

Radar Sensors for Conveyor Belt Loading

Case Study - Pilbara Port, Australia



- ✓ Uninterrupted operation in all weather, lighting and environmental conditions
- ✓ Reliable detection, high-resolution imaging, 360° scanning capability
- ✓ Zero maintenance or cleaning with a five-year service interval
- ✓ Proven to withstand extreme temperatures, vibrations, impact, dust, debris and water

The Challenge

Minimising Disruptions to Ship Loading

Pilbara Port

Iron ore mining is a vital global industry. In Australia, the mining is largely concentrated in the 'Pilbara' northern part of Western Australia. Iron ore is a key export and is transported to the coast via a 1,400km network of rail tracks.

Port Pilbara is one of the main ports for shipping iron ore. It is located approximately 1,600km north of Perth. It is a Security Level 1 Port and currently is the world's second-largest bulk exporter. Loading ships in Pilbara is a 24/7, 365 days a year operation that uses heavy-duty conveyor belt loaders. The entire loader is capable of swinging 180°, turning immediately from a fully-loaded ship on one side of the quay to an empty ship on the other side.

Loading of ships is not an easy task, and it is critical to take into account the ship's movement, both vertically and from side to side. It is also vital that balance is maintained throughout the process. This necessitates constant monitoring of the loading process to make sure the iron ore goes into the correct hold compartment.

Each loading machine can convey several thousand tons of iron ore per hour. With each ton of iron ore being worth approximately \$100, it is essential to keep the loaders operating with minimal downtime. If a loading machine gets damaged and production is hampered for whatever reason, the loss per machine is likely to be a minimum of approximately one million US dollars per day, rising to as much as \$12 million.



The objective of Navtech Radar's sensors was to improve the operators' ability to fill the ships without disruption and damage to infrastructure.



The sensors are capable of working automatically year round with no cleaning required. The operator is aided in his duties and any potential risks are mitigated as the radar identifies them and the operator reacts accordingly.



The weather in Pilbara is very dry and hot, and video technologies and Lidar sensors are adversely affected by dust. Navtech's sensors operate flawlessly in all environments and require minimum maintenance.

The Solution

Advanced Loading Control

Radar sensors

Navtech Radar's sensors were mounted on the bulk loader to provide data for anti-collision, navigation and optimum loading. The high definition radars scan 360° analysing their environment. If the loader gets too close to objects, it raises an awareness alarm, informing the operator to potential problems.

The operator works in a remote cabin at the very end of the boom close to the ship. From this vantage point, he or she has the best possible chance of distributing the cargo evenly and precisely. The operator has a demanding and challenging job as they have to position the loader at the right angle to load the ship and make sure the load is spread evenly. Navtech Radar's sensor aids the operators' job as the radar is able to scan accurately the area the loader is operating in and easily identify potential collision risks regardless of the visibility conditions at the time.

Navtech's sensors are integrated with the user interface where a CITEC solution provides the operator with all the machine controls, alarms and warnings. If an object is detected being too close on the left-hand side, all leftward movement of the loader is disallowed, pre-programmed by the PLC interface. Likewise, if the ship rises too much compared to the loading angle, the operator is warned and can adjust by moving the loader upwards. Loading the ships is a continuous process that must be replicated and completed with accuracy and speed. Navtech Radar sensors ensure the machine operates continuously with minimal risk of disruption and the associated financial implications.



360° Detection

Cost-effective

Unlike other radar technology, Navtech's sensors cover 360° so fewer sensors are required to do the same job.



Multiple Sensors

Integrated solution

Multiple sensors can be seamlessly integrated to work in unison and map the entire area.



All Weather

Performance

The sensors are unaffected by extreme weather and light conditions and work flawlessly all year round.



About our Sensors

"Navtech Radar's sensors installed at Pilbara have proven their worth. They continue to perform as promised which has generated interest from other sites. The business case for a successful solution is overwhelming.

Previous attempts using alternative technologies have failed to provide the levels of robustness and performance that the harsh environment demands. The current step-by-step approach is more cautious and pragmatic and we are confident that as we achieve our goals, we increase the profitability of long-term success.

Navtech's commitment to travel to the other side of the globe to resolve non-trivial issues was a significant factor in our success so far. The way they responded to issues as they emerged is truly a credit to the company.

Navtech is good at thinking outside the box, applying a serious, scientific methodology to resolve the issues. It is a mark of Navtech's capability and commitment to their product and client satisfaction."

Andrew Pasquale, *Consultant at LogiCamms, System Integrators*

Benefits

- ✓ **All weather operation**
Uninterrupted operation in all weather, lighting and environmental conditions.
- ✓ **Fully automated operation**
Reliable detection, high-resolution imaging, 360° scanning capability.
- ✓ **Robust Design**
Proven to withstand extreme temperatures, vibrations, impact, dust, debris and water.
- ✓ **Low maintenance**
Zero maintenance or cleaning with a five-year service interval.
- ✓ **Easy Installation**
Sensor mounts directly to a mounting plate for simple installation and servicing.

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