

Marichal Ketin Company presentation

Marichal Ketin

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General Information

- Since 1911
- Design, manufacturing and sales of rolling mill rolls for the hot rolling of flat products with a finished weight ranging from 4 to 40 tons
- Location : Liège (Sclessin)
- Turnover 2015/2016: 22,6 million EUR
- Employees : 120 (25 white collars, 95 blue collars)
- Production : 600 rolls/year with an average weight of 11 tons, total production capacity = 7,000 tons

Rolls grades

Indefinite Chill double Pour → HSM rear finishing stands, Plate Mills, Skin-Pass

- ICDP
- Enhanced ICDP (Venus)
- ICDP special Heat Treatment
- Graphitic High Speed Steel (PHENIX)

High chromium iron

- Comet 90 → front finishing stands / Skin-Pass
- Comet 70 → plate Mill work rolls, roughing work rolls rolls for checkered and tear plates

High Speed Steel (HSS) → HSM front finishing stands

- Kosmos
- Aurora I, II

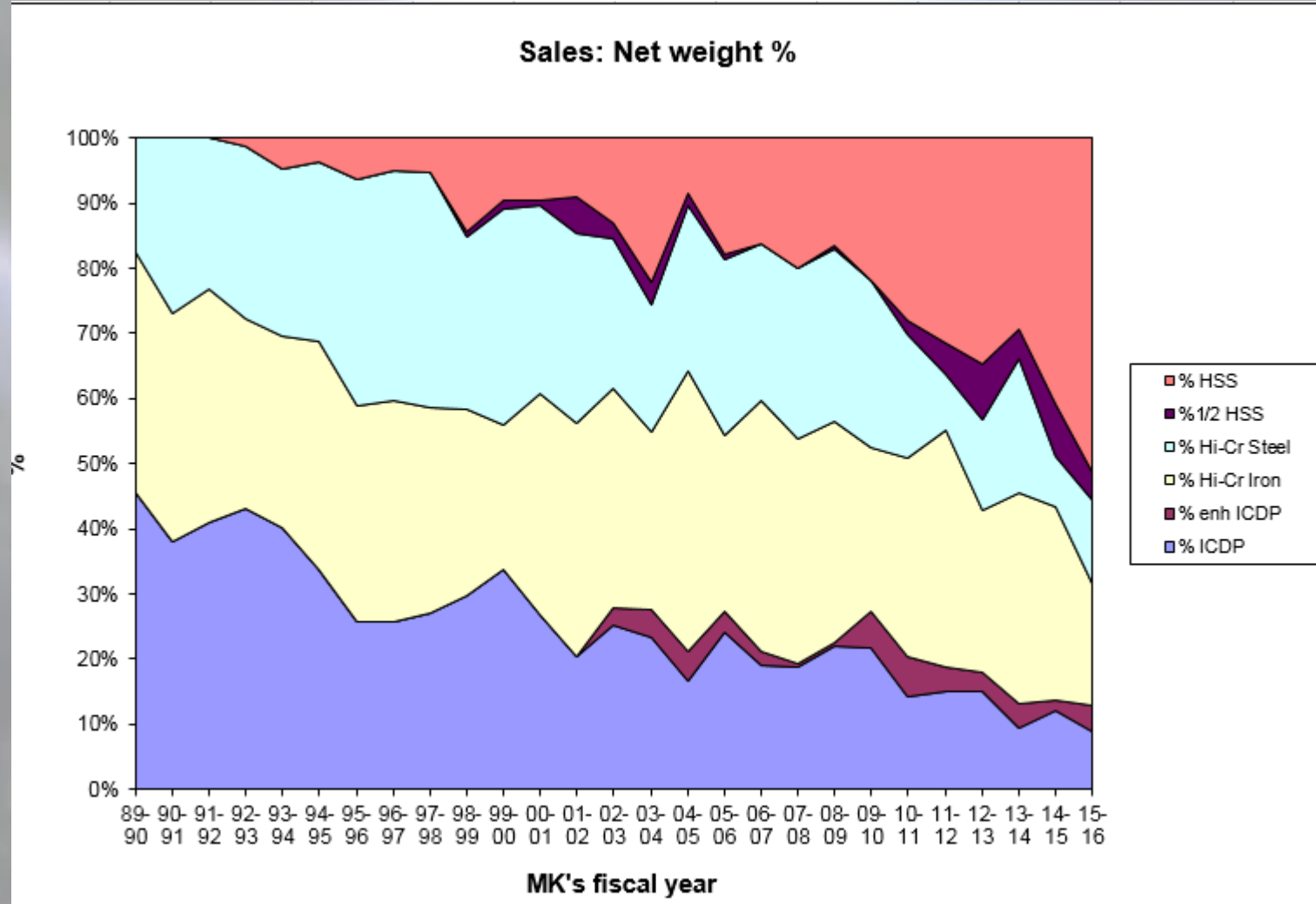
High chromium steel → HSM roughing mills

- Galaxy

Semi-HSS and HSS for HSM roughing stands

- Zarya
- Sirius

Product Mix 1990-2016



Manufacturing Process



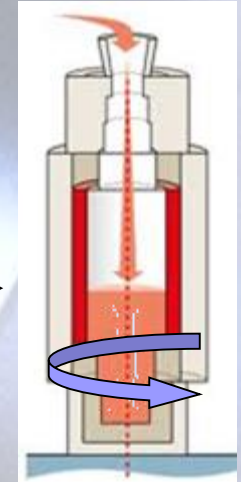
Raw materials



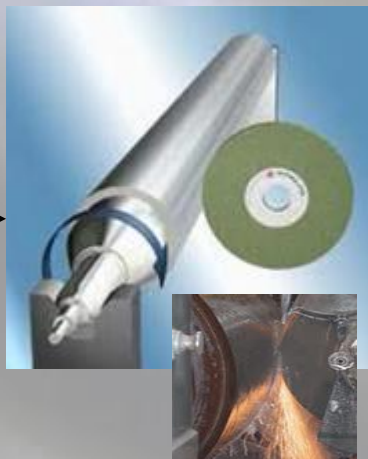
Induction furnaces



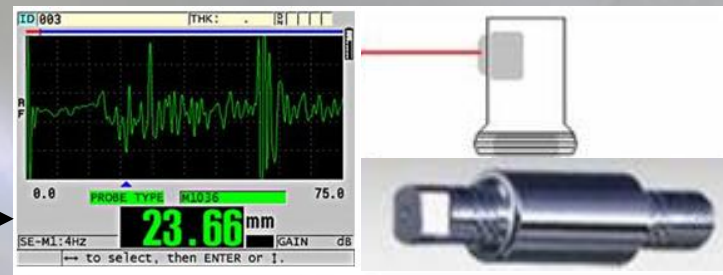
Metal casting inside if a vertical spinning machine



Heat treatment



Machining



Quality control and packaging



Melting Process

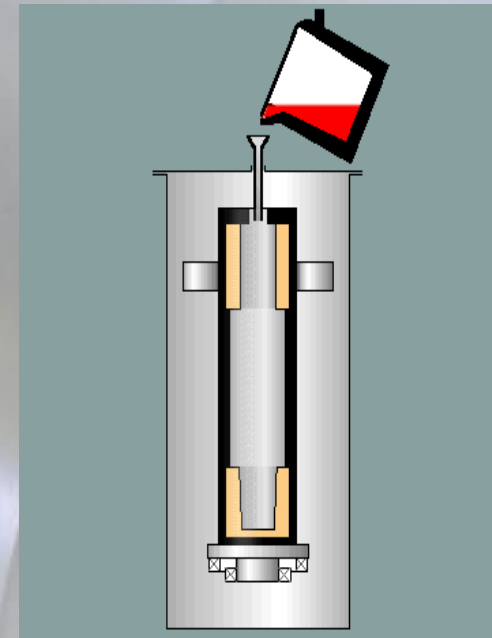


3 induction furnaces - 2 x 30 to , 1x 13 to

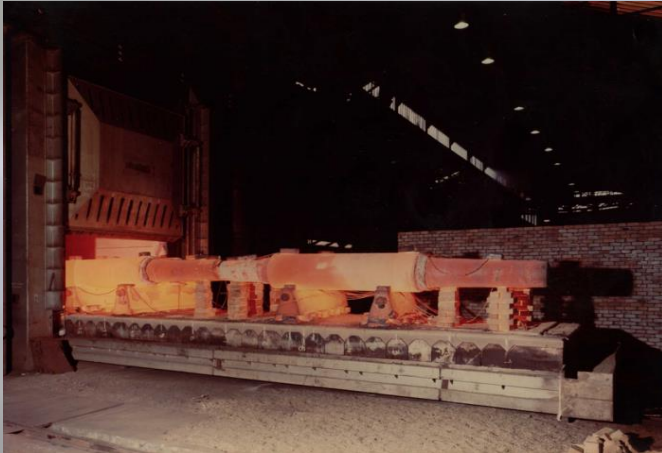
Vertical Spin casting process



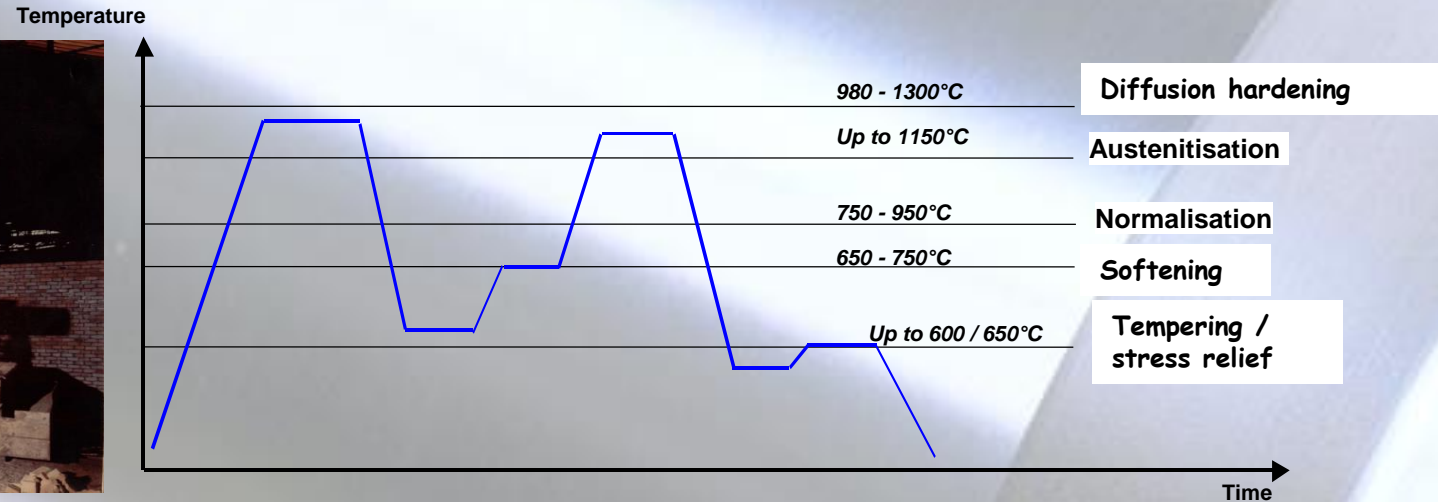
2 spin-casting machines
Up to 1350 mm finished
diameter



Heat treatment



8 heat treatment furnaces
total capacity: 750 tons



Main Objectives :

1. Obtain desired microstructure and aimed hardness with a residual austenite content of < 5%
2. Reduce the residual stresses to an acceptable non critical level

Final machining



Rough grinding



CNC finishing lathe



Final grinding



CNC Milling&Drilling Center

- 1 Waldrich rough grinder
- 2 Heyligenstaed CNC finishing lathes 16 & 40 T
- 2 Herkules rough machining lathes
- 2 Finish grinders Cincinnati & Waldrich
- 3 Milling machines Waldrich & Collet
- 1 CNC Milling&Drilling center Soraluze FP8000
- 2 Drilling machines
- 1 Vertical lathe Berthier

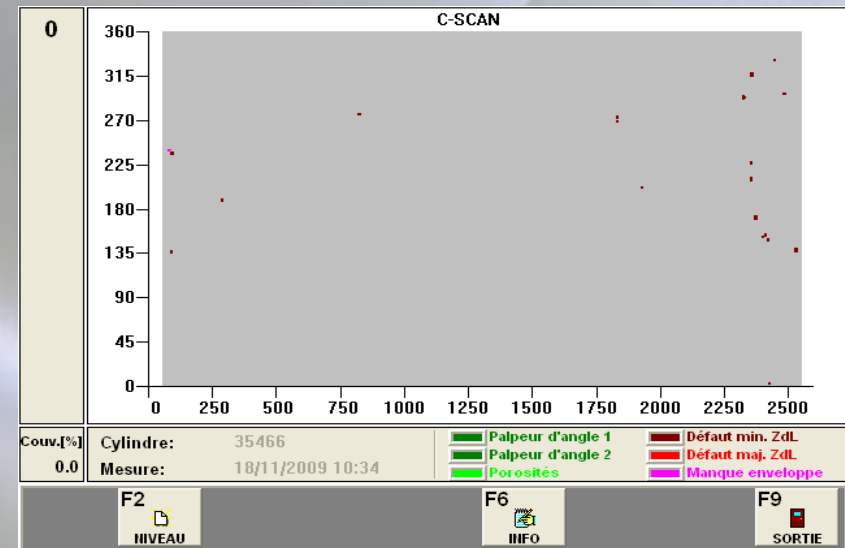
Ultrasonic Inspection

Purpose :

- Evaluation of the shell-core bonding conditions
- Evaluation of internal cracks within the shell
- Detection de porosities and inclusions in the shell
- Measurement of the usable shell thickness

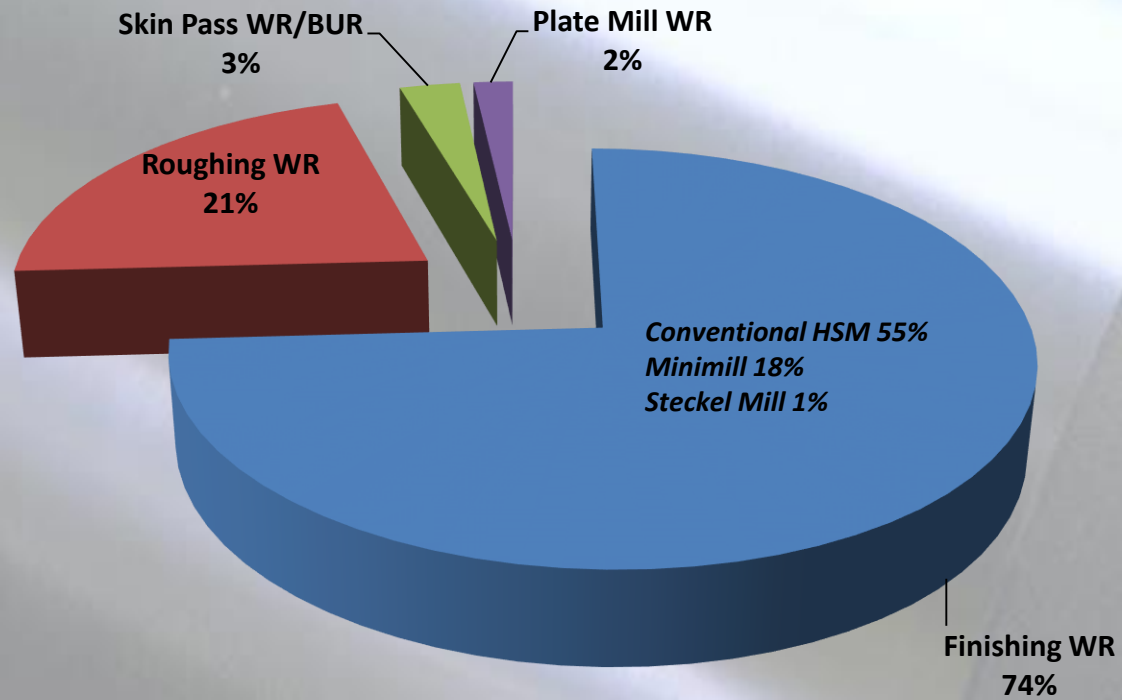


Manual inspection



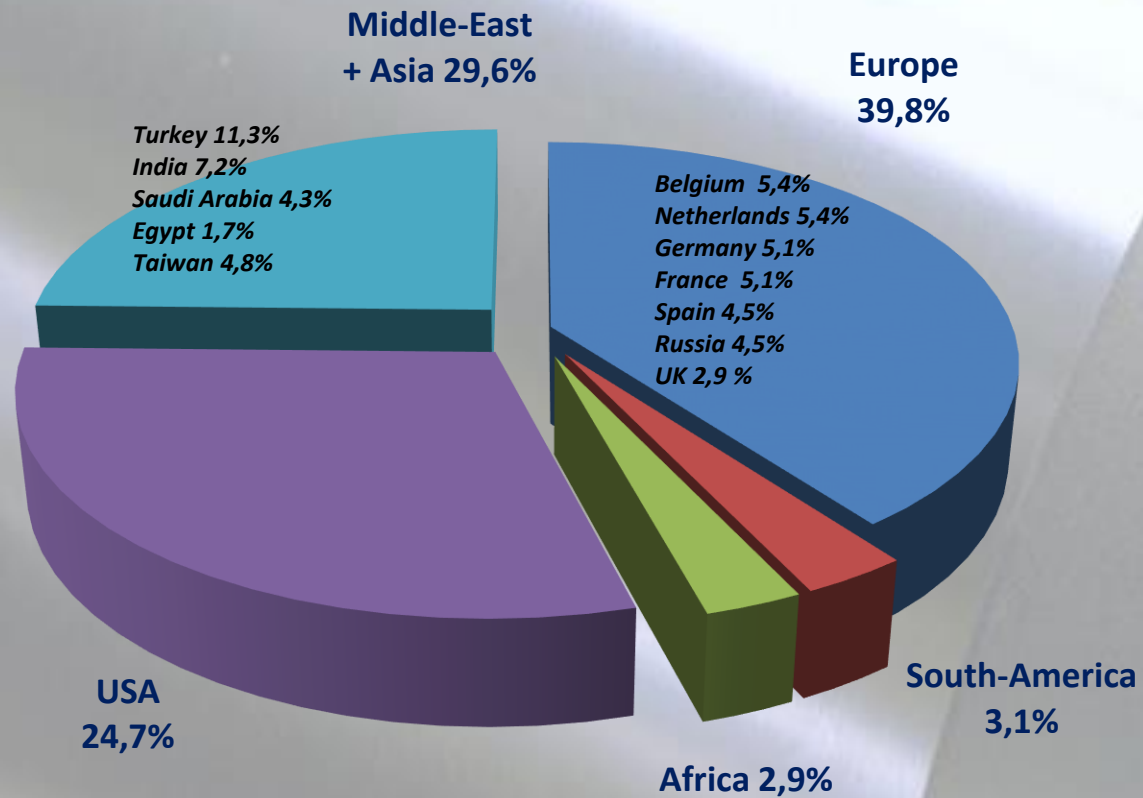
Lismar automatic inspection system

Markets 2015-2016



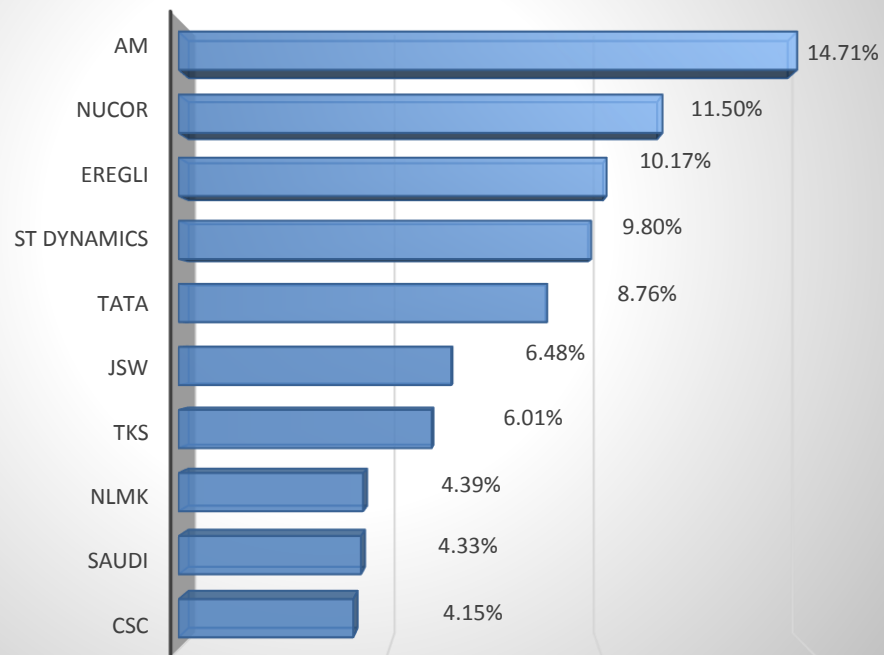
Markets

Sales 2015-2016 (turnover %)



Markets

Sales 2015-2016 - Top Ten Customers



Research & Development

- MK : development of new work roll materials
- CRM : subcontractor of MK for 50% of the R&D budget
- R&D expenses : approx. 3% of the turnover
- Walloon Region – financial support for R&D projects – duration : 3 years to 5 years max.
- Strong collaboration with local universities and research centers for R&D projects :
 - ULg
 - Umons
 - Sirris



R&D : History of main R&D projects

- 1981/1986 : IRSIA – High chromium iron (HCI)
- 1987/1991 : High chromium steel (HCS)
- 1992/1996 : High speed steel (HSS)
- 1997/ 1999 : HCI – cold rolling mills
- 2000/2002 : enhanced Indefinite Chill
- 2003/2005 : - Work roll degradation - Part I
 - influence of minor elements (HSS, enhanced ICDP)
- 2007/2009 : - Work roll degradation - Part II
 - Thixoforming of Steel (MK/CRM/ULG/CRIF/CRIBC)
- 2005/2009 : First DEI – « Cencylam » Modeling the vertical spin casting
- 2010/2012 : - Thixoforming of steel – Part II
 - New materials and casting techniques for HSM Work rolls
- 2012/2018 : - New cladding process for work roll manufacturing
- 2013/2015 : - New work roll grade for rear finishing stands, Graphitic HSS
- 2016-2018 : - New work roll grade for Roughing stands HSM, ½ HSS