GTE

Greater Engineering™

Hopper Train VSD Upgrade



Project Background

Client: Port Authority
Date: January - May 2026
Location: Pilbara Region, WA

Background

GTE's client for this project operates a port facility in the Pilbara. A key part of the port's bulk materials handling operation is a rail mounted hopper train - consisting of 3 hoppers and a motor control centre mounted on a mobile assembly.

The existing ABB variable speed drives (VSDs) on the hopper train had reached the end of their service life and needed to be replaced to ensure reliable operation and mitigate any potential downtime risks. GTE was engaged integrate nine new Schneider Electric Altivar 950 VSDs into the hopper train control system, with one clear requirement: the upgraded system had to operate consistently with the existing hopper train, keeping changes to established operating practices to a minimum. These requirements shaped how the project was planned, tested and delivered, so that as much work as possible was completed before the team arrived on site.

The Challenge

- **A tight shutdown window:** Commissioning had to be completed within the allocated shutdown window, so configuration and testing needed to be done as far as possible before the team reached site.
- **Legacy infrastructure compatibility:** The existing PLC, rack and engineering workstations all needed changes to support fieldbus-compatible VSDs and the Altivar 950 data type manager (DTM) software.
- **Safety and unexpected interactions:** Commissioning and testing had to be planned to protect people and equipment, and testing revealed a possible effect on a cable reeler, which runs from a direct-on-line (DOL) drive, that had to be assessed before return to service.

The Solution

GTE integrated nine Schneider Electric Altivar 950 VSDs with the hopper train PLC, upgrading the supporting control system infrastructure and completing a factory acceptance test (FAT) before mobilising to site. The approach was designed to keep operation consistent with the existing hopper train while making far better use of the communications the new drives offer.

Key Features

Comprehensive Factory Acceptance Testing

Leveraging our state of the art test lab facilities, all VSDs were powered up, their configurations downloaded and DTM communications with the PLC verified before travel, reducing the workload in the shutdown window and identifying potential issues early.

PLC Infrastructure Upgrade

The hopper train PLC received a network interface card (NOC) upgrade to support fieldbus-compatible VSDs and DTM-based communication, and the PLC rack was fitted with an Ethernet backplane.

Engineering Workstation Updates

Workstation firmware was updated to support the Altivar 950 DTM, and Control Expert was upgraded to version 16, with firmware, DTM and Control Expert compatibility checked before mobilisation.

Fieldbus Integration

Fieldbus communications between the PLC and each drive were used more extensively than on the legacy drives, making more comprehensive drive feedback available to the existing control system.

Centralised Drive Access

The DTM gives engineers access to drive configuration, fault-finding and diagnostic information from a centralised engineering workstation.

Clearer SCADA Diagnostics

Additional drive status and diagnostic information is now displayed in SCADA for operations personnel.

Risk Assessment Before Return to Service

The potential effect of the upgraded tramming VSDs on the DOL-driven cable reeler was identified during testing and assessed before the system returned to service.

Results & Impact

Operational Efficiency

Drive configuration and communication testing was completed during FAT, before the team travelled to site. This reduced the work required during the shutdown and let the available commissioning time be used more effectively.

System Reliability and Integration

The upgraded drives integrate with the existing hopper train control system while maintaining the hopper train's established operating requirements. Fuller use of fieldbus communication gives engineers direct access to drive information for diagnostics and fault-finding from a centralised workstation, a capability not previously available in this form.

Safety and Compliance

Commissioning and testing were planned to manage risk to personnel and equipment. Testing was also used to confirm how the upgraded drives interact with the existing system, including the assessment of the cable reeler risk before the equipment was returned to service.

Seamless Execution

All nine VSDs were integrated into the control system on time, despite a tight commissioning window. Applying lessons learned from the previous upgrades, and retaining key personnel from these projects supported a more informed and efficient delivery.

Outcome

The hopper train upgrade delivered a modern drive system that integrated with the existing control system and operates the way its teams expect. Clearer SCADA feedback and centralised engineering access gave both operations and maintenance personnel better visibility of drive status and diagnostics, supporting troubleshooting and delivering a faster mean time to repair. By leveraging their deep client knowledge and extensive brownfields expertise, GTE delivered all nine drives on time within a shortened shutdown window. GTE has also identified an opportunity to review the existing hopper train PLC code and standardise drive logic across the site, which would simplify future integration and maintenance. As Western Australia's largest independent system integrator, GTE Group combines control systems expertise, careful preparation, brownfields expertise, our state of the art test lab and a client-first approach to deliver upgrades that deliver ongoing benefits for our clients.

