

Technical Direction

Bridge

BTD 2011/06 Rev 1 | RMS.19.1379 – 24 September 2019

Provisions for the Design of Super-T Girder Bridges

Summary:	Audience:
This technical direction sets out design and detailing provisions for Super-T girders.	<ul style="list-style-type: none"> • Bridge Designers • Asset Managers • Project Managers • Industry Partners

Information

This bridge technical direction sets out design and detailing of Super-T girder bridges to minimise risks and future repair costs.

Bridge Technical Direction

The design and detailing of Super-T girders must comply with Roads and Maritime Services standard bridge drawings B0200 Series;

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Approvals:

Owner:	Christian Christodoulou Director Bridges and Structures	Review Date:	24 September 2024
Authorised by:	Chris Harrison Director of Engineering	Effective Date:	4 April 2011 (1 st issue) 24 September 2019 (Rev 1)

The following provisions must apply:

Super-T Girders

1. The concrete cover in the standard drawings is based on exposure classification B1 as defined in AS 5100.5 *Bridge design – Concrete* and concrete characteristic compressive strength of 50 MPa at 28 days. For more severe exposure classifications, the concrete cover and girder flange thickness need to be increased to conform to the requirements of AS 5100.5.
2. The number of strands to be debonded at any section must not exceed 50% of the total number strands. Strands horizontally or vertically adjacent to a debonded strand, must not be debonded;
3. The minimum distance from the end of the girder to the bearing centreline measured along the girder centreline must be 400 mm for AS/NZS 4672.1 - 7wire ordinary -15.2 -1750-Relax 2 strands;
4. The coarse aggregate used in the concrete mix of Super-T girders must be graded with a nominal size of either 20 mm or 14 mm conforming to RMS B80 *Concrete Work for Bridges*;
5. Super-T girders should be placed on a transverse grade to match the cross fall of the deck slab. Where placing the girders on a transverse grade is not possible and a step will be created in the soffit of the deck slab, the effect of shrinkage and additional restraint associated with the slab thickness change at the step must be considered in the design to prevent cracking;
6. Designers and manufactures must ensure that the details of girders and link slabs will allow concrete to flow around the reinforcement and completely fill the space without voids or honeycombing;

Cross Girders

7. Cross Girders must be provided at the ends of Super-T girders. Cross girders must be designed for all load effects associated with bearing replacement in accordance with BTD2018/01;
8. Cross girders must not extend beyond the outside face of edge Super-T girders;

Maximum Span Length for Simply Supported Girders

9. The maximum span, measured centre to centre between bearings, of Super-T girders designed for SM1600 traffic loading must be as follows:
 - 18 metres for Type T1 girders,
 - 23 metres for Type T2 girders,
 - 28 metres for Type T3 girders,
 - 33 metres for Type T4 girders,
 - 37 metres for Type T5 girders;

Restrictions on Use of Super-T Bridge Girders

10. Super-T girders must not be used for bridge superstructures if the soffit of the girder bottom flange will be below the water level at any flood event up to 50 year average recurrence interval (ARI);
11. Super-T girders must, unless otherwise approved by the Director Bridges & Structures, not be used in bridges with a skew greater than 35 degrees. Where a skew greater than 25 degrees is proposed, linear elastic stress analysis of the deck slab using numerical methods such as finite element analysis must be undertaken to account for the skew effects on transverse and longitudinal bending of the deck and link slabs, and the differential shrinkage effects between the deck slab and the girders particularly in the vicinity of the acute corners of the bridge deck. Special attention must be taken to control cracking of the bridge decks to within specification limits.

References:

- AS 5100.5 Bridge design – Concrete
- BTD 2018/01 Bridge Bearings
- RMS B80 Concrete Work for Bridges



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