

Abstract

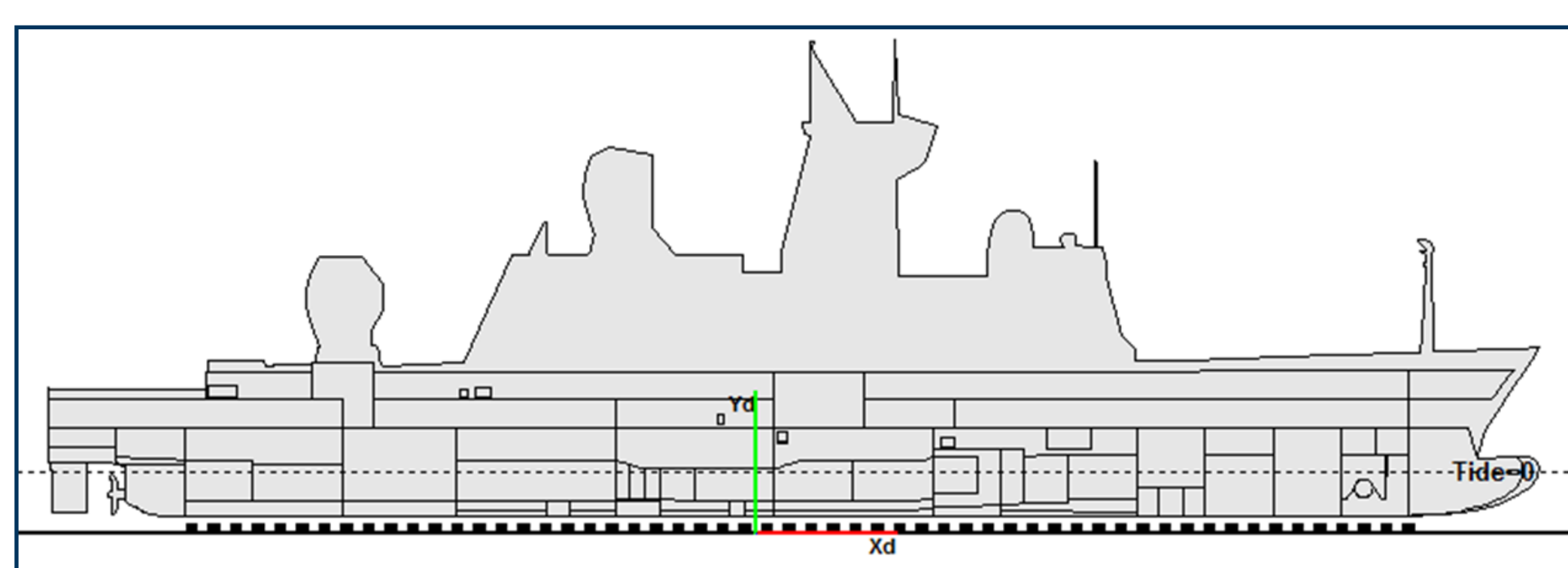
- USNS HOWARD O. LORENZEN (T-AGM25) sustained moderate to significant hull damage during a 2014 dry docking evolution
- There were several contributing factors identified but their relationship and relative impact is yet undetermined
- It is important to understand the relationship between the contributing factors in order to prevent future occurrences of hull damage during dry docking evolutions



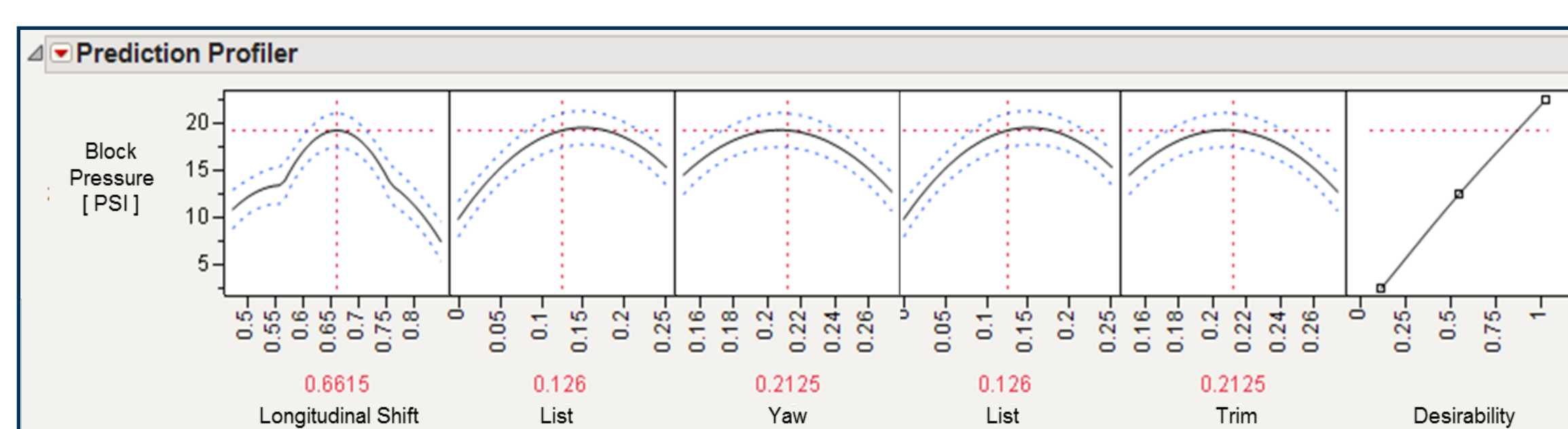
USNS HOWARD O. LORENZEN (T-AGM 25) in dry dock

Methods

- Contributing factors to be analyzed are: ship's list, ship's trim, ship's yaw, longitudinal shift (forward/aft), transverse shift (port/starboard), ship's displacement, dry dock block height (specifically side blocks)
- Program of Ship Salvage Engineering (POSSE) Docking Plan Tool is used to calculate the loading pressure on a dry docking block
- Contributing factors can be varied in POSSE, and the corresponding loading pressure found
- A design of experiments approach is used to test various contributing factor values and combinations
- The POSSE loading pressure results are used to analyze the impact of each contributing factor
- A prediction profile is used to determine the contributing factors that lead to maximum block loading pressure, and likewise minimum pressure



POSSE model for dry docking condition



Example prediction profile for maximum block pressure

Results

- Dry dock block pressures will be calculated using POSSE for various contributing factor input values and combinations
- Pressures will be analyzed at 7 key dry dock block locations along the ship hull
- A prediction profile will be generated for each dry dock block analyzed
- The major contributing factors to each dry dock block's maximum loading pressure will be determined