

IOWA DEPARTMENT OF TRANSPORTATION

To Office Bridges and Structures Date June 29, 2007
Attention All Employees Ref No. 521.1
From Gary Novey
Office Bridges and Structures
Subject Method's Memo No. 162 (Bridge railing selection on interstate and primary highways)

A new policy for determining Test Levels (TL) and the associated heights for railings on interstate and primary road bridges was approved by the Highway Division Management Team. This policy is intended to be a supplement to the current AASHTO LRFD Bridge Design Specifications, Section 13: Railings. See Attachment A for additional information.

The new policy states the following:

- All interstate mainline bridges shall require a TL-5 (minimum height of 44": 42" plus 2" for future overlay) railing.
- Bridge railing test level and the associated height for other primary highways shall be evaluated by Pre-Design Section (Field Exam) for replacement structures and the Preliminary Bridge Section for other bridges.

This policy is applicable to new bridges, bridge replacements, deck replacements and bridge widening and is effective immediately.

Bridge repair or rehabilitation projects where the existing railing is not affected by such work will not be required to comply with this policy and no retrofit is needed. If you have any question, please check with Ahmad Abu-Hawash for additional information.

GAN:dgb:bj

Guidelines for selection of railing for primary and interstate bridges

Generally, TL-4 (minimum height of 34": 32" plus 2" for future overlay) is considered acceptable for most interstate and primary roads with a mixture of trucks and heavy vehicles. But in some cases, other factors may require the use of TL-5 (minimum height of 44": 42" plus 2" for future overlay). These factors may include:

- Traffic volume and mix: The presence of high number of a van-type tractor-trailer as determined from predicted traffic data for the design year.
- Unfavorable site conditions where a rollover or penetration beyond the railing could result in severe consequences. This applies to bridges with fracture critical elements within the zone of intrusion or flyover bridges. Unfavorable site conditions includes:
 - Reduced radius of curvature
 - Steep down grades on curvature
 - Variable cross slopes

Examples of fracture critical elements may include cables on cable stayed bridges, hangers on arch bridges, and truss members on truss bridges or supports for sign structures.

- Approach roadway rail height
- Headlight glare
- Snow pile up during snow removal spilling over roadways below
- Snow pile up causing ramping up the barrier rail

The need for TL-6 (minimum height of 92") railing which is suitable for higher level of protection is not anticipated for the vast majority of bridges in Iowa.

A flow chart (Figure 1) has been developed to aid in the determination of the appropriate test level. The appropriate test level/rail height will need to be determined by the Pre-Design Section (Office of Design) in the early phase of project conception with input from the Districts during concept field exam. On projects that are not initiated in the Pre-Design Section, the determination of the test level will be the responsibility of the Preliminary Bridge Section (Office of Bridges and Structures). This effort will require some coordination among the various Engineering Bureau offices and the Districts.

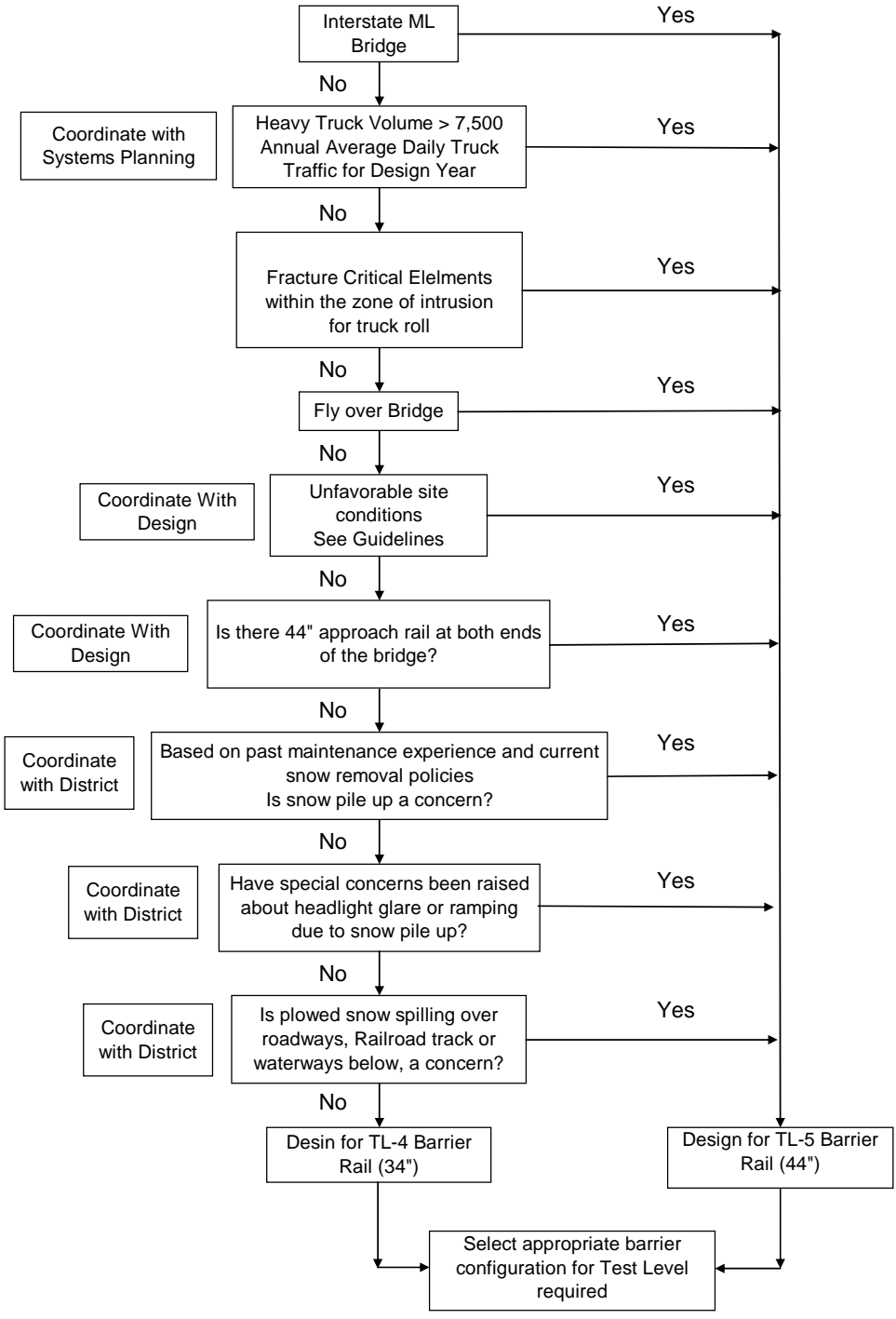
Based on examining the factors discussed above and the predicted truck traffic for 2035 (see Figure 2), all mainline interstate bridges except as noted below would qualify for TL-5 railing with a height of 44". Rail height on mainline bridges near on-ramps need to be investigated for potential conflict with sight distance. Bridges on other highways in Iowa, overhead bridges and ramp bridges would require a similar evaluation using the attached flow chart. Overhead bridges near interchanges, especially in urban areas near side roads/streets, will require close evaluation of the available sight distance to avoid potential conflict.

The evaluation criteria discussed in this memo applies to both the median and outside railings and in some cases may results in different railing heights on the same bridge. Other considerations such as aesthetics may influence the decision on whether same railing height would be used for

both the median and outside railings. Cost is a minor contributor based on comparing concrete volumes between the 34" and 44" rails. The 44" rail requires an additional 0.023 cu.yd. of concrete per lineal foot.

This policy is applicable to new bridges, bridge replacements, deck replacements and bridge widening. Bridge repair or rehabilitation projects where the existing railing is not affected by such work will not be required to comply with this policy and no retrofit is needed.

Figure #1
Flow Chart for determining Bridge Barrier Rail Height on Interstate and Primary Highways



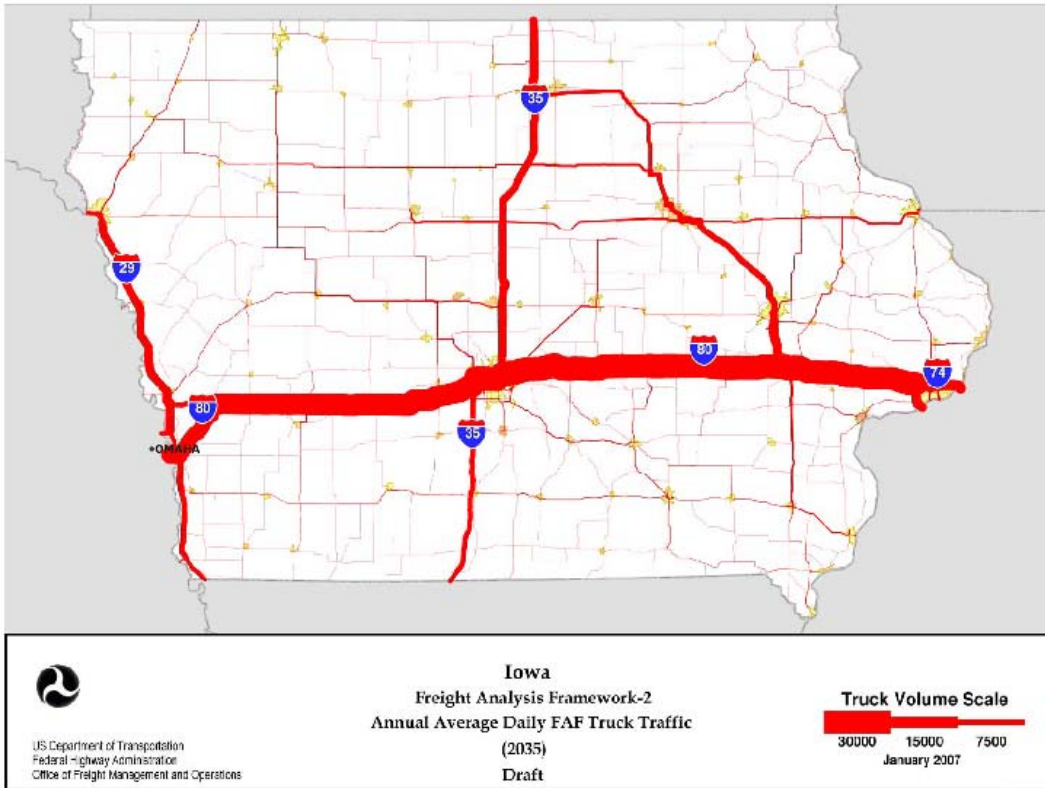


FIGURE 2