

2.3.2 RAIL BRIDGES

2.3.2.3 T-BEAMS

GENERAL DESCRIPTION

Railway bridge superstructures are designed mostly as ballast-top, non-composite structures in the span range 4 to 25 m. Precast T-beams provide economical sections for the construction of these bridges, from 10 to 25 m. A transverse tie design or concrete end and intermediate diaphragms are required in most designs in order to ensure that the members will not be spread apart by the application of the live load. Tie systems vary depending on the requirements of the relevant state rail authority.

Prestressed T-beams are favoured by some rail authorities for spans greater than 15 m.

COMPONENT DETAILS

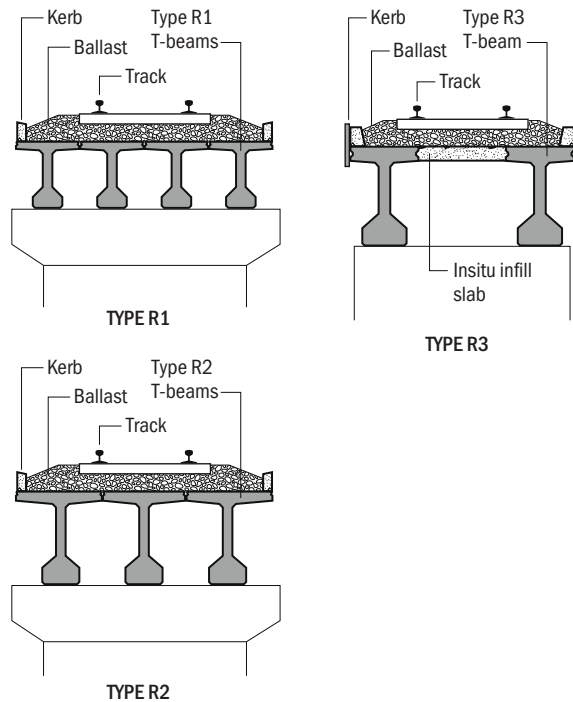
Component types and depths vary according to load requirements and rail gauge, with profiles depending on the respective rail authority.

A series of bulb T-beams used for railway construction is shown in *Standard Sections*. Type R1 and R2 usually have a nominal 50-mm gap between flanges with an insitu key joint, while Type R3 are used up to 2 m apart with an insitu infill slab between. See *Typical Arrangements* for details.

Current design philosophy employs fully-prestressed designs using only prestressing strands, which are debonded locally as required at each end to control concrete stresses to within acceptable design limits at transfer of prestress.

Concrete is usually Special Class concrete, strength grade S50. Strength at transfer of prestress is commonly specified as 35 MPa.

TYPICAL ARRANGEMENTS



SECTION PROPERTIES

Type	Depth (mm)	A (mm ²)	I _x (mm ⁴)	Y _t (mm)	Y _b (mm)	Z _t (mm ³)	Z _b (mm ³)	Mass (t/m)	Span (m)
R1	1100	417400	64.830 x 10 ⁹	519	581	124.9 x 10 ⁶	111.6 x 10 ⁶	1.100	10-15
R2	1600	684670	235.83 x 10 ⁹	720	880	327.6 x 10 ⁶	268.0 x 10 ⁶	1.745	14-25
R3	1630	793600	260.10 x 10 ⁹	772	858	336.9 x 10 ⁶	303.2 x 10 ⁶	2.030	13-21*

* Used in the configuration shown in *Typical Arrangements*

STANDARD SECTIONS

