INTEROFFICE MEMORANDUM

DATE: April 8, 1971

TO: Bridge Design Personnel

FROM: Frank Harrison

SUBJECT: Changes in Design Resulting From the AASHO 1971 Interim Specification

Interim 1 - Article 1.3.6

Applies to investigating fatigue in steel grid floors which are not commonly used in this state.

Interim 2 - Section 6

This section has been rewritten to allow continuous prestressed structures and make the section independent of other sections of the specifications. Although much of design procedure remains the same as the 1969 Specifications, the following deletions, changes and additions have been made.

1. Notation changes.
2. Article 1.6.5, Load Stages, is deleted.
3. Allowable stress changes.
4. Article 1.6.12, Continuity, is added.
5. Article 1.6.15, End Blocks, is renamed Anchorage Zones and changed.
6. Article 1.6.17, Post-Tensioning Anchorages and Couplers, is added.
7. Article 1.6.21, Span Lengths, is added.
8. Article 1.6.22, Expansion and Contraction, is added.
9. Article 1.6.23, T-Beams, is added.
10. Article 1.6.24, Box Girders, is added.

The designer is advised to read the commentary on this section before attempting to design prestress.

Interim 3 - Article 1.7.3 - Fatigue Stresses

1. Butt welded splices to plate girders are now checked for fatigue in category J, base metal adjacent to continuous flange-web fillet welds. Category J requirements have changed.

2. Allowable fatigue stresses for base metal have increased - see new curves 7, 8, and 9, figure 1.7.3A.

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3. Fillet welded cover plates will be somewhat less restricted by fatigue in the 100,000 and 500,000 cycle ranges. See new curves 10, 11, and 12, Figure 1.7.3B.

Interim 4 - Article 1.7.4 - Pins, Rollers and Expansion Rockers

1. Allowable stresses for design of pins, rollers and rockers 4" diameter or less AASHO M-169 or ASTM A-108 have been reduced.

Interim 5 - Article 1.7.20 - Splices and Connections

1. Some bolted field web splices have been controlled by the first paragraph requirement that 75% of the web shear strength be developed in the splice. An alternate procedure now permits design for a shear equal to the maximum shear due to applied loads multiplied by the ratio of splice design amount to maximum moment due to applied loads. The alternate procedure should reduce the number o fasteners required in webs of deep girders which usually have excess shear capacity.

2. The width transition of plate girder flanges in all commonly used grades of steel may be accomplished with a taper in place of the more expensive circular transition for width formerly required.

Interim 6 - Article 1.7.68 - Cover Plates

1. The maximum thickness of a single cover plate has increased from 11/2 to 2 times the flange thickness. Cover plates wider than the beam flange must be welded transversely at the ends. The designer must still observe thickness limitations on steel grades.

Interim 7 - Article 1.7.118 -1.7.139 - Load Factor Design

This is a new article in the Structural Steel Section which permits the design of steel structures by load factors as an alternate method. The applied loads are multiplied by factors greater than 1 and compared to the ultimate capacities of cross sections to resist axial load, moment, etc. Service loads (calculated weight of the structure, live load and impact) will still be applied to the elastic moment of inertia to calculate.

1. Shear connector spacing
2. Fatigue calculations
3. Deflections

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This will require us to calculate plastic as well as elastic section properties and add several additional steps to the design procedure.

Advantages include material savings and better insurance against overload failure. Disadvantages will be more cases where the deflection limitations and fatigue control. We will first adopt load factor design for a limited range of span lengths for certain roadway widths of simple composite I-beams. For the time being, load factor design will be used on selected jobs only, with working stress design a perfectly acceptable alternate design procedure.