



Twelve cranes and one material flow

**Demag cranes in Stahlo service
centre in Gera**



DEMAG



Steel and aluminium coils are automatically stored in an area measuring 5,000 m²

In Gera, Stahlo operates an unparalleled independent steel service centre where 400,000 tons of sheet steel can be processed on four production lines to meet the most demanding customer-specific quality requirements every year. The material flow in the coil store is served by two fully automated Demag process cranes; another ten Demag cranes are installed in the five bays where strips are split and shaped blanks are cut on large presses. The material flow is controlled by the Demag WMS warehouse management system.

THE CUSTOMER

Stahlo Stahlservice GmbH & Co. KG is one of the most advanced and largest independent steel service centres in Germany. The offering of the company, which belongs to the Friedhelm Loh Group, includes a complete range of products and services for all important materials in the thin sheet market. At its locations in Dillenburg, Gera and Nordhausen, Stahlo produces split coil, cut-to-size and standard sheets, blanks and contoured blanks in all common grades – up to high and ultra-high-strength – to meet specific customer needs. The location in Gera is also home to one of Europe's largest blanking lines.

More than 1,600 tons of customer-specific slit coil, contoured blanks and cut blanks made from sheet steel and sheet aluminium can be shipped from the steel service centre operated by Stahlo in Gera every day. Stahlo has been operating at this location for many years and has been so successful, that the annual capacity was increased to some 400,000 tons in a new building. One of the reasons for this are major orders placed by car makers and their suppliers.

For example, Stahlo produces the metal blanks for side panels, roofs and boot lids for an OEM in Wolfsburg and Zwickau according to the demanding quality requirements for car exterior body parts. The new, highly advanced machinery can also be used to process ultra-high-strength steel grades, which are seeing very high demand particularly due to electromobility.

THE TASK

Doubling capacities – and a new material flow concept

When six new workshops were built covering an area of 22,000 m², Stahlo added a central coil store at the end of the production bays covering an area of more than 5,000 m². The entire material flow was completely reorganised – Stahlo refurbished and relocated existing facilities and also invested in new processing equipment. For example, this included a further slitting line which can process ultra-high-strength grades up to 1,900 MPa and a blanking line with a press force of 800 tons. Stahlo now has two redundant facilities, since besides a large slitting line, one of Europe's largest blanking lines was already installed in Gera.

To double the capacity, the material flow needed to be restructured. For this reason, new crane systems were installed in all workshops – twelve in total.

THE SOLUTION

Coil store: automated and space-saving handling

The material flow in the extended steel service centre begins in the largest, newly built workshop. The coils, which have a maximum weight of 40 tons, are largely delivered by rail and on trucks. One of the two open-winch process cranes first places the coil on one of three powered roller tables. At this point, the packing is removed, a goods-in check is performed and the data are added to the Demag warehouse management system (WMS).

While unloading is performed under manual control, the cranes switch to automatic mode to serve the store, which covers an area of 129 metres in length (crane runway) and 41 metres wide and can accommodate 2,600 coils.

Steel and aluminium: handling coils with one crane

The automatic cranes handle the steel coils by magnet and the aluminium coils with grippers. Handling by magnet offers the advantage that the coils can be stacked with smaller spaces left between them – 400 mm instead of 800 mm – because no clearance is needed at the sides for the coil tongs. This increases the filling capacity accordingly. To accomplish this, the cranes need to change their load handling attachments via a permanently reeved spreader. Besides storing the coils, the two automatic cranes can also retrieve the coils at the transfer points for the five workshops, which are arranged at right angles to the central store. These cranes are rated for handling almost 19 coils per hour. This also includes re-storage of residual coils from processing.

Sophisticated cranes for complex tasks

The five workshops where the coils are processed to become precision semi-finished products were also equipped with new Demag cranes, which were each adapted to the very different (processing) tasks, such as slitting and pressing operations.

Workshops 5 and 6, where the blanking lines are also located, are served by process cranes that each have a load capacity of 20 tons and are equipped with calibrated weighing equipment. They are not only used for handling the coils, but also for swapping and positioning heavy press tools.

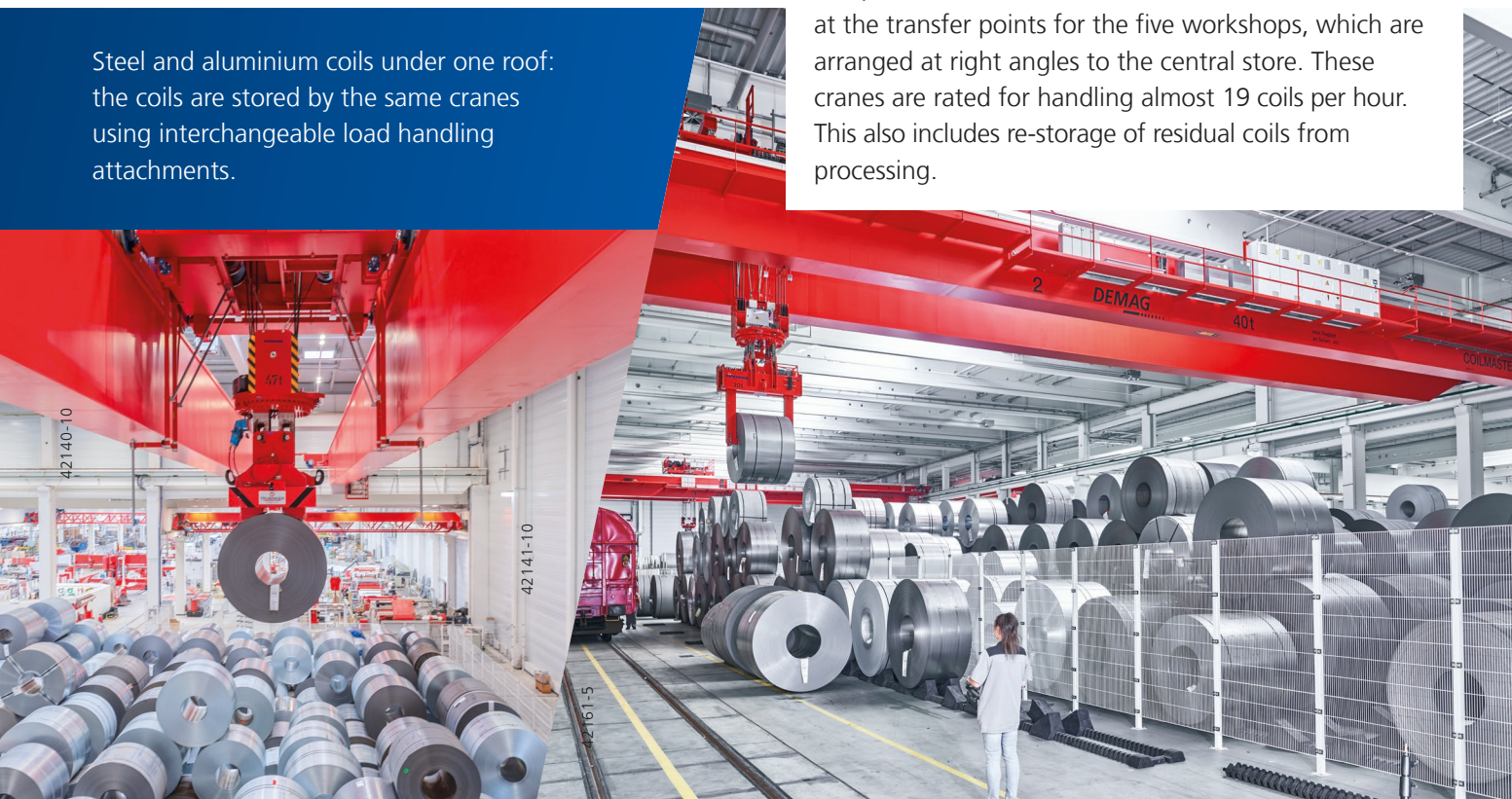
Special functions: pre-positioning, smart tandem mode and turning loads

These cranes are equipped with a positioning control system, which enables specified positions to be approached. Laser-assisted positioning systems are required to accomplish this. With a high level of precision, they monitor the position of or distance between the cranes on the crane runway, which is approximately 175 metres long in workshop 5.

Another (special) function needed for the often large sheets of steel is provided by smart tandem mode, which enables two cranes to operate as a team for the synchronised handling of bulky or very heavy loads. The Demag smart SafeControl system enables the crane operator to select between single and smart tandem operating modes for the cranes quickly and reliably at the press of a button or via selector switch on the radio control. In tandem mode, the control system calculates the relevant load spectrums and, therefore, not only ensures convenient operation, but also a high level of safety in every load situation.

In addition, the cranes in workshops 5 and 6 are mechanically designed and equipped with controls for turning loads by up to 180°. At the same time, Demag SafeControl provides safety-oriented monitoring of the complex interplay between the long and cross-travel units and the lifting motion. If any irregularities or an overload occur, it issues a warning signal or stops the motion sequences and thus prevents dangerous operating situations.

Steel and aluminium coils under one roof:
the coils are stored by the same cranes
using interchangeable load handling
attachments.



TURNING LOADS

- Loads weighing up to 50 t can be turned
- Loads can be turned by up to 180 degrees
- Safe and reliable monitoring of the turning process by rope angle sensors
- Safe and reliable cut-off of lifting and travel motions if the maximum permissible rope angles are exceeded
- Demanding requirements for safe control systems according to standard EN ISO 13849-1 are fulfilled
- Two-channel rope angle sensors prevent crane operating errors as required by safety category 3 of the Machinery Directive
- Performance level d for lifting & lowering and Performance Level c for all travel motions



Six Demag V-type cranes transport the coils and sheets for further processing in the 175 m-long workshops.

“Working cranes” with V-type girder design in three workshops

In three of the six workshops, the coils are “only” slit on highly advanced lines. This is where coils and rings need to be handled. This task is performed by six V-type cranes, which each have a 16 t load capacity and a span of 20.5 m. The profile design enables the cranes to achieve high load capacities for a low deadweight and, in addition, reduced oscillation characteristics. This accelerates the material flow when handling the coils and sheets and improves safety for the operators.

One of the V-type cranes features a special design with double girders and an outside-running chain hoist to reach loads weighing up to 5 t with a minimum approach dimension.

THE WAREHOUSE MANAGEMENT SYSTEM

Everything from a single source – including WMS

Project management expertise, project planning and delivery of an integrated solution from a single source were only some of the reasons why Stahlo opted for Demag cranes. This applies not only to the crane “hardware” and the automated control system especially on the process cranes. In particular, it also applies to the Demag warehouse management system (WMS). It is part of the order package and – together with the ERP system at the location – coordinates control of the entire material flow in the steel service centre.

Demag configures this warehouse management system for individual requirements in each application and designed it to meet the specific requirements of high-availability crane handling. In the Stahlo store, the Demag WMS automatically adapts the width-dependent storage grid to match the given inventory, among other

factors, thus ensuring optimum use of the available space. The Demag WMS initiates every handling movement by the cranes and, as soon as it is completed, reports it to the Stahlo ERP system. Customer-specific storage strategies, such as storage by specific types and size-dependent stacks of steel coils, have been implemented to increase the storage density. This paves the way for automated material handling and an end-to-end flow of information.



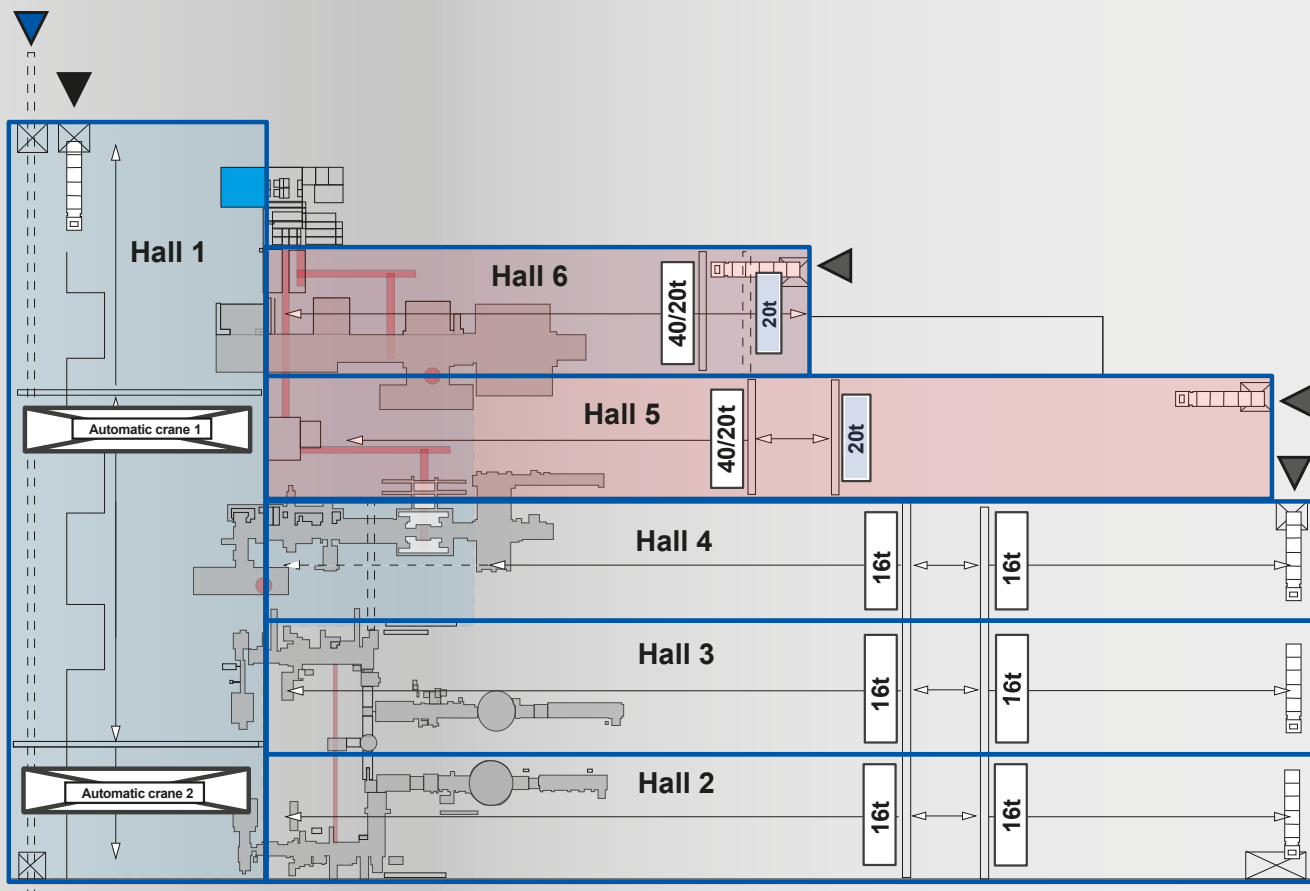
OLIVER SONST CEO Stahlo International:

“It is impressive to see how precisely the 40 ton coils can be automatically moved through the workshops with apparently no effort.”

KAY-UWE STRÜMPF Factory manager:

“Optimum process times in the material flow and smart automated relocation in the store according to priority and material type have enabled us to make enormous steps forward here at Stahlo in Gera”.





HALL OVER VIEW PLANT GERA

AUTOMATED COIL WAREHOUSE

Hall 1: 2 x ZKKW

Net storage area: 2,900 m²
 Storage capacity: 35,000 m²
 Length of crane runway: 126 m
 Load capacity: 40 t
 Track gauge: 41.10 m

► **Truck delivery**

► **Delivery by rail**

► **Pick up truck**

SLITTING LINES

Hall 2: 2 x ZVKE

Load capacity: 16 t
 Gauge centre dimension: 20.26 m
 Positioning control with calibratable weighing technology, HSL 175 m
 Reserve sender

Hall 3: 2 x ZVKE

Load capacity: 16 t
 Track gauge: 20.16 m
 Positioning control with calibratable weighing technology, HSL 175 m

Hall 4: 2 x ZVKE

Load capacity: 16 t
 Track gauge: 20.16 m
 Positioning control, HSL 140 m

BLANKING MACHINES / PRESS

Hall 5: 2 x ZKKE

Load capacity: 20t + 20 t / 40 t
 Track gauge: 20.1m
 Positioning control (path measurement), HSL 161 m with reserve transmitter

Hall 6: 2 x ZKKE

Load capacity: 20t + 20 t / 40 t
 Track gauge: 20 m
 Positioning control (path measurement), HSL 91 m with crane scale

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