

**DESIGN AND PERFORMANCE ANALYSIS OF A VARIABLE PITCH
AXIAL FLOW FAN FOR ANKARA WIND TUNNEL**

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FOR
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Approval of the Graduate School of Natural and Applied Sciences.

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I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science.

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ABSTRACT

DESIGN AND PERFORMANCE ANALYSIS OF A VARIABLE PITCH AXIAL FLOW FAN FOR ANKARA WIND TUNNEL

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In this study, a variable pitch axial flow fan is designed and analyzed for Ankara Wind Tunnel (AWT). In order to determine the loss characteristics of AWT, an algorithm is developed and the results are validated. Also some pressure and velocity measurements are made at the fan section to find the losses experimentally. After completion of the fan design, analyses are made at different volumetric flow rates and blade angles including the design point and the performance characteristics of the fan are obtained and thereafter the operating range of the tunnel is determined.

Keywords: Ankara Wind Tunnel, tunnel losses, variable pitch axial flow fan design and analysis, performance characteristics of fan.

ÖZ

ANKARA RÜZGAR TÜNEL Ç N PALA AÇISI DE T R LEB LEN EKSENEL B R FAN TASARIMI VE PERFORMANS ANAL Z

Yalçın, Levent

Yüksek Lisans, Havacılık ve Uzay Mühendisli i Bölümü

Tez Yöneticisi: Prof. Dr. . Sinan Akmandor

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Bu çalışmada, Ankara Rüzgar Tüneli (ART) için pala açısı değiştirilebilen eksenel bir fan tasarlandı ve analizi yapıldı. ART'nin basınç kaybı karakteristiğini belirlemek için bir algoritma geliştirildi ve sonuçlar doğrulandı. Aynı zamanda kayıpları deneysel olarak bulmak için fan bölgesinde bazı basınç ve hız ölçümleri yapıldı. Fan tasarımının ardından, tasarım noktasında içeren farklı debi ve pala açılarında analizler yapıldı ve fan performans karakteristikleri elde edildi ve daha sonra tünelin çalışma hız aralığı belirlendi.

Anahtar Kelimeler: Ankara Rüzgar Tüneli, tünel kayıpları, pala açısı değiştirilebilen eksenel fan tasarımı ve analizi, fan performans karakteristiği.

To My Primary School Teacher...

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