

Research Report (April, 2018 - March, 2019)

Enrollment from
April 2018

Department of Applied Mechanics and Engineering

Yuu SAKATA

I. List of Papers

1.

II. List of Talks

1. ○Sakata, Y., Nobumichi, F., Ohta Y. July, 2018, "Investigation of Rotating Stall under Surge Behavior in a Two-Stage Axial Flow Compressor", Proceedings of the ASME 2018 5th Joint US-European Fluids Engineering Summer Conference, (Montreal).

III. Research Results in AY2018

Study on flow phenomena under off-design operation of axial-flow compressors were conducted. First, the relationship between the growth of the stall cell and the variation of the surge behavior was experimentally investigated. The flow field under stable operation near the peak point of the unsteady characteristics changed rapidly. In this case, an wall pressure fluctuation data shows that the number of the spike-type disturbance during the stall inception of the compressor were varied due to the change in the flow rate and the pressure-rise in the stable operating region of the compressor. When the attention is focused on the growth of the stall cell during the stalling process, the wall pressure fluctuation data shows that the stall cell rapidly grown by gathering more than one spike type disturbance into one stall cell. In this case, the stall cell fully expanded toward entire circumferential direction, and the surge cycle were switched. Second, the conventional radial rotor blades and the forward swept rotor blades were compared under the inlet distortion operation.

IV. Research Plan for AY2019

We are planning to submit two paper to the Transactions of the JSME. The first paper reports on the experimental results of the effects of application of the forward swept blades, on the compressor characteristics and the compressor stall under the inlet distorted condition. The second paper reports on the effects of the tip clearance variation on the compressor stall in the normal inflow and the inlet distorted condition.