

**Vessel grounding in entrance channels: case studies and physical model tests**

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**ABSTRACT:**

Physical model studies were conducted of a 250K DWT fully laden iron ore vessel grounding on the side slopes of the outbound channel at a major Australian port. A key deliverable of the study was to estimate the tug force required to pull the vessel off the channel slope and back into the entrance channel. The tests were conducted at the Coastal & Hydraulics Laboratory, of the CSIR in Stellenbosch, South Africa. Simulated vessel grounding was modelled in a hydraulic basin at a scale of 1:100. Over the course of the ship grounding simulation, the actual scenario was modelled as well as various other possibilities of groundings using two channel profiles, four different approach angles, and vessel grounding speeds ranged between 2 and 12 knots. It was found that high speed impacts of 8 to 12 knots at 10° to the channel side slopes have the potential to damage the hull and require enormous tug forces to re-float the grounded vessel.