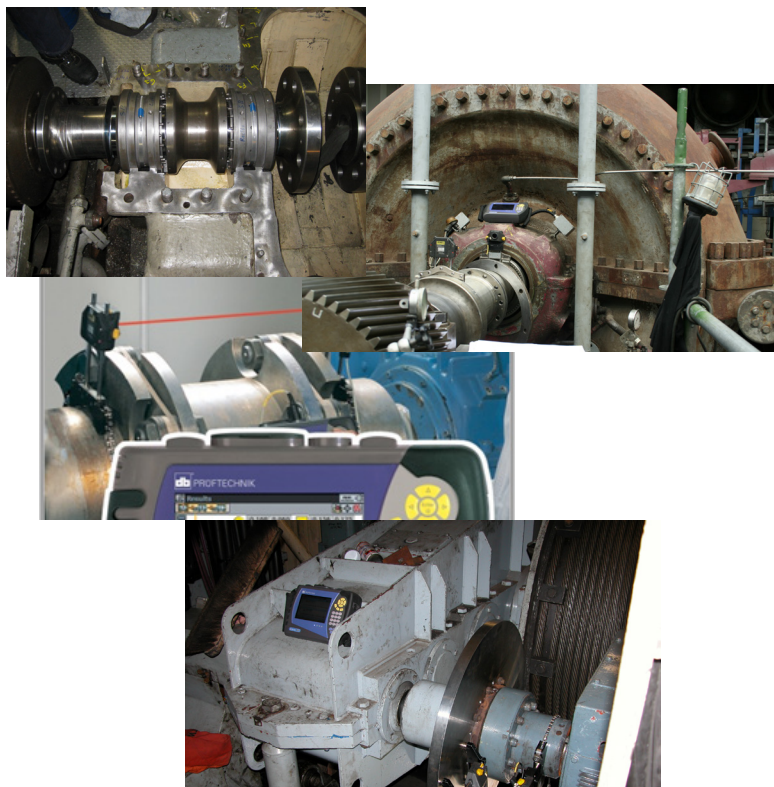


The top image shows a large, circular metal flange with multiple bolt holes, likely a component of a turbine or engine. The middle image shows a metal part being machined on a lathe, with a cutting tool visible. The bottom image shows a metal part being drilled on a lathe, with a cutting tool visible.

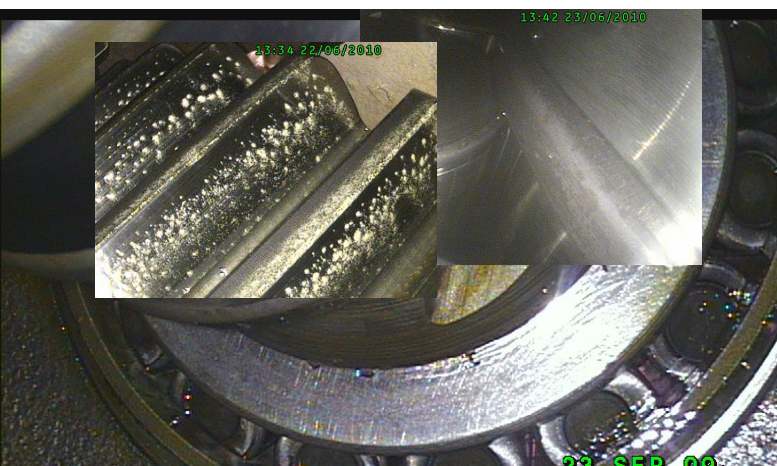
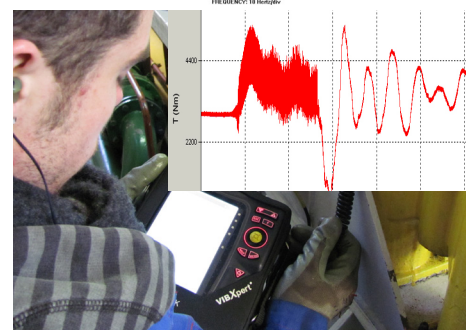
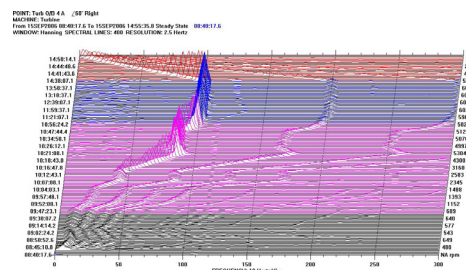


# Diagnostics Services

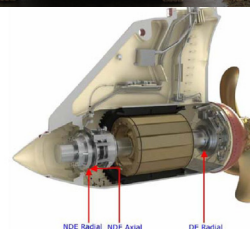
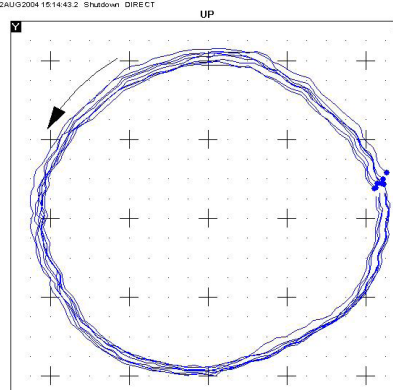


Our services:

1. Machinery health or condition inspections
2. On site troubleshooting
3. Machinery commissioning
4. Field trim balancing (single and multi plane)
5. Machinery alignment services
6. Geometrical measurements
7. Thermal growth studies
8. Torque and power measurements by telemetric strain gauge technology



Y: COMP NDE 45 L / 45° La8 DIR AMPL: 86.7 micro m pp  
X: COMP NDE 45 R / 45° R8 DIR AMPL: 86.3 micro m pp  
MACHINE: Compressor  
32AUG2004 15:14:42.2 Shutdown DIRECT





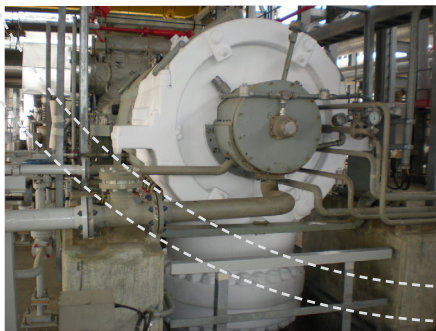
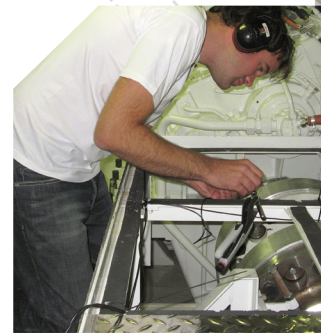
# Machinery health or condition inspections

## On-site troubleshooting



Our knowledge, experience and equipment allows us to identify potential machinery malfunctions, such as rolling element bearing defects, gear related problems, rubs, resonances, etc. Significant and valuable time can therefore be saved to resolve the problem.

Our machinery experts at GBS international are capable of providing inspections on an individual basis or as part of a contractual agreement in order to access the health or condition of your machinery. In some cases these inspections are periodically carried out and will complement your condition based maintenance program. Other examples where we proved to be successful are related to 'end of warranty' inspections. To inspect rolling element bearings or planetary gearboxes we use the latest videoscopes from General Electric. These videoscopes allow us to identify problems, often impossible to see by the naked eye.



## Machinery startup (Commissioning)

Our engineers have extensive experience with advising and assisting the start up of machines after revision, reinstallation, or maintenance outages. Starting up necessitates the gathering of (base line) information and comparative analysis of the information.

# Field Balancing

The most common machinery problem is unbalance, which must be confirmed before attempting to balance machinery. Our specialists are trained in isolating unbalance problems and subsequently correcting them either for single plane balancing or multi-plane balancing for complex machines with one or more bearings combined with multiple measurement and correction planes.



## VECTOR BALANCING<sup>®</sup> (CCW Rotational Direction)

**Transducer Orientation**  0 = Top, other positions against rotational direction

### Reference Run

Amplitude  mm/s, mils or  $\mu$ m  
Phase  Degrees Lag

### Calibration Run

Calibration weight  Gram  
Amplitude  mm/s, mils or  $\mu$ m  
Phase  Degrees Lag

### Calculated Correction Weight

Mass  Calculated Correction Weight  
Angle  Look at plot for CW or CCW rotation  
0° is present calibration weight position

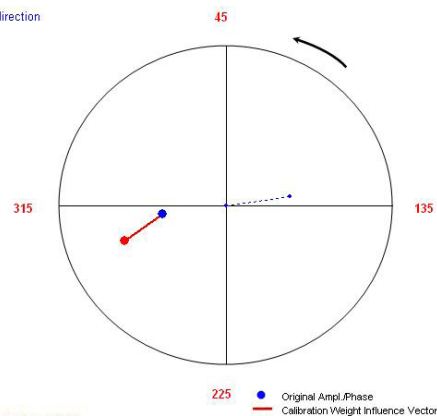
**Influence Cal. Weight**  mm/s, mils or  $\mu$ m / gram of weight

**Placed Correction Weight** Concrete Position

Mass  Placed Correction Weight  
Angle  Look at plot for CW or CCW rotation

**Expected Amplitude**  mm/s, mils or  $\mu$ m

**Phase lag:** Number of degrees between the high spot of the rotor and the transducer at the moment the keyphasor strikes, measured against rotational direction

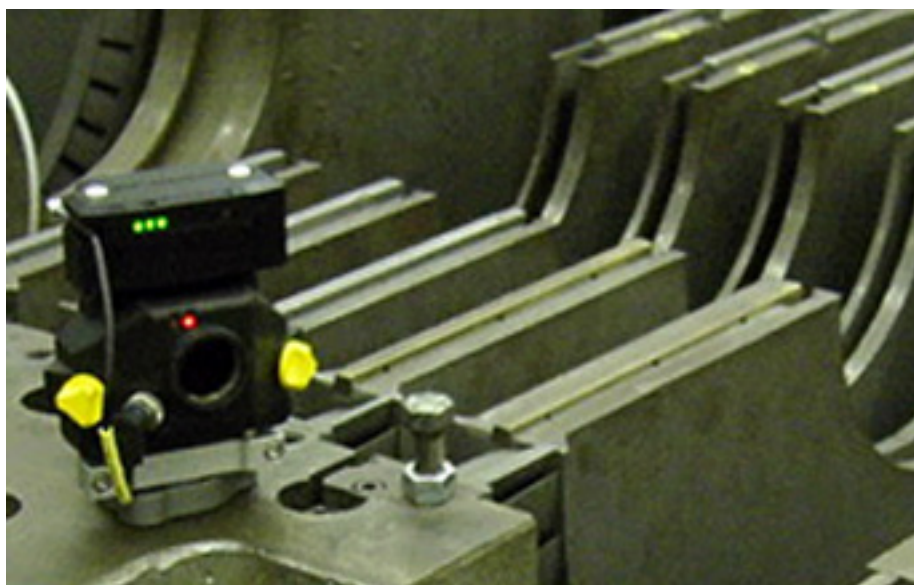


## Machinery Alignment Services

Second to rotor unbalance, misalignment is a frequently encountered problem. GBS international is able to handle both hot and cold alignment projects on your machinery as well as reciprocating compressors in addition to rotating machinery. Our services are available from simple two case machine configurations to more complex multi-case situations such as large steam turbine generators.

## Geometrical Measurements

Our geometrical measurements are performed with the use of a Levalign Ultra rotating laser system from Prüftechnik. This system and the available expertise, an ideal solution for machinery foundations and weak machinery split casings, provide quick and efficient measurements of surface flatness and levelness.





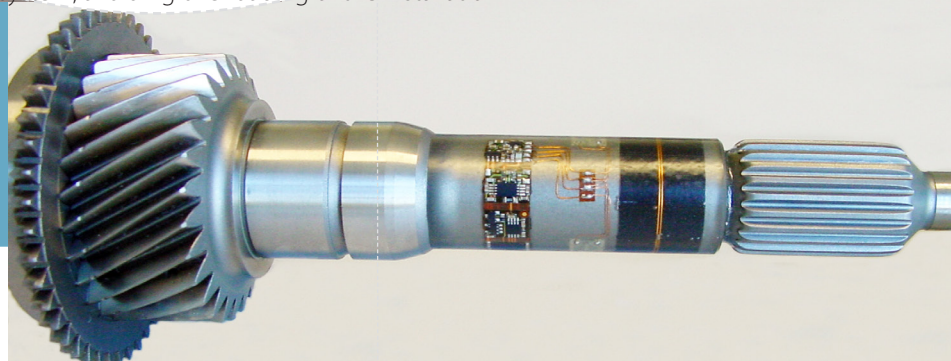
# Thermal Growth Studies

We are able to study thermal growth in machines pertaining to normal alignment or differential expansion



## Torque and power measurements by telemetric strain gauge technology

The engineers at GBS international successfully have completed many torque and power measurements and analyses projects. In many cases these measurements quickly led to the root cause of failing machinery components. Permanent systems have also been implemented world wide, where the recorded torque data is directly linked to a control system, avoiding overloading of the installation



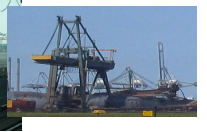
# Referenties

## Enkele van onze klanten



Power industrie

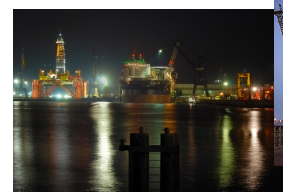
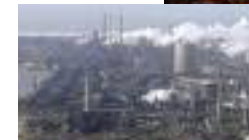
Bulk- en container handling



(Petro) chemie



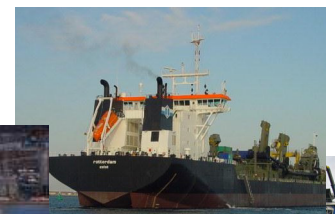
Staalindustrie



Offshore



Maritiem



Baggerindustrie



## Verkoop



**Dennis Janse**  
verkoop onderdelen en service,  
specialisatie tandwielkasten  
  
Mobiel +31 (0)6 20 696 954  
Email. d.janse@gbs.international



**Geert Vander Schueren**  
verkoop verspaning en service - België  
  
Mobiel +32 478 51 81 82  
Email. g.vanderschueren@gbs.international



**Chris Breijs**  
verkoop verspaning en service  
  
Mobiel +31 (0)6 46 116 078  
Email. c.breijis@gbs.international



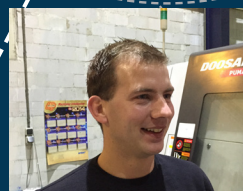
**Robert de Kreek**  
verkoop verspaning en service  
  
Mobiel +31 (0)6 10 087 064  
Email. r.dekreek@gbs.international



**Ferry Groenendijk**  
Projectleiding / werkvoorbereiding,  
fabricage onderdelen  
  
Mobiel +31 (0)6 53 586 904  
Email. f.groenendijk@gbs.international



**Franklin Sodenkamp**  
Projectleiding / werkvoorbereiding , specia-  
lisatie tandwielkasten  
  
Mobiel +31 (0)6 20 696 847  
Email. f.sodenkamp@gbs.international



**Tim Maat**  
Projectleiding / werkvoorbereiding , specia-  
lisatie tandwielkasten  
  
Mobiel +31 (0)6 52 585 923  
Email. t.maas@gbs.international



**Eelco Fortuin**  
Projectleiding / werkvoorbereiding, fabri-  
cage onderdelen  
  
Mobiel +31 (0)6 10 256 718  
Email. e.fortuin@gbs.international



**Wijnand Verkaik**  
Projectleiding / werkvoorbereiding, fabricage onder-  
delen  
  
Mobiel +31 (0)6 10 863 371  
Email. w.verkaik@gbs.international

## Projectleiding

## Techniek



**Jan de Koning**  
engineering en techniek  
  
Mobiel +31 (0)6 20 696 835  
Email. j.dekoning@gbs.international

Gearbox Services international  
Hermanus Boerhaavestraat 2  
3261 ME Oud Beijerland

Tel +31 (0)186-645555 (24uur-7dagen/wk)  
fax +31 (0)186-614490  
email info@gbs.international

[www.gbs-international.com](http://www.gbs-international.com)  
[www.facebook.com/gearbox.services](https://www.facebook.com/gearbox.services)  
[www.youtube.com/user/gearboxservices](https://www.youtube.com/user/gearboxservices)  
[twitter.com/#!/gearboxservices](https://twitter.com/#!/gearboxservices)