

Category 3: Excellence in Sustainability and Innovation

Application of Lean Construction Methodology for Stabilisation Works in Queensland

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Queensland Department of Transport and Main Roads



Queensland Government

Department of Transport and Main Roads

2023 AustStab Awards of Excellence

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Overview

- Rehabilitation works on Transport and Main Roads' (TMR) Leichhardt Highway Rehabilitation project commenced in 2022.
- The original scope for this project in a rural/ remote location was to mill and fill the insitu asphalt and lightly bound pavement to improve rideability and safety. The project's objective was to improve safety and community connectivity, and deliver economic benefits for the cattle, road freight, mining and tourism industries.
- The alternative scope the project team proposed was full width stabilisation using minimal imported material and recycling existing material. The stabilisation option was preferable from both an economical and environmentally sustainable perspective as the original design of mill and fill required disposing existing material and importing in new.
- Overall, the Leichhardt Highway Project was an overwhelming success for the public and Operations team alike, achieving above and beyond the customer needs ahead of time and on-cost, with added training value for the local workforce.

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Operating Environment (context)

– How that affects the initiative

- In regional communities, the road network is essential to support industry competitiveness, connectivity and regional growth.
- As a part of the state-controlled network, the Leichhardt Highway is a strategic priority in the Road Rehabilitation Program for Queensland's south-east. The project was to commence mid-September 2022, however, due to unseasonal wet weather and delays in gaining access to the site, the project commenced in October 2022.
- To meet the needs of the community and achieve completion prior to wet season, the project was hence required to be completed in a shorter timeframe than originally planned. Utilising their local knowledge and experience in delivering in a rural/ remote location, TMR successfully delivered through good planning, agility, innovation/creativity, avoiding wastage and double handling, and application of new techniques/technology.

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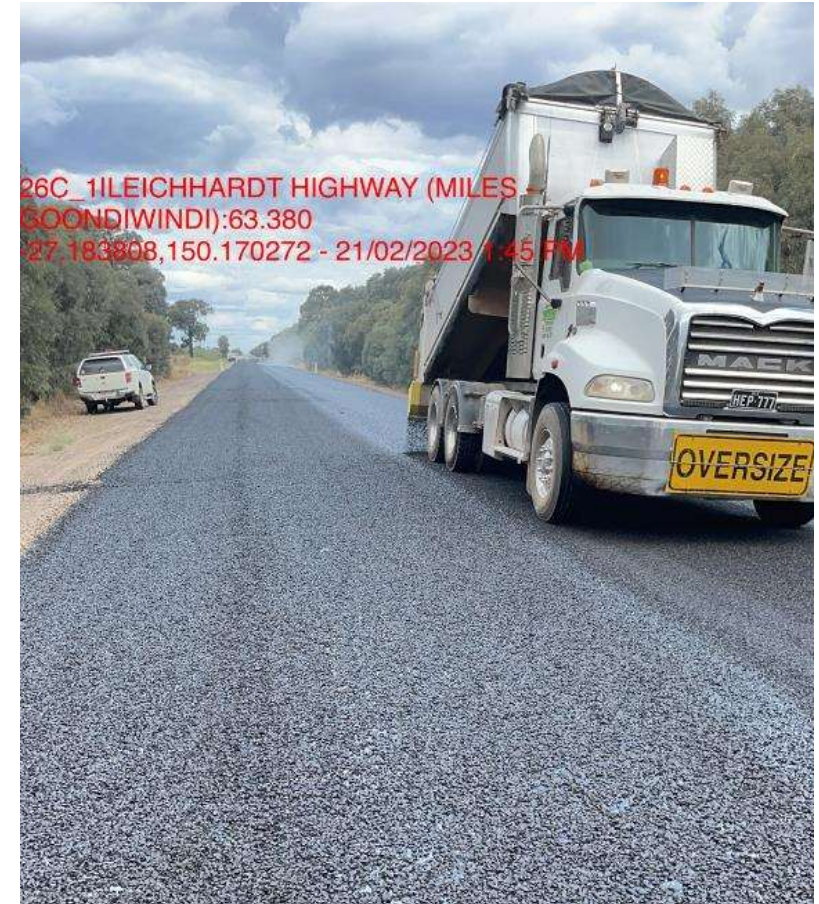


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Challenges

Human Resources and material supply - building an effective project team

- To meet the needs of the community and achieve completion prior to wet season, TMR's RoadTek project team utilised their local knowledge and experience in delivering in a rural/remote location, and successfully delivered through good planning, agility, innovation/creativity, avoiding wastage and double handling, and application of new techniques/technology.
- The team embraced the LEAN methodology to maximise value for the customer while minimising waste to improve environmental outcomes.



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Challenges

Cost and time - limited funding available to complete the works

- The funds available for the project were capped at \$2.94million.
- To complete the scope of works with the available funding, innovations in design and creativity in construction methodology had to be achieved. The project team addressed these challenges by:
 - Cutting rehandling costs and wastage by delivering required material on time, and determining stabilising/construction processes, including work time for cement stabilising.
 - Collaboration with the suppliers and subcontractors in the planning stages assisted the project team to tailor requirements of the project.
 - Incorporating existing material in the design cut down on waste and reduced the cost of importing and disposal of existing materials
 - Engaging soil testers early helped the project team to establish a rolling pattern and review the construction methodology
 - Innovation was actively pursued on the project, with employees encouraged to discuss any ideas that may conserve time or money.
 - From the very beginning there was a need to reduce the costs by increasing productivity and downtimes to deliver a quality final product : The project team successfully achieved this, completing the project seven weeks ahead of schedule
 - Additionally completed works such as de-watering, re-shaping drains, desilting the culverts, changing seals from C170 to C320.

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Evidence of Success

- The Leichhardt Highway Project was completed on 22 December 2022, seven weeks ahead of schedule.
- Despite a change of commencement date, TMR's RoadTek team was able to deliver additional subgrade treatments around culverts, dewatering and reshaping table drains within budget. Using their strength of knowledge in stabilisation works and practices, the improved efficiency was achieved by delivering the works by planning parallel activities alongside increasing the number of sealing visits.
- This project is a great example of Minor Infrastructure Contract management under relational arrangements and successful application of the LEAN methodology for stabilising processes. The project was completed ahead of schedule, reduced wastage (from original design) and maximised the utilisation of the stabiliser (increasing cost efficiency) by using it for other activities such as loosening existing material and cut padfoot marks. The project was completed with significant cost savings for TMR.
- Overall, the Leichhardt Highway Project was an overwhelming success for the travelling public, community and the project team, achieving above and beyond the customer needs ahead of time and on-cost, with added training value for the local workforce.
- We delivered a safer road sooner for the regional community, just in time for a busy Christmas period for the network.

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Evidence of the Initiative in Practical Use

1. **Design and construction methodology:** Using integrated design and build arrangements to work closely with materials laboratory, designers, client and suppliers to achieve higher quality and cost/time savings.
2. **Procurement:** Establishing a Partnership arrangement with all parties contributing to a common outcome.
3. **Production planning:** Benchmarking to establish 'best in class' production methods with clear identification of critical paths. Reviewed Lot diagram compliance with traffic management.
4. **Construction activities:** Engaging a second grader and rollers to maintain high productivity by opening new lots and spreading the material ahead.
5. **Dewatering:** Dewatering table drains and using the clean water for construction or other activities to reduce time of carting water from another water source or emptying nearest dam.
6. **Risk Management** – Managing the risks throughout the project with an agile and open mindset.
7. **Logistics:** Arranging Just In Time (JIT) delivery of material to eliminate the need of onsite storage and double handling.

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Evidence of the Initiative in Practical Use

8. **Communication:** Ensuring clear and timely project communication from start to finish with all internal and external stakeholders.
9. **Utilising the Talents:** Utilising multi-skilled people in the team to enable the opportunity to move them to the required activities with minimal team members. An engaged, motivated, well trained, flexible and fully engaged workforce.
10. **Reusing existing material:** Designing the project to have 50mm top up and reuse the existing material.
11. **Planning Early:** Planning is a continuous process as material delivery and production are planned a day or two before to reduce waiting time: Pre planning the machinery requirement and transport once for the required section reduced unnecessary downtime.
12. **Inventory:** Materials not required for the works were not ordered early and stockpiled which reduced wastage, storage, and degradation.

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Letter of Support

The excellence in project management delivered an outstanding result for Department of Transport and Main Roads and Queensland (DTMR). The project team utilised RoadTek project management methodology combined with the LEAN Philosophy to execute this project with great success, demonstrating the significant benefits that can be achieved through application of tried and tested project management strategies.

I am personally thankful for the project team's hard work and dedication to the project. I also acknowledge RoadTek's management staff who were willing to work with the Contract Administration team through a relational approach while complying with the contract conditions, which had expedited the decision-making process. RoadTek's integrated approach to managing time, cost, quality, and customer's experiences is a testament to their people. RoadTek enjoy a positive reputation for good reason.

This project has been highlighted in the community and I commend the project for recognition through the Project Management Achievement Awards. I am providing my supporting consent in submitting the award and all project collateral.

Bill Lansbury
Regional Director (Southern Queensland)

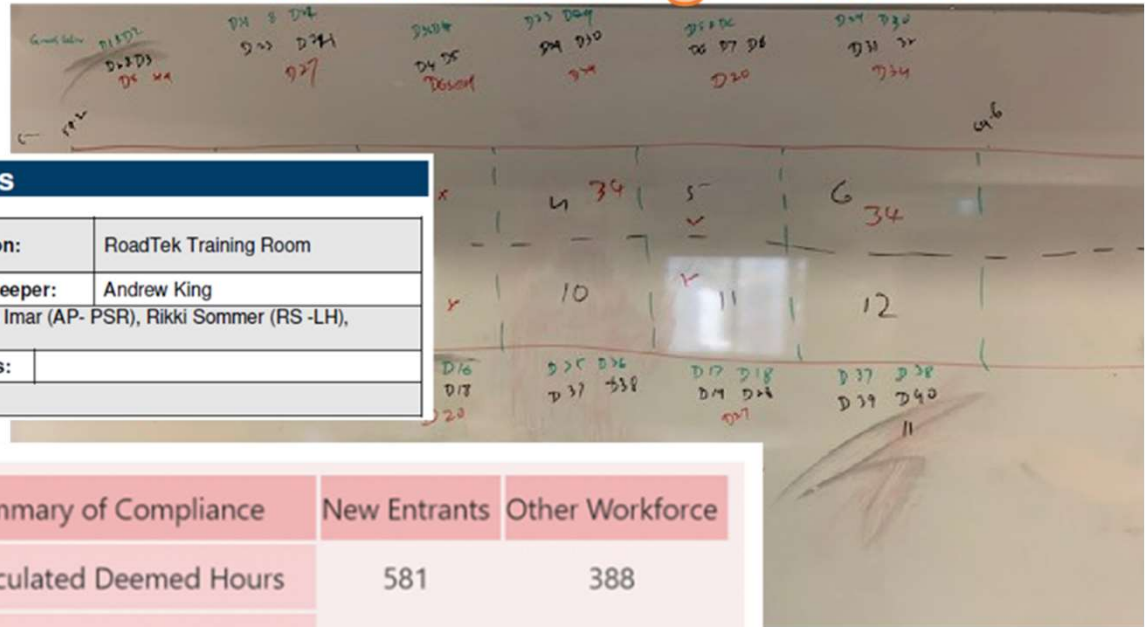
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Supporting Data

Brainstorming Session



Project Team Prestart Meeting Minutes

Meeting Title:	Prestart Meeting for Leichhardt highway Project	Date/Time:	21/10/2022 : 10:00	Location:	RoadTek Training Room
Chairperson:	Logi R L	Minute Taker:	Logi.R.L	Time-Keeper:	Andrew King
Attendees:	Steven Hurlock (SH-PM), Andrew King (AK – Estimator), Kris Swain (KS -Supervisor), Apollos Imar (AP- PSR), Rikki Sommer (RS -LH), Jade McEvoy (JM – Field PSR), Roy Hammond (RH – leveller)				
Guests:		Apologies:			
Purpose of the Meeting:	Review the delivery methodology and process				

Achievement on Training

10	HUMAN / PLANT RESOURCE MANAGEMENT & STAKEHOLDER RELATIONSHIPS	<ul style="list-style-type: none"> Roles and responsibilities outlined in the project plan The additional resources to be sourced internally with in other product lines prior to engage the contractor Trainees need to be engaged as per the training program Look the opportunity to provide works for the locals and indigenous community Performance management to be managed in timely manner Team learning and feedback are important for the success.
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Summary of Compliance	New Entrants	Other Workforce
Calculated Deemed Hours	581	388
Contract Agreed Hours	581	388
Actual Achieved Hours	639	1178
Actual Achieved Percentage	110.0%	303.6%

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