Abstract
Our aging bridge stock is expected to carry higher and higher loads over time. Even the current general access vehicles often exceed the original design standard for many bridges in service. The increased use of high productivity vehicles and higher mass limit axle loadings means that many bridges either require strengthening or replacement in order to safely service the community and freight industry.

Fortunately, there are a number of practical and relatively cost effective options for increasing the capacity of a bridge. This paper will look at four recent case studies where structures have been strengthened using innovative methods that allow a significant increase in vehicle loadings. The four case studies are:

- Mersey River Bridge. Installation of retrofitted shear studs to increase the composite action between the steel beam and concrete deck.
- South Esk River Bridge. Installation of bonded steel plates on the cantilever concrete crosshead to improve bending moment and shear capacity.
- Duck River Bridge. Installation of external post tensioning on the concrete crosshead to improve bending moment capacity.
- Emu River Bridge. Installation of carbon fibre strips to increase moment capacity in the concrete beams.

The result in each case was a practical and cost effective outcome that improved each bridge from an original design of a 32T truck to take a suite of vehicles including 68T B-Doubles, therefore improving the economic life of the asset.

Key Words: Bridge, Strengthening, Mass Limits, Load Limit