CASE STUDY

ESPERANCE BRANCH LINE INFRASTRUCTURE UPGRADE

PROJECT Esperance Branch Line infrastructure upgrades | Esperance, Western Australia
CLIENT Arc Infrastructure

THE SITE

The Esperance Branch Line (EBL) is a single line railway running from Kalgoorlie to Esperance in Western Australia. At almost 400km long the original line was established in the 1930's, undergoing a significant upgrade in the 1960's to standardise the rail gauge.

Today the rail line continues to play a fundamental role in facilitating the transportation of iron ore, fuel and grain services between Kalgoorlie and the port town of Esperance.

The push to move more freight to rail and off the roads has resulted in an increased tonnage from the resource and infrastructure sectors along the EBL. With the anticipated growth in these sectors, it is imperative that the EBL is maintained to effectively support the increase in freight movements.

THE CHALLENGE

The ongoing maintenance and upgrade of the railway line (including lengthening of crossing loops) and replacement of sleepers and rails, along with drainage and ballast programs is a continual process. Unfortunately, due to the age of the track, and poor records maintained from the past, there is virtually no survey detail of the existing line. This presents significant challenges for engineering design within the program.

As an active rail line all works need to be conducted in between scheduled train services. Safety within the rail corridor is paramount and a Work on Track Authority is required prior to commencement, as well as always having a track protection officer on location.

The remoteness of the site would also pose a challenge, with some sites only accessible at certain times of the year due to extreme weather conditions.

In consultation with the client, Arc Infrastructure, MNG undertook detailed feature survey works at 23 sites along the EBL totalling 18 kilometres as part of the 2022 infrastructure upgrade project.

THE SOLUTION

With a clear grasp of the need to provide accurate detailed information of the rail line, ballast and topography, MNG proposed a tiered program that would enable detailed engineering to be undertaken. Furthermore, this approach would also allow subsequent construction works to be undertaken at a later date with full survey control.

The sites were prioritised with the client and discussed with the track protection officer, who liaised with the operational team. This ensured that all works could be conducted efficiently and safely between scheduled track services, without disruption to other work crews.

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Maintaining strong communications with the local teams also ensured that access to the individual sites was possible and that no time would be lost due to foreseeable logistical issues.

Understanding the rail engineer's requirements for the track geometry, inclusive of the rail alignment, curves, cross slopes, and gradients, MNG proposed the use of various surveying techniques be used conjointly throughout the project, to ensure specific data requirements were obtained in the most time effective manner. In addition to traditional surveying techniques, MNG utilised their specialised track survey system from Amberg Technologies. The "Amberg Trolley" is a highly precise system for capturing track geometry information to aid with the design for the as-built documentation and planning of railway line refurbishment.

Highly accurate survey control was established along the survey corridor for the purposes of the as-built survey and future construction activities. Concrete survey control points were connected to the state survey network to ensure the integrity of the overall project and for use with future upgrade projects.

THE OUTCOME

All surveying was conducted in accordance with track and civil survey guidelines. Detailed survey plans, in accordance with the scope of works, were compiled, checked and delivered to the client in a staged manner allowing their design engineers to commence their programs in a timely manner.

Typically, plans and high accuracy digital data was supplied to Arc Infrastructure within one week of the completion of field work.

MNG also computed the rail centreline, relevant geometry and track chainage for each of the sites which was compiled into a database. Working with the client this database was then configured to their specific requirements and directly uploaded into their system saving valuable time and resources.

Arc Infrastructure has commended MNG for their work in the project, particularly with the supply of the track centreline. Used to determine features such as maximum curvature and impact on the environment, the inclusion of this data will significantly reduce time in the design phase of the railway line refurbishment and upgrades.

MNG OPERATING THE "AMBERG TROLLEY" AT A RAILWAY CROSSING

A KEY BENEFIT TO THE CLIENT WAS THE COMPUTATION OF THE TRACK CENTRELINE, SIGNIFICANTLY REDUCING TIME IN THE DESIGN PHASE OF THE PROJECT.

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