kullanımını engelleyen veya yapıda değer kaybı oluşturan her türlü hasarı,

ı) Yapı denetim kuruluşu :Bakanlıktan aldığı izin belgesi ile münhasıran yapı denetimi görevini yapan, ortaklarının tamamı mimar ve mühendislerden oluşan tüzel kişiyi,

j) Yapı müteahhidi :Yapım işini, yapı sahibine karşı taahhüt eden veya ticarî amaçla ya da kendisi için şahsî finans kaynaklarını kullanarak üstlenen, ilgili meslek odasına kayıtlı, gerçek ve tüzel kişiyi,

k) Proje müellifi :Mimarlık, mühendislik tasarım hizmetlerini iştigal konusu olarak seçmiş, yapının etüt ve projelerini hazırlayan gerçek ve tüzel kişiyi,

l) Denetçi mimar ve mühendis :İlgili mühendis ve mimar meslek odalarına üyeliği devam eden ve Bakanlıkça denetçi belgesi verilmiş mühendis ve mimarları,

m) Laboratuvar : İnşaat ve yapı malzemeleri ile ilgili ham madde ve mamul madde üzerinde ilgili standartlarına veya teknik şartnamelerine göre ölçüm, muayene, kalibrasyon yapabilen ve diğer özelliklerini tayin eden, Bakanlıktan izin almış tesisi,

İfade eder.

Yapı denetim kuruluşları ve görevleri

Madde 2 – Bu Kanun kapsamına giren her türlü yapı; Bakanlıktan aldığı izin belgesi ile çalışan ve münhasıran yapı denetimi ile uğraşan tüzel kişiliğe sahip yapı denetim kuruluşlarının denetimine tabidir. Yapı denetim hizmeti; yapı denetim kuruluşu ile yapı sahibi veya vekili arasında akdedilen hizmet sözleşmesi hükümlerine göre yürütülür. Yapı sahibi, yapım işi için anlaşma yaptığı yapı müteahhidini vekil tayin edemez.

Yapı denetim kuruluşlarının nama yazılı ödenmiş sermayelerinin tamamının, mimar veya mühendislere ait olması zorunludur. Yapı denetim kuruluşları; denetçi mimar ve mühendisler ile yardımcı kontrol elemanları istihdam eder.

(Mülga üçüncü fıkra: 8/8/2011-KHK-648/25 md.)

Yapı denetim kuruluşları aşağıda belirtilen görevleri yerine getirmekle yükümlüdür:

a) Proje müelliflerince hazırlanan, yapının inşa edileceği arsa veya arazinin zemin ve temel raporları ile uygulama projelerini ilgili mevzuata göre incelemek, proje müelliflerince hazırlanarak doğrudan kendilerine teslim edilen uygulama projesi ve hesaplarını kontrol ederek, ilgili idareler dışında başka bir kurum veya kuruluşun vize veya onayına tabi tutulmadan, ilgili idareye uygunluk görüşünü bildirmek.

b) Yapı denetimini üstlendiğine dair ilgili idareye taahhütname vermek, yapı ruhsatının ilgili bölümünü imzalamak, bu yapıya ilişkin bilgileri yapı ruhsatı düzenleme tarihinden itibaren yedi gün içinde Bakanlığa bildirmek.

c) Yapının, ruhsat ve ekleri ile mevzuata uygun olarak yapılmasını denetlemek.

d) Yapım işlerinde kullanılan malzemeler ile imalatın proje, teknik şartname ve standartlara uygunluğunu kontrol etmek ve sonuçlarını belgelendirmek, malzemeler ve imalatla ilgili deneyleri yaptırmak.

e) Yapılan tüm denetim hizmetlerine ilişkin belgelerin bir nüshasını ilgili idareye vermek, denetimleri sırasında yapıda kullanılan malzeme ve imalatın teknik şartname ve standartlara aykırı olduklarını belirledikleri takdirde, durumu bir rapor ile ilgili idareye ve il sanayi ve/veya ticaret müdürlüklerine bildirmek.

f) İş yerinde, iş güvenliği ve işçi sağlığı konusunda gerekli tedbirlerin alınması için yapı müteahhidini yazılı olarak uyarmak, uyarıya uyulmadığı takdirde durumu ilgili bölge çalışma müdürlüğüne bildirmek.

g) Ruhsat ve eklerine aykırı uygulama yapılması halinde durumu üç iş günü içinde ilgili idareye bildirmek.

h) Yapının ruhsat eki projelerine uygun olarak kısmen veya tamamen bitirildiğine dair ilgili idareye rapor vermek.

ı) Zemin, malzeme ve imalata ilişkin deneyleri, şartname ve standartlara uygun olarak laboratuvarlarda yaptırmak.

Sorumluluklar ve yapılamayacak işler

Madde 3 – Bu Kanunun uygulanmasında, yapı denetim kuruluşları imar mevzuatı uyarınca öngörülen fennî mesuliyeti ilgili idareye karşı üstlenir.

Yapı denetim kuruluşları, denetçi mimar ve mühendisler, proje müellifleri, laboratuvar görevlileri ve yapı müteahhidi ile birlikte yapının ruhsat ve eklerine, fen, sanat ve sağlık kurallarına aykırı, eksik, hatalı ve kusurlu yapılmış olması nedeniyle ortaya çıkan yapı hasarından dolayı yapı sahibi ve ilgili idareye karşı, kusurları oranında sorumludurlar. Bu sorumluluğun süresi; yapı kullanma izninin alındığı tarihten itibaren, yapının taşıyıcı sisteminden dolayı on beş yıl, taşıyıcı olmayan diğer kısımlarda ise iki yıldır.

Yapıda, yapı kullanma izni alındıktan sonra, ilgili idareden izin alınmadan yapılacak esaslı tadilattan doğacak yapı hasarından, izinsiz tadilat yapan sorumludur. Yapı denetim kuruluşu; yazılı ihtarına rağmen yapı sahibi tarafından önlemi alınmayan, parsel dışında meydana gelen ve yapıda hasar oluşturan yer kayması, çığ düşmesi, kaya düşmesi ve sel baskınından doğan hasarlardan sorumlu değildir.

Yapı denetim kuruluşlarının yöneticileri, ortakları, denetçi mimar ve mühendisleri ile proje müellifleri, laboratuvar görevlileri ve yapı müteahhidi; bu Kanunun uygulanmasından dolayı ortaya çıkan yapı hasarından sorumludur.

Yapı denetim kuruluşu denetim faaliyeti dışında başka ticarî faaliyette bulunamaz. Bu kuruluşun denetçi mimar ve mühendislerinin, denetim faaliyeti süresince başkaca meslekî ve inşaat işleri ile ilgili ticarî faaliyette bulunmaları yasaktır.

Yapı denetim komisyonları ve görevleri[(1)]

Madde 4 –(Değişik: 8/8/2011-KHK-648/ 26 md.)

Bu Kanunun uygulanması ile ilgili Bakanlık iş ve işlemlerinin yürütülmesini sağlamak üzere, Bakanlık merkezinde Merkez Yapı Denetim Komisyonu ve illerde İl Yapı Denetim Komisyonları kurulur. İl Yapı Denetim Komisyonları, yapı denetim kuruluşlarına izin belgesi verilmesi hariç Kanunda belirtilen diğer görevleri yapar.

Merkez Yapı Denetim Komisyonu, konu ile ilgili Bakanlık personeli arasından, biri başkan olmak üzere Bakanlıkça görevlendirilecek toplam yedi üyeden oluşur ve Bakanlıkça uygun görülen birimin bünyesinde faaliyetlerini yürütür. Bakanlık; gerek görülen konular hakkında çalışmada bulunmak üzere, ilgili kamu kurum ve kuruluşları ile meslek ve sivil toplum kuruluşlarının temsilcilerini Bakanlıkça hazırlanan yönetmelikte belirtilen usul ve esaslar çerçevesinde Komisyonda görevlendirebilir.

İl Yapı Denetim Komisyonu, Çevre ve Şehircilik İl Müdürlüğünün teklifi üzerine, biri başkan olmak üzere Merkez Yapı Denetim Komisyonunca görevlendirilecek toplam beş üyeden oluşur.

Yapı denetimi hizmet sözleşmeleri

Madde 5 – Yapı denetimi hizmet sözleşmeleri yapı sahibi ile yapı denetim kuruluşu arasında akdedilir. Bu sözleşmenin bir sureti taahhütname ekinde ilgili idareye verilir.

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(1) Bu madde başlığı "Yapı denetim komisyonu ve görevleri" iken, 8/8/2011 tarihli ve 648 sayılı KHK' nın 26 ncı maddesi ile metne işlendiği şekilde değiştirilmiştir.

Bu sözleşmede; taahhüt edilen hizmetin konusu, yeri, inşaat alanı, süresi, varsa yapı sahibi ile yapı müteahhidi arasında akdedilen sözleşmede yer alan yapının fizikî özellikleri, yapı denetimi hizmet bedeli, yapı denetiminde görev alacak teknik personel listesi ve diğer yükümlülükler yer alır.

İlgili idare; yapı denetimi hizmet sözleşmesinde yer alan hükümlere, yapı sahibinin uymaması halinde yapı tatil tutanağı düzenleyerek inşaatı durdurur, yapı denetim kuruluşunun uymaması halinde ise yapı denetimi komisyonuna bildirimde bulunur.

(Mülga dördüncü fıkra: 8/8/2011-KHK-648/ 27 md.)

(Değişik beşinci fıkra: 8/8/2011-KHK-648/ 27 md.) Yapı denetimi hizmeti için yapı denetim kuruluşuna ödenecek hizmet bedeli, yapı denetimi hizmet sözleşmesinde belirtilir. Bu bedel, yapı yaklaşık maliyetinin % 1,5'inden az olamaz. Hizmet bedeli oranı, yapım süresi iki yılı aşan iş için yıllık % 5 artırılır ve yapım süresi iki yıldan daha az olan işler için yıllık % 5 azaltılır. Bu bedele, katma değer vergisi ile yapı denetim kuruluşu tarafından talep edilen ve taşıyıcı sisteme ilişkin olmayan malzeme ve imalâtlar konusunda yapı müteahhidince yaptırılacak olan laboratuvar deneylerinin masrafları dâhil değildir. Yapı denetim kuruluşu, yapı sahibinden başka bir ad altında, ayrıca hiçbir bedel talebinde bulunamaz.

(Değişik altıncı fıkra: 8/8/2011-KHK-648/ 27 md.) Yapı denetim hizmet bedeli, yapı denetim kuruluşlarının hizmet bedellerinin ödenmesinde kullanılmak üzere yapı sahibince il muhasebe birimlerinde açılacak emanet nitelikli hesaba yatırılır. Yatırılan tutarların % 1'i ruhsatı veren idarenin, % 1'i Bakanlık bünyesinde bulunan döner sermaye işletmesinin hesabına aktarılır.

(Mülga yedinci fıkra: 8/8/2011-KHK-648/ 27 md.)

Yapı denetim kuruluşu ile mimar ve mühendislerinin yapı ile ilişkisinin kesilmesi

Madde 6 – Yapı denetim kuruluşunun görevden ayrılması veya mimar ve/veya mühendislerinden birinin, herhangi bir sebeple yapı ile ilişkisinin kesilmesi halinde yapı denetim kuruluşu durumu; gerekçeleri ile birlikte en geç üç iş günü içinde yazılı olarak Bakanlığa ve ilgili idareye bildirir. Aksi takdirde kanunî sorumluluktan kurtulamaz.

Bu durumda; yapı sahibince, yeniden yapı denetim kuruluşu görevlendirilmedikçe veya yapı denetim kuruluşunca, ayrılan mimar ve/veya mühendislerin yerine yenisi işe başlatılmadıkça ilgili idarece yapının devamına izin verilmez.

Sicillerin tutulması ve yapılara sertifika verilmesi

Madde 7 – (Mülga: 8/8/2011-KHK-648/ 25 md.)

Denetim faaliyetinin durdurulması ve izin belgesinin iptali

Madde 8 – Yapı denetim kuruluşlarından, bu Kanunda öngörülen esaslara göre denetim görevini yerine getirmedikleri anlaşılanların veya son üç yıl içerisinde üç defa olumsuz sicil alanların veyahut 3 üncü maddenin son fıkrası ile 6 ncı maddenin birinci fıkrası hükümlerine aykırı hareket ettiği belirlenenlerin denetim faaliyeti, yapı denetim komisyonunun teklifi üzerine Bakanlıkça bir yıla kadar durdurulur ve belgesi geçici olarak geri alınır. Durdurma kararı, Resmî Gazetede ilan edilir ve sicillerine işlenir. Denetim faaliyetinin geçici olarak durdurulmasına neden olan yapı denetim kuruluşunun mimar ve mühendisleri, bu süre içerisinde başka ad altında dahi olsa hiçbir denetim faaliyetinde bulunamaz. Geçici durdurmaya neden olan mimar ve mühendisler Bakanlıkça ilgili meslek odasına bildirilir. Meslek odaları, bu kişiler hakkında kendi mevzuatına göre işlem yapar.

Faaliyeti üç defa durdurulan yapı denetim kuruluşunun denetim faaliyetine son verilir ve izin belgesi Bakanlıkça iptal edilir.

İzin belgesi iptal edilen yapı denetim kuruluşunun, kusurları mahkeme kararı ile kesinleşen mimar ve mühendisleri başka bir yapı denetim kuruluşunda görev almaları halinde, görev aldıkları bu kuruluşa izin belgesi verilmez, verilmişse iptal edilir.

Denetim faaliyeti geçici olarak durdurulan veya izin belgesi iptal edilen yapı denetim kuruluşu hakkındaki bu karar ilgili idareye bildirilir ve denetimini üstlendiği yapıların devamına izin verilmez. Bu durumda, yapım faaliyetine devam edilebilmesi için yapı sahibince başka bir yapı denetim kuruluşunun görevlendirilmesi zorunludur.

Ceza hükümleri

Madde 9 – (Değişik: 23/1/2008 – 5728/497 md.)

Bu Kanun hükümlerinin uygulanması sırasında, yapı denetim kuruluşunun icraî veya ihmalî davranışla görevini kötüye kullanan ortakları, yöneticileri, mimar ve mühendisleri, yapı müteahhidi, proje müellifi gerçek kişiler ile laboratuvar görevlileri, altı aydan üç yıla kadar hapis cezası ile cezalandırılır.

Yapı denetim kuruluşunun ortak ve yöneticileri, mimar ve mühendisleri ile laboratuvar görevlileri bu Kanun hükümleri çerçevesinde yapmaları gereken denetimi yapmadıkları hâlde yapmış gibi veya yapmalarına rağmen gerçeğe aykırı olarak belge düzenlemeleri hâlinde Türk Ceza Kanununun resmi belgede sahtecilik suçuna ilişkin hükümlerine göre cezalandırılır.

Yapı denetim kuruluşunun izin belgesi alma aşamasında gerçeğe aykırı belge düzenlendiğinin izin belgesi verildikten sonra anlaşılması hâlinde, izin belgesi derhal iptal edilir.

Bu Kanuna aykırı fiillerden dolayı hükmolunan kesinleşmiş mahkeme kararları, Cumhuriyet başsavcılıklarınca Bakanlığa ve mimar ve mühendislerin bağlı olduğu meslek odalarına bildirilir.

Yapı denetim kuruluşu ile denetçi mimar ve mühendisleri; eylem ve işlemlerinden 3194 sayılı İmar Kanununun fenni mesul için öngörülen hükümlerine tabidirler.

Bakanlığın denetim yetkisi

Madde 10 – Bakanlık, bu Kanunun uygulanmasında yapı denetim kuruluşlarının işlem ve faaliyetlerini denetleme yetkisine sahiptir.

Kanunun uygulanacağı iller

Madde 11 – Bu Kanunun uygulanmasına pilot iller olarak; Adana, Ankara, Antalya, Aydın, Balıkesir, Bolu, Bursa, Çanakkale, Denizli, Düzce, Eskişehir, Gaziantep, Hatay, İstanbul, İzmir, Kocaeli, Sakarya, Tekirdağ ve Yalova illerinde başlanır.

Pilot illerin genişletilmesi ve daraltılmasına, Bakanlığın teklifi üzerine Bakanlar Kurulu yetkilidir.

Diğer hükümler ve yönetmelikler

Madde 12 – Bu Kanunda hüküm bulunmayan hallerde 3194 sayılı İmar Kanunu ve ilgili mevzuat hükümleri uygulanır.

(Değişik ikinci fıkra: 8/8/2011-KHK-648/ 28 md.) İlgili idarelerin bu Kanunda belirtilen hususlara ilişkin görevleri ile çalışma usul ve esasları; yapı denetim kuruluşları ve şubelerinin sınıflandırılması, kuruluşlar arasında adaletli iş dağılımını temin etmek üzere bir ilde faaliyet gösterebilecek olan yapı denetim kuruluşu sayısının belirlenmesi ile kuruluş safhasında sahip olunması gereken asgarî nitelikler; yapı denetim kuruluşları ve laboratuvar kuruluşlarının görevleri ile çalışma usul ve esasları; denetçi belgesi verilmesine ilişkin usul ve esaslar ile yapı denetim ve laboratuvar kuruluşlarında görev alacak personelde aranacak nitelik, tecrübe ve bunların istihdam şartları ile görev ve sorumlulukları; diğer yapı sorumlularının nitelikleri, görevleri ile çalışma usul ve esasları; Merkez ve İl Yapı Denetim Komisyonunun görevleri ile çalışma usul ve esasları; yapı denetimi hizmet sözleşmesinin esasları, asgarî hizmet bedelinin belirlenmesi ve hizmet bedelinin ödenmesi, bu Kanun uyarınca denetlenerek inşa edilen yapılara sertifika verilmesi ve düzenlenecek meslek içi eğitimlere ilişkin usul ve esaslar Bakanlıkça hazırlanan yönetmelikle düzenlenir.

Yürürlükten kaldırılan ve değiştirilen hükümler

Madde 13 – a) 3.2.2000 tarihli ve 595 sayılı Yapı Denetimi Hakkında Kanun Hükmünde Kararname yürürlükten kaldırılmıştır.

b) 27.1.1954 tarihli ve 6235 sayılı Türk Mühendis ve Mimar Odaları Birliği Kanununun ek 5, ek 6, ek 7 nci maddeleri ile geçici 6 ve geçici 7 nci maddeleri yürürlükten kaldırılmıştır.

c) 17.6.1938 tarihli ve 3458 sayılı Mühendislik ve Mimarlık Hakkında Kanunun 7 nci maddesi aşağıdaki şekilde değiştirilmiştir.

Madde 7 – 1 inci maddede belirtilen diploma veya ruhsatnamelerden birini haiz olmayanlar Türkiye'de mühendis veya mimar unvanı ile istihdam olunamazlar, imzalarla sanat icra edemezler, bu unvanları kullanarak rey veremezler ve imza da koyamazlar.

Geçici Madde 1 – Bu Kanunun yürürlüğe girdiği tarihten önce Bakanlıkça yapı denetim kuruluşlarına verilmiş olan yapı denetimi izin belgeleri, bu Kanunun yürürlüğe girdiği tarihten itibaren üç ay süreyle geçerlidir. Bu süre içerisinde bu Kanun hükümlerine uygun olarak yenilenmeyen yapı denetim izin belgeleri geçersiz sayılır.

Geçici Madde 2 – Bu Kanunun yürürlüğe girdiği tarihten önce 3194 sayılı İmar Kanunu ile 595 sayılı Yapı Denetimi Hakkında Kanun Hükmünde Kararname hükümlerine göre alınan yapı ruhsatları geçerlidir.

Geçici Madde 3 – 595 sayılı Yapı Denetimi Hakkında Kanun Hükmünde Kararname uyarınca yapı denetim kuruluşlarınca tahsil edilmiş olan malî sorumluluk sigorta primleri yapı sahiplerine iade edilir.

Yürürlük

Madde 14 – Bu Kanun yayımı tarihinden otuz gün sonra yürürlüğe girer.

Yürütme

Madde 15 – Bu Kanun hükümlerini Bakanlar Kurulu yürütür.

4708 SAYILI KANUNA EK VE DEĞİŞİKLİK GETİREN MEVZUATIN YÜRÜRLÜĞE GİRİŞ TARİHİNİ GÖSTERİR LİSTE

Değiştiren Kanun	4708 sayılı Kanunun değişen maddeleri	Yürürlüğe giriş tarihi
5728	9	8/2/2008
KHK/648	1, 2, 4, 5, 7, 12	17/8/2011

APPENDIX G

Building Inspection Law (Law Number: 4708) Application Regulation – Article 3

Article 3 (Madde 3)
Definitions (Tanımlar) in the Regulation

MADDE 3 – (1) Bu Yönetmelikte geçen;

a) Bakanlık: Bayındırlık ve İskân Bakanlığını,

b) Denetçi mimar ve mühendis: İlgili mühendis ve mimar meslek odalarına üyeliği devam eden ve Bakanlıkça denetçi belgesi verilmiş mühendis ve mimarları,

c) İlgili idare: Belediye ve mücavir alan sınırları içindeki uygulamalar için büyükşehir belediyeleri ile diğer belediyeleri, bu alanlar dışında kalan alanlarda valilikleri, yapı ruhsatı ve kullanma izin belgesi verme yetkisine sahip diğer idareleri,

ç) İlgili meslek odaları: 27/1/1954 tarihli ve 6235 sayılı Türk Mühendis ve Mimar Odaları Birliği Kanununa göre kurulmuş olan mühendis veya mimar odalarını,

d) İş bitirme tutanağı: İnşaatın kısmen veya tamamen fen ve sanat kurallarına, ruhsata ve eklerine, ilgili standartlara, teknik şartnamelere ve diğer mevzuata uygun olarak tamamlandığını göstermek üzere yapı denetim kuruluşu tarafından tanzim ve ilgili idaresi tarafından tasdik edilen tutanağı,

e) İşyeri teslim tutanağı: İnşaatın fiilen başladığını belgelemek üzere, yapı ruhsatının alınmasını takiben yapı sahibi, yapı denetim kuruluşu, yapı müteahhidi veya yapı müteahhidi adına şantiye şefi tarafından imza altına alınıp ilgili idareye sunulan tutanağı,

f) Kanun: 4708 sayılı Yapı Denetimi Hakkında Kanunu,

g) Komisyon: Kanunun 4'üncü maddesinde belirtilen Yapı Denetim Komisyonunu,

ğ) Kontrol elemanı: Yapım işinin denetlenmesi hizmetlerini bizzat yapıda ve şantiye sahasında, denetçi mimar ve mühendislerin sevk ve idaresi altında, gerektiğinde onlara danışarak yapmak ile görevli olan mimar ve mühendisleri,

h) Laboratuvar: İnşaat ve yapı malzemeleri ile ilgili ham madde ve mamul madde üzerinde ilgili standartlarına veya teknik şartnamelerine göre ölçüm, muayene, kalibrasyon yapabilen ve diğer özelliklerini tayin eden, Bakanlıktan izin almış tesisi,

ı) Proje müellifi: Mimarlık, mühendislik tasarım hizmetlerini iştigal konusu olarak seçmiş, yapının etüt ve projelerini hazırlayan gerçek ve tüzel kişiyi,

i) Şantiye şefi: Konusuna ve niteliğine göre yapım işlerini yapı müteahhidi adına yöneterek uygulayan, mühendis, mimar, teknik öğretmen veya tekniker diplomasına sahip teknik personeli,

j) **Taşıyıcı sistem**: Yapıların temel, betonarme, ahşap, çelik karkas, duvar, döşeme ve çatı gibi yük taşıyan ve aktaran bölümlerini ve istinat yapılarını,

k) **Yapı**: Karada ve suda, daimî veya geçici, yeraltı ve yerüstü inşaatları ile bunların ilave, değişiklik ve tamirlerini içine alan sabit ve hareketli tesisleri,

l) Yapı denetim kuruluşu: Bakanlıktan aldığı izin belgesi ile münhasıran yapı denetimi görevini yapan, ortaklarının tamamı mimar ve mühendislerden oluşan tüzel kişiyi,

m) Yapı denetleme defteri: Yapı denetim kuruluşunca, şantiyede yapılan denetim sonuçları işlenen ve şantiye şefince şantiyede muhafaza edilen defteri,

n) **Yapı hasarı**: Kullanımdan doğan hasarlar hariç, yapının fen ve sanat kurallarına aykırı, eksik, hatalı ve kusurlu yapılması nedeniyle yapıda meydana gelen ve yapının kullanımını engelleyen veya yapıda değer kaybı oluşturan her türlü hasarı,

o) **Yapı inşaat alanı**: Işıklıklar hariç, bodrum kat, asma kat ve çatı arasında yer alan mekanlar ve ortak alanlar dahil yapının inşa edilen tüm katlarının alanını,

ö) Yapı müteahhidi: Yapım işini, yapı sahibine karşı taahhüt eden veya ticari amaçla veya kendisi için şahsi finans kaynaklarını kullanarak üstlenen, ilgili meslek odasına kayıtlı, gerçek ve tüzel kişiyi,

p) Yapı sahibi: Yapı üzerinde mülkiyet hakkına sahip olan gerçek ve tüzel kişileri,

r) Yapı yaklaşık maliyeti: Binalarda, Bakanlıkça her yıl yayımlanan mimarlık ve mühendislik hizmet bedellerinin hesabına esas yapı yaklaşık birim maliyetlerine ilişkin ilgili mevzuatta belirtilen birim maliyet ile yapı inşaat alanının çarpımından elde edilen bedeli; binalarda yapılacak değiştirme, güçlendirme ve esaslı onarım işleri ve bina dışında kalan yapılarda ise yapının keşif bedelini,

s) Yapım süresi: Yapı sahibinin, yapı ruhsatını aldığı tarih ile yapı kullanma iznini aldığı tarih arasındaki dönemi,

ş) Yardımcı kontrol elemanı: Denetçi mimar ve mühendislerin sevk ve idaresi altında ve kontrol elemanları ile birlikte yapı denetimi faaliyetlerine katılan teknik öğretmen, yüksek tekniker, tekniker ve teknisyenleri

ifade eder.

APPENDIX H

CPD Courses in Hazard and Safety Concepts Provided by Chamber of Architects of Turkey

Group-A Courses: Earthquake – Architectural Design

- ***A1.** Earthquake Factor in Building Design*;

Duration / Credit: 6 Hours = 6 Credits

Course Objective: What makes earthquakes to cause disasters is related to the rapidly growing and uncontrolled urbanization which do not realize the earthquake fact in building construction in a country where its almost entire geography and population located on a seismically active region. In this training course, it is aimed to express the important and effective role of practicing architects in seismic design which starts by the beginning of the first sketches of a design and continues in both selection of structural system and construction of the structural system behavior under seismic forces. Besides, as one of the most important responsible building professional in design and construction planning among design teams, it is vital for the practicing architects to secure all safety and comfort issues in construction site. Architects have important responsibilities in developing resistant buildings in general. In particular, in order to conduct coordination between project groups (including architects - structural engineers - geological engineers) and questioning seismic safety of buildings, architects have crucial responsibilities in knowledge transfer. The course aims to explain the important role of practicing architects in this seismically active region in terms of developing safe and secure buildings and living conditions, and transfering necessary tools and knowledge for securing urban resilience.

Course Contents:
Earthquake Factor Concept in Building Design; Earthquake Legislations and Boundaries; Principles of Seismic Resistance of Buildings; Probable Results due to Construction and Occupancy Defects; Earthquake Factor in Building Design; Settlement Site Selection Criteria and Affects; Architectural Design; Structural System Design and Detailing; Settlement Site Selection Criteria and Affects; Topographical Affects; Affects related to the soil characterisitics (soft-hard soil affects); Soil Liquefaction; Architectural Format; Building Formation (geometrical proportions) in vertical and horizontal; Architectural Components (stairs, facades, forms of architectural components...); Torsion resulted from Building Form; Resonance between building and soil (building and soil period); The Pounding Affect; Soft Story and Short Column Affects; Structural System Design and Building Detailing; Design and Selection of Structural System Components (and materials); Strong Beam – Weak Column Affects; Discontiniousness of Vertical Structural System Components; Selection of Rigidity Components; Design Principles of Diaphragms; General View to the Different Structural Systems.

- ***A2.** Earthquake Factor in Architectural Design*

Duration / Credit: 6 Hours = 6 Credits

Course Objective: Besides being one of the high standard legislations in the world, current laws and regulations in Turkey related to the earthquake resistant design have been carrying technical languages that addressing to more structural engineers than practicing architects. Common approach among the community and building professionals about the earthquake resistant design concept is seeing the issue directly related with the engineering calculations rather than architectural design. On the contrary, many studies and researches conducted on the former big earthquakes around the world have revealed that the common approach given above is not true. The inspection and analysis of buildings that had collapsed or heavily damaged during the earthquakes have showed that the architectural design faults have considerable affects on seismic performance of those buildings. In addition, low building material, construction and production qualities in Turkey combining with architectural design faults have been exceeding acceptable load conditions on buildings that cause deficiency in building safety issues as well as disaster risks. This training course aims to show common architectural design faults among typical concrete buildings that should to be avoided in terms of seismic resistant design; to revise related issues and contents of current disaster law in terms of architectural design; and to raise the awareness on relation between seismic design and architectural design concepts in order to draw attetion of practicing architects on responsibilities for developing seismic resistant buildings.

Course Contents:
Basic Earthquake Knowledge; Definition of the Earthquake Term; Seismic Fault Classes; Earthquake Classes; Earthquake Parameters; Seismic Waves; Earthquake Intensity Scale; Earthquake Magnitude Scale; Seismic Characteristics of Turkey; Seismic Behavior of Reinforced-Concrete Buildings; Characteristics of Reinforced-Concrete Material; Basic Definitions in Building-Earthquake Relation; Basic Concepts in Earthquake Resistant Design; Valid Earthquake Resistant Design Criteria in Turkey; Earthquake Resistant Design Faults Observed in Reinforced-Concrete Buildings; Significance of Earthquake Resistant Design in Architectural Project; Earthquake Resistant Design Faults in Plan; Earthquake Resistant Design Faults in Section; Analyzing with Computer Generated Models of Commonly Faced Earthquake Resistant Design Faults' Affects on Buildings; A Computer Generated Model of an Apartment Type Building with Irregular Plan; A Computer Generated Model of a Building with Wrong Column Arrangement; A Computer Generated Model of a Building with Soft Story Irregularity; A Computer Generated Model of a Building with Weak Story Irregularity; A Computer Generated Model of a Building with Wrong Curtain Wall Arrangement; Results.

- ***A3.** Earthquake in Architectural Design*

Duration / Credit: 6 Hours = 6 Credits

Course Objective: Turkey is located on one of the seismically active regions. For this reason it is vital to develop earthquake resistant building in order to avoid from high numbers of casualties and economic losses. The training course covers earthquake affects on buildings; structural system components' behaviors under seismic forces; details to increase earthquake resistance by developing structural system that starts from the architectural design process; basic principles that should be taken into account in earthquake resistant design of reinforced concrete buildings; and commonly observed design and construction faults of reinforced concrete buildings in Turkey.

Course Contents:
Basic Earthquake Knowledge; Basic Knowledge of Earthquake Resistant Building Behavior Under Seismic Forces; Safety Against Earthquake, General Behavior of the Building, and Structural Irregularities in Earthquake Resistant Design; General Rules for Reinforced Concrete Buildings; Exploring and Analyzing of Earthquake Affects on Buildings Pertaining from Design and Construction Faults Among the Samples.

- ***A4.*** *Structural System Arrangement in Buildings*

Duration / Credit: 6 Hours = 6 Credits

Course Objective: A large amount of the country is located on 1st and 2nd degree earthquake zones, thus it is an obligation to obey the design and construction rules determined by the earthquake legislations in Turkey. It is also important to be known and adopted of those rules by the practicing architects in order to be fulfilled of safety, economy and aesthetic in building design as well as success of the project. This training course aims to transfer necessary information about the rules and legislation to the architects to enhance their capacity in safe building design and appropriate structural system selection. In the first section of the course, general rules and specifications related to reinforced concrete buildings are mentioned. The second section covers the specifications of steel buildings, their implementation fields, and usage solutions of both materials together through the comparison of steel buildings with reinforced ones.

Course Contents:
Section-1: Structural System Arrangement in Reinforced Concrete Buildings:
Introduction; Building Safety; Loads; Reinforced Concrete Structural System Components; Bars; Surface Structural Elements; Reinforced Concrete Structural Systems; Frame Systems; Systems with Shear-Walls; Shear-Wall - Frame Systems; Tube Systems; Arrangement of Structural System; Effective Parameters; Irregularities; Preventative Measures; Slab Systems; Girder Plate Slab (Kirişli Plak Döşeme); Ribbed Slab (Dişli ya da Nervürlü Döşeme); Cork Flooring (Mantar ya da Kirişsiz Döşeme); Related Regulations; Earthquake Damaged Buildings; Samples.
Section – 2: Structural System Arrangement in Steel Buildings:
Introduction; Structural Design; Design Principals; Design Steps; Material Preference; Specifications of Steel Buildings; Material; Architecture; Environment; Sustainability; Fire; Corrosion; Implementation Fields of Steel Buildings; Steel Structural Systems; Stability Ties; Stability Ties in Roofs; Stability Ties in Single-story Buildings; Multi-story Buildings; Rigidity Frame Systems; Shear-Wall Systems; Frame Tube Systems; Cage Tube Systems; Core Systems; Reinforced Concrete-Steel Systems; Comparison of reinforced Concrete and Steel Structural Systems; Steel Buildings with Reinforced-Concrete Core; Reinforced Concrete-Steel Composite Structural Systems; Samples.

Group-B Courses: Regulative system related to hazard and development concepts

- ***B1.*** *Building Inspection*

Duration / Credit: 6 + 6 = 12 Hours (Two-Days Training) = 12 Credits

Course Objective: Main objective of the training course is to capacity enhancement and knowledge refreshment of practicing architects who are working as project and implementation inspectors in building inspection firms. It is vital to train the professional inspectors in buildings legislations and laws including building inspection law and other new legal necesities which are required by Ministry of Environment and Urban Planning (named as Ministry of Public Works and Settlement before 2011). The newly adopted lesiglations in accordance with the efforts to be a member of European Union Country is crucially important for practicing architects in terms of understanding and implementing legal amendments in building production process. Building Inspection course is designed to help practicing architects in knowledge transfer from legal issues to building production practices.

Course Contents:
First Day
Legal Framework in Building Inspection Implementation; Aim and Scope; Definitions; Building Inspection Organizations (or Firms); Attitude Fundementals: Ethics, Responsibilities, and Sanctions; Definitions / International Documents; Responsibilities and Sanctions Designated by Laws; Inspection of Architectural Services; Procedures and Bases Regarding to Architectural Project Inspection; Environmental Effect Inspection in Professional Inspection; Accessibility Standards and Guide – Ergonomics.
Second Day
Architectural Practice Processes, Rules, Materials and Standards Inspection, Work Place and Health Rules in Building Inspection; Rules Determining Building and Implementing Processes; Inspection Lists Used in Building Inspection; Material Standards and Inspection in Building Production process; Work Place and Health in Construction Works.

- ***B2.*** *Development Regulation and Implementation*

Duration / Credit: 6 Hours = 6 Credits

Course Objective: The main course approach is to develop argumentation on delivered documents (like development regulation, construction permits, housing license, diameter, street level) by using question-answer methodology and former application examples. The problems faced with among the current building production process is argued by the help of those delivered documents.

Course Contents:
Definition of the Development Act; Building Development Steps; Application of the Acts; Qestion-answer Session.

- ***B3.*** *Interrelation Between Development Regulation and Architectural Design*

Duration / Credit: 6 Hours = 6 Credits

Course Objective: The aim of the course is to inform practicing architects about legal rules that are accepted as the important bases for the architectural design and mostly believed to be barriers or limiting rules for the architectural design. Therefore, a project that is prepared proper with the regulations help architects in terms of time saving (not loosing time for official and legal steps for construction and housing permits or other types of issues). It is also important to prepare a project in accordance with the regulations in order to produce productive design which are not affected from limitations designated in regulations.

Course Contents:
Development term – legislation relation: the human right of living in healty environments that is secured by constitution and takes part in both general legislation and development legislation; Framework of Development legislation (Development Law, Regulations, Circulars etc.): Understanding the viewpoint of development Law and other special laws that are also related to development activites and kept seperated from the development law (such as Law On The Protection of Cultural and Natural Heritage, Tourism Incentive Law) to the urban and architectural space; Obligation of preparing development plan according to development legislation. Preparing development plan and acceptance process. Conversion of development plan to a legal document. Amendment procedures in development plans; Viewpoints of development plans to the living environment that changes from urban scale to the architectural scale; Examining of a sample development plan in both macro (urban) and micro (architectural) scale. Reflection of urban scale to the architectural space in terms of development plan; Architectural design procedures and requirements of functions of different areas determined in sample development plan. Exercising for understanding and analyzing of requirements by the participants that come from development plans (function, density, floor number, building character etc.), planning conditions and legislations (roofs, thermal value, parking amount etc.); Except from the Development Law (law number of 3194), examination of a sample development plan that was prepared according to its own law (specifically of Law On The Protection of Cultural and Natural Heritage) in terms of settlement scale and architectural space scale; Under the illumination of a conservation plan, studying of plan preparing methods with participants for architectural spaces that are arranged according to special legislation development plan (such as The Conservation Plan, Tourism Development Plan of Settlement). Specifically in urban conservation areas, sampling of design dimension based on plan and plan notes of restoration, renovation and building in historical site. Identification of architectural profession services.

Group-C Courses: Hazard and safety courses other than earthquake hazard

- ***C1.*** *Fire Insulation*

Duration / Credit: 4 Hours = 4 Credits

Course Objective: The aim of the course is to deliver necessary information on structural measures (passive fire insulation measures) designated by related laws and regulations including Prevention of Buildings From Fire Act and Building Materials Act (that was put in to effect on 08.09.2002 under the Official Newspaper, number 24870). Training program includes basic knowledge on fire and fire insulation, specifications of fire insulation materials, logic of fire safety design, design and location of building egresses, materials that are required to have fire separator characteristics, affects of fires on structural systems and necessary precautions all of which comprise architectural design rules and application details. In this course, architectural design rules are supported by published up-to-date national and international building acts that involve related articles and issues. In addition, former fire experiences are explored and commentated with the course participants.

Course Contents:

Basic Information and Design Fundamentals; Basic Information: In this section, basic information related to the following contents are delivered; definition of the fire, fire triangle, elements involving in combustion reaction, combustion products, definition of passive fire insulation (or protection), new European reaction to fire classes, fire resistance classes of building elements; Design Fundamentals: Structural precautions (passive fire insulation measures) related basic information is delivered with explanatory issues given in the other country acts' under the framework of Protection of Buildings From Fire Act and Building Materials Act; protection of structural elements, limiting the formation and movement (or spread) of flame and smoke, limiting the spread of fire to the adjacent buildings, design and location of fire escape routes and location for building inhabitants, securing life safety of rescue team in the building; Materials Knowledge and Application Details: In this section, basic information related to the following contents are delivered; materials used in passive fire insulation (stone wool or rock wool, plasterboard, fire glass etc.), application details, detail selection, fire affects on and measures to be taken for structural systems; Affects of fire on structural systems and fire insulation details: steel construction buildings, reinforced concrete buildings; Building applications and detail selection: fire insulation of walls and partitions, fire insulation of roofs and suspending ceilings, fire insulation of floors, passage details.

- ***C2.*** *Fire Safety in Buildings*

Duration / Credit: 6 + 6 Hours (Two-Day Training) = 12 Credits

Course Objective: Main objective is to emphasize that fire safety can only be secured by interdisciplinary works in which practicing architects have crucially important roles. Fire safety design can be achieved if only mandatory issues in fire acts are understood and analyzed correctly by architects. In this sense, it is vital to inform and transfer knowledge to the architects about latest developments in fire acts.

Course Contents:
Theoretical Information (fire formation, movement, spreading); Fire Safety Design (targets, tactics, components); Fire Prevention (prevention from combustion, limiting flammables, management); Communication (detection and alarm systems); Escape (user and building charecteristics, escape route design); Limitation (passive measures, active measures); Extinguishing (fire brigade access, extinguishing systems); General argumentation.

APPENDIX I

Interviews with Building Professionals Participating to Building Inspection System

Table I.1: Interview-1

Interviewee 1: Inspector architect (vice president of Union of Building Inspection Firms)		
organizational structure	*implementation of the BIS*	*competency of professional*
1. Inharmonious with the ongoing traditional contractor system, 2. Deficient organization of financial system that cause corruptive interactions between contractors and inspectors.	1. Exemption of public buildings from the BIS cause equality problems among the buildings, 2. Exemption creates series of administrative problems due to its unclear and unfair approach.	1. Ineffective legal system that does not enforce and/or facilitate compulsory professional training system, 2. Unclear and/or undefined responsibility definitions of the building professionals within the inspection system legislation.

Table I.2: Interview-2 and 3

Interviewee 2 and 3: City Planner and Civil Engineer (Presidency of BIS commission)		
responsibilities of inspection firms	*responsibilities of building professionals*	*competency of professionals*
1. Due to the insufficient legislative formation and the lack of necessary professional competency, contrary to the expectations, the inspection firms remain least active partition within BIS.	1. Doubt and obscurity on responsibilities and rights of building professionals that make them not to share responsibilities accurately with other participants in the implementation process of BIS,	1. Urgent need to train professional inspectors as the expertise of the inspection of different types of buildings (industrial, buildings, housing etc.).

Table I.3: Interview-4

Interviewee 4: City Planner (General Directorate of Provincial Bank)		
organizational structure	*implementation of the BIS*	*competency and professional training*
1. Limitation of the BIS to 19 provinces whereas the other 63 provinces were exempted from the system in the period between 2001 – 2012, 3.Exemption building approach creates series of administrative problems due to its unclear and ill-structured approach.	1. Inharmonious and fragmented implementation and legal system, 2. Misunderstanding and deficient applications among the building professionals due to fragmented system,	1. Insufficient training system and deficient competency among the inspectors result in failure through the building inspection process, 2. Insufficient awareness and lack of necessary capacity in inspection process among the building owners.

Table I.4: Interview-5

Interviewee 5: Geological Engineer (Director of the Disaster Coordination Department, Greater Municipality of Ankara)		
organizational structure	*implementation of the BIS*	*competency and professional training*
1. Defective inspection activities of local municipal organizations due to their political formation and economic relations within the free market system, 2. Corruption and unethical behavior of municipal professionals that forms barriers for inspection activities.	1. Failure in reliable inspection activities due to ill-structured financial system that regulate and organize the inspection activity, 2. Lack of reliable and guiding soil survey maps that reveal the ground conditions which affect to achieve an effective and safe inspection activity.	1. Inadequacy of competent building professionals participating to the inspection activities within the inspection firms, 2. Unawareness among the professionals about important progressing information related to the effective inspection system due to technical and legal innovations.

Table I.5: Interview-6

Interviewee 6: Architect (Professional inspector in a private inspection firm)	
responsibilities and rights of building professionals	*competency and professional training*
1. Complicated and obscuring responsibility sharing among professional participants in BIS due to the lack of administrative clarities on this subject,	1. Insufficient accreditation model of certifying, 2. Dialogical problem between project owners, inspectors and governmental institutions due to the insufficient capacity of the professionals,

Table I.6: Interview-7

Interviewee 7: Vice Secretary General (Union of Municipalities of Turkey)	
organizational structure	*implementation of the BIS*
1. Coordination problems between institutions, 2. Insufficient approaches of the all BIS actors in terms of arranging a well-functioning system among the legal and the administrative structure. 3. Gaps in implementation process due to deficient coordination between stakeholders of the BIS.	1. Ineffective inspection efforts of the municipal organizations due to lack of necessary technical sources and competent professionals, 2. Failure of inspection responsibility of the municipalities in terms of inspecting the inspection firms' works.

Table I.7: Interview-8

Interviewee 8: City Planner (Greater Municipality of Ankara)	
implementation of the BIS	*competency and professional training*
1. Lack of reliable soil survey and related information in order to develop hazard maps which affect the success of the application efforts and cause failure in the occupancy period of buildings when they face with hazardous events.	1. Insufficient capacity of the professionals in the inspection firms and the municipalities which does not meet to achieve reliable inspection practices, 2. Lack of competency of building inspection professionals due to inadequate professional training and accreditation system.

Table I.8: Interview-9

Interviewee 9: Architect (Continuing Professional Development Center, Chamber of Architects)
competency of professionals
Although the continuing professional development system and its relation to training of building professionals who are serving in BIS are very important; 1. Insufficient training model which needs more detailed training programs including legal and administrative process of BIS in addition to regular continuing professional training services, 2. Ineffective use of developing training technologies causes participation problems and knowledge access among building professionals.

APPENDIX J

Planning and Building Professionals Dealing with Hazard-Safety-Building Inspection Concepts in The US

Table J.1: List of professionals contacted in the US to evaluate and understand their standpoints to the hazard-disaster related issues in terms of building safety-security-risk-building codes-inspection concepts.

Contacted Person	Profession / Membership	Job Description
Dawn Anderson	Architect, Member of AIA and CSI (Construction Specifications Institute)	California Certified Access Specialist OSHPD Inspector of Record ICC (International Code Council) Combination Inspector Quality Assurance & Property Inspection
William Siembieda	Planner, Member of AICP (American Institute of Certified Planners)	California Polytechnic State University Department Head *Research and Teaching Interest:* Land use policy, large scale land planning and design, strategic planning, feasibility, policy, and housing finance for low income communities. (<u>Note:</u> Colorado Hazards Workshop participant)
Philip Line	Structural Engineer	URS Corporation, Trainer of FEMA 454 course – Designing for Earthquake. (<u>Note:</u> Colorado Hazards Workshop participant)
Graham Billingsley	Landscape Architect, Former president of AICP (American Institute of Certified Planners), Member of APA (American Planning Association)	He managed the Building Division which implemented the International Building Code (IBC) and conducted building inspections within Boulder County, Colorado.
James C. Schwab	Planner, Member of APA and AICP	Manager, APA (American Planning Association) Hazards Planning Research Center, Senior Research Associate, Co-Editor, Zoning Practice They have a FEMA-funded training course continuing for a long time; “Planning for a Disaster-Resistant Community” (<u>Note:</u> Colorado Hazards Workshop participant)
Alex Salazar	Architect, AIA Member in California	Salazar- Duncanson - Birchall Architects
Guy Nordenson	Structural Engineer	Guy Nordenson and Associates Structural Engineers LLP
Jim C. Barnes	Civil Engineer	Safety Assessment Program Coordinator Technical Assistance Programs Section Recovery Branch California Emergency Management Agency

APPENDIX K

The CES Schedule Required in the US States

Table K.1: The CES Schedule of AIA in the US. Source: AIA Continuing Education web page[59] (accessed in January, 2010).

State	Total Hours Annually	HSW Hours Annually	Distance Learning Accepted
AIA CES	*18*	*8: 4 hrs Sustainability as part of 8 HSW*	*Yes*
1- Alabama	12	12	Yes
2- Alaska	24/2 years	24/2 years	Yes
3- Arkansas	12	12	Except HSW
4- California	5/2*amount of coursework hours required to renew a license will be phased in beginning with 1 hour, then 2 1/2 hours, eventually requiring 5 hours every renewal cycle (two years) for all licensees	8	
5- Colorado	16/2 years	16/2 years	Yes
6- Delaware	24/2 years	24/2 years	Yes
7- District of Columbia	24/2 years	16/2 years	Yes
8- Florida	20/2 years	16/2 years	Yes
9- Georgia	24/2 years	16/2 years	Yes
10- Hawaii	16/2 years	16/2 years	Yes
11- Idaho	8	8	Yes
12- Illinois	24/2 years	16/2 years	Yes
13- Indiana	24/2 years	16/2 years	Yes, with exams
14- Iowa	24/2 years	16/2 years	Yes, but except HSW
15- Kansas	30/2 years	0	Yes
16- Kentucky	12	8	Yes
17- Louisiana	12	12	Yes
18- Maryland	24/2 years	16/2 years	Yes
19- Massachusetts	12	8	Yes
20- Minnesota	24/2 years	24/2 years	Yes, with documentation of completion
21- Mississippi	24/2 years	24/2 years	Yes
22- Missouri	24/2 years	16/2 years	Yes
23- Nebraska	24/2 years	16/2 years	Yes
24- Nevada	8	8	Yes, with documentation
25- New Jersey	24/2 years	16/2 years	Yes
26- New Mexico	24/2 years	24/2 years	Yes
27- New York	36/3 years	24/3 years	Yes, 50% max
28- North Carolina	12	12	Yes
29- Ohio	24/2 years	16/2 years	Yes
30- Oklahoma	24/2 years	24/2 years	Yes
31- Oregon	12	12	Yes
32- Rhode Island	24/2 years	16/2 years	Yes
33- South Carolina	12	12	Yes
34- South Dakota	12	20/2 years	Yes, but with strict restrictions
35- Tennessee	24/2 years	16/2 years	Yes
36- Texas	8	8: 1 hr ADA, 1 hr Sustainability	Yes, 3 hr Max
37- Utah	16/2 years	16/2 years	Yes
38- Vermont	24/2 years	24/2 years	Yes
39- West Virginia	12	12	Yes
40- Wyoming	16/2 years	16/2 years	Yes

[59] www.aia.org, accessed January 2010

APPENDIX L

The Continuing Professional Training Courses Provided by AIA/CES in the US

Table L.1: AIA/CES courses regarding the key words of inspection, hazard, disaster, earthquake, safety, security, building codes (adopted from; www.aia.org: accessed February 2010)

CES Course #	CES Education/Training Course-Material Title
1	Changes within the 2009 International Building Code (IBC)
2	Adaptive Reuse: Structural-Architectural Interaction in Historic Buildings (or How to renovate crappy old buildings without losing your mind)
3	Introduction to Designing Fenestration for Blast Mitigation
4	Fire Safety Trade-Offs (Concrete Masonry Designs)
5	NYC Buildings (Construction Safety)
6	Curtainwall: Products, Performance and Practicality
7	Designing with Shear Walls for Low to Midrise Construction
8	Designing for Earthquakes: FEMA 454 Training
9	Healthcare Facilities: Design Considerations and Best Practice Applications
10	Passive Firestop Systems
11	Integrated BIM and Design Review for Safer, Better Buildings: How project teams using collaborative design reduce risk, creating better health and safety in projects
12	Meeting Seismic Goals with ASCE 41 for Existing Wood Structures
13	The New NYC (New York City) Construction Codes Training Seminar
14	Safe Room Importance Grows Near Schools
15	Building and Designing for Security
16	Sustainability through Durability, Adaptability and Deconstructability
17	Protective Glass Specs and Tech
18	Blast Hazard Mitigation
19	Post Disaster Safety Assessment Evaluator Training
20	Planning for Secure Buildings
21	Seismic Design Basics
22	Earthquake Safety & Mitigation for Schools
23	ATC-20 Earthquake Damage Safety Assessment Training
24	HCAcademy Web-Ex Planning for Disasters
25	Practical Design of Structures for Blast Effects
26	Principles of Seismic Design
27	Quality Challenges During Major Disasters
28	Reinvention 2010 / Housing Tour: New Orleans Rebuilds for Safety and Sustainability After Hurricane Katrina
29	Shingle Roofing Systems - Avoiding Roofing Disasters
30	The A/E and Site Safety- "Know your Duties and How to Avoid Disasters"
31	The Magnitude 8.8 Chile Mega-Earthquake of 2010: Damage & Recommendations for Risk Management
32	Training Architects to Help Communities to Recover from Disasters
33	2008 Fundamentals of I-Codes for the Permit Tech Institute
34	Air Sealing Fire Separation Assemblies: Codes And Conflicts
35	Breaking The Code: The New NYS Codes Demystified
36	Building Codes Note: The courses specified under "building codes" title are more than one course (there are a lot of courses given in many states of the U.S.) … Here, some of the specific learning objectives that have strong relations to study area are cited …
37	Building Codes: Code Searches
38	Building Codes: Egress Concepts
39	Building Codes: Fire Protection Review
40	Building Codes: Fire Resistive Rated Construction
41	Codes. Barriers, and Moisture
42	Codes & Building Sciences: Conflicts, Resolutions, & Results
43	Codes, Fire Doors, and Architectural Hardware
44	Firestopping: Products, Applications, Specifications and Codes
45	Integrated Site and Building Design Using CPTED, LEED, BIM and the ICC SMARTcodes
46	Passive Survivability and Building Codes: Setting an Agenda
47	Reducing Flood Losses through the International Codes

Table L.1: AIA/CES courses regarding the key words of inspection, hazard, disaster, earthquake, safety, security, building codes (continuing)

48	Building Stronger Homes in the Face of Hurricanes, Floods and Earthquakes
49	L'Aquila Earthquake Reconnaissance - Seismic Engineering
50	Structural Design and the Earthquake in Sichuan China
51	Advanced Combination Inspection Methodology
52	Combination Field Inspection
53	Common Issues in Special Inspections
54	Extreme 1! Plan Review & Inspections
55	Extreme 2! Plan Review & Inspections
56	IBC Chapter 17 - Special Inspections
57	IBC- Special Inspection: How Did it Impact Construction Materials Testing Services?
58	Infrared A to Z: energy audits, construction, final inspections, training, energy assessments, and diagnosing building problems
59	International Building Code Seminar, Structural Design and Special Inspections
60	Residential Building Inspections (Field Inspection Process)
61	Special Inspection Requirements in the International Building Code
62	Special Inspections: What Should You Expect?
63	Are We Ready for Disasters?
64	Avoid Design Disasters For Heavy Commercial Projects
65	Avoiding Design Build Disasters
66	Avoiding Design Disasters (Interior & Exterior Stone Cladding)
67	Avoiding Disasters
68	Building For Natural Disasters
69	CA Documentation " Documenting Deficiencies and Delays to Avoid Disasters"
70	Code Compliant Design Disasters
71	Communication Tools Notifying The Public During Disasters, Natural And Man – Made
72	Communities Recovering From Disasters
73	Construction Disasters
74	Disasters - Design of Patient Care Environments
75	Disasters- Limitations of Development and Design With Natural Hazards and Disasters
76	Disasters of All Shapes And Sizes: Strategies For Preparation And Recovery
77	Disasters! How can we help
78	Expect The Worst: Planning For Disasters
79	Exterior Wall Construction Disasters
80	Getting Smart About Hurricanes and Other Natural Disasters
81	Government and Industry Working Together to Mitigate and Prepare for Disasters
82	High Efficiency - Commercial-1 - Disasters, Systems, Facades
83	Housing in The Wake of Katrina and Other Disasters
84	How Can Architecture Help When Natural Disasters Occur
85	Immediate Architecture - Design, Urban Strategy, and Infrastructure Following Disasters
86	Life Safety Issues in Regards to Recent Disasters
87	Major Aviation Disasters - Strategies & Tactics
88	Natural Disasters
89	Natural Disasters and Effective Emergency Management
90	Natural Disasters By Health Midwest Facilities Planning
91	Natural Disasters: Smart Growth Opportunities Left in Their Wake
92	Natural Disasters: Keeping a Roof Over Your Head
93	Post-Katrina New Orleans: Natural Disasters and The Built Environment
94	Preparing for Unexpected Events and/or Disasters
95	RC Storm Track: Eng. Design to Survive Natural Disasters
96	Rebuilding After Great Disasters
97	Research and Design for Survival - Overcoming Generational Poverty and Natural Disasters
98	Security Technology in The Age of Terrorism and Natural Disasters
99	Strategies for Arch Responses to Natural & Other Disasters
100	Structural Engineering for Natural Disasters
101	Trauma of Natural Disasters of Children and Families
102	War on Design/Emergencies/Natural Disasters and Crises
103	Combination Inspections of Small Commercial Structures
104	Commercial Building Inspections-Based on the 2006 IBC
105	Integration of Special Inspections with CDs
106	International Building Code Seminar, Electrical Design, Installation & Inspection
107	Masonry Inspection
108	Materials, Design, and Special Inspections under the New 2008 NYC Building Code
109	SIPS:Design, Construction and Inspection/Advanced Framing
110	Special Inspections

Table L.1: AIA/CES courses regarding the key words of inspection, hazard, disaster, earthquake, safety, security, building codes (continuing)

111	Building Codes: Building Planning Review
112	Building Codes for Historic Preservation
113	Code Change Update (Changes to the I-Codes and Standards)
114	Codes Forum: Green Building Codes--Local Jurisdictions
115	Codes Pertaining to Door Hardware
116	Energy Code Changes: Overview of the Greening of NYC and other Codes
117	Evolving Energy Codes and Lighting Standards
118	Form Based Codes
119	Fun with Accessibility Codes for California
120	Green Building Codes and Ordinances
121	Green Building Codes: Strategic Planning
122	IBC Codes
123	Introduction to Zoning & Codes for Design Professionals
124	Intro to the International Code Council Discussion of Statewide Building Codes for Alabama
125	Learn How Form-Based Codes Can Transform Cities and Towns
126	New 2008 NYC Plumbing & Fuel Gas Codes
127	New Codes- 2008
128	Nuts & Bolts of Form-Based Codes
129	NYS Codes review
130	Overview of Building Codes
131	Smart Growth: The Problem with Codes, and the House on the Corner
132	The New Improved 2003 City of Houston Building Codes
133	Updates and Revisions to the ADA and Title 24 Access Codes
134	What Architects Need to Know About the Energy Codes
135	When Building Science and Codes Conflict
136	CA Documentation: Documenting Deficiencies and Delays to Avoid Disaster
137	Campus Emergency Management/Disaster Planning
138	Developing a Disaster and Emergency Plan for Operations
139	Disaster Preparedness Training
140	Disaster Risk Reduction in International Humanitarian Response
141	Learning To Help Congregations Cope With Natural Disasters
142	When Disaster Strikes - Tools & Techniques to Respond to Project Disasters
143	2006 IBC & IFC Hazardous Ocupancies - "How not to make your building an H occupancy"
144	Case Study - Ovid Barns: Working in High Fire Hazard Zones
145	Health & Environmental Hazards of Building Materials & Processes
146	Health Hazards in Construction
147	How to Prevent the Potential Hazards of Green Design
148	OSHA 10-Hour General Industry Training (Session 4 of 5) - Hazardous Energy Control
149	2006 IBC Wind & Seismic Engineering Fundamentals
150	Fire Resistive and Seismic Design for Acoustical Ceiling Systems
151	HAZUS: New Technology to Determine Seismic Risk
152	L'Aquila Earthquake Reconnaissance - Seismic Engineering
153	Overview of IBC Seismic Design Provisions
154	Seismic and Wind Design Considerations for Wood Frames Structures
155	Seismic Code Requirements for Ceilings
156	Seismic Design of Reinforced Concrete Shear Walls
157	Seismic Example for Cold-Formed Steel using AISI S213-207
158	Seismic Retrofitting Your Historic House

APPENDIX M

The AIA/CES Course objectives and contents related to hazard, disaster and safety concepts

Continuing Education System (CES) Courses regarding Health-Safety-Welfare (HSW) issues conducted by AIA

1. Changes within the 2009 International Building Code (IBC)

Learning Objective: Upon completion, participants will be better able to:

- Indentify the general requirements of the 2009 IBC
- Indentify the significant changes that occurred between the 2006 and 2009 IBC
- Explain the differences between the 2006 and 2009 IBC

Contents related to hazard, safety, disaster, inspection etc.

- Manufacturing, processing, generation or storage of materials in terms of hazard classification; low-moderate and high hazard,
- Fire protection,
- For High Rise Buildings: Fire Command Center per 911; Standby and Emergency Power; Emergency responder radio coverage system; Mechanical or natural smoke removal,
- For Ambulatory Health Care Facilities: Smoke barriers required if more than 10,000 sq ft (30 sq ft of refuge area within each smoke compartment, Independent mean of egress); Automatic fire sprinkler system; Fire alarm system,
- Fire Rated Walls-Assemblies: Many Levels of Separation (Exterior walls, Fire Walls, Party Walls, Fire Barriers, Shaft Enclosures, Fire Partitions, Smoke Barriers, Horizontal Assemblies,
- Sprayed Fire-Resistant Materials (SFRM),
- Fire Walls: Used to create separate buildings, Structurally independent, Ratings not reduced by sprinklers, Continuous from Foundation to Roof, Imaginary Lot Lines, Noncombustible,
- Ice Dam Protection: An ice dam is a buildup of ice and water that works its way under the roofing which is mainly caused from warming of the underside of the roof deck and overhands that are below freezing.
- Adaptive Reuse:

2. Structural-Architectural Interaction in Historic Buildings

Learning Objective: Upon completion, participants will be better able to:

- Indentify the general concepts of historic building renovation
- Indentify the important and critical points in structural and architectural design solutions for reuse of old buildings

Contents related to hazard, safety, disaster, inspection etc.

- Adaptive Reuse: Key considerations for change in occupancy; Fire Protection: change in occupancy or number of occupant groups = fire separation, non-combustible, fire-rating … Sound Transmission: within a unit or between units or floors may need to be Attenuated … Structural Capacity: change in occupancy = code-specified live load allowance, change in finishes = affect superimposed dead loads, lack of capacity = life safety or comfort (serviceability),
- Structural Capacity: Reinforcing (options); Truss systems, composite systems, shear/bearing, columns. Reuse and renovation affects on structural durability against natural and other forces in terms of structural safety,
- Examining and Evaluation of similar case studies.

3. Introduction to Designing Fenestration for Blast Mitigation

Learning Objective: This course will provide an understanding of:

- Blast Hazards
- Blast Mitigation Design
- Blast Resistant Products and Installation
- Blast Mitigation Requirements / Applications
- Acceptable Test Methods
- AAMA 510
- Blast Product / Project Certification

Contents related to hazard, safety, disaster, inspection etc.

- Blast Hazards: Primary Fragments (Flying Glass that Fly at speeds in excess of 100 ft/second [68 mph] or in some cases, speeds may exceed 200 ft/second [136 mph], and Flying Building Components), Secondary Fragments (Shrapnel, Rocks, Dirt, Etc.), Structural Collapse/Damage …
- Collateral Damage: Loss of Life, Business Disruption, Property Damage ...
- Understanding a Blast Wave …
- Blast Wave interaction and acts on a structure: Results typically vary for differing materials and construction, according to; Material flexibility, Material ductility, Material strength …
- Designing Fenestration to Resist Blast Hazards: Threat Assessment, Building Preparation, Design of Window System, Anchor System, Installation …
- Glazing Guidelines: Laminated Glass, Window Film, Polycarbonate, Insulating Glass Unit …
- AAMA 510-06: Voluntary Guide Specification for Blast Hazard Mitigation for Fenestration Systems

4. Fire Safety Trade-Offs (Concrete Masonry Designs)

Learning Objective: After completion of this material, designer should understand:

- Three necessary elements for a balanced design fire safety philosophy,
- Difference between active and passive fire protection,
- Concept of trade-offs in fire safety regulations.

Contents related to hazard, safety, disaster, inspection etc.

- Balanced Design for Fire Safety: Fire Detection (includes the installation of smoke detectors and fire alarms), Fire Suppression (includes the use of sprinkler systems), Fire Containment (includes fire barriers, fire walls and exterior walls built of non-combustible fire resistant materials such as concrete masonry …
- Passive and Active Fire Protection Systems …
- Design Considerations of Fire Protection Systems: Compartmentation and Fire Separation Walls which limit the spread of fire and smoke; provides safe haven and property protection; and helps ensure building stability to allow occupants to exit and protect firefighters …

5. NYC Buildings (Construction Safety)

Learning Objective: At the conclusion of the training session, participants will learn:

- Methods to reduce the number of accidents on construction sites
- Department site safety regulations
- Requirements for site safety plans
- How to comply with special inspection requirements

Contents related to hazard, safety, disaster, inspection etc.

- High risk construction study: Concrete Operations, Excavation Operations, Crane Operations, Hoist Operations …
- Increasing Safety Awareness: Flyers, Safety Harness Campaign …
- Special Inspections: Independent inspection of construction, Required to verify compliance with approved plans, Mandated for certain types of construction (Structural components, Life-safety systems, Means and methods of construction affecting structural stability)

6. Curtainwall: Products, Performance and Practicality

Learning Objective: After completion of this material, participants will learn to:

- Recognize and differentiate between different types of aluminum curtainwall.
- Understand design parameters for curtainwall anchorage to the building, to ensure ease of installation, movement accommodation, and structural integrity.
- Optimize energy efficiency and thermal performance of curtainwall.
- Learn how to mitigate blast hazards through curtainwall design.
- Design for seismic movements and induced inertial loads.
- Learn how curtainwall impacts building LEED® certification.

Contents related to hazard, safety, disaster, inspection etc.

- Curtainwall types: Storefront, Stick Wall, I-Beam Wall, Pressure Wall, Unitized Wall, Window Wall…
- Relation of building movements, design loads on structures and curtainwall systems …
- Performace criteria of curtainwall design and implementation: dead and live load performances …
- Specific load performance of curtainwall systems: effects of wind load on structural stability in terms of understanding curtainwall system behavior...
- Anchorage: Curtainwall anchorage must be designed for each individual project's conditions, due to almost unlimited combinations of loads, tolerances, movements, and substrates. However, there are basic anchor types and design principles that are applicable to a wide range of conditions ...
- Other Important Performance Parameters: Seismic Design, Blast Hazard Mitigation, Acoustics, Thermal Performance, Solar-optical performance…
- Balanced Design: Curtainwall selection and design should be based on all applicable criteria, not on any specific single number rating system including Emergency Egress, Hurricane Impact, Psychiatric Detention, Blast Hazard Mitigation, Noise Control, Seismic Movements, Smoke Evacuation …

7. Designing with Shear Walls for Low to Midrise Construction

Learning Objective: Upon completion of this course the Design Professional will be able to:

- Explain what shear is
- Describe what a shear wall is
- Explain the main components of a shear wall
- Show where shear walls should be located
- List what types of forces shear walls resist
- Explain where shear walls direct lateral forces
- Describe what the test standards are for
- Explain the methods and systems providing shear values
- Express the advantages and disadvantages of each type of shear method
- Explain what Architect, Engineer, and Specification professionals consider when specifying shear elements

Contents related to hazard, safety, disaster, inspection etc.

- Buildings need shear strength to resist seismic forces …
- Components Providing Horizontal and Vertical Transfer of Shear Forces: Uplift devices (hold-downs/straps/bolts); Framed shear walls; Steel reinforced concrete columns, walls; Prefabricated shear assemblies; Brace Frames; Moment Frames …
- Three Main Components Providing the Strength in a Framed Shear Wall:
  - Framing Members; Studs, Beams, Posts
  - Sheathing/Bracing Materials; Sheet materials (Plywood/OSB, Steel sheet, Composite shear panels, Drywall/cement boards); Bracing (Interior brace frame [tube, stud, or plate], Cross bracing/strapping)
  - Fastener (size, pattern, frequency, and method); Nails, Screws, Welds
- Where Are Shear Walls Typically Located:
  - At Floor level of all structures
  - Symmetrically on exterior and/or interior walls

- Placed in relation to strength and stiffness required to accommodate load paths based on span-width ratios and vertical load …
- Design Considerations:
    - Products are properly identified …
    - Buildings are specified and designed in accordance with current building codes and industry recommendations…
    - Buildings are constructed per plans and industry standards…
    - Backing for wall mounted fixtures…
    - Superior Fire resistance for 1 and 2 Hour…
    - Shaft wall for mechanical ducts…
    - Projectile resistance (Hurricane Zones)…
    - Blast and Ballistic resistant walls…
    - Future floor and roof diaphragms…

8. Designing for Earthquakes: FEMA 454 Training

Learning Objective: Upon completion of this course the Design Professional will be able to:

- Have an opportunity without technical backgrounds in engineering and seismology to learn the principles of seismic design…
- Relate facts about the nature of earthquakes and seismic hazard to seismic design…
- Refer to principles of site evaluation and selection in FEMA 454, and apply to design projects in earthquake hazard areas…
- Explain earthquake effects on buildings…
- Recognize and address seismic issues in architectural design projects…
- Recall basic regulation of seismic design and refer to appropriate building codes to design buildings in seismic-risk areas…
- Cite examples of past, present and future developments in seismic design…
- Refer in FEMA 454 to the principles of evaluation and retrofit of existing buildings…
- Differentiate between structural and non-structural elements of seismic design…
- Discuss interactions between multi-hazard design systems…

Contents related to hazard, safety, disaster, inspection etc.

- Participant Activity: Activity groups based on experience in natural hazards and seismic design; Based on one seismic design problem and conducted in four parts; Group reports at the end of the activity …
- Architect's Role in Seismic Design: Initiates the building design; Determines issues relating to its configuration that can have a major influence on the building's seismic performance …
- Course Agenda: Introduction; Nature of Earthquakes and Seismic Hazards; Site Evaluation and Selection; Earthquake Effects on Buildings; Seismic Issues in Architectural Design; Regulation of Seismic Design; Seismic Resistant Design (past, present, and future);Existing Buildings (evaluation and retrofit); Seismic Protection of Nonstructural Elements; Multi-Hazard Issues; Course Conclusion …
- Site Evaluation and Selection: Discuss the impact of the site and surrounding environment on the structure; Recognize the interrelationship of site factors, the building program, and performance criteria; Identify options for mitigating site hazards …
- Earthquake Effects on Buildings: Explain how certain aspects of ground motion affect buildings; Cite the building attributes that modify the way in which the building responds to ground motion …
- Construction Quality:

The entire structural system must be correctly constructed if it is to perform as intended: lateral forces are especially demanding;

- Materials must have expected properties
- All structural members must be securely connected together
- Steel and anchors in reinforced concrete must be correctly installed
- Materials testing and on-site inspection by qualified personnel must be enforced

- System Choice:
    - Framing systems must be chosen early because different system characteristics have a major effect on architectural design, both functionally and aesthetically …
    - For example, if shear walls are selected, the building planning must be able to accept a pattern of permanent structural walls with limited openings that run uninterrupted through every floor from roof to foundation …
- Variations and Alternatives:
    - Variations of these basic types relate to materials used and the ways in which members are connected …
    - Designers must use care when mixing systems because of different stiffness and difficulty in obtaining a balanced resistance …
    - Now see increasing use of dual systems for high performance structures, for example where moment frames are used as a back-up system to shear walls …
- 21st Century Architectural Trends: Physical constraints on high rise buildings force them to have direct load paths and fairly planar exteriors; In lower buildings, with more freedom to invent forms, planning irregularities are now fashionable that go far beyond the irregularities; Tilted walls and highly fragmented facades abound (metaphors for the isolated and disconnected elements in modern society)
- Towards an Earthquake Architecture: An architecture for seismic regions that expresses the elements necessary to provide seismic resistance in ways that are of aesthetic interest and have meaning beyond fashionable forms and decoration …
- Performance based seismic design …
- There is an increased need to be able to predict building performance and relate that performance to design standards: Prescriptive codes describe what to do; Performance based approach describes the intent of the code (the desired performance) in a way that allows the designer to decide how the intent is met …

9. Healthcare Facilities: Design Considerations and Best Practice Applications

Learning Objective: Upon completion, participants will be better able to explain and/or describe:

- The importance of infection control…
- The importance of life safety and fire protection…

- The general principles of emergency preparedness…
- The fundamentals of healthcare heating and cooling systems…
- The basic methodology of HVAC design for isolation rooms, intensive care units and imaging rooms…
- The requirements of emergency power systems for cooling triage areas…

Contents related to hazard, safety, disaster, inspection etc.

- Design, Operation and Maintenance for life safety, accessibility, infection control, disaster response, controls-pressure, HVAC, fire …
- Key terms for quality design in order to sustain infection control in an healthcare facility; sources of infection, ACH (Air Changes per Hour), triage, epidemiology …
- Understanding science of infection ($\text{Infection} = \dfrac{\text{Dose x Site x Virulence x Time}}{\text{Level of Host Defense}}$)
- Effect of infection control on HVAC design…
- Emergency Department (preliminary design approach): Urgent care/fast track/acute care – Pathways from Walk-in or Ambulatory Entrance, waiting room/registration, triage, trauma/resuscitation/heart/stroke – operating room-like space, exam rooms, procedure rooms/radiology, nurse station/team area, emergency exhaust, decontamination area …
- The life safety approach for hospitals: Hospitals must rely on the building and building systems to protect its occupants while they remain in place. Corridor walls are built smoke-tight, if not rated construction, to protect patients in their rooms. Smoke compartments are a key facet of fire protection. This is called a Defend-In-place strategy, which work in stages…
- Critical design issues: Fire and Smoke Dampers …
- Since 1967, health care facilities have been required to provide passive smoke control capabilities as an integral part of their design. As with any life safety system element, passive smoke control barriers require inspection and ongoing maintenance …

10. Passive Firestop Systems

Learning Objective: Upon completion, participants will be better able to:

- Have a renewed awareness of the passive fire protection industry…
- Leave with a clear understanding of how to maximize building safety through effective compartmentation …

Contents related to hazard, safety, disaster, inspection etc.

- Life safety is paramount in designing, building, and occupying structures. Emergency lighting, fire alarms, exit corridors, sprinklers and emergency responders often come to mind when we think of this topic. Yet, with so many variables to consider in the dynamic construction industry it is often difficult to maintain continuity and build redundancy where it matters most, overall building safety. In the event of a fire, occupants are often comforted by the presence of the aforementioned items. They rarely recognize one of the most critical components of all, Passive Firestop Systems...
- It is intended to provide an in depth analysis on the history, evolution and current firestop standards in place today. Through the exploration of the design and testing process, participants will follow the transformation of firestop products into listed systems. Attendees will be updated on applicable building code requirements and gain a clear understanding of ways to streamline their specification practices...
- The passive fire protection industry will be broken down into three critical applications; Through Penetrations, Construction Joints, and Protective Wraps. While analyzing these segments, attendees will be exposed to the most current products and technologies available on the market today…

11. Integrated BIM and Design Review for Safer, Better Buildings: How project teams using collaborative design reduce risk, creating better health and safety in projects

Learning Objective: After completion of this material, participants will be able to:

- Apply the productivity and safety benefits of operating in a collaborative design process…
- Communicate the use of 3-D graphic design tools across multiple organizations using diverse technology platforms, resulting in better, safer outcomes…
- Evaluate the use of integrated design tools, BIM and design review for reducing project uncertainties, waste, risk, and creating safer projects for owners and developers…

Contents related to hazard, safety, disaster, inspection etc.

- Project teams are leveraging BIM and integrated design review to enhance the health, safety and welfare (HSW) performance of their projects. Such HSW advantages include enhanced building occupant safety. For instance, BIM can be used to analyze and compare fire-rated egress enclosures, automatic sprinkler system designs, and alternate stair layouts. Even finely grained details, such as stair width, rail height, and door swing can be evaluated with BIM to simulate real-world emergency evacuations. Similarly, building accessibility and amenity for occupants tend to be better understood and executed, such as analyzing provisions for users with disabilities…
- Risk Reduction: With such significant health and safety benefits in both design and construction phases, it follows that overall project liability, as well as project team risk, can be reduced, too. Issues of design coordination, conflicts, and code compliance can be addressed during design, rather than construction. Projects should have less variability in cost and construction time, along with fewer claims. Architects, as well as their consultants, working with a building information model, reduce risk because the model makes the relation of design information explicit within the same virtual space. The ambiguity between the architect's design intent and the 'fit' of a consultant's building system is practically eliminated…

12. Meeting Seismic Goals with ASCE 41 for Existing Wood Structures

Learning Objective: Upon completion, participants will be better able to:

- Understand ASCE 41…
- Evaluate ASCE 41 Performance-Based Design …
- Understand Seismic Upgrade Design …
- Determine Seismic Deficiencies …

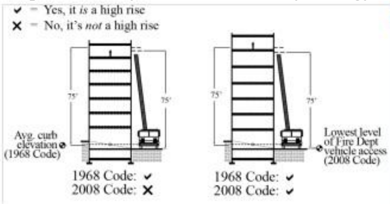
Contents related to hazard, safety, disaster, inspection etc.

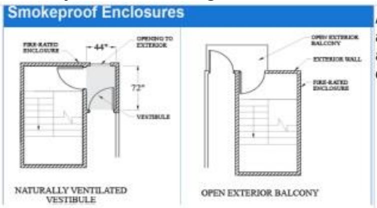
- Seismic Performance Levels: Operational, Immediate Occupancy, Life Safety, Collapse Prevention …
- Seismic Upgrade Design: determine seismic deficiencies, establish rehabilitation objective, obtain as-built information, select rehabilitation method, identify rehabilitation schema, design the rehabilitation / verify design, prepare construction documents, oversee quality control during construction …
- Determining Seismic Deficiencies: screening phase – quick checks, evaluation phase, detailed evaluation phase …

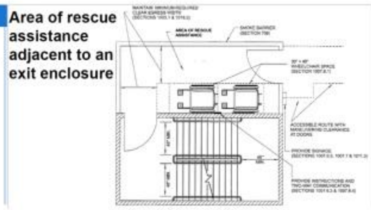
- Common Structural Seismic Deficiencies: lack of a complete and continuous load path, soft/weak story, brittle and/or deteriorated materials, lack of deformation compatibility …

13. The New NYC (New York City) Construction Codes Training Seminar

Learning Objective: This seminar will discuss in general the differences between the current New York City Building Code and the New 2008 New York City Building Code in various areas such as; administration, fire-resistance-rated construction, fire protection systems, accessibility, energy efficiency, structural design …







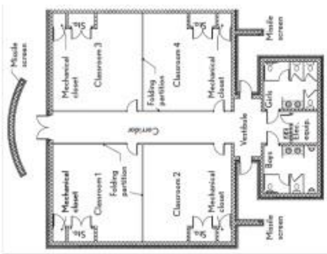
14. Safe Room Importance Grows Near Schools

Learning Objective: After completion of this material, designers will be able to understand:

- Design requirements for safe rooms or missile barriers…

Contents related to hazard, safety, disaster, inspection etc.

- Studies show that more than 80 percent of the total property damage from natural disasters in the United States is due to extreme wind…
- Studies from Texas Tech University indicate that a tornado safe room is a solution that will keep occupants safe from extreme wind events. The materials selected to design safe rooms must meet the challenge of standing up to the strong winds and flying debris of the tornadoes…
- Research by the Texas Tech University Laboratory has demonstrated that both 6- and 8-inch-thick (152-and 203-mm) concrete masonry walls that are fully grouted with concrete and reinforced vertically with no. 4 (m# 13) reinforcing steel bars in every cell can withstand the impact of a nominal 2 x 4 inch (50 x 101 mm) wood stud weighing 15 pounds (6.8 kg) striking perpendicular to the wall with speed in excess of 100 mph (161 km/h …
- Design and implementation example for the safe room from Vilonia Elementary School in Arkansas…
- Often called "missile barriers," the safe rooms are expected to resist the penetration of flying debris as well as tornado-force winds. To be considered a safe room, the building must be designed to meet certain safety regulations based on guidelines established by FEMA. FEMA recognizes few building materials as capable of meeting these requirements. However, cost and installation time for these materials can be significant enough that one building material is selected over anot.



15. Building and Designing for Security

Learning Objective: After completion of this material, designer should be able to:

- Understand the relationship between security and building design and the architect's role in that relationship…
- Learn about the emerging issues in building designs and security considerations for both existing and new buildings…
- Understand threats that drive the need for security planning and design in buildings…
- Examine a variety of security design concepts including the detection and deterrence of threats…

Contents related to hazard, safety, disaster, inspection etc.

- Today's building designs must protect people and property not only from humanly motivated threats such as criminals and terrorists, but also from natural threats such as earthquakes, hurricanes, and floods…
- Once a threat assessment, vulnerability assessment, and risk assessment have been completed, and the owner has articulated the resources it is prepared to devote to mitigating the threats to an acceptable level, a programmatic statement can be developed. The design professional then uses this to begin the physical design for security. The architect must be equipped to bring resources and skills to bear on a security problem in the same way as any other design problem. To accomplish this may require engaging specialists in areas in which the architect is not trained or experienced, such as blast mitigation, communications security, or the use of electronic hardware and software to augment physical and operational security measures…
- In many instances, designing for physical security also addresses fire and life safety requirements. In any case, all threats to a building—from storm, earthquake, terrorist bomb, or accidental fire—require protection of the occupants from the immediate, direct effects of the event, such as flying debris or structural collapse. After that, it is the designer's task to design for safe evacuation of a facility and safe entry by emergency personnel…
- Building design is based on specific functional criteria. From the function, the design evolves. Examples of building functions include encouraging efficient job performance, supporting user needs, keeping users safe from hazardous conditions, and protecting occupants from crime and other violent acts. Safety in buildings is mandated by building codes and standards that establish how buildings are to perform during abnormal conditions (e.g., fires, hurricanes, floods, and earthquakes). Building security, on the other hand, is about how assets (people, information, and property) can be protected from the effects of malevolent acts carried out by individuals or groups of individuals (e.g., violent people, criminals, extremists, and terrorists)…
- The primary components of security are detection and deterrence of malevolent threats before they can be carried out. In the event they are carried out, an additional critical component involves provision of appropriate response and recovery actions…

- ➢ Detection. Before a threat can be delayed or responded to, it must be detected or perceived. A security system should be able to identify the presence of a threat, but detection ultimately relies on observation by building users or security personnel. Observation methods can be direct—that is, without the use of equipment—or they can employ monitoring and detection devices to extend and enhance human capabilities to observe activities and conditions…
  - ➢ Deterrence. Once a threat has been detected, a security system can delay its occurrence by physical or operational methods or a combination of both. The intent of the security delay function is to extend the time before a threat can be carried out and to maintain distance between the threat and the target…
  - ➢ Response. The ability to respond to or intervene in a threat stems from what occurs in the detection phase and the amount of time created for apprehension or neutralization in the deterrence phase. Response actions can be official or unofficial. An official response may involve law enforcement or private security forces. Unofficial responses may involve building users such as doormen, neighborhood watch patrols, and so on…
- What does CPTED mean? CPTED (crime prevention through environmental design) is an environmental-behavior theory and methodology based on the proposition that enlightened architecture and site design deters criminal behavior and reduces fear of crime…

16. Sustainability through Durability, Adaptability and Deconstructability

<u>Learning Objective:</u> Upon completion, participants will be better able to:
- Understand High Performance Building principles using precast concrete systems…
- Understand precast connections and how to create designs with adaptability and deconstructability in mind…
- Understand how to integrate the structural system with other building systems…
- Discuss sustainable principles and how it relates to concrete…

<u>Contents related to hazard, safety, disaster, inspection etc.</u>
- High Performance Building Considerations:
  Sustainability + Functional = High Performance
  Aspects Resilience
- High Performance: Site Development – Longevity - Energy Conservation – Durability - Water Conservation - Low Maintenance - Material Resources - Disaster Resistance - Indoor Air Quality…
- What is a Functional Resilient building? A building with higher degree of durability that can perform better and decrease the amount of materials going to landfills due to: Fire, windstorms, floods, seismic, blast, severe environment conditions, other potential disasters…
- Understanding and evaluating durability tests: fire durability testing, wind cannon test, blast testing…
- Evaluation of examples from different buildings and places…

17. Protective Glass Specs and Tech

<u>Learning Objective:</u> After completion of this material, designer should be able to:
- Understand hurricane-resistant, blast mitigating, safety & security defense glass materials and systems (protective glazing solutions)…

<u>Contents related to hazard, safety, disaster, inspection etc.</u>
- When choosing the right hurricane-resistant glass for your application, the following points must be evaluated:
  - ➢ Determine the applicable building code and test method
  - ➢ Determine the required design pressure/wind load
  - ➢ Qualify the missile requirement – large and/or small missile
  - ➢ Identify the largest glass size
  - ➢ If using a tested or certified framing system, confirm the laminated glass qualified with the particular manufacturer's product
  - ➢ If not using a tested or certified frame, evaluate system design details, such as:
    - — Glazing method: conventional or structurally glazed
    - — Glass bite – Often large missile applications require a minimum edge engagement of 5/8" to augment performance
  - ➢ Anchorage and hardware requirements – Typically large missile applications require an enhanced design…

18. Blast Hazard Mitigation

<u>Learning Objective:</u> After completion of this material, designer should be able to:
- Understand the importance of designing structures to resist explosions…
- Understand the design criteria for blast-resistant buildings…

<u>Contents related to hazard, safety, disaster, inspection etc.</u>
- Explosion threats pertaining from: Accidental explosions; Terrorist bomb threats; Forced entry; Natural hazards, wind, seismic; Conventional weapons; Ballistics…
- Primary Window Design Criteria First and Foremost: Wind load structural design; Window design category; Air infiltration resistance; Forced entry resistance; Water infiltration resistance; Sound barrier & Seismic Protection; Energy conservation U, SHGC, VLT; Condensation resistance…
- Blast Terminology
  - ➢ ATFP –Anti-Terrorism/Force Protection
  - ➢ Peak Overpressure –PSI or KPA
  - ➢ Impulse –PSI*msec or KPA*msec
  - ➢ Positive Phase –msec
  - ➢ Negative Phase –msec
- Blast Protection: A building cannot be designed to be bomb proof... the key is to limit the acceptable damage to a confined area. Question is how extensive and how widespread is the localized or "acceptable" damage?

19. Post Disaster Safety Assessment Evaluator Training

<u>Learning Objective:</u> Upon completion, participants will be better able to:
- Understand Safety Assessment Program…
- Understand how to assist an inspector with the evaluation of the facilities (buildings and infrastructures) in the aftermath of a disastrous event…

<u>Contents related to hazard, safety, disaster, inspection etc.</u>

- The main goal of the Safety Assessment Program (SAP) is to get people affected by a disaster back into their buildings as quickly and safely as possible…
- Safety Assessment Program (SAP) has been expanded beyond just earthquake hazards to include high wind events (hurricane, tornado, windstorm), floods (slow moving, fast moving), and fires (urban-wildland)…
- Experience in dealing with earthquakes reveals that the number of total inspections due to non-structural damage can be more than three times the number of red-tagged and yellow-tagged buildings. Threats also exist from other natural and man-made disasters, including floods, hurricanes, and explosions. Most building departments do not have the ability to perform multitudes of such inspections in a short period of time, so a strong need exists to have a cadre of trained professionals available to assist local governments, along with a program to manage this cadre…

20. Planning for Secure Buildings

Learning Objective: By completing this course you will learn and be able to:

- Define the synergies and tradeoffs associated with balancing security and sustainable site planning…
- List 5 synergies to consider when balancing security and energy…
- Understand the possible attacks and threats to consider in a risk assessment and vulnerability analysis…
- Understand appropriate countermeasures for possible threats…
- Describe elements of the risk and vulnerability assessment process…
- Explain the intent of the UFC/IFC Security Design Criteria…

Contents related to hazard, safety, disaster, inspection etc.

- Security and safety have become paramount in buildings. But it is essential to balance the approach to security with other project requirements and goals. This course will introduce the key elements of determining and analyzing the risks and threats to buildings and provide recommendations and responses for a balanced approach to safety and security in building projects.

21. Seismic Design Basics

Learning Objective: By completing this course you will learn and be able to:

- Explain how earthquakes occur...
- Describe how earthquakes affect buildings…
- Summarize at least two seismic design factors to consider in buildings...
- Understand at least two seismic design strategies or devices...

Contents related to hazard, safety, disaster, inspection etc.

- Buildings in any geographic location are subject to a wide variety of natural phenomena such as windstorms, floods, earthquakes, and other hazards. About half of the states and territories in the United States—more than 109 million people and 4.3 million businesses—and most of the other populous regions of the earth are exposed to risks from seismic hazards. In the U.S. alone, the average direct cost of earthquake damage is estimated at $1 billion/year while indirect business losses are estimated to exceed $2 billion/year. While the occurrence of these incidents cannot be precisely predicted, their impacts are well understood and can be managed effectively through a comprehensive program of hazard mitigation planning and effective seismic design.
- This course will provide an introduction to the concepts and principles of seismic design, including strategies for designing earthquake-resistant buildings to ensure the health, safety, and security of building occupants and assets.

22. Earthquake Safety & Mitigation for Schools

Learning Objective: By completing this course, you will learn the following:

- How to assess and analyze a school's earthquake risks…
- How to develop an actionable plan to reduce and manage earthquake risks…
- How to initiate an earthquake risk reduction plan for existing school buildings that were not designed and constructed to meet modern building codes…
- How to secure non-structural elements of the school facility…
- How to apply incremental seismic rehabilitation to protect buildings and ensure occupant safety…
- Why incremental seismic rehabilitation is an affordable alternative for school safety…

Contents related to hazard, safety, disaster, inspection etc.

- The training material information is based on Incremental Seismic Rehabilitation of School Buildings (K-12): Providing Protection to People and Buildings, FEMA 395...

23. ATC-20 Earthquake Damage Safety Assessment Training

Learning Objective: Following the course, participants will be able to:

- Summarize how buildings structurally react to earthquake forces using building examples presented which have been exposed to those forces…
- Differentiate the significance of the green, yellow, and red postings placed at an evaluated structure…
- Explain when and how to post a building & importance of building reuse using the course building samples…

Contents related to hazard, safety, disaster, inspection etc.

- ATC-20 is the most common methodology used to perform post-damage safety evaluations of buildings. In the aftermath of a major disaster, building safety assessment is one of the most distressing problems of unknown scope and severity that engineers, architects, building officials, and building owners have to face. In this course, a structural engineer will teach you about the most current methods for performing post earthquake safety evaluations of buildings...

24. HCAcademy Web-Ex Planning for Disasters

Learning Objective: By completing this course, you will learn the following:

- Intro/background: Info based on research; 9/11 and Katrina prompting mandates for preparedness - though substantially unfunded mandates; Threat array is varied (design).
- Managing patient surge: Immediate (within hour) vs delayed (up to weeks after) (design); ED as front door. Multiple doors. (design); Managing volumes in facility (design); When to move outside facility (design); How to move outside facility (design); Isolation room (design); ED as isolation ward (design); Provisions for surge within ED (design); Mobile isolation units (design); Surge strategies
- Within hospital (design)
- Use of non-hospital space (design)
- Working toward self-sufficiency: Current JCAHO standards not enough; Physical provisions (design); Supplies strategies (design); Disaster response teams; Sustaining staff (design)

- Coordinating response within regional system: Reasons for not communicating; Task force work groups; Coordinated use of each facility (design); Use of common software

25. Practical Design of Structures for Blast Effects

Learning Objective: By completing this course you will be able to:
- Discuss dynamic and equivalent static analysis using SDOF models…
- Have some awareness and capability of anti-terrorist consequences as an architect...
- Discuss design methodologies and user-friendly computer programs…
- Learn vulnerability assessment using pressure - impulse diagrams…

26. Principles of Seismic Design

Learning Objective: Following the course, participants will be able to:
- Discuss tectonic theory in the Pacific Northwest and the effects of earthquakes in the area...
- Identify the seismic design considerations of steel, concrete, wood, and masonry buildings…
- Discuss geotechnical considerations for deep and shallow building foundations...
- Discuss how existing buildings are evaluated / renovated for earthquake damage and will review pertinent existing building codes…

Contents related to hazard, safety, disaster, inspection etc.
- This face-to-face, 6.0 hour, lecture presentation is designed for building professionals interested the science of earthquakes, their effects on structures, and structure design to mitigate earthquake effects. Learners will be able to explain the fundamentals of earthquake actions, analysis of their effects on structures, structure design considerations in areas prone to earthquakes, and evaluating/renovating existing buildings. This event will be conducted in a handicap-accessible conference room with ample seating space and writing surface for all in attendance. Materials prepared by the faculty will be distributed to all participants. Interaction will be encouraged in the form of Q&A.

27. Quality Challenges During Major Disasters

Learning Objective: By completing this course you will be able to:
- Identify challenges for disaster related services and recovery…
- Share lessons-learned for mobilization…
- Prepare better and recover faster from future disasters…

28. Reinvention 2010 / Housing Tour: New Orleans Rebuilds for Safety and Sustainability After Hurricane Katrina

Learning Objective: By completing this course you will be able to:
- Understand existing extreme conditions in New Orleans, post-Hurricane Katrina…
- Learn how new building safety and energy codes affect the design and engineering of new housing structures in New Orleans: Hurricane conditions; high-water conditions...
- Apply sustainable design and best building performance practices in a demanding climate: passive solar orientation; right-sizing HVAC equipment; window openings and orientation; sun shading…
- Design for human health, safety, and welfare in a flood zone: elevation of structures above the flood zone; designing for natural ventilation; facilitating rescue from rooftops…

Contents related to hazard, safety, disaster, inspection etc.
- This all-day housing tour will encompass single-family and multi-family buildings designed to withstand extreme conditions in New Orleans, LA, and to maximize energy efficiency and water conservation. Buildings are also engineered to allow occupants to safely escape high water on upper portions of the structures…

29. Shingle Roofing Systems - Avoiding Roofing Disasters

Contents related to hazard, safety, disaster, inspection etc.
- The proper installation of shingles, underlayments, hip & ridge and skylights. Understanding how much ventilation is needed and how to achieve it. The truth about warranties and what is covered and is there anything better…

30. The A/E and Site Safety- "Know your Duties and How to Avoid Disasters"

Contents related to hazard, safety, disaster, inspection etc.
- Site Safety and the 2007 AIA Documents -OSHA Standards -Other Federal, State, Industry Safety Standards -Design Duties and Site Safety -Site Visits What to DO and What not to do -Reducing your risks through your contract -Mistakes not to Make- Case Studies of Construction Disasters…

31. The Magnitude 8.8 Chile Mega-Earthquake of 2010: Damage & Recommendations for Risk Management

Learning Objective: After completion of this material, designer will be able to:
- Learn what needs to improve to prevent the damage we in Chile?
- Have a look at historical building preservation: practical applications and reinforcement...
- Have new lessons from one of the largest earthquakes to date and how those lessons can benefit us here in the States...

Contents related to hazard, safety, disaster, inspection etc.
- This seminar will cover the new lessons learned from one the largest earthquakes to date. The effects of earthquakes and damages will be covered along with the risk to buildings, contents and future preventative measures and improvements…

32. Training Architects to Help Communities to Recover from Disasters

Contents related to hazard, safety, disaster, inspection etc.
- This seminar will train participants to help communities recover from disaster and mitigate damage from future mishaps. Architects will learn how to use the profession skills in helping to assess damage and rebuild communities hit by natural disasters...

33. 2008 Fundamentals of I-Codes for the Permit Tech Institute

Learning Objective: After completion of this material, participants will be able to:
- Describe an overview of building code enforcement...
- Employ legal principles in the building department...
- Explain the fundamental plan review process...
- Read basic construction documents...
- Use I-Codes to find the answers to frequently asked questions...
- Use strategies and techniques to effectively interact with customers…

34. Air Sealing Fire Separation Assemblies: Codes And Conflicts

Contents related to hazard, safety, disaster, inspection etc.

- ASTM E-119 Tests for fire separation assemblies, particularly party walls, do not address the wide variety of real world construction configurations that result in uncontrolled air leakage in multifamily buildings. Effective air sealing strategies are possible in these assemblies, however codes are somewhat ambiguous on the properties and types of acceptable systems and products that can be used, leading to inconstant enforcement. The Canadian Building Code has addressed this issue. A review of current status of air sealing fire separation assemblies within the I-Codes and test methods will also be discussed…

35. Breaking The Code: The New NYS Codes Demystified

<u>Contents related to hazard, safety, disaster, inspection etc.</u>

- Learn to Navigate the new Code books, which will became mandatory, as of January 1, 2008. Major Changes from the current codes will be higlighted. The speaker, who is both an architect and a code Enforcement Officer will shed light on the codes through her dual insight…

36. Building Codes

<u>Note:</u> The courses specified under "building codes" title are more than one course (there are a lot of courses given in many states of the U.S.) … Here, some of the specific learning objectives that have strong relations to study area are cited …

<u>Learning Objective:</u> After completing these courses, the attendee will be able to:

- Preview structural provisions; Describe simple and complex plan submissions; Discuss fire and smoke dampers; Review important issues to ensure a project is constructed as intended and without incident; Identify what to consider to ensure the building designed is the building that is constructed; Discuss building classifications; Discuss building code violations; Review the code adoption process, identify code provisions, and discuss significant code changes; Review hurricane issues; Discuss building code enforcement, and identify performance-based codes; Discuss what to expect from engineers; Discuss OBC-07 structural provisions, identify special considerations in renovation projects, and review insurance issues; Identify the prescriptive and non-prescriptive parts of codes, and review the impact of approval by the building inspector; Discuss occupancies and use groups, identify unique theories for walls, roofs, exterior wall protection and exits, and review the minimum requirement of codes; Explain why building codes matter, review the ICC 2006 building codes, and discuss plan review compliance; Recognize legal aspects of noncompliance, review construction inspections, and discuss historical codes and grandfathered structures, additions and modifications; Identify means of egress, review fire rated ceiling design requirements, and discuss ventilation codes and standards; Discuss fire sprinklers and alarms; Identify what codes apply to alterations of existing buildings; Discuss structural tests and special inspections, and identify New York modifications regarding the reinforcement of masonry; Identify who enforces codes; Review the history and development of building codes; Identify the health, safety and welfare aspects of building codes.

37. Building Codes: Code Searches

<u>Learning Objective:</u> At the conclusion of the "Code Searches" program participants will have a better understanding of the following:

- The importance of getting started early in the design process which includes; identifying code agencies having jurisdiction - identifying the local codes that will be applicable with any adopted revisions - understanding the submittal requirements to secure code approvals…
- Why careful and detailed documentation is necessary - the "Dos" and the "Donts" in working with Code officials…

38. Building Codes: Egress Concepts

<u>Learning Objective</u>: At the conclusion of the "Egress Concepts" program participants will have a better understanding of the following:

- The importance of a safe and clear path of travel from any point in the building to an exterior exit…
- Calculating the occupant load, exit capacities, and exit discharge…
- Documenting egress findings on drawings as may be required by State Fire Marshall and other jurisdictions…

39. Building Codes: Fire Protection Review

<u>Learning Objective:</u> After completion of this program, participants will have a better understanding of:

- The design options that may be available for automatic fire suppression systems, including sprinklers that are to be installed…
- Other fire performance issues to be reviewed include: fire performance requirements that apply to specific occupancy and construction types…
- Fire protection system requirements that establish the need for: heat and smoke detectors - alarm systems - special fire suppression systems …
- The goal of the building code which is to provide a margin of safety for the building occupants…

40. Building Codes: Fire Resistive Rated Construction

<u>Learning Objective:</u> By completing this course you will have a better understanding of:

- Various wall construction types and finishes as defined and required by the Building Code as follows: exterior walls - fire barriers - fire walls - smoke barriers - smoke partitions - shafts - floor construction - roof construction - penetration protection - interior finishes…
- Energy Code Participants will also learn the importance of applying precise terminology to the various wall construction types and finishes and not use the terminology interchangeably…

41. Codes. Barriers, and Moisture

<u>Learning Objective:</u> By completing this course you will be able to:

- Examine the logic associated with the common building code requirement for plastic sheathing on the inside of buildings…
- Identify situations where infiltration barriers can work as air barriers and when they can work as vapor retarders…
- Explain what drives moisture, how these different materials can function in a building, and how to make sure they work for you and not against you…

<u>Contents related to hazard, safety, disaster, inspection etc.</u>

- Vapor retarders, house wraps, air barriers, and other membranes can get you into deep water or they can bail you out…

42. Codes & Building Sciences: Conflicts, Resolutions & Results

<u>Learning Objective:</u> By attending this session, participants will:

- Gain insights into how and why building codes sometimes conflict with the best design and practice…
- Learn how to establish and maintain productive working relationships with code officials…

- Find out about green building methodologies related to code conflicts and approvals KEY WORDS: building science, codes, green building, health & safety, housing, housing performance, implementation, innovation, inspections, new construction…

Contents related to hazard, safety, disaster, inspection etc.

- This course will help to the participants to;
  - Examine common areas where the requirements of building codes conflict with building science principles…
  - Understand how these problems arise as well as real life ways they can be avoided to provide affordable and durable housing...
  - Learn ways to address those challenges by making good building science based arguments for alternative approaches that are better aligned with scientific principles and actual building performance…

43. Codes, Fire Doors, and Architectural Hardware

Learning Objective: Attendees will:

- Learn the functionality, application, and requirements of hardware on labeled openings…
- Identify door hardware components and how to apply them to fire doors…
- Understand door and frame fire classifications, and learn how they are determined…

Contents related to hazard, safety, disaster, inspection etc.

- Examples of finished installations, both successful and unsuccessful, will be also explained...

44. Firestopping: Products, Applications, Specifications and Codes

Contents related to hazard, safety, disaster, inspection etc.

- The different types of firestopping products are currently available. Where firestopping is typically required is discussed. Participants will learn about the methods for specifying firestopping products. Applicable code requirements for firestopping will also be discussed…

45. Integrated Site and Building Design Using CPTED, LEED, BIM and the ICC SMARTcodes

Contents related to hazard, safety, disaster, inspection etc.

- Participants will learn the essential knowledge to rapidly site and design federal facilities in an urban area. They will review NFPA 1600 All-Hazards Risk Analysis; Federal Security Standards (DoD UFC and GSA ISC) and Urban Site Security Design Principles; Commercial Security Standards and Practice (NFPA 730 and 731); and CPTED (Crime Prevention Through Environmental Design) Principles. They will also consider LEED certification standards, energy and sustainable design principles, Building Information Modeling and ICC SMARTcodes…

46. Passive Survivability and Building Codes: Setting an Agenda

Learning Objective: By attending this course, participants will:

- Understand passive survivability (livable conditions in the event of extended power outages, interruptions in heating fuel, or shortages of water) and why it is a high priority for homes being built today and in the future…
- Understand that a passive survivability agenda is also a sustainability agenda…
- Provide the most effective ways to achieve green building goals…
- Learn how innovative ideas can emerge from the idea stage to implementation…

47. Reducing Flood Losses through the International Codes

Learning Objective: After completion of this material, participants will :

- Know the family of building codes known as the I-Codes and the National Flood Insurance Program (NFIP)…
- Learn that the 2003 and 2006 editions of the International Building Code (IBC) meet the minimum design and construction requirements of the NFIP for all buildings and structures, including, by reference, one- and two-family dwellings…

Contents related to hazard, safety, disaster, inspection etc.

- This material will explain the latest flood-resistant construction standards and code requirements, and how raised wood floors help meet those requirements…

48. Building Stronger Homes in the Face of Hurricanes, Floods and Earthquakes

Learning Objective: By completing this course you will be able to:

- Understand how the I-Code provisions align with and differ from NFIP regulations and ASCE 24…
- Gain an understanding of the expected earthquake performance of houses constructed according to the IRC…
- Learn where extra attention is needed during design / construction to get the best performance to sustain less property damage…
- Learn about which measures you can take to obtain "above code" performance in your buildings…

49. L'Aquila Earthquake Reconnaissance - Seismic Engineering

Learning Objective: Participants, attending to this course, will:

- Overview of causes and seismic engineering of 2009 Italy earthquake…
- Structural deficiencies of historic buildings…
- Detailed review of structural deficiencies in concrete and masonry structures…
- Opportunities for rebuilding…

50. Structural Design and the Earthquake in Sichuan China

Learning Objective: Participants, attending to this course, will:

- Understand the seismic performance of various construction types prevalent in China during a strong earthquake...
- Learn how emergency measures developed and in place in the US could benefit other areas of the world…
- Learn how "lessons learned" can improve emergency response action in the US…
- Learn how refuge is obtained subsequent to a natural disaster and how architects and engineers can aid in providing safe havens subsequent to such an event...

Contents related to hazard, safety, disaster, inspection etc.

- Participants will learn how refuge is obtained in various parts of the world subsequent to a natural disaster and how we as architects and engineers can aid providing safe havens subsequent to an event.

51. Advanced Combination Inspection Methodology

Contents related to hazard, safety, disaster, inspection etc.

- This full-day course is designed to spur the thought processes of and to draw on the attendee's abilities as an experienced inspector to perform the more complex field inspections in an orderly, logical, and systematic process...

- A model case study will be explored in the afternoon, going into the methodology of the inspections required for the construction of a new structure…
- This course is ideal for the more experienced field inspector who is looking to refresh his/her basic field inspection methodology skills…
- The class applies toward the Field Inspector Credential…

52. Combination Field Inspection

Contents related to hazard, safety, disaster, inspection etc.

- This full-day course presents selected misconceptions, methodologies, and resources pertaining to the application of the California Codes…
- It is ideal for the beginning field inspector and those interested in "brushing up" his/her field techniques…
- Selected building, electrical, plumbing and mechanical subjects and their inspection methodologies will be explored…
- This course applies toward the Field Inspector, Counter Technician and Code Enforcement Credentials…

53. Common Issues in Special Inspections

Learning Objective: After completion of this course, design professional will be able to:

- Understand the difference between construction materials testing and special inspections...
- Understand the building code requirements for special inspections…
- Understand common problem areas uncovered by special inspections…
- Understand their role in the special inspection process...

Contents related to hazard, safety, disaster, inspection etc.

- In this course, it is presented samples of how special inspections have been rolled-out in various jursidictions…

54. Extreme 1! Plan Review & Inspections

Contents related to hazard, safety, disaster, inspection etc.

- In this course, it is addressed the very large and unusual building plan review and inspections. The class will focus on high-rise construction, atriums and very large buildings…
- The discussion will address the review and inspections of alternate designs, smoke control and performance based design…
- The class will also discuss the special inspection process and how to monitor the program…

55. Extreme 2! Plan Review & Inspections

Contents related to hazard, safety, disaster, inspection etc.

- This class continues from where Extreme 1 ended but continues its focus on very large and unusual building plan review and inspections…
- The discussion will address the review and inspections of alternate designs and performance based design…
- Extreme 2 will include IECC and green buildings concepts…

56. IBC Chapter 17 - Special Inspections

Contents related to hazard, safety, disaster, inspection etc.

- This program is intended to educate the attendees on the following requirements of the International Building Code, Chapter 17 - Special Inspections, specifically the following:
    - What special inspections are where they originated from…
    - How to utilize proper paperwork and forms to ensure code compliance...
    - What specifically structural engineers and materials testing agencies can do in this process and what is required of the architect, owner and contractor...

57. IBC- Special Inspection: How Did it Impact Construction Materials Testing Services?

Contents related to hazard, safety, disaster, inspection etc.

- The architect will learn about the impact of the new training for special inspections and will learn about the training for the materials testing services…
- Architects will learn about the impact the new training has had upon services rendered and what requirements are needed for the training and inspections…
- They will also learn about the materials used during these inspections, and how the inspections are performed…

58. Infrared A to Z: energy audits, construction, final inspections, training, energy assessments, and diagnosing building problems

Learning Objective: After completion of this course, design professional will be able to:

- Consider using infrared thermography as a tool in energy audits, construction, final inspections, training, energy assessments, and diagnosing building problems...
- Understand the basics of infrared diagnistics in residential structures…
- Recognize the value and benefit of using infrared thermography for building inspections…
- Learn about the new imaging products available in the market that can meet your needs…

59. International Building Code Seminar, Structural Design and Special Inspections

Learning Objective: After completion of this course, design professional will be able to:

- Differentiate between dead loads, live loads, wind loads, snow and rain loads, and earthquate loads...
- Know the contractor responsibility for special inspections, as well as the criterial or approvals, statement of special inspections, seismic inspection and testing, and load tests...

Contents related to hazard, safety, disaster, inspection etc.

- Participants will review construction documents for structural design.

60. Residential Building Inspections (Field Inspection Process)

Contents related to hazard, safety, disaster, inspection etc.

- This class provides new residential inspectors with basic techniques and an understanding of conducting inspections of one & two family dwelling and townhouse buildings. The discussion will include preparation, presentation and inspections of the building, mechanical and electrical portions of a building…

61. Special Inspection Requirements in the International Building Code

Learning Objective: Participants, attending to this course, will enhance:

- Understanding of IBC requirements for special inspections…
- Understanding of what special inspections are…
- Understanding of contractor responsibilities…

- Understanding of who can provide special inspections…
- Managing special inspection requirements New Knowledge or Skill: Ability to manage special inspection process during project construction…

62. Special Inspections: What Should You Expect?

Contents related to hazard, safety, disaster, inspection etc.

- This seminar will identify the relationship of the special inspector to the building official, structural engineer, design team, quality control agency and the contractor…
- Daily reports, piling logs, forms, discrepancies and test results will be discussed and the importance of accurate documentation…
- Periodic vs. continuous inspection will be discussed also...
- Qualifications of who can or should perform special inspections…

APPENDIX N

RIBA-CPD Core Curriculum

Table N.1: RIBA / CPD Core Curriculum Study Guide. Source: http://www.architecture.com (official web-site of RIBA).

Section	Core Curriculum Subjects	Possible Topics
1	Being safe – health and safety,	Pertinent construction legislation and building regulations; CDM (or similar outside the UK), particularly designers' responsibilities; Workplace health and safety; Employers' responsibilities; Risk assessment; Fire safety legislation; CSCS card procurement…
2	Climate – sustainable architecture,	*A. Briefing:* Knowledge of climate change and climate change science and impact of both mitigation and adaptation; KPI's and which ones should be used; Communicating the importance of low carbon design; Understanding stakeholders, clients, planning and legislative authorities; Defining the brief whilst balancing sustainability targets; Understanding and prioritizing energy efficiency in low carbon design; Importance of sustainable design from inception to completion and handover including post-occupancy evaluation and feedback; Understanding the impact of choices on traditional and old buildings… *B. Design process* Regulations, codes, guidance and standards (current and planned); Heat loss parameters and understanding the relationship between air tightness, insulation, glazing, heat loss and solar gain; Building services and renewable energy systems; Building energy performance/metering and monitoring; Understanding the energy assessment process; Material selection, embedded energy, recycling and minimizing waste; Understanding energy and u-value calculations; When to use passive or mechanical ventilation; Whole life carbon foot printing; Resource energy efficiency, materials, water, energy and behavior; Understanding sustainable benchmarking tools and assessment methods: BREEAM, SAP, PHPP, Code for Sustainable Homes, EARM…
3	External management – clients, users and delivery of services,	Architects' contracts (eg, as lead or sub consultant), terms of engagement, scope of services, clear letters of appointment, relevant legislation; Intellectual property rights, copyright law; Duty of care, professional liability, negligence and professional indemnity, including insurance; Client relationship management; Briefing/getting the brief right/context of the brief; Adding value through design and services; Obligations to stakeholders, warranties and third party rights; Communication, progress reporting and appropriate and timely advice; Cost monitoring and control and financial management; Programming of services appropriate to appointment; Coordination + integration of design team input…
4	Internal management – professionalism, practice, business and management,	Architect's obligation to society and the protection of the environment; Practice structures, legal status and business styles; Time management, recording, planning and review; Effective communication, presentation, pitching, confirmation and recording; Staff management and development; Practice finance, business planning, funding and taxation; Marketing and promoting the practice; Fee calculation, negotiation, bidding; Administration, quality management, QA systems, recording and review; Team working and leadership; Resource management, job costing and cash flow; Risk management; Project management; Current RIBA and ARB codes of conduct and discipline, including professional ethics…

Table N.1: RIBA / CPD Core Curriculum Study Guide (continuing)

5	Compliance – legal, regulatory and statutory framework and processes,	The relevant UK (or overseas if you work elsewhere) legal systems and processes, civil liabilities and the laws of contract and tort (delict); Planning, Listed Buildings and Conservation Areas Acts, guidance and processes (see also section 9); Building regulations, EU regulations, ISOs, approved documents and standards, guidance and processes, such as The Equality Act 2010, Health and Safety, fire safety, environmental; Land law, property law, The Party Wall Act, and rights of other proprietors; Terms within construction contracts implied by statute; Statutory undertakers 6and authorities, their requirements and processes; Employment-related legislation and policies; Environmental and sustainability legislation (see also section 2); Accessibility, inclusion, and diversity legislation (see also section 10); Advisory design review systems; Health and safety/CDM legislation and regulations (see also section 1)…
6	Procurement and contracts,	Procurement methods, including for public and larger projects and relevant legislation, Tendering methods, codes, procedures and project planning; Forms of contract and sub-contract, design responsibility and third-party rights; Claims, litigation and alternative dispute resolution methods; The effect of different procurement routes on programme, cost, risk, quality; Collaboration and briefing in construction and provisions for team working; Application and use of contract documentation; Duties and powers of a lead consultant and contract administrator; Site processes, quality monitoring, progress recording, payment and completion; Project Management (as a qualified person)
7	Designing and building it – structural design, construction, technology and engineering,	Architectural design; BIM, CAD, modelling, mapping and visualization; Design for accessibility; Technical innovations; Specification writing and choosing materials; Production information; Alternative structural, construction and material systems; Optimum physical, thermal and acoustic environments; Systems for environmental comfort within the relevant precepts of sustainable design; Strategies for building services and the integration within a design project…
8	Where people live – communities, urban and rural design and the planning process,	The theories and objectives of urban design and the qualities of successful places; The influence of design and development on places, communities, non urban areas and cities; The needs and aspirations of communities, and space and building users; The ways in which spaces and places fit into their local context; The role played by design within the larger community context; Understanding briefing, engagement, empowerment, cohesion and leadership and their impact on creating successful communities; Understanding the relation between design, buildings, green spaces, gathering places, facilities, energy, carbon reduction, highways, servicing, safety and security and people…
9	Context – the historic environment and its setting,	Legislation and published governmental and other guidance relevant to historic assets (buildings, areas, monuments, gardens and parks, whether designated yet or not) and their settings, eg, Icomos; Planning and Conservation Acts, guidance and processes; Cultural significance; Historical significance; Architectural significance; Settings; Aesthetic qualities and values; Investigation, materials, technology and the building environment; Social, environmental and financial issues; Implementation and management of conservation works; Special considerations in the application of approved documents (including building regulations, The Equality Act, environmental, fire safety); The impact of archaeological sites known or suspected on building; The impact of green design choices on traditional and old buildings…
10	Access for all – universal or inclusive design.	The principles of universal or accessible design; Planning and access; Equality and diversity legislation, including The Equality Act 2010, and relevant building and other regulations; Access and inclusion in the workplace; Understanding, writing and implementing access statements; Relevant product specification; Community consultation and engagement and working with user groups; Special issues for fire, security and egress; Principal guidance standards; Different buildings and their uses and users; Design detailing, e.g., color and contrast, acoustics; Fixtures, fittings and equipment; Refurbishment of listed buildings and access; Management policies, procurement and brief writing; Lifetime Homes and wheelchair housing…

APPENDIX O

Some of the Critical Inspection Activity Areas

These activity areas are needed to be aware of within the interior-insulation-ventilation inspection process, particularly for residential buildings[60].

- Heat Movement,
- Moisture Movement - Controlling Moisture,
- Protection From Water Damage,
- Compressed Insulation,
- Thermal Bridging,
- Precautions About Adding Insulation,
- Checking the Attic,
- Attic Access,
- Attic Pull-Down Stairs,
- Attic Insulation Rulers and Thicknesses,
- Difficult Areas to Check in the Attic,
- Wall Sheathing,
- Floors and Crawlspaces,
- Types of Insulation,
- Foam Insulation,
- Radiant Barriers,
- Insulation Labels,
- Where to Look for Insulation,
- Roof Ventilation and Insulation,
- Roof Vents and Insulation Clearance,
- Ventilation Required,
- Some Roof Ventilation Definitions,
- Ice Dams,
- Roof Ventilation Based on Climate and Insulation Amount,
- Rule of Thumb,
- Roof Height at the Eave,
- How Basement Walls Should Dry to the Interior,
- Finding Interior Foam Insulation and a Fire Hazard,
- Look for Holes That Allow Air Leakage into the Basement Wall,
- Check for Moisture at Bottom of Basement Finished Walls,
- Slab on Grade Construction,
- Cracks in the Slab and Moisture Problems,
- Insulation on the Exterior Slab-On-Grade Foundation,
- Frost Protected Shallow Foundations and Insulation,
- Slab with Moisture-Resistant Finishes,
- Slab with Moisture-Sensitive Finishes,
- Missing Slab Insulation, Signs of Moisture Problems,
- Crawlspaces,
- Air Leakage and Major Moisture Problems,
- Air Sealing,
- Look for Big Air Leaks,
- Air Sealing from the Attic,
- Blower Doors – Useful Tool Checking Air Leaks,
- Air Barriers, Vapor Diffusion Retarders,
- For Hot/Humid Climates; Walls Dry Towards the Inside,
- Inspecting “Warm Walls” in Cold Climates,
- For Cold Climates; Walls Dry Towards the Outside,
- Ventilation of the House Interior Air,
- Natural Ventilation,
- Energy-Recovery Ventilation Systems,
- Bathroom Ventilation Ducts and Fans,
- Windows, Condensation in Double-Paned Windows,
- Safety Glass for Inspectors,
- Doors,
- Egress,
- Steps,
- Handrails and Illumination,
- Emergency Escape and Rescue Openings,
- Floors,
- Walls and Ceilings.

[60] Adapted from *"How to Inspect the Attic, Insulation, Ventilation and Interior" course*, InterNACHI (The International Association of Certified Home Inspectors). Available from: http://www.nachi.org/interiorcourse.htm (Accessed on 2011).

APPENDIX P

Building Hazards Particularly for Residential Structures

Adapted from the information at http://www.nachi.org/hazards.htm (accessed in 2011)

This list of terms covers some of the most common household dangers likely to be encountered by homeowners. Inspectors have to take into account during inspection activities.

1. **algae:** microorganisms that may grow to colonies in damp environments, including certain rooftops. They can discolor shingles; often described as "fungus."
2. **alligatoring:** a condition of paint or aged asphalt brought about by the loss of volatile oils, and the oxidation caused by solar radiation; causes a coarse, "checking" pattern characterized by slipping of the new paint coating over the old coating to the extent that the old coating can be seen through the fissures. "Alligatoring" produces a pattern of cracks resembling an alligator hide, and is ultimately the result of the limited tolerance of paint or asphalt to thermal expansion and contraction.
3. **asbestos:** a common form of magnesium silicate which was commonly used in various construction products because of its stability and resistance to fire. Asbestos exposure, caused by inhaling loose asbestos fibers, is associated with various forms of lung disease. Asbestos is the name given to certain inorganic minerals when they occur in fibrous form. Though fire-resistant, its extremely fine fibers are easily inhaled, and exposure to them over a period of years has been linked to cancers of the lung and the lung-cavity lining, and to asbestosis, a severe lung impairment. Asbestos is a naturally occurring mineral fiber sometimes found in older homes. It is hazardous to your health when a possibility exists of exposure to inhalable fibers. Homeowners should be alert for friable (readily crumbled or brittle) asbestos, and always seek professional advice in dealing with it.
4. **bleeding:** the migration of a liquid to the surface of a component or into/onto an adjacent material.
5. **blister:** an enclosed, raised spot evident on the surface of a building. They are mainly caused by the expansion of trapped air, water vapor, moisture or other gases.
6. **blue stain:** a bluish or grayish discoloration of the sapwood caused the growth of certain mold-like fungi on the surface and in the interior of a piece, made possible by the same conditions that favor the growth of other fungi.
7. **bubbling:** in glazing, open or closed pockets in a sealant caused by the release, production or expansion of gasses.
8. **buckling:** the bending of a building material as a result of wear and tear, or contact with a substance such as water.
9. **carbon monoxide (CO):** a colorless, odorless, highly poisonous gas formed by the incomplete combustion of carbon.
10. **cohesive failure:** internal splitting of a compound resulting from over-stressing of the compound.
11. **condensation:** water condensing on walls, ceiling and pipes; normal in areas of high humidity, usually controlled by ventilation or a dehumidifier.
12. **corrosion:** the deterioration of metal by chemical or electrochemical reaction resulting from exposure to weathering, moisture, chemicals and other agents and media.
13. **crater:** pit in the surface of concrete resulting from cracking of the mortar due to expansive forces associated with a particle of unsound aggregate or a contaminating material, such as wood or glass.
14. **crazing:** a series of hairline cracks in the surface of weathered materials, having a web-like appearance; also, hairline cracks in pre-finished metals caused by bending or forming; see brake metal.
15. **cupping:** a type of warping that causes boards to curl up at their edges.
16. **damp-proofing:** a process used on concrete, masonry and stone surfaces to repel water, the main purpose of which is to prevent the coated surface from absorbing rainwater while still permitting moisture vapor to escape from the structure. Moisture vapor readily penetrates coatings of this type. Damp-proofing generally applies to surfaces above grade; waterproofing generally applies to surfaces below grade.
17. **decay:** disintegration of wood and other substances through the action of fungi.
18. **distortion:** alteration of viewed images caused by variations in glass flatness or in homogeneous portions within the glass; an inherent characteristic of heattreated glass.
19. **drippage:** bitumen material that drips through roof deck joints, or over the edge of a roof deck.
20. **dry rot:** see fungal wood rot.
21. **feathering strips:** tapered wood filler strips placed along the butt edges of old wood shingles to create a level surface when re-roofing over existing wood shingle roofs; aso called "horsefeathers."
22. **fungal wood rot:** a common wood-destroying organism which develops when wood-containing material is exposed to moisture and poor air circulation for a long period of time (six-plus months); often and incorrectly referred to as "dry rot."
23. **fungi (wood):** microscopic plants that live in damp wood and cause mold, stain and decay.
24. **incompatibility:** descriptive of two or more materials which are not suitable to be used together.
25. **lead-based paint:** Lead is a highly toxic metal that was used for many years in products found in and around homes. Lead may cause a range of health problems, from behavioral problems and learning disabilities, to seizures and death. Children age 6 and under are most at risk because their bodies are growing quickly.
26. **migration:** spreading or creeping of a constituent of a compound onto/into adjacent surfaces; see bleeding.
27. **mud cracks:** cracks developing from the normal shrinkage of an emulsion coating when applied too heavily.
28. **mushroom:** an unacceptable occurrence when the top of a caisson concrete pier spreads out and hardens to become wider than the foundation's wall thickness.
29. **photo-oxidation:** oxidation caused by rays of the sun.

30. **ponding:** a condition where water stands on a roof for prolonged periods due to poor drainage and/or deflection of the deck.
31. **radon:** a naturally-occurring, radioactive gas which is heavier than air and is common in many parts of the country. Radon gas exposure is associated with lung cancer. Mitigation measures may involve crawlspace and basement venting and various forms of vapor barriers.
32. **scrap out:** the removal of all drywall material and debris after the home is "hung out" (installed) with drywall.
33. **seasoning:** removing moisture from green wood in order to improve its serviceability.
34. **settlement:** shifts in a structure, usually caused by freeze-thaw cycles underground.
35. **sludge:** term for the waste material found in sump pump pits, septic systems and gutters.
36. **spalling:** the chipping and flaking of concrete, bricks and other masonry where improper drainage and venting and freeze/thaw cycling exists.
37. **splitting:** the formation of long cracks completely through a membrane. Splits are frequently associated with lack of allowance for expansion stresses. They can also be a result of deck deflection and a change in deck direction.
38. **ultraviolet degradation:** a reduction in certain performance limits caused by exposure to ultraviolet light.
39. **UV rays:** ultraviolet rays from the sun.
40. **veining:** in roofing, the characteristic lines or "stretch marks" which develop during the aging process of soft bitumens.
41. **warping:** any distortion in a material.
42. **water vapor:** moisture existing as a gas in air.

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B.ARCH	İTÜ Architecture	1998
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WORK EXPERIENCE

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2004-Present	METU	Research Assistant
2001-2003	MİRO Mimarlık, İstanbul	Architect
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1998-1999	DELTA Büro Mobilya, İstanbul	Architect

FOREIGN LANGUAGES

Advanced English

PUBLICATIONS

International
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