

Code of Practice

Bridge support protection

1. Scope and application

BTN003 Bridge support protection states VicRoads' requirements for the design of protection of supports for new bridge structures.

Bridge Technical Notes are a Code of Practice. Compliance with Bridge Technical Notes is mandatory.

Other than as stated in this document and relevant VicRoads standard specifications, the provisions of AS5100:2017 shall apply. Where this document differs from AS5100:2017, its requirements override those of AS5100:2017.

2. Terminology and Abbreviations

AGRD	Austrroads Guide to Road Design
Clear Zone	As defined in the AGRD
Protection barrier	A reinforced concrete barrier as illustrated in Appendix C

3. Design for strength

3.1. Loads

Collision loads shall be in accordance with AS5100.2:2017 C111.

3.2. Structural design

Barriers components shall be designed and detailed in accordance with the requirements of AS5100.5 and AS5100.6.

3.3. Foundations

In all cases protection barriers shall have a suitable foundation designed in accordance with AS5100.3:2017.

Foundations for protection barriers in new structures may be combined with the bridge foundation.

4. Collision from road traffic

4.1. General

Parameters to be considered in a risk assessment methodology are given in Appendix A. The list is not exhaustive and it might be necessary to consider other parameters.

4.2. Bridge supports

Bridge supports supporting road, rail and pedestrian bridges shall be positioned outside of the Clear Zone.

If site constraints do not permit the bridge supports to be positioned outside of the Clear Zone, a reinforced concrete barrier shall be provided in accordance with the detail shown in Appendix D.

4.3. Geometry

The cross-section and height of protection barriers shall be determined in accordance with clause 6.3.16 of AGRD Part 6.

Protection barriers and their connections to approach and departure barriers shall comply with AS5100.1:2017 C114.3 (b) to (i).

4.4. End treatment

A transition to a roadside or median barrier shall be provided at the ends of protection barriers. If site constraints do not permit the use of a transition barrier, a proprietary attenuation device shall be provided.

5. Collision from rail traffic

5.1. General

Structures over rail shall have a clear span between abutments.

However, in exceptional cases, when provision of an intermediate support is unavoidable, the designer shall consult the rail authority to determine its requirements for design of protective barriers.

Proposals for inclusion of intermediate supports shall be submitted to the Superintendent for approval. Submissions for approval shall include fully detailed justification for adoption of an intermediate report

Parameters to be considered in a risk assessment methodology are given in Appendix B. The list is not exhaustive and it might be necessary to consider other parameters.

5.2. Frangible piers

Frangible piers shall not be used to support road over rail bridges.

5.3. Abutments

Appendix A states the parameters to be considered if a risk assessment is required pursuant to AS5100.1 clause 15.3.2.

The designer must consult the rail authority to determine the possibility of additional tracks in the future. If additional tracks are planned, the design shall be prepared on that basis.

5.4. Deflection walls

Appendix A states the parameters to be considered if a risk assessment is required pursuant to AS5100.1 clause 15.3.6.

6. Collision from waterway traffic

New structures shall be designed in accordance with the methodology stated in AS5100.1:2017 Clause 15.4 and subject to the requirements of AS5100.2:2017, in particular, Clauses 11.6 and 16.7.

Parameters to be considered in a risk assessment methodology are given in Appendix C. The list is not exhaustive and it might be necessary to consider other parameters.

7. Connections and other details

7.1. Bonded and mechanical anchors

Use of bonded or mechanical anchors (as defined in BTN006 and BTN008 respectively) in structural connections is not permitted.

8. Constructability and maintainability

In the event of a collision, the design shall include provisions to enable replacement of a severely damaged barrier.

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Bridge Technical Notes are subject to periodic review and may be superseded.

Appendices

Appendix A

Risk assessment

If a risk assessment is required, the following parameters shall be considered:

Collision by road traffic

- class of road
- design and operational speed of the road
- total traffic volume (AADT)
- percentage of commercial vehicles (CV%)
- road geometry
- vehicle accident records for this structure (if existing) and similar locations
- type, structural form, strength and robustness of existing and proposed bridge supports
- geometry of the existing or proposed bridge supports, with particular attention on tapered columns that might snag high vehicles
- distance from trafficked lanes to the face of new or existing bridge supports
- level difference between divided carriageways
- geometry and surface levels in the central median area
- presence of drainage channels or other features in the median
- presence of a sealed shoulder or emergency stopping lanes between the trafficked lanes and the bridge supports
- possible effects of a vehicle impact with a bridge support on vehicle occupants and third parties (persons and property)
- potential risks associated with introduction of bridge support protection system(s).

Note that the list is not exhaustive and it might be necessary to consider other parameters.

Appendix B

Collision by rail traffic

The rail authority shall be consulted to ascertain if a risk assessment is required and, if so, the specific methodology to be used.

Appendix C

Risk assessment

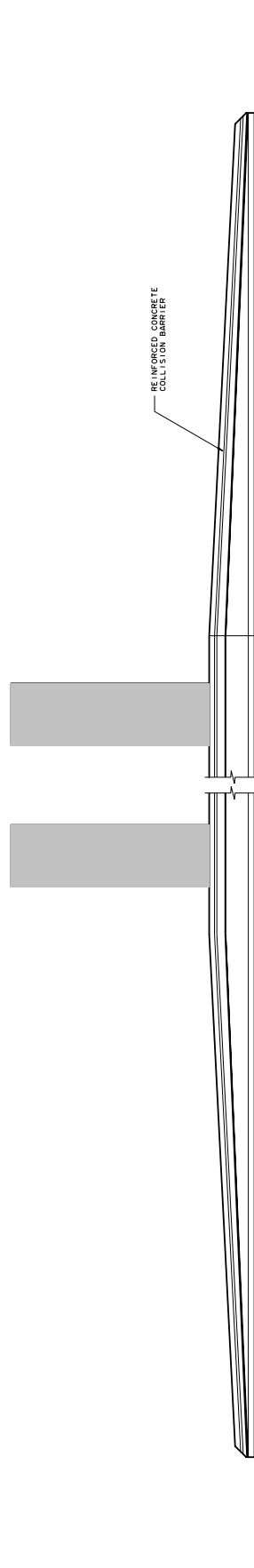
If a risk assessment is required, the following parameters shall be considered:

Collision by waterway traffic

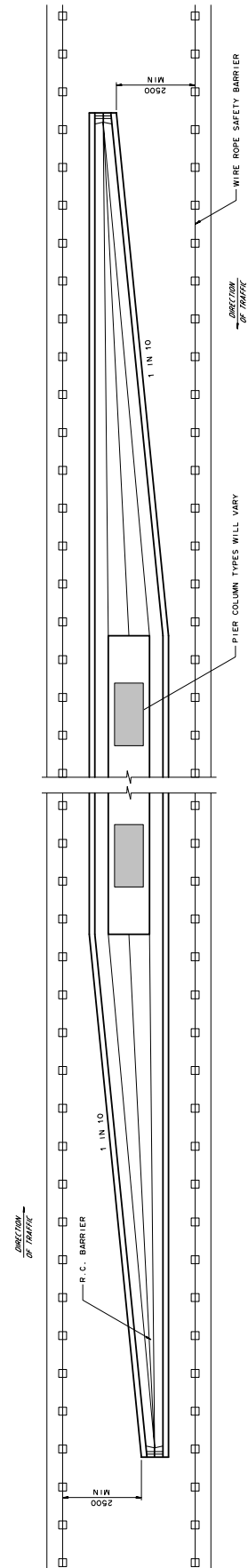
- type and weight of vessel currently operating on the waterway
- type and weight of vessel likely to operate on the waterway over the next 100 years
- risk of a vessel becoming detached from its mooring and colliding with a bridge during flood conditions
- risk of collision by an out-of-control vessel colliding with the structure from either upstream or downstream directions during normal weather conditions.
- evidence or past-history of vessel collisions with bridges on the waterway in question
- whether other structures (upstream and downstream) could shield the bridge in question and prevent a collision
- maximum flood velocity
- maximum speed of vessel
- collision loads
- debris loading
- deficiency in capacity of existing structure
- available methods of strengthening
- complexity of strengthening
- cost of strengthening
- availability of future opportunities to strengthen
- the possibility and practicality of providing partial protection – i.e. to piers and not to the superstructure
- option to provide only lateral restraint to prevent displacement of the superstructure
- risk to pedestrian and vehicle users of the bridge in the event of a collision
- effect on the road network if the bridge is closed or partially closed following a collision
- economic consequences of a temporary closure
- class of road
- design and operational speed of the road
- total traffic volume (AADT)
- percentage of commercial vehicles (CV%)

Note that the list is not exhaustive and it might be necessary to consider other parameters.

Appendix D Geometry



ELEVATION



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