

ADDING MORE VALUE

ISMR profiles MKM, a copper manufacturer in Germany, that continually seeks to add value for its customers.

Mansfelder Kupfer und Messing GmbH (Mansfeld Copper and Brass Ltd or MKM) is a leading European manufacturer of preliminary and semi-finished products of copper and copper alloys, based in Germany. In existence for over 100 years, MKM is well-known as a market leader in technology and service concepts. Its products, made in Germany, are exported throughout the world.

MKM provides an entire product range for copper: coils and sheet from 0.3 up to 6mm in thickness as well as plate of up to 350mm thickness. It also supplies wire, tube and bar as an 'all-in-one supplier' for copper and copper alloys. The company

is highly customer-oriented, continually seeking increased benefits for its customers.

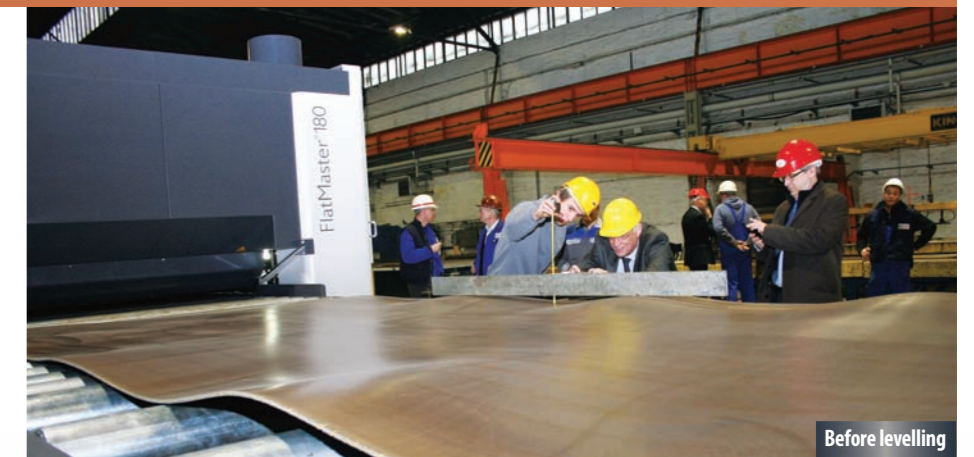
AN EYE ON INNOVATION

"In capital-intensive sectors such as the copper industry, technology and innovation represent a powerful lever on competitiveness. In contrast to advances achieved in production techniques, copper processing has hardly advanced at all for decades," MKM explained.

"Since its privatisation, MKM has focused consistently on modern, continuous-operation casting processes. We use a vertical continuous plant for casting bolts as a preliminary product for bar and tubing, and a horizontal wire-casting plant

ISMR SAYS

"MKM's procurement of a new leveler, the largest ever built by ARKU, has improved efficiency, saved time and increased quality"



Before levelling

for the manufacture of copper and copper-silver cast wire bars. As for copper strip, where there was no efficient technology available, this was developed by us."

The Conti-M plant, as part of the new strip rolling mill, covers the first part of the process chain, from cathode to milled hot strip. As the first high-performance plant with continuous cast-rolling technology for copper strip, it is a key innovation in copper-processing.

The manufacture of semi-finished metal in a single work cycle direct from the smelting plant is an old idea that has been intensively worked on since it first emerged back in the 19th century. This technology, which has meanwhile established itself for copper wire bars and for aluminium strip and zinc strip, and which is now beginning to be applied

– with difficulty – to steel, appeared to be at best a long-term target for copper strip. Until now, only hard-to-shape Cu alloys were processed as cast strip (horizontal continuous cast) with low levels of performance.

The Conti-M notably shortens the conventional manufacturing process. With the new technology developed by MKM, the metal for smelting, derived from cathodes or scrap, is transferred in a continuous process via a twin-belt casting machine in a solid state directly to a hot-rolling mill and is then all-round milled. The hot strip leaves the plant at a rate of 60 tonnes per hour in the form of 25-tonne coils with a width of 1,250mm.

So far, the Conti-M has produced only E-Cu copper strip. However, the plant has also been designed for the manufacture of SE-Cu, highly

purified OF-Cu and light alloys. Moreover, by varying the furnace technology, it will later also be possible to process alloys. The technological concept offers decisive advantages compared to conventional hot-strip manufacturing in terms of lower investment, lower energy consumption, lower emissions, lower space requirement, shorter material throughput times and consistent high quality

"The advantages of the Conti-M not only put us in a position to offer our customers better quality and greater delivery reliability, but also enable us to launch new products – such as rolled starter sheet metal for electrolysis," MKM explained. "Thanks to our modern cold-rolling mills, we can now offer cold-rolled strip at all conceivable process-stage variants, in addition to milled or non-milled hot strip." >>



After levelling

FOCUS ON COIL PROCESSING

» ROLLED STARTER SHEET

In the manufacture of copper cathodes, a starter sheet is needed. Traditionally, these were either manufactured by electrolysis from copper or steel starter sheet.

The cost basis of the Conti-M enables the economic use of rolled copper starter sheet, manufactured from cold-rolled strip in a special shaping plant. Thanks to its geometry, this enables a higher packing density and current density than electrolytic products created from copper starter sheet. In conventional electrolysis, without any further investment, capacity increases of 15 - 20 per cent can be targeted. Compared to other processes, MKM's technology with rolled starter sheet has the following advantages:

- no permanent starter sheet is needed
- the very smooth surface of the rolled starter sheet leads to higher technical purity of the cathodes
- longer cathode cycles lead to higher cathode weights and reduce crane cycles
- higher power utilisation.

Several mining concerns have successfully tested MKM's starter sheet. An electrolysis procedure has already been introduced.

NEW LEVELLER PROCUREMENT

During the last few years, MKM has invested a lot in new production equipment – the machine park boasts the latest equipment and plant. It has historically used straightening machines for coil as well as a few precision levellers.

FLATMASTER 180

- Hydraulic precision leveller for parts
- Roller diameter 180mm
- Maximum passage width 3000mm
- Hydraulic adjustment
- Automatically extendable levelling roller cassette especially important for sensitive materials and surfaces (regular cleaning prohibits imprints and scratches on the material surface)
- Total weight approx. 150 tons
- Levels sheet metal from 6 – 60mm in thickness
- Achieved flatness results 1mm/m
- Effective overload protection (especially important for thick material)
- Hydraulic levelling gap control for constant levelling results
- Especially designed for parts with big cross-sections (wide and thick).

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Copper sheet at MKM

"Our existing straighteners did not achieve the desired results in flatness and stress-release, especially for "thinner products" (up to 60mm thickness)," MKM told ISMR, explaining that it made a series of elaborate tests at ARKU's Levelling Centre (Baden-Baden, Germany) before deciding to purchase a FlatMaster 80 – a hydraulic precision leveller for sheets of up to 23mm in thickness.

"The engineers were very confident with the FlatMaster 80 – enquiring after a bigger leveller with a larger capacity," ARKU told ISMR. "We had never built such a huge precision leveller before so many tests were made on the biggest existing ARKU precision machine. The physical performance tests were successful and our engineers were able to form solid conclusions enabling us to build this machine."

However, the global economic crisis hit in 2008 and the project was postponed. MKM eventually placed the order in 2010, when the overall financial climate was still unpredictable, making the investment to differentiate itself from its competitors and add value for its customers.

"The project proceeded on a very good cooperative basis between our two companies, making joint collaborative decisions. The investment was made for an MKM division that was already performing well. The decision-makers wanted to improve their competitive position in the long-term and even gain market share," ARKU told ISMR.

The duration from order to delivery was less than 12 months (construction, production and installation of the machine). The machine was delivered and installed for production in December 2010.

"The effort for levelling was significantly reduced with our ARKU precision levellers e.g. we do not need to make stress-relieving cuts anymore. The process now is very simple and lean: singular levelling – sawing – selling," said Uwe Hirsemann, MKM business unit manager for sheet and plate. "With precision levelling, we receive nearly stress-free sheets; thus we now do not need heat

treatment for many products. The machine has fully met our expectations: a significantly quality improvement in flatness and surface finish."

"With the FlatMaster we can achieve best tolerances that we either could not reach before or only with huge efforts. As a result, we now get orders that we had lost before," concluded Stefan Quandt, MKM's marketing manager.

QUALITY FOCUS

At MKM, product quality is a top priority. The quality of the semi-finished copper has a direct influence on the productivity of further processing and the environmental compatibility of the end products.

"With the new, continuous-operation, high-performance plant, we have laid the basis for high, uniform product quality, since the new technologies employed are less susceptible to breakdown and work with highly developed control engineering and in-line testing techniques," said MKM.

"Our quality management system embraces all business processes from the customer enquiry to the finished product. Continuous improvements and regular training of employees are important elements of the system. Since 1993, we have been continuously certified for listing on Lloyd's Quality Assurance Register. Since 2002, we have been certified in accordance with DIN EN ISO 9001:2008.

"In addition to this, a series of product and material-specific licences have been obtained e.g. from Germanischer Lloyd, TÜV-Nord, Gütegemeinschaft Kupferrohr e.V., KIWA, AFNOR and SITAC." ■

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