

Automated material handling in the steel processing sector

Efficient system solutions for steel handling

Challenges for computer-controlled handling in coil stores

Continuous improvement of the quality of its products and products is the most important corporate goal for the cold-rolled strip manufacturer Bilstein. As part of this approach, great emphasis has been placed on the storage process. Coils weighing up to a maximum of 28 t with a total annual volume of up to 500,000 t were to be moved in a storage bay measuring approx. 2,400 m² in size. To achieve this, the material had to be stored, moved and retrieved as gently as possible. An increase in storage capacity by means of optimised utilisation of space was a further goal. At the same time, any personnel capacities that became available as a result of the changes were to be used for further expansion of the company. In addition, permanent availability of the cranes used in the storage operation was expected in order to store the approx. 2,300 tonnes of steel that arrive on three trains every day and to supply it to the production line. The latter part of the operation had to pay special consideration to the fast cycle times, which require a coil to be fed to the splitting machine every six minutes.

Overview of requirements

- Careful handling of the material to improve quality in the material transport operation
- Automatic transport and storage of the hot strip coils
- Optimum utilisation of space to reduce costs thanks to shorter travel paths
- Continuous availability of the systems 24 hours per day, 6 days per week
- Scheduled supply of the splitting machine in 6-minute cycles



Bilstein Group, Germany

Automated logistics in the steel coil store of a cold-rolled strip manufacturer



The Bilstein company, the headquarters of the Bilstein Group, has been meeting the challenges of the steel processing sector since 1911 and manufactures cold-rolled strip for stamped, bending and deep-drawn parts. It offers the material in standard and modified grades, which is also facilitated by clearly defined processes and the use of state-of-the-art measuring and control devices in the facilities. They make it possible to manufacture products to reproducible specifications with the tightest tolerances.

Customers, particularly suppliers to the automotive industry, in Germany and abroad rely on the high quality grades of steel from Hagen. With more than 550 employees, Bilstein processes approximately 400,000 tonnes of steel which is shipped every year. This can only be achieved by means of automated processes in many areas, however, particularly also in the coil stores.

To enable only first-class products to be supplied, demanding quality standards are also applied in the storage processes, which can only be achieved by automatic system solutions.

COILMASTER

DEMAG 28t

3993

Demag Coilmaster automatic double-girder open winch crane



38263-6

Automated processes with the Coilmaster

The Coilmaster automatic double-girder overhead travelling crane used in the facility travels on a runway measuring 130 metres in length. With a span of 27,300 mm, the crane has the capacity to lift hot strip coils with a maximum outside diameter of 1,950 mm and loads weighing up to 28 tonnes. The order data and specifications of the incoming steel are already stored in the IT systems when the product arrives. The coil grab (optionally also C-hook) is designed in such a way that it can handle any coil safely and reliably, despite differences in the coil formation as well as in the size or shape of the coil eye.

When the rail cars are (manually) unloaded, the barcode labels are scanned and then subjected to a plausibility check by the IT system

(storage manager system) with reference to their weight, diameter and width dimensions. The storage manager system then assigns a ring number as a unique identifier for the coil and tracks it fully automatically throughout the entire coil store. The storage position is automatically selected and its co-ordinates are communicated to the crane controls. When the coil has been automatically deposited, the crane reports completion of the mission to the storagemanager system. To serve the production line in the same way, the coils are fully automatically retrieved for timely delivery to the splitting machine when an order has been manually acknowledged.

The heart of the transport facility is the storage manager system – a warehouse management software

package with an integrated visualisation system. This software package interfaces with the host computer, two production terminals, the crane control system, the scanner station and a mobile barcode scanner.

Storage manager system benefits

- Rapid and paperless recording of incoming goods
- Labelling of the material
- Immediate overview of inventories and availability
- Dedicated and rapid detection of coils during the storage and retrieval operations
- Increased storage capacity by means of automatic storage location allocation
- Handling which is kind to the material by means of optimum storage location selection
- Improved workplace safety as a result of labour-saving methods



Improved utilisation of space and rapid access

The software is used to generate relocation operations in phases of low utilisation – also to prepare for retrieval operations on the following day. The crane travel paths and the time required to retrieve material are significantly reduced (by up to 25%) in this way. To meet safety requirements, the larger and heavier items are also moved to the lower levels. Elimination of the walkways and aisles also provides higher storage capacity.

Precise incoming and outgoing material checks

Coils arriving in the store are scanned and measured, and then automatically provided with a label and ring number. This procedure makes it possible to check exactly which items enter and leave the store, which in turn facilitates continuous inventory monitoring of the stock. The computer system specifies the exact storage location allocated for each coil to the operator. The storage data (incl. the position, storage time and ring number) acknowledged by the system is available in production. This ensures that precise inventory information is available at any time and that specific items are delivered.

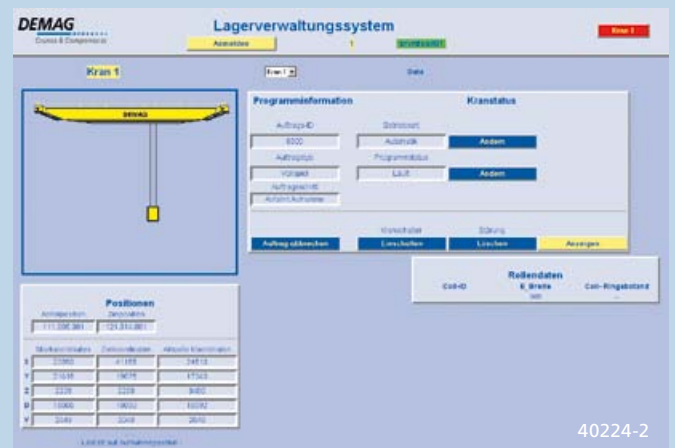


Store utilisation at a glance

The current utilisation of the coil lines is shown in the form of a graphic display. This arrangement provides dynamic visualisation of the position of the crane and the storage and retrieval points. The operator is shown both storage and retrieval operations at the terminal, whereby the storage manager system can also dynamically include his position in the display. The store layout shown on the display, which includes the railway tracks, the store area and the retrieval area, also enables the operator to maintain an overview of the entire storage facility from the terminal.

Rapid information and intervention

Simple data entry screens make it possible for the operator to call up information via terminals quickly and easily and to forward it to the storage manager system. The movements of individual coils can be tracked back over a period of several months. Monitoring of the automated process also incorporates continuous tracking of the crane operating status. This includes the crane diagnostic system, switch-over between operating modes (automatic/manual) as well as stopping and continuing an order.



Technical data

Crane

- Coilmaster double-girder open winch crane
- 28 t x 27.3 m
- Crab type: open winch crab
- Hoist speed: 0-15 m/min
- Cross-travel speed: 0-60 m/min
- Long-travel speed: 0-100 m/min
- Load handling attachment: coil grab; C-hook

Control

- Automatic mode
- Manual operation: radio control

Storage manager system

- Warehouse management computer with peripherals
- 2 production terminals
- Visualisation system

Safety system

- Fencing with 4 protected access points
- Retrieval zone with light-beam curtain

Further reference installations



Goods being loaded and unloaded on ships, rail and trucks at ILL in Linz, Austria



Coil handling and processing at Welser in Ybbsitz, Austria



Automatic handling of aluminium coils at Pechiney Rhenalu in Rugles, France



Just-in-time delivery to an automotive plant by Panopa in Wolfsburg, Germany

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