

Project title	Structural Finite Element Analysis Rail Grinder Traction Locker
Date	June 2020

SCOPE/OBJECTIVE

AEGIS has undertaken a structural analysis and approval assessment for the traction locker design of the Rail Grinder trains. The locker frame houses the key elements of the traction equipment, such as the main inductor, rectifier, inverter drives, brake chopper, capacitors and 3-Phase AC busbars and has a total mass of over 1.5 tonnes.

Structural Finite Element Analyses were undertaken for the traction locker to assess its structural capability and compliance with the mandated Standards, under static and dynamic accelerations applied individually to the structure, as per the 'frame mounted equipment' load cases specified in BS EN 12663: 2010.

TECHNOLOGY USED (IF APPLICABLE)

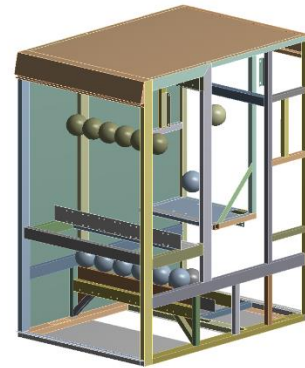
ANSYS Mechanical
SpaceClaim
SOLIDWORKS 3D CAD

HOW WE HELPED

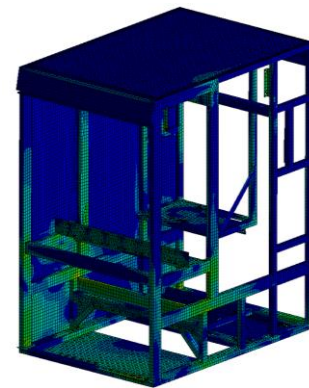
AEGIS worked collaboratively with our clients' designers throughout the duration of the project, providing them with the required assistance and consultancy.

- AEGIS provided our client with an initial set of results which identified the non-compliant aspects of the design.
- AEGIS suggested a set of design modifications to provide solutions for the high stressed areas and enhanced the structural performance of the design.
- Collaboratively AEGIS and our client refined these ideas and implemented a design modification which meets the standards requirements and feasibility constraints.

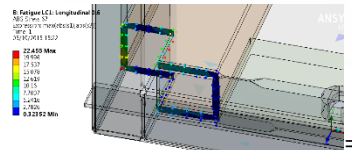
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Spheres represent Point masses for the removed /simplified items.



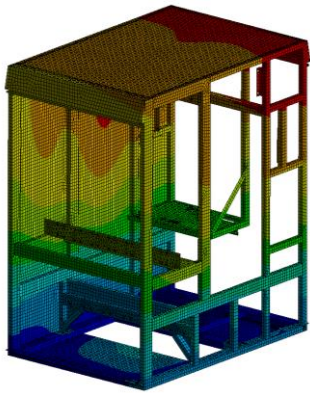
Equivalent Von-Mises stress distribution used for the assessment of the proof stress when the structure is subjected to the various proof load cases



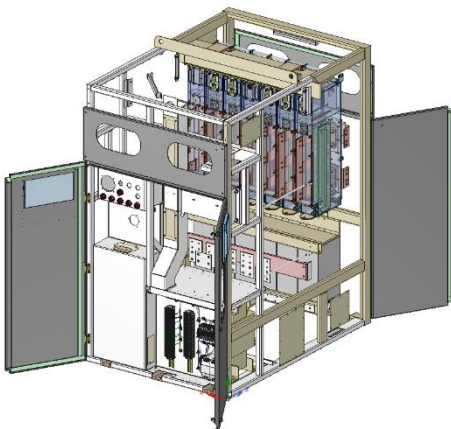
AEGIS Case Study

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Node principal stresses generated at the weld locations are extracted and subjected to weld assessment



Total deformation of the Traction Locker Frame



Traction Locker Frame CAD Model