

# DURA<sup>®</sup> TBG – T Bridge Girder

## Description

**DURA<sup>®</sup> TBG** is prefabricated using the revolutionary composite material of ultra-high performance concrete and high-carbon-high-tensile steel fibres (UHPdC). It is an excellent solution for bridge engineers looking for a cost effective, fast construction, light-weight and high-durability option for bridges with a span range of 15 to 30m.

## Features

- **DURA<sup>®</sup> TBG** are typically prestressed to 70~80% of the 'guaranteed' tensile strength of the strands. Strands used are 15.2 mm diameter 7-wire super strands (low relaxation) complying with AS 1311; with a guaranteed tensile load of 250 kN and ultimate breaking load of 270 kN.
- The UHPdC of the **DURA<sup>®</sup> TBG** has characteristic compressive strength range between 120 to 140 MPa, and characteristic flexural strength of 20 MPa.
- **DURA<sup>®</sup> TBG** eliminates the used of conventional steel reinforcing bars and stirrups, except at regions where jointing detail are needed during construction. All steel fibers used are made from high carbon steel wires with tensile strength of minimum 2300 MPa.

## Advantages of DURA<sup>®</sup> TBG

- **DURA<sup>®</sup> TBG** is highly durable and impermeable. It is therefore suitable for use even in harsh environments.
- **DURA<sup>®</sup> TBG** is unique as the tops of the units make up the entire deck slab to form a "full-deck" beam thus eliminating the formwork of the superstructure. Together with carefully planned detailing, the construction process can be shortened considerably, resulting in overall cost and time savings.
- No scaffolding, props or formwork are required over the supports, thus reducing construction site activities, improving safety margins and eliminating in-situ casting work (except construction of the joints and minor details).
- Ease of handling/transportation and installation - **DURA<sup>®</sup> TBG** is significantly thinner in section and at least 50% lighter than conventional beams. This weight efficiency also leads to further optimization of the foundations and support structures; at the same time contributing to a sustainable development regime.
- **DURA<sup>®</sup> TBG** can be produced to required lengths with increment of 0.5 m. Spans outside the indicated range can be considered on request.
- Due to its high durability, high ductility and high fatigue strength, it provides excellent resistance against impact and abrasion loads.

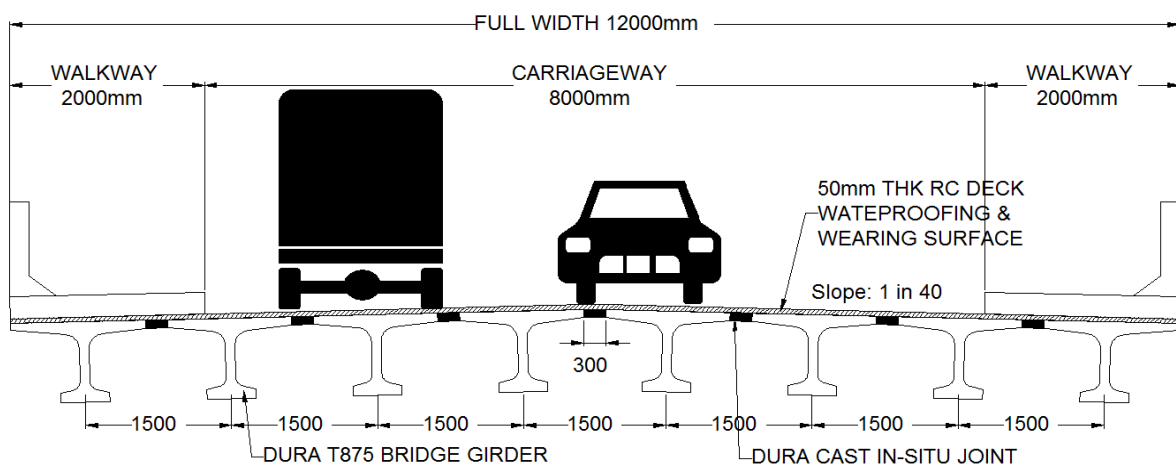


Figure 1 – Example of a 20 m single span bridge using DURA<sup>®</sup> T875BG.

**DURA**<sup>®</sup> TBG

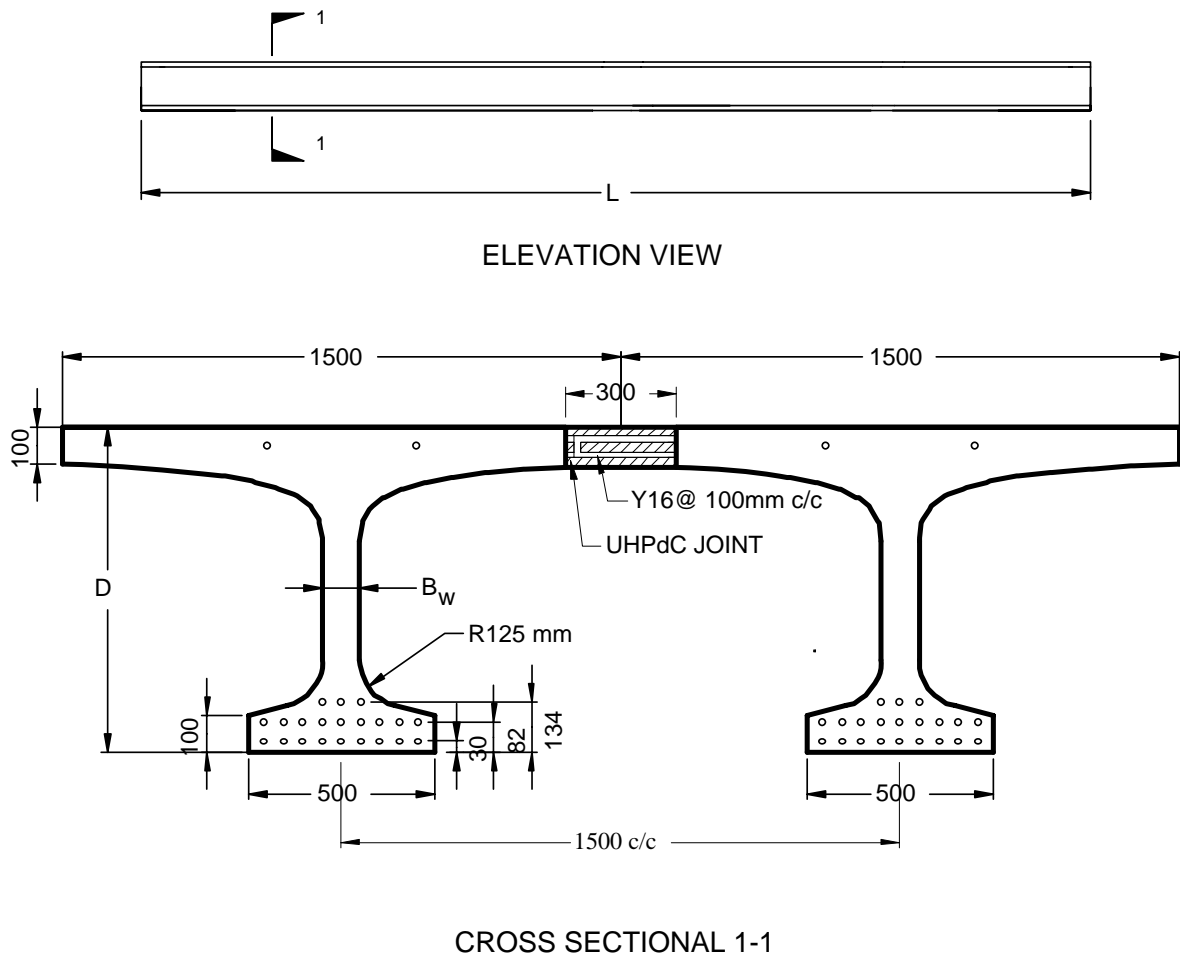


Figure 2 – Detail of DURA<sup>®</sup> TBG.

Refer to table 1 for technical data

Table 1: Technical Data for Pre-tension DURA<sup>®</sup> TBG.

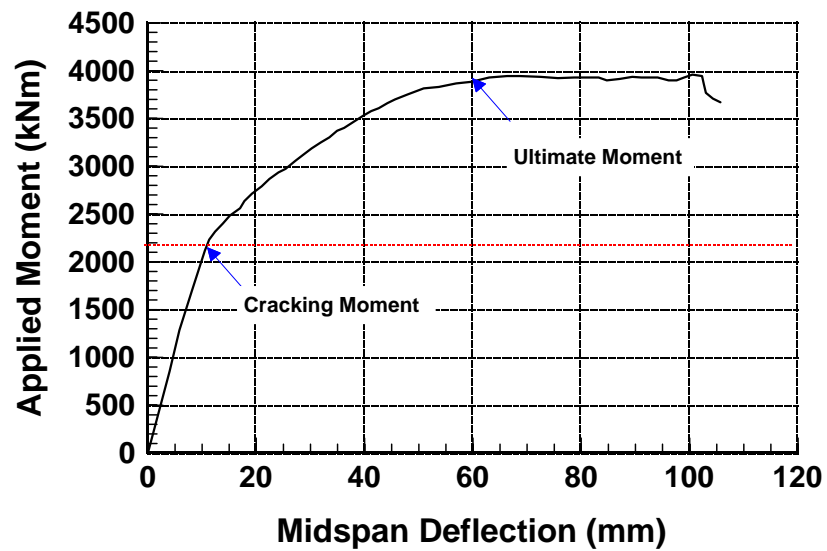
		Unit	T875	T1375
Length	L	m	15 ~ 20	21 ~ 30
Weight	W	kN/m	8.3	10.2
Sectional Area	A <sub>g</sub>	x 10 <sup>3</sup> mm <sup>2</sup>	348.2	423.8
Neutral Axis	y <sub>top</sub>	mm	300	497
	y <sub>bot</sub>	mm	575	878
Moment of Inertia	I <sub>xx</sub>	x 10 <sup>9</sup> mm <sup>4</sup>	34.16	107.43
Section Modulus	Z <sub>top</sub>	x 10 <sup>6</sup> mm <sup>3</sup>	113.87	215.99
	Z <sub>bot</sub>	x 10 <sup>6</sup> mm <sup>3</sup>	59.41	122.42
Web Thickness	B <sub>w</sub>	mm	100	125
Depth	D	mm	875	1375



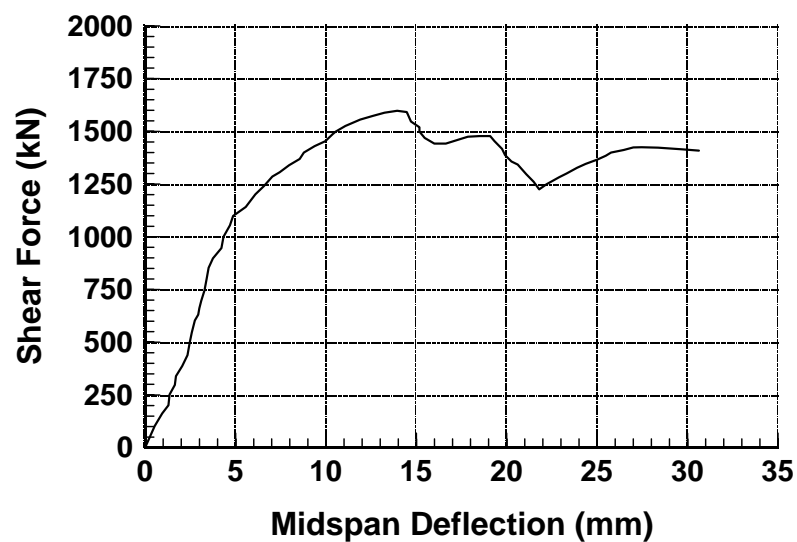
Flexure Strength Test Setup For T875BG



Shear Strength Test Setup For T875BG



Experimental Flexure Strength Result of Dura<sup>®</sup> T875BG



Experimental Shear Strength Result of Dura<sup>®</sup> T875BG



Figure 3 – Photo shows 2 pieces of T875BG joined together.

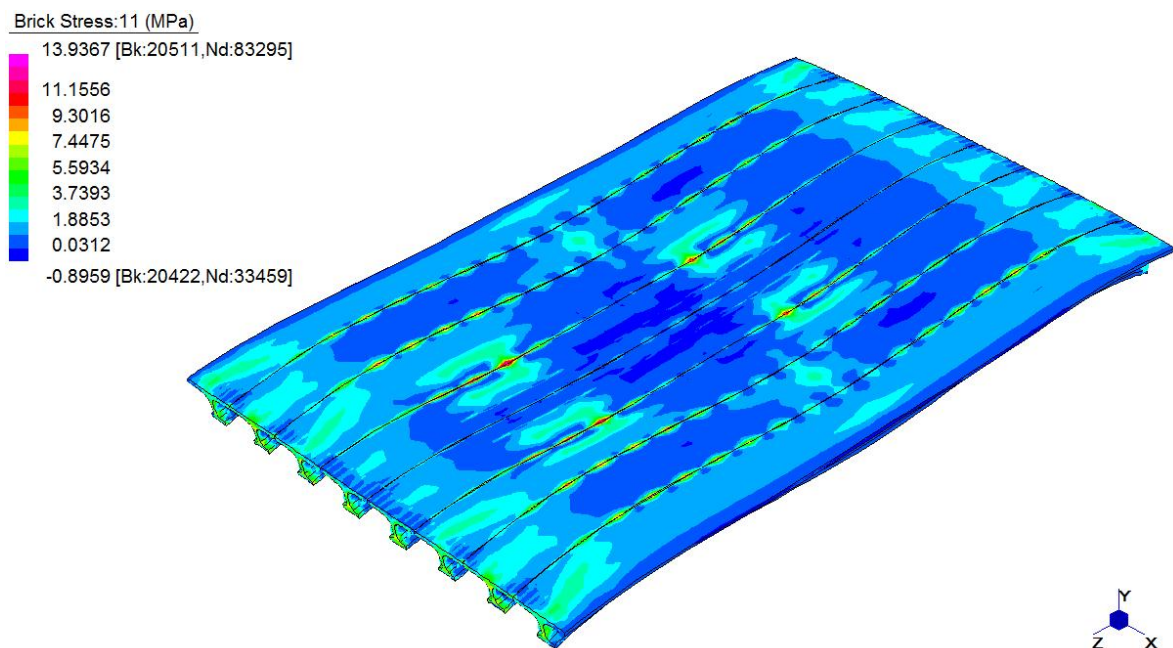


Figure 4 – Non-Linear Finite Element Modelling Result on 20m Span and 12m Wide Bridge using T875BG at Full 45HB Loading.

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