# Tasmania Freight Access Bridge Upgrade Program 2020

The Simpson Strong-Tie® Composite Strengthening Systems™ has been used to strengthen 7 bridges across Tasmania as part of the ongoing Infrastructure Upgrade programs. Fulfilling strategic designs for load bearing capacity increases, tight timelines and budget constraints.

## THE CHALLENGE

*"The Tasmanian Government is committed to strengthening Tasmanian bridges on key routes to retain the existing levels of service for heavy vehicle freight and community access. These upgrades of state road bridges are in order to allow for high-productivity freight vehicles (HPFV)."* Source: Transport Tasmania

With the increase in load requirements of bridges and the need to extend service life, strengthening with Composite Fibre Reinforced Polymer (**CFRP**) can be considered as an ideal solution.

The following structural deficiencies were identified for these sites:

- Positive bending in the deck longitudinal direction
- Positive bending in the deck transverse direction
- Positive bending in the kerbs

## PROJECT INFORMATION

**Project Category**
Bridge Repair and Strengthening

**Project Name**
Humphreys Rivulet Bridge
ESK Main road rail underpass

**Project Owner**
Department of State Growth (DSG) - Tasmania

**Engineer**
Pitt & Sherry

**Structural Restoration Contractor and FRP Installer**
Freyssinet

**Simpson Strong-Tie Products**
S&P Laminate, S&P Resin220

**Project Start Date**
March 2020

### CHALLENGE

To strengthen state road bridges on key routes to retain the existing levels of service and to allow for upgrades that would handle high-productivity freight vehicles (**HPFV**).

### SOLUTION

Strengthening with Composite Fibre Reinforced Polymer (**CFRP**) has been considered as an ideal solution.

### RESULTS

Novel installation methods were developed and met the client's specific requirements and optimize material use.

## THE SOLUTION

With CFRP strengthening deemed the best solution, the retrofit process can be narrowed down to the following:

1. Assess existing structure to ensure concrete is suitable CFRP application (minimum 1.5MPa tensile adhesive strength)
2. All cracks would be structurally bonded using an epoxy injection process
3. All loose delaminated concrete would be repair as per relevant standards and specifications
4. Application of CFRP plates for flexural strengthening according to the engineers' specifications
5. Subsequent protective coating required prior to strengthening.

### Proposed Strengthening Methodology

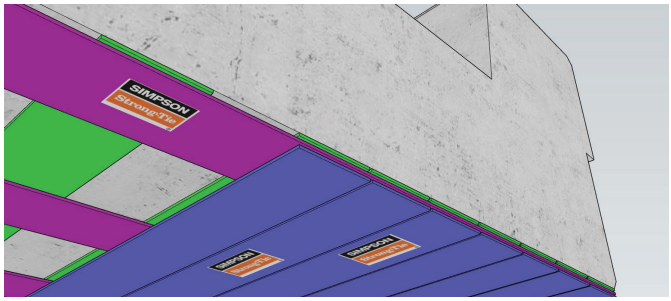
Due to the nature of stiffened kerb bridges, it was specified that carbon fibre reinforcement be used to strengthen the underside of the kerbs and deck.

The strengthening proposed was to consist of:

- 3660m of 150 x 1.4mm thick CFRP Laminates applied longitudinally and transversely under the deck, as well as under the kerbs (with the option of using near surface mounted (NSM) CFRP rods in the case of clearance limitations).
- 4 tons of S&P Resin220

CFRP strengthening design in accordance with AS5100.

This project required extensive coordination between Simpson Strong-Tie and the contractor. Initially Simpson Strong-Tie reviewed and made alterations to the proposed designs in order to optimize CFRP layouts and ensure the most economical installation procedures for the contractor. Simpson Strong-Tie engineers or RPS specialists also coordinated extensive installation training. During the project they were in contact with installers on a weekly basis to not only to assist with project queries but also to observe that the FRP installation was carried out to meet client requirements, Standard Specification and Simpson Strong-Tie expectations.




The strengthening and rehabilitation of bridges using CFRP has been widely adopted across Australia.

It provides a cost effective and efficient strengthening solution with significant advantages.

Simpson Strong-Tie® were chosen for this project due to their engineering capabilities, technical knowledge and field support.

## THE RESULTS

Due to the unique challenges presented on this project, novel installation arrangements of the CFRP Laminates were developed in order to accommodate for the specific requirements and optimize material use.

MORE INFO

Simpson Strong-Tie® Australia Pty Ltd
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