
Specification & Guidelines for Road Safety Hardware

APPENDIX D: SLIP FORMED CONCRETE BARRIERS



April 2022

DOCUMENT REFERENCES

- AS/NZS 3845 Part 1:2015
- AS/NZS 3845 Part 2:2017
- Waka Kotahi NZTA M23
- Waka Kotahi NZTA M23 Interim acceptance notices
- Waka Kotahi Bridge Manual
- Waka Kotahi Traffic Control Devices Manual
- AUSTRROADS Part 6: Roadside Design, Safety and Barriers
- AUSTRROADS Part 3: Geometric Design
- American Association of Highway and Transportation Officials (AASHTO) Manual for Assessing Safety Hardware (MASH)



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This publication is also available on Waka Kotahi NZ Transport Agency's website at www.nzta.govt.nz



New Zealand Government



The Transport Agency is part of, and contributes to, the Road to Zero safety strategy.

Road to Zero is the government's strategy to guide improvements in road safety over the period 2020–2030. The strategy's vision is to stop people being killed or seriously injured on our roads. This means that no death or serious injury while travelling on our roads is acceptable.

For more information visit www.transport.govt.nz/zero

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SLIP FORMED CONCRETE BARRIERS

1. GENERAL

All slip formed concrete barrier shall be formed using the F-shape profile detailed in Section **Error! Reference source not found.** of the M23 document.

2. GEOMETRY

- 2.1 A 3 m long by 300 mm deep reinforced concrete anchor footing shall be provided at each barrier termination, at any intermediate open joints and spaced no greater than every 48 m for TL-4 and 24 m for TL-5. Reinforcing shall be continuous through intermediate anchor footings (no air gap required).
- 2.2 An anchor footing arrangement in accordance with the "Barrier and Anchor Footing Elevation" shown on Drawing B8-3 in Appendix B is an acceptable solution.
- 2.3 Where the barrier height transitions up or down, this shall occur over at a rate not exceeding 1V:15H.
- 2.4 To prevent random shrinkage cracking, contraction joints shall be provided at 3 m maximum spacing by saw cutting to a minimum depth of 50 mm; the cutting shall be carried out no more than 24 hours after the concrete has been poured.

3. SUBSTRATE

Substrate base material shall be compacted granular material, asphaltic concrete or similar as per the Engineer's specification. Level of base shall be embedded below finished pavement level on both sides as per the "Barrier and Anchor Footing Elevation" shown on Drawing B8-1 in Appendix B.

4. CONCRETE CONSTRUCTION

- 4.1 Concrete construction shall comply with NZS 3109 and NZS 3104 except at as modified below:
 - i) Concrete minimum cementitious content shall be 350 kg per cubic metre.
 - ii) Concrete maximum water cement ratio shall be 0.4.
 - iii) A set retarding admixture may be used.
 - iv) Concrete consistency shall be assessed by visual and tactile methods. Up to a total of 12 litres of clean water may be added to each cubic metre of batched concrete before and during placement. Slump and cylinder tests of concrete containing this additional water are not required unless requested by the Engineer.
 - v) Test cylinder samples may be taken at the production plant. Tests for acceptance shall be in accordance with clause 9.5.2 of NZS 3109. In addition, one extra cylinder shall be taken and tested at 7 days.
 - vi) Concrete shall be thoroughly compacted in the mould, such that the surface of the barrier extruding at the back of the mould is smooth and tight with no open areas appearing on the concrete that might otherwise indicate poor compaction.
 - vii) Barrier cross sectional tolerances shall comply with Figure 5: Slip Formed Concrete Barrier Dimensional Tolerances.
 - viii) Barrier position shall be within +/-30 mm of set out position.
 - ix) End of day joints and any barrier cut-outs shall be within +/-20 mm of design position and verticality.
- 4.2 Surface finish shall be Class U3 in accordance with NZS 3114.
- 4.3 Surface tolerances and irregularities shall meet the requirements for Class F4 in accordance with NZS 3114.
- 4.4 The four longitudinal bars shown in the "Barrier and Anchor Footing Elevation" on Drawing B8-3 in Appendix B shall be 12.7 mm low relaxation galvanised prestressing strand. Strand shall be suspended mechanically in the correct position within the mould while placing concrete. Cables/bars/strands shall be held taut (no visible sag) during slip forming.
- 4.5 Longitudinal prestressing strands shall be joined by overlapping the strand ends a minimum of 1 m and clamping each lap with four (4) half-inch commercial rope grips suitable for use with 12.7 mm (approximately half inch) strand. The grips shall be positioned at spacings no less than 200 mm apart and shall be clamped tightly.
- 4.6 Substrate base material shall be compacted granular material, asphaltic concrete or similar in accordance with the Engineer's specification. The base shall be embedded below finished pavement level on both sides as per Drawing B8-1 in Appendix B.