



Progress on New Traffic Load Models for the Bridge Manual

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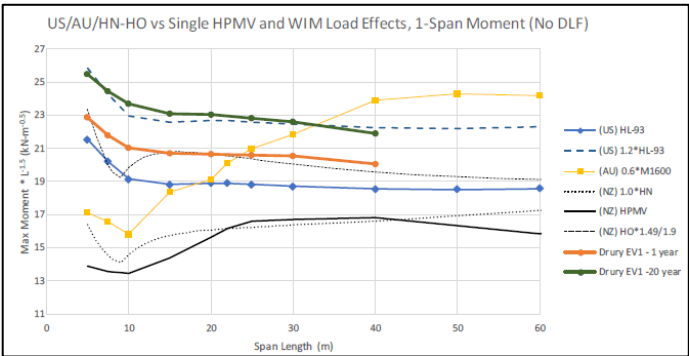
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Abstract: The Bridge manual's HN-HO-72 traffic load model used for the design of new bridges in New Zealand is more than 50 years old and has acknowledged deficiencies. Several pieces of work related to a replacement traffic load model have been carried out over the last 15 years, but apart from the TAN issued in early 2026 to address on an interim basis the deficiencies of the HN normal live load model for continuous bridges, no significant changes have been made. However, in late 2025 NZTA restarted work on a replacement load model, or models.

- Design traffic load models are required to represent, now and into the future:
- the global effects of conforming (legal) vehicles
- the global effects of permitted overweight vehicles travelling in 'own lane' with legal traffic
- global effects of heavy load platforms travelling in an optimum position on the bridge carriageway without other traffic present
- the local effects on bridge decks and secondary members of the axle groups of both conforming and permitted overweight vehicles.

Associated load factors should be selected giving consideration to the resulting reliability index (and hence level of safety or probability of failure) both when new bridges are put into service, and at a time in the future when loading has increased.

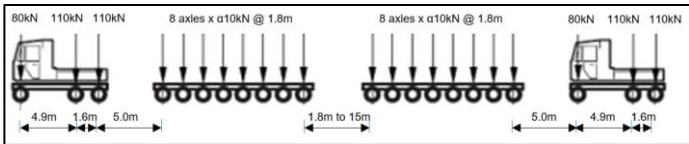


Work done by Beca in 2020 comparing demands from the then new HPMV evaluation loading with those obtained from NZ weigh-in-motion data and North American and Australian design loadings indicated, as shown above, that the AASHTO

HL-93 loading, with suitable scaling, may be a good candidate for a design load model for conforming or normal traffic.

However, before this can be implemented, an investigation into what allowance for changes in vehicle weights and configuration is required is to be completed. Current investigations into increased vehicle masses in response to the possible fuel crisis, and the coming impact of the advent of battery-electric trucks demonstrate that allowance for change, even in the immediate future, is required.

The current load model does not make specific allowance for heavy load platforms. A Beca investigation carried out in late 2023 into a suitable overload design model for the SH29 Omanawa River Bridge recommended that the AS 5100 HLP 320 load model with a highway specific scale factor, tractor units and allowance for a variable split platform would be an appropriate design model in the national context. The effects of such a load model on the design and costs of typical bridges are to be investigated before scale factors for different highway types are investigated and confirmed.



It is thought that a separate 'own lane' permitted overload design loading is still required, to cater for overweight vehicles that should be able to travel in the traffic stream with legal traffic. Whether this is a modification of the current HO loading or based on a more 'real' vehicle form is to be determined. Regardless of which, it needs to be more suitable for continuous bridges than the current loading model.

As a first step into the formulation of design load models that adequately cater for the local effects of axles and axle groups on bridge decks and secondary members, the adequacy of the current design load model is to be confirmed. The HO load model currently typically governs the design of such elements, but is known to not adequately represent the wheel load effects of multi-axle groups such as heavy load platforms on longer span bridge decks.

The presentation will enlarge upon the above, briefly summarising the various pieces of work carried out in recent years, and present key considerations and progress made since work was restarted in late 2025. Although it is not expected that the work presented will be in a final form, it is intended that the presentation will inform the industry and elicit feedback.