

BRIDGE DESIGN STANDARD PRACTICES

The following standard practices were established by the Bridge Design Standard Practices Committee in meetings held on August 17, 1992, November 17, 1992, and December 8, 1992. They were distributed by Consulting Engineers General Memorandum No. 93-7.

1. **Jacking Provisions**

Provisions for future jacking should be provided on all new bridges. This will be reflected in future Bridge Manual revisions.

2. **Expansions Joints**

The following procedure for the use of expansion joints when required has been developed:

- For movements up to 1-1/2" and for fixed joints, Asphaltic Plug Expansion Joints will be specified. Details for sawing and sealing at fixed ends is hereby deleted.
- For movements over 1-1/2" but less than 4", elastomeric concrete headers with strip seals will be used. Upcoming Bridge Design Manual revisions will include details for setting extrusions to avoid plow damage.
- For movements over 4", modular expansion joints will normally be specified. Although their performance has been marginal to date, alternates have not been developed. Finger joints may be used if a self cleaning trough can be provided.
- A temperature range of 120 degrees F should be used for determining movement.

3. **Deck Weepholes**

The use of 1-1/2" diameter PVC weepholes for deck drains has been revised. When the weephole falls outside the fascia girder where large slab overhangs exist, particularly at box girders, a short stub (3" below the bottom of the deck) should be used. This will be reflected in future Bridge Manual revisions in greater detail.

4. **Pile Splices and Reinforcement**

Bridge Manual Plates 3-6.1 and 3-6.2 concerning pile splice and point reinforcing are actually never used in the field. Contractors always prefer to use prefabricated splices and point reinforcing. These plates should be deleted and a note added to the general notes stating the Contractor may use prefabricated components.

5. **Granite Stone Curbing**

Granite stone curbing will no longer be used on bridges or retaining walls. Details will be developed for a new parapet shape. In the interim, designers should use best engineering judgement in their modification of the existing parapet to eliminate the use of granite curbing.

6. **Diaphragms**

AASHTO Article 10.20.1 requires that diaphragms be placed normal to the girders when the skew angle is greater than 20 degrees. This sometimes causes problems due to large differential deflections when diaphragms are placed in line across the bridge and not staggered. Designers should be aware of this potential problem and consider staggering diaphragms for this reason.

7. **Lateral Wind Bracing**

Designers should make every reasonable attempt to avoid the use of lateral wind bracing. AASHTO Article 10.21.1 states "The need for lateral bracing should be investigated. Flanges attached to concrete decks or other decks of comparable rigidity will not require lateral bracing."

8. **Steel Designations**

Designers shall specify ASTM A709, Grade 50 steel (formerly ASTM A572) for painted steel structures. The Department's previous practice of specifying ASTM A588 (painted) is hereby discontinued. Unpainted steel shall be specified as ASTM A709, Grade 50W (formerly ASTM A588). The designation "ASTM A36" is hereby discontinued and replaced by "ASTM A709, Grade 36."

9. **Weathering Steel**

The Department's recent experience concerning repainting of structural steel has brought about a reassessment of our practice of discouraging the use of unpainted weathering steel in all applications. Factors leading to this reassessment include the rapidly escalating cost of containment systems for paint removal and the likelihood that environmental constraints will increasingly limit the availability of durable systems in the future.

In order to limit the need to repaint in the future, it is preferred that any new steel bridges in appropriate locations be constructed of unpainted weathering steel. In general, appropriate locations include railroad crossings and crossings over fresh water streams and rivers, and overpass structures where vertical clearance is high enough to prevent salt spray from reaching the steel. Inappropriate locations include structures over or very near salt water, and most overpass structures. In general, vertical clearance must be at least 30 feet at overpasses and the area under the structure relatively open to totally eliminate salt spray.

In addition, unpainted weathering steel bridges must be designed to eliminate deck joints or to protect areas of steel near joints from leakage, and proper precautions taken to minimize substructure staining. Provisions should also be included to control vegetation growth under the structure to reduce moisture in the air which could have a detrimental effect on the structure.

Concrete structures should also be considered as an alternative to painted or unpainted structural steel. Factors such as ease and speed of construction, potential future maintenance cost, and disruption to the motoring public should be considered during type selection in addition to initial construction cost.