

SECTOR:  
HEAVY EQUIPMENT

OFFERINGS:  
DESIGN APPROVAL STUDIES

TECHNOLOGY:  
STRUCTURES

## SHOCK AND VIBRATION ANALYSIS FOR CERTIFICATION OF ELECTRONIC EQUIPMENT

Our customer is supplier of electronic equipment to Indian Railways. Equipment is in form of large box that houses 40 components and multiple sub-components. The equipment is to be installed in moving trains, exposing the box and smaller components to shock and vibration loading. Since it is mission critical equipment, the end customer requires certification studies for covering (a) functional analysis for random vibration in 3 directions (b) Long life test analysis (c) Shock analysis in all three directions. Studies were to be performed in conformance to IEC 61373 Code.

Loading conditions for Vertical, Longitudinal and Transverse loading (Class 1 – Body mounted – ASD spectrum) is taken from the code and PSD curves were generated for functional and long life test analysis. Stress is shown separately on all the components having different material properties. Displacements of the components were also calculated. Transient analysis for shock was carried out with loading of half SINE pulse in three directions.

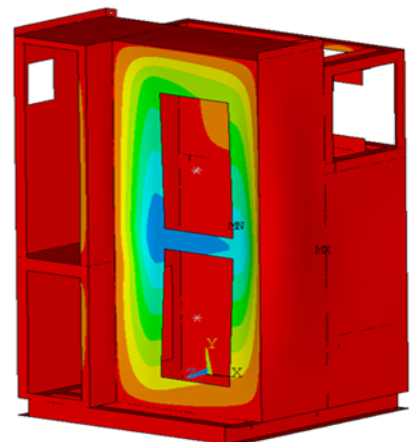
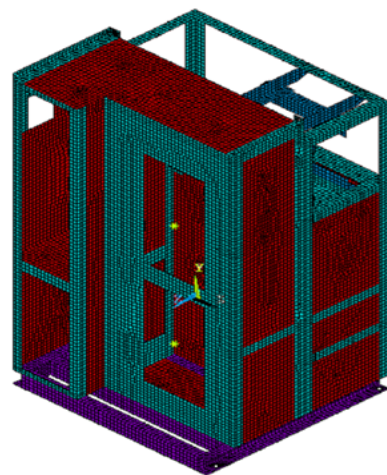


Figure 94: Mesh and results for shock loading (internals not shown)

Complex geometrical system with all components and sub-components was modeled. Stresses and displacements were found to be within the acceptable range for all the components, the box and the overall systems. Final report was presented to the end customer that led to the approval of system installation.