



16.2 MODIFICATIONS TO EXISTING STRUCTURES THAT INCREASE DEAD LOAD

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 and the bridge is unable to meet AASHTO-CA BDS without the future dead load provisions, 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) to calculate live load carrying capacity.

If the bridge permit rating remains the same or improves and the rating factors for legal vehicles remain 1.0 or greater, the modifications to the bridge are acceptable. If the permit rating degrades, the modifications to the bridge resulting in added dead load may be considered acceptable if the LRFR rating factors for the legal vehicles remain 1.0 or greater and the project engineer obtains a design exception from the SM&I Senior Transportation Permit Engineer and District Traffic Operations. If a design exception is not granted, a refined analysis shall be conducted, and if that analysis does not sufficiently improve the legal load rating factors or the permit rating, strengthening and replacement alternatives shall be considered. In all cases, preliminary rating results shall be shared with the SM&I Senior Permit Engineer for determination of permit route preservation.

The live load carrying capacity calculation shall 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 shall review as-built plans, shop plans, previous load rating calculations, and 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*.

The General Notes shall include a statement that the existing structure was evaluated using the AASHTO-CA BDS or LRFR method per the BLRM. If a project-specific evaluation criteria is approved, the General Notes shall reference it.



The permit rating determined from the analysis shall be included. If a design exception for a permit rating downgrade is granted, then denote the change.

For example:

The structure was evaluated using the *AASHTO LRFD Bridge Design Specifications and the CA Amendments* in compliance with STP 16.2.

Or:

The structure was evaluated using the Load and Resistance Factor Rating method per the *Caltrans Bridge Load Rating Manual* in compliance with STP 16.2.

At completion of the project, an electronic copy of the analysis or calculations sealed by a California Registered Professional Engineer and analysis models shall be submitted to the SM&I Senior Permit Engineer.

16.2.3 REFERENCES

1. Caltrans (2022). *Structure Maintenance and Investigations Bridge Load Rating Manual*, 2nd Edition, California Department of Transportation, Sacramento, CA.
2. Caltrans (2021). Caltrans Structure Technical Policy 4.3, *Sound Wall Dead Load Distribution*, California Department of Transportation, Sacramento, CA.