EXAMINATION OF ORGANIZATIONAL SAFETY CULTURE OF AN AUTOMOTIVE COMPANY

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ABSTRACT

EXAMINATION OF ORGANIZATIONAL SAFETY CULTURE OF AN AUTOMOTIVE COMPANY

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This study aimed to build a safety culture level assessment tool for the automotive industry and to apply this tool in an organization of automotive industry. The first part of the study was to create a safety culture matrix by making semi-structured interviews with 45 qualified personnel in an automotive industry company. Each interview contained questions about five levels (Pathological, Reactive, Calculative, Proactive and Generative) of nine dimensions (communication system, occupational health and safety trainings, accident / near miss reporting, machines / equipment safety, workers' commitment to safety, management commitment to safety, emergency preparedness, priority given to occupational health and safety and ergonomics) about safety culture in automotive industry. After building the safety culture matrix, the application of the matrix conducted by applying a questionnaire and gathering demographic data from interviewees. The questionnaire method was not a regular selection. However, every five cells were printed in different colored pages and the pages were given to interviewees in a mixed order. The second part of the study was completed with 301 personnel worked in the automotive industry. After that, ANOVA, correlation and regression processes completed. Results showed that employees that did not have any accidents evaluated communication dimension significantly higher than those who had an accident. Moreover, employees with more than 10 years of experience

evaluated OHS training dimension higher than other levels of company experience and evaluated management commitment significantly higher than employees with 4-10 years of experience. Additionally, company experience was positively correlated with both work accident and near misses. Work accident history was positively correlated with near miss and negatively correlated with communication. It was found that communication negatively and OHS training was positively associated with work accidents. Finally, the findings, limitations and future suggestions were discussed in terms of related literature.

Keywords: Safety Culture, Automotive Safety, Safety Dimensions, Organizational Culture, Safety Culture Matrix

ÖZ

BİR OTOMOTİV ŞİRKETİNİN ORGANİZASYONEL GÜVENLİK KÜLTÜRÜNÜN İNCELENMESİ

Öcal Şen, Duygu
Yüksek Lisans, İş Sağlığı ve Güvenliği
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Bu çalışmada, otomotiv endüstrisi için güvenlik kültürü seviyesi ölçüm aracı oluşturmak ve otomotiv endüstrisinde faaliyet gösteren bir şirkette uygulamasını yapmak amaçlanmıştır. İlk çalışma, otomotiv sektöründe tecrübeli 45 çalışanla yapılan, yarı yapılandırılmış görüşmelerin sonucunda güvenlik kültürü matrisinin oluşturulmasıdır. Her görüşmede katılımcılara, otomotiv sektöründe güvenlik kültürünün dokuz boyutunun (iletişim sistemi, iş sağlığı ve güvenliği eğitimleri, kaza / yakın kaza raporlaması, makine / ekipman güvenliği, çalışanların iş güvenliğine bağlılığı, üst yönetimin iş güvenliğine bağlılığı, acil durum hazırlığı, iş sağlığı ve güvenliğine verilen öncelik ve ergonomi) beş seviyesi (Patalojik, Reaktif, Bürokratik, Proaktif ve Üretken) ile ilgili sorular sorulmuştur. Güvenlik kültürü matrisinin oluşturulmasının ardından, anket çalışması ve demografik verilerin toplanmasını içeren uygulama çalışması yapılmıştır. Anket çalışması sıralı seçim şeklinde değil, matrisin herhangi bir boyutuna ait her bir hücresi ayrı renkte kağıtlara basılarak karışık olarak katılımcılara verme şeklinde yapılmıştır. Çalışmanın ikinci aşamasına otomotiv sektöründe çalışan 301 personel katılmıştır. Sonrasında ANOVA, korelasyon ve regresyon çalışmaları tamamlanmıştır. Sonuçar daha önce kaza geçirmemiş çalışanların iletişim boyutunu kaza geçirenlerden daha yüksek değerlendirdiğini

görstermiştir. Ayrıca sonuçlar 10 yıldan daha fazla tecrübesi olan çalışanarın İSG eğitimi boyutunu diğer seviyede tecrübesi olan çalışanlardan daha yüksek ve yönetimin bağlılığı boyutunu 4-10 yıl deneyimli çalışanlardan daha yüksek değerlendirdiğini göstermiştir. Buna ek olarak çalışma şirket deneyiminin iş kazası ve ramak kalalarla pozitif ilişkili olduğu ve iş kazası geçirmenin ramak kalalarla pozitif, iletişimle ise negatif ilişkili olduğu ortaya çıkmıştır. İş kazalarının iletişimle negatif, İSG eğitimiyle pozitif ilişkili olduğu bulunmuştur. Son olarak da bulgular, kısıtlar ve gelecekteki çalışmalar için öneriler tartışılmıştır.

Anahtar Kelimeler: Güvenlik Kültürü, Otomotiv Güvenliği, Güvenlik Boyutları, Organizasyonel Kültür, Güvenlik Kültürü Matrisi

To my beloved family.

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LIST OF ABBREVIATIONS

AuSCuF	Automotive Safety Culture Framework
OH&S	Occupational Health and Safety
HSE	Health and Safety Executive (England)
MAPSAF	Manchester Patient Safety (Manchester University)
ILO	International Labor Organization
OHSAS	Occupational Health and Safety Assessment Series
ICAO	International Civil Aviation Organization

CHAPTER 1

INTRODUCTION

1.1. General Information

Occupational health and safety concept is crucial for all sectors and all companies since injuries and life loses keep continuing all over the world because of work accidents and occupational illnesses. Organizations try to make some improvements in their health and safety management systems, technology and standards in order to prevent losses but in some cases, efforts are not enough because incidents keep happening. Figure 1.1 shows the incident rate in different European countries in 2015. It can be clearly seen from the figure that in some countries the rate closes to zero but none of them achieve that point despite all their effort.

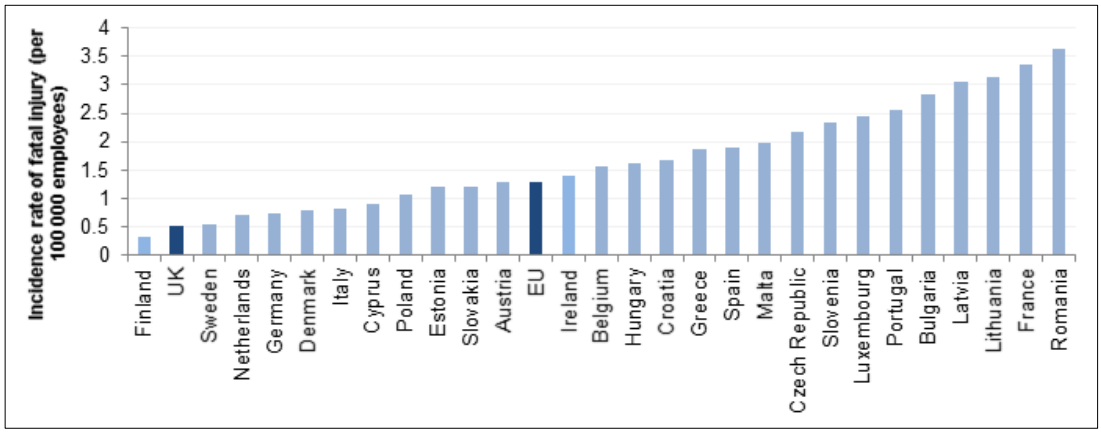


Figure 1.1 Standardized incidence rates of fatal injury at work in Europe (HSE, 2015)

Improvements in safety technology, standards, and management systems may create an organized workplace, however; these changes may not affect the organizational culture. In other words, a workplace may be designed with the technological equipment and perfect standards and procedures may be documented to use this equipment in a perfect order; moreover, a great safety management system may be

created to follow the safety outputs, nevertheless; none of these barriers can close a very important gap in health and safety performance: human factor.

According to the plateau effect on Health and Safety Performance Theory (see Figure 1.2), the key element to decrease incident rates is to achieve a mature safety culture level (Hudson,2007). The figure shows that with the help of technology and standards like engineering and hardware improvements incident rate decreases to a certain level, in addition to that with solid health and safety management systems including risk management, reporting and competence incident rate reduces some more; however, in order to minimize incident rate an improved culture is required in addition to them.

Every organization has a good or poor safety culture. It is not correct to categorize workplaces as have or do not have safety culture because as culture's existence, every organization has its own type of safety culture. With increasing safety culture level, key performance indicators of the company will improve and after some point, everyone tries to keep the level on top or higher than it already is.

In the automotive industry, workers face some safety risks due to the nature of the job. TUIK Statistics (2016) showed that there were 9533 work accidents in 2016 in Turkey at motor land vehicle production sector. In the previous year, work accident number of that sector was 8107 according to TUIK Statistics (2015). That accident numbers showed that there was a 17.6% increase in the work accident values in a year in the automotive sector in Turkey. It means that with increasing mechanization, some portion of the risks getting lower, but some risks remain constant.

It is not an easy job to make a workplace a risk-free area; however, in order to achieve that aim countermeasure activities need to continue. Continual improvement is a must in the health and safety sector as stated in OHSAS 18001 (2007) Standard. OHSAS is a British Standard that enables organizations to demonstrate that they have an occupational health and safety system. OHSAS 18001:2007 defines continual improvement as the "recurring process of enhancing the OH&S management system in order to achieve improvements in overall OH&S performance consistent with the

organization's OH&S policy". In his study Ghahramani (2017) highlights that safety culture is important for continual improvement in occupational health and safety practices in OHSAS 18001 certified companies. In order to reduce risks that may cause work accidents, it is needed to have a system to control the hazard and risks in the workplace.

The aim of the study is to measure the safety culture level of an automotive company and state the points that are open to improvement.

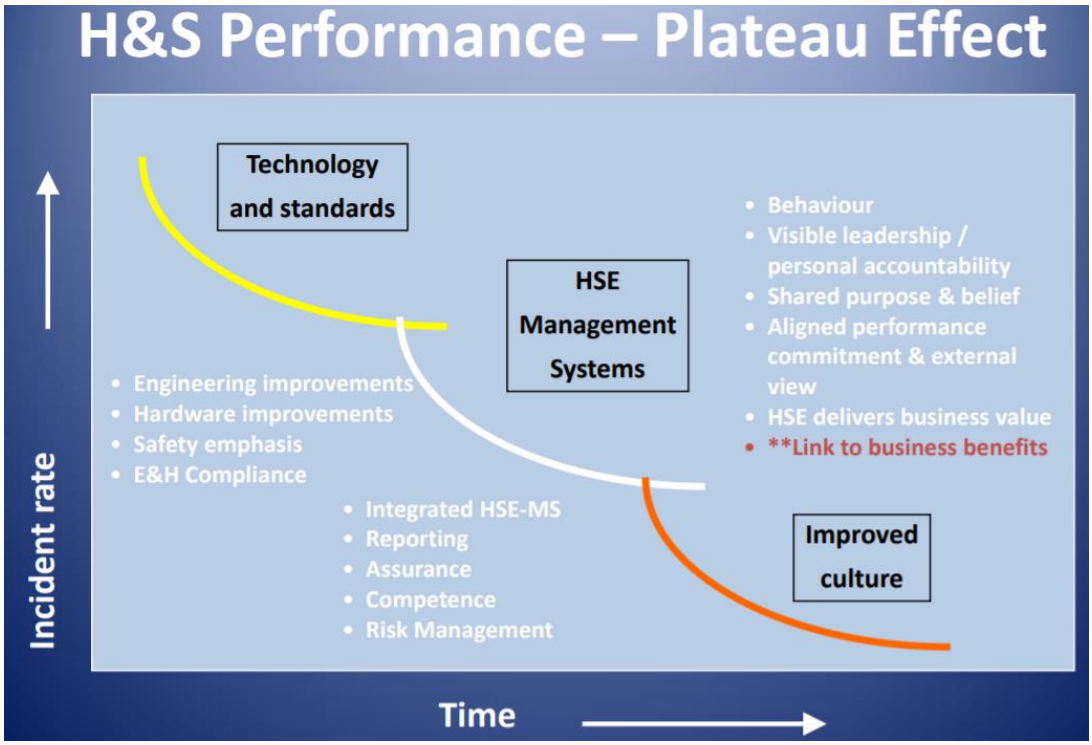


Figure 1.2 Plateau Effect on Health and Safety Performance Theory (Hudson, 2007)

In order to achieve maturity in organization's safety culture level, it needs to be measured first. It is a multidimensional concept and developing a measurement method tailored for a specific sector/industry is not easy. Safety culture can be measured by qualitative and quantitative methods. In the first part of the current study, an automotive sector-specific safety culture matrix was created with interviews. Then, in the second part, a group of workers picked the level of their company at different dimensions.

1.2. Definitions Related to Health and Safety Concept

1.2.1. Occupational Health and Safety

Occupational health and safety is generally defined as the science of the anticipation, recognition, evaluation, and control of hazards arising in or from the workplace that could damage the well-being of workers, taking into account the possible impact on the surrounding communities and the environment (Alli, 2008). Safety is defined by ICAO (2012) as "The state in which the possibility of harm to persons or of property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and safety risk management.". In order to protect workers' health from both work accidents and occupational illnesses, safety management systems need to be established. ILO (2011) defines occupational safety and health management system as "A set of interrelated or interacting elements to establish OSH policy and objectives, and to achieve those objectives". It is also stated that safety management system can contribute to the protection of employees from hazards and its resulted risks; moreover, it can help the elimination of injuries, disabilities, ill health, narrow escapes, and life loses (ILO, 2011).

It is stated by laws of the countries and international safety standards that protecting workers' health is both employers' and employees' responsibility. It is an employer's duty to protect the health and safety of their employees and surroundings who might be affected by their business; moreover, employers must do everything, which is reasonably practicable to achieve this (HSE, 2001). In addition to employers, employees are also responsible to protect their own and enclosing people's health. In other words, workers have a duty to take care of their own health and safety and that of others who may be influenced by their actions at workplace (HSE, 2001). Therefore, as it is stated by the regulations that, maintaining health and safety at workplace is everyone's job in the workplace including workers at all level like managers, visitors, interns, employer, etc.

1.2.2. Work Accident

Work accident is an unexpected and unplanned occurrence, arising out of or in connection with work, which results in one or more workers incurring themselves in terms of first aid, disease or fatality (ILO, 2013). As there are many private and governmental agencies are constituted, lots of codes and legislations are created and lots of money is spent all over the world, it can easily be seen that work accidents are undesired, and organizations try to find solutions to avoid them. When the human factor comes into the equation, reducing the accident rates become difficult.

The ILO (2016) estimates that some 2.3 million people around the world succumb to work accidents or diseases every year; this corresponds to over 6000 deaths every single day. Worldwide, there are around 340 million work accidents and 160 million people that suffer from work-related illnesses (ILO, 2016). In addition, the reported work accidents getting higher with the promoting safety regulations in Turkey. Figure 1.3 and Table 1.1 represent the number of deaths and employees that injured due to work accidents between the years 2007 to 2016 in Turkey. The recorded work accident number increased approximately 4 times between 9 years. The reason for this increase was not only the increase in the work accidents but also the implementation of 6331 numbered Health and Safety Law in Turkey. With this law, the notice of work accidents was promoted. Certain pecuniary punishments have been applied if the employers did not report the accidents. In addition, during these years except from 2008 and 2012, every year more than a thousand people lose their lives by reason of work accidents.

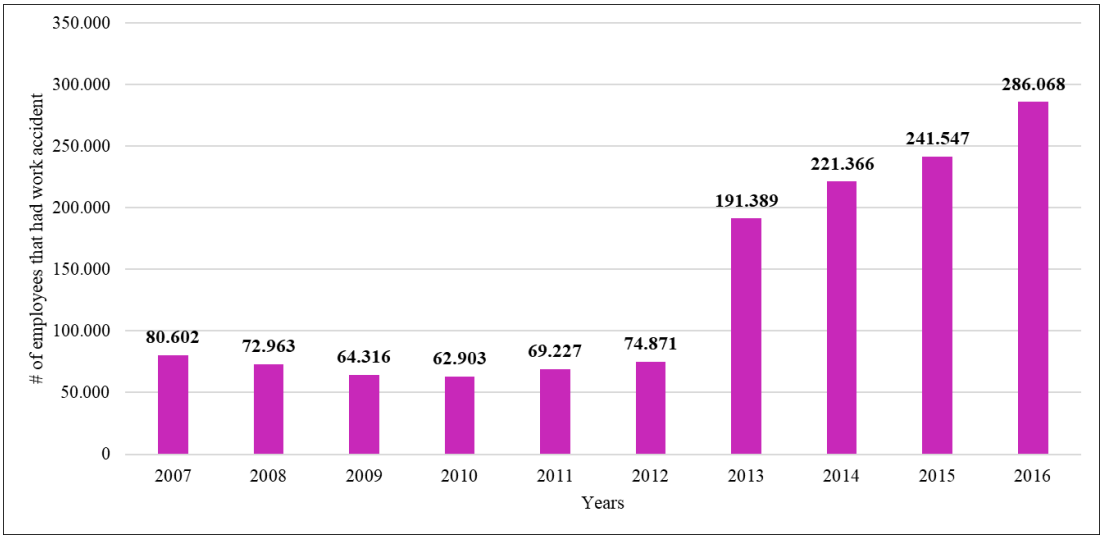


Figure 1.3 Number of Employees that Had Work Accidents during Years

Table 1.1 SGK Statistics of Deaths due to Work Accidents

Years	***Number of Deaths due to Work Accidents***
2007	1.044
2008	866
2009	1.171
2010	1.444
2011	1.700
2012	744
2013	1.360
2014	1.626
2015	1.252
2016	1.405

Similar to countries safety culture and accident rate differences, companies have some differences as well. In order to interpret these differences, some literature studies took

place. Safety performance and safety culture maturity levels' relationship was examined by some researches. In their study, Vinodkumar and Bhasi (2009) found that most of climate factors in their research get better values in the companies with low accident rates than in those with high accident rates at chemical industry. Similarly, Stemn et al. (2019) complete a study in mining industry and find that mines with low accident rates had higher safety culture maturity values for most of the elements than mines with high incident rates. Those studies showed that there is a relationship between safety culture and accident rates in different sectors.

1.2.3. Safety Culture

In order to understand the safety culture, the definitions of culture and organizational culture need to be understood. Both culture and organizational culture have many definitions in the literature. A known sociological definition of culture is that ''Culture consists of the values the members of a given group hold, the norms they follow, and the material goods they create'' (Giddens, 1989). Shein (2004) defines the culture of a group (organizational culture) as a pattern of shared basic assumptions that a group has gained as it solved troubles of external adaptation and internal integration. Organizational culture is accepted as a subtype of culture. Likewise, some researchers assume that safety culture is a part, a type, or a sub-group of organizational culture. Kennedy and Kirwan (1998) emphasized this situation as "Safety culture is a sub-element of the overall organisational culture"**.**

Safety culture is defined by so many researchers and there exist a lot of different definitions of the concept. Between all these definitions, no common, established definition exists. On the other hand, most of them include some notions like *attitude* or *perception* (Guldenmund, 2000). Table 1.2 represents the literature review of the definitions of safety culture.

Table 1.2 Definitions of Safety Culture from Literature Research

Reference	Definition of Safety Culture
Cox and Cox (1991)	"*Safety cultures reflect the **attitudes**, beliefs, **perceptions**, and values that employees share in relation to safety*" (as cited in Guldenmund, 2000)
International Safety Advisory Group (1991)	"*Safety culture is that assembly of characteristics and **attitudes** in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance*" (as cited in Guldenmund, 2000)
Pidgeon (1991)	*"The set of beliefs, norms, **attitudes**, roles, and social and technical practices that are concerned with minimising the exposure of employees, managers, customers and members of the public to conditions considered dangerous or injurious"* (as cited in Guldenmund, 2000)
Ostrom et. al. (1993)	"The concept that the organisation's beliefs and ***attitudes***, manifested in actions, policies, and procedures, affect its safety performance" (as cited in Guldenmund, 2000)
Geller (1994)	"*In a total safety culture (TSC), everyone feels responsible for safety and pursues it on a daily basis*" (as cited in Guldenmund, 2000)

Table 1.2 (continued)

Berends (1996)	"*The collective mental programming towards safety of a group of organisation members*" (as cited in Guldenmund, 2000)
Lee (1996)	"*The safety culture of an organisation is the product of individual and group values,* ***attitudes****,* ***perceptions****, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, and organisation's health and safety management*" (as cited in Guldenmund, 2000)
Kennedy and Kirwan (1998)	"*It is an abstract concept which is underpinned by the amalgamation of individual and group* ***perceptions****, thought processes, feelings and behaviour which in turn gives rise to the particular way of doing things in the organisation.*"
Cooper (2000)	"*Safety culture is a sub-facet of organisational culture, which is thought to affect members'* ***attitudes*** *and behaviour in relation to an organisation's ongoing health and safety performance.*"

Table 1.2 (continued)

Cox and Cheyne (2000)	"*The culture for safety within the operating company was described, in terms of employees'* ***attitudes*** *and* ***perceptions****, by six factors, labelled as management commitment, personal need for safety, appreciation of risk, attribution of blame, conflict and control and supportive environment.*"
Diaz-Cabrera et al. (2007)	"*Safety culture can be construed to be manifest in shared values and meanings, and in a particular organizational structure and processes, safety policies, strategies, goals, practices and leadership styles related to safety management system.*"
Lee and Harrison (2000)	"*Definitions of safety culture abound, but they variously refer to the safety-related values,* ***attitudes****, beliefs, risk* ***perceptions*** *and behaviours of all employees.*"

Table 1.2 (continued)

ACSNI (The Advisory Committee on the Safety of Nuclear Installations) (1993)	"*The safety culture of an organisation is the product of individual and group values,* ***attitudes****,* ***perceptions****, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation's health and safety management.*"
Richter and Koch (2004)	*"The shared and learned meanings, experiences and interpretations of work and safety - expressed partially symbolically -which guide peoples' actions towards risks, accidents and prevention.*"

Although there exists an uncertainty in the common definition of safety culture, its necessity is obvious. After the Chernobyl Nuclear Accident, one of the biggest disasters of the world happened on 1986, the International Atomic Energy Agency's International Nuclear Safety Advisory Group (INSAG) examined the accident and concluded that there are many factors that indicate lack of/absence of safety culture in the plant. So that INSAG (1986) indicated that, the need to create and maintain a safety culture is a precondition for ensuring nuclear power plant safety.

Safety culture can be expressed by the phrases "the way the company handles works" or "how the organization does the work". If the way that the work is done is safe, it means that a positive safety culture is in place. If not all the employees are careful about safety issues and their awareness is not enough, the safety management system

stays insufficient; moreover, if the work/production continues no matter what, then a poor level of safety culture is in place.

1.2.4. The Aim of the Study

This study aimed to build a safety culture level assessment tool for automotive industry and implementation of this tool in an organization of the automotive industry. The previous subtitles indicated the importance of safety culture, however, in the automotive sector, the measurement of safety culture is not mature yet. Therefore, this study aims to generate an Automotive Sector Safety Culture (AuSCuF) Matrix and measure the safety culture level of an organization using it.

The first part of the study was to create a safety culture matrix by making semi-structured interviews with 45 qualified personnel in the automotive industry. Each interview contains questions about five levels of maturity (Pathological, Reactive, Calculative, Proactive and Generative) for nine dimensions about safety culture in automotive industry namely, communication system, occupational health and safety trainings, accident / near miss reporting, machines / equipment safety, workers' commitment to safety, management commitment to safety, emergency preparedness, priority given to occupational health and safety and ergonomics. After building the safety culture matrix, the implementation of the matrix made by applying a questionnaire and gathering demographic data of interviewees. The questionnaire was not made by regular selection but made by printing each five-cell in different colored pages and giving them to interviewees in mixed order. With this method, participants cannot select the best or the worst level just by looking at the options, they need to understand every card in every color, then make a selection. The second part of the study was applied with 301 personnel in the automotive industry.

CHAPTER 2

STUDIES

2.1. STUDY 1: Developing the Safety Culture Matrix

2.1.1. Method

Safety culture measurement can be performed with qualitative or quantitative methods. Generally, it is handled with qualitative tools such as observations or interviews since they are simpler and more practical to perform. However, it only took some time to create the consolidated table afterward. In addition, quantitative methods including statistical evaluation of some data like questionnaire results can be executed, too. It is essential to develop the questionnaires in a way that participants feel comfortable to relate them to the choices. It is necessary both for the accurateness of the study and participants' contentedness. In the current study, the matrix was filled according to a group of employees' answers so that the sector/company jargon protected. Therefore, the selection of the safety culture level process (Study 2) was also completed successfully.

In their study, Parker et al. (2006) used a quantitative method for the oil industry. This study has tried to make a general safety culture matrix for safety culture assessment. After that Manchester Patient Safety Framework (MaPSaF) was created by Parker et al (2009). The study was supported by the National Primary Care Research and Development Centre, University of Manchester. In MaPSaF, different parts of the health care organization were reviewed in different matrixes. This leaded safety culture

assessment to be studied for each type of work separately. In order to correlate with this knowledge, this study was based on sector-specific Safety Culture Matrix.

In order to measure the safety culture of organizations, creating sector-specified or company-specified safety culture matrix is an advantageous way because the information in the matrix cells and the results of the current level may be different in different companies. Similarly, it would be advantageous to designate the areas that are open to improvement clearly with sector or company specified matrixes.

In Safety Culture Matrix the rows represent previously decided safety dimensions, the columns represent the maturity levels. In the current study, a 5 x 9 AuSCuF (Automotive Sector Safety Culture Framework) Matrix was generated. Template of AuSCuF Matrix is given in Table 2.1.

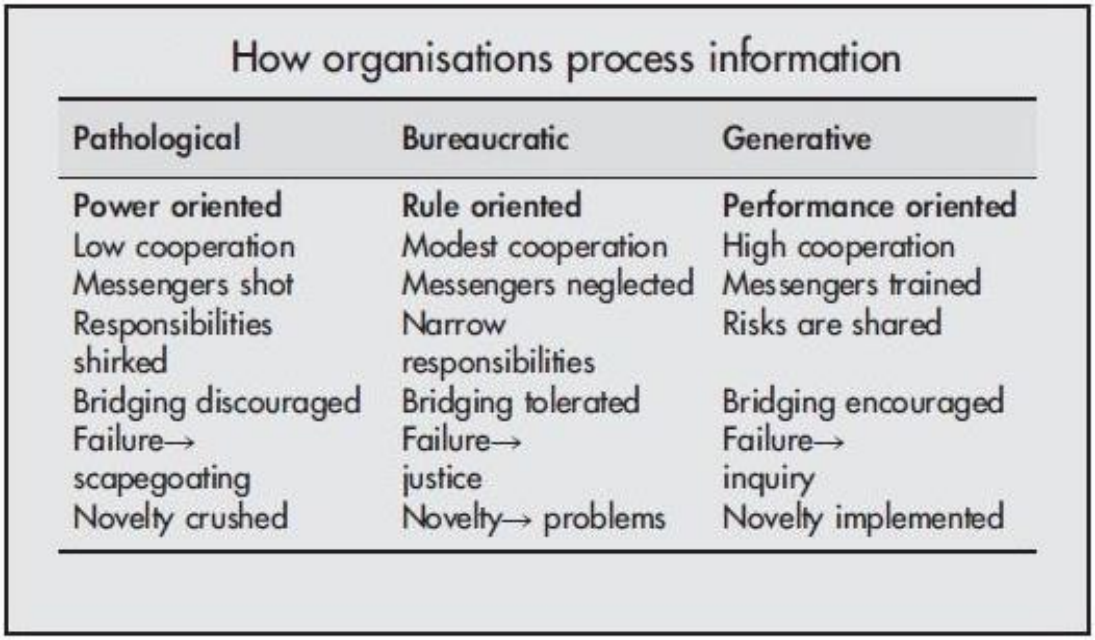
Table 2.1 AuSCuF Matrix Template

Levels / Dimensions	A	B	C	D	E
D1					
D2					
D3					
D4					
D5					
D6					
D7					
D8					
D9					

The first step of creating this matrix was determining the dimensions because safety culture is not a one-dimensional concept. Then, according to increasing maturity, safety culture levels were filled with the semi-structured interviews with the employees. Afterward, a group of employees asked to select the level of their company for each dimension. In order to do that, previously marked and colored sets of paper were given to employees and they are asked to select one paper / one color for each dimension.

2.1.2. Safety Culture Maturity Model

At first, Westrum (1993) defined three levels of organizational culture namely, pathological, bureaucratic and generative, based on the way the safety-related information handled in the organization (Figure 2.1).



How organisations process information

Pathological	Bureaucratic	Generative
Power oriented	Rule oriented	Performance oriented
Low cooperation	Modest cooperation	High cooperation
Messengers shot	Messengers neglected	Messengers trained
Responsibilities shirked	Narrow responsibilities	Risks are shared
Bridging discouraged	Bridging tolerated	Bridging encouraged
Failure→ scapegoating	Failure→ justice	Failure→ inquiry
Novelty crushed	Novelty→ problems	Novelty implemented

Figure 2.1 Westrum's (1993) Organizational Culture Typology

After Westrum's definitions of organizational culture levels, two additional levels proposed by Reason (1997) as proactive and reactive. Finally, the maturity levels of safety culture are listed as pathological, reactive, bureaucratic, proactive and generative (Table 2.2).

Table 2.2 Levels of organizational safety culture (Parker & Hudson, 2001)

Safety Culture Maturity Level	Characterization
Pathological	Why do we need to waste our time on risk management and safety issues?
Reactive	We take risk seriously and do something very time we have an incident.
Bureaucratic	We have systems in place to manage all likely risks.
Proactive	We are always on the alert, thinking of risks that might emerge.
Generative	Risk management is an integral part of everything we do.

In the present study, maturity levels are used as pathological, reactive, bureaucratic, proactive and generative as suggested by Parker & Hudson (2001). However, some different usages of maturity levels are present in the literature. Filho et al. (2010) changed "generative" level to "sustainable" because sustainable is more familiar in their country. Fleming (1999) designed the safety culture maturity model for the offshore oil industry as "emerging, managing, involving, cooperating and continually improving". Stemn et al. (2019) used "basic, reactive, compliant, proactive and resilient" in their study. Most of the definitions of these levels logically the same and they all express improving maturity in safety culture.

2.1.3. Determination of Dimensions

In the current study, after literature research, brainstorming with safety specialists and examining the incidents that were reported in the automotive sector, the dimensions were selected as communication system, occupational health and safety trainings, accident / near miss reporting, machines / equipment safety, workers' commitment to safety, management commitment to safety, emergency preparedness, priority given to occupational health and safety and ergonomics. The detailed description of them is in the Table 2.3.

Table 2.3 Nine Dimensions of Automotive Safety Culture Matrix

Dimension	Description
Communication System	This dimension outlines the communication system between different levels of workers, related to OHS issues.
Occupational Health and Safety Trainings	This dimension focuses on the quality and efficiency of OHS trainings.
Accident / Near Miss Reporting	This dimension reflects the incidents are reported or not. In addition, it digs the purpose of reporting.
Machines / Equipment Safety	This dimension discusses the machine/equipment safety and the effectiveness of maintenance procedures.
Workers' Commitment to Safety	This dimension focuses on the employees' safety perspective.
Management Commitment to Safety	This dimension discusses top managements' commitment, participation, and contribution to safety.
Emergency Preparedness	This dimension discusses whether the organization is ready for an emergency or not with checking the emergency plans, drills and sketching.
Priority Given to Occupational Health and Safety	This dimension reflects the priority is on production or safety in the organization.
Ergonomics	This dimension focuses on how the organization solves ergonomic problems including personal and environmental aspects.

In their study, Filho and Waterson (2018) stated that the most common aim of using the maturity model was general safety management assessment, assessment of communication about the safety, management commitment to safety and safety training. After the research and brainstorming, the current study's dimensions showed similarities to Filho and Waterson's (2018) conclusion.

Table 2.4 Empty AuSCuF Matrix

Dimensions \ Levels	Pathological	Reactive	Bureaucratic	Reactive	Generative
Communication System					
OHS Trainings					
Accident / Near Miss Reporting					
Machines / Equipment Safety					
Workers' Commitment to Safety					
Management Commitment to Safety					
Emergency Preparedness					
Priority Given to OHS					
Ergonomics					

2.1.4. Determination of Interview Questions

The reason to ask the interview questions to selected employees was to develop the AuSCuF Matrix cells. The main questions that were prepared to ask interviewees are provided in Table 2.3. During the interviews, almost all questions asked to every participant. According to their answers, additional questions that may not be present at the given table were also asked. The main purpose was getting deeper answers and completing the matrix accordingly.

Table 2.5 AuSCuF Matrix Interview Questions

Dimensions	**Questions**
Communication System	• How do employees contribute the decisions related to OHS issues? • How does the information flow take place between shifts? • In which way the recordkeeping takes place in the company related to OHS? (written or verbal) • How do employees share their complaints about OHS problems?
OHS Trainings	• Is there any training given related to OHS? • Who provides the trainings? • Who participates in the trainings? • How often are the trainings given? • Are the OHS trainings beneficial for employees? • In what level employees attend trainings?

Table 2.5 (continued)

Accident / Near Miss Reporting	• How do employees react when they face accidents or near misses? • How are those incidents reported? • To whom are those incidents reported? • What is the purpose of reporting the incidents? • How do reports evaluate?
Machines / Equipment Safety	• Are the OHS requirements taking into account when a new machine delivered to the company? • Is there a maintenance department valid in the company? • How often does the maintenance take place? • Are there any procedures related to maintenance? / Is the maintenance team follow those procedures?
Workers' Commitment to Safety	• Are the employees aware of the issues related to OHS? • Do the employees use the personal protective equipment provided for them? How do they request new equipment? • How do employees report an OHS problem? • In which ways do the employees contribute to safety problems and solutions?
Management Commitment to Safety	• How does management approach to provide safe and healthy working environment? • How does the management determine the OHS policy? • Does the management provide enough budget for OHS? • How do management audit OHS issues on the field? / Is there a tracking mechanism for that purpose? • Is the management team get the OHS improvements/developments to their targets?

Table 2.5 (continued)

Emergency Preparedness	• How do employees select to any emergency team? • Does the emergency teams get additional training? • Is there an emergency action plan in the plant? Are the employees aware of that plan? • How are the emergency drills conducted? • How often the emergency drills take place? • Are the emergency exits and fire distinguishers marked in the plant?
Priority Given to OHS	• For the employees' point of view, is the production more important than OHS? • For the managers' point of view, is the production more important than OHS? • Is there time pressure? / Is there production pressure? • If you cannot finish the work on time, do you bend the OHS rules? • Do the rewards or targets given to employees based on OHS or production?
Ergonomics	• Are the ergonomic problems of employees taken into account? • How the ergonomic risk assessment take place? • How coordinated / tidy is the plant? • Are the thermal comfort conditions suitable at the plant? • If there exist some thermal comfort problems, how do the company react to solve them?

Another question list was prepared by the Health and Safety Executive (2010), showed similarities in the same topics that were used in this study like management and employee commitment, communication and OHS trainings. The overall question set was given in Table 2.6.

Table 2.6 Question Set: Safety Culture (HSE, 2010)

	Questions
1	**Management commitment** • Where is safety perceived to be in management's priorities (Senior/middle/1st line)? • How do they show this? • How often are they seen in the workplace? • Do they talk about safety when in the workplace and is this visible to the workforce? • Do they 'walk the talk'? • Do they deal quickly and effectively with safety issues raised? • What balance do their actions show between safety and production? • Are management trusted over safety?
2	**Communication** • Is there effective two-way communication about safety? • How often are safety issues discussed? • With line manager/subordinate? • With colleagues? • What is communicated about the safety programme of the company? • How open are people about safety?

Table 2.6 (continued)

3	**Employee involvement** • How are people (all levels, especially operators) involved in safety? • How often are individual employees asked for their input safety issues? • How often do operators report unsafe conditions or near misses etc? • Is there active, structured operator involvement e.g. workshops, projects, safety circles? • Is there a continuous improvement / total quality approach? • Whose responsibility is safety regarded to be? • Is there genuine cooperation over safety – a joint effort between all in the company?
4	**Training/information** • Do employees feel confident that they have all the training that they need? • How accurate are employees' perceptions of hazards and risks? • How effective is safety training in meeting needs (including managers!)? • How are needs identified? • How easily available is safety information?
5	**Motivation** • Do managers give feedback on safety performance (& how)? • Are they likely to notice unsafe acts? • Do managers (all levels - S/M/1st) always confront unsafe acts? • How do they deal with them? • Do employees feel they can report unsafe acts? • How is discipline applied to safety? • What do people believe are the expectations of managers? • Do people feel that this is a good place to work (why/why not)? • Are they proud of their company?

Table 2.6 (continued)

6	**Compliance with procedures** • What are written procedures used for? • What decides whether a particular task will be captured in a written procedure? • Are they read? • Are they helpful? • What other rules are there? • Are there too many procedures and rules? • How well are people trained in them? • Are they audited effectively? • Are they written by users? • Are they linked to risks?
7	**Learning Organisation** • Does the company really learn from accident history, incident reporting etc? • Do employees feel confident in reporting incidents or unsafe conditions? • Do they report them? • Do reports get acted upon? • Do they get feedback?

2.1.5. Participants

The AuSCuF Matrix was filled by semi-structured interviews that lasted 60-90 minutes with 45 employees with the permission of them. Interviewees were selected from different departments with different seniorities in order to gather solid results from all over the organization. It was crucial to preserve the company jargon for making the decisions easier to employees that would participate in the second part of the study. The department distribution of the employees that participated in interviews was given in Figure 2.2. For gathering various and rich answers, workers from disparate departments were chosen like Quality, Research and Development, and Human Resources in addition to production departments. 20% of the participants (N = 9) worked at Driveline Assembly, 13.33% of them (N = 6) worked at both Engine Production and Warehouse and Internal Logistics Departments, 11% of them (N = 5)

worked at Human Resources, 8.99% of them (*N* = 4) worked at Research and Development, Production Maintenance and Driveline Production Departments, 6.67% of them (*N* = 3) worked at Gear and Heat Treatment and Quality Departments and finally 2.22% (*N* = 1) of them worked at the Health and Safety Department.

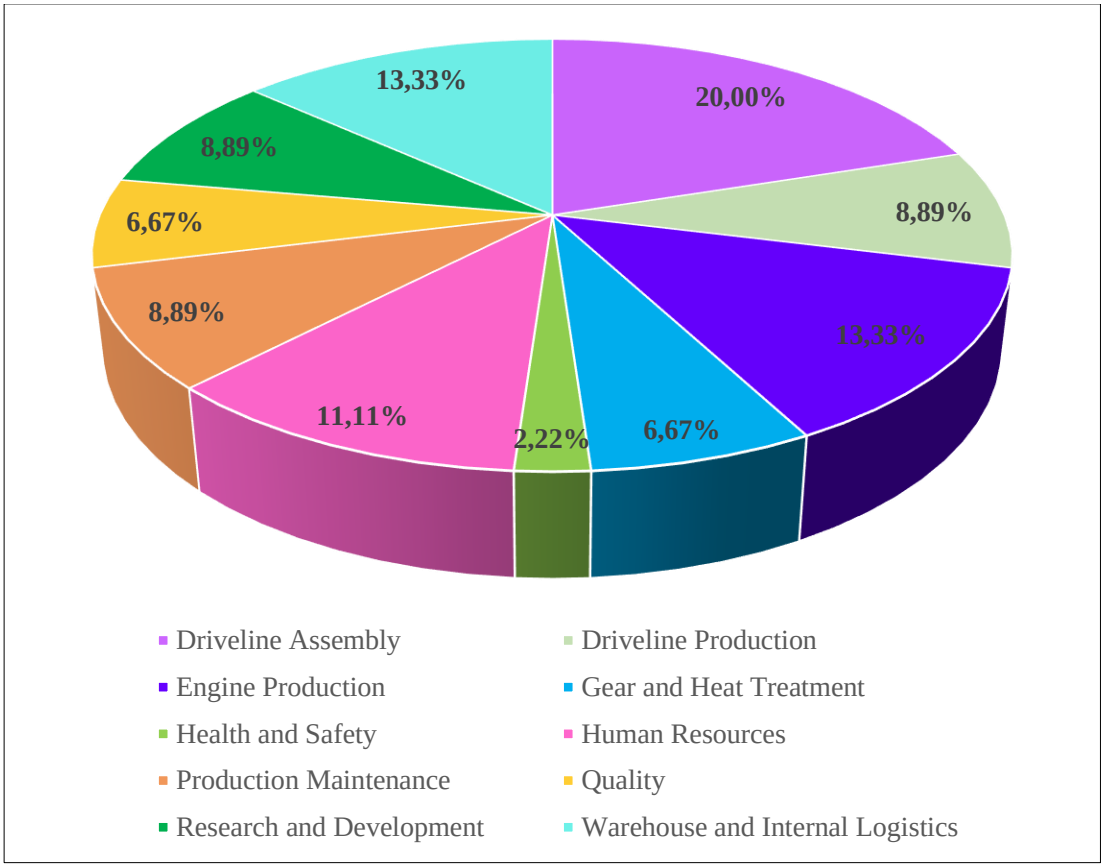


Figure 2.2 Department Distribution of Interview Participants

Moreover, the majority of the participants were white collar (*N* = 34, 75.56%) and 91.11% of them (*N* = 41) were male. The collar and gender distribution of them were given in Figure 2.3 and 2.4.

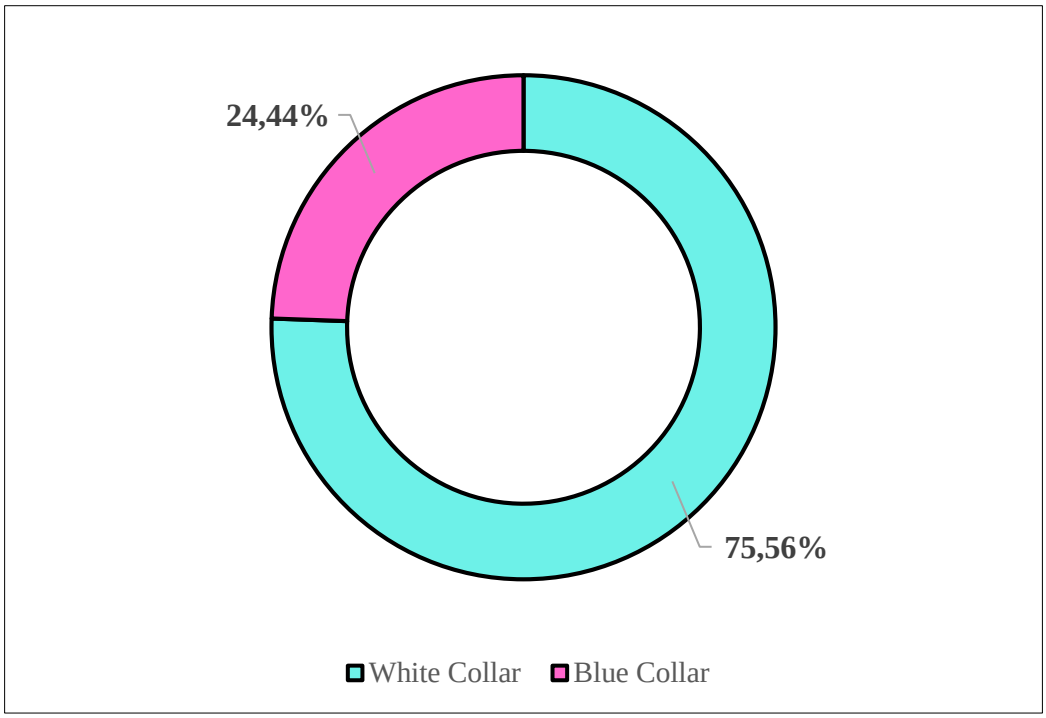


Figure 2.3 Collar Distribution of Participants

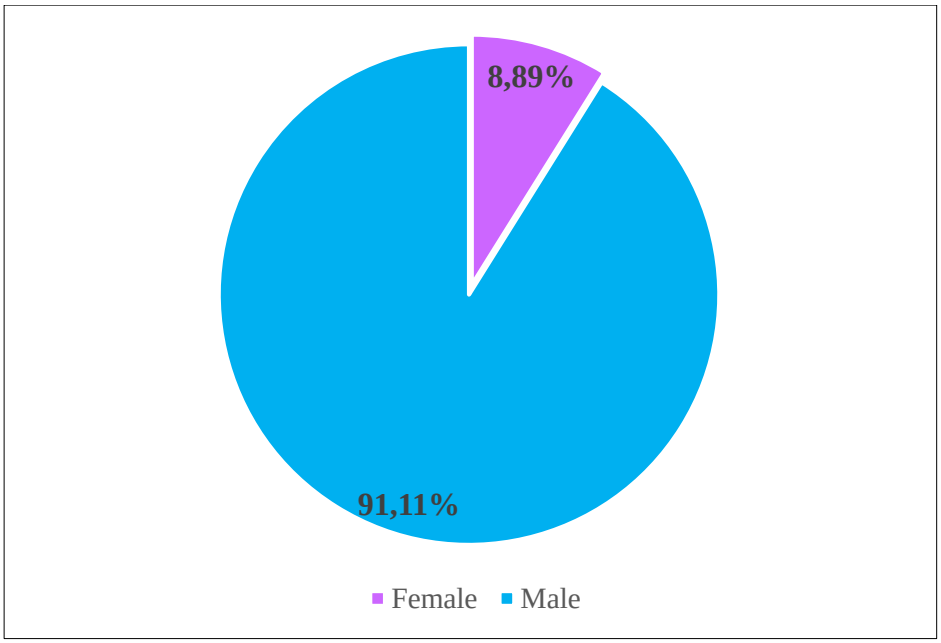


Figure 2.4 Gender Distribution of Participants

Every cell of the previously established AuSCuF Matrix was filled with the scope of previously defined questions' answers. According to participants' answer, deeper questions were added to the interview. It was crucial to get participants' own words in order not to damage the jargon of the company. This was a preparation for the next step, which was the determination of the company's safety culture level. If the jargon retains constant, employees will choose the correct level easily.

After filing 45 AuSCuF Matrix cell, the final matrix was generated according to common answers of the participants (See Appendix B).

2.2. STUDY 2: Identifying the Safety Culture Level of the Company

2.2.1. Method

After developing the Safety Culture Matrix for Automotive Industry, another method was used for the implementation of the matrix in order to identify the safety culture level of the company. At the first stage, each five-level cell was printed in different colored pages for all dimensions. Each five same-colored page group was given to interviewee in mixed order. By this way, the interviewee cannot identify the stages by its order and he/she needed to read the entire context afterward he/she can decide which one to choose. This led the interviewee to read the cells correctly and not choose the level by order of the cells. Therefore, it can be seen that this method was quite different from the standard questionnaire methodology.

In the second part of this application, demographic data of the interviewee were collected by giving a pre-oriented data collection paper to him/her. The name of the interviewee was not taken, and it was informed to him/her. The interviewer and none of the interviewees knew each other in their social life. By this way, it was aimed to collect the most reliable data.

Filling of the demographic data collection paper and determination of each dimension's level took accordingly 25-30 minutes. Some of the workers participate in the selection part of the study by groups and some of them perform one person at a time. Everyone filled the paper and made the selection by himself/herself. After getting the demographic data collection paper and the selected papers, interviewer checked if there was a missing part on the demographic data or the cards that showed the dimension's level for every participant.

2.2.2. Participants

For the purpose of defining the safety culture level of the company, 301 employees were selected randomly. In order to understand the correct level, a mixed group was needed. Participants were selected from several departments of the company because determining the total culture perception of the plant was important. The department distribution of the employees that were contributed to the selection process was given in Figure 2.3. 32.89% of the participants (N = 99) worked at Driveline Assembly, 15.95% of them (N = 48) worked at Warehouse and Internal Logistics, 15.61% of them (N = 47) worked at Gear and Heat Treatment, 14.62% of them (N = 44) worked at Driveline Production, 13.29% of them (N = 40) worked at Engine Production Departments. The rest of the participants were worked at Production Maintenance (N = 8), Occupational Health and Safety (N = 7), Quality and Quality Systems and Technical Training (N = 2) Departments.

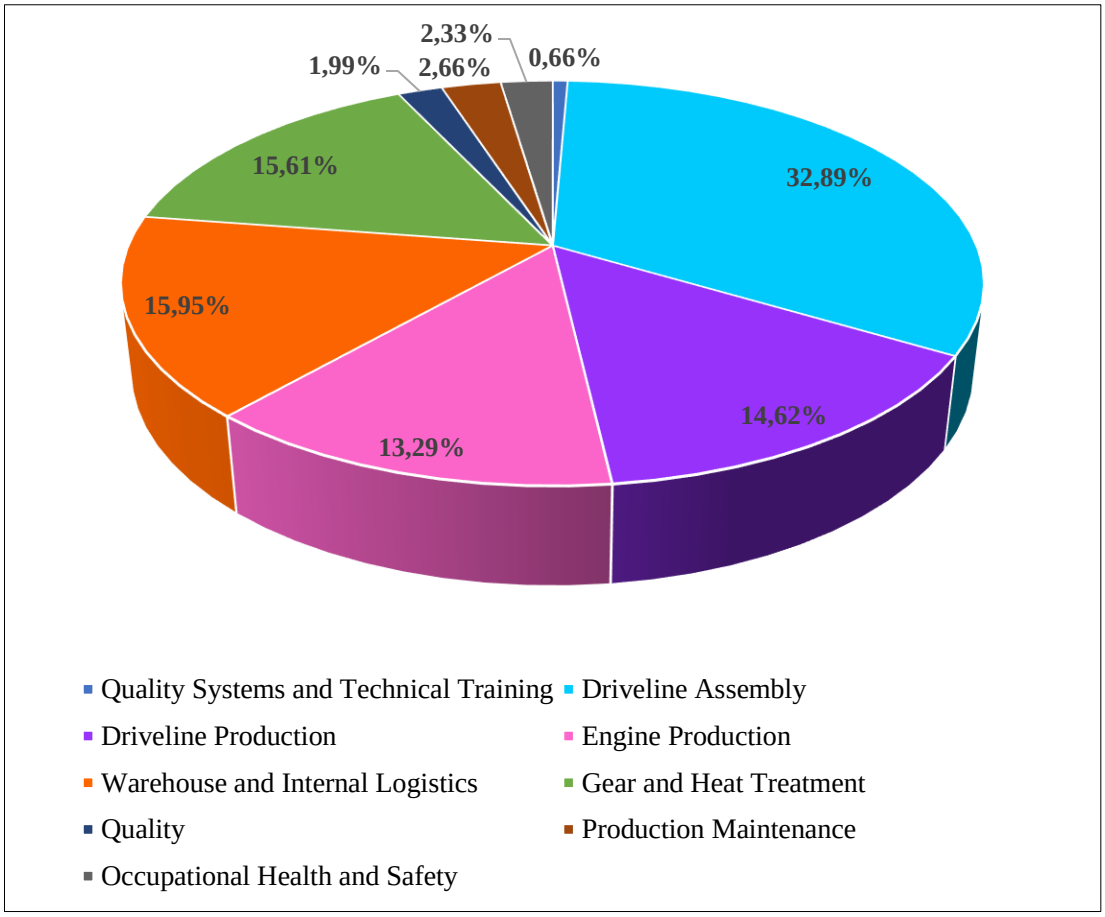


Figure 2.5 Department Distribution of Participants

Majority of the participants (*N* = 185, 67%) graduated from high school; no one was below that level. 89% of them (*N* = 268) were blue collar, 11% of them were (*N* = 33) white collar. Moreover, 96% of them are men (*N* = 288) and 4% of them are women (*N* = 11). Their experience levels were different from each other for both company and total experience point of view. The experiences of the participants were given in Table 2.4 and 2.5.

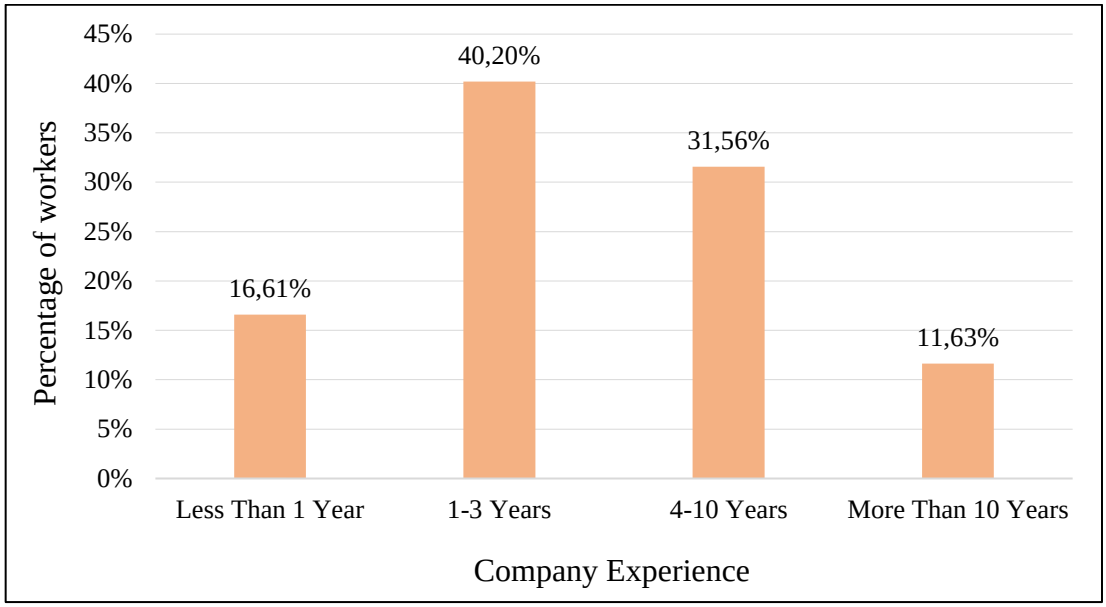


Figure 2.6 Company experience of participants

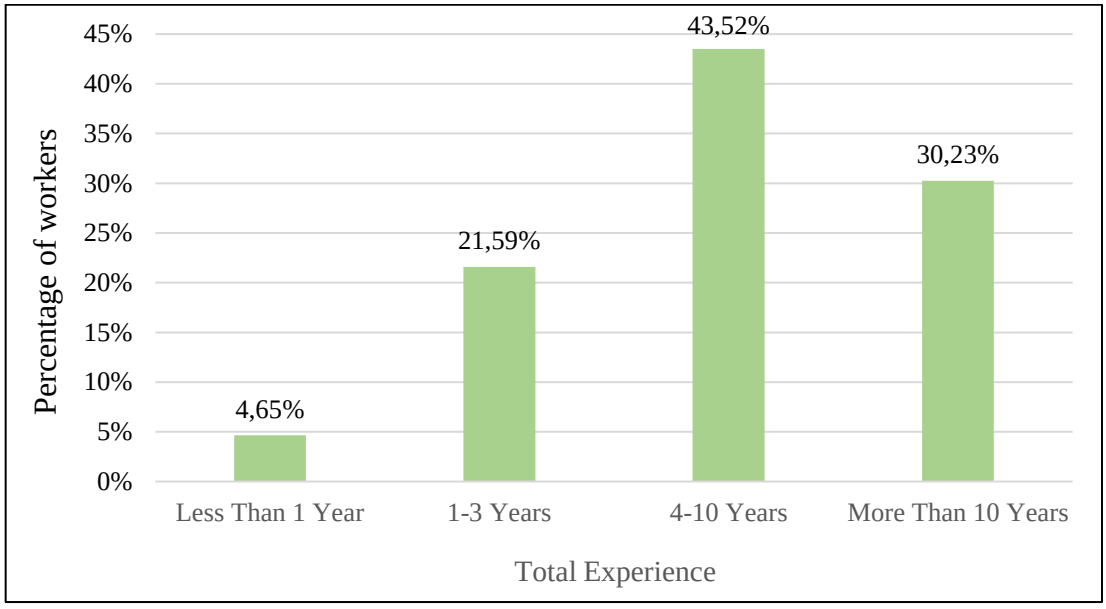


Figure 2.7 Total experience of participants

CHAPTER 3

RESULTS

3.1. Descriptive

There were 301 employees participated in the study. Their descriptive data of the participants were given in Table 3.1 including gender, age, collar, education, company experience, overall experience values. In addition, the total selection results were given in Figure 3.1.

Table 3.1 Descriptive Data of 301 Participants

Gender	***N***	**%**
Male	290	96.3
Female	11	3.7
Total	*301*	*100*
Age	***N***	**%**
18-25	89	29.6
26-35	171	56.8
More than 35	41	13.6
Total	*301*	*100*
Collar	***N***	**%**
Blue Collar	268	89
White Collar	33	11
Total	*301*	*100*
Education	***N***	**%**
High School	185	62
Vocational School of Higher Education	72	24

Table 3.1 (Continued)

University	42	14
Master's Degree	1	0.3
Doctorate	1	0.3
Total	*301*	*100*
Company Experience	***N***	**%**
Less than 1 Year	50	16.6
1-3 Years	121	40.2
4-10 Years	95	31.6
More than 10 Years	35	11.6
Total	*301*	*100*
Overall Experience	***N***	**%**
Less than 1 Year	14	4.7
1-3 Years	65	21.6
4-10 Years	131	43.5
More than 10 Years	91	30.2
Total	*301*	*100*

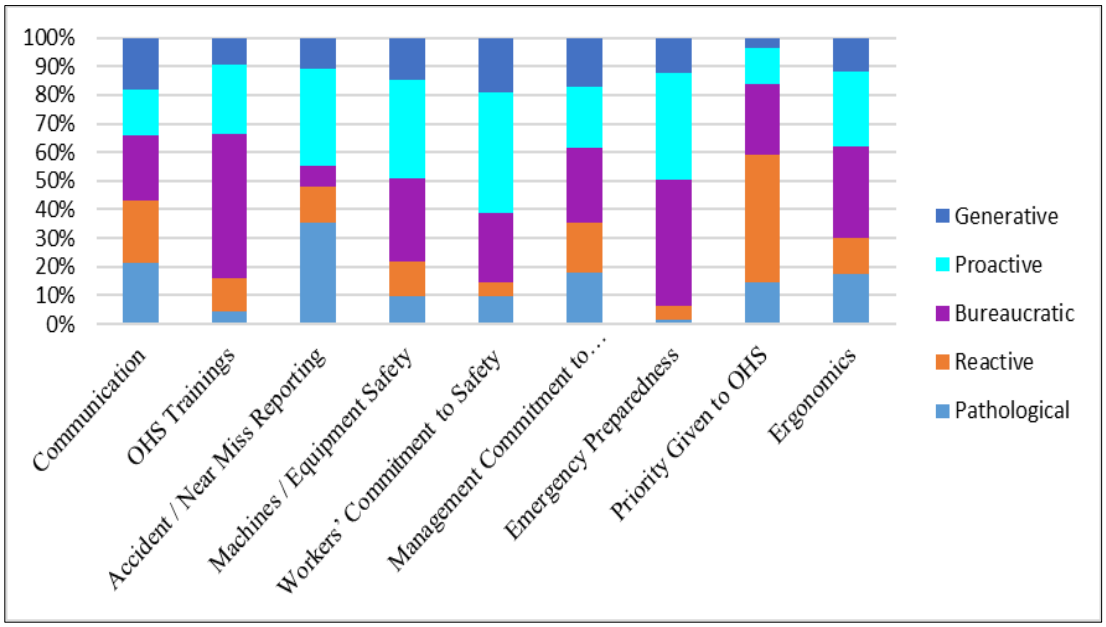


Figure 3.1 Results of Total Safety Culture Levels for 301 Employees

In order to make comparisons, the departments consisting more than 40 participants (more than 10%) were chosen. For that reason, the analysis was made totally with 278 participants from 5 departments that were driveline assembly, driveline production, gear and heat treatment, engine production and warehouse and internal logistics. Their descriptive data were given in Table 3.2 including gender, age, collar, education, company experience, overall experience values.

Table 3.2 Descriptive Data of 278 Participants

Gender	***N***	**%**
Male	270	97.1
Female	8	2.9
Total	*278*	*100*
Age	***N***	**%**
18-25	85	30.6
26-35	160	57.6
More than 35	33	11.9
Total	*278*	*100*

Table 3.2 (Continued)

Collar	***N***	**%**
Blue Collar	257	92.4
White Collar	21	7.6
Total	*278*	*100*
Education	***N***	**%**
High School	181	65.1
Vocational School of Higher Education	65	23.4
University	32	11.5
Master's Degree	-	-
Doctorate	-	-
Total	*278*	*100*
Company Experience	***N***	**%**
Less than 1 Year	47	16.9
1-3 Years	111	39.9
4-10 Years	88	31.7
More than 10 Years	32	11.5
Total	*278*	*100*
Overall Experience	***N***	**%**
Less than 1 Year	14	5.0
1-3 Years	60	21.6
4-10 Years	122	43.9
More than 10 Years	82	29.5
Total	*278*	*100*

These 278 participants selected their companies' safety culture level in terms of 9 dimensions namely, communication system, occupational health and safety trainings, accident / near miss reporting, machines / equipment safety, workers' commitment to safety, management commitment to safety, emergency preparedness, priority given to occupational health and safety and ergonomics. The total selection results were given in Figure 3.2. Moreover, Figure 3.3 represents the results according to departments' mean values.

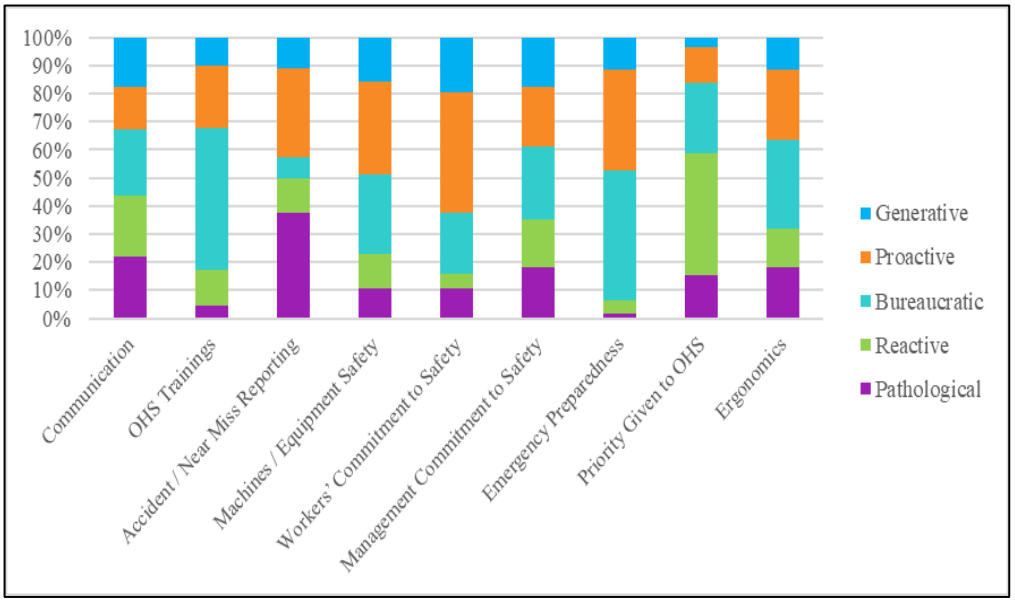
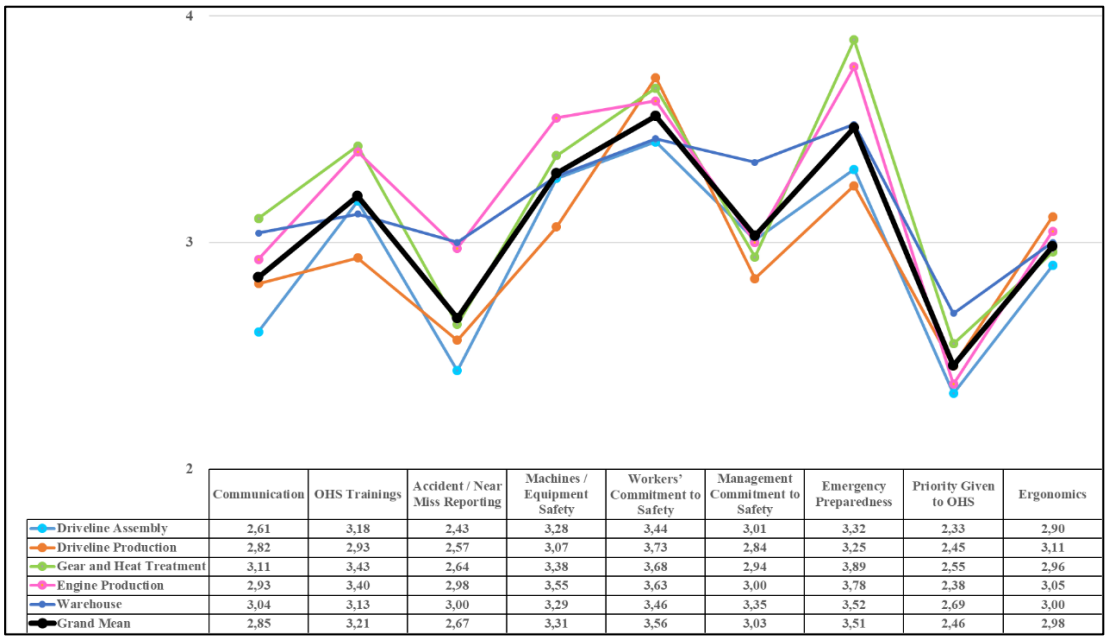


Figure 3.2 Results of Total Safety Culture Levels for 278 Employees



	Communication	OHS Trainings	Accident / Near Miss Reporting	Machines / Equipment Safety	Workers' Commitment to Safety	Management Commitment to Safety	Emergency Preparedness	Priority Given to OHS	Ergonomics
Driveline Assembly	2,61	3,18	2,43	3,28	3,44	3,01	3,32	2,33	2,90
Driveline Production	2,82	2,93	2,57	3,07	3,73	2,84	3,25	2,45	3,11
Gear and Heat Treatment	3,11	3,43	2,64	3,38	3,68	2,94	3,89	2,55	2,96
Engine Production	2,93	3,40	2,98	3,55	3,63	3,00	3,78	2,38	3,05
Warehouse	3,04	3,13	3,00	3,29	3,46	3,35	3,52	2,69	3,00
Grand Mean	2,85	3,21	2,67	3,31	3,56	3,03	3,51	2,46	2,98

Figure 3.3 Mean Values of Department's Results

3.2. Group Comparison of Safety Culture Dimensions

According to participants' numbers in departments, 278 of them were selected from 301. The departments were driveline assembly, driveline production, gear and heat treatment, engine production and warehouse and internal logistics as mentioned before. With these participants, analysis of variance was conducted to compare groups in terms of work accident, near miss, company experience and overtime through 9 safety culture dimensions which are communication system, occupational health and safety trainings, accident / near miss reporting, machines / equipment safety, workers' commitment to safety, management commitment to safety, emergency preparedness, priority given to occupational health and safety and ergonomics.

3.2.1. Work Accident and Safety Culture Dimensions

Nine different ANOVAs were conducted for employees that had been in an accident (N = 58) and never had accident (N = 220) in 9 safety culture dimensions. As a result, the differences between employees who had an accident and those who did not have any accidents were significantly different in terms of only communication dimension ($F(1, 276) = 7.21$, $p = .008$, $\eta p^2 = .03$). Employees that did not have any accidents evaluated communication significantly higher than those who had accident. On the other hand, in OHS training ($F(1, 276) = 1.22$, $p = .27$), work accident/near miss reporting ($F(1, 276) = .879$, $p = .349$), machines/equipment safety ($F(1, 276) = 2.90$ $p = .090$), workers' commitment to safety ($F(1, 276) = .212$, $p = .646$), management commitment to safety ($F(1, 276) = 1.92$, $p = .167$), emergency preparedness ($F(1, 276) = .011$, $p = .917$), priority given to OHS ($F(1, 276) = .047$, $p = .828$) and ergonomics ($F(1, 276) = 1.10$, $p = .294$) dimensions those who had accidents and never had accident were not significantly different from each other. The mean and standard deviations were given in Table 3.3.

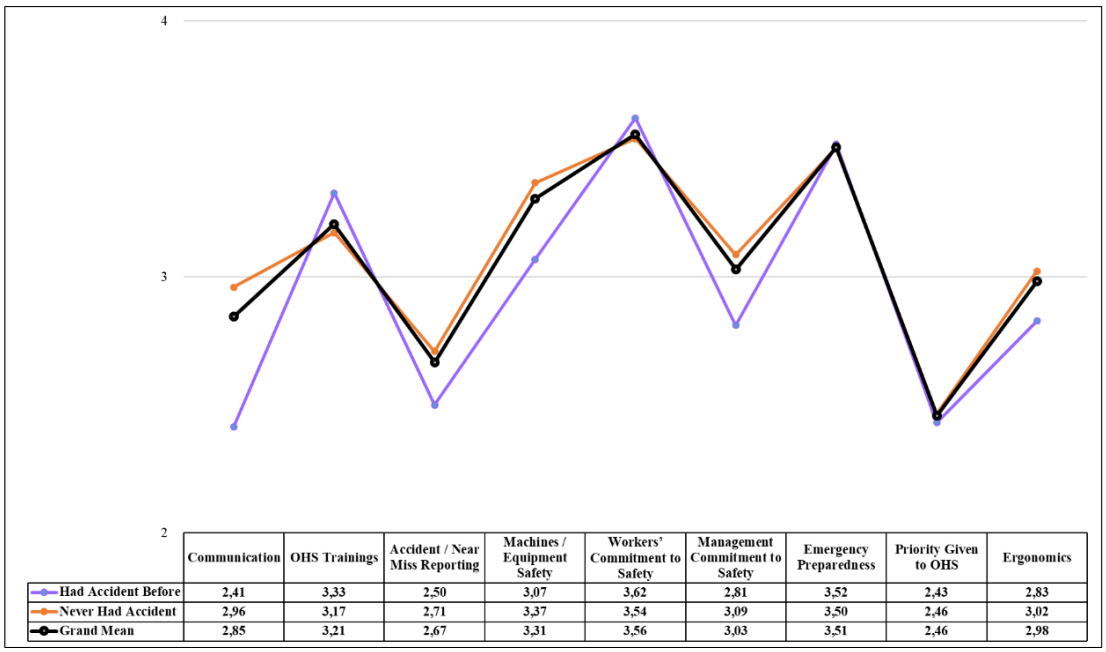
Table 3.3 Descriptive of Safety Culture Dimensions Based on Work Accident

Dimensions	Mean		SD		df	F	p	ηp²
	Had Accident	Never Had Accident	Had Accident	Never Had Accident				
Communication System	2.41	2.96	1.3	1.4	1	7.21	.008	.025
OHS Trainings	3.33	3.17	.91	.96	1	1.22	.27	.004
Accident / Near Miss Reporting	2.5	2.71	1.54	1.5	1	.88	.349	.003
Machines / Equipment Safety	3.07	3.37	1.37	1.14	1	2.9	.09	.01
Workers' Commitment to Safety	3.62	3.54	1.17	1.18	1	.21	.65	.001

Table 3.3 (continued)

Management Commitment to Safety	2.81	3.09	1.46	1.32	1	1.92	.167	.007
Emergency Preparedness	3.52	3.50	.84	.82	1	.011	.917	.000
Priority Given to OHS	2.43	2.46	1.04	1.01	1	.047	.828	.000
Ergonomics	2.83	3.02	1.29	1.25	1	1.1	.294	.004

In addition, the mean graph of the answers given for 9 dimensions was given in Figure 3.4.



	Communication	OHS Trainings	Accident / Near Miss Reporting	Machines / Equipment Safety	Workers' Commitment to Safety	Management Commitment to Safety	Emergency Preparedness	Priority Given to OHS	Ergonomics
Had Accident Before	2,41	3,33	2,50	3,07	3,62	2,81	3,52	2,43	2,83
Never Had Accident	2,96	3,17	2,71	3,37	3,54	3,09	3,50	2,46	3,02
Grand Mean	2,85	3,21	2,67	3,31	3,56	3,03	3,51	2,46	2,98

Figure 3.4 Mean Values of the Employees with and without Accident History

3.2.2. Near Miss and Safety Culture Dimensions

Nine different ANOVAs were conducted for employees that encountered a near miss (N = 135) and never encountered one (N = 143) in 9 safety culture dimensions. Consequently, the differences between employees who encountered a near miss and those who did not encounter any near misses were significantly different in terms of work accident/near miss reporting ($F(1, 276) = 8.81$, $p = .003$, $\eta p^2 = .03$) and machines/equipment safety ($F(1, 276) = 3.79$, $p = .053$, $\eta p^2 = .014$) dimension. Employees who encountered near miss evaluated work accident/near miss reporting and machines/equipment safety dimensions lower than those who did not.

Nonetheless, other dimensions than work accident/near miss reporting and machines/equipment safety were not significantly different based on employees' near miss encounter; communication ($F(1, 276) = 1.28$, $p = .259$), OHS training ($F(1, 276) = .028$, $p = .868$), workers' commitment to safety ($F(1, 276) = .19$, $p = .663$), management commitment to safety ($F(1, 276) = .489$, $p = .485$), emergency preparedness ($F(1, 276) = 2.32$, $p = .129$), priority given to OHS ($F(1, 276) = .31$, $p = .581$) and ergonomics ($F(1, 276) = .52$, $p = .471$,for descriptive see Table 3.4)

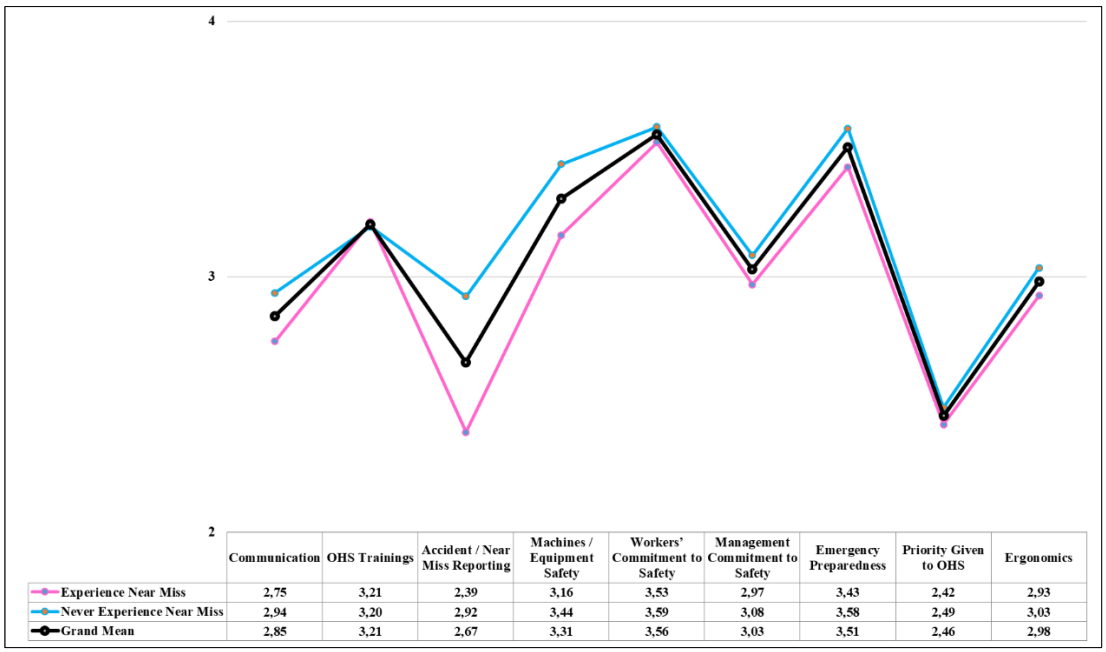
Table 3.4 Descriptive of Safety Culture Dimensions Based on Near Miss

Dimensions	Mean		SD		df	F	p	ηp²
	Had Near Miss	Never Had Near Miss	Had Near Miss	Never Had Near Miss				
Communication System	2.74	2.94	1.35	1.43	1	1.28	.259	.005
OHS Trainings	3.21	3.2	.9	.99	1	.03	.868	.000
Accident / Near Miss Reporting	2.39	2.92	1.48	1.5	1	8.81	.003	.031
Machines / Equipment Safety	3.16	3.44	1.19	1.19	1	3.79	.053	.014
Workers' Commitment to Safety	3.53	3.59	1.1	1.24	1	.19	.663	.001

Table 3.4 (continued)

Management Commitment to Safety	2.97	3.08	1.36	1.36	1	.49	.485	.002
Emergency Preparedness	3.43	3.58	.78	.88	1	2.32	.129	.008
Priority Given to OHS	2.42	2.49	.93	1.09	1	.31	.581	.001
Ergonomics	2.93	3.04	1.21	1.31	1	.52	.471	.002

In addition, the mean graph of the answers given for 9 dimensions was given in Figure 3.5.



	Communication	OHS Trainings	Accident / Near Miss Reporting	Machines / Equipment Safety	Workers' Commitment to Safety	Management Commitment to Safety	Emergency Preparedness	Priority Given to OHS	Ergonomics
Experience Near Miss	2,75	3,21	2,39	3,16	3,53	2,97	3,43	2,42	2,93
Never Experience Near Miss	2,94	3,20	2,92	3,44	3,59	3,08	3,58	2,49	3,03
Grand Mean	2,85	3,21	2,67	3,31	3,56	3,03	3,51	2,46	2,98

Figure 3.5 Mean Values of the Employees with and without Near Miss Encounter

3.2.3. Company Experience and Safety Culture Dimensions

Nine different ANOVAs were conducted to test the differences in terms of safety culture dimensions between employees with different levels of company experience. The company experience was divided into four; as less than 1 year (N = 47), 1-3 years (N = 111), 4 – 10 years (N = 88) and more than 10 years (N = 32). The company experience differences were significant for OHS training ($F(3, 274) = 3.44$, $p = .017$, $\eta p^2 = .04$). According to pairwise comparisons, employees with more than 10 years were significantly different from employees with less than 1 year ($p = .043$), with 1 – 3 years ($p = .058$) and with 4 – 10 years ($p = .013$) of experience. There was no significant difference between groups besides that one. Employees with more than 10

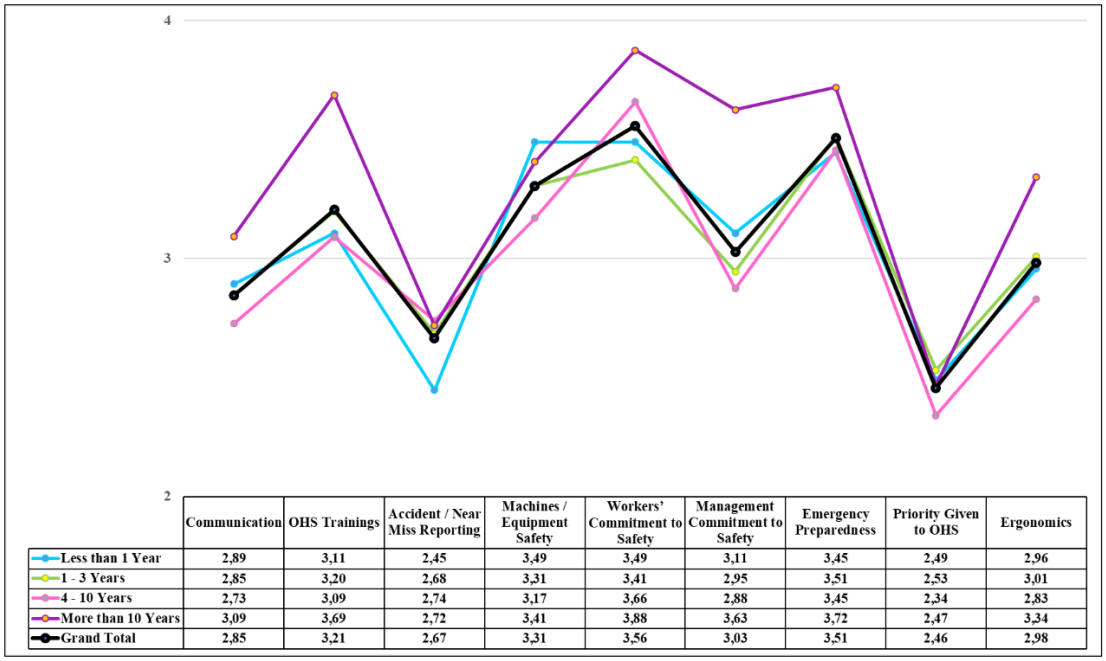
years of experience evaluated OHS training dimension higher than other levels of company experience. Moreover, the company experience differences were significant for management commitment ($F(3, 274) = 2.7$, $p = .046$, $\eta p^2 = .03$). Pairwise comparisons showed that only dimension evaluation of employees with more than 10 years of experience were significantly different from employees with 4-10 years of experience ($p = .042$). Employees with more than 10 years of experience evaluated management commitment significantly higher than employees with 4-10 years of experience. On the other hand, other dimensions than OHS training and management commitment were not significantly different based on employees' company experiences; communication ($F(3, 274) = .57$, $p = .637$), work accident/near miss reporting ($F(3, 274) = .41$, $p = .743$), machines/equipment safety ($F(3, 274) = .82$, $p = .483$), workers' commitment to safety ($F(3, 274) = 1.62$, $p = .185$), emergency preparedness ($F(3, 274) = .9$, $p = .441$), priority given to OHS ($F(3, 274) = .6$, $p = .616$) and ergonomics ($F(3, 274) = 1.34$, $p = .262$, for descriptive see Table 3.5 and Figure 3.6).

Table 3.5 Descriptive of Safety Culture Dimensions based on Company Experience Levels

Dimensions	Mean				SD				df	F	p	ηp²
	Less than 1 year	1 - 3 years	4 - 10 years	More than 10 years	Less than 1 year	1 - 3 years	4 - 10 years	More than 10 years				
Communication System	2.89	2.85	2.73	3.1	1.46	1.4	1.32	1.51	3	.57	.637	.006
OHS Trainings	3.11	3.2	3.1	3.69	.98	.96	.89	.9	3	3.44	.017	.036
Accident / Near Miss Reporting	2.45	2.68	2.74	2.72	1.56	1.45	1.56	1.53	3	.41	.743	.005
Machines / Equipment Safety	3.5	3.3	3.17	3.41	1.18	1.23	1.21	1.07	3	.82	.483	.009

Table 3.5 (continued)

Workers' Commitment to Safety	3.49	3.41	3.66	3.88	1.21	1.27	1.06	1.01	3	1.62	.185	.017
Management Commitment to Safety	3.11	2.95	2.88	3.63	1.26	1.4	1.35	1.18	3	2.7	.046	.029
Emergency Preparedness	3.45	3.51	3.45	3.72	.90	.85	.79	.73	3	.9	.441	.010
Priority Given to OHS	2.49	2.53	2.34	2.47	1.08	1.01	.96	1.11	3	.6	.616	.007
Ergonomics	2.96	3.01	2.83	3.34	1.33	1.23	1.27	1.18	3	1.34	.262	.014



	Communication	OHS Trainings	Accident / Near Miss Reporting	Machines / Equipment Safety	Workers' Commitment to Safety	Management Commitment to Safety	Emergency Preparedness	Priority Given to OHS	Ergonomics
Less than 1 Year	2,89	3,11	2,45	3,49	3,49	3,11	3,45	2,49	2,96
1 - 3 Years	2,85	3,20	2,68	3,31	3,41	2,95	3,51	2,53	3,01
4 - 10 Years	2,73	3,09	2,74	3,17	3,66	2,88	3,45	2,34	2,83
More than 10 Years	3,09	3,69	2,72	3,41	3,88	3,63	3,72	2,47	3,34
Grand Total	2,85	3,21	2,67	3,31	3,56	3,03	3,51	2,46	2,98

Figure 3.6 Mean Values of the Employees in terms of Company Experience

3.2.4. Overtime and Safety Culture Dimensions

Nine different ANOVAs were conducted to test the differences in terms of safety culture dimensions between overtime intervals of employees. The difference for the safety culture dimensions based on overtime levels indicated that none of the difference were significant in terms of communication ($F(2, 275) = 1.43$, $p = .241$), OHS trainings ($F(2, 275) = .54$, $p = .584$), work accident/near miss reporting ($F(2, 275) = 1.62$, $p = .2$), machines/equipment safety ($F(2, 275) = .44$, $p = .647$), workers' commitment to safety ($F(2, 275) = .59$, $p = .556$), management commitment ($F(2, 275) = 1.01$, $p = .345$), emergency preparedness ($F(2, 275) = .17$, $p = .845$), priority given to OHS ($F(2, 275) = .41$, $p = .662$) and ergonomics ($F(2, 275) = .02$, $p = .977$).

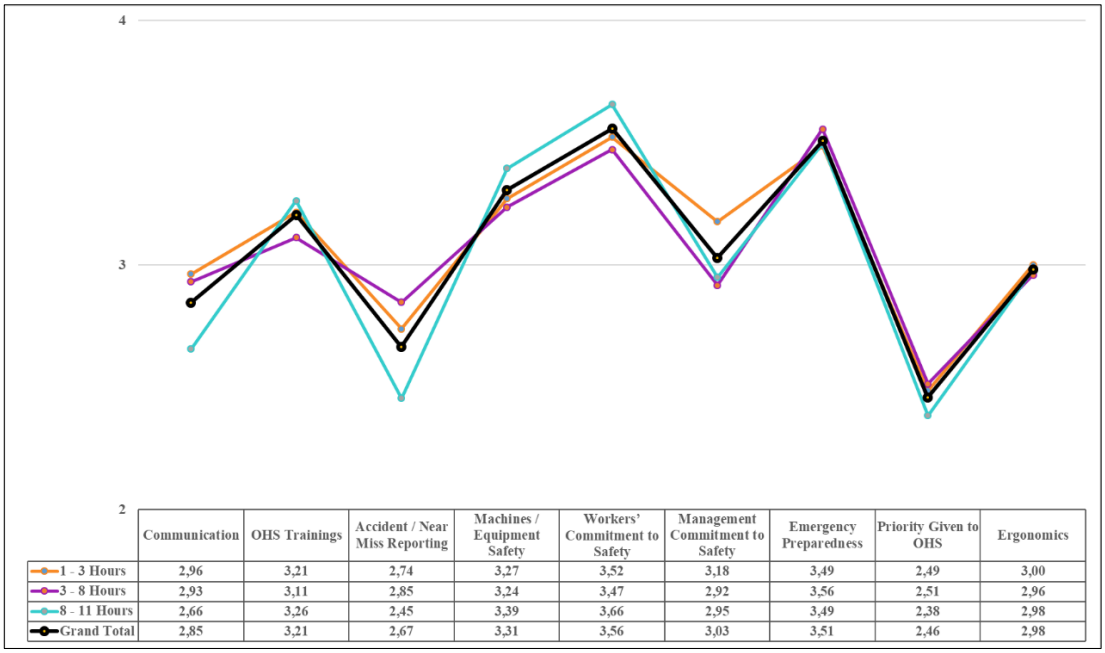
Additionally, the mean graph of the answers given for 9 dimensions and descriptive were given in Table 3.6 and Figure 3.7.

Table 3.6 Descriptive of Safety Culture Dimensions based on Overtime

Dimensions	Mean			SD			df	F	p	ηp²
	1 – 3 hours	3 – 8 hours	8 – 11 hours	1 – 3 hours	3 – 8 hours	8 – 11 hours				
Communication System	2.96	2.93	2.66	1.36	1.41	1.41	2	1.43	.241	.010
OHS Trainings	3.2	3.11	3.27	1.02	.91	.9	2	.54	.584	.004
Accident / Near Miss Reporting	2.73	2.85	2.45	1.48	1.5	1.55	2	1.62	.200	.012
Machines / Equipment Safety	3.27	3.24	3.39	1.19	1.28	1.14	2	.436	.647	.003
Workers' Commitment to Safety	3.52	3.47	3.66	1.16	1.28	1.11	2	.59	.556	.004

Table 3.6 (continued)

Management Commitment to Safety	3.18	2.92	2.95	1.31	1.35	1.4	2	1.07	.345	.008	3.18	2.92
Emergency Preparedness	3.49	3.56	3.49	.85	.85	.79	2	.17	.845	.001	3.49	3.56
Priority Given to OHS	2.49	2.51	2.38	.97	1.14	.97	2	.41	.662	.003	2.49	2.51
Ergonomics	3	2.96	2.98	1.28	1.34	1.19	2	.02	.977	.000	3	2.96



	Communication	OHS Trainings	Accident / Near Miss Reporting	Machines / Equipment Safety	Workers' Commitment to Safety	Management Commitment to Safety	Emergency Preparedness	Priority Given to OHS	Ergonomics
1 - 3 Hours	2,96	3,21	2,74	3,27	3,52	3,18	3,49	2,49	3,00
3 - 8 Hours	2,93	3,11	2,85	3,24	3,47	2,92	3,56	2,51	2,96
8 - 11 Hours	2,66	3,26	2,45	3,39	3,66	2,95	3,49	2,38	2,98
Grand Total	2,85	3,21	2,67	3,31	3,56	3,03	3,51	2,46	2,98

Figure 3.7 Mean Values of the Employees in terms of Overtime Intervals

3.3. Correlations

For the study variables, bivariate correlations were computed (Table 3.6). First, age was only positively correlated with company experience (r = .578, p < .01). Company experience was positively correlated with both work accident (r = .131, p < .05) and near misses (r = .144, p < .05). Work accident history was positively correlated with near miss (r = .125, p < .05) and negatively correlated with communication (r = -.153, p < .01). Near miss history was negatively correlated with both accident/near miss reporting (r = -.178, p < .01) and machines/equipment safety (r = -.118, p < .05).

Moreover, all the organizational safety culture dimensions were positively correlated with each other (see Table 3.6). The r values ranged between .162 and .496.

Table 3.7 Correlations between Variables in the Present Study

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Age	1													
2 Company Experience	,578**	1												
3 Work Accident	-,019	,131*	1											
4 Near Miss	,092	,144*	,125*	1										
5 Overtime	,011	,045	-,002	,059	1									
6 Communication	-,003	,022	-,153**	-,074	-,091	1								
7 OHS Training	,051	,095	,056	-,013	,030	,351**	1							
8 Accident/Near Miss Reporting	,044	,057	-,063	-,178**	-,077	,356**	,326**	1						
9 Machines/Equipment Safety	-,073	-,049	-,097	-,118*	,048	,261**	,282**	,241**	1					
10 Workers' Commitment	-,037	,097	,026	-,046	,060	,267**	,353**	,179**	,314**	1				
11 Management Commitment	-,003	,057	-,065	-,046	-,048	,496**	,382**	,370**	,357**	,288**	1			
12 Emergency Preparedness	,050	,061	-,025	-,100	-,011	,317**	,417**	,398**	,210**	,274**	,235**	1		
13 Priority Given to OHS	-,056	-,074	-,006	-,060	-,017	,363**	,193**	,211**	,224**	,169**	,303**	,162**	1	
14 Ergonomics	-,012	,034	-,076	-,060	,004	,384**	,394**	,260**	,318**	,292**	,422**	,319**	,354**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

3.4. Regression Analysis

In order to test the relationships between organizational safety culture dimensions, work accidents and near misses, two different regression analyses were conducted. Nine dimensions of organizational safety culture were entered into the model as independent variables. Work accidents (0 = 0 Accident, 1 = At least 1 Accident) and Near Misses (0 = 0 Near Miss, 1 = At least 1 near miss) were entered into the model as dummy coded, two different dependent variables.

For work accidents, the model was significant (F (9, 291) = 1.88, p = .055) and explained 5.5% of the variance (R^2 = .055). Communication (95% CI [-.09, -.01]) was negatively and OHS training (95% CI [.01, .12]) was positively associated with work accidents. As the communication level increased and OHS training level decreased, the likelihood of experiencing at least one accident was decreased.

For near misses, the model was not significant (F (9, 291) = 1.55, p = .13) and explained 4.6% of the variance (R^2 = .046).

Table 3.8 Hierarchical Regression Analysis on Work Accidents and Near Misses

	Work Accidents				Near Misses			
Variables	R^2	*F*	*β*	*p*	R^2	*F*	*β*	*p*
Safety Culture	.055	1.88		.055	.046	1.55		.13
1. Communication			*-,189*	*,008*			*-,016*	*,826*
2. OHS Training			*,149*	*,033*			*,086*	*,220*
3. Accident / Near Miss Reporting			*-,030*	*,648*			*-,169*	*,012*
4. Machines / Equipment Safety			*-,100*	*,122*			*-,095*	*,142*
5. Workers' Commitment			*,067*	*,296*			*-,006*	*,920*
6. Management Commitment			*,008*	*,916*			*,048*	*,514*
7. Emergency Preparedness			*-,004*	*,951*			*-,047*	*,493*
8. Priority Given to OHS			*,075*	*,242*			*-,015*	*,814*
9. Ergonomics			*-,070*	*,311*			*-,012*	*,862*

CHAPTER 4

DISCUSSION

4.1. Overview

The aim of the present study was to create a safety culture matrix in order to assess the safety culture level of an automotive company. Moreover, the maturity levels of safety culture related to dimensions were investigated in terms of some variables like accident and near miss history, company experience and overtime intervals. Moreover, correlation and regression analysis were conducted in order to make relations and predictions.

In the following chapter, the summary and discussion of the results are given. Furthermore, the unique contributions of the present study and limitations and suggestions for future studies are present in this part.

4.2. Summary and Discussion of the Results

The current study shows that employees that did not have any accidents evaluated communication significantly higher than those who had an accident. This result may lead us to think if the organization's accident investigation process was not well functioned, the employees who had an accident may consider that the implementation of precautions and the communication system fails under some conditions. On the other hand, employees who did not have an accident may assume that the accident investigation and communication systems were well functioned. While employees

who had an accident evaluated communication dimension at reactive level (M = 2.4), employees who never had accident (M = 2.96) evaluated nearly at the bureaucratic level.

Employees who encountered near miss evaluated work accident/near miss reporting and machines/equipment safety dimensions lower than those who did not. The reason for employees who encountered an incident evaluated the topic lower may be the real perception of this topic changes with experience. Both work accident/near miss reporting, and machines/equipment safety dimensions are directly related to risk perception. Oah et all (2018) states that "Workers who have witnessed accidents of peers or experienced accidents themselves are more likely to perceive a higher accident risk, even if the probability of an accident is not greater after such an event has occurred." That outcome states that after experiencing an accident or near miss, employees' risk perception increases so that they evaluate the work accident/near miss reporting is insufficient in their organization as they perceive or expect. Similarly, they evaluate machines/equipment safety conditions lower than those who did not have any near miss experience.

Employees with more than 10 years of experience evaluated OHS training dimension higher than other levels of company experience. As the experience of the employees increase, they may assume that their knowledge related to some topics gets better. Therefore, with the increased seniority employees may start to think that they do not need training anymore and they may think that present trainings are more than enough. In Edward and Taylor's paper, it is stated that "Previous studies have shown that occupational safety training has beneficial effects on knowledge gain and improved behavior but there is weak evidence for improved safety outcomes". Similarly, more than 10 years of experienced employees gained the knowledge and they may conclude

that, that knowledge is enough for them. The employees with less than 1 year, 1-3 years and 4-10 years of experience evaluated OHS trainings at bureaucratic level (M = 3.11, M = 3.2, M = 3.1) whereas employees with more than 10 years of experience evaluated nearly proactive (M = 3.7) level. The overall result for that dimension is that the given OHS trainings are evaluated by the employees nearly at the bureaucratic level. According to the scale that was developed for this dimension, the given trainings are limited to the legal requirements. The quality of them does not encounter with practical applications. Moreover, they are getting the trainings with crowded classes with inefficient context.

The study shows that employees with more than 10 years of experience evaluated management commitment significantly higher than employees with 4-10 years of experience. When their seniorities increase, employees may tend to involve with their job further. Therefore, they may start to think they are closer to management; moreover, they may seem themselves as a part of management. After a decade of work, employees get promotion naturally, so that this situation supports the idea of being closer to management or being a part of it. Because of the mentioned reasons, employees with more than 10 years of experience might consider themselves as management and select management commitment dimension nearly proactive level (M = 3.63), whereas employees with 4-10 years of experience consider their company near bureaucratic (M = 2.88) level in the same dimension.

According to the correlation analysis, company experience was positively correlated with both work accident and near misses. This result conflicted with TUIK Statistics (2016). TUIK Statistics showed that after 2 years of company experience, the numbers of work accidents were gradually decreasing. Since the question was asked “have you ever been in a work accident in your life”, experienced workers may relate the question

with their junior years' incidents and mark the paper accordingly. For that reason, the results displayed a positive correlation between the company experience and incidents.

According to the results, near miss history was negatively correlated with both accident/near miss reporting and machines/equipment safety dimensions. The accident and near miss reporting generally had local countermeasures like procedure updates, retraining and disciplining of employees (Reason, 1991). With a similar logic, employees who do not want to take the trainings over and over again or face disciplinary action several times may refrain from reporting the incidents.

As a result of regression analysis, communication was negatively and OHS training was positively associated with work accidents. As the communication level increased and OHS training level decreased, the likelihood of experiencing at least one accident was decreased. Communication is a key element in safety culture development. One of the most effective ways to improve safety culture and prevent injuries is to optimize safety-related communication throughout an organization (Williams, 2003). It is essential to report the safety issues one shift to another in order to make sure that the next shift is aware of the safety-related situations before they start to produce. Moreover, it is beneficial and required that employees can report safety problems to their supervisors and be a part of the solutions. If they cannot communicate about those issues, improvement of safety culture will slow down. Effective communication mechanisms are critical to engage staff in safety activities, to gain cooperation and support, and to maintain a positive safety culture (Vecchio-Sadus, 2007). The study result supports the findings of Williams (2003) and Vecchio-Sadus (2007) in terms of communication. On the other hand, the level of safety training efficiency of the organization was discussed before. The company provides trainings at a level that they

only meet legal requirements. The OHS trainings inefficient and superficial in the company so that it may mean the trainings have no positive effect on the accident rate.

Furthermore, looking at the 278 participants' results (See Appendix G), in communication dimension majority of the participants evaluated their company at pathological, reactive or bureaucratic levels so that they think the health and safety problems can be transferred by foreman only. Workers do not participate in health and safety problems by themselves. The information transfer related to health and safety issues generally handled by verbal communication. In the OHS training dimension, participants mainly evaluated the company at the bureaucratic level. That shows the OHS trainings are given only for legal compliance. Occupational Safety Specialists and Occupational Physicians give those trainings in fixed time intervals and according to a training program that was determined by law; therefore, the trainings are inefficient and do not cover the practice. Moreover, in accident / near miss reporting dimension, participants evaluated the organization at the pathological level mostly. The interesting part was the next mostly selected level was proactive. Those levels are far away from each other in terms of their description. The first explanation for this situation may be some departments' attitude towards reporting the incidents was different from others. However, when the department distribution was examined, there was not any particular difference between the numbers. The other explanation may be some part of the organization assume they do not report the smallest incidents as mentioned in pathological level and some part evaluate every incident, no matter the size is, is reported. Moreover, in machines / equipment safety dimension, participants evaluated their organization mostly in bureaucratic and proactive levels. That showed participants think that the company is at least comply with the regulations during machine / equipment purchasing and maintenance processes. Furthermore, some of

the participants evaluated the maintenance team and application of the procedures worked well. One of the most distinct results was workers' commitment to safety dimension. Participant evaluate company workers' commitment to safety at the proactive level mostly. The main reason for that result is they see themselves into the safety processes and the explanation on the card has an explanation related to workers. For example, some of the explanations were "Workers are aware of the health and safety issues." or "Workers see health and safety as a part of their job.". After getting a high level of selection result from that dimension, it may be logical that in order to get the realistic results for this dimension the questions may be converted to "Your co-workers are aware of the health and safety issues" or "Your associates see health and safety as a part of their job." After that conversion people may perceive that dimension in the right way. In management commitment dimension almost every levels' result close to each other. That showed every person in the organization has different perception related to their managers' attitude towards health and safety so that management level workers may not have a solid approach towards safety issues. When looking at emergency preparedness dimension, the majority of the participants evaluated the dimension at bureaucratic and proactive levels. That showed that participants think their company at least comply with the legal requirements related to emergency preparedness. They evaluated that the organization has the emergency teams and they had drills at least complying with laws. The emergency exits are marked in the company and emergency drawings are hanged in the plant. Another distinct result was the priority given to OHS in the organization. Participants mostly evaluated that dimension in the reactive level. They see their company's focus at production at blue collar, first and top manager levels. Participants feel time and production pressure on them. Finally, in ergonomics dimension, participants evaluated

their company mostly in bureaucratic and proactive levels. They think their company at least comply the legal requirements in ergonomic point of view, that includes both the environmental parameters like heat, lightning, etc. and factors that may affect workers' future health (musculoskeletal) problems. They evaluate that ergonomic risk assessment took place and some precautions were taken related to it.

4.3. Unique Contributions of the Study

To best of our knowledge, it was the first application of MaPSaF into Automotive Sector in the world; moreover, because of the attendance of 301 interviewees, it was one of the most participatory surveys in the literature related to safety culture level measurement.

Creating a tailor-made safety culture matrix for a company was demanding and precious work. Instead of a stereotypical measurement method with a survey, this study aimed to preserve the company jargon and get accurate outcomes as a result of using a common language. Since that jargon is close to sector, the matrix can be used in other automotive sector companies in order to measure the safety culture level in defined dimensions.

The safety culture dimensions that were gathered by both literature research and examining the incidents and also brainstorming with the specialists at the sector were crucial contributions. With the participants' inputs and solid dimensions existence, a reliable and valid matrix was developed. In addition, after the analysis, the study had contributions on accident and near miss history and company experience relations with specific dimensions of safety culture.

4.4. Limitations and Suggestions for Further Studies

The first limitation related to the current study is that it seems not possible to make a common matrix for all sectors. If it could be possible, the effort spent to complete the study will decrease. However, since every sector has its own jargon and since the safety culture dimensions will differ for each of them, commonization seems impractical. Therefore, for different sectors, new interviews and new safety culture matrixes should be prepared in the future. In their study Lawrie et. al. (2006) stated that it is essential to apply the safety culture framework to other industries requires attention; however, because of the mentioned limitations, it is not possible to apply one framework to all industries. From another point of view, that limitation is not related to the current study only, measurement of safety culture - no matter what the method is - is demanding work.

The second limitation is that completion of the current study takes a lot of time because it was a manual process and it was not easy to get employees from the production line to complete the study since the factory worked with 3 shifts in 24 hours. With successful planning, people can contribute to study with groups, but it needs a lot of time. In order to get speed, the digitalization of the study is needed.

A final limitation of the study is that the study needs a high number of participants with different characteristics in order to make a more solid analysis. It should not be forgotten that a greater number of participants requires more labor. For the current study, the number of the participants was high; however, some variables the distribution of the collar or the gender of the participants were not balanced. The main reason for that, in the current industry the women workers find their place recently and there are much more blue collar employees than white collars that know the nature

of the job. With a balanced number of characteristics, different analysis can be conducted.

As mentioned before, the digitalization of the study is needed in order to get speed. After the digitalization, many employees can attend the study simultaneously; therefore, the time and effort spent to complete the study will decrease. That digitalization may be the integration of the card selection into an application that will valid in tablets so that the selection work and data collection will be simpler.

The current study was implemented in one company in the automotive sector. There should be more applications in the sector in different organizations so that group comparisons can take place. Moreover, the safety culture level measurement with maturity levels vs. dimensions matrix should be applied in different sectors in order to determine the safety culture levels of the companies and consequently in order to reach better.

In addition to different company implementations, the matrix can be applied to the same company periodically (maybe once a year) in order to see the altering in the maturity of safety culture level. Moreover, companies may try to create an action plan for completing the next level's requirements (like from bureaucratic to proactive) to increase their maturity level in the related dimension.

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APPENDICES

A. Ethical Permission

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
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05 Mayıs 2017

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Doç. Dr. Türker ÖZKAN ;

Danışmanlığını yaptığınız yüksek lisans öğrencisi Duygu ÖCAL ŞEN' in ***"Otomotiv Sektöründe Güvenlik Kültürü Seviyesi Analizi"*** başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek gerekli onay **2017-SOS-074** protokol numarası ile **08.05.2017 – 30.08.2018** tarihleri arasında geçerli olmak üzere verilmiştir.

Bilgilerinize saygılarımla sunarım.

Prof. Dr. Ş. Halil TURAN
Başkan V

Prof. Dr. Ayhan SOL
Üye

Prof. Dr. Ayhan Gürbüz DEMİR
Üye

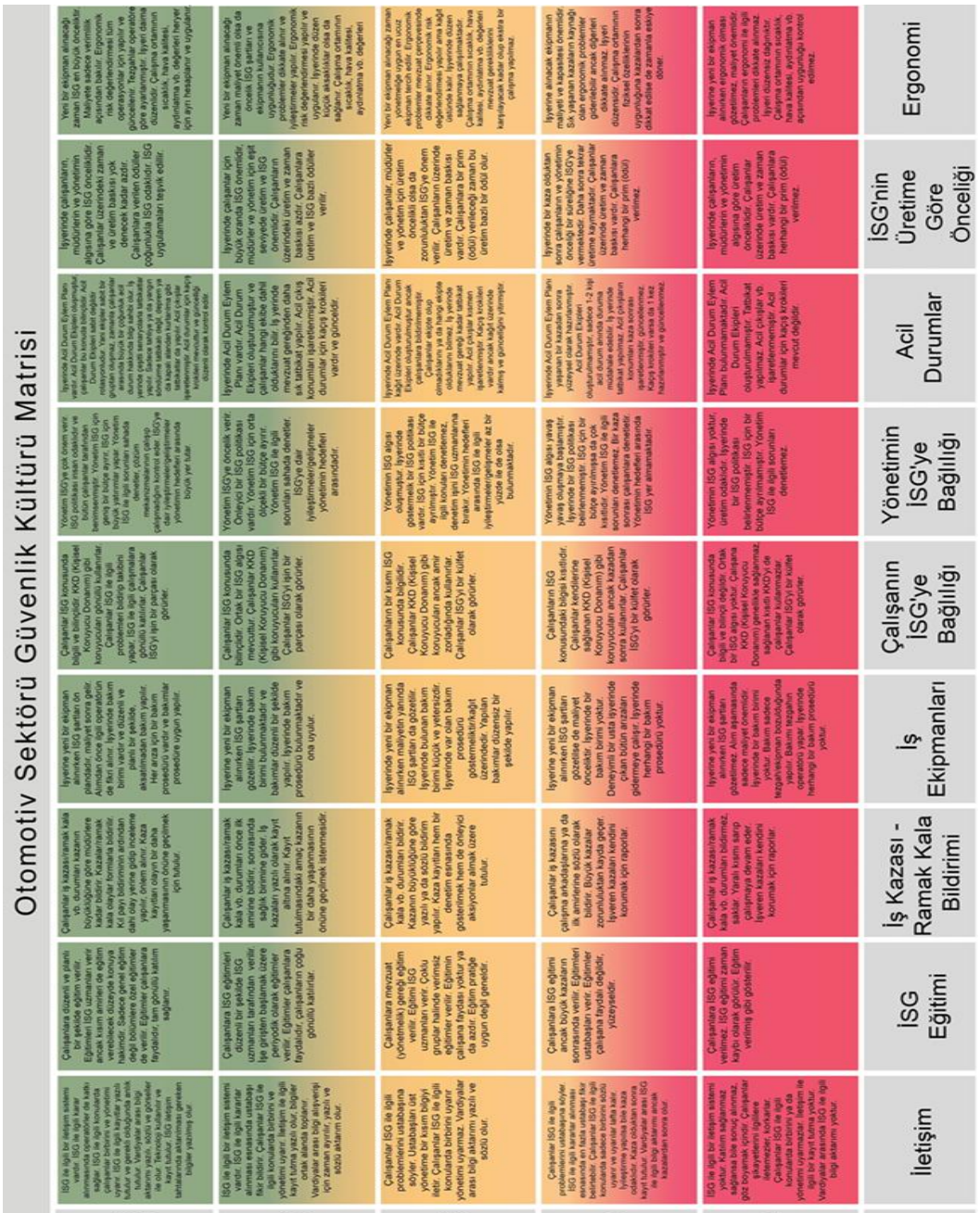
Doç. Dr. Yaşar KONDAKÇI
Üye

Doç. Dr. Zana ÇITAK
Üye

Yrd. Doç. Dr. Pınar KAYGAN
Üye

Yrd. Doç. Dr. Emre SELÇUK
Üye

B. Automotive Sector Safety Culture Matrix



C. Automotive Sector Safety Culture Matrix Details

	Boyut 1: İletişim
A	İSG ile ilgili bir iletişim sistemi yoktur. Katılım genellikle sağlanmaz; sağlansa bile sonuç alınmaz, göz boyamak içindir. Çalışanlar şikayetlerini ilgililere iletemezler, işlerini kaybetmekten korkarlar. Çalışanlar İSG konularında birbirini ya da yönetimi uyarmazlar. Bu anlamda bir kayıt tutma yoktur. Vardiyalar arasında İSG ile alakalı bilgi aktarımı yoktur.
B	Çalışanlar İSG ile ilgili problemlerini ancak ustabaşına söyleyebilir. Çalışanlar İSG konularında sadece birbirini sözlü uyarır ve uyarılar lafta kalır. İyileştirme yapılsa bile kaza odaklıdır. Kaza olduktan sonra kayıt tutulur. Vardiyalar arası İSG ile alakalı bilgi aktarımı kazalardan sonra, yalnızca kaza ile ilgili olur.
C	Çalışanlar İSG ile ilgili problemlerini ustabaşına söyler. Ustabaşları yönetime bir kısım bilgiyi iletir. İSG ile ilgili kararlar alınmasında nadiren ustabaşının fikri alınır, operatörlerin fikri alınmaz. Çalışanlar İSG konularında birbirini uyarır, yönetimi uyarmaz. Vardiyalar arası İSG ile alakalı bilgi aktarımı yazılı ve sözlü olur.
D	İSG ile ilgili bir iletişim sistemi vardır. İSG ile ilgili kararlar alınmasında ustabaşı fikir bildirir. Çalışanlar İSG konularında birbirini ve yönetimi uyarır. Kayıt tutma yazılı olur, bilgiler ortak alanda toplanır. Vardiyalar arası İSG ile alakalı bilgi alışverişi için zaman ayırılır, yazılı ve sözlü aktarım olur.
E	İSG ile ilgili oturmuş bir iletişim sistemi vardır. İSG ile ilgili karar alınmasında operatörler de katkı sağlar. İSG konularında çalışanlar birbirini ve yönetimi uyarır. İSG'ye dair kayıtlar yazılı ve gerekli olduğunda anlık tutulur. Vardiyalar arası bilgi aktarımı yazılı, sözlü ve görseller ile olur. Teknoloji takip edilir ve kayıt tutma işleminde teknoloji kullanılır. İSG iletişim araçlarına vardiyalar arası aktarılması gereken bilgiler yazılmış olur.

	Boyut 2: İSG Eğitimi
A	Çalışanlara İSG eğitimi verilmez. İSG eğitimi hem çalışanlar hem de yönetim tarafından zaman kaybı olarak görülür. Eğer eğitim verilerinin ilgili birimlere sunulması gerekirse, eğitim verilmiş gibi gösterilir.
B	Çalışanlara İSG eğitimi ancak büyük kazaların sonrasında verilir. Eğitimleri ustabaşları verir. Eğitimler genel konuları kapsamaz, kaza odaklıdır. Eğitimler çalışana faydalı değildir, yüzeyseldir ve konular üstün körü anlatılır.
C	Çalışanlara mevzuat (yönetmelik) gereği eğitim verilir. Eğitimi İSG profesyonelleri verir. Çoklu gruplar halinde verimsiz eğitimler verilir. Eğitimin çalışana faydası yoktur ya da azdır. Eğitim pratiğe uygun değil geneldir.
D	Çalışanlara İSG eğitimleri düzenli bir şekilde İSG uzmanları tarafından verilir. İşe girişten başlamak üzere periyodik olarak eğitimler verilir. Genel eğitimlere ek olarak ihtiyaç dahilinde ilave eğitimler de verilir. Eğitimler çalışanlara faydalıdır, çalışanların çoğu gönüllü katılır.
E	Çalışanlara düzenli ve planlı bir şekilde eğitim verilir. Eğitimleri İSG uzmanları verir ancak kısım amirleri de eğitim verebilecek düzeyde konuya hakimdir. Sadece genel eğitim değil planlı bir şekilde bölümlere özel eğitimler de verilir. Eğitimler çalışanlara faydalıdır, çalışanların tamamı eğitimlere gönüllü katılım sağlar.

	Boyut 3: İş Kazası / Ramak Kala Bildirimi
A	Çalışanlar ramak kala (kıl payı) ve kendilerine küçük gelen kazaları hem bildirmeleri gerektiğinin bilincinde olmadıklarından hem de ufak tefek kabul ettikleri kazaları kendileri de önemsemediklerinden bildirmezler. Ayrıca iş

	kaybetme korkuları olduğundan yaralansalar bile yaralı kısmı sarıp çalışmaya devam ederler. Çalışanlar ancak rapor almayı gerektirecek kazaları zorunluluktan ustabaşına bildirirler. İşveren çok az sayıda kazayı kendini korumak için raporlar.
B	Çalışanlar iş kazasını geçirdiklerini çalışma arkadaşlarına ya da ilk amirlerine sözlü olarak bildirir. Ramak kala (kıl payı) bildirimi pek yapılmaz. Büyük kazalar zorunluluktan kayda geçer. İşveren, kazaların büyük kısmını hem işine gelmediğinden hem de haberi olmadığından raporlamaz. İşveren raporlamak zorunda kaldığı kazaları ise kendini korumak için raporlar.
C	Çalışanlar iş kazası/ramak kala (kıl payı) vb. durumları bildirir. Kazanın büyüklüğüne göre yazılı ya da sözlü bildirim yapılır. Kaza kayıtları öncelikle bir denetim esnasında gösterilmek ve yasal zorunlulukları yerine getirmek için tutulur. Kaza kayıtları ayrıca sınırlı bir takım önleyici aksiyonların alınması için de tutulur.
D	Çalışanlar iş kazası/ramak kala (kıl payı) vb. durumları önce ilk amirine bildirir. Yaşanan bütün iş kazaları yazılı olarak kayıt altına alınır. İş kazalarından sonra olay yerine gidilip inceleme yapılır. İnceleme yapılmasının ve kayıt tutulmasının amacı kazanın bir daha yaşanmasına engel olmaktır.
E	Çalışanlar iş kazası/ramak kala vb. durumları kazanın büyüklüğüne göre üst yönetime kadar bildirir. Kazalar/ramak kala (kıl payı) olaylar ve iş kazaları formlarla bildirilir. Kıl payı bildiriminin ardından dahi olay yerine gidip inceleme yapılır, önlem alınır. Kaza kayıtları ve alınan önlemlerin takibi için programlar kullanılır. Kaza ve kıl payı kayıtları olayın bir daha yaşanmasının önüne geçilmek için tutulur.

Boyut 4: İş Ekipmanları

A	İşyerine yeni bir ekipman alınırken İSG şartları gözetilmez. Alım aşamasında sadece maliyet önemlidir. İşyerindeki makineler/tezgahlar eskimiş, yıpranmış ve işlevlerini kaybetmeye başlamıştır. İşyerinde bir bakım birimi yoktur. Ekipmanlar artık çalışamaz hale gelene kadar onarılmadan kullanılır. Bakım sadece tezgâh/ekipman bozulduğunda/zorunluluktan yapılır. Bakımı tezgâhın operatörü yapar. İşyerinde herhangi bir bakım prosedürü yoktur.
B	İşyerine alınacak ekipmanın maliyeti ve kapasitesi önemlidir. Alınacak ekipmanın İSG gerekliliklerini karşılaması geri plandadır. İşyerinde bir bakım birimi yoktur. Deneyimli bir usta işyerinde çıkan bütün arızaları gidermeye çalışır. İşyerinde herhangi bir bakım prosedürü yoktur.
C	Yeni bir ekipman alınacağı zaman yönetmeliğe uygun en ucuz ekipman tercih edilir. İSG şartlarına da ilk sırada olmasa da bakılmaktadır. İşyerinde bakım prosedürü vardır ancak göstermeliktir/kâğıt üzerindedir. İşyerinde var olan bakım prosedürü göstermeliktir/kâğıt üzerindedir. Yapılan bakımlar düzensiz bir şekilde ve genelde ihtiyaç doğdukça yapılır.
D	Yeni bir ekipman alınacağı zaman maliyet önemli olsa da öncelik İSG şartları ve ekipmanın kullanıcısına uygunluğudur. İşyerinde geniş bir bakım birimi bulunmaktadır ve bakımlar düzenli bir şekilde yapılır. İşyerinde detaylı bakım prosedürleri bulunur ve onlara uyularak bakım yapılır.
E	İşyerine yeni bir ekipman alınırken İSG şartları ön plandadır, maliyet sonra gelir. Ekipman alınmadan önce ilgili operatörün de fikri alınır. İşyerinde geniş bir bakım birimi vardır ve düzenli ve planlı bir şekilde, aksatılmadan bakımlar yapılır. Her arıza için bir bakım prosedürü vardır ve bakımlar prosedüre uygun yapılır.

	Boyut 5: Çalışanın İSG'ye Bağlılığı
A	Çalışanlar İSG konusunda bilgili ve bilinçli değildir. Ortak bir İSG algısı yoktur. Çalışana KKD (Kişisel Koruyucu Donanım) genellikle sağlanmaz, sağlanan kısıtlı KKD'yi de çalışanlar tam kullanmazlar. Çalışanlar İSG'yi tamamen gereksiz ve bir külfet olarak görürler.
B	Çalışanların İSG konusundaki bilgisi kısıtlıdır. Çalışanlar kendilerine sağlanan KKD (Kişisel Koruyucu Donanım) gibi koruyucuları ancak kazadan sonra bir süreliğine kullanırlar. Çalışanlar İSG'yi bir zaman kaybı ve külfet olarak görürler.
C	Çalışanların bir kısmı İSG konusunda bilgilidir. Çalışanlar KKD (Kişisel Koruyucu Donanım) gibi koruyucuları ancak amir zorladığında kullanırlar. Çalışanlar İSG'yi bir külfet olarak görürler.
D	Çalışanlar İSG konusunda bilinçlidir. Ortak bir İSG algısı mevcuttur. Çalışanlar KKD (Kişisel Koruyucu Donanım) gibi koruyucuları kullanırlar, yönetim tarafından belirlenmiş İSG kurallarını gözetirler. Çalışanlar İSG'yi işin bir parçası olarak görürler.
E	Çalışanlar İSG konusunda bilgili ve bilinçlidir. KKD (Kişisel Koruyucu Donanım) gibi koruyucuları gönüllü kullanırlar. Çalışanlar İSG ile ilgili problemleri bildirip takibini yapar, İSG ile ilgili çalışmalara gönüllü katılırlar. Çalışanlar İSG'yi hem işin bir parçası hem de toplumsal hayatın bir gerekliliği olarak görürler.

	Boyut 6: Üst Yönetimin İSG'ye Bağlılığı
A	Üst yönetimin İSG algısı yoktur, üretim odaklıdır. İşyerinde bir İSG politikası belirlenmemiştir. İSG için bir bütçe ayrılmamıştır. Üst yönetim İSG ile ilgili sorunları denetlemez, çözüm aramaz.

B	Üst yönetimin İSG algısı yavaş yavaş oluşmaya başlamıştır. İşyerinde bir İSG politikası belirlenmemiştir. İSG için bir bütçe ayırılmışsa da çok kısıtlıdır. Üst yönetim İSG ile ilgili sorunları denetlemez. Bir kaza sonrası çalışanlara denetletir. Üst yönetimin hedefleri arasında İSG yer almamaktadır.
C	Üst yönetimin İSG algısı oluşmuştur. İşyerinde göstermelik bir İSG politikası vardır. İSG için kısıtlı bir bütçe ayrılmıştır. Üst yönetim İSG ile ilgili konuları denetlemez, denetim işini İSG uzmanlarına bırakır. Üst yönetimin hedefleri arasında İSG ile ilgili iyileştirmeler az bir yüzde ile de olsa bulunmaktadır.
D	Üst yönetim İSG'ye öncelik verir. Önleyici bir İSG politikası vardır. Üst yönetim İSG için orta ölçekli bir bütçe ayırır. Üst yönetim İSG ile ilgili temel sorunları sahada denetler. İSG'ye dair iyileştirmeler üst yönetimin hedefleri arasındadır.
E	Üst yönetimin önceliği İSG'dir. İSG politikası insan odaklıdır ve bütün çalışanlar tarafından benimsenmiştir. Üst yönetim İSG için geniş bir bütçe ayırır, İSG için büyük yatırımlar yapar. Üst yönetim İSG ile ilgili sorunları sahada denetler, çözüm mekanizmalarının çalışıp çalışmadığını kontrol eder. İSG'ye dair iyileştirmeler üst yönetimin hedefleri arasında büyük oranlarda yer tutar.

	Boyut 7: Acil Durumlar
A	İşyerinde acil durumla ilgili hiçbir çalışma yapılmamıştır. İşyerinde Acil Durum Eylem Planı bulunmaz. Acil Durum Ekipleri oluşturulmamıştır. Tatbikat yapılmaz. Dolayısıyla işyerinde acil bir durumda ne yapılacağını bilen kimse yoktur. Acil çıkışlar vb. işaretlenmemiştir. Acil durumlar için kaçış krokileri mevcut değildir.

B	İşyerinde Acil Durum Eylem Planı yaşanan büyük bir kazadan sonra yüzeysel olarak hazırlanmıştır. Acil Durum Ekipleri oluşturulmamıştır, sadece 1-2 kişi acil durum anında duruma müdahale edebilir. İş yerinde tatbikat yapılmaz. Acil çıkışların konumları kaza sonrası işaretlenmiştir, güncellenmez. Kaçış krokileri varsa da 1 kez hazırlanmıştır ve güncellenmez.
C	İşyerinde Acil Durum Eylem Planı kâğıt üzerinde yasal gerekliliği karşılayacak şekilde oluşturulmuştur. Acil Durum Ekipleri belirlenmiştir ancak çalışanlara bildirilmemiştir. Çalışanlar ekipte olup olmadıklarını ya da hangi ekipte olduklarını bilmez. İş yerinde mevzuat gereği kadar tatbikat yapılır. Acil çıkışlar kısmen işaretlenmiştir. Kaçış krokileri vardır ancak kâğıt üzerinde kalmış ve güncelliğini yitirmiştir.
D	İşyerinde Acil Durum Eylem Planı vardır. Acil Durum Ekipleri oluşturulmuştur ve çalışanlar hangi ekibe dahil olduklarını bilir. İş yerinde mevzuat gereğinden daha sık tatbikat yapılır. Acil çıkış konumları işaretlenmiştir. Acil durumlar için kaçış krokileri vardır ve günceldir.
E	İşyerinde Acil Durum Eylem Planı vardır. Acil Durum Ekipleri oluşmuştur, çalışanlar bu konuda bilinçlidir. Acil Durum Ekipleri sabit değildir rotasyonludur. Yani ekipler sabit bir gruptan oluşmaz, zamanla çalışanlar arasında büyük bir çoğunluk acil durum hakkında bilgi sahibi olur. İş yerinde çeşitli senaryolarla tatbikatlar yapılır. Sadece tahliye ya da yangın söndürme tatbikatı değil, deprem ya da kapalı alandan kurtarılma gibi tatbikatlar da yapılır. Acil çıkışlar işaretlenmiştir. Acil durumlar için kaçış krokileri mevcuttur ve güncelliği düzenli olarak kontrol edilir.

	Boyut 8: İSG'nin Üretime Göre Önceliği
A	İşyerinde çalışanların, müdürlerin ve üst yönetimin algısına göre üretim önceliklidir. İşyerindekilerin tamamı tarafından İSG kurallarının bir işe yaramadığı ve üretimi aksattığı düşünülür. Çalışanlar üzerinde üretim ve zaman baskısı vardır. Çalışanlara herhangi bir prim (ödül) verilmez.
B	İşyerindeki genel algıya göre üretim önceliklidir. Ancak bir kaza olduktan sonra çalışanların, müdürlerin ve üst yönetimin önceliği bir süreliğine İSG'ye kaymaktadır. Daha sonra öncelik tekrar üretime dönmektedir. Çalışanlar üzerinde üretim ve zaman baskısı vardır. Çalışanlara herhangi bir prim (ödül) verilmez.
C	İşyerinde çalışanlar, müdürler ve üst yönetim için üretim öncelikli olsa da yasal zorunluluktan dolayı İSG'ye de bir miktar önem verilir. Çalışanların üzerinde üretim ve zaman baskısı vardır. Çalışanlara bir prim (ödül) verileceği zaman bu üretim bazlı bir ödül olur.
D	İşyerinde çalışanlar için büyük oranda İSG önemlidir, müdürler ve üst yönetim için eşit seviyede üretim ve İSG önemlidir. Çalışanların üzerindeki üretim ve zaman baskısı azdır. Çalışanlara üretim ve İSG bazlı ödüller verilir.
E	İşyerinde çalışanların, müdürlerin ve üst yönetimin algısına göre İSG önceliklidir. Çalışanlar üzerindeki zaman ve üretim baskısı yok denecek kadar azdır. Çalışanlara verilen ödüller çoğunlukla İSG odaklıdır. İSG uygulamaları teşvik edilir.

	Boyut 9: Ergonomi
A	İşyerinde çalışma alanları düzensiz ve dağınıktır. Çalışanların ergonomi ile ilgili problemleri dikkate alınmaz. Çalışma ortamının sıcaklık, hava kalitesi, aydınlatma vb. açısından uygunluğu kontrol edilmez. Dolayısı ile genellikle

yetersizdir.

B	İşyerinde sık yaşanan kazaların kaynağı olan ergonomik problemler giderilebilir ancak diğerleri dikkate alınmaz. İşyeri düzensizdir. Çalışma ortamının fiziksel özelliklerinin uygunluğuna kazalardan sonra dikkat edilse de zamanla eskiye döner yani genellikle sıcaklık, hava kalitesi, aydınlatma vb. fiziksel özellikler uygun değildir.
C	İşyerinde tertip düzen sağlanmaya çalışılmaktadır ancak takibi düzenli yapılmadığından yeterli değildir. Ergonomik problemler mevzuat çerçevesinde dikkate alınır. Ergonomik risk değerlendirmesi yapılır ama çoğunlukla kağıt üstünde kalır. Çalışma ortamının sıcaklık, hava kalitesi, aydınlatma vb. değerleri mevzuat gerekliliklerini karşılayacak kadar olup ekstra bir çalışma yapılmaz.
D	İşyerinde ergonomik problemler dikkate alınır ve iyileştirmeler yapılır. Ergonomik risk değerlendirmesi yapılır ve uygulanır. İşyerinde düzen küçük aksaklıklar olsa da sağlanır. Çalışma ortamının sıcaklık, hava kalitesi, aydınlatma vb. değerleri uygundur.
E	İşyerinde çalışma alanları daima düzenlidir. Ekipman ve makinelerin yerleri, çalışma pozisyonları da göz önünde bulundurularak belirlenmiş, işaretlenmiştir. Çalışma alanları çalışmayı engelleyecek ya da acil bir durumda kaçmayı zorlaştıracak kadar dar değil, çalışanların gereğinden fazla hamle yapmasına sebep olacak kadar da geniş değildir. Ergonomik risk değerlendirmesi tüm operasyonlar için yapılır ve güncellenir. Tezgahlar operatöre göre ayarlanmıştır. Çalışma ortamının sıcaklık, hava kalitesi, aydınlatma vb. değerleri her yer için ayrı hesaplanır ve çalışanların da görüşleri alınarak optimum seviyede tutulur.

D. Voluntary Participation Form

ARAŞTIRMAYA GÖNÜLLÜ KATILIM FORMU

Sayın Katılımcı,

Orta Doğu Teknik Üniversitesi İş Sağlığı ve Güvenliği yüksek lisans öğrencisi Duygu Öcal iş sağlığı ve güvenliği programı öğretim görevlisi Doçent Doktor Türker Özkan denetiminde iş güvenliği kültürü hakkında yüksek lisans tezi araştırması yürütmektedir. Bu form sizi araştırma koşulları hakkında bilgilendirmek için hazırlanmıştır.

Güvenlik kültürü bir işyerinde tüm çalışanlar tarafından iş güvenliği ile ilgili paylaşılan kanaat ve benimsenen tavırların bütünüdür. Bu çalışmanın amacı çalıştığınız şirketteki güvenlik kültürünün çeşitli boyutlar için ölçülmesidir.

Bu çalışma tamamen gönüllülük esasına dayalıdır. Katılmanız ya da katılmamanız durumunda herhangi bir yaptırımla karşılaşmazsınız. Araştırmaya katılanlardan elde edilen bilgiler tamamen gizli tutulacaktır, herhangi bir şekilde paylaşılmayacaktır. Verdiğiniz bilgilerin yazılı olduğu kağıtlarda isim yerine bir numara kullanılacaktır.

Araştırma projesi hakkında ek bilgi almak istediğiniz takdirde Orta Doğu Teknik Üniversitesi İş Sağlığı ve Güvenliği Bölümü yüksek lisans öğrencisi Duygu Öcal Şen ile iletişime geçebilirsiniz.

E-posta: duygu.ocal@metu.edu.tr

Yukarıdaki bilgileri okudum ve bu çalışmaya gönüllü olarak katılıyorum.

Katılımcının;

Adı Soyadı	Tarih	İmza
……..	…./…./…….	……..……

E. Post-Research Information Form

ARAŞTIRMA SONRASI BİLGİLENDİRME FORMU

Öncelikle bu araştırmaya katıldığınız için teşekkür ederiz.

Bu çalışma daha önce de belirtildiği gibi Orta Doğu Teknik Üniversitesi İş Sağlığı ve Güvenliği yüksek lisans öğrencisi Duygu Öcal Şen tarafından iş sağlığı ve güvenliği programı öğretim görevlisi Prof. Dr. Türker Özkan denetiminde iş güvenliği kültürü hakkında yürütülen yüksek lisans tez araştırmasıdır.

Bu çalışmanın amacı çalıştığınız şirketteki güvenlik kültürünün çeşitli boyutlar için ölçülmesidir. İşyerlerinde güvenlik kültürünün ölçülmesi, işyerinin incelenen boyutlarda çalışanların genel algısında göre ne seviyede olduğunu göstermektedir. Bunun sonucunda ise işyerinin iyileştirmeye açık yönler ortaya çıkmakta ve ilerleme kaydedilmesine olanak sağlanmaktadır.

Elde edilen bilgiler bilimsel araştırma ve yazılarda kullanılacaktır. Çalışma ile ilgili ek bilgi almak ya da sonuçları öğrenmek istediğinizde duygu.ocal@metu.edu.tr adresinden Orta Doğu Teknik Üniversitesi İş Sağlığı ve Güvenliği Bölümü yüksek lisans öğrencisi Duygu Öcal Şen ile iletişime geçebilirsiniz.

F. Personal Information and Data Collection Sheet

Bağlı Olduğunuz Müdürlük

……..

	☐ Mavi Yaka	☐ Beyaz Yaka	
Yaşınız	☐ 18-25	☐ 26-35	
	☐ 36 ve üzeri		
Cinsiyetiniz	☐ Kadın	☐ Erkek	
En Son Mezun Olduğunuz Okul	☐ İlkokul	☐ Ortaokul	
	☐ Lise	☐ Yüksekokul	
	☐ Üniversite	☐ Yüksek Lisans	
	☐ Doktora		
TürkTraktör Tecrübeniz	☐ 1 Yıldan Az	☐ 1-3 Yıl	☐ 4-10 Yıl
	☐ 10 Yıldan Fazla		
Toplam İş Tecrübeniz	☐ 1 Yıldan Az	☐ 1-3 Yıl	☐ 4-10 Yıl
	☐ 10 Yıldan Fazla		
İş Kazası Geçirdiniz Mi?	☐ Evet	☐ Hayır	
Kıl Payı (Ramak Kala) Yaşadınız Mı?	☐ Evet	☐ Hayır	
Ayda Kaç Saat Fazla Mesai Yapıyorsunuz?	☐ 1-3 Saat	☐ 3-8 Saat	☐ 8-11 Saat

	A	B	C	D	E
1	A1	B1	C1	D1	E1
2	A2	B2	C2	D2	E2
3	A3	B3	C3	D3	E3
4	A4	B4	C4	D4	E4
5	A5	B5	C5	D5	E5
6	A6	B6	C6	D6	E6
7	A7	B7	C7	D7	E7
8	A8	B8	C8	D8	E8
9	A9	B9	C9	D9	E9

G. Study 2 Results by Numbers

1. Results of 301 participants

Communication System Dimension Results

Departments / Levels	A1	B1	C1	D1	E1	Total
Gear and Heat Treatment	7	7	15	10	8	47
Driveline Production	11	10	8	6	9	44
Health and Safety	1	1	1	1	3	7
Quality	0	1	2	2	1	6
Driveline Assembly	25	26	25	9	14	99
Quality Syst. and Training	1	0	0	0	1	2
Engine Production	7	9	10	8	6	40
Warehouse and Int. Logistics	11	9	7	9	12	48
Production Maintenance	1	3	1	2	1	8
Grand Total	64	66	69	47	55	301

A1: Pathological B1: Reactive C1: Bureaucratic D1: Proactive E1: Generative

Occupational Health and Safety Trainings Dimension Results

Departments / Levels	A2	B2	C2	D2	E2	Total
Gear and Heat Treatment	1	5	22	11	8	47
Driveline Production	3	9	22	8	2	44
Health and Safety	0	0	6	1	0	7
Quality	0	0	1	4	1	6
Driveline Assembly	3	12	57	18	9	99
Quality Syst. and Training	0	0	1	1	0	2
Engine Production	0	4	20	12	4	40
Warehouse and Int. Logistics	6	5	19	13	5	48
Production Maintenance	0	0	4	4	0	8
Grand Total	13	35	152	72	29	301

A2: Pathological B2: Reactive C2: Bureaucratic D2: Proactive E2: Generative

Accident / Near Miss Reporting Dimension Results

Departments / Levels	A3	B3	C3	D3	E3	Total
Gear and Heat Treatment	20	3	4	14	6	47
Driveline Production	18	6	1	15	4	44
Health and Safety	0	0	1	5	1	7
Quality	1	0	0	4	1	6
Driveline Assembly	38	18	11	26	6	99
Quality Syst. and Training	0	0	1	1	0	2
Engine Production	12	4	2	17	5	40
Warehouse and Int. Logistics	16	4	2	16	10	48
Production Maintenance	2	2	1	3	0	8
Grand Total	107	37	23	101	33	301

A3: Pathological B3: Reactive C3: Bureaucratic D3: Proactive E3: Generative

Machines / Equipment Safety Dimension Results

Departments / Levels	A4	B4	C4	D4	E4	Total
Gear and Heat Treatment	5	4	15	14	9	47
Driveline Production	7	6	11	17	3	44
Health and Safety	0	1	4	2	0	7
Quality	0	0	1	4	1	6
Driveline Assembly	10	13	33	25	18	99
Quality Syst. and Training	0	0	1	1	0	2
Engine Production	2	3	10	21	4	40
Warehouse and Int. Logistics	6	8	10	14	10	48
Production Maintenance	0	0	3	5	0	8
Grand Total	30	35	88	103	45	301

A4: Pathological B4: Reactive C4: Bureaucratic D4: Proactive E4: Generative

Workers' Commitment to Safety Dimension Results

Departments / Levels	A5	B5	C5	D5	E5	Total
Gear and Heat Treatment	3	4	7	24	9	47
Driveline Production	3	2	9	20	10	44
Health and Safety	0	0	5	2	0	7
Quality	0	0	1	4	1	6
Driveline Assembly	15	3	21	43	17	99
Quality Syst. and Training	0	0	1	0	1	2
Engine Production	3	2	10	17	8	40
Warehouse and Int. Logistics	5	4	13	16	10	48
Production Maintenance	0	0	6	1	1	8
Grand Total	29	15	73	127	57	301

A5: Pathological B5: Reactive C5: Bureaucratic D5: Proactive E5: Generative

Management Commitment to Safety Dimension Results

Departments / Levels	A6	B6	C6	D6	E6	Total
Gear and Heat Treatment	9	9	11	12	6	47
Driveline Production	9	10	9	11	5	44
Health and Safety	0	2	3	2	0	7
Quality	1	1	1	1	2	6
Driveline Assembly	18	15	30	20	16	99
Quality Syst. and Training	1	0	0	1	0	2
Engine Production	9	6	9	8	8	40
Warehouse and Int. Logistics	6	7	13	8	14	48
Production Maintenance	1	2	3	2	0	8
Grand Total	54	52	79	65	51	301

A6: Pathological B6: Reactive C6: Bureaucratic D6: Proactive E6: Generative

Emergency Preparedness Dimension Results

Departments / Levels	A7	B7	C7	D7	E7	Total
Gear and Heat Treatment	0	2	15	16	14	47
Driveline Production	1	3	26	12	2	44
Health and Safety	0	0	1	5	1	7
Quality	0	0	0	4	2	6
Driveline Assembly	3	6	53	30	7	99
Quality Syst. and Training	0	0	0	1	1	2
Engine Production	0	0	15	19	6	40
Warehouse and Int. Logistics	1	2	19	23	3	48
Production Maintenance	0	1	3	3	1	8
Grand Total	5	14	132	113	37	301

A7: Pathological B7: Reactive C7: Bureaucratic D7: Proactive E7: Generative

Priority Given to Occupational Health and Safety Dimension Results

Departments / Levels	A8	B8	C8	D8	E8	Total
Gear and Heat Treatment	10	16	10	7	4	47
Driveline Production	5	22	10	6	1	44
Health and Safety	0	4	3	0	0	7
Quality	1	3	0	1	1	6
Driveline Assembly	16	50	20	10	3	99
Quality Syst. and Training	0	1	0	1	0	2
Engine Production	5	20	11	3	1	40
Warehouse and Int. Logistics	7	12	19	9	1	48
Production Maintenance	0	6	1	1	0	8
Grand Total	44	134	74	38	11	301

A8: Pathological B8: Reactive C8: Bureaucratic D8: Proactive E8: Generative

Ergonomics Dimension Results

Departments / Levels	A9	B9	C9	D9	E9	Total
Gear and Heat Treatment	12	4	13	10	8	47
Driveline Production	4	9	12	16	3	44
Health and Safety	0	0	4	3	0	7
Quality	0	0	1	2	3	6
Driveline Assembly	20	11	37	21	10	99
Quality Syst. and Training	0	1	0	1	0	2
Engine Production	5	7	12	13	3	40
Warehouse and Int. Logistics	10	6	14	10	8	48
Production Maintenance	1	1	3	2	1	8
Grand Total	52	39	96	78	36	301

A9: Pathological B9: Reactive C9: Bureaucratic D9: Proactive E9: Generative

2. Results of 278 participants

Communication System Dimension Results

Departments / Levels	A1	B1	C1	D1	E1	Total
Gear and Heat Treatment	7	7	15	10	8	47
Driveline Production	11	10	8	6	9	44
Driveline Assembly	25	26	25	9	14	99
Engine Production	7	9	10	8	6	40
Warehouse and Int. Logistics	11	9	7	9	12	48
Grand Total	61	61	65	42	49	278

A1: Pathological B1: Reactive C1: Bureaucratic D1: Proactive E1: Generative

Occupational Health and Safety Trainings Dimension Results

Departments / Levels	A2	B2	C2	D2	E2	Total
Gear and Heat Treatment	1	5	22	11	8	47
Driveline Production	3	9	22	8	2	44
Driveline Assembly	3	12	57	18	9	99
Engine Production	0	4	20	12	4	40
Warehouse and Int. Logistics	6	5	19	13	5	48
Grand Total	13	35	140	62	28	278

A2: Pathological B2: Reactive C2: Bureaucratic D2: Proactive E2: Generative

Accident / Near Miss Reporting Dimension Results

Departments / Levels	A3	B3	C3	D3	E3	Total
Gear and Heat Treatment	20	3	4	14	6	47
Driveline Production	18	6	1	15	4	44
Driveline Assembly	38	18	11	26	6	99
Engine Production	12	4	2	17	5	40
Warehouse and Int. Logistics	16	4	2	16	10	48
Grand Total	104	35	20	88	31	278

A3: Pathological B3: Reactive C3: Bureaucratic D3: Proactive E3: Generative

Machines / Equipment Safety Dimension Results

Departments / Levels	A4	B4	C4	D4	E4	Total
Gear and Heat Treatment	5	4	15	14	9	47
Driveline Production	7	6	11	17	3	44
Driveline Assembly	10	13	33	25	18	99
Engine Production	2	3	10	21	4	40
Warehouse and Int. Logistics	6	8	10	14	10	48
Grand Total	30	34	79	91	44	278

A4: Pathological B4: Reactive C4: Bureaucratic D4: Proactive E4: Generative

Workers' Commitment to Safety Dimension Results

Departments / Levels	A5	B5	C5	D5	E5	Total
Gear and Heat Treatment	3	4	7	24	9	47
Driveline Production	3	2	9	20	10	44
Driveline Assembly	15	3	21	43	17	99
Engine Production	3	2	10	17	8	40
Warehouse and Int. Logistics	5	4	13	16	10	48
Grand Total	29	15	60	120	54	278

A5: Pathological B5: Reactive C5: Bureaucratic D5: Proactive E5: Generative

Management Commitment to Safety Dimension Results

Departments / Levels	A6	B6	C6	D6	E6	Total
Gear and Heat Treatment	9	9	11	12	6	47
Driveline Production	9	10	9	11	5	44
Driveline Assembly	18	15	30	20	16	99
Engine Production	9	6	9	8	8	40
Warehouse and Int. Logistics	6	7	13	8	14	48
Grand Total	51	47	72	59	49	278

A6: Pathological B6: Reactive C6: Bureaucratic D6: Proactive E6: Generative

Emergency Preparedness Dimension Results

Departments / Levels	A7	B7	C7	D7	E7	Total
Gear and Heat Treatment	0	2	15	16	14	47
Driveline Production	1	3	26	12	2	44
Driveline Assembly	3	6	53	30	7	99
Engine Production	0	0	15	19	6	40
Warehouse and Int. Logistics	1	2	19	23	3	48
Grand Total	5	13	128	100	32	278

A7: Pathological B7: Reactive C7: Bureaucratic D7: Proactive E7: Generative

Priority Given to Occupational Health and Safety Dimension Results

Departments / Levels	A8	B8	C8	D8	E8	Total
Gear and Heat Treatment	10	16	10	7	4	47
Driveline Production	5	22	10	6	1	44
Driveline Assembly	16	50	20	10	3	99
Engine Production	5	20	11	3	1	40
Warehouse and Int. Logistics	7	12	19	9	1	48
Grand Total	43	120	70	35	10	278

A8: Pathological B8: Reactive C8: Bureaucratic D8: Proactive E8: Generative

Ergonomics Dimension Results

Departments / Levels	A9	B9	C9	D9	E9	Total
Gear and Heat Treatment	12	4	13	10	8	47
Driveline Production	4	9	12	16	3	44
Driveline Assembly	20	11	37	21	10	99
Engine Production	5	7	12	13	3	40
Warehouse and Int. Logistics	10	6	14	10	8	48
Grand Total	51	37	88	70	32	278

A9: Pathological B9: Reactive C9: Bureaucratic D9: Proactive E9: Generative

H. Pairwise Comparison Details

Dependent Variable: Communication System

(I) Experience	(J) Experience	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Less than 1 year	1 - 3 years	,047	,243	1,000	-,598	,692
	4 - 10 years	,166	,252	1,000	-,503	,836
	More than 10 years	-,200	,320	1,000	-1,050	,649
1 - 3 years	Less than 1 year	-,047	,243	1,000	-,692	,598
	4 - 10 years	,120	,199	1,000	-,409	,649
	More than 10 years	-,247	,280	1,000	-,991	,497
4 - 10 years	Less than 1 year	-,166	,252	1,000	-,836	,503
	1 - 3 years	-,120	,199	1,000	-,649	,409
	More than 10 years	-,366	,288	1,000	-1,132	,399
More than 10 years	Less than 1 year	,200	,320	1,000	-,649	1,050
	1 - 3 years	,247	,280	1,000	-,497	,991
	4 - 10 years	,366	,288	1,000	-,399	1,132

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: OHS Trainings

(I) Experience	(J) Experience	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	95% Confidence Interval for Difference
					Lower Bound	Upper Bound
Less than 1 year	1 - 3 years	-,092	,163	1,000	-,525	,341
	4 - 10 years	,015	,169	1,000	-,434	,465
	More than 10 years	-,581*	,215	,043	-1,151	-,011
1 - 3 years	Less than 1 year	,092	,163	1,000	-,341	,525
	4 - 10 years	,107	,134	1,000	-,248	,462
	More than 10 years	-,489	,188	,058	-,989	,010
4 - 10 years	Less than 1 year	-,015	,169	1,000	-,465	,434
	1 - 3 years	-,107	,134	1,000	-,462	,248
	More than 10 years	-,597*	,193	,013	-1,110	-,083
More than 10 years	Less than 1 year	,581*	,215	,043	,011	1,151
	1 - 3 years	,489	,188	,058	-,010	,989
	4 - 10 years	,597*	,193	,013	,083	1,110

Based on estimated marginal means

*. The mean difference is significant at the ,05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Accident / Near Miss Reporting

(I) Experience	(J) Experience	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	95% Confidence Interval for Difference
					Lower Bound	Upper Bound
Less than 1 year	1 - 3 years	-,238	,264	1,000	-,939	,463
	4 - 10 years	-,292	,274	1,000	-1,019	,436
	More than 10 years	-,272	,347	1,000	-1,195	,651
1 - 3 years	Less than 1 year	,238	,264	1,000	-,463	,939
	4 - 10 years	-,054	,216	1,000	-,629	,521
	More than 10 years	-,034	,304	1,000	-,842	,774
4 - 10 years	Less than 1 year	,292	,274	1,000	-,436	1,019
	1 - 3 years	,054	,216	1,000	-,521	,629
	More than 10 years	,020	,313	1,000	-,811	,851
More than 10 years	Less than 1 year	,272	,347	1,000	-,651	1,195
	1 - 3 years	,034	,304	1,000	-,774	,842
	4 - 10 years	-,020	,313	1,000	-,851	,811

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Machines / Equipment Safety

(I) Experience	(J) Experience	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	95% Confidence Interval for Difference
					Lower Bound	Upper Bound
Less than 1 year	1 - 3 years	,183	,208	1,000	-,370	,736
	4 - 10 years	,319	,216	,845	-,255	,893
	More than 10 years	,083	,274	1,000	-,645	,811
1 - 3 years	Less than 1 year	-,183	,208	1,000	-,736	,370
	4 - 10 years	,136	,171	1,000	-,318	,589
	More than 10 years	-,100	,240	1,000	-,737	,537
4 - 10 years	Less than 1 year	-,319	,216	,845	-,893	,255
	1 - 3 years	-,136	,171	1,000	-,589	,318
	More than 10 years	-,236	,247	1,000	-,892	,420
More than 10 years	Less than 1 year	-,083	,274	1,000	-,811	,645
	1 - 3 years	,100	,240	1,000	-,537	,737
	4 - 10 years	,236	,247	1,000	-,420	,892

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Workers' Commitment to Safety

(I) Experience	(J) Experience	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	95% Confidence Interval for Difference
					Lower Bound	Upper Bound
Less than 1 year	1 - 3 years	,075	,203	1,000	-,465	,615
	4 - 10 years	-,170	,211	1,000	-,731	,391
	More than 10 years	-,386	,268	,906	-1,097	,326
1 - 3 years	Less than 1 year	-,075	,203	1,000	-,615	,465
	4 - 10 years	-,245	,167	,861	-,688	,198
	More than 10 years	-,461	,234	,303	-1,084	,162
4 - 10 years	Less than 1 year	,170	,211	1,000	-,391	,731
	1 - 3 years	,245	,167	,861	-,198	,688
	More than 10 years	-,216	,241	1,000	-,857	,425
More than 10 years	Less than 1 year	,386	,268	,906	-,326	1,097
	1 - 3 years	,461	,234	,303	-,162	1,084
	4 - 10 years	,216	,241	1,000	-,425	,857

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Management Commitment to Safety

(I) Experience	(J) Experience	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	95% Confidence Interval for Difference
					Lower Bound	Upper Bound
Less than 1 year	1 - 3 years	,160	,233	1,000	-,459	,780
	4 - 10 years	,231	,242	1,000	-,412	,874
	More than 10 years	-,519	,307	,553	-1,334	,297
1 - 3 years	Less than 1 year	-,160	,233	1,000	-,780	,459
	4 - 10 years	,071	,191	1,000	-,437	,579
	More than 10 years	-,679	,269	,072	-1,393	,035
4 - 10 years	Less than 1 year	-,231	,242	1,000	-,874	,412
	1 - 3 years	-,071	,191	1,000	-,579	,437
	More than 10 years	-,750*	,276	,042	-1,485	-,015
More than 10 years	Less than 1 year	,519	,307	,553	-,297	1,334
	1 - 3 years	,679	,269	,072	-,035	1,393
	4 - 10 years	,750*	,276	,042	,015	1,485

Based on estimated marginal means

*. The mean difference is significant at the ,05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Emergency Preparedness

(I) Experience	(J) Experience	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	95% Confidence Interval for Difference
					Lower Bound	Upper Bound
Less than 1 year	1 - 3 years	-,067	,144	1,000	-,449	,316
	4 - 10 years	-,008	,150	1,000	-,405	,390
	More than 10 years	-,272	,190	,917	-,776	,232
1 - 3 years	Less than 1 year	,067	,144	1,000	-,316	,449
	4 - 10 years	,059	,118	1,000	-,255	,373
	More than 10 years	-,205	,166	1,000	-,646	,236
4 - 10 years	Less than 1 year	,008	,150	1,000	-,390	,405
	1 - 3 years	-,059	,118	1,000	-,373	,255
	More than 10 years	-,264	,171	,739	-,718	,190
More than 10 years	Less than 1 year	,272	,190	,917	-,232	,776
	1 - 3 years	,205	,166	1,000	-,236	,646
	4 - 10 years	,264	,171	,739	-,190	,718

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Priority Given to OHS

(I) Experience	(J) Experience	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	95% Confidence Interval for Difference
					Lower Bound	Upper Bound
Less than 1 year	1 - 3 years	-,042	,177	1,000	-,512	,428
	4 - 10 years	,148	,184	1,000	-,340	,637
	More than 10 years	,021	,233	1,000	-,599	,640
1 - 3 years	Less than 1 year	,042	,177	1,000	-,428	,512
	4 - 10 years	,191	,145	1,000	-,195	,576
	More than 10 years	,063	,204	1,000	-,479	,605
4 - 10 years	Less than 1 year	-,148	,184	1,000	-,637	,340
	1 - 3 years	-,191	,145	1,000	-,576	,195
	More than 10 years	-,128	,210	1,000	-,686	,430
More than 10 years	Less than 1 year	-,021	,233	1,000	-,640	,599
	1 - 3 years	-,063	,204	1,000	-,605	,479
	4 - 10 years	,128	,210	1,000	-,430	,686

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Ergonomics

(I) Experience	(J) Experience	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	95% Confidence Interval for Difference
					Lower Bound	Upper Bound
Less than 1 year	1 - 3 years	-,052	,219	1,000	-,633	,530
	4 - 10 years	,128	,227	1,000	-,475	,731
	More than 10 years	-,386	,288	1,000	-1,152	,379
1 - 3 years	Less than 1 year	,052	,219	1,000	-,530	,633
	4 - 10 years	,179	,179	1,000	-,297	,656
	More than 10 years	-,335	,252	1,000	-1,005	,335
4 - 10 years	Less than 1 year	-,128	,227	1,000	-,731	,475
	1 - 3 years	-,179	,179	1,000	-,656	,297
	More than 10 years	-,514	,259	,291	-1,204	,175
More than 10 years	Less than 1 year	,386	,288	1,000	-,379	1,152
	1 - 3 years	,335	,252	1,000	-,335	1,005
	4 - 10 years	,514	,259	,291	-,175	1,204

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Communication System

(I) Overtime	(J) Overtime	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1-3 hours	3-8 hours	,032	,212	1,000	-,478	,542
	8-11 hours	,306	,194	,346	-,161	,773
3-8 hours	1-3 hours	-,032	,212	1,000	-,542	,478
	8-11 hours	,274	,215	,612	-,244	,792
8-11 hours	1-3 hours	-,306	,194	,346	-,773	,161
	3-8 hours	-,274	,215	,612	-,792	,244

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: OHS Trainings

(I) Overtime	(J) Overtime	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1-3 hours	3-8 hours	,104	,145	1,000	-,245	,453
	8-11 hours	-,048	,133	1,000	-,367	,272
3-8 hours	1-3 hours	-,104	,145	1,000	-,453	,245
	8-11 hours	-,152	,147	,913	-,506	,203
8-11 hours	1-3 hours	,048	,133	1,000	-,272	,367
	3-8 hours	,152	,147	,913	-,203	,506

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Accident / Near Miss Reporting

(I) Overtime	(J) Overtime	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1-3 hours	3-8 hours	-,109	,230	1,000	-,662	,444
	8-11 hours	,284	,210	,534	-,222	,790
3-8 hours	1-3 hours	,109	,230	1,000	-,444	,662
	8-11 hours	,393	,233	,281	-,170	,955
8-11 hours	1-3 hours	-,284	,210	,534	-,790	,222
	3-8 hours	-,393	,233	,281	-,955	,170

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Machines / Equipment Safety

(I) Overtime	(J) Overtime	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1-3 hours	3-8 hours	,035	,182	1,000	-,404	,474
	8-11 hours	-,123	,167	1,000	-,525	,279
3-8 hours	1-3 hours	-,035	,182	1,000	-,474	,404
	8-11 hours	-,158	,185	1,000	-,604	,289
8-11 hours	1-3 hours	,123	,167	1,000	-,279	,525
	3-8 hours	,158	,185	1,000	-,289	,604

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Workers' Commitment to Safety

(I) Overtime	(J) Overtime	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1-3 hours	3-8 hours	,051	,179	1,000	-,380	,482
	8-11 hours	-,133	,164	1,000	-,528	,261
3-8 hours	1-3 hours	-,051	,179	1,000	-,482	,380
	8-11 hours	-,184	,182	,935	-,622	,254
8-11 hours	1-3 hours	,133	,164	1,000	-,261	,528
	3-8 hours	,184	,182	,935	-,254	,622

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Management Commitment to Safety

(I) Overtime	(J) Overtime	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1-3 hours	3-8 hours	,261	,206	,619	-,235	,757
	8-11 hours	,228	,188	,681	-,226	,682
3-8 hours	1-3 hours	-,261	,206	,619	-,757	,235
	8-11 hours	-,033	,209	1,000	-,537	,471
8-11 hours	1-3 hours	-,228	,188	,681	-,682	,226
	3-8 hours	,033	,209	1,000	-,471	,537

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Emergency Preparedness

(I) Overtime	(J) Overtime	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1-3 hours	3-8 hours	-,070	,126	1,000	-,374	,235
	8-11 hours	-,009	,116	1,000	-,288	,270
3-8 hours	1-3 hours	,070	,126	1,000	-,235	,374
	8-11 hours	,061	,128	1,000	-,249	,370
8-11 hours	1-3 hours	,009	,116	1,000	-,270	,288
	3-8 hours	-,061	,128	1,000	-,370	,249

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Priority Given to OHS

(I) Overtime	(J) Overtime	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1-3 hours	3-8 hours	-,028	,155	1,000	-,401	,345
	8-11 hours	,102	,142	1,000	-,239	,444
3-8 hours	1-3 hours	,028	,155	1,000	-,345	,401
	8-11 hours	,130	,157	1,000	-,249	,509
8-11 hours	1-3 hours	-,102	,142	1,000	-,444	,239
	3-8 hours	-,130	,157	1,000	-,509	,249

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Dependent Variable: Ergonomics

(I) Overtime	(J) Overtime	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1-3 hours	3-8 hours	,042	,193	1,000	-,422	,505
	8-11 hours	,020	,176	1,000	-,404	,445
3-8 hours	1-3 hours	-,042	,193	1,000	-,505	,422
	8-11 hours	-,021	,196	1,000	-,493	,450
8-11 hours	1-3 hours	-,020	,176	1,000	-,445	,404
	3-8 hours	,021	,196	1,000	-,450	,493

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.