



MMAE SEMINAR

Wednesday, November 7, 2007
E-1 BUILDING – CRAWFORD AUDITORIUM
3:30 – 4:30 PM

Recent Studies in Turbine Blade Cooling

Je-Chin Han
Texas A&M University,
Mechanical Engineering Department
e-mail: jc-han@tamu.edu



Abstract

Developments in turbine cooling technology play a critical role in increasing the thermal efficiency and power output of advanced high temperature gas turbines. For turbine internal cooling, this presentation will focus on the effect of rotation on rotor blade internal coolant passage heat transfer. To better understand the 3-D rotating flow physics in complicated internal coolant passage geometry, the computational flow and heat transfer results will be presented and compared using the RANS method with advanced Reynolds stress turbulence models. For turbine external cooling, this presentation will focus on the turbine blade film cooling including leading and trailing edges as well as tip and platform regions. The detailed heat transfer and film cooling distributions will be presented using the newly developed transient liquid crystal image technique as well as the pressure sensitive paint technique. Ongoing and future turbine cooling studies at Texas A&M University, Turbine Heat Transfer Laboratory will be discussed.