

The Roll of ICEM CFD in the Design of EATON Products

Ramu Ramamurthy

EATON Corporation

Abstract

At EATON, Computational Fluid Dynamics (CFD) is used as an up front design tool, early in the product development cycle to validate concepts before committing to hardware. The product applications include supercharger airflow, EGR valve flow, hydraulic regulator valve fluid flow, and engine valve heat transfer. In this presentation, the focus is on the CFD pre-processor software, ICEM CFD and how it is being used to reduce the EATON CFD analysis cycle time.

This paper will detail the EATON CFD process improvements obtained using ICEM CFD and other techniques that have led to the product cycle time reduction. These process improvements, in addition to improving the solution accuracy, have reduced the CFD modeling time by as much as 50%. One of the process tools being used is the ICEM CFD's direct CAD interface for Pro-Engineer. The analysts use this CAD interface, to maintain the associations between the Pro-Engineer CAD model and the CFD grid generation process. This interface and an in-house process have reduced the need for IGES/STL translation from CAD to CFD pre-processor. This also avoids the potential problems with translation.

The second process that will be discussed is the use of highly automatic meshing tools from ICEM CFD such as automatic hybrid meshing, surface meshing and multi-block hex meshing and how they have improved the efficiency of the CFD models.

