



Manufacturer Trusts Hirschmann Wireless to Improve Heavy Machinery Operations



Massive port-container cranes use reliable wireless network architecture to maximize safety and security.

Project Overview

The manufacturing supply chain is invisible to most consumers. When it comes to how products are shipped, it's typical to picture shipping containers on trains or trailers. And while many people don't think about this mode of material handling until they're stuck behind them on the freeway or at a train crossing, these containers are a crucial component in the global supply chain.

Containerized manufactured products – and to a lesser extent raw materials – can include everything from agricultural products to electronics. But, before the containers carrying this valuable cargo are ever seen by the public, they have often spent months crossing the sea.

With seven of the top ten largest shipping ports in the world, China plays a critical role in the smooth operation of global shipping and material transportation. Both before the containers can set out on their way and after arriving at the receiving port, they must be placed on and/or removed from the massive container ships that transport them between destinations across the globe.

Shanghai Zhenhua Heavy Industries, a global leader in heavy machinery manufacturing and machine building, added reliable wireless connections at several port locations to connect their industry-leading Rubber Tired Gantry (RTGs) cranes and base stations for more reliable, efficient operations.

Be certain.
Belden.



Shanghai Zhenhua Heavy Industries Co., Ltd., formerly Shanghai Zhenhua Port Machinery Company (ZPMC), is the largest heavy-duty equipment manufacturer in the world, producing cranes, large-scale container machinery and bulk-handling machines designed to load and unload ships. In fact, of all the port-based cranes used worldwide, their Rubber Tired Gantry (RTG) cranes make up 75 percent. ZPMC's large-size port container cranes and ore/coal bulk material handling machinery are high-quality, sustainable and reliable and can be found in 76 countries all over the world.

In each shipping port, RTGs are used to pile containers with the highest degree of efficiency. Moving constantly across a dock-side track, RTGs routinely load/unload massive containers at a rate of 30-40 containers per hour. Any unforeseen delays or downtime can bring harbor traffic to a halt.

At the Shanghai port, as with many others, RTG cranes are stationed outside at the harbor and so the products used to monitor the RTG must withstand extreme temperature ranges, industrial stress and constant movement. Timeliness and safety are paramount – therefore ZPMC must strike a balance between efficiency and reliability, while in the pursuit of maximum performance.

Due to the massive size and nature of the work done by RTGs, reliable and stable communication is needed between the cranes in the ship harbor, as well as to the base station. The base station has access to the office network (tower), and therefore this project required a robust wireless link between the various components of the operation.

Project Needs and Challenges

To help maintain ZPMC's reputation as a leader in RTG performance and safety, multiple obstacles must be overcome at each installation. To more easily meet the exacting requirements of their operations – as well as to limit potential downtime – ZPMC determined it was necessary to work with a partner who has a reputation for high-quality industrial networking components and approval from and experience in the Chinese market.

For this project, specifications included the following:

- RTGs represent an important part of the global supply chain – any downtime or latency could cripple shipping timelines and lead to global shortages.
- Every RTG, no matter its position, must have constant wireless coverage and access to the base station.

- Signals must routinely travel in excess of 700 meters to 1 kilometer.
- All components must comply with IEEE's 802.11n wireless specifications.
- ZPMC wants a partner to provide intensive support at the installation and testing of the real application on the crane.
- RTGs must have an industrial-grade solution due to the intense outdoor, heavy machinery-based use.
- Interference from metal inside the cranes, known as Electronic Signal Disturbance, cannot disturb transmission.
- Speed and security are critical: the margins for error in moving massive 20- to 40-foot shipping containers are infinitesimally small.

The Belden Solution

To accommodate the difficulties brought-on by the unique requirements of the port shipping environment, Belden teamed up with Shanghai HiTe – an experienced, local partner for the project's design and support phases. Together, they detailed a solution which would overcome a host of obstacles and meet the needs of this unique application.



Fully automated Rubber Tired Gantry (RTG) cranes that make container handling safer, more productive and more reliable

"For us, downtime is not an option, and despite some concerns about the reliability of wireless technology – we knew it would be key to enhancing overall performance. Our customers rely on us to bring them solutions that will meet exacting specifications for equally exacting applications – as with the RTG cranes. The only way we can meet those expectations is by working with partners that know both our business needs and those of our customers in China and across the world. Belden is one partner that carries the technical approvals needed and delivers solutions we know they stand behind."

– Ms. Xiayuan Xu, Sales Manager, Shanghai Zhenhua Heavy Industries



A Rubber Tired Gantry (RTG) crane can move up to 40 containers per hour

While the problems facing such an installation were complex, the vast product options and immediate availability simplified the unique obstacle of monitoring and pinpointing massive moving equipment. Shanghai Hi-tech Control System Co., Ltd. (HITE), the system integration partners, handled the network design, product selection and installation to ensure seamless support throughout the project and continues to provide on-going post-installation support.

The Hirschmann wireless solution ensures that every RTG crane, regardless of location, can be covered and access the base station. Furthermore, integrated Electronic Signal Disruption protection supports fail-safe and reliable signal transmission.

Product Details

To create a future-proof network that could meet the demands of the customer, the following Hirschmann products were chosen for ZPMC's RTG crane installations.

BAT450-F Industrial Wireless Access Points

The Hirschmann BAT 450-F enables fast data transmission speeds in challenging industrial markets – up to 450 Mbps. The cost-effective, high-performance wireless LAN access point, with its compact and ruggedized design, delivers maximum flexibility for the highest speed and reliability.

- Cost-effective solution – only pay for the required features
- Industrial design – comply with challenging global requirements and approvals
- Ruggedized solution – industrial M12 sockets, integrated ESD protection and ClearSpace technology
- Designed for harsh environments – operating temperature range from -40°C to 70°C, with protection class IP65/IP67
- Fast data speeds – ensure fast data transmission and high bandwidth with the IEEE 802.11n
- Innovative wireless technology – guarantees maximum WLAN availability

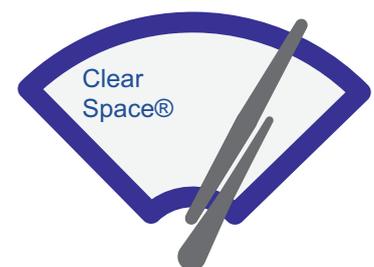


BAT450-F Industrial Wireless LAN Access Point

ClearSpace Wireless

The application of bandpass filters helps to eliminate all interference caused by competing radio signals. The resulting ClearSpace wireless solution delivers greater transmission stability over longer distances without interruptions. The highest performance speed of 450 Mbit/s facilitates new applications, such as HD video streaming.

- Guarantees stable wireless connections
- ESD protection and robust hardware ensure access points with high reliability and long operational lifetimes
- High- and low-voltage power supply for DC, plus Power over Ethernet (PoE) power pack

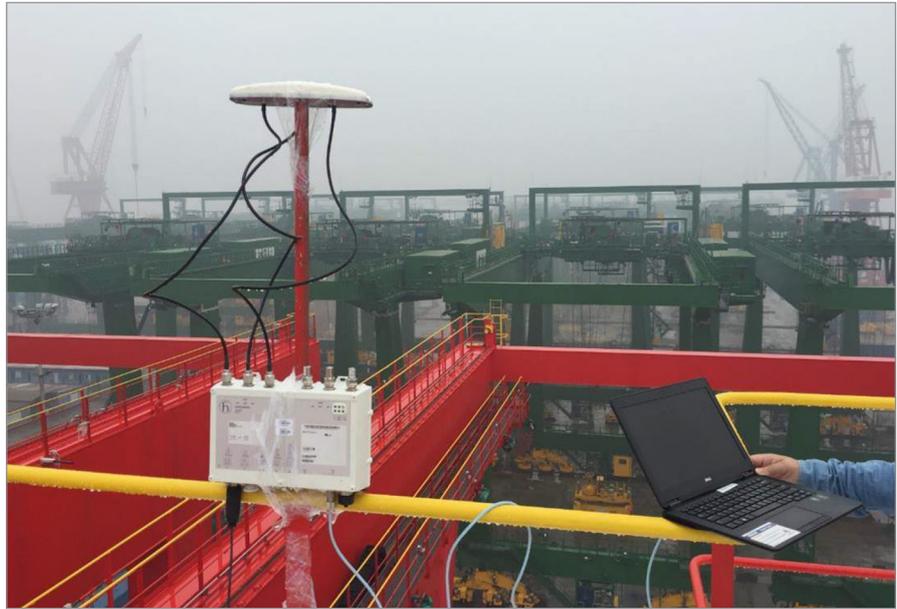


Clear Space® Wireless

Why Belden

With its best-in-class industrial products and reliable, robust industrial-grade solutions, Belden helped ZPMC through a close partnership with its China-based partners. Together, they provided a robust industrial solution, close local support and products approved for use in China. The result was a professionally installed, supported configuration that was fast and easy to build for maximum performance.

Belden's cost-effective and proven solution fit within their budget. The system is also essentially infinitely expandable – depending upon available bandwidth – to accommodate additional cranes or architecture changes as the facility's needs evolve.



Testing the Hirschmann wireless solution at a local harbor with ZPMC

Always Stay Ahead with Belden

In a highly competitive environment, it is crucial to have reliable partners who add value to your business. When it comes to signal transmissions, Belden is the No. 1 solutions provider. We know your business and want to understand your specific challenges and goals to show how effective signal transmission solutions can push you ahead of the competition. By combining the strengths of our five leading brands, Belden, GarrettCom, Hirschmann, Lumberg Automation and Tofino Security, we are able to offer the integrated solution you need. Today, it may be a single cable, switch or connector, to solve a specific issue; tomorrow, it can be a complex range of integrated applications, systems and solutions. With the rise in smart, connected devices brought on by the Industrial Internet of Things (IIoT), together, we can make sure your infrastructure is ready to handle and make sense of the influx of data. Transform your business now with instant access to information, and make your vision a reality. Visit info.belden.com/iiot to learn more.

About Belden

Belden Inc., a global leader in high quality, end-to-end signal transmission solutions, delivers a comprehensive product portfolio designed to meet the mission-critical network infrastructure needs of industrial, enterprise and broadcast markets. With innovative solutions targeted at reliable and secure transmission of rapidly growing amounts of data, audio and video needed for today's applications, Belden is at the center of the global transformation to a connected world. Founded in 1902, the company is headquartered in St. Louis, USA, and has manufacturing capabilities in North and South America, Europe and Asia.

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