CASE STUDY

Using RACE to operate one of the world's largest interconnected coal rail networks

RACE

The Customer

The customer is an owner-operator of track for one of the world's largest interconnected coal rail networks, linking mine producers with three major ports. The customer wants to ensure their capital investment, the track infrastructure, is being used to capacity by maximising the volume of coal railed over the network each week.

The Challenges

As the track owner, our customer contracts use of the network to haulage providers for three separately planned but interconnected coal chains, each with their own operational constraints. With each provider submitting their weekly usage plans independently of each other and with so many different scheduling inputs to consider (i.e., number of available trains, production schedules, contractual access obligations, crew scheduling and track maintenance or repairs), made it impossible for the customer to know if the plans received were maximising network capacity. Additionally, it was the customer's responsibility to combine the schedules, manage any conflicts based on contractual obligations, and then issue the final schedule to each stakeholder without revealing other stakeholder's commercial information.

Key Challenges

- Complex manual planning and scheduling process due to the extensive number of data inputs from each network stakeholder.

- The three separate but interconnected coal chains had operational constraints that must be considered during the planning and scheduling process.

- Generating a plan that maximised the amount of coal hauled over the network each week while factoring in the above considerations.

About RACE

RACE is Polymathian's proprietary value chain optimisation tool designed to solve a range of complex rail-based value chain planning and scheduling problems.

The Value

Increase the amount of coal transported across the network

Reduce the number of unproductive assets network-wide

Schedule maintenance with minimal disruption to throughput

A Deswik Company

Polymathian
Industrial Mathematics Software

Toll Free
+61 1800 951 252

www.polymathian.com
info@polymathian.com

The Solution

After implementing the RACE Planning module, the customer now produces mathematically optimised schedules for their network stakeholders that considers all input variables, which ultimately ensures the network is operating at capacity on any given week.

Additionally, they can now plan network maintenance at optimal times, resulting in minimal disruption to throughput. The confidence provided by using a global optimisation tool gives the above-rail stakeholders the certainty needed to confidently contract larger orders, further improving network efficiencies.

Solution Highlights

- Deployed the planning module of RACE to solve inbound rail planning and scheduling problems.
- Stakeholders demand data is input into RACE by the customer, who can then solve the complex scheduling problem using industrial mathematics.
- The resulting integrated plan is issued to the coal chain stakeholders to incorporate into their business processes/ systems.

The Benefits

- Revolutionised how coal chains are planned and scheduled – no global optimisation tool existed before RACE that allowed for this level of stakeholder cooperation. The customer is now able to do what was previously impossible due to human constraints.
- Reduced planning times from days to hours, with the added ability to run multiple scenarios further into the future for optimal planning.
- Increased efficiency of the rail network reduced transport costs per ton of coal for every producer in the network, which in an environment of decreasing margins becomes increasingly important.
- Network maintenance is now scheduled in the future with minimal impact on network throughput.

Decision Support

RACE enabled planners to make more intelligent and strategic planning decisions for scenarios such as:

- What is the most efficient number of trains needed to run at capacity for any given day of the week?
- When should network maintenance be scheduled to minimise throughput loss for that week?
- What if I change the spacing rules for trains running in the same direction down a particular branch line?
- What if part of the network is not electrified and can only be serviced by diesel trains?
- What if the power network goes down and the spacing between electric trains needs to be spread out?
- What should my crew roster be, given the varied demand over a weekly period?

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