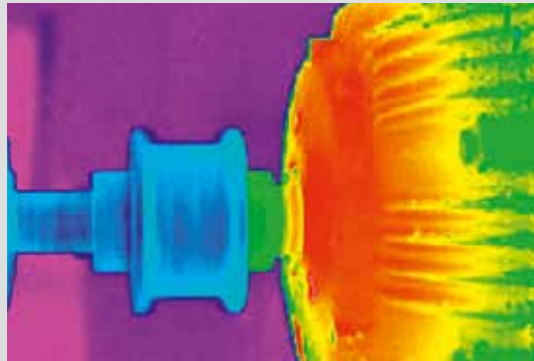


**THERMOGRAPHIC MEASUREMENT**



Thermal imaging techniques allow us to visualize heat distribution in machinery, structures and switchboards, to identify and prevent the root causes of failures.

**DYNAMIC MACHINE MOVEMENT MEASUREMENT**

By precisely quantifying the movement of machinery such as propulsion systems in different loading conditions, engine outputs and manoeuvring scenarios, we can optimize its position to ensure proper alignment in all circumstances.



**On Site Alignment B.V.**

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**TROUBLESHOOTING SERVICE**

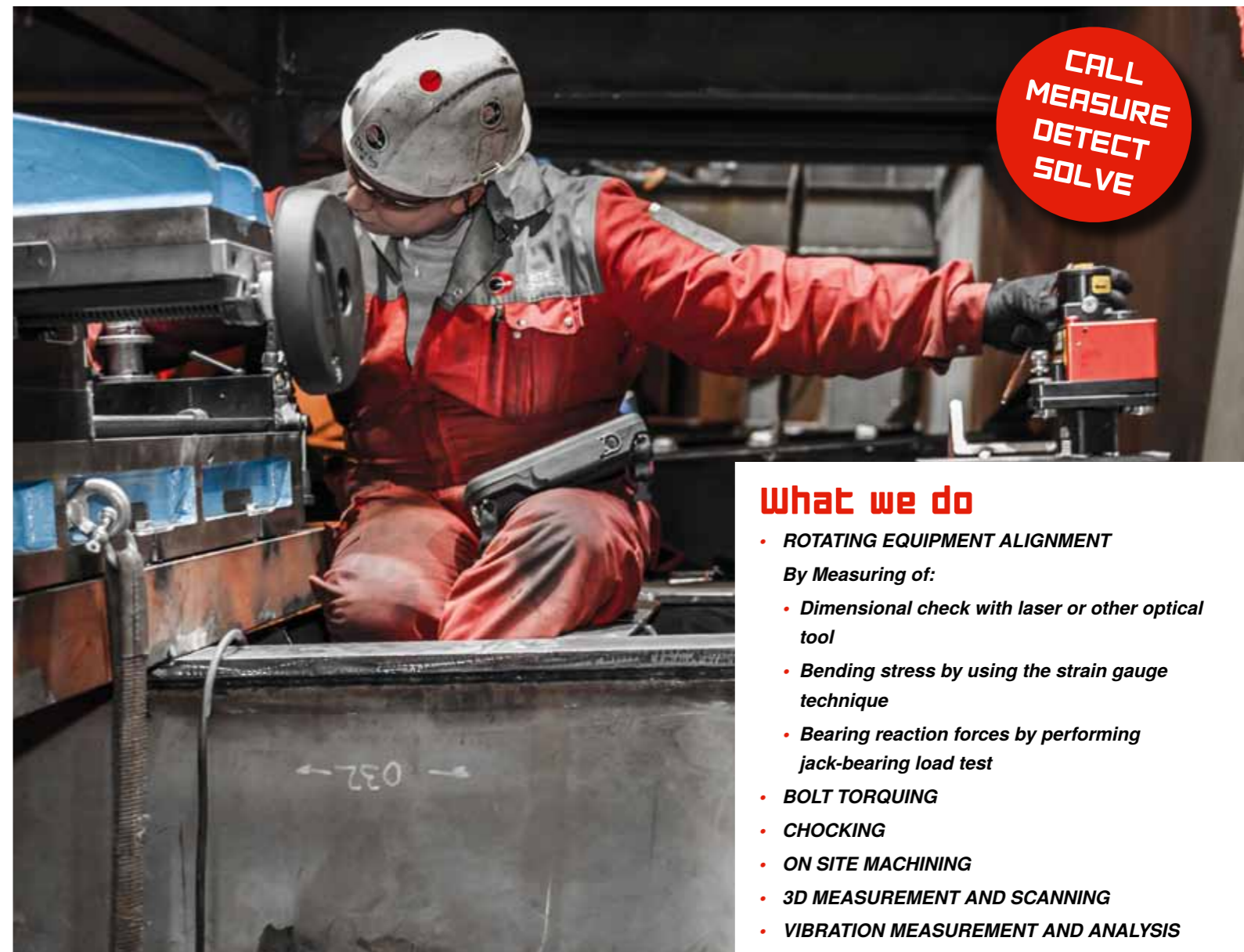


By combining advanced diagnostic technologies and engineering techniques with years of experience in the field, we can quickly understand and solve any problems with your marine rotating equipment – and prevent a recurrence

**OSA ENGINEERING:  
ON OR OFF-SITE**

We can perform the following services, either at your premises or in our own workshops

- Calculate and analyse:
  - Shaft alignment gap and sag
  - Bearing reaction forces
  - Thermal expansion
  - Relative hull deformation
  - Dynamic movement /deformation
- Develop and implement chocking plans, including approval of relevant classification societies
- Create manuals for the alignment of new and existing propulsion shafts, including advise about important milestones during the process and alignment reports
- Design of shaft lines
- Troubleshoot vibration problems



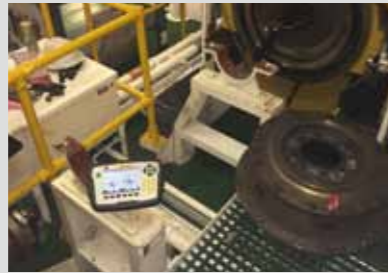
**What we do**

- **ROTATING EQUIPMENT ALIGNMENT**  
By Measuring of:
  - Dimensional check with laser or other optical tool
  - Bending stress by using the strain gauge technique
  - Bearing reaction forces by performing jack-bearing load test
- **BOLT TORQUING**
- **CHOCKING**
- **ON SITE MACHINING**
- **3D MEASUREMENT AND SCANNING**
- **VIBRATION MEASUREMENT AND ANALYSIS**
- **SHAFT ORBIT MEASUREMENT**
- **SHAFT POWER MEASUREMENT**
- **THERMOGRAPHIC MEASUREMENT**
- **DYNAMIC MACHINE MOVEMENT MEASUREMENT**
- **TROUBLESHOOTING SERVICE**
- **OSA ENGINEERING: ON OR OFF-SITE**

### ROTATING EQUIPMENT ALIGNMENT



We carry out shaft alignment on all types of rotating equipment, including engines, gearboxes, generators, shaft (support) bearings, pump sets, winches and bow thrusters. We also measure and correct crankshaft web deflection.



### GEOMETRICAL MEASUREMENT

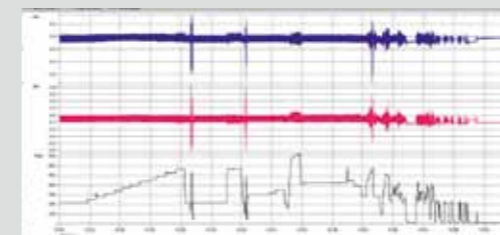
We measure straightness, line bore, flatness, perpendicularity and parallelism. For rotating machinery and all kind of structures.



### ON-SITE MACHINING SERVICES



We can carry out machining tasks at your premises, including line boring, flange facing, milling and reaming. We machine landing faces of slewing bearings for cranes, thrusters or wind turbine pedestals, line boring of stern tubes, reaming of fitted bolt holes and foundations of dredge pumps.



### SHAFT ORBIT MEASUREMENT

By measuring the lateral movement of a rotating shaft we can find out the dynamic behaviour. With this information we can quantify whirling, identify why stern tube seals leak and check if the alignment targets in static condition are correct.



### 3D MEASUREMENT AND SCANNING



We can measure the geometrical of an object both in itself and in relation to other objects. For example, we can ascertain the flatness of a flange and its exact position and angle in relation to the surrounding structures.



### STRAIN GAUGE ALIGNMENT AND BEARING LOAD MEASUREMENT

We can measure stresses in shaft lines with strain gauge technique. The measured stress will be entered into a FEM model of the shaft line. By reverse engineering we can calculate the actual alignment. The software will also calculate if this is within tolerances stated by the OEM and Class Association. This alignment process is validated by checking the theoretical bearing load from the calculation with the actual bearing load by doing

jack/bearing load test to ensure a 100% correct process.



### VIBRATION MEASUREMENT AND ANALYSIS

We can ascertain the precise condition of rotating machinery and diagnose the causes of structural vibrations/resonance and recommend practical solutions.



### BOLT TORQUE SERVICES



We perform controlled tightening of bolted connections, calculating the torque according to industry best practices and classification rules.

### CHOCKING



We work with solid steel chocks, epoxy resin chocks, mechanical re-adjustable solutions and resilient rubber mounts. We also provide pre-cut stainless steel shims.

### SHAFT POWER AND TORSIONAL VIBRATION



By measuring torsional shaft stresses, we can determine shaft power to verify the engine's rated output. Measuring torsional vibration is also crucial to understanding problems like coupling failures and shaft fractures.

