# SH77 Rakaia Gorge Bridge No.1

REAAA Young Presenters Competition 2018

# SH77 Rakaia Gorge Bridge No.1

- 55m span wrought iron truss constructed circa 1882
- One of the oldest structures on NZ's State Highway network
- Category 1 Heritage Structure
- Deck replacement and seismic strengthening works currently underway

# Overview of Final Solution

New deck consists of:

- Modified steel UB transoms
- Laminated Timber Panels (140mm thick)
- BRP road patch surfacing
- 50 year expected remaining life following deck replacement

Steel UB transoms in storage yard (Source: Downer NZ)

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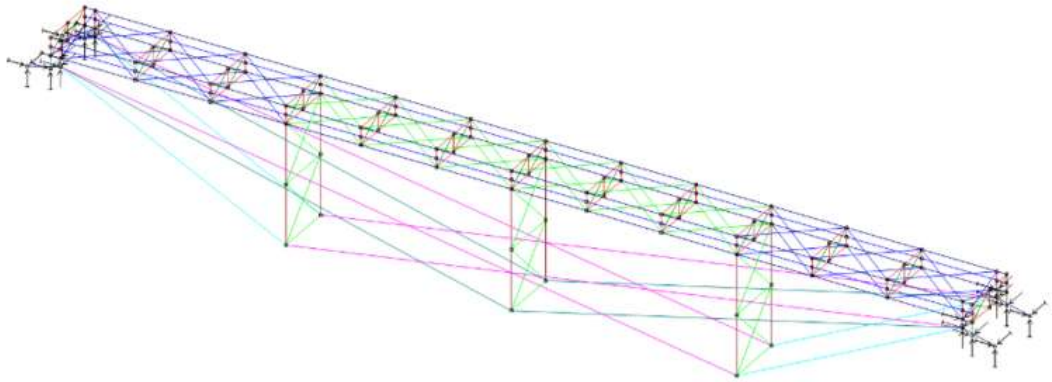
BRP road patch on Laminated Timber Panel

# Limited Capacity of Existing Structure

- Limited live load and seismic capacity
- Dead load of new deck a critical consideration and constraint
- Detailed seismic assessment undertaken to enable seismic strengthening to occur in parallel with deck replacement
- Diaphragm action from Laminated Timber Panels in larger earthquakes (Return Period > 1000 yrs.)



3D Microstran model used for Detailed Seismic Assessment

# Form of Existing Structure

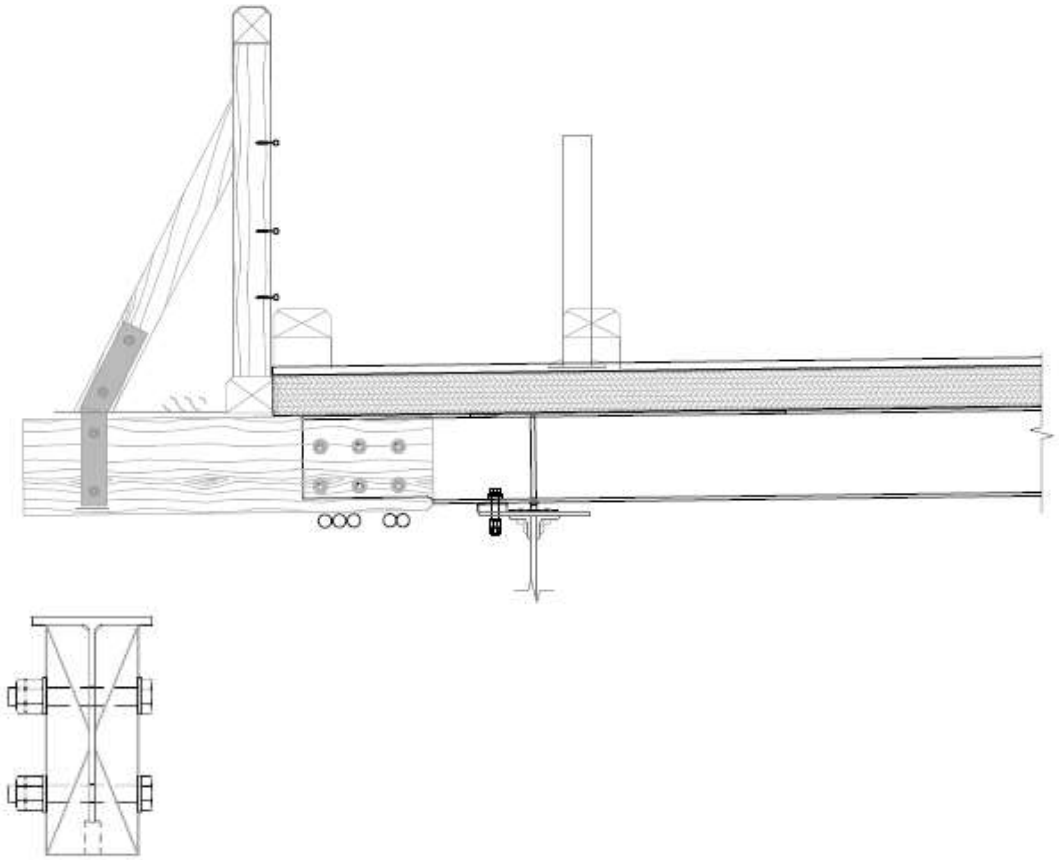
- Riveted girders with rivets protruding through top flange
- Bearing plates with oversized holes used to accommodate rivets

# Form of Existing Structure

- New deck has a more continuous surface
- Originally, water drained through many gaps between deck planks
- Cross-fall in new deck allows water to drain off edge of structure

# Heritage Considerations

- Existing visual appearance deemed to have exceptional heritage significance
- New steel transoms designed to have spliced timber ends
- Enables reuse of original material
- Outward appearance sympathetic with original design



# Access and Future Maintenance

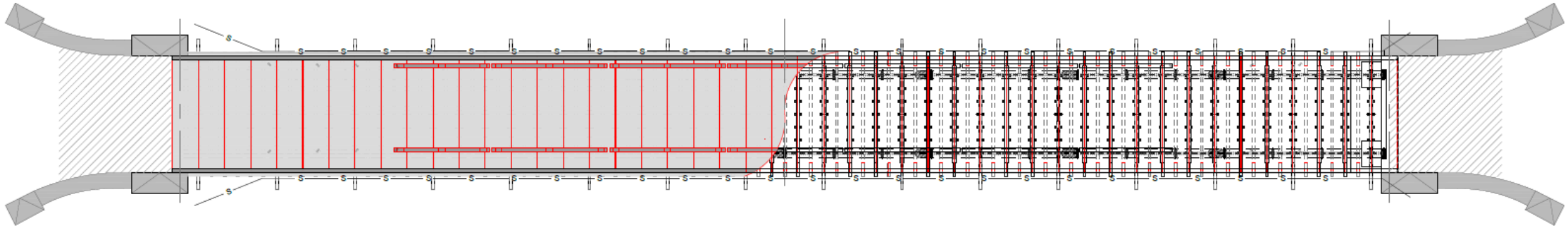
- Deck approximately 16m above river below
- Scaffold installed across entire structure to complete works
- Provides safe access to underside of deck between trusses

Scaffolding of Structure (Source: Downer NZ)

# Access and Future Maintenance

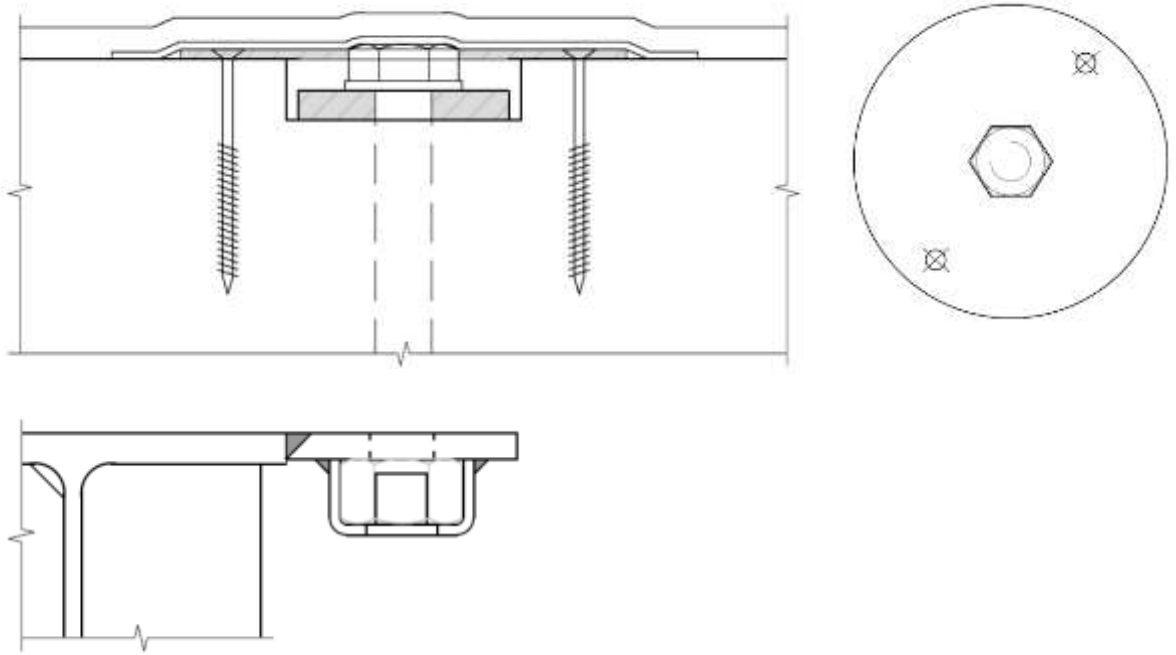
- Single lane bridge and only alternative route to SH1 across the Rakaia River
- Night closures required for majority of works
- Staged deck replacement methodology



# Access and Future Maintenance

- Chosen materials have improved durability over original
- Maintenance of timber decks a constant challenge
- Hold down detail enables tightening from deck surface



# Questions?

Breakout of headwall at Christchurch end of structure during night closure (Source: Downer NZ)