



TWMS/ metals

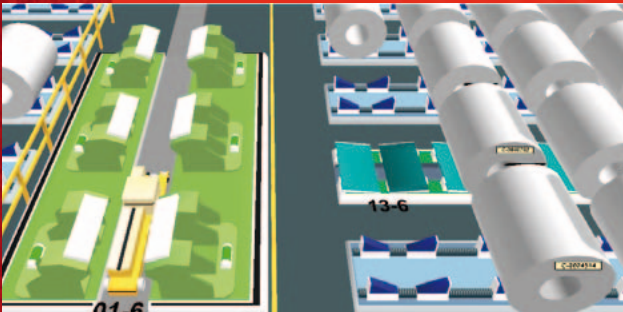
TECHNICAL WAREHOUSE
MANAGEMENT SYSTEM



Industriesoftware GmbH

Rapid Material Handling, Better Overview

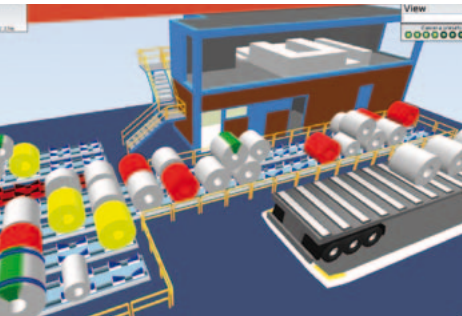
... Efficient warehousing



- ▶ **Slabs • coils • sheets • blocks • billets • tubes/pipes • sections ...**
- ▶ **Trucks • trains • ships ...**
- ▶ **Cranes • lift trucks • transfer cars • walking beams • chain conveyors ...**

The Technical Warehouse Management System/ metals (TWMS/metals) controls and visualizes transportation and warehouse processes in the metal industry, from continuous casting to loading long or flat products.

Unlike other storage systems such as high-bay warehouses, for instance, warehouse management in the metal industry is very complex. There are no uniform rack heights, ABC zones, or standardized transfer points for transportation means and material handling vehicles.



A suitable storage location must be identified for each storage item individually. This requires taking the current warehouse situation and a number of different restrictions into consideration.

Therefore, 3tn has designed the TWMS/metals specifically for the metal industry. This system is prepared for any customary product, transportation means, and warehouse configuration.

The TWMS/metals controls manual and automated transportation processes as well as fully automated warehouses. In doing so, it optimizes intercon-

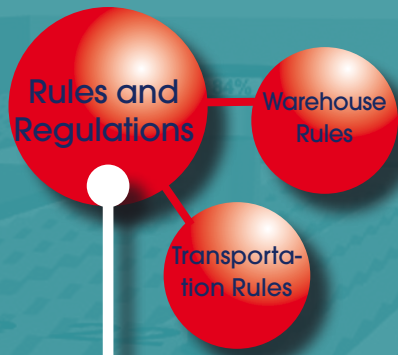
necting or even plant-wide warehouse utilization and efficiently uses transportation means such as cranes or transfer cars. On one side, it communicates with ERP and MES systems and on the other side with basic automation and sensors.

The TWMS/metals visualizes the current warehouse situation from any perspective in real time. It displays not only the current warehouse situation but also a wealth of additional information. The operator can detect at a glance, if a coil is on hold, if a slab may be stored at a certain location, or if a restriction is violated.

The system centrally manages warehouse processes and automatically tracks inventory. This ensures consistent accuracy of the database reflecting the actual inventory, thereby reducing the time spent searching almost to zero.

RESULT: Optimum use of warehouse space for each product, short shipping times, efficient deployment of personnel and means of transportation, no damage from improper storage, and improved work safety.

Our installed systems prove their worth each day in numerous plants run by the world's leading steel producers – many of them using fully automated operations.



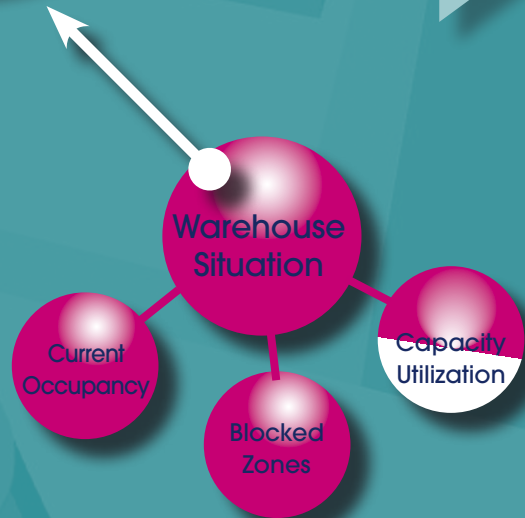
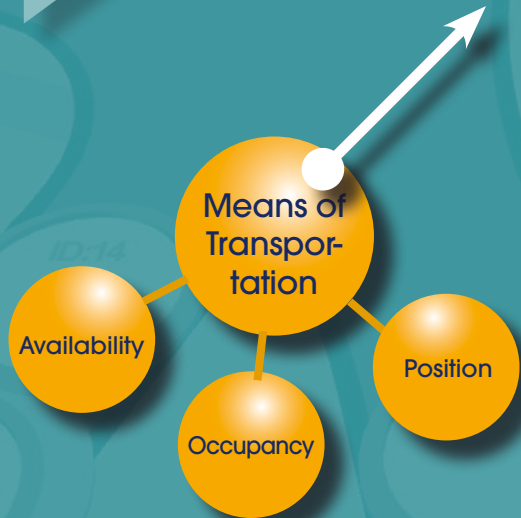
A yellow circular node labeled "Demands" is connected to a photograph of a warehouse with tall metal shelving units. Below the photo is a screenshot of a software interface showing various data points and charts.

- Customer Requirements
- Product Characteristics
- Production Planning
- Priorities

A large central circular node with a background image of a warehouse aisle. The text "TWMS/metals" is in a large, bold font, with "Technical Warehouse Management System" below it in a smaller font.



- Storage Goals
- Means and Routes of Transportation
- Priorities
- Visualizations



From Customer Demand to Order Fulfillment

When an object such as a slab or a coil is to be transported, the TWMS/metals receives information from production control, the MES, or ERP.

The system identifies the optimal storage location, the most suitable combination of transportation means, and the optimal route to the storage location. In doing so, it considers the current warehouse situation, the availability of resources, as well as optimizing and restricting transportation and warehouse rules. Then, the TWMS/metals issues the order to the vehicle operators or the automated transportation controls such as automatic cranes or coil ferries.

As soon as the order has been carried out, the TWMS/metals reports the order as finished to the higher-level systems.

The TWMS/metals is a user-friendly system. Clearly arranged operator guidance with context-sensitive menus make operation easy, even for inexperienced users. The interfaces come with many different language settings; additional languages may be integrated within a central table.



Transportation
Order

6

Instant Information

... The warehouse visualized in a virtual representation



+

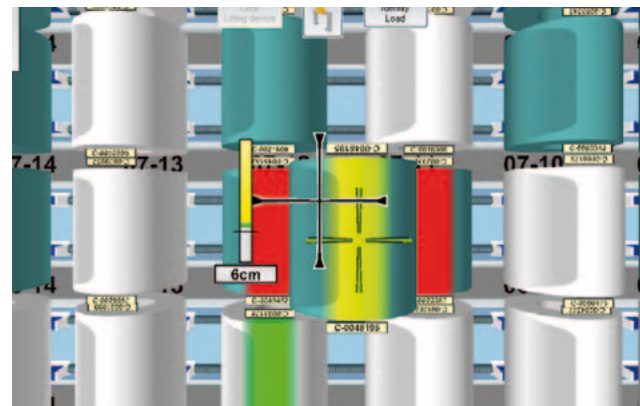
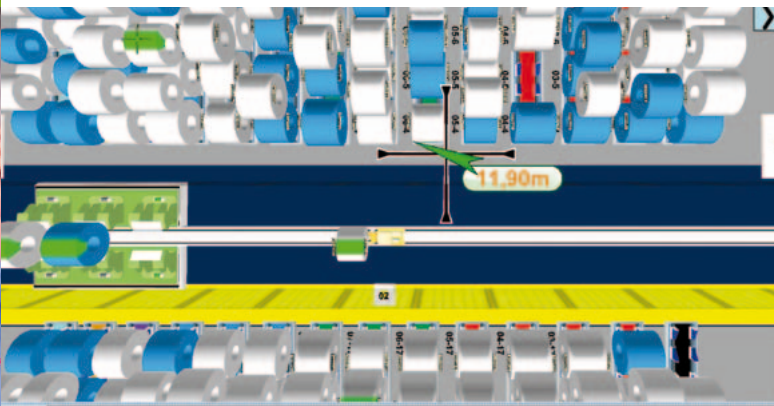
0

00

The TWMS/metals visualizes the current warehouse situation and means of transportation in a realistic real-time 3D view from any location and from any arbitrary viewpoint. This, for example, facilitates a virtual tour through the warehouse.

view of what is directly below his crane on a monitor, and facilitates precise positioning of objects being stored.

The TWMS/metals is a system that can anticipate and prevent restriction violations and damage to storage goods. For instance, if the crane operator approaches an unsuitable storage location,



Furthermore, a wealth of additional information, e.g. ID-numbers, material data, or 'on hold' flags can be accessed by a click of the mouse.

an alert will immediately be issued. As a result, damage and additional costs are avoided.

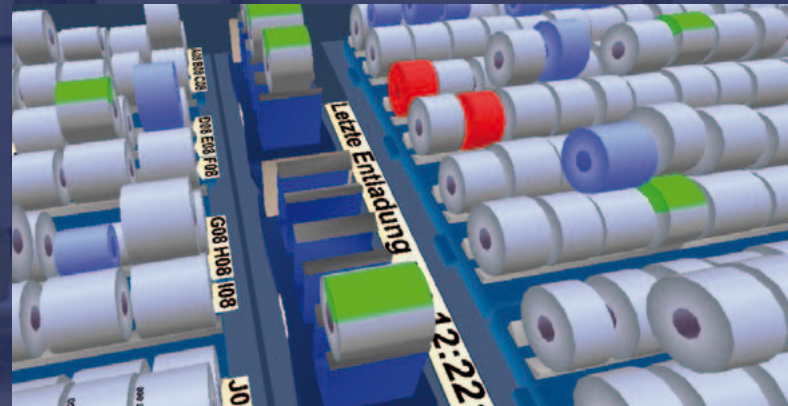
By design, the TWMS/metals is a mobile system that also works on cranes, in vehicles, and with handheld terminals. This enables the crane operator to obtain a real-time, three-dimensional

Furthermore, visualization contributes to work safety. In many cases, the presence of a shop floor operator in the warehouse is no longer necessary, as crane and vehicle operators work on their own.

8

Focus on the Metal Industry

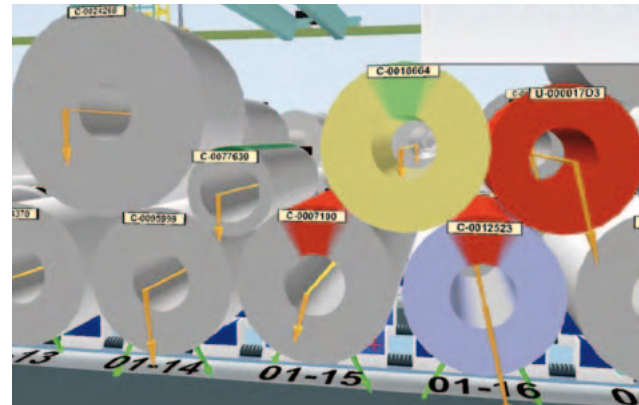
... Networked on all levels



Production methods in the metal industry adhere to similar principles. However, the detailed conditions in different facilities vary greatly. The TWMS/metals is easily adaptable to individual requirements.

The rules can be built based on material characteristics, customer needs, or production planning requirements. The 3tn rule editor facilitates intuitive operation.

In identifying suitable storage locations, the TWMS/metals goes into such a level of detail as to calculate, for instance, the resulting load on the coil skids during the stacking of coils. This ensures



Transportation and warehouse rules form the core of the TWMS/metals and can be easily modified with flexible parameters. During installation, proven modules are individually adapted to the boundary conditions of the respective facility. Regardless of where the system is running – a rolling mill or a finishing facility, using slabs or coils, cranes or coil ferries – many elements that are stored in the system can easily be integrated.

security and stability in the storage of each coil in its desired position.

The TWMS/metals is embedded between ERP, MES, and the automation / sensor system. Unlike the higher-level systems, it directly processes sensor data such as from cranes or vehicles and sends control signals to the various means of transportation.

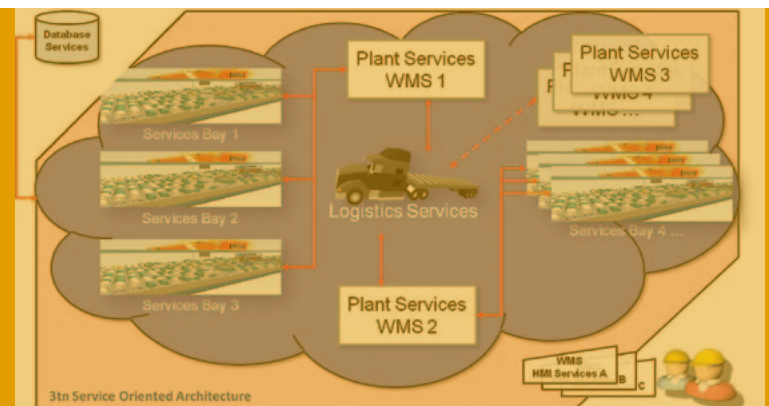
10

Future-proof and Flexible

... A secure investment



TWMS/metals is based on the standards of a service-oriented architecture (SOA), which facilitates particularly flexible warehouse management solutions and supports effortless extensions. The SOA allows the TWMS/metals to provide warehouse management from a single building up to entire plants – the system grows with your needs.



TWMS/metals offers extraordinary reliability and excellent system maintainability through the optional use of various (virtual) servers and the distribution of tasks among different server processes. The availability of the overall system remains responsive during software updates as well as during interferences of individual subsystems.

SUMMARY OF THE ADVANTAGES

- **TWMS/metals** provides you with a realistic 3D representation of the warehouse inventory and the storage environment at any time.
- **TWMS/metals** knows all products of the metal industry.
- **TWMS/metals** adapts to your specific needs.
- **TWMS/metals** grows with your requirements.
- **TWMS/metals** operates in a rule-based manner and is highly parameterisable.
- **TWMS/metals** protects your goods from damage.
- **TWMS/metals** supports almost any language.

TWMS/metals REDUCES YOUR OPERATING COSTS!

About us

Thomas Niepmann and Thorsten Tönjes founded 3tn in 1999 after several years of working together on warehouse management projects in the metal industry.

Their business plan was to develop customer-specific software solutions for optimizing material movement, specifically adapting to metal industry user requirements. This plan has been consistently followed ever since.

The 3tn team consists of software developers, computer scientists, electrical technicians and engineers. Their expertise covers every stage of a project, from analyses and feasibility studies, through software development, all the way to project completion, start-up, and user training. Experienced technicians ensure comprehensive after sales support and constant on-call service.



Industriesoftware GmbH

3tn Industriesoftware GmbH
Robert-Bosch-Str. 1
59439 Holzwickede - Germany

Telefon: +49 2301 912610
Telefax: +49 2301 9126111
www.3tn.de