



US Steel Manufacturer Streamlines Operations, Reduces Costs and Improves Productivity with Celona 5G LAN

CUSTOMER

U.S. Steel manufacturer

LOCATION

Pennsylvania

CHALLENGE

Eliminate production disruptions, downtime, and process problems due to problematic wireless connectivity

VERTICAL

Industrial Manufacturing

CUSTOMER SIZE

Leading manufacturer and only producer of forged steel wheels for railcars and locomotives in North America

Frustrated with network downtime, erratic connectivity and spotty coverage, a leading manufacturer of high precision forged steel wheels for railcars and locomotives in North America was desperate.

The company has the unique luxury of being able to sell as much product as it can make and sell more if they can make more. Any idle time resulting from an operational glitch directly impacts both the top and bottom lines of the business. And the network is central to everything the organization produces.

A 24 by 7 operation spread across 1.4 square miles the U.S. steel manufacturer operates an extensive outdoor scrap yard along with indoor melt shop, forging, testing and storage operations in one of the most challenging wireless environments in the world.

Not conducive to wireless networking, metal buildings, machinery, massive magnets, and extremely hot temperatures made it next to impossible to gain dependable wireless signals or stable connections.

The company had been using Wi-Fi to connect various instrumentation and industrial tablets to collect data and send instructions to workers. While useful for office connectivity, in such a challenging environment, Wi-Fi network could not keep up with the coverage requirements and was not able to deliver the reliability required to support the critical communications essential to the manufacturing process.

IMMEDIATE RETURN ON INVESTMENT WITH CELONA

With Wi-Fi signals bouncing off metal obstacles, nearby interference from other Wi-Fi networks combined with huge furnaces throwing off electromagnetic energy, productivity, time, and money were being lost.

This manufacturing environment wreaked havoc for production staff to trying to receive critical instructions and report process details to and from back-end database systems that were intolerant of any sort of network latency caused by a mobility event such as channel hopping or roaming between Wi-Fi access points.

As a result, IT staff were constantly bombarded by calls at all hours, anytime during 24x7 operation, regarding lost connectivity that halted operations.



“If I had to continue to deal with the Wi-Fi issues I have to deal with every day at the plant, I’d have to hire more people,” said the head of IT operations for the U.S Steel Manufacturer. “And frankly that wouldn’t even fix the technical challenges that I have with using Wi-Fi technology within our environment. With Celona’s technology, all that goes away. The solution pays for itself.”

The steel wheel manufacturing process is highly integrated, requiring multiple steps to turn scrap metals into highly engineered railcar wheels that meet stringent industry quality standards and regular audits and inspections. The process involves staff operating large mobile cranes to sort scrap steel into different grades and placing them within “charge buckets” that are ultimately dumped into a melting pot. Using the wireless network, operators receive their instruction “recipes” that detail exactly what steel to put where and when. If connectivity is lost, everything effectively stops.

A single bucket of steel, once heated, is expected to yield approximately 300 forged wheels. All wheels are stored and sonic tested. If any single wheel out of a “heat” fails, the entire batch is scrapped. As a result, the network became an essential component for tracking, documenting, and precisely reporting each step performed in the manufacturing process.

LOWERING TOTAL COST OF OWNERSHIP WITH CELONA

Unlike typical connectivity to the Internet, operational applications in industrial settings, like a steel manufacturing plant, are critical to the overall process flow. Therefore, disruptions from unreliable connectivity can result in material loss and lost productivity.

Within industrial operations like those in steel manufacturing, where a particular process depends on the previous and follow-on processes, it is critical to keep the processes “humming.” Any disruption in one area of the operation can ripple through the rest of the processes.

For example, an interruption in the scrap yard can disrupt a charge bucket (i.e., bringing various metals to the scrap yard) and furnace (i.e., melt metals with other “recipe” materials to create the correct-grade stainless steel) operations. If a heat operation is disrupted for a long time, about \$90,000 worth of material is deemed lost along with hours and hours of manual labor.

Having tried everything imaginable, the IT staff at the steel manufacturer turned to a turnkey private wireless solution using Celona’s 5G LAN system.

Since Celona cellular 4G/5G radios, using the clean 3.55 to 3.7 GHz CBRS spectrum, can operate at higher power levels, the private cellular network requires fewer access points to cover a larger area than the Wi-Fi network.

The working area of the manufacturing plant covers about 250,000 square feet of indoor space and about 1,000,000 square feet of outdoor space. This required more than 80 Wi-Fi access points and related cabling and infrastructure to provide the density and coverage needed.

For the steel manufacturer, the Celona 5G LAN required 4–6 times fewer indoor access points and 5–6 times fewer outdoor access points than Wi-Fi at that steel manufacturing plant. This was more than welcomed news to the IT staff.

In addition to the immediate ROI due to reliability improvements for wireless communications, the cost of acquisition and installation for the wireless networking system designed for the critical applications has also been significantly improved.

REMARKABLE RESULTS

The steel manufacturer was experiencing five to six disruptions weekly in the scrap yard operations. After replacing six Wi-Fi APs in the scrap yard with one Celona private LTE outdoor AP, the manufacturer reported less than five disruptions from the private cellular network in the last 18 months.

With the private cellular network, the steel manufacturer effectively reduced the unplanned downtime in the scrap yard operation by more than 70 times. According to the company 5–6 disruptions per week for 48 weeks (assuming one month of scheduled downtime for maintenance), resulted in 264 disruptions per year using Wi-Fi. This was crippling the business.

And based on the cost savings from eliminating unplanned downtimes for the steel manufacturer, the total three-year subscription costs of Celona's indoor and outdoor solutions could be recouped in as little as 5 months, after which the cost savings from the private cellular quickly accrues in the subsequent months.

In addition to that, thorough testing has shown the following performance and operational benefits for the critical business workflow applications at the facility:

- 70% reduction in operational disruption vs. Wi-Fi
- 5 to 6x fewer cellular wireless access points relative to Wi-Fi
- ROI payback in under 5 months by eliminating unplanned downtimes
- 3-year total network cost savings of 39% for indoor 5G LAN vs Wi-Fi 6
- 3-year total network cost savings of 31% for outdoor 5G LAN vs. Wi-Fi 6
- The effective removal of network latency that could cause application disconnects
- Improved mobility by reducing roaming times and often eliminating roaming events
- Reliable connectivity for mobile crane operators
- Reduction in wireless network maintenance/ adjustments

CELONA 5G LANs IDEALLY SUITED FOR INDUSTRIAL MANUFACTURING

Celona 5G LANs are purpose-built for the most demanding manufacturing environments and use cases that require low-latency connectivity and deterministic wireless performance.

Unlike any other private wireless solution on the market, Celona's 5G LAN is a fully integrated end to end system bundling all the requisite components including access points, packet core software, SIM cards / provisioning and cloud-based network orchestration within a single subscription.

Celona's patented MicroSlicing™ technology automatically identifies mission-critical traffic flows, enforcing and prioritizing strict QoS requirements such as guaranteed bandwidth, latency, and jitter requirements on a per application or device group basis. The Celona orchestration platform is used to quickly define and apply strict quality of service (QoS) policy for specific manufacturing applications and critical devices to guarantee that the appropriate network service levels are continually being met.

To see a Celona 5G LAN in action next to your critical applications and see how you can also realize its significant benefits for return on investment and total cost of ownership, visit us at celona.io/journey.

hello@celona.io | celona.io