

Abstract Submitted  
for the DFD14 Meeting of  
The American Physical Society

**Flow and Stall Characteristics of Transonic Compressor with a Single Circumferential Casing Groove** YASUNORI SAKUMA, The University of Tokyo — In the present study, CFD analysis on transonic rotor, NASA Rotor 37 with and without circumferential single grooved casing treatment was carried out, with the purpose of clarifying the effect which casing groove has on the near casing flow field of compressors and to obtain productive guidelines for designing robust and effective casing treatment. Based on the evaluation of blockage flow distribution and its development process in near stall condition, the onset of stall in NASA Rotor 37 was shown to be caused by the blockage flow local to the tip region of the passage. The implementation of simple, single circumferential groove enabled to assess the exact effect it has on the near tip flow field and its stability enhancement capability. The principal effect of the casing groove was the reduction of flow momentum of tip leakage flow. This effect contributed to the stability enhancement of NASA Rotor 37 by suppressing the accumulation of blockage near the blade tip region. In the series of analysis, the axial location and the depth of the groove were parametrically varied. The effect of the casing groove tended to show distinctive change according to the groove location, and deeper groove showed a higher potential in suppressing the onset of stall.

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Date submitted: 31 Jul 2014

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