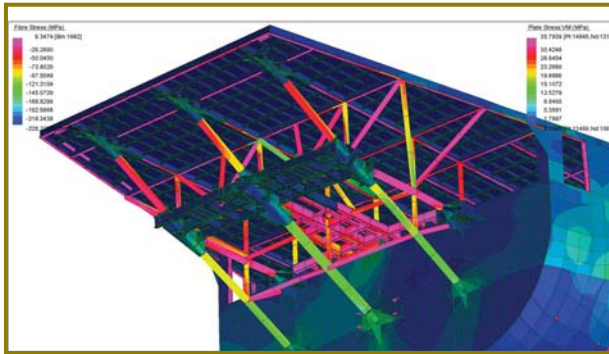


# Australian Marine Technologies



## Structural Design—FEA

Structural Finite Element Analysis has been utilized effectively in structural designs by AMT to develop weight optimized, safe and producible structures in marine applications.



Design of complex ship structures and components requires a number of analytical tools to optimize the weight, stiffness and strength requirements. Naval ships provide further structural challenges with onerous shock and vibration requirements to be met. AMT uses its FEA capability as its primary structural analysis tool for the design of ship structures and structural components. Applications include both static and dynamic load analysis applied to the maritime environment.

AMT performs analysis ranging from hull global analysis through to detailed component design. Utilizing the features of the package, AMT is able to determine key structural parameters including:

- Stress values and contours
- Stress flow and structural behaviour
- Deflections both static and dynamic
- Vibration/natural frequency analysis
- Structural weight definition

Structural analysis utilizing Strand 7 FEA has been applied to some of the novel and innovative designs developed by AMT. The conversion of a commercial tanker MT DELOS to the naval replenishment ship HMAS SIRIUS provided an opportunity to use detailed FEA modeling in both Strand 7 and SpaceGass for some of its unique structural features.

This included the Flight Deck cantilevered off the transom which was subject to numerous load cases considering sealoads, motions, towing and helicopter operations.

Integration of the Replenishment At Sea masts into the existing tanker's upper deck structure also provided unique challenges

with extreme multidirectional loads and stress distribution constraints. A major FEA analysis of the hull girder with the additional decks allowed the ship to retain its critical SDA notation with Lloyds Register Classification.

AMT has employed FEA modeling for detailed analysis to identify failure modes and subsequent structural redesign. Examples include the upgrade of the Close In Weapon System on the RNZN ANZAC frigates and the modifications to the RAN LPA class to incorporate an extensive antenna suite on the main mast.

Effective structural analysis employing FEA methods was an essential factor in completing the design for the award winning DELOS Conversion. AMT has been commended on its ability to develop optimized structural designs that meet all strength requirements whilst minimizing weight and impacts on existing ship structures and systems.

AMT has a highly developed capability in structural design utilising FEA modelling for complex structures. Coupled with extensive structural design experience, AMT can analyse and develop effective designs for a broad range of maritime applications.

