



# MAINTENANCE PARTNERS

*A SMART FIT*

2/07/2020





**MAINTENANCE**  
PARTNERS

*A SMART FIT*

# Welcome Presentation Title



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# Staf & Quanda

**Safety  
Targets  
Always  
First**



**Quality  
Needs  
Daily  
Attention**



VCA\*\* / ISO9001 / ATEX / IECEx-03 / MASE / SAFETY AWARD BOREALIS



# Agenda

A Smart Fit

General info

B.U. Lines

MP at Work



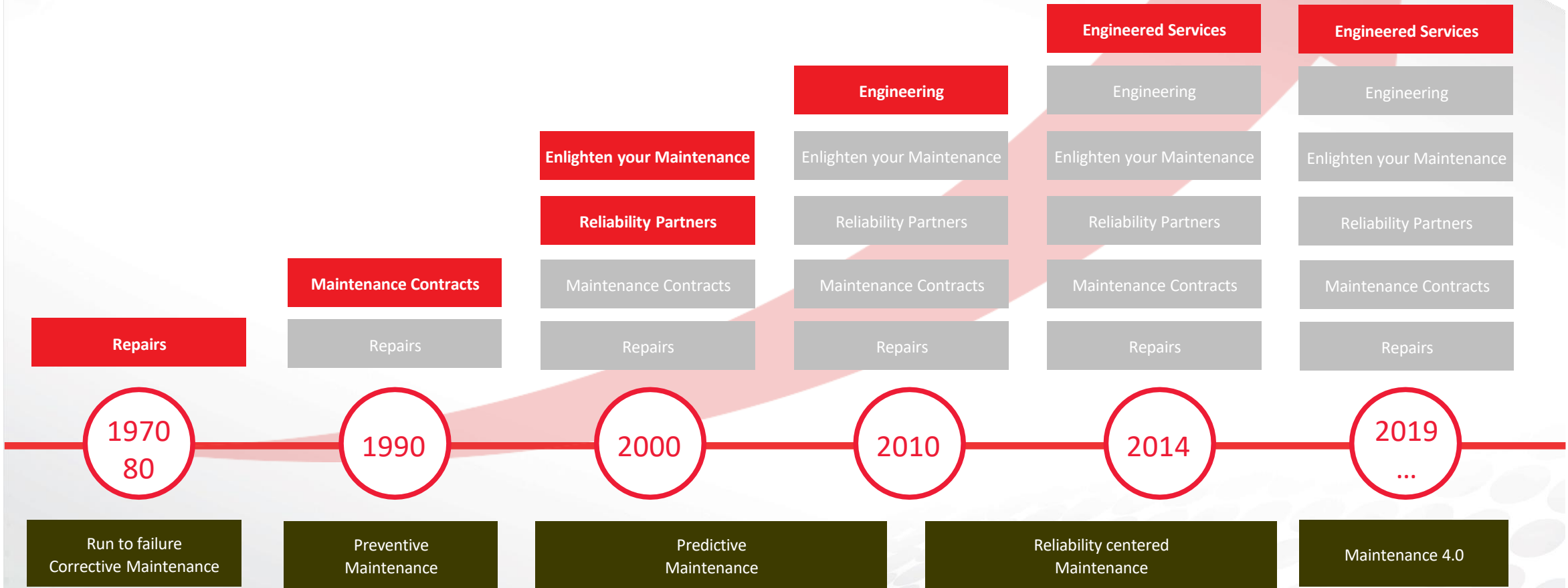
# A Smart Fit



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# Evolution of market and MP



# Our values

Flexible

Expert

Innovative

Eager

Dynamic

Respect



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# Mission statement

**We fulfill the highest expectations of our  
employees, customers and other  
stakeholders by delivering reliability and  
Engineered Services, specialized in  
rotating equipment.**





# Our dreams

**Develop &  
strengthen MP as  
a brand and identity,  
with a long term  
vision**



**Be recognized as  
an innovator  
& trendsetter  
in Engineered  
Services**

**MP to grow x Pi  
every 10 years**

$\pi$

**Be the best employer  
by creating a safe and  
'happy' work  
environment**



**Continue to develop  
Belgium  
as a center of  
excellence and  
decision-making**



**Our values**

**Our dreams**

**Our mission**

**Our strategic exercise**

**A SMART FIT**



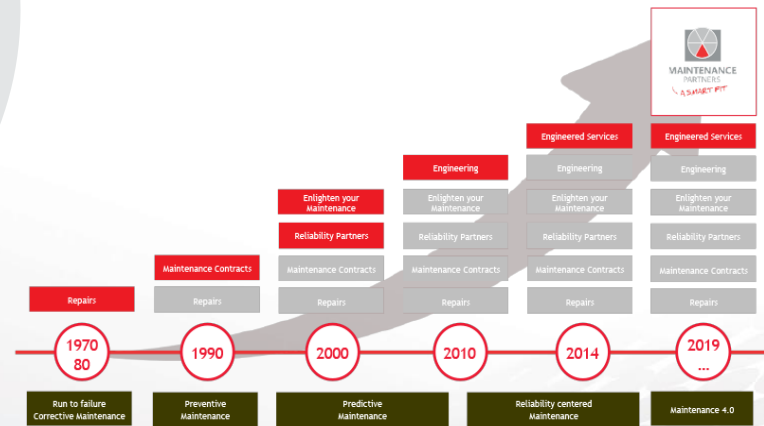
# A Smart Fit

Employees / Customers / Other Stakeholders

## Smart Game

- ✓ Standardization
- ✓ Expected quality
- ✓ Correct price
- ✓ Lead time

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## Fit for purpose

- ✓ Tailor made
- ✓ Quality as needed
- ✓ Total cost of ownership
- ✓ Lead time



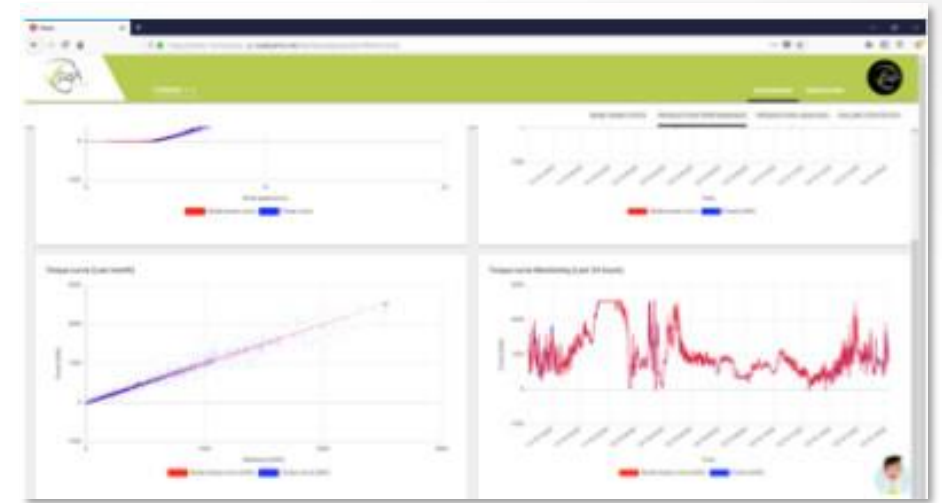
# A Smart Fit: Maintenance 4.0

## MP Connectivity

- Synchronizes connections to all relevant equipment
  - Turbine controller, process PLC, electric protections, excitation system, vibration monitoring
  - Connection to cloud-based database where historical data is recorded
  - Very high data acquisition rate of 100 ms → troubleshooting for advanced trips and failures by our experienced specialists

## Performance for Assets

- Predictive system that checks and follows up on the main parameters such as temperature, vibration, performance, etc.
- Possibilities:
  - Big Data Collection
  - Statistical Correlations between relevant parameters
  - Efficiency Calculation Model
  - Study of Historical Data
  - Dashboards to visualize data
  - Predictive Maintenance



## Training



# General info



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# History MP



Foundation of **Maintenance Partners**  
(after a management buy-out from the ABB Service) group)



2001

2006

2009

2012

2014

2015

2016

2019

2020



Workshop  
Zwijndrecht



MP joins



Launch of



Establishment of  
MP France



Management buy-out:  
Belgian management  
acquires company for 100%



Establishment of  
MP Sweden



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# Locations



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-  Main Workshop
-  Satellite Workshop
-  MP Office
-  Authorized Agent

**Maintenance Partners Sweden AB**  
Hakkas



**Maintenance Partners Belgium nv**  
Zwijndrecht



**Maintenance Partners Belgium nv**  
Gent



**Maintenance Partners Wallonie sa**  
Nanine



**Maintenance Partners France SAS**  
Nantes



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# Facts & figures

## General information



Turnover

€ 39.000.000



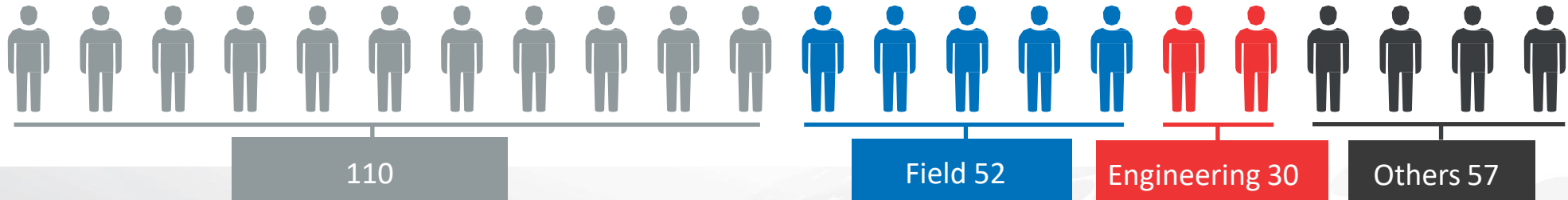
Shopfloor

20.000 m<sup>2</sup>



Employees

249



110

Field 52

Engineering 30

Others 57





# Facts & figures

## Technical information



Lifting Capacity

<110 T

13,6m Under hook



High Speed Balancing

<30.000 rpm



Machining Capacity

<6m length

<1,1m  $\phi$



VPI

<2,7  $\phi$

<4 m length



Electrical Test Facilities

Loaded testing <550 KW



# Facts & figures

## Technical information



Diagnostics

Partial Discharge 16-Channel



Re-engineering

3D Measuring

Measuring &  
Control Room



Welding Robot



Field Service Fleet

Service  
Vans

Tool  
Containers



# MP Workshops







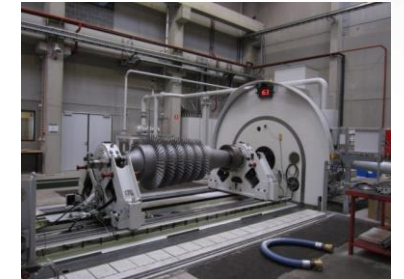
- 20 000 m<sup>2</sup> total floorspace
- Overhead cranes up to 110.000 KG
- Lathes
- Milling machines
- Horizontal bore
- Welding equipment
- Coating applications
- Climate controlled measuring room
- 3D measuring equipment
- Atos triple scan
- Material analyser
- Welding robot
- Electric test facilities
- Non and destructive test equipment
- Glass blast facilities - 8000 x 3000 x 3000 mm



# MP Rotor shop

## Specifications

	DH7S	DH4
 Max rotor weight	600 – 12.500 kg	60 – 1.250 kg
 Max rotor length	6.000 mm	6.000 mm
 Max rotor diameter	1.700 mm	1.700 mm
Max journal diameter	280 mm	125 mm
 Max drive speed	12.000 rpm	30.000 rpm



# MP Field service



Our highly skilled field service employees provide services such as minor and major overhauls, including commissioning and start-up assistance. This service can be performed on scheduled or non scheduled maintenance.

**Our field service team is fully equipped with:**

- Tool and hoisting containers
- Hytorc
- Laser alignment
- Condition monitoring
- Field balancing
- 3D scan
- Atos triple scan
- Non destructive testing



# MP Engineering

MP's Engineering team consists of 30 specialists

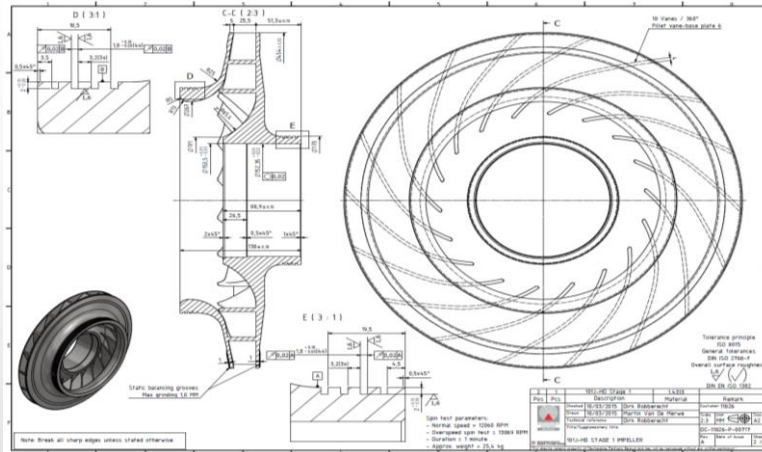
- Material Engineer
- Design Engineer
- Process Engineer
- Technical Specialists (Electrical, Mechanical, Welding & Diagnostics)
- CAD Drawers
- Project Managers
- Reliability team (vibration, electrical analysis, infrared, ultrasound, dielectric measurements)
- MP connectivity
- P4A



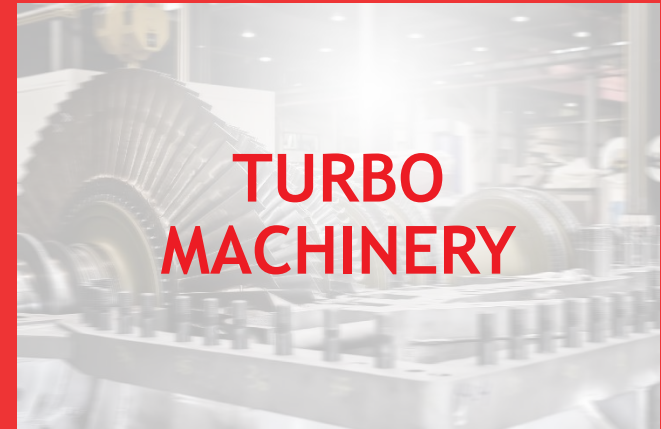
# MP Engineering

## Main capabilities

- 3D Scanning of spare parts
- Re-engineering of spare parts
- Remodeling damaged spare parts
- Improving of efficiency (redesign & upgrades)
- Improving of durability (materials & upgrades)



# B.U.Lines





# Business Unit ROTATING

← Back to B.U. Lines





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# BU Rotating

Maintenance of electrical & mechanical rotating equipment



# BU Rotating

- Smart Game
- Shop and field activities
- Standardization
- All brands
- All rotating machines
- Rewinding E motors
- Welding repairs
- Major and minor overhauls
- High and low speed balancing
- Part refurbishment
- Parts supply:
  - O.E.M or by reverse engineering
- Revamps and upgrades
- Failure analysis
- Vibration analysis
- Reliability audits and programs
- Second hand equipment
- New equipment



Business Unit

# TRANSFORMERS

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# BU Transformers



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# BU Transformers

- **Diagnostics**
  - Oil analyses
  - Electrical measurements & diagnostics
- **Streaming of oil**
- **Fault analysis**
- **Overhaul and repair**
  - Repair of leakages
  - Replacement/install of parts
  - Overhaul cooling fans and oil pumps
  - Modifications on transformers
  - Repair and rewinding



# BU Transformers

- Relocation of transformers
  - Dismantling, lifting, transport & mounting
- Installation of new transformers
- Specials
- Reporting





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Business Unit

# TURBOMACHINERY



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# Focus Markets & Equipment

## Turbomachinery

	Expander	Compressor	Steam Turbine	Generator
Pulp & Paper			✓	✓
Waste to Energy & Biomass			✓	✓
Air Separation		✓	✓	✓
Fertilizer	✓	✓	✓	✓



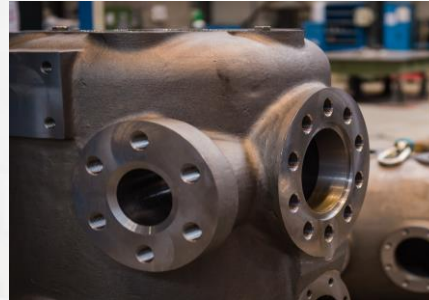
# BU Turbomachinery

Compressors, Steam Turbines,  
Generators & B.O.P.



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# BU Turbomachinery

- Fit for purpose
- Shop and field activities
- Major and minor overhauls
- Commissioning and start - up assistance
- Rotor repairs
- High and low speed balancing
- Part refurbishment
- Parts supply: O.E.M or by reverse engineering
- Revamps and upgrades
- Failure analysis
- Reliability audits and programs
- Second hand equipment
- Storage containers



# MP at work



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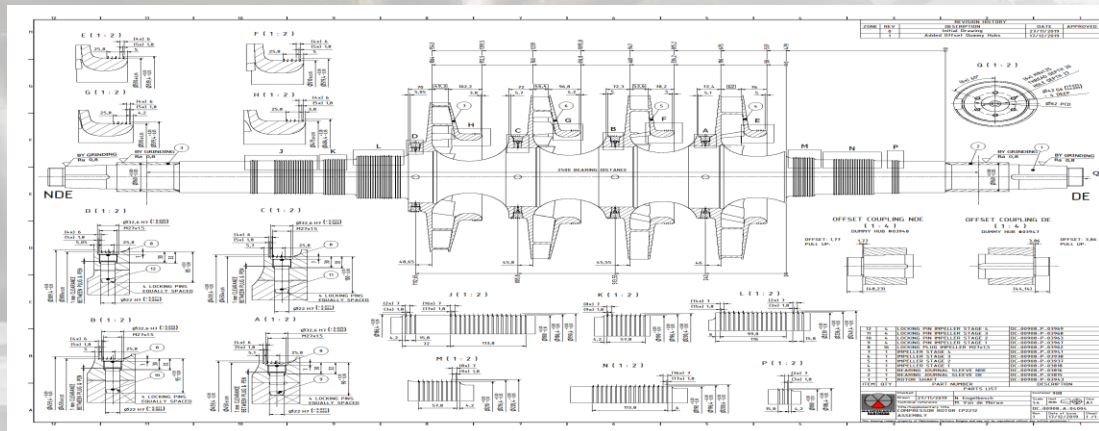
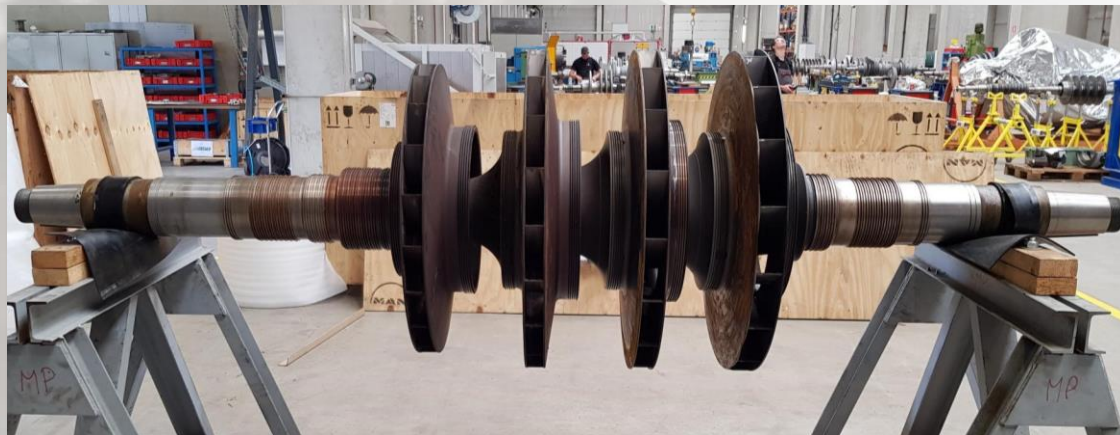


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# MP at work: Turbomachinery

## Brand new compressor rotor



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# MP at work: Turbomachinery

## Brand new compressor rotor

- The rotor had reached end of life and had to be renewed
- MP's engineering team scanned and re-engineered the rotor fully according to the customer's specifications → **Fit for purpose**

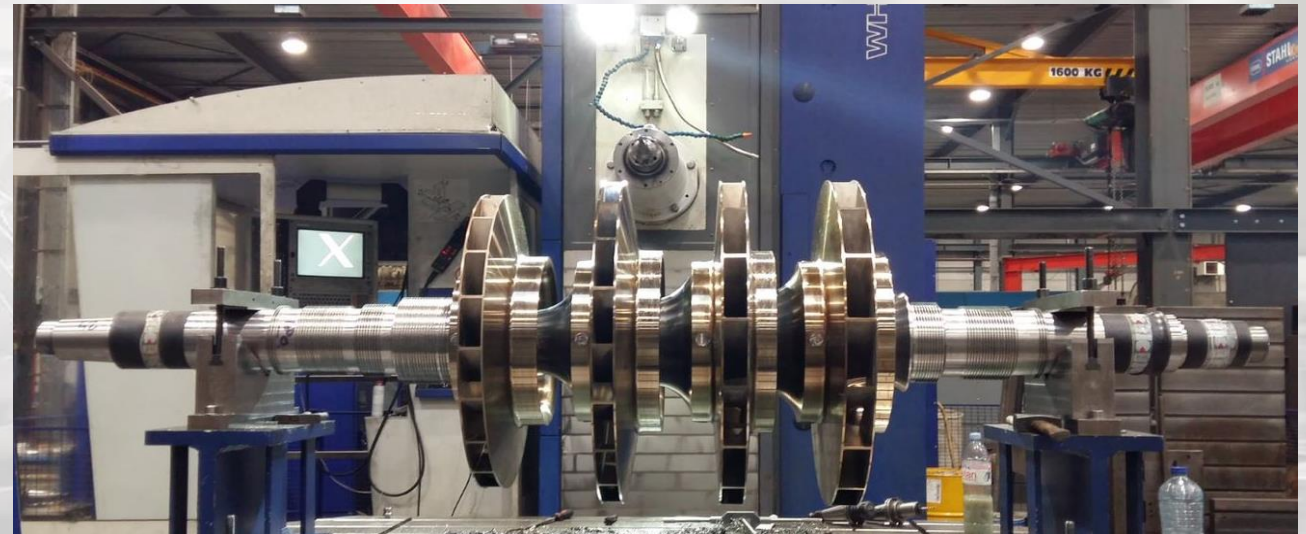
### Where MP made the difference:



Re-engineered and manufactured in 6 months time



Budget was significantly lower than the OEM's proposal



# MP at work: Turbomachinery

## Reverse Engineered repair of steam turbine rotor:

- After NDT inspections on the rotor NCR's were found
- Second and third row wheels were in severe condition!
  - deformation; axial bending of the wheels +/- 20 mm
  - several cracks in shroud bands and discs
- After dismantling the blades, the 2 wheels were machined off completely to the shaft, and build up again by performing robotic TIG welding technology



# MP at work: Turbomachinery

## Reverse Engineered repair of steam turbine rotor:

### Investigation on repair methodology:

- Detailed analysis on the base material was done
- Composing of welding and heat treatment procedures
- Welding test was performed on sample piece

### Engineering phase:

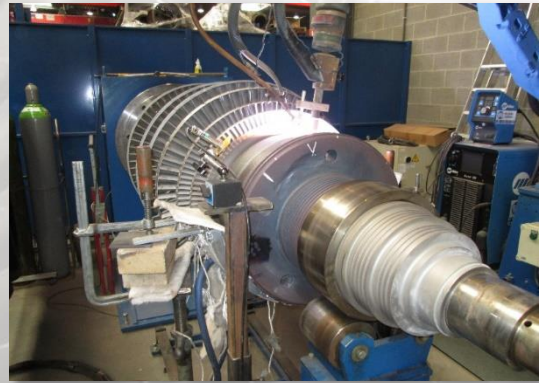
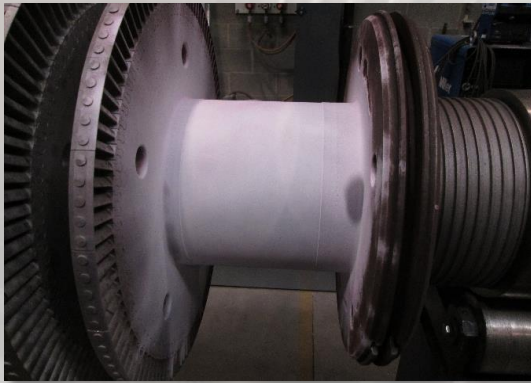
- Pre- and final machining drawings





# MP at work: Turbomachinery

Reverse Engineered repair  
of steam turbine rotor:



# MP at work: Turbomachinery

Reverse Engineered repair  
of steam turbine rotor:

Where MP made the difference:

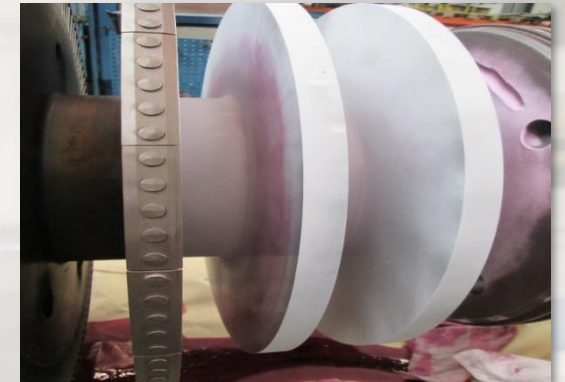
OEM offered the customer  
complete new rotor!



Lead-time for the welding  
repair: 8 weeks



Repair budget was a fraction  
of a new one



# MP at work: Rotating

## Manufacturing of low speed compressor E-motor Stator 23MW 10KV 350 RPM

- Existing E-motor is located in an ATEX area (hazardous environment)
- Due to insulation deterioration and high level of partial discharge the installed motor is a ticking bomb!!
- Periodic follow up by on-line monitoring of the existing machine.
- On-site investigation on the existing motor 'Picture of the complete machine'
- MP copied the existing stator in order to exchange it during a planned shutdown in 2014



# MP at work: Rotating

Manufacturing of low speed  
compressor E-motor  
Stator 23MW 10KV 350 RPM

## Engineering phase:

- Re-engineering of the stator frame
- NDT
- Stripping of the insulation
- Dimensional check of profile copper wire
- Redesign of the coils
- Calculation of new magnetic core plates
- Less losses & higher efficiency!!



Establishment of  
ATEX certification



# MP at work: Rotating

Manufacturing of low speed  
compressor E-motor Stator 23MW  
10KV 350 RPM

Where MP made the difference:



Delivery time of new Stator was  
5 months compared to 9 months  
delivery time of OEM



The cost for the customer was  
less than 30% of OEM proposal



# MP at work: Transformers

## Overhaul of tap changer

Where MP made the difference:



Delivery time 25% quicker



The cost for the customer was 50% less than the competitor's proposal

Before



After



# References



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