

ADVANCED EPOXY TIMBER PILE REPAIR



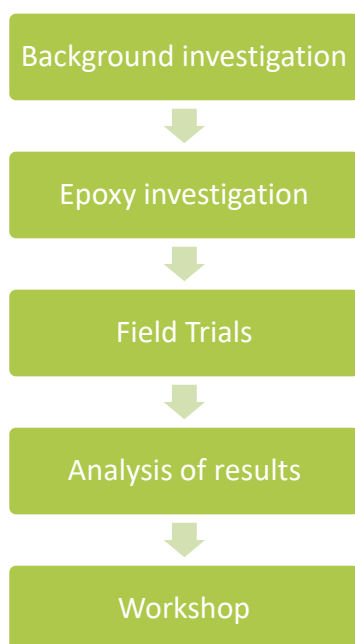
Investigating the application of epoxy resins in the repair of timber bridge piles.

WARRIP has been investigating whether epoxy resins can be better used to effectively treat timber bridge piles through a series of trials across WA.

Background

Main Roads have been utilising epoxy fill injection solutions in timber piles as a semi-structural solution for the past 20 years, to mitigate against further localised deterioration. This repair method is currently only utilised for piles that have been identified as having an adequate cross-section area intact. An opportunity was identified in the use of epoxy resin as a method of increasing the structural capacity of timber piles. This approach needed to be validated through field trials as there was not much literature to support it in this specific application.

Approach



Field Trials

The field trials have been invaluable for trialling epoxy options and methods. They have allowed for findings and refinements to the method such as:

- Improved flowability of resins result in easier installation
- Incorporation of a 'quickset' plug mix at the base of the pile
- Improvements to installation process that create better economy, reducing the volume of material required to achieve the same result
- Determining the most effective approach to formwork set out, improving the overall likelihood of success to the method, and reducing leakages
- Providing guidance for conducting repair works in an environment where the water level is encroaching the repair zone

EPOXY FLOWING INTO THE WRAPPED PILE



Source: Main Roads 2020



Specifications

Main Roads Specification 850 and Main Roads Timber Bridges Repair Manual were identified as requiring updates based on the findings of the field trials. Updates include clearer directions and updated figures to illustrate incorrect versus correct applications of the epoxy.

PILE ISOLATION TECHNIQUE



Source Main Roads 2020

Next steps

Next WARRIP will consider testing to evaluate the mechanical and structural improvements gained by this updated approach.

Consideration of Main Roads experience with other forms of pile rehabilitation.



Field trials support the practice of using epoxy as a structural repair option.



Specifications identified for updates.



Evaluate the mechanical and structural improvements.

FUTURE CONSIDERATIONS

Field test the design solutions for constructability and refinements of solutions.

Laboratory testing to determine the strength of the treated timber piles.

Validation of the construction methodology.

References

Dwyer, P, Chaw E & Ur-Rehman, A 2022, *Advanced Epoxy Timber Pile Repair, contract report 2021-027*, prepared by ARRB for WARRIP, Perth, WA.

