

Minimum Bridge Width for SLC Girder Structures

Introduction

The AT Roadside Design Guide (section 5.4.1) states that the minimum bridge width for new bridge construction is 9.0m. However, the closest configurations of SLC girders to this standard provide either 8.7m or 9.9m clear roadway. Technically, the minimum standard would rule out use of the 8.7m clear roadway configuration. However, due to the potentially significant cost increase, the following practice has been developed to achieve a balance between the principles behind the minimum standard and the available structure options.

Background

Section 5.4.1 of the AT Roadside Design Guide details the requirements for bridge width, based on shy line offset values to the bridge rails. The guiding principle is that the clear roadway across the bridge should match the width associated with the design standard for the approaching roadway. However, a minimum shy line offset value of 1.0m has been identified, resulting in a minimum bridge width of 9.0m. This minimum width exceeds the approach roadway width in only a few cases, such as Service Classifications 2 and 3 with Design AADT < 200vpd (based on Aug. 2001 version of Table A3.2i in Design Bulletin 27), and Local Roads with Design AADT < 200vpd (based on Table H1.1a in the Highway Geometric Design Guide).

SLC girder widths are similar to those of SCC girders, as detailed on standard drawing S-1630 (rev-1), which shows a clear roadway width of 8.72m for 8 girder lines and 9.94m clear roadway width for 9 girder lines. Non-composite SL girders (S-1685) can provide 8.94m of clear roadway width as they do not have integrated curbs. Therefore, the SL girders are very close to matching the minimum bridge width criteria with no excess. However, the closest SLC girder configuration provides somewhat less width, resulting in a shy line offset value of 0.86m. The most economical configuration that meets the minimum bridge width criteria is the 9.94m clear roadway option, which significantly exceeds the minimum criteria and requires an additional girder line.

Recommendation

The 8.72m clear roadway provided by an 8 girder line SLC structure is not considered to be equivalent to the minimum 9.0m clear roadway criteria. However, eliminating this option would result in an effective minimum bridge width of almost 10.0m for this type of structure. Therefore, it is recommended that the 8.72m clear roadway SLC option still be considered applicable in the following circumstances :

Service Classification 2 and 3 : Design AADT < 400vpd
Local Roads : Design AADT < 500vpd

These values would result in structures with shy line offsets of 0.86m (less than the minimum standard of 1.0m) only at sites where the approach road standard is either 8.0m or in the bottom third of the range for 9.0m. Analysis using guardrail encroachment equations indicates that the maximum number of annual encroachments (at 500vpd) is about 0.004 ($< 2.2 \times 10^{-6}$ % of vehicles), and the proposed allowable reduction would result in less than a 5% increase in this small number. In addition, the maximum daily number of times when opposing traffic is crossing the bridge is less than 4 for the 500vpd criteria based on the 1988 New Zealand DOT prediction equation. This suggests that most vehicles will have lots of room to shy from the bridge rails as there will be no oncoming traffic.

Contact

Questions or further information on this guideline may be directed to the Bridge Planning Specialist in the Bridge Engineering and Water Management Section of Technical Standards Branch.

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