

# NAVAL ARCHITECTURAL ANALYSIS & FLOATING SERVICE LOAD CHART CHECKLIST

## EM 385-1-1 Requirements

- 16.L.02 – Identify the design and construction standard of the lifting equipment:
  - ASNI/ASME B30.8
  - ABS
  - API 2C
- Crane List and Trim (Side and Off Lead Angles): 16.L.04.b
  - Manufacturer’s floating/out-of-level load chart provided for the basis of the analysis
    - Includes list and trim degree limitations
  - Stability analysis over the full range of crane slewing angles shows the resultant LHE list and trim are within the manufacturer’s limits
    - Typically worst case slewing angles are over the vessel ends, corners and sides. The analysis, at a minimum, should evaluate these slewing angles.
    - For the crane radius and capacity, the maximum capacity radii, maximum reach radii and the radii with the maximum overturning moment should be evaluated.
- U.S. Coast Guard Lifting Stability: 16.L.04.a
  - Over the full range of the crane slewing angles, the stability analysis shall meet:
    - 46CFR173.005 to 173..025
      - Righting Arm Stability Calculations
      - Analysis can demonstrate the heeling moment due to the maximum hook load is not greater that the Heeling Moment calculation in 173.005.
- Freeboard: 16.L.04.c
  - Over the full range of the crane slewing angles and radii, the vessel shall maintain a minimum 1 foot freeboard during lifting operations.
- Bottom Submergence: 16.L.04.d
  - Over the full range of the crane slewing angles and radii, the bottom of the vessel shall remain submerged.
- Structural Analysis: 16.L.06
  - Structural analysis (including calculations) to document the adequacy of the structure (pedestal, under deck in way of crawlers, etc.) in conjunction with the applied LHE loads (maximum overturning moments, ground bearing pressure, etc.).

## NAVAL ARCHITECTURAL ANALYSIS

- Does the NAA and supporting documentation:
  - Identify the design and construction standard of the lifting equipment:
  - Stability Analysis
    - Apply 40 mph adverse wind
    - Include 360° slewing range (or limited slewing range if applicable)
    - Define the vessel loading condition (if applicable)
      - Tanks (Fuel, Water, Waste, etc.)
      - Ballast
      - Provisions & Stores
    - Where applicable, include maximum allowable deck load (and VCG limit)
    - Meets the requirements of 16.L.04.a (46CFR173)
    - Meets the requirements of 16.L.04.b (LHE List/Trim Limits)
    - Meets the requirements of 16.L.04.c (1 foot freeboard)
    - Meets the requirements of 16.L.04.d (bottom submergence)
  - If necessary, derate the load chart to comply with 16.L.04
  - If necessary, derate the load chart to comply with 16.L.06
  - Stamped/certified by an RPE or qualified Naval Architect/Marine Engineer, competent in the field of floating cranes
- Is a structural analysis provided
  - If not, provide reasoning for not preparing a structural analysis
  - If necessary, reduce/derate the load chart for the structural capacity

## **FLOATING SERVICE LOAD CHART**

- Does the Floating Service Load Chart Include the following:
  - Naval Architect's Notes delineating:
    - Draft limits;
    - Deck cargo weight and Vertical Center of Gravity above deck;
    - Maximum wind speed;
    - Environmental limits;
    - Vessel heel and trim limits;
    - LHE Machine list and trim limits, and
    - Vessel condition (e.g., dry bilges, watertight integrity, etc.).
  - The LHE Manufacturer's Floating Service Crane Load Chart.
  - If de-rating of the Crane Manufacturer's Floating Service Crane Load Chart is required, a separate Floating Service Safe Working Load Chart shall be provided with:
    - Mode of operation;
    - Table of hook load, boom elevation angle, lift radius (with list/trim considered);
    - Maximum Machine List and Trim;
    - Maximum Floating Platform List and Trim;
    - LHE configuration, to include boom length, amount of counterweight, parts of wire, and block size.
    - The Floating Service Load Chart shall be programmed into the crane LMI.
- Stamped/certified by an RPE or qualified Naval Architect/Marine Engineer, competent in the field of floating crane/derrick design