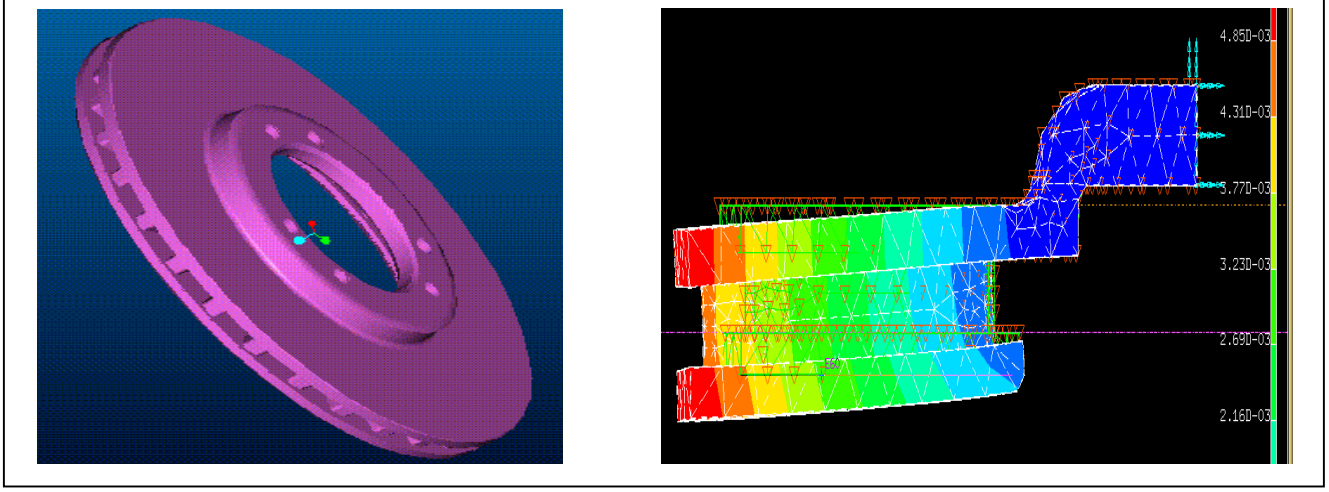
CLEMSON UNIVERSITY

CREDO LABORATORY PROJECTS

Project Title: **MULTI-MATERAIL DESIGN AND ANALYSIS OF DISC BRAKE ROTOR**



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Project Abstract:

Designing multiple material disc brake rotors with lighter weight is difficult, if not impossible, without a full knowledge of the stresses operating in the mechanism in which they are to be incorporated. Therefore, fully studying the behavior of the brake during vehicle operation is necessary. This includes an understanding of the factors influencing the thermal behavior during braking.

The objectives of this research are to develop a methodology for heterogeneous brake disc rotor design and analysis. By borrowing Finite Element meshing technology to modeling heterogeneous brake disc rotor, this research will develop a Finite Element program to analysis thermal and mechanical stresses the rotor will endure during different operation. This problem concerned transient heat transfer and coupled finite element analysis. The final status of this research will combine Genetic Algorithms (Gas) and Finite Element Analysis (FEA) to design a lighter weight with minimum thermal and mechanical stresses. Starting from 2D heterogeneous rotor analysis, the final task of the research is to deal with 3D heterogeneous objects design and analysis problem.

The two figures in the box show a solid model and a finite element thermal and stress analysis model of a of a 3D brake disc rotor.

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