

16.2 CHANGE IN DEAD LOAD OF EXISTING STRUCTURES

16.2.1 GENERAL

The purpose of this policy is to preserve the bridge live load carrying capacity and service life when existing bridges are being considered for modifications that add dead load.

16.2.2 POLICY

When bridge modifications are being considered that result in added dead load, the project engineer shall calculate the change in live load carrying capacity using the Load and Resistance Factor Rating (LRFR) method. Refer to the latest editions of Structure Maintenance and Investigation's (SM&I) *Bridge Load Rating Manual* (BLRM) and *AASHTO The Manual for Bridge Evaluation* (MBE) to calculate live load carrying capacity.

If the bridge permit designation remains the same or improves and the rating factors for legal trucks remain 1.0 or greater, the modification to the bridge may be considered acceptable. If the permit designation degrades, the modifications to the bridge resulting in added dead load may still be considered acceptable if the LRFR rating factors for the legal trucks remain 1.0 or greater. The project engineer must obtain concurrence from the SM&I Senior Permit Engineer for any change in permit designation. If approval is not received, strengthening and replacement alternatives must be considered. In all cases, preliminary rating results must be shared with SM&I Senior Permit Engineer for determination of permit route preservation.

The live load carrying capacity must account for dead load from the proposed modifications and the presence of all existing dead load, such as bridge deck wearing surfaces, deck replacement, seismic retrofit-related components, median barrier or sidewalks, barrier rail replacement, utilities, and any existing bridge widenings. The bridge designer must review as-built plans, bridge inspection reports, and identify any other undocumented modifications.

When adding sound barriers to traffic barriers on existing bridges, refer to Structure Technical Policy 4.3, *Sound Wall Dead Load Distribution*.

Final structure plans for bridge modification projects must include a statement in the General Notes indicating whether a future wearing surface of 35 psf is still allowed or no longer permitted. The General Notes must also include a statement that the existing structure was evaluated using the LRFR method per the BLRM and MBE. The permit designation determined from the analysis must be included. If a permit rating



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downgrade is granted by the SM&I Senior Permit Engineer, then denote the change.

For example:

The structure was evaluated using the Load and Resistance Factor Rating method per the *Caltrans Bridge Load Rating Manual* and *AASHTO The Manual for Bridge Evaluation*. Permit designation is PPGGGG.

Or:

The structure was evaluated using the Load and Resistance Factor Rating method per the *Caltrans Bridge Load Rating Manual* and *AASHTO The Manual for Bridge Evaluation*. Permit designation was downgraded from PPPPGG to PPGGGG.

At completion of Final Structure Plans, Specifications, and Estimate, provide an electronic copy of the load ratings calculations sealed by a California Registered Professional Engineer and analysis models to the SM&I Senior Permit Engineer.

16.2.3 REFERENCES

1. AASHTO. (2017). *AASHTO LRFD Bridge Design Specifications*, 8th Edition, American Association of State Highway and Transportation Officials, Washington DC.
2. Caltrans. (2019). *California Amendments to AASHTO LRFD Bridge Design Specifications*, 8th Edition, California Department of Transportation, Sacramento, CA.
3. AASHTO. (2019). *AASHTO The Manual for Bridge Evaluation*, 3rd edition (2018) with 2019 Interims, American Association of State Highway and Transportation Officials, Washington DC.
4. Caltrans. (2019). *Bridge Load Rating Manual*, California Department of Transportation, Sacramento, CA.