Rail BI

Confident, cost-effective decision-making for rail infrastructure projects

Rail BI

Automated Business cases for rail infrastructure projects

Experience in **rail** data, processes and software since 2014.

A boutique consultancy: group of software engineers from a variety of backgrounds and training: physics, computer science, data science and accounting.

A great place to work: work-life balance is essential value - completed a successful transition to 4-day week in 2021

We are passionate about:

1. Helping organisations get control of their data: harnessing data into information with flexible and easy access, transformation of data and business processes to ensure longevity of data solutions
2. Building services and applications: modern cost-effective tools for easy automation of processes, reporting and visualisation
3. Communicating the limits of spreadsheets! Excel has many uses but is often taken far beyond where it stifles collaboration, and effectiveness gives way to errors, poor maintainability and risk of data loss, data corruption or data theft.

"The Rail BI team [...] have provided these services not only demonstrating their high degree of technical capability but also in an effective, agile, reliable, efficient and customer focused manner in the way these services have been delivered"

Phillip Bennett
Commercial Director - Digital Railway Programme

Strategic partnership with Network Rail to investigate efficiencies in planning processes. Specifically, "how do we build business cases and cost estimates for all of the upcoming Digital Railway projects without expensive lengthy processes and abortive work?"

We discovered that ETCS and Traffic Management (TM) business cases were very well suited to asset data and metric-based estimation and built a quick and accurate platform for justifying investment decisions:

Step 1: Harness the data. To move data out of silos and resolve discrepancies, we built an intuitive browsable interface for their data. We imported multiple sources of asset and operational data, connected them logically and geographically. We cleansed and rationalised.

Step 2: a platform for quick cost-effective decision making. With cost and benefit metadata in place, our platform allowed instantaneous appraisal for early-stage estimation for projects anywhere on the UK network, including:

- CapEx and Whole Life Cycle costs of new components
- Removal and disposal of assets
- Business change, Design and other costs
- Costs of taking possession of the railway
- Risk and Uncertainty
- Performance improvement benefits
- Capacity improvement benefits
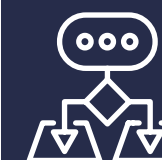- Safety improvement benefits

Step 3: automated report generation. NR could define templates for bespoke reports and include any output from the application. After generating results, large reports can be generated detailing all aspects of the case. These are then instantly ready for submission to governing bodies.

Analysis

Time

Consistency

Key Benefits

Key benefit 1: unprecedented scenario analysis capabilities. As the estimation turnaround was so fast, the client could appraise a previously impossible quantity of alternative scenarios. As project plans evolved, changes could be very quickly brought in, allowing instantaneous updates of outputs and reports.

Key benefit 2: Time taken for estimating activities reduced by 80% resulted in estimated cost savings at 2.5% of total project cost. This gives savings of £2m in CP5 (2014-2019) and a forecasted benefit of £5m in CP6 (2020-2025). 32% of projects not-funded represent a large amount of wasted time spent previously in order to find out a project is not viable. ROI: 230%

Key benefit 3: consistent appraisal for a level playing field. All projects are estimated using the same data, the same algorithms and the same methodology. The result is that you are comparing apples with apples when looking across different plans.

25
business cases

323
scenarios evaluated

£1,115bn
Sum of option costs

17
Business cases funded

8
Business cases not funded

Trusted to deliver cases for ⮌

Castlefield Corridor, East Coast Main Line, Transpennine Route Upgrade, East West Rail, Northern Power House Rail, and more.

Largest case ⮌

East Coast mainline ETCS SOBC produced, totalling £1.2bn. The project is currently underway (eastcoastupgrade.co.uk). "We were informed that this project could not have been achieved with the traditional methods of consultants and spreadsheets, due to its scale and complexity" (Conrad Barrett-Freeman, Founder)

"Designed to interface with key industry datasets, Rail BI allows us to quickly and consistently apply composite railway technology design solutions across specific parts of the railway network. [...] Rail BI is the ideal tool with which to carry out early design studies; increasing speed to market, and putting passengers first."

Derek Patterson
Estimating Manager - Currie & Brown

Intelligent strategic work planning for signalling

We advised the client to incorporate all of their asset data, policies and manual plans of work in order to derive less risk than their current processes and allow for further sophistication of planning and estimation activities.

Step 1: Develop the planning functionality to allow for:

1. Signalling worktypes: interventions can perform a complex array of outcomes, from changing technologies to minor interventions of subsystems and life extensions
2. Renewal policies: depending on the existing technology, different worktypes will be automatically applied according to policies
3. Asset life policies: timing interventions according to policy ensures maximised renewal efficiency, using life extensions where required to reach a desired upgrade point

Step 2: Combine the data and policies to:

1. Generate an automated work plan for renewals and upgrades throughout the UK.
2. Allow scheduling of digital signalling projects and automatically bring in life extension works where required.

Time taken to create national workbank scenario cost models reduced on average by **70%**

Step 3: Import the current signalling works plan.

1. The future picture changes with the current plan.
2. Ensure that the automated and the manual plans work together:
   a. If an area gets removed from a project, an automated job should come in to remind the user that this renewal must take place.
   b. If the user has chosen not to have this renewal, ensure that assets out of policy are always visible as this can have an impact on safety.

Step 4: Outputs: New outputs were provided for specific domain areas, such as remaining asset life, CapEx costs by package or intervention area, volume delivery profiles.

Step 5: Rollout to users: local asset managers will maintain their local workbanks in the platform. This is kept as a national plan for visibility of the whole. Reporting and budget allocation starts at the national level before being broken down into regions.

Resilience

Performance

Relevance

Future-Proof

Key Benefits

Key benefit 1: Resilience and reliability. Before Rail BI, complexity and lack of transparency led to errors resulting in large overspend and in some cases the inability to deliver the plan.

Key benefit 2: Performance and scalability. The platform is now being used for national scenarios with 15k - 20k projects per scenario over 60-100 years. Plans can be accessed by over 100 users simultaneously and the system is fast enough for them to interact with it and get meaningful results.

Key benefit 3: Relevance: changes to underlying data become immediately available and any resulting changes to the plans are updated simultaneously with full transparency

Key benefit 4: Future-proof: with improvements in IoT and Advanced Analytics, insights such as predictive maintenance can feed into Rail BI to improve the efficacy of the automated planning, while still allowing planners to take control and ownership of their regional plans.

Result: Used by 165 users over 5 regions and 13 routes.

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Contact us if:

- You are experiencing difficulty maintaining or scaling spreadsheet models
- You are repeating the same work and suspect that it should be automated
- You manage data and need help with planning, maintaining and fully exploiting your information and data-driven processes