



Developments in Bridge Capacity Assessment and Access Management

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Abstract:

The procedures to be followed for the evaluation of the traffic load capacity (both for normal and permitted overweight vehicles) of state highway bridges in NZ and consequent management of access based on the evaluation outcomes are set out in section 7 of the Bridge manual. The procedures are generally utilised for local authority road bridges also.

It has become apparent that some aspects of both the evaluation procedures and access management procedures are inflexible and may require overly conservative interventions for bridges that are found to be 'over-utilised'. Consequently, the current framework requires review and revision.

The publication in 2025 of the Austroads Bridge Assessment Guideline: Heavy Vehicles created an opportunity to review and reconsider current Bridge manual requirements for the assessment of bridges and the mechanisms to manage bridges that are determined to be over-utilised or deficient. In late 2025 the NZTA Waka Kotahi commissioned a Bridge Capacity Discussion Document, which included a review of Bridge manual requirements and relevant sections of the Austroads Guideline and proposed changes to current NZTA practices.

Some amendments to evaluation practice for General Access, 50MAX and HPMV assessments were proposed, including changes to traffic load placement rules, dynamic load factors for posted speed limits and requirements for coincident pedestrian, cyclist and maintenance traffic loading.

However, the most significant proposed changes were to acceptable utilisation ratios (D/C ratios). Currently the Bridge Manual requires all bridges with a utilisation ratio greater than 1.00 (regardless of location) to be posted with weight and/or speed limits, unless they meet criteria for higher allowable stress levels, including a more frequent inspection regime. The higher allowable stress criteria allow a utilisation ratio of up to approximately 1.05 and are only applicable to a small subset of bridges. The discussion document proposed that the acceptable utilisation ratio for bridges on secondary state highways be increased to 1.075, and also that the application of the higher allowable stress regime be widened and the resulting uplift in acceptable utilisation ratio be increased, so that bridges operating under the regime could have utilisation ratios up to 1.075 on main state highways and 1.15 on secondary state highways.

Taken together with the proposed changes to evaluation practice, the proposed amendments to acceptable utilisation ratios represent a significant increase in live load capacity for some bridges, especially those on secondary highways.

The proposed changes were subsequently "road tested" on a selection of Northland state highway reinforced concrete T-

beam bridges constructed in the late 1930s and early 1940s that had been assessed as being significantly over-utilised under General Access loading according to the current Bridge Manual requirements. After application of the changes proposed in the discussion document, many (but not all) of these over-utilised bridges were found to no longer require vehicle weight limits or capacity increase measures to achieve acceptable utilisation ratios. The remainder required less onerous limitations to be applied.

Based on this experience, the NZTA Waka Kotahi initiated the development of a new framework and associated documentation to define processes for the assessment and management of bridges that are determined to be over-utilised or deficient for traffic loading. The framework was developed with reference to the 'Austroads Bridge Assessment Guideline: Heavy Vehicles' and based largely on the recommendations in the Bridge Capacity Discussion Document. A peer review of the Bridge Capacity Discussion Document was commissioned and the review findings considered and implemented in the development of the new framework for appropriate management of over-utilised bridges.

The new NZTA framework for management of over-utilised bridges is intended to be implemented in late 2026. Intended coverage includes:

- A clear and robust mechanism for quantifying and communicating the additional risk associated with operating individual bridges beyond a utilisation ratio of 1.0.
- Define acceptable utilisation ratios under normal traffic loading (GA, 50MAX or HPMV) for bridges based on route categorization.
- A revised higher allowable stress regime to define allowable increases to acceptable utilisation ratios in specific circumstances, and when appropriate mitigations are in place.
- Procedures to be followed when it is considered desirable or necessary to operate a bridge at a higher utilisation ratio than permitted within the framework, including technical approval and appropriate risk ownership.
- For deficient bridges requiring intervention, management of risk during the period before intervention is able to be implemented
- Utilisation ratios to be used in the derivation of permitted overweight capacities
- Changes to bridge evaluation practice will be conveyed via amendments to the Bridge manual.

The presentation will enlarge upon this abstract, providing more detail with regard to the recommendations of the Bridge Capacity Discussion Document, the outcomes resulting from applying the recommendations to a selection of 'over-utilised' Northland state highway bridges, and the proposed changes to assessment and access management procedures through the new NZTA framework for management of over-utilised bridges documentation.