

INNOVATION
CMF
RENOWNED
INDUSTRIAL APPLICATIONS



OUR BUSINESS SPIRIT: INNOVATION & PERFORMANCE

PRESENTATION

PARTNERSHIP
SPECIAL STEEL
SOLUTION
FORGED
RESISTANCE

SUMMARY

1 – OVERVIEW OF MG VALDUNES

2 – FORGED MECHANICAL COMPONENTS

- FMC product line
- FMC forging process
- Test & expertise capabilities
- FMC references
- Certifications
- Benefits for industrial customers
- Contacts



OVERVIEW OF MG VALDUNES

OVERVIEW OF MG-VALDUNES

- More than 100 years of experience
- Subsidiary of ASCO Industries till 1998
- MG Valdunes is now a subsidiary of Maanshan Iron & Steel Co, China (Ma Steel)
- Ma Steel is a major figure in the world steel industry
 - Steel production of 18 million tonnes per year, workforce over 40 000 persons
 - Turnover 14 Billion USD
 - Capacity 1 million wheels per year
 - 85% of Ma Steel's production serves the Chinese market





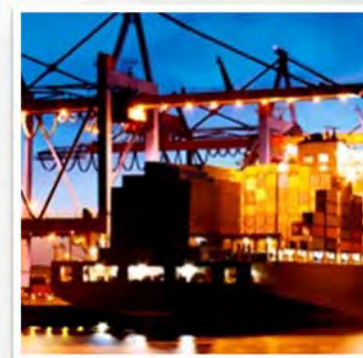
OVERVIEW OF MG-VALDUNES



- Market Leader for high performance railway wheels, axles and wheelsets
- The most comprehensive portfolio in the wheelset industry
- Highly experienced partner for expert services, product design, approval and maintenance
- High performing R&D engineers providing the best technical products & applications
- A complete range of approvals & certifications worldwide, including IRIS (railway) and ISO9001
- Worldwide agent network – our products are currently in use in over 80 countries

OVERVIEW OF MG-VALDUNES

2 MARKETS	TURNOVER 2015 (M €)		EMPLOYEES
Wheels, axles and wheelsets for the railway industry Forged Mechanical Components revolution parts for industrial applications	TOTAL	+/- 60	MA Steel  40 000 MG Valdunes  480
	Passengers	+/- 35	
	Freight	+/- 15	
	FMC	+/- 6	
	EWC	+/- 4	



PRODUCTION CAPABILITIES

DUNKIRK



Industrial

Black wheels
Crane wheels

160 employees

VALENCIENNES



Rail

Wheels
Axles
Wheelsets

320 employees

OVER €50 MILLION INVESTMENT IN NEXT 5 YEARS

DUNKIRK

- Refurbishment of the 5000 tons press
- 2 new machinery centers for industrial wheels
- Polyner quenching tank
- Painting process (industrial wheels)
- 2 New efficient furnaces for Heat Treatment of Forged Mechanical Components
- Modernization and change of the rolling mill
- Installation of a new workshop for resilient wheels

VALENCIENNES

- Modernization of the heating furnace of the Heat Treatment
- 4 New machining centers for complex product
- New line for axles machining and 1 new machining line for standard products
- Shipping zone in a building extension
- Investment in maintenance of motor and passenger wheel-sets

Forged Mechanical Components

FMC PRODUCT LINE

Crane wheels, gears, discs, pulleys, piston heads... for industrial applications

Grades for crane wheels:

- ✓ 42CrMo5-04 (Cranes)
- ✓ 42CrMo4 (Cranes)
- ✓ Class C
- ✓ 50CrMo4

Grades for gears:

- ✓ 18CrNiMo7-6
- ✓ 18CrNi8
- ✓ 16NiCrMo13
- ✓ 30CrNiMo8
- ✓ 42CrMo4
- ✓ Others...

Grades for brake discs:

- ✓ 28CrMoV5-08



CRANE WHEELS, SHEAVES, GEARS AND DISCS FOR INDUSTRIAL APPLICATIONS

Diameters:

- 250 mm to 1,400 mm

Block weight:

- 100 kg to 3.2 tons

Crane wheels produced according to:

- DIN 15078, 15079, 15090, 15093...
- SID S466A, S466E
- Upon customer specification & drawings

(ThyssenKrupp Steel Standards, ACM standards, etc...)



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- Cutting off with a high degree of accuracy



- Fully automated heat furnace - T°C of 1,320°C
- Capability up to 300 blocks of Ø325mm for serial parts
- Smaller heating furnace + manipulator with a capability of up to 20 blocks of Ø325mm for projects with smaller quantities
- Gas firing with optimization of the heating parameters to achieve a T°C homogeneity inside the furnace and to limit the ignition loss
- Waste recycling, filtering and ventilation systems



-
- ```

graph TD
 A[] --> B[]
 B --> C[]
 C --> D[]

```



- 
- ```

graph TD
    A[ ] --> B[ ]
    B --> C[ ]
    C --> D[ ]
  
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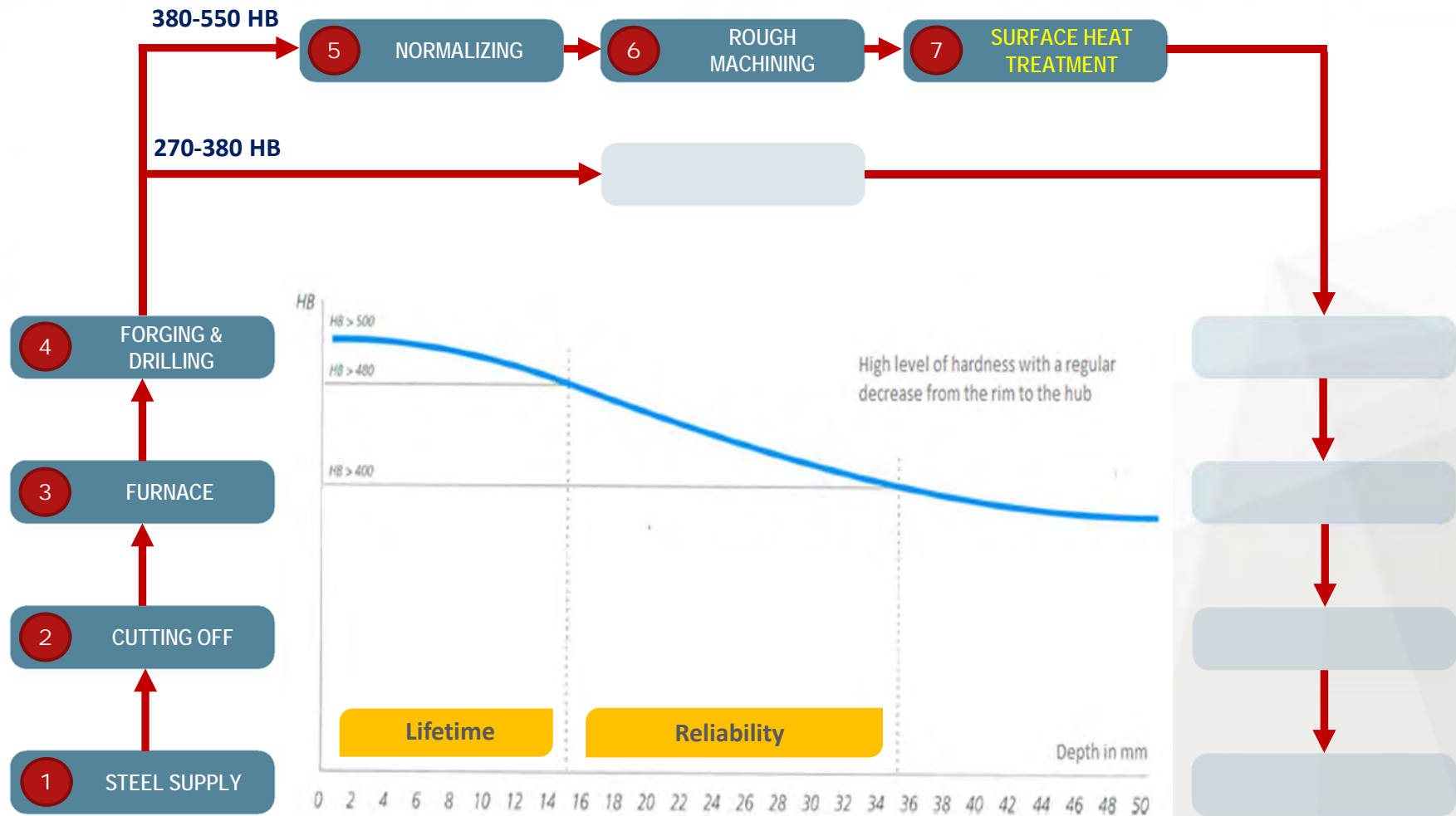


- Rough machining of the stress-relieved part to 5-6 mm of the final dimensions



- Reheat of the rough machined part to a T°C of 880°C with immediate surface heat treatment
- Rotary motion of the hot part in a water quenching tank
- Hardening by pulverization pressurized water
- Combined with the licensed steel grade, this technology enables to achieve high levels of hardness (up to 550 HB) in-depth (>15mm)

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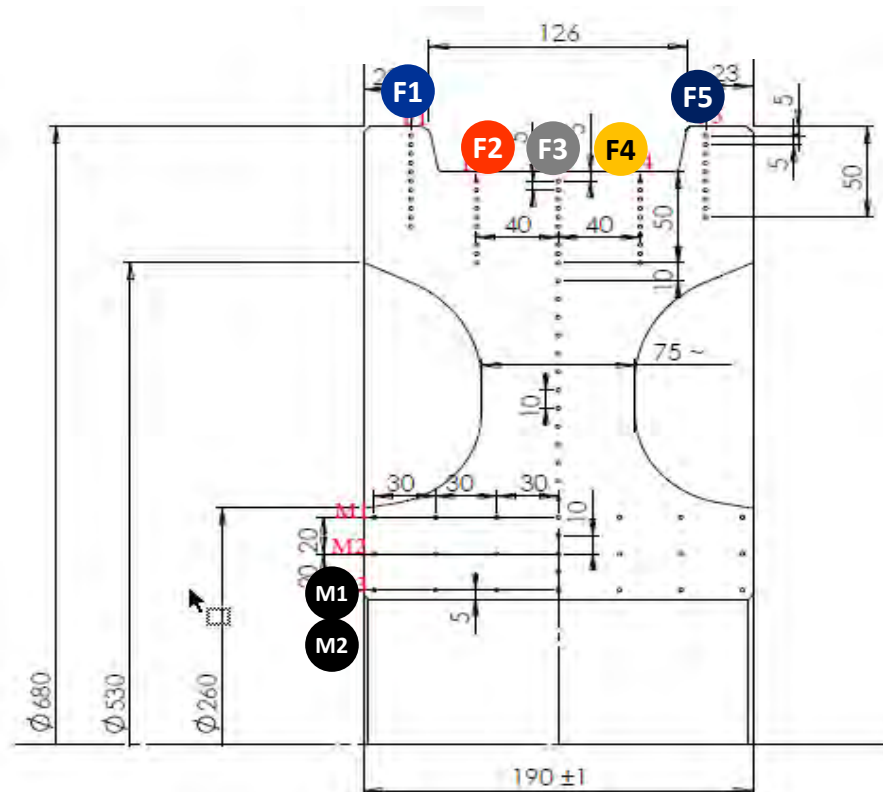


UNEQUALLED LIFETIME

A combination between a high quality steel & a heat treatment know-how

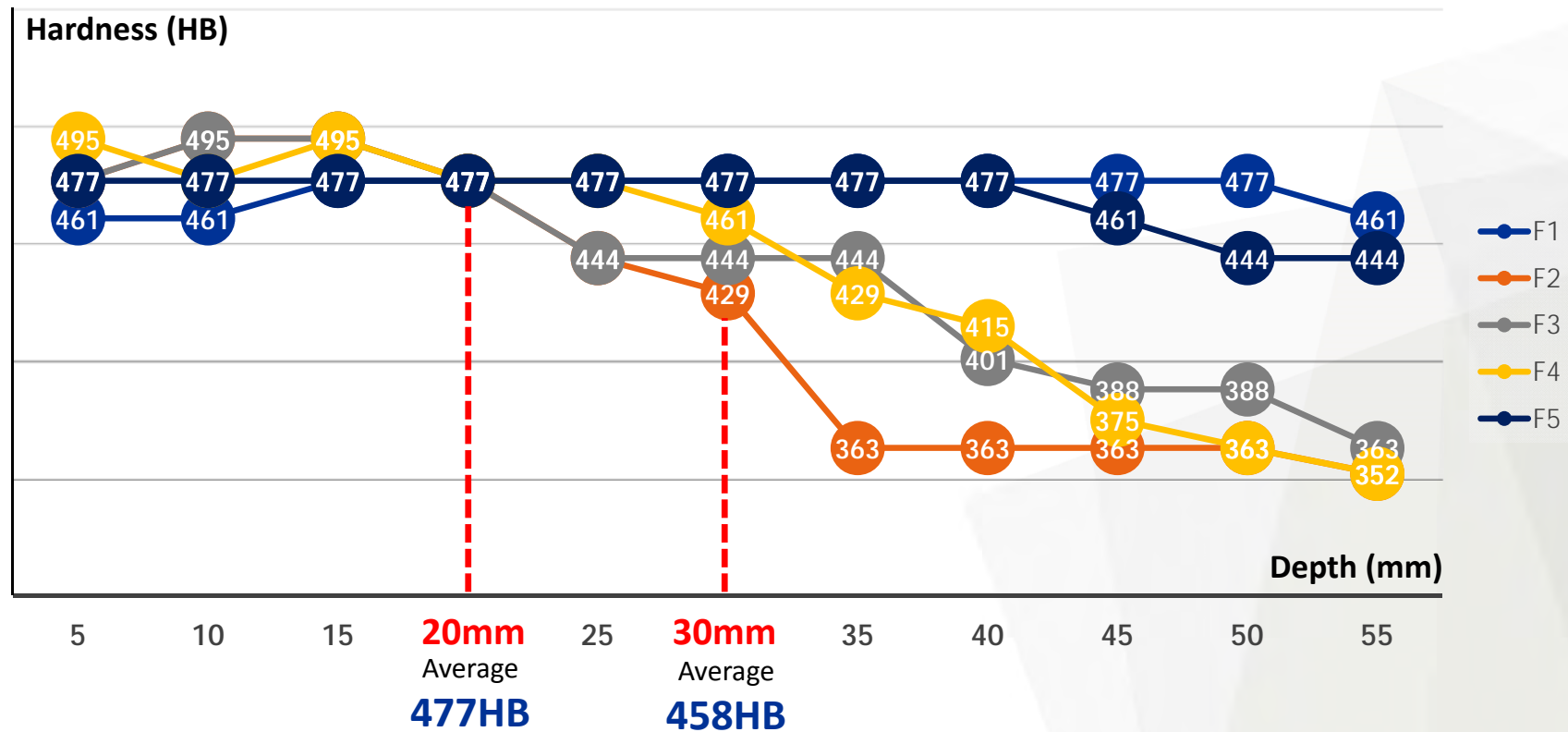
Ø680mm crane wheel

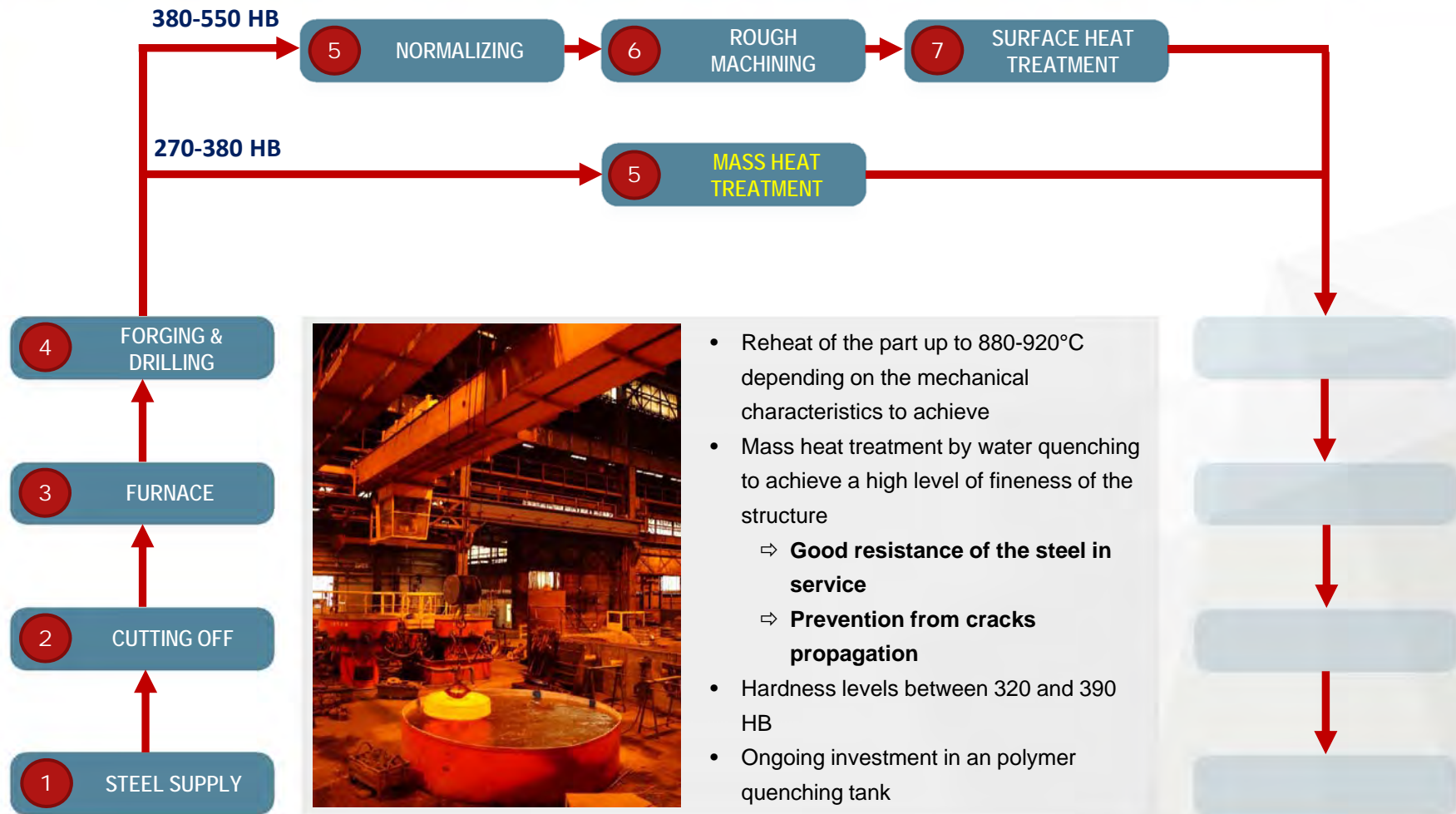
450-500 HB surface heat treatment test results



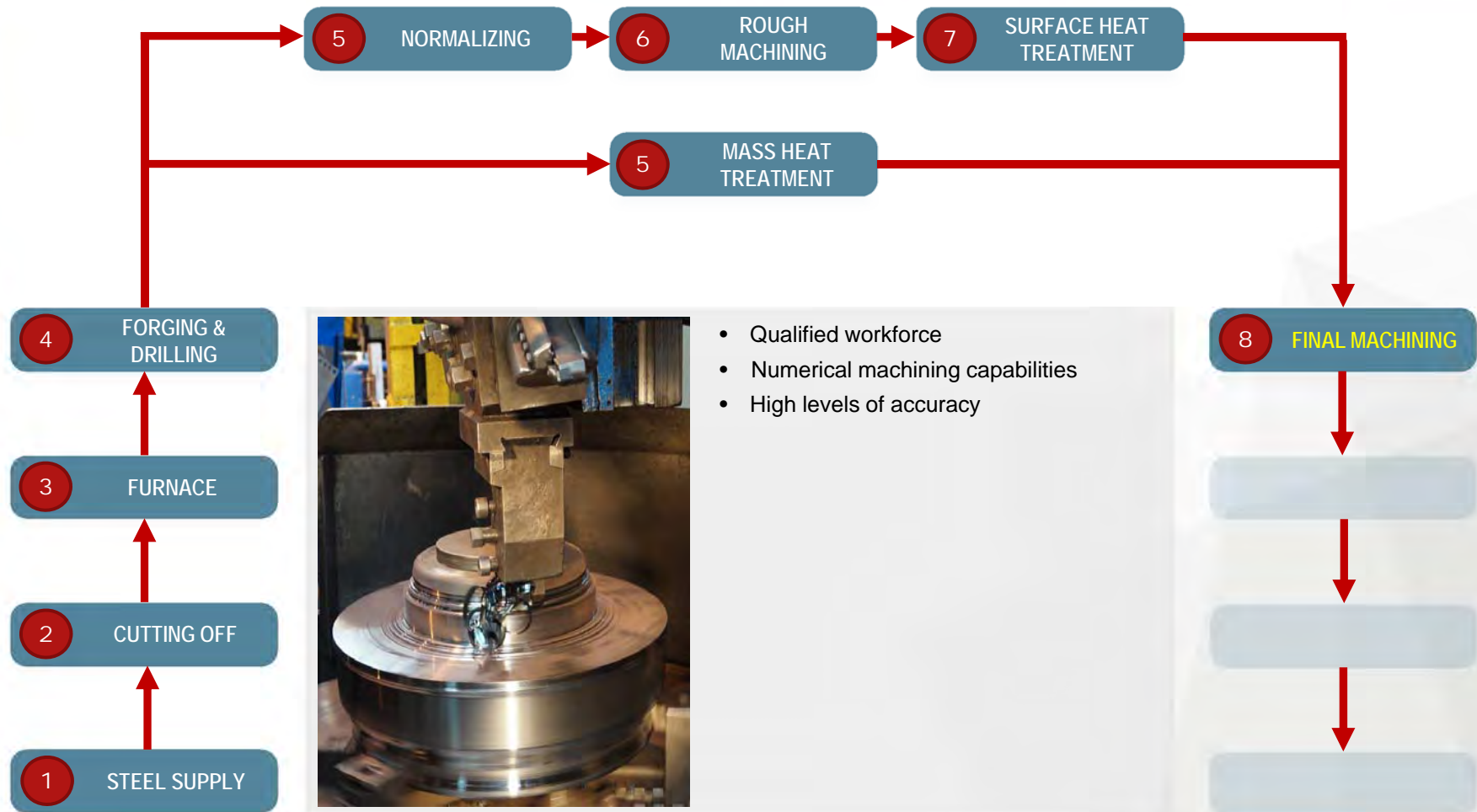
UNEQUALLED LIFETIME

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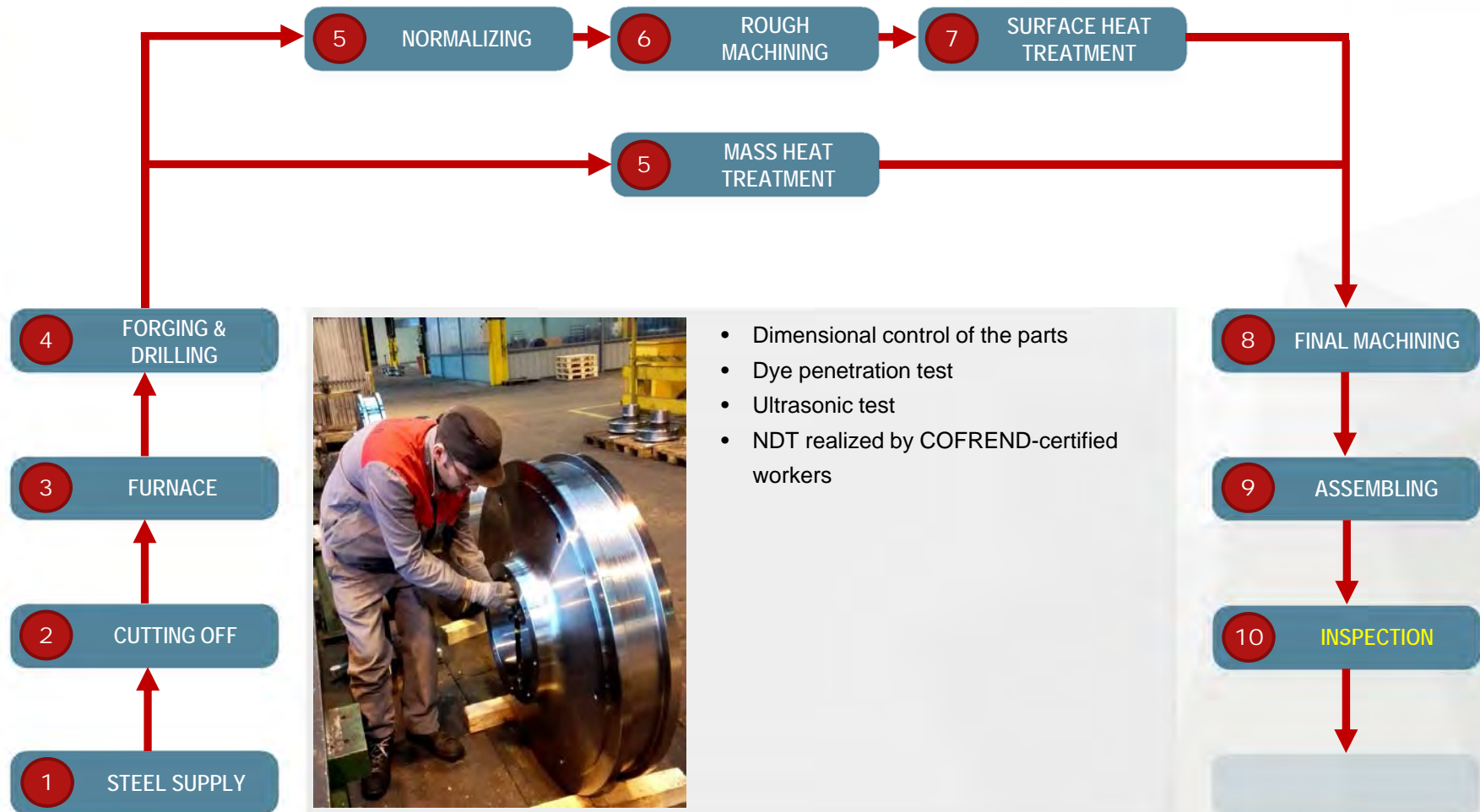
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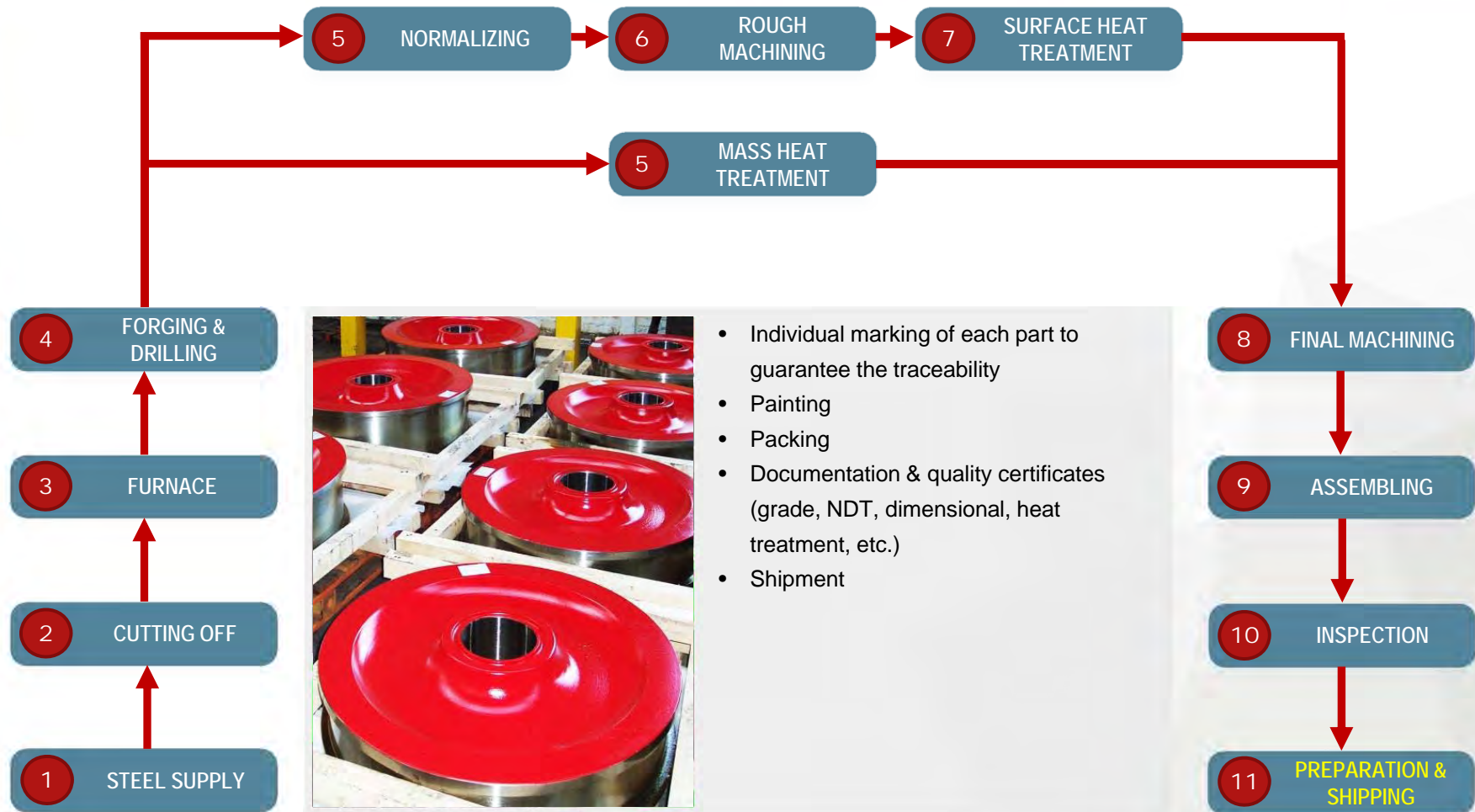
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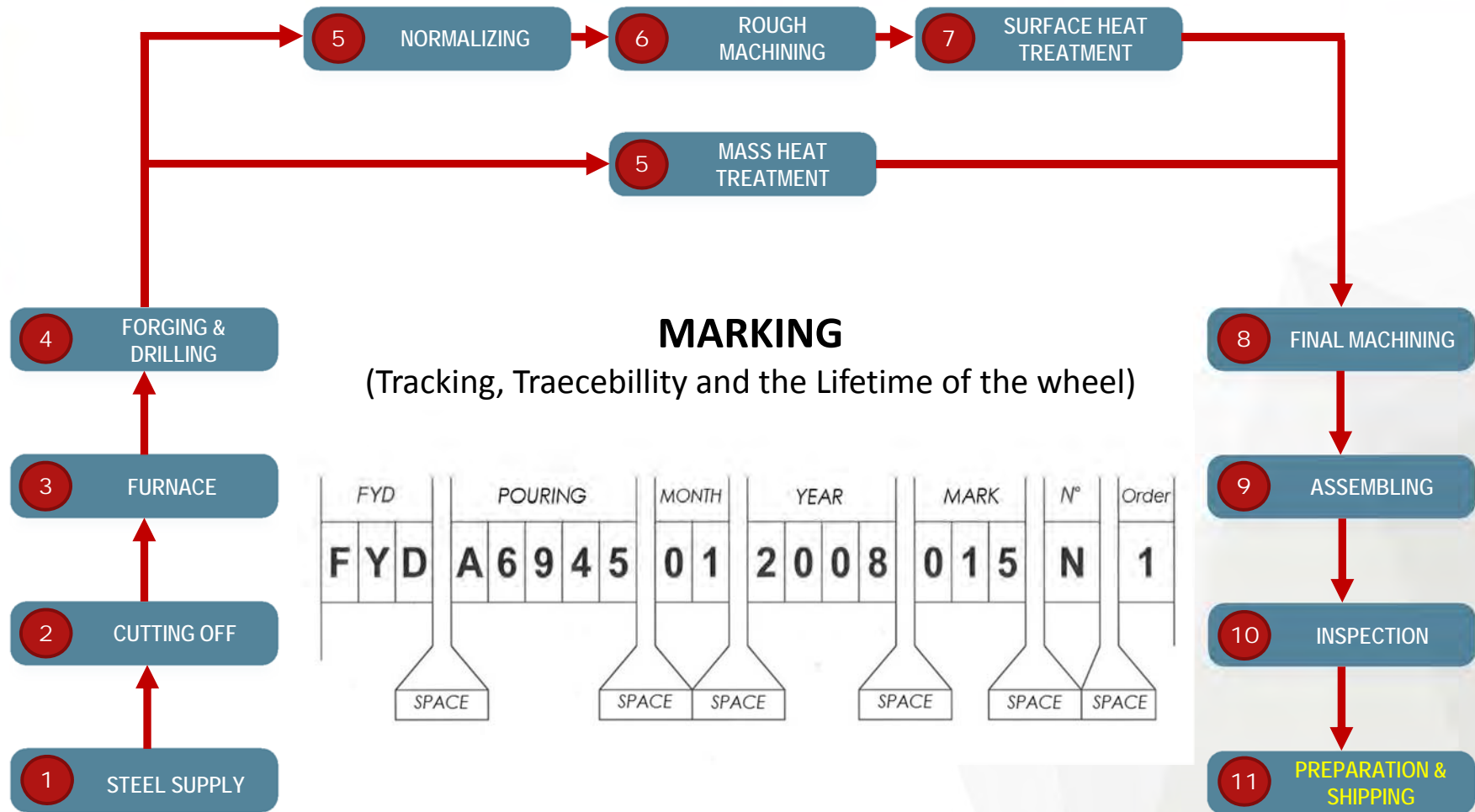


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- Dimensional control of the parts
- Dye penetration test
- Ultrasonic test
- NDT realized by COFREND-certified workers

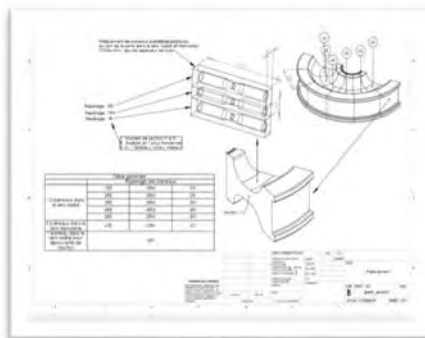




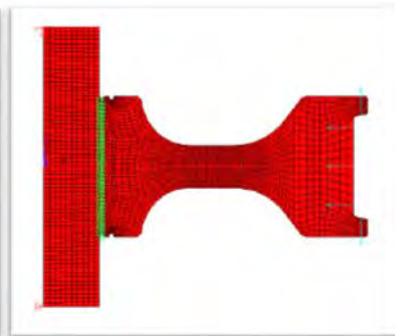
TEST & EXPERTISE CAPABILITIES

Mechanical contacts between crane rim & rail CEN/TS 13001-3-3

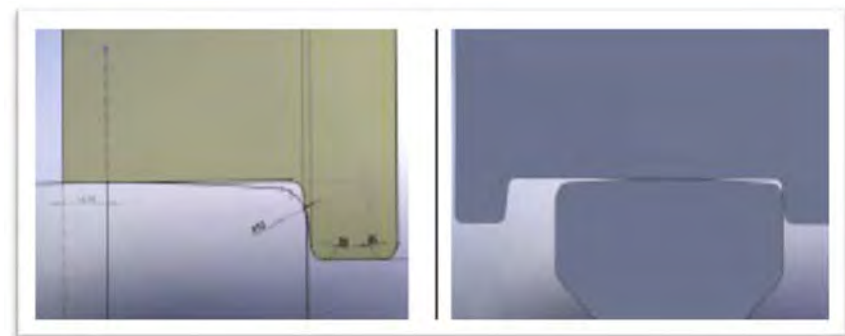
Finite element calculations (ANSYS, ABAQUS & MATLAB softwares)



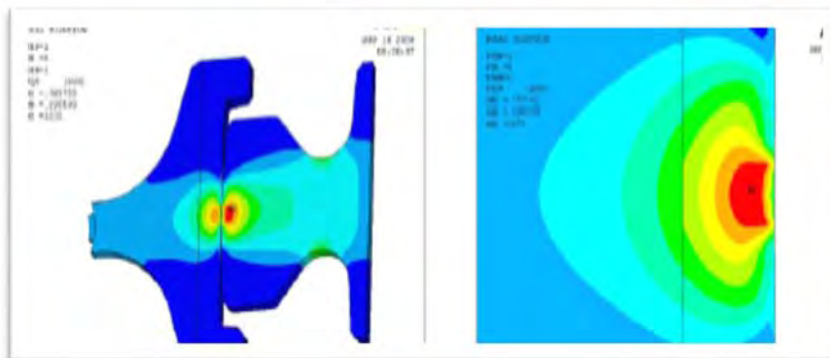
Material properties



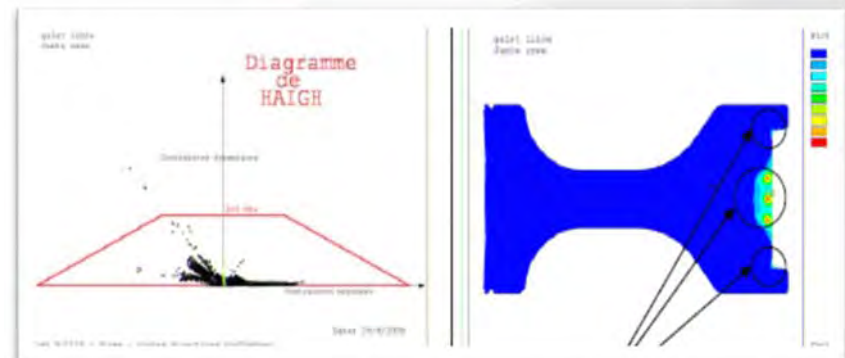
Crane wheel meshing & loading



Crane wheel/rail contact definition



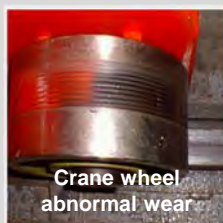
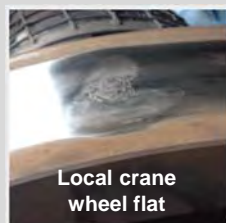
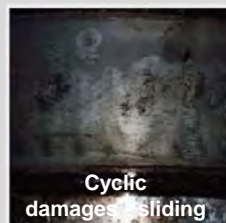
FEA contact calculation



Fatigue calculation

TEST & EXPERTISE CAPABILITIES

Defect examination



Root cause analysis



Samples surface preparation, Samples resin coating for examination, Micrographic examination (Picture analyzer: Cleanliness, Grain size, Microstructure), Optical microscopic examination

Recommendations

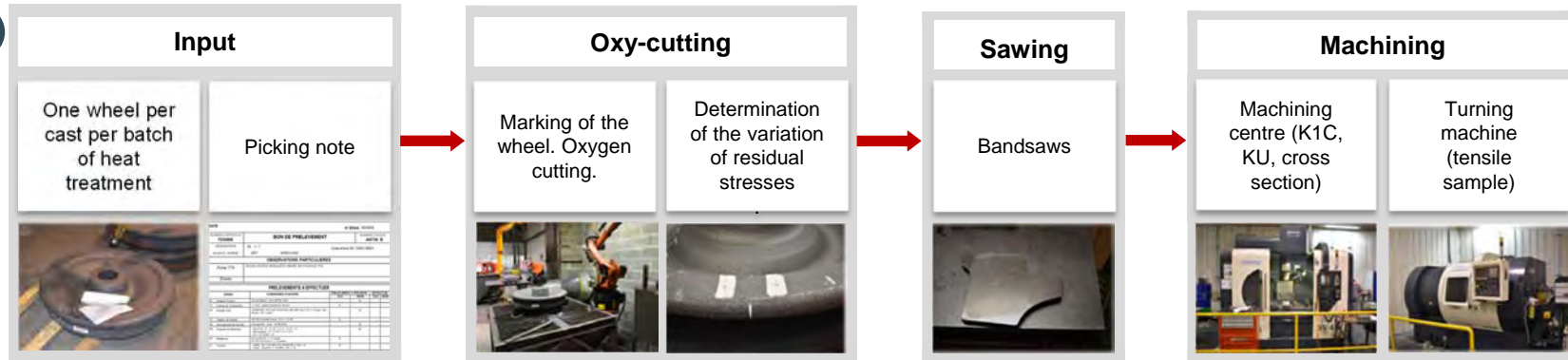
EXPERTISE E14513					
Document : E14513			Revision : 1		
TATA STEEL'S CRANE WHEEL DEFECTS ANALYSIS			Page : 1 / 37		
Date : JULY, 2014					
- VALDUNES PROPERTY - ALL RIGHTS RESERVED -					
<p align="center">EXPERTISE E14513</p> <p align="center">TATA STEEL'S CRANE WHEEL DEFECTS ANALYSIS</p>					
To : MM Gosselin, Digne, Mrs Feraut					
Copy : Mrs Foltz, M. Chatelet					
	Written by	Approval			
Service :	TEST CENTER	DDR			
Name :	LEFEBVRE A. HANNEZ A.	F. DEMILLY			
Visa					

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METALLURGICAL TEST CENTER

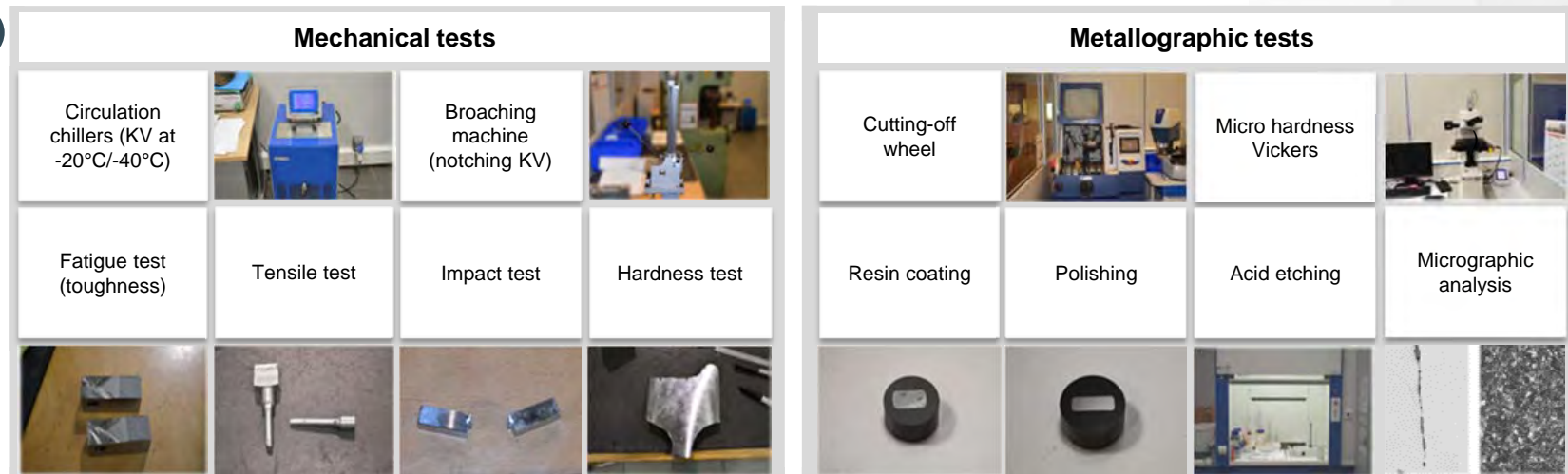
1

PREPARATION



2

TESTS



3

OUTPUT

FMC REFERENCES

STEEL INDUSTRY

Arcelor Mittal
Asco Industries
Riva Group
Saarstahl
Tata Steel
Valhourec
Constellium
Alteo
Industeel
Aperam
Thyssen
Luccini
Dillinger Hütte
...

CRANE BUILDERS

Danieli
ECL
Eiffage
Fayat Group
Taim-Weser
Konecranes
NFM Technologies
Reel
SMS Demag
Kranbau Köthen
Koch
Jaso
Konecranes
...

RAILWAY INDUSTRY

Faiveley
Knorr-Bremse
Poli
Qinetiq-UK
...

HARBOURS

Cargotec
Port de Dunkerque
Port du Havre
Ports autonomes
Rijkswaterstaat sea-lock

OTHERS

Karl georg
Alstef
CORDM
Poma
RBG
Groupe Fives Stein
ADF
Endel
Lafarge
Baudin Château Neuf
ISRO
STAHL Cranesystems
Seval
...

STEEL INDUSTRY



Handling crane

HARBOURS AND SEA-LOCKS



Harbour gantry crane wheels

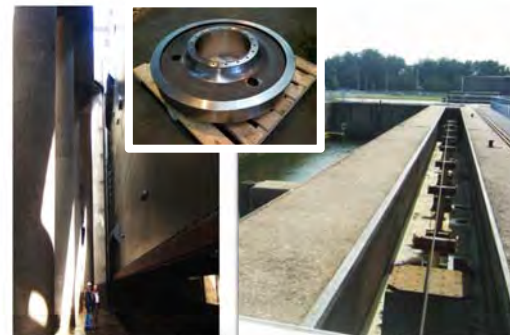
OTHERS



Wheels for stadium decks



Wheels Ø 1.200 mm on a drive axle
of a steel ladle transfer car



Wheels at a Sea-lock door in
The Netherlands



Rocket Launching Pad (Indian Space
& Research Organization)

BENEFITS FOR INDUSTRIAL CUSTOMERS

- ✓ Renowned trademark worldwide
- ✓ Long lifetime products for reduced Total Cost of Ownership (TCO)
- ✓ Reliable components to guarantee a high availability ratio
- ✓ Broad range of forged mechanical components for industrial applications
- ✓ From tailor-made to serial parts
- ✓ 'Can do' attitude to meet customers expectations
- ✓ Expertise and technical support capabilities



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THANK YOU FOR
YOUR ATTENTION
ANY QUESTIONS?

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