

ESSENTIAL INFORMATION FOR SHAFT ALIGNMENT CALCULATION

Reliability of shaft alignment calculations depends on completeness and accuracy of propulsion shafting modeling. Shaft alignment designer should have complete information to model propulsion shafting properly. There are three Category of essential information for shaft alignment calculation:

- Category I** – obligatory data, lack of which renders impossible any calculations.
- Category II** – very important additional data, taking in account of which may results in substantial quantitative and qualitative changes.
- Category III** – descriptions of shaft alignment and operating conditions that enable goal-seeking behavior to derive more relevant results for shaft alignment procedure and ensure more safe propulsion shafting operation.

| Pos | Name | Category | | |
|-------------------|--|----------|----|-----|
| | | I | II | III |
| I. GENERAL | | | | |
| 1 | Ship Type and main particulars | | | * |
| 2 | Ship Class | | | * |
| 3 | Is the ship newbuilded or repaired | | | * |
| 4 | Set out the cause of the propulsion train repair including description of the failure nature and conditions, if the ship is under repair | | | * |
| 5 | List of main operating conditions | | | * |
| 6 | Assumed alignment conditions | | * | |
| 7 | Assumed alignment technique | | | * |
| 8 | Shaft alignment procedure limitations | | * | |
| 9 | Other special conditions | | | * |

| II. SHAFTING | | | | |
|----------------------|--|---|---|---|
| 1 | General Arrangement of propulsion train | * | | |
| 2 | Drawings of the shafts specifying their lengths and diameters | * | | |
| 3 | Masses and center of gravity for heavy equipment associated with the shafting | * | | |
| 4 | Information about filling of the shaft bore (oil, rods etc.) | | * | |
| 5 | Information regarding propeller shaft liner (material, thickness, length and position) | | * | |
| III. BEARINGS | | | | |
| 1 | Stern tube drawing | | * | |
| 2 | Material and dimensions of the stern tube bearing bushes | * | | |
| 3 | Stern tube bearing lubricator (water, oil) | | * | |
| 4 | Permissible loads (nominal pressure) for intermediate bearings specified by manufacturer | * | | |
| 5 | If permissible loads for intermediate bearings are unknown material and dimensions of bearing bushes | * | | |
| 6 | Thermal growth at the bearings place | * | | |
| 7 | Compliance of the bearings' stools | | | * |
| 8 | Wear down rate | | | * |
| IV. PROPELLER | | | | |
| 1 | Weight in the air | * | | |
| 2 | Material | * | | |
| 3 | In the case of CPP weight of the blades and hub volume (hub dimensions) or propeller weight in the water | * | | |
| 4 | Percent of submergence during shaft alignment | * | | |
| 5 | Percent of submergence in operation if not 100% | | * | |
| 6 | Vertical and horizontal hydrodynamic moments in operation (or thrust value and eccentricities) | | * | |
| V. ENGINE | | | | |
| 1 | Type | | | * |
| 2 | Static thrust load Diagram (for low speed engines) | * | | |
| 3 | Deflectional and angular compliances at the thrust-shaft flange (for low speed engines) | * | | |
| 4 | Crankshaft dimensions, allowable loads for engine bearings and allowable stress in crankshaft if data of item 2, 3 for low speed engines are not available | * | | |

| | | | | |
|-----------------------------------|--|---|---|---|
| 5 | Weight of flywheel | * | | |
| 6 | Thermal growth | * | | |
| 7 | Additional loads on crankshaft in operation | | | * |
| VI. GEAR BOX | | | | |
| 1 | Output shaft drawing specifying shaft lengths and diameters | * | | |
| 2 | Weight of the wheel | * | | |
| 3 | Permissible loads for gear box bearings specified by manufacturer in static and dynamic conditions | * | | |
| 4 | Allowable difference of loads on output shaft bearings in the case of plain bearings | | * | |
| 5 | Thermal growth | * | | |
| 6 | For one pinion helical gear: <ul style="list-style-type: none"> – Power of pinion – Pitch diameter of wheel – Speed of wheel – Transverse pressure angle of gear wheel – Helix angle of gear | | | * |
| VII. COUPLINGS AND SLEEVES | | | | |
| 1 | Weight and center of gravity | * | | |
| 2 | Allowable misalignment for flexible couplings | | * | |
| 3 | Angular and radial compliance for flexible couplings | * | | |
| VIII. HULL | | | | |
| 1 | General arrangement and double bottom plan for engine room | | | * |
| 1 | Scantlings of double bottom structure elements | | | * |
| 2 | Draughts for main operating conditions including full load and ballast conditions | | | * |