

CASE STUDY

Strategic and Tactical Rail Crew Planning

RACE

Sector
Bulk Commodity Rail

Module
Crew

The Customer

The customer is a large haulage provider in the Central Queensland Coal Network in Australia.

The Challenges

In addition to efficiently managing daily rosters for operational planning, the customer encountered a significant challenge in deciding how to re-allocate crews between train depots for next weeks' planned rail services. The requirement to give drivers a weeks' notice if they are to operate out of a different depot, coupled with the dynamic nature of raiing in bulk operations and the persistent shortage of train drivers means advance planning is key to maximising crew utilisation and ensuring planned rail services can be crewed.

Investigating changes to operations like: taking on new mine port combinations; opening up new depots; changing the roster structure; and/or changing EBA rules was extremely time consuming and relied on the subjective expertise of planners. The absence of objective tools that can efficiently evaluate complex new operating scenarios meant that the customer was always questioning their crew operating methodology.

About RACE Crew

RACE Crew is a mathematical optimisation tool for maximising rail crew efficiency by allocating rostered on rail crew at multiple depots to crew train services.



Tactical Planning

Automatically generate optimal weekly shift plans



Optimisation

Maximising crew utilisation across depots



Reliability

Fulfill contracts and size operations based on business decisions





The Solution

Polymathian deployed its RACE Crew module to tackle the dual challenges of efficiently allocating train crew to depots for next weeks planned rail operations, and to allow the customer to undertake strategic studies involving changes to their crewing methodology.

Using planned rail services, driver roster data and the EBA rules, the mathematical optimisation engine of the RACE Crew module now provides the customer with an automatically generated and mathematically optimal as well as legally compliant crew allocation for the next weeks planned rail operations.

Plans are generated based on the customer's objectives, offering the flexibility for the optimisation process to focus on specific key performance indicators (KPIs) in a configurable order. For example, these KPIs include, using the fewest drivers, minimising barracks shifts, minimising barracks time, minimising car travel

time, minimising train and vehicle relief and minimising overtime.

Furthermore, the RACE Crew module features scenario capabilities, allowing planners to readily undertake strategic modelling to answer questions constantly asked of them by senior management. What happens if: we take on a different contract mix, change key EBA rules, open up new depots, change the day on and off pattern of the roster, alter roster day off shoulder rules, bring in new technology on trains that permit single driver operations under certain conditions, open up new safe relief locations, etc.

The RACE Crew module seamlessly integrates with both the RACE Planner and RACE Live modules to ingest both planned and scheduled rail service data. RACE Planner is used by network operators and/or haulage providers to generate optimal weekly plans for next weeks' rail operations. RACE Live is used to manage daily variation in rail operations and provides scheduled service data to RACE Crew.





The Benefits

The implementation of the RACE Crew module has transformed the planning landscape for the customer, offering an objective, efficient, automated, repeatable and optimal method for tactical and strategic rail crew planning.

Planners overseeing crew management now have access to sophisticated optimisation technology, enhancing their ability to make the best possible decisions for their business.

In essence, RACE Crew empowers the customer to make more informed, sound, and reliable business decisions, improving efficiency and confidence in their rail operations.



Decision Support

- How can I ensure that the proposed weekly rail plan can be legally crewed?
- Do I need to move drivers between depots to crew next weeks planned rail services?
- How can I reliably evaluate in advance the impact of taking on new haulage contracts?
- What would be the impact of changes in the structure of the master roster?
- How would changes to the day-on, day-off pattern at new or existing depots impact crew allocation in comparison to the previous plan?
- How will a new EBA rule affect crew efficiency?
- How would opening a new depot at location X with Y drivers affect crew deployment when taking on new mine-port combinations?
- What would the impact of rapidly upskilling the qualifications of the driver cohort at a specific depot mean for footplate percentage?
- What is the impact of introducing new technology that allows single driver operations for more of the operating geography?