

October 19, 2020

Bridge Rail Height & Bridge End Hazard Markers

Introduction

SARM quite often receives inquiries regarding bridge rail height and bridge end hazard markers and how they create an obstacle to over width equipment frequently used in agriculture. When rural municipalities contemplate reductions to their bridge rail heights and bridge end hazard markers, they consider not only their agency to alter these parts of their bridges, but the consequences of their bridges not meeting generally accepted standards. The response to these inquiries is multifaceted and involves three of SARM's current departments: Legal Services, Municipal Bridge Services, and Insurance. These three departments have collaborated to create this information package to address inquiries pertaining to bridge rail height or bridge end hazard markers.

Legal Framework

Duty of Care: Section 343 of The Municipalities Act not only imposes a duty of care but goes on to prescribe that a breach of the duty created by Section 343 of the Municipalities Act constitutes negligence if a loss ensues.

At the outset, it should be noted that the RM has the direction, control and management of all streets and roads within the RM (with the exception of those roads designated as Provincial Highways), by virtue of section 12 of The Municipalities Act.

The terms "streets" and "roads" are so defined in The Municipalities Act to include all bridges located along those roads.

Pursuant to Section 343 of The Municipalities Act, the RM is required to keep all of its roads and bridges in a "reasonable state of repair," and will be held civilly liable should someone sustain damage because of a failure to do so.

Standard of Care: What must a municipality do to meet this obligation or, to put it another way, what is the required standard of care?

Section 343 of The Municipalities Act states in part that “a street, road or other public place is to be considered in a reasonable state of repair if those who use [it] can, exercising ordinary care, do so with safety.”

In determining whether a municipality has met the required standard of care in any case, the courts may have regard to standards or guidelines provided by provincial government agencies, such as the Ministry of Highways and Infrastructure or other specialty organizations such as the Transportation Association of Canada and its Manual of Uniform Traffic Control Devices for Canada. Generally accepted standards and guidelines are not considered conclusive but, rather, simply evidence as to whether you have met the required standard of care.

Generally Accepted Bridge Standards

Bridge Rail Height: Please note that:

- 1) Clause 12.4.3.1 of the CSA S6:19 Canadian Highway Bridge Design Code states:

Traffic barriers shall be provided on both sides of bridges to delineate the superstructure edge and to reduce the consequences of vehicles leaving the roadway. Barrier adequacy in reducing the consequences of vehicles leaving the roadway shall be determined from crash tests.

- 2) Table 12.8 of the CSA S6:19 Canadian Highway Bridge Design Code states in part:

Minimum Traffic Barrier Height operating under the two lowest test level conditions (Test Level 1, TL-1 & Test Level 2, TL-2) shall be 680 mm.

The height of the [traffic] barrier is the vertical distance from the top [of the barrier] to the bottom of the roadway . . . face of the traffic barrier, as applicable.

The Saskatchewan Ministry of Highway and Infrastructure has adopted a bridge rail system similar to the California Type 115 bridge rail system (see attached sketches) that has been crash tested with a height of 762 mm from the top of the barrier to the top of the roadway surfacing. If the California Type 115 traffic barrier height were altered, the crash test performance of the barrier would be unknown and would need to be verified by crash tests.

Should your Municipality decide to lower the height of the bridge rail on the proposed bridge below 762 mm, your Municipality may assume an increased liability exposure when a vehicle impacts the bridge rail and if your Municipality lowers the rail height below 680 mm the possible increased liability exposure would be even greater.

Bridge End Hazard Markers: Please note that:

- 1) RMTSM 3-6 of the Rural Municipal Traffic Signing Manual states in part:

Bridge End Hazard Markers are to be installed directly in front of the bridge abutment with the inside edge of the WA-36(L/R) sign aligned with the outside edge of the bridge deck and their bottom edge 1.0 meters above the roadway surface. Bridge End Hazard Markers may be installed in a manner which allows for them to be removed to allow over width loads to pass.

SARM Municipal Bridge Services has investigated installation methods for bridge end hazard markers and has determined what they believe is the optimal installation system. If the bridge end hazard marker is installed with a hinge point and counterweight that allow it to act as a pendulum when impacted by over width loads the installation can meet all of the position requirements stated in RMTSM 3-6 and is removable for over width traffic without requiring the road user to replace the sign after crossing the structure. Information pertaining to this bridge end hazard marker installation alternative is attached.

Liability Insurance

The Liability Self-Insurance Plan (LSIP) cannot endorse the construction or modification of a bridge that falls below generally accepted standards. If during the investigation of a claim involving a bridge, the particular bridge was found to have been built or modified to a standard below generally accepted standards, it may well serve to increase the likelihood of the RM being found liable in a lawsuit. That being said, if the RM Council ultimately decides to construct or modify a bridge for use on its roads which falls below generally accepted standards, this would not preclude the RM from coverage under its liability insurance.

The RM's liability coverage through the LSIP would cover (i.e. defend) the RM against any claims for bodily injury or property damage arising out of a 3rd party's use of an RM bridge, regardless of how the particular bridge was constructed, whether or not it was engineered, or whether or not any aspect of it deviated from generally accepted standards. There are no clauses within the policy wording for the LSIP, which state any requirements for an RM bridge, in order for it to qualify for liability coverage.

Risk Management

With risk management the most important thing you can do is be proactive in identifying and dealing with potential hazards. If Council decides to construct or modify a bridge below generally accepted standards, you may want to consider high visibility delineation of the bridge and installing regulatory maximum speed signs to require vehicles to slow down before crossing the bridge and put in place a reasonable system for inspection of the same.

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Summary

Every RM has a statutory responsibility under Section 343 of the Municipalities Act to keep their roads in a reasonable state of repair, such that the traveling public exercising ordinary care, can travel the road safely. This responsibility extends to bridges, culverts, and low-level crossings as well.

It is, of course, up to Council to decide what to do with bridge rail height and bridge end hazard markers. There is no legislative or regulatory requirement that obligates your Municipality to a particular bridge rail system or to a bridge rail system at all. However, if you choose to install bridge rails or hazard markers which are lower than the generally accepted standard, and if someone were to sustain damage as a result, there is a risk of liability. Generally accepted standards are considered evidence as to what is reasonable. Thus, if one complies with the generally accepted standards, then that is considered evidence that the person has met the required standard of care. Conversely, if one does not comply with the generally accepted standards, then that is considered evidence of negligence.

Having said this, we understand that there are practical reasons for reducing bridge rail and hazard marker heights to facilitate the movement of equipment. If that is what Council is of the view it needs to do, then we recommend (i) that you set out in a policy approved by resolution of Council the standard you are going to adopt and the reasons why and (ii) that measures be taken to reduce the speed of vehicles as they approach and cross the bridge, so as to minimize the risk of a vehicle going off of the bridge.

Should you require further information, please contact one of the undersigned at SARM.

Sincerely,

Michael Morris

Michael Morris, Q.C.
Director of Legal Services

Daniel Segal

Daniel Segal, P. Eng., PMP
Director of Municipal Bridge Services

Craig Williams

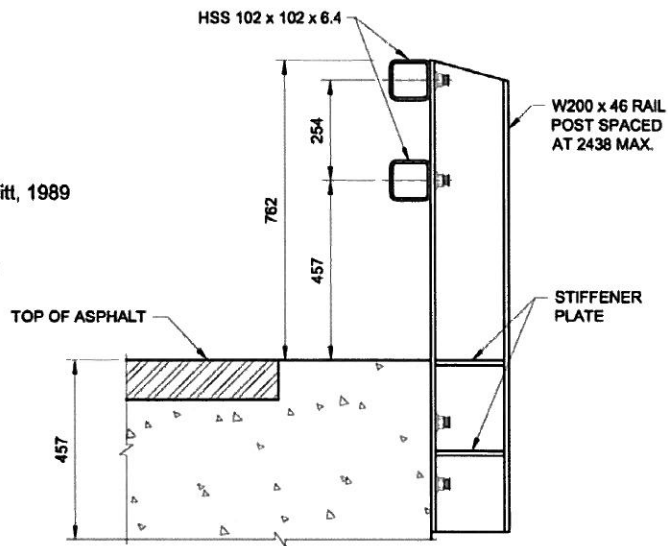
Craig Williams, BBA, CIP
Director of Insurance & Benefits

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Barrier Information

Performance Level: PL-1
 Test Level: TL-2
 Reference: Buth and McDevitt, 1989
 FHWA, 1990
 US Usage: California
 Canadian Usage: British Columbia
 Ontario

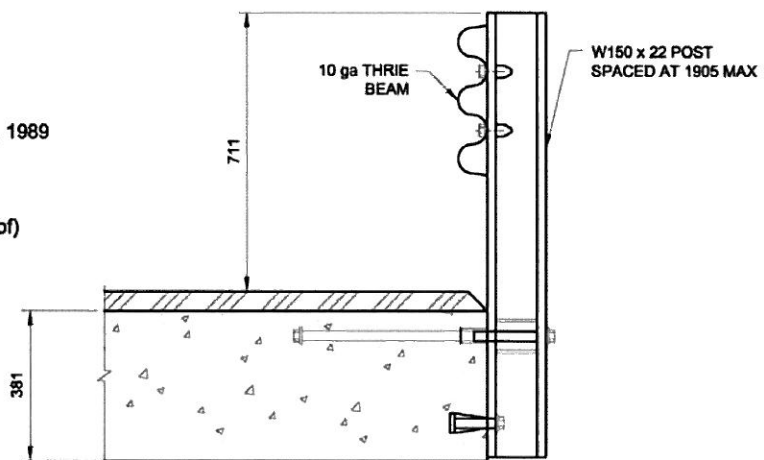


CALIFORNIA TYPE 115

Figure 4.23

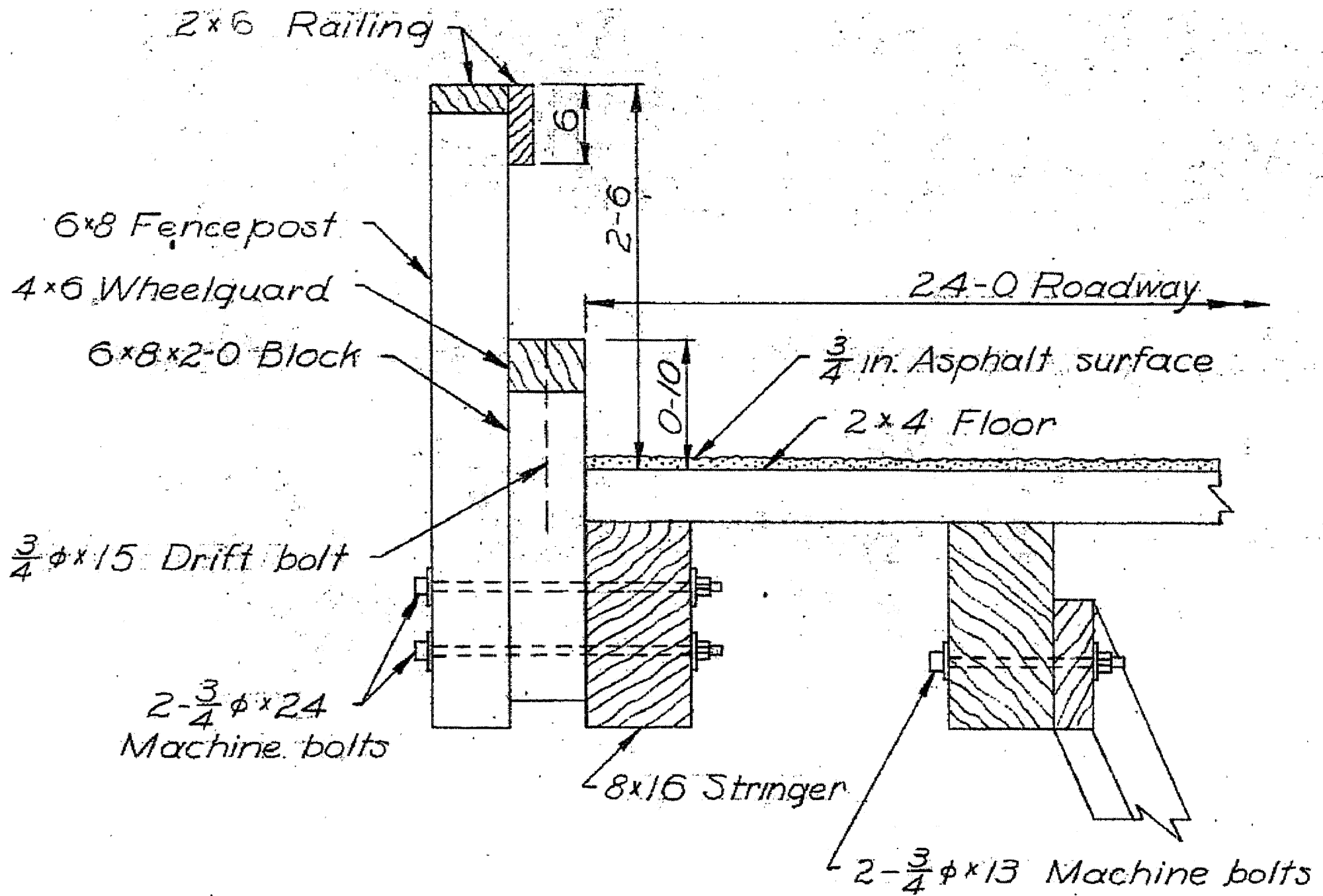
Barrier Information

Performance Level: PL-1
 Test Level: TL-2
 Reference: Buth and McDevitt, 1989
 FHWA, 1990
 US Usage: Oregon
 Canadian Usage: British Columbia
 Ontario (a version of)



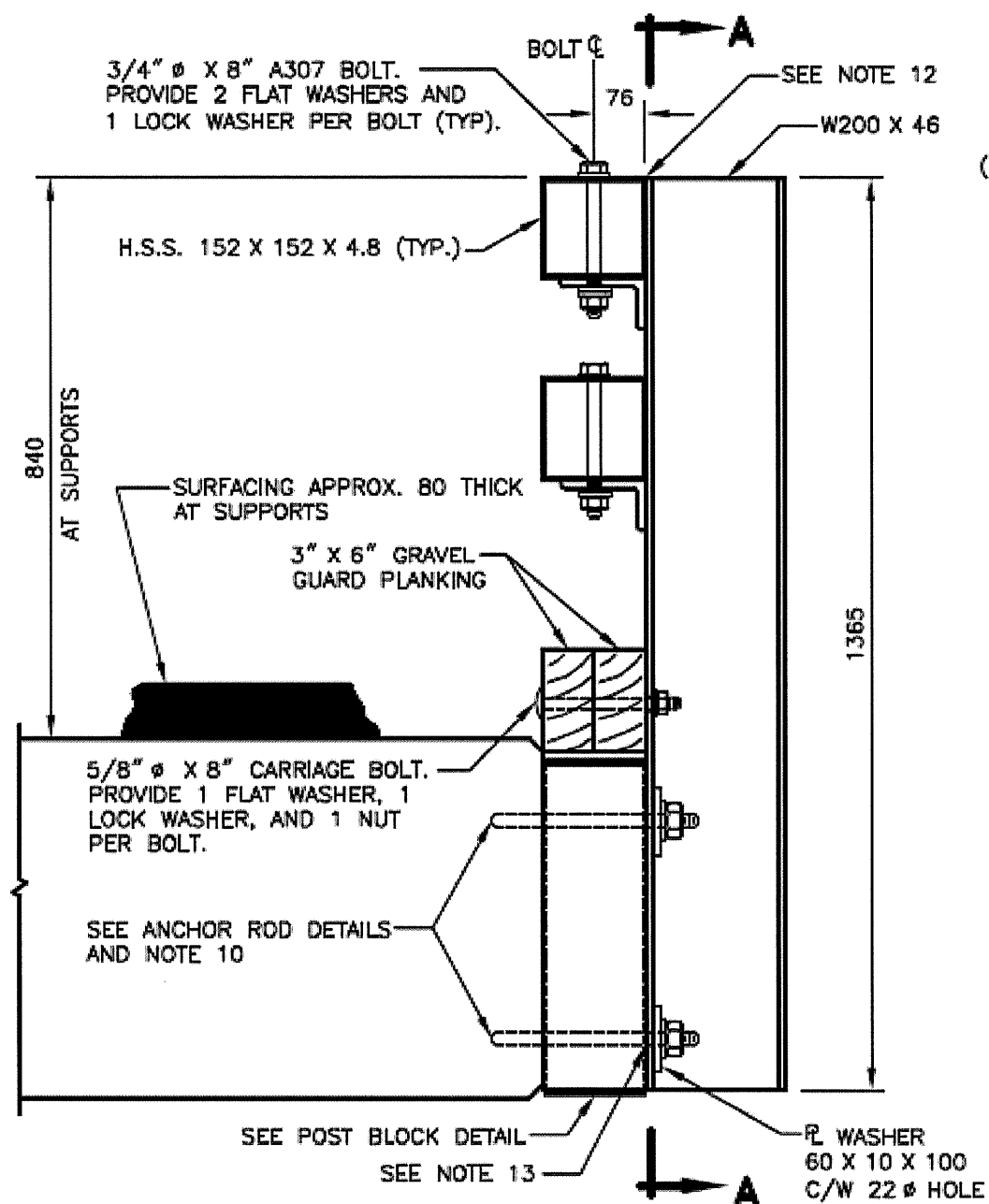
OREGON SIDE - MOUNTED THRIE BEAM

Figure 4.24

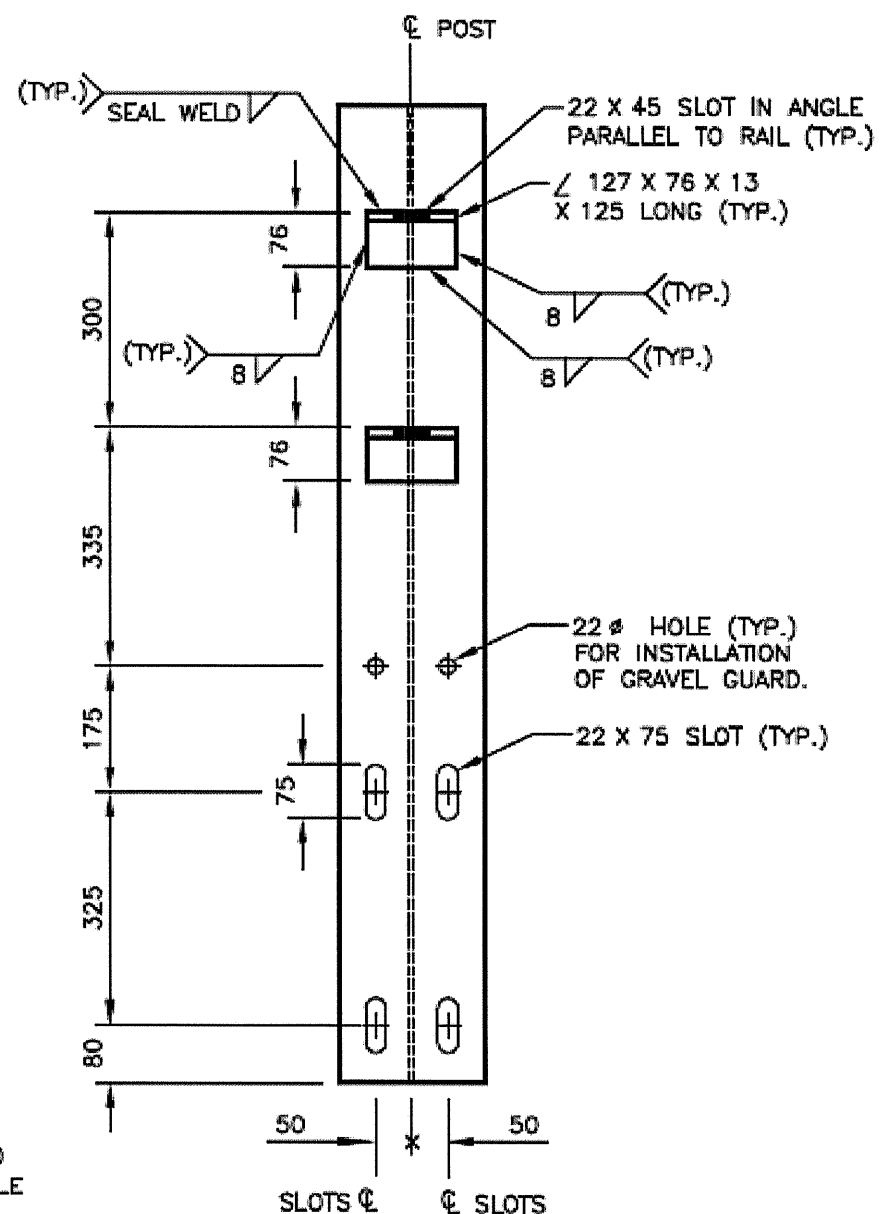


FENCE DETAIL

Scale: 3/4 in. = 1 ft.



SIDE ELEVATION



SECTION A-A

POST DETAILS



January 11, 2016

To Whom It May Concern:

RE: Bridge End Hazard Markers

SARM Municipal Bridge Services has been investigating alternative installation methods for bridge end hazard markers in response to regular inquiries from rural municipalities regarding best practices and consequences of maintaining or not maintaining the signs according to the current Rural Municipal Traffic Signing Manual RMTSM 3-6. We have determined what we believe is the optimal installation system for bridge end hazard markers.

The installation system allows the WA-36 sign to be installed with its bottom edge 1.0 meters above the roadway and its inside edge flush with the inside edge of the bridgerail as stated by RMTSM 3-6. The installation system also requires no effort on the part of the roadway users to remove or replace the signs when they present a barrier to traffic. The installation system described in these documents is for information purposes only and is not intended to replace the existing standard RMTSM 3-6.

Please refer to the attached drawings for a detailed description of the installation system. The drawings are to relay the general idea of the installation; the drawings will not fit all situations so they do not have to be built exactly as shown. We recommend that the installation system be modified in order to fit each bridge site and the needs of your rural municipality with consideration taken of the points below.

- 1) The top of the support bracket must be below the top of the existing bridgerail to avoid being an additional barrier to traffic.
- 2) The support bracket in the drawings was drawn with the assumption of using salvaged grader blades to construct the support bracket. Please test your chosen support brackets for stability and modify them as necessary to ensure they are adequate, especially when the sign is upset by traffic.
- 3) If a bolt is used to create the hinge (as seen on the drawings) or any other hardware is placed in the installation perpendicular to traffic, we recommend that a rounded bolt head be used on the roadway side of the installation to avoid creating a snag hazard for traffic.
- 4) The counterweight should be large enough that strong winds cannot upset the sign.
- 5) If the sign is upset beyond 90° (horizontal), its bottom end can present a snag hazard to the vehicle passing over it. The counterweight could be made heavy enough that the sign is less likely to pass through horizontal, but the increased effort required to upset the sign could result in damage to vehicles. We have included two possible solutions on the drawings to prevent the sign from rotating beyond 90°. The two possible solutions are described below.



- a. Bridgerail Stop: the existing bridgerail can be used to stop rotation of the sign. This technically only works for traffic passing onto the bridge and not off of it, but since the hinge point is below the top of the existing bridgerail there shouldn't be concerns with vehicles leaving the bridge unless the counterweight is not heavy enough and/or the vehicle hits the sign too forcefully.
- b. Leash: a cable, chain, etc. connecting the bottom of the sign post to the support bracket could be used to limit rotation of the sign. This solution would be able to limit the signs rotation in both directions so that it would work for traffic passing onto and off of the bridge.

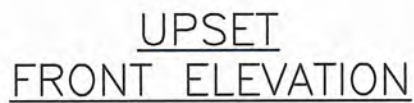
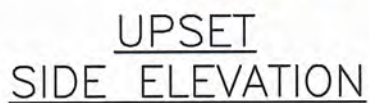
I wish to state again that the installation recommended in these documents does not replace the existing standard for bridge end hazard markers. Neither does this installation have to be used or used in the specific way described in these documents. Every rural municipality will have unique challenges to overcome or may not even feel this is the optimal solution for them. I encourage you to use and modify this information as you wish so that it best fits your needs.

I hope that this information proves to be useful to your rural municipality. If you have any further questions, please feel free to contact Municipal Bridge Services.

Sincerely,

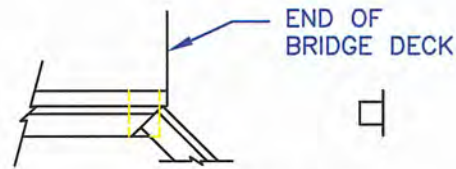
Daniel Segal, P. Eng.

Director of Municipal Bridge Services

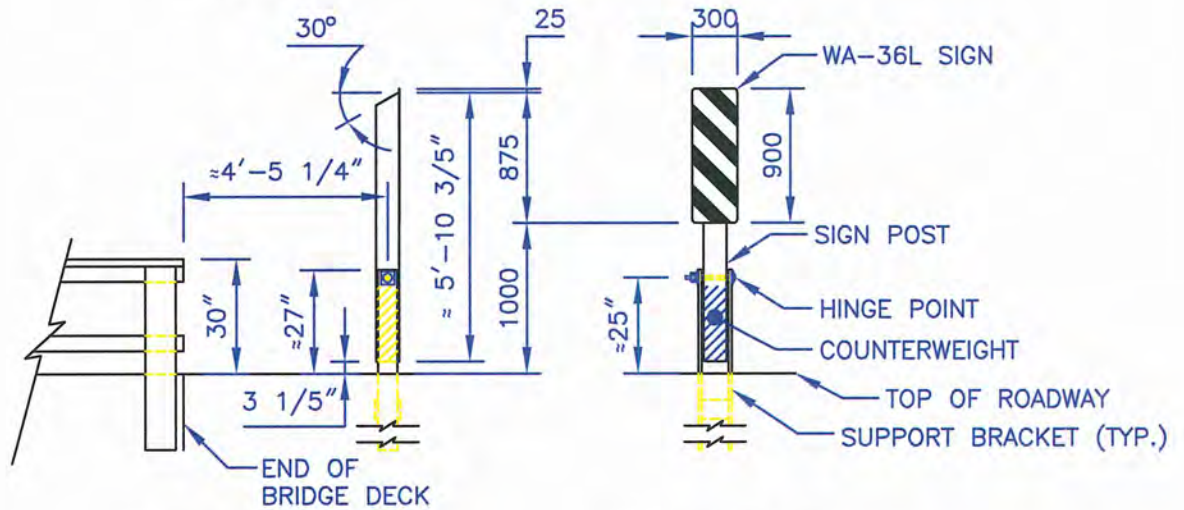


SCALE 1:25

NOTE: THE INSTALLATION AT THE OTHER CORNER OF THE
ABUTMENT IS A MIRROR IMAGE OF THIS INSTALLATION.

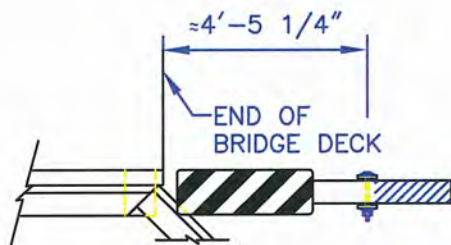


UPRIGHT
PLAN

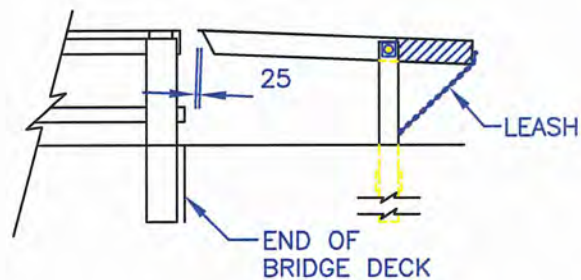


UPRIGHT
SIDE ELEVATION

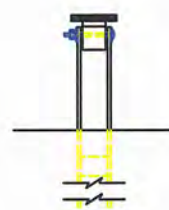
UPRIGHT
FRONT ELEVATION



UPSET
PLAN



UPSET
SIDE ELEVATION

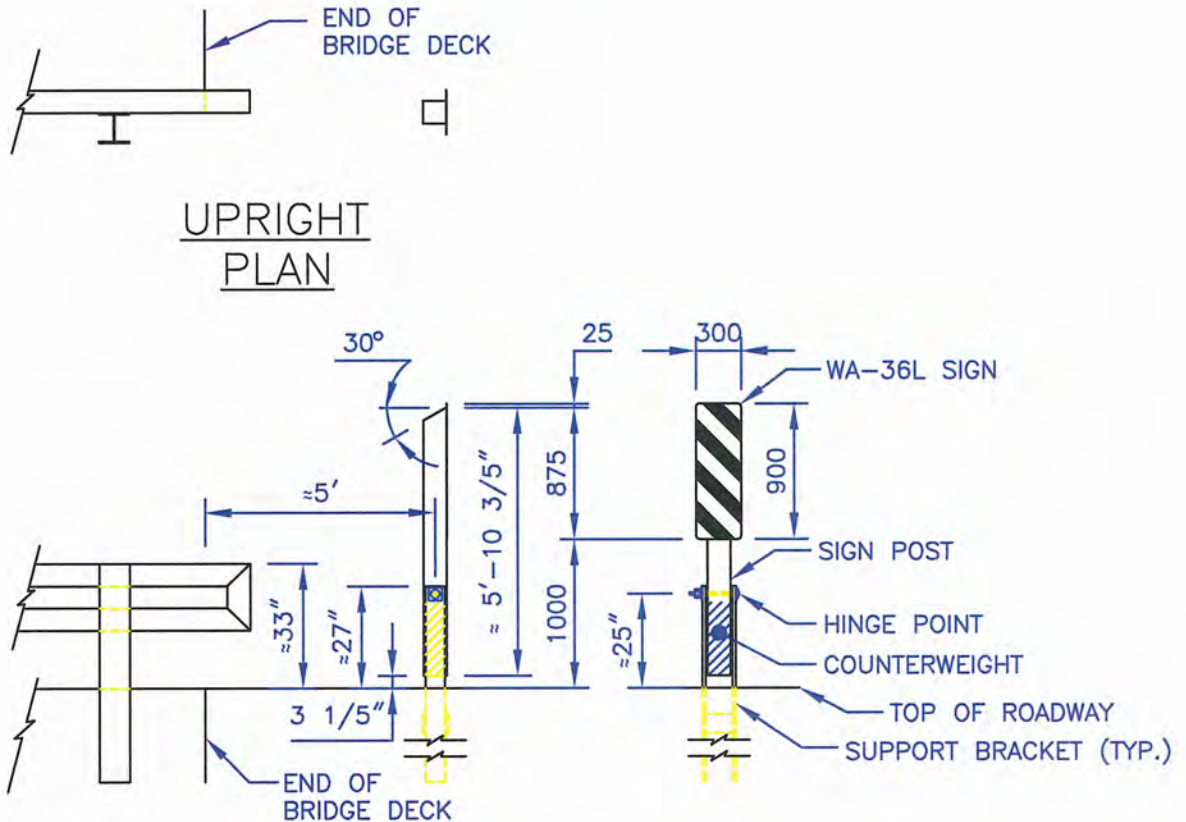


UPSET
FRONT ELEVATION

TIMBER BRIDGERAIL WITH WINGRAIL INSTALLATION

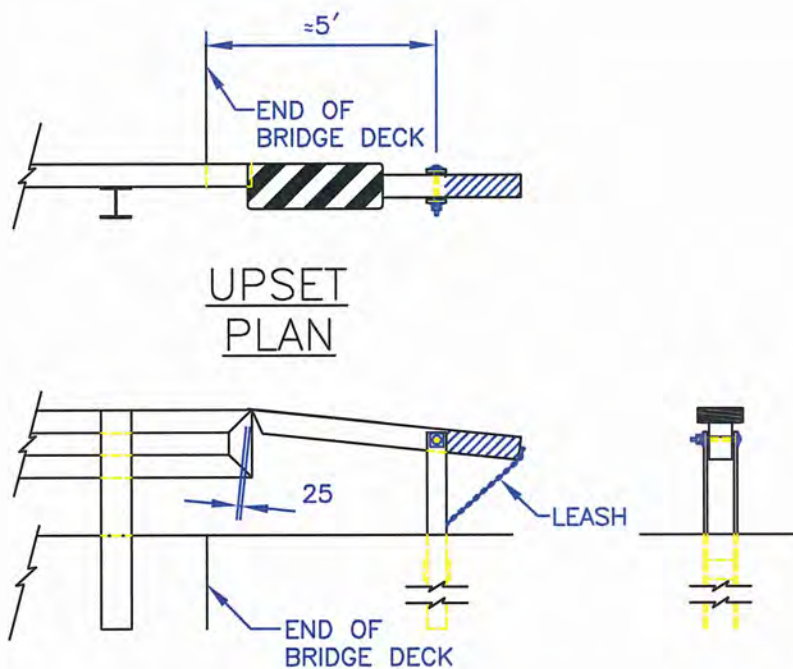
SCALE 1:25

NOTE: THE INSTALLATION AT THE OTHER CORNER OF THE ABUTMENT IS A MIRROR IMAGE OF THIS INSTALLATION.



UPRIGHT
SIDE ELEVATION

UPRIGHT
FRONT ELEVATION



UPSET
SIDE ELEVATION

UPSET
FRONT ELEVATION

STEEL BRIDGERAIL INSTALLATION

SCALE 1:25

NOTE: THE INSTALLATION AT THE OTHER CORNER OF THE ABUTMENT IS A MIRROR IMAGE OF THIS INSTALLATION.





RURAL MUNICIPAL TRAFFIC SIGNING MANUAL

Section:

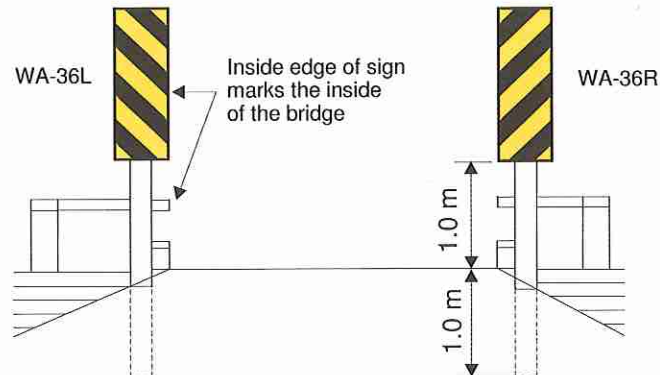
DELINEATORS & HAZARD MARKERS

Subject:

BRIDGE END HAZARD MARKER

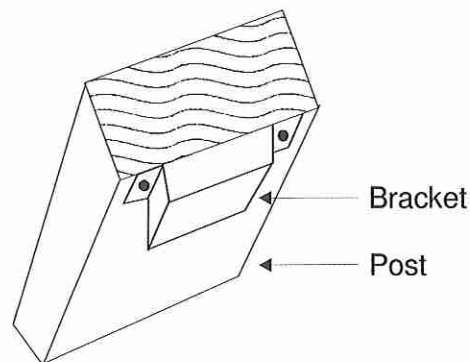
BRIDGE END HAZARD MARKER

Place the hazard markers directly in front of the bridge abutment.



Hazard Marker Bracket

The Hazard Marker Bracket may be used at locations where the hazard markers may have to be removed to allow overwidth loads to pass.



Brackets are made of 1 1/4" flat iron. 2 brackets are required per post.