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Heavy-lifting: coupled stability & structural analysis in a load-out operation

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The economic and technical challenges of large-scale load-in/out operations require the assurance provided by specialized and integrated engineering software that provides leading-edge support to preparation and planning and helps ensure enhanced safety and quality control.

This case-study describes the planning of a loadout operation by a Self Propelled Modular Trailer (SPMT), for which all technical and environmental constraints are integrated in a quasi-dynamic model, developed in a combined GHS (hydrostatics & stability) and MAESTRO™ (ship-specialized FE) environment. Model and calculations address and cater to tide, wind, mooring forces (winches, anchors, .), ballast, pump capacity, verification at each stage of the loading of draft and trim, stability, hull girder bending moment and deflection, compliance with operational limits and Regulations, etc. The realistic Finite Element structural model of the ship is loaded in synchrony with the GHS (hydrostatics and SPMT). The integrated GHS and MAESTRO environment allows tracking and managing the combined hydro and mass loading effects in quasi-dynamic mode: based on the same hydrostatic balance, MAESTRO receives tank loads from GHS, and runs detailed stress analysis and limit state evaluation of the structure, thereby ascertaining the structural integrity and girder deformation patterns of the carrier

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