



Collision warning system at voestalpine Stahl

The challenge

Vehicles and cranes move at a fast pace in the hot slab storage area at voestalpine Stahl GmbH. A large number of cranes and heavy-duty vehicles move around in a relatively confined space. From an occupational safety perspective, there was a need to provide drivers and crane operators with technical support in order to avoid collisions that may have serious consequences.

The solution

The solution is a collision warning system based on Symeo's LPR®. The permanently-installed LPR® transponders and LPR® modules on every crane and slab transporter transmit the participant's position to the warning system and radio it to the other participants. This information is used to calculate movement directions and speed locally, creating a dynamic safety zone around each vehicle that controls the warning signals.

The project's success

An easy-to-understand visualization of the vehicle position and surrounding obstacles on six-inch displays provides excellent orientation for drivers and crane operators. A tiered system with visual and acoustic warnings alerts participants to any collision dangers. In cooperation with the customer, the system was set up in a practice-oriented manner so as not to unnecessarily disturb production and slab transporting with superfluous warnings. The decentralised collision warning system at voestalpine is proving to be highly robust, failsafe and maintenance-low, and it is a valuable addition to driver cabs across the steel works.

Managers of the hot slab storage area and the flame scarfing shop at voestalpine Stahl GmbH in Linz/Austria had already been searching extensively for a reliable solution that offers position tracking for vehicles and cranes as well as collision risk calculation. The area to be covered is approximately 75,000 m² and features three ongoing problem areas: a gas cutting machine that moves on rails, five cranes on two parallel crane tracks, six gantry lift trucks and five low-platform tippers. The vehicles can cross the crane tracks at three points and travel directly below the cranes along the crane track. Position tracking via WiFi and GPS was rejected as being unreliable, and a proposal put forth for a centralised IT solution to calculate positions and paths was equally unconvincing.

The solution came in the form of the LPR[®] positioning system from Symeo already in use at voestalpine Grobblech GmbH. The positioning system is made up of LPR[®] transponders distributed across the premises as reference points, and LPR[®] radar units on the vehicles and cranes. This became a collision warning system for the sister company, voestalpine Stahl, in which every participant radios its position and movement data to all the others. Similar to glider planes, each participant can determine any potential

collision risks locally, using the data from its own position and that reported from other participating vehicles and cranes.

Vehicles and cranes warn each other

The Collision Warning System (CWS) developed for voestalpine is based on dynamic safety zones for the participants. Starting from the dimensions of a vehicle or crane and depending on the direction of movement and speed, a collision danger zone is defined. Redundant ZigBee modules radio the position of the vehicles and cranes and transmit information on the collision zone. In addition to the collision zone, each participant also has a defined proximity radius. In order to avoid unnecessary computing, the on-board collision calculator ignores other vehicles and cranes, provided the proximity radii do not overlap. A display similar to a radar screen with colour-coded warning levels and acoustic signals was developed with the help of Symeo's partner ABF Industrielle Automation GmbH to ensure drivers react appropriately to the CWS calculation. The CWS was further perfected based on feedback gathered during the test phase. Thanks to the system's configurability, it was possible to deactivate superfluous warnings, allowing vehicles to pass by one another at a low speed and cranes to operate in tandem.

voestalpine group

The voestalpine group is a steelmaking, processing and technology group that operates worldwide. It manufactures, processes and develops high-quality steel products. The group has 500 production and sales companies in more than 50 countries on five continents. With its top-quality flat steel products, the group is one of the leading partners to the automotive and domestic-appliance industries of Europe, and to the oil and gas industries worldwide. voestalpine Stahl GmbH operates a fully integrated steel works in Linz for all the processing stages at a single location. www.voestalpine.com

Symeo GmbH

Symeo GmbH develops and markets systems for precise and contact-free distance measurement, position detection and collision avoidance. Symeo products are suitable for cranes, industrial vehicles as well as for other transport methods. Furthermore, the company develops customer-specific telemetry and smart metering solutions, which fulfill relevant standards (e.g. EN 50463). Symeo products are robustly designed and well-suited for applications in harsh industrial environments indoors and outdoors.

Symeo's patented LPR[®] offers a wireless and real-time system for precise positioning and distance measurement that is ideally suited for industrial applications. Symeo also provides industrial GNSS receivers that can be combined with LPR[®] and other motion and inertial sensor systems, enabling highly available and precise positioning even under the most adverse conditions and in areas with limited satellite availability.

The company delivers standardised products and complete solutions to system integrators, original equipment manufacturers (OEMs) and end customers worldwide.

Facts & Figures

- Collision warning system for cranes and slab transporters based on Symeo LPR[®]
- Visual and acoustic warnings alert drivers and crane operators
- Completely decentralised system: WiFi-independent communication via ZigBee (2.4 GHz) using the Symeo data protocol
- 100 percent coverage inside and outside the hot depository and flame scarfing shop via LPR[®] transponder technology
- Dynamic safety zones for calculating collision danger depending on movement directions and speed
- Scalability: Additional vehicles and cranes can be integrated into the system at any time

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