



## Three-dimensional Store Visualisation – Exact to the Inch

### The Challenge

Headquartered in Hagen, Westphalia, Hoesch Hohenlimburg GmbH specialises in hot-rolled steel strip. Here, “Hohenlimburg medium strip” is manufactured from slabs by hot rolling in widths up to 685 mm and thicknesses of 1.5 to 16 mm. The heavy steel slabs delivered to Hagen are stored temporarily side by side and on top of each other and all need to be identified without error in order to avoid confusion when picking them up with a crane, for example.

### The Solution

A state-of-the-art inventory management system has the function of identifying the slabs individually on delivery, of assigning optimal store positions and of coordinating the subsequent processing sequence efficiently. To effect this, Local Positioning Radar (LPR) units mounted on the crane trolleys record every single movement of the trolleys and so enable consistent identification of all moved objects in store. The movement profiles are then combined with data obtained by laser surface scanning the slab piles and with existing information taken from a data base system.

### The project's success

The inventory management system now has position data of every single stored object down to an accuracy of  $\pm 50$  mm available. This allows three-dimensional store visualisation that can be used for coordination of logistics as well as for intuitive instructions for the crane operator generated by the system. There is virtually no risk of confusing slabs anymore and at the same time, the store turnover was increased by 20 percent.

## A modern inventory management system for integrated processes

The inventory management system (IMS) implemented by 3tn Industriesoftware at Hoesch Hohenlimburg records the varying slabs as soon as they are delivered by road or rail and optimises the unloading process. The IMS identifies the optimal storage position and supplies the crane operator with detailed instructions on his display including a 3D view of the storing operation. Based on the scheduled furnace operating sequence, the IMS calculates the time needed to clear the required slabs for access first and then supply them to the furnace roller conveyors in time. The resulting transport operations are distributed among a total of six crane systems in a time and priority controlled fashion.

### Highest standards for position data

The quality of the position data is crucial for reliable IMS operations: The positions of the long and slender steel slabs must be measured with highest precision in order to enable one-to-one identification of the slabs stacked side by side and on top of each other and error-free three-dimensional imaging. To effect this, the cranes' positions are recorded exactly and the current storage profile is determined. The inventory management system implemented by 3tn Industriesoftware at Hoesch Hohenlimburg relies on Symeo's Local Positioning Radar (LPR) for recording the cranes' positions: With the help of LPR, all movements of every single slab can

be tracked with highest precision individually, consistently, and under the most adverse environmental conditions.

Moreover, two laser scanners are mounted on each crane at Hoesch Hohenlimburg, detecting load changes and transmitting elevation section profiles to the IMS for further processing. The IMS calculates the exact pickup and set-down positions of a slab, even when it has been hoisted with oblique pull or set down swinging. Combined with information taken from the data base system where position data of all stored slabs are filed, a detailed 3D image with a precision of  $\pm 50$  mm is created containing the positions of all slabs stacked side by side and on top of each other.

### How the Local Positioning Radar works

The sensors of Symeo LPR allow exact recording of the cranes' positional coordinates – translating into the position of each single relocated steel slab. To enable this, an LPR base station mounted on the crane trolley permanently receives individually coded radio signals from LPR transponders mounted in the hall. Using precise run time measuring, the base station can determine its position several times per second down to a precision of 5 cm, even under the most adverse environmental conditions. The current coordinates are transmitted to the inventory management system in real-time and this information can then be interrelated with data from other sources and processed further.

## Hoesch Hohenlimburg

Hoesch Hohenlimburg GmbH is a ThyssenKrupp Steel AG company and considers itself as a specialist providing customised applications allowing even small lot sizes to be manufactured cost-effectively. Continuing research into and advancement of processes and product quality as well as support for customers with technical advice result in meeting a broad range of specific customers' requirements in partnership. Hoesch Hohenlimburg has a secure primary material basis available within the ThyssenKrupp group as their slab demand is met in most parts by the ThyssenKrupp group smelting plants.

[www.hoesch-hohenlimburg.de](http://www.hoesch-hohenlimburg.de)

## 3tn Industriesoftware

As a software developer, 3tn Industriesoftware GmbH has specialised in developing and installing control systems for the steel industry. Their product range includes inventory management and warehouse automation systems for coil and slab stores, transport control systems as well as systems for material flow tracking, data management, and control of basic automation equipment.

[www.3tn.de](http://www.3tn.de)

## SYMEO

Symeo GmbH develops and markets systems enabling precise and contact free real-time distance and position measurement of cranes and free moving vehicles and objects. Symeo's products are of extremely robust design making them ideally suited for applications in rough industrial environments, indoors as well as outdoors.

Symeo can offer Local Positioning Radar (LPR), a radio based, real-time capable absolute position measuring system, ideally suited for industrial applications. This patent protected technology and the development team's long lasting experience in dealing with complex industrial environments enable cost effective customized solutions. They are complemented by innovative combinations of LPR with additional non-contact sensor equipment (e.g. optical systems, acceleration sensors, gyroscopes, GPS).

The Company cooperates with leading system integrators and ERP software solutions providers. Symeo offers customized solutions to OEMs and supplies users worldwide with industry specific measurement products and retrofit solutions.

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## Facts & Figures

- Symeo Local Positioning Radar delivers a basic crane position with an accuracy of  $\pm 50$  mm
- The overall system delivers a three-dimensional precision of  $\pm 50$  mm per object
- One-to-one identification of the slabs using consistent tracking
- No more confused slabs
- Crane movement reduction by 20 percent
- Increase of store turnover by 20 percent