

CASE STUDY

Identifying Latent Capacity and Other Efficiencies Through Optimal Bulk Rail Logistics Planning

RACE

Participant
Haulage Provider

Module
Planning

The Customer

The customer is a major bulk logistics rail operator serving the New South Wales and Victorian agricultural supply chains.

The Challenges

The customer needed a more efficient way to schedule their trains across its network, from loading trains at grain silos and transporting bulk amounts of grain over hundreds of kilometres of rail network to unloading at domestic mills and terminals for export.

This rail value chain is large, complex and involves many stakeholders. The customer's prime constraint is developing a schedule modelling constraints on network access caused by high volumes of rail traffic on regional, coastal, and metro lines owned and operated by multiple entities.

In addition to the limited track availability, many load and unload sites only allow access to rail services within narrow time windows. Rail plans must align to schedules provided by domestic and export terminals and servicing load points during daylight hours for safety purposes. Accounting for the availability of all stakeholders within a value chain while also producing an optimal rail plan presents a challenging problem to solve.

Before engaging Polymathian, the customer's spreadsheet-based planning system was time-consuming and inflexible. In a dynamic environment where network availability is regularly updated, re-planning often continues until the plan is released. Rudimentary validation methods hinder the ability of planners to reschedule or evaluate other options.

About RACE

Backed by sophisticated industrial mathematics, RACE is Polymathian's decision support tool for the rail industry, producing optimal rail schedules within minutes.



The Value



Speed

Generate optimised plans within minutes



Optimisation

Ensure rolling stock is used optimally



Visibility

Exploiting hidden capacity to improve throughput





The Solution

As an existing RACE user for other commodities, the customer was keen to see how the tool would impact their grain operations.

The first step was to model their complex rail network, producers, rolling stock, and associated constraints within RACE. By capturing this data in the tool, planners are no longer responsible for manipulating vast amounts of information. RACE stores this data, using it to produce highly optimised plans in a fraction of the time it took previously.

RACE introduces consistency and optimisation into the planning process. Whereas previously, the quality of a plan was subject to the planner's experience and rules of thumb, without optimisation for time, cost, asset utilisation, and any number of business goals.

The Benefits

Objectivity

Replace subjectivity and human decision making inherent in manual processes with data-driven and objective Mathematically optimised planning.

Precision

Mathematically optimised schedules eliminate the need for self-imposed buffers previously required for plan execution.

Latent capacity identification

Optimal plans maximise performance with minimum resources.

Ad hoc pathing

Paths through the network can be found for new and above-contract customer requests.

Streamlined planning process

Plans produced in minutes, rather than days, allows personnel to focus on more strategic opportunities.

Contract mix optimisation

Within the model, contracts are evaluated for yield and impact on asset utilisation.

Decision support

- Can I rail this producer's demand?
- Can I rail higher volumes from this customer?
- What is my actual capacity?
- When can I access this loading site to get the product and take it to port?
- How can I minimise waiting to avoid wasting valuable crew time?
- Is it more efficient to turn up early and wait at a load site or to delay arrival?
- How many rolling assets are required to fulfil this demand?
- How many train cycles should I run?