

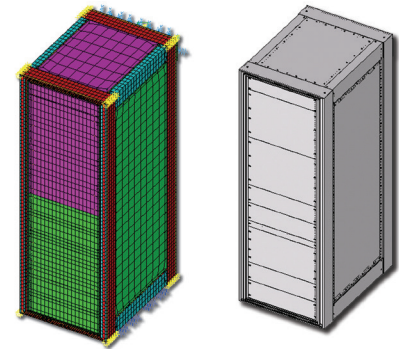


Case Study

Structural Analysis of Electronics Racks

OVERVIEW

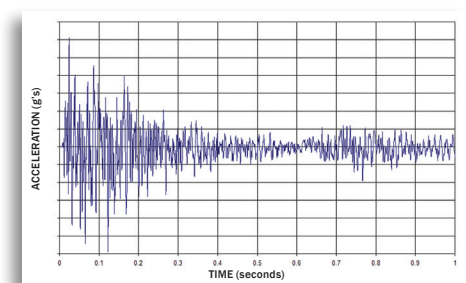
The Cooperative OUTBOARD Logistics Update (COBLU) system is an upgrade of the countermeasures detection and analysis system deployed on U.S. and British Royal Navy ships, which provides early warning and targeting of surface ships. The enhanced COBLU system features advanced methods of detecting, sorting, and tracking hostile emitters to provide intelligence indication and warning. BAE Systems supplies a shipboard-mounted rack assembly as part of the COBLU system, consisting of a rack with several commercial off-the-shelf and custom units slide mounted into the rack. The rack assemblies are mounted on isolators. BAE Systems was interested in understanding the performance of rack welds due to static, shock, and vibration loading and asked ATA to perform structural analysis to determine how the welds affected the structural integrity of the rack.



Rack FEM and solid models

TASKS PERFORMED & KEY OUTCOMES

- Created detailed finite element models (FEMs) of welded and unwelded configurations of the assembly
- Applied test-based transient excitation data to the rack FEMs
- Predicted displacement and stress response due to these excitations
- Compared displacement results to test data to determine if model generated similar responses as the test article, and modified interface spring stiffness to match data
- Performed bolt analysis of all major fastener interfaces for both configurations
- Identified structural design margins and potential design upgrades



Transient Acceleration