

CASE STUDY

Modernising rail operations with a real-time Train Management System

RACE

Sector
Bulk Commodity Rail

Module
Live

The Customer

The customer is a newly established bulk haulage provider responsible for moving material from mines in Central Queensland to a terminal on the East Coast for seaborne export.

The Challenges

The customer needed to build or acquire a modern Train Management System (TMS) to manage and maintain accurate records of rail activities necessary for operations. The TMS facilitates the crucial jobs required to: operate and maintain a fleet of locomotives; managing hundreds of wagons; employing roughly one hundred train drivers, with 24 / 7 x 365 operations in regional Queensland.

The rail assets used to perform this work and the supply of labour to operate the assets culminate in revenue generating activity which needs to be auditable and reconcilable for regulatory and accounting purposes.

About RACE Live

RACE Live is a collaborative decision support tool to manage your train services and rolling stock in real-time



Digital Twin

Evaluate your trains current location in relation to the plan



Operational Efficiency

Automate data entry and schedule management



Commercial Auditing

Track cancellation and under delivery causes





Accounting and managing attributes

Every day, thousands of data points are recorded for every train service to ensure:

- operations are compliant with the network operator.
- adequate maintenance of rolling stock is undertaken.
- accurate tracking of movements are recorded for accounting purposes.
- efficient operations are maintained.

It is an expectation of the customer that every wagon's contents are accounted for and duly associated with specific contracts. When cancellations do occur, understanding the cause and responsible party is imperative for claiming rebates. Similarly, when trains are under-loaded, understanding the circumstances is key to accurately attributing lost revenue.

Maintenance and the need for visualisations

As the customer didn't have an accurate, real time 'digital twin' of the rail operations, it was difficult for maintenance activities to be carried out on time and in a fashion that minimised impact on revenue generation. For example, planning to fix a faulty wagon requires accurate record keeping regarding its location and which train service it may be attached to. It was also challenging to decipher the huge volume of data without visualisations and related tooling.

Competition and Communication

As a new haulage provider, it is critical to establish strong customer relationships and provide timely communications. The speedy delivery of updates to consignment information and rolling stock configuration is something the haulage provider is wholly responsible for providing.

Regulatory Compliance

Regulatory compliance also plays a large role in the decision-making process. The customer faced a range of data exchange responsibilities with the rail network operator, which had to be automated if the workload was to remain manageable.

Before train services are allowed to run on the network, a complete list of rolling stock must be provided, and upon loading a complete list of loaded wagons is also provided before commercial reconciliation is performed.

Labour

In the event of an issue, understanding the impacts to labour and rostering is critical to avoid cancellations, service disruptions, and to ensure maximum productivity. The customer required live updates of train movements in order to better manage operations when these unforeseen circumstances arise.



The Solution

Polymathian deployed RACE Live to meet the customer's real time train management system requirements.

With RACE Live the customer is now able to more effectively manage operations and automate the data transaction activities expected of modern rail haulage providers. Some of these operations include:

- Receiving constant live train movement updates and visualising them in familiar Gantt (timeline) and Marey (time-distance) views
- Sending real time service updates to the appropriate stakeholders
- Broadcasting locomotive and wagon lists to appropriate authorities/stakeholders
- Maintaining an auditable record of commercial fulfilment

- Assessing train service transposition options ('consist swaps') and the operational impact
- Managing crew relief when services are delayed

The Benefits

The customer is now able to understand the conflicts that will arise from the constant changes in a dynamic bulk haulage rail network. RACE Live provides utility to planners by overlaying their own estimates over the network schedules, and the last recorded actuals – enabling them to communicate any plan updates clearly with all stakeholders.

By providing an easy-to-use data capture interface, all cancellation causes and tonne shortfalls are attributed and stored for reporting.

Different access levels such as "Read Only" can be given to a host of stakeholders, eliminating the need for exporting reports and risking disseminating out-of-date information.

Decision Support

- What is the impact of a system closure or force majeure (e.g. cyclone) on my operations?
- Who or what has been the main cause of service cancellation?
- Who or what has been the main cause of delivering empty wagons?
- When will my specific wagon next return to the depot (so that I can perform maintenance)?
- Where are my trains positioned on the network right now?
- What conflicts are coming up following changed network conditions?
- Will relief crews be required to address changed network conditions?
- Will the maximum shift lengths be sufficient to crew my entire train service?
- Which service transposition might be needed to ensure all scheduled departures can still run?
- If I need to cancel a service, which one should I cancel and why?