



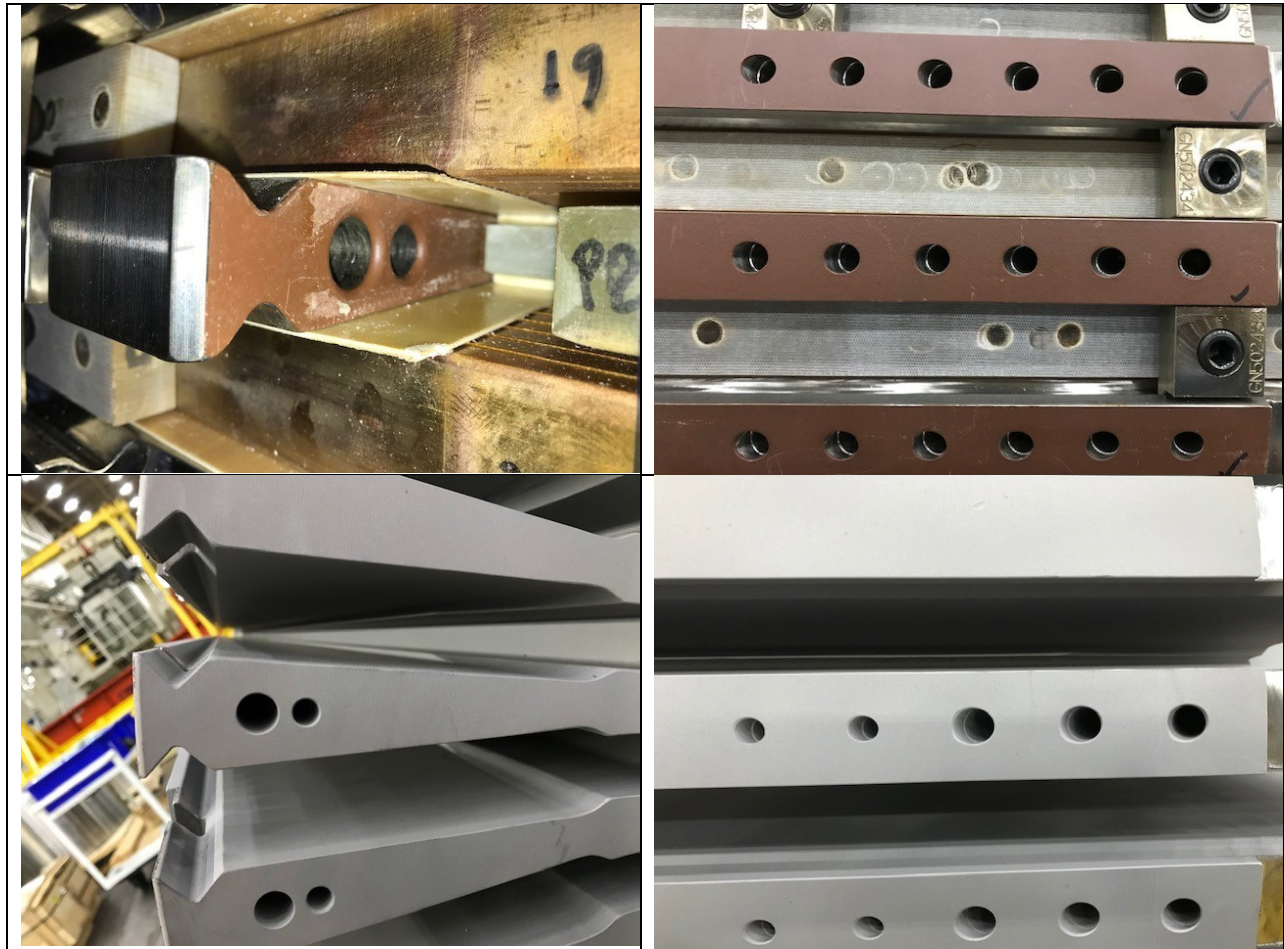
UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING

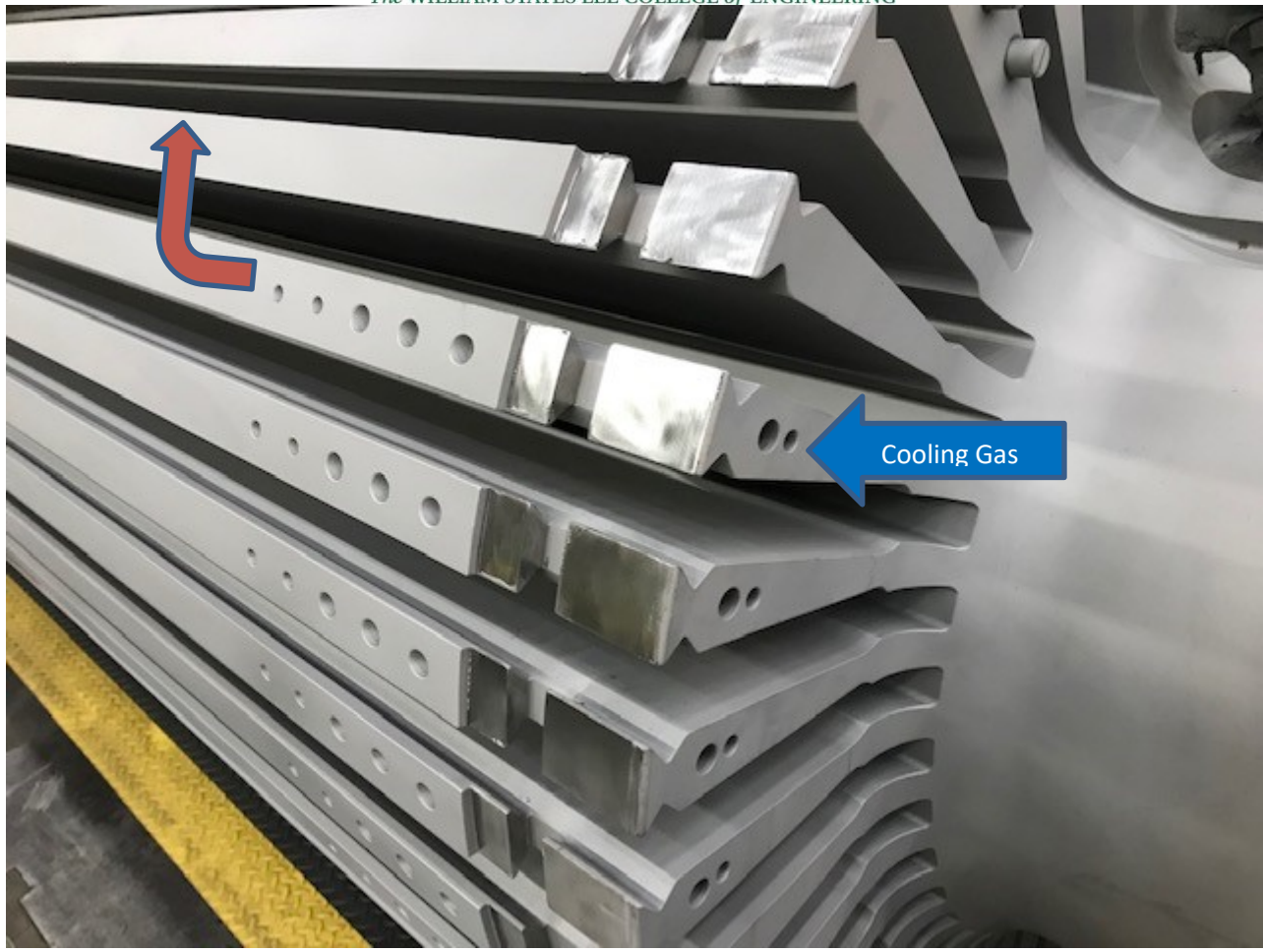
The project is sponsored by the Siemens Generator Manufacturing department in Charlotte NC. The project will analyze different geometries for thermosiphon holes to determine which has better cooling efficiency.

Project Requirements:

This project will analyze two different configurations for thermosiphon holes found inside a gas turbine generator. Cooling gases (air or hydrogen) are moved through these holes to remove heat from the metal which heats up during generator operation. See below pictures



The cooling gas enters the tooth axially and exit radially. The end holes are drilled longitudinally into each tooth. The radial discharge holes are drilled diagonally or perpendicular and intersect the axial holes. See picture below:



The team will be given two different geometries for the thermosiphon holes. The team will analyze each configuration and using computational fluid dynamics, determine what the respective cooling efficiencies are. The team will build representative cross sections of each hold configuration and then validate the CFD analysis by testing the models.

Expected Deliverables/Results:

- Results of the CFD analysis comparing the performance of each configuration.
- Physical models built and tested to verify CFD calculations
- Economic analysis of the hole configuration cost/performance tradeoff

Disposition of Deliverables at the End of the Project:

Models and report to be given to the Supporter after the conclusion of the Expo

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Energy concentration
- Interest in Computational Fluid Dynamics