Shaft-line and Main Engine alignment onboard
Shaft-line and Main Engine alignment onboard

To obtain optimal parameters for service conditions

- Engine crankshaft straight in service condition
- Bearing load of all main engine bearings and propeller line in service condition to be within specified limits
- Acceptable crankshaft deflections in service condition
Shaft-line and Main Engine alignment onboard

To compensate as much as possible changes between alignment and service condition:

a) Hull deflection
b) Engine temperature
c) Dry dock / afloat
Shaft-line and Main Engine alignment onboard

Cold, aligning conditions

Design draft

Service conditions
Engine hogging due to thermal expansion
Shaft-line and Main Engine alignment onboard

Initial SAG of bedplate applied

Bedplate SAG

| Cylinder Frame | 50–90 °C |
| Framebox       | 40–50 °C |
| Bedplate       | 40–50 °C |
SHAFT-LINE AND MAIN ENGINE ALIGNMENT ONBOARD

MAN Diesel, recommended main engine alignment before chocking (afloat condition, coupled to shafting system and main engine in sagged condition).

**Recommended procedure:**

At present MAN Diesel recommended procedure prior to chocking is:

- Vessel in afloat condition
- Engine in sagged condition (piano wire verification).
- Engine coupled to the shafting system. That is to control the crankshaft deflection of the last unit and the engine aft end static load.
- Engine cold.
Coupling of main engine with shaft line to be performed according to shaft calculation, SAG and GAP for the flange coupling between intermediate shaft / engine crankshaft.

After coupling, before chocking, one complete set of measurements should be recorded in order to confirm the main engine alignment. MAN Diesel & Turbo can provide the Excel format for the measurements and review the measurements all free of charge on request.

Ref. MAN B&W Quality Specification No. 0743547-3
Ref. MAN B&W Production Recommendation No. 0743104-0
Shaft-line and Main Engine alignment onboard

1. Shaft line alignment procedure, SAG / GAP
Shaft-line and Main Engine alignment onboard

Measurement of GAP/SAG for flange coupling
Main Engine / Intermediate Shaft
Shaft-line and Main Engine alignment onboard

2. Measurement of Main Engine SAG by piano wire
Shaft-line and Main Engine alignment onboard

Piano-wire tool-set
Shaft-line and Main Engine alignment onboard

Example of excel sheet chart for SAG measurements
3. Measuring of the crankshaft deflection (autolog)

(Ref. MAN B&W Quality Specification No. 0743503-0)
Shaft-line and Main Engine alignment onboard
4. Bearing Loads

Checking of bearing load (reaction) by jacking-up test at cold condition, for the shaft line bearing(s) and for the three aftmost engine bearings.

(Ref. MAN B&W Production Recommendation 0742884-5)
Shaft-line and Main Engine alignment onboard

Jack-up measurements of intermediate shaft bearing load
Shaft-line and Main Engine alignment onboard

Dial gauge for measurements of intermediate shaft bearing load
Shaft-line and Main Engine alignment onboard

Jack-up measurements of main bearing load
Shaft-line and Main Engine alignment onboard

Dial gauge for measurements of main bearing load
5. Main bearing top clearance

In some cases (e.g. VLCC’s) 0.2 mm reduction of the top clearance in aftmost engine bearing is acceptable at the alignment (light, afloat) condition.

Measurement of main bearing top clearance by feeler gauge
Shaft-line and Main Engine alignment onboard

Main engine alignment diagram – step by step

1. Align engine towards intermediate shaft flange
   - Check
2. SAG the engine (pianowire mounted)
3. Couple the engine to I.M. shaft
4. Check crankshaft deflection all units
5. Check journal bearing top clearance
6. Check engine bearing load (3 aftmost bearings)
   - OK
   - NOT OK
     - Adjust engine fore and/or aft end
       - Check
     - Check crankshaft deflection aft unit
     - Check engine SAG
     - Check crankshaft deflection all units
     - Check journal bearing clearance
     - Chock the engine
Shaft-line and Main Engine alignment onboard

MDT recommend:

Checking the alignment in way of

- Crankshaft deflection
- Bearing load
- Engine SAG
- Main Bearing clearance

- before chocking the engine
Shaft-line and Main Engine alignment onboard

Thank you very much for your attention!

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