

## Dura<sup>®</sup> Joint – High Performance Connection

### Description

The **Dura<sup>®</sup> Joint** is a field-cast connection for prefabricated structural elements used for bridge construction or building construction. It is made using ultra-high-performance concrete (UHPC), which allows the **Dura<sup>®</sup> Joint** to be simpler to construct and provide a more robust long-term performance than connections constructed through conventional methods.

### Features

- High flexural strength (beyond 25MPa) by using steel fibres.
- Compressive strength between 120-150 MPa.
- Fast curing, with about 80 MPa compressive strength achievable in 24 hours.
- Self-consolidating and thixotropic.

### Advantages of Dura<sup>®</sup> Stitch

- **Dura<sup>®</sup> Joint** is highly homogenous and impermeable, which results in damage from corrosion being a non-issue.
- Due to its durability, the **Dura<sup>®</sup> Joint** is also maintenance-free.
- **Dura<sup>®</sup> Joint** is fast curing, which allows projects to complete earlier.
- **Dura<sup>®</sup> Joint** is self-consolidating, eliminating the need for vibrating equipment.
- The UHPC used to make **Dura<sup>®</sup> Joint** is a proven construction material that has been used to make commercial products since 2010.
- The **Dura<sup>®</sup> Joint** has been successfully used for at least 20 projects from 2011-2020 and our clients are satisfied with its performance.

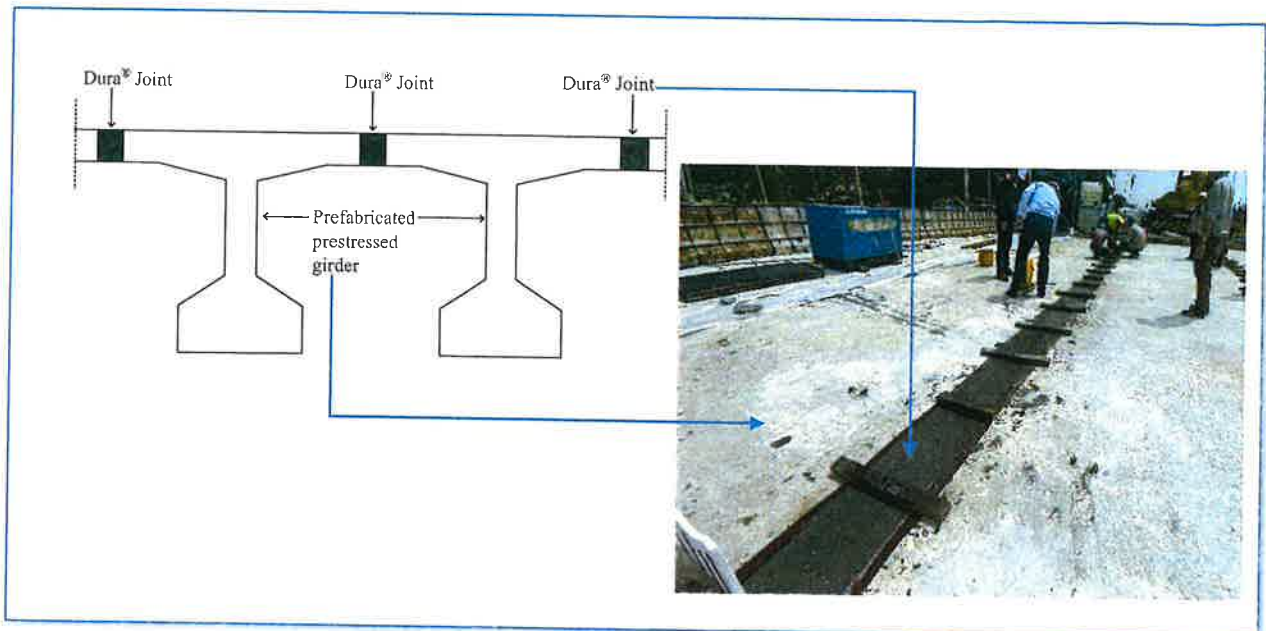
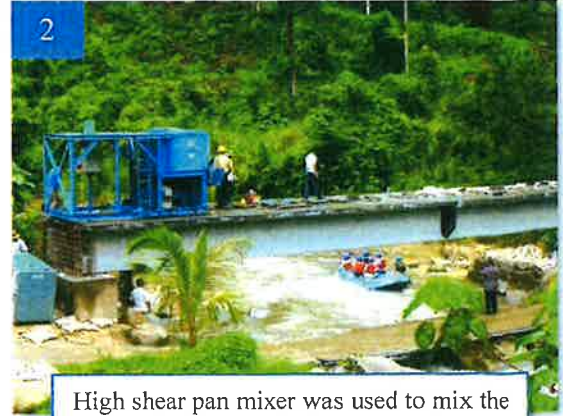


Figure 1. Dura<sup>®</sup> Joint on prefabricated prestressed girders.



1 Waterproof timber planks, timber strips and steel sheets were used for the **Dura**<sup>®</sup> Joint formworks.



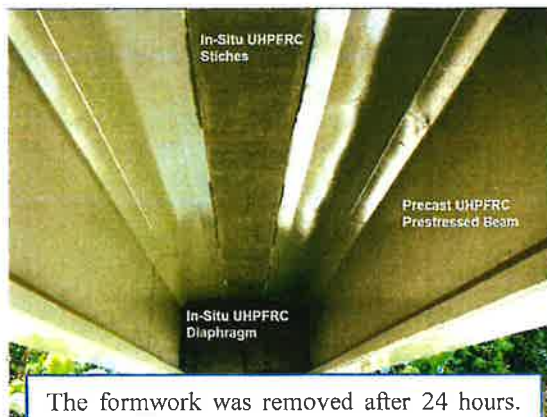
2 High shear pan mixer was used to mix the UHPC for the **Dura**<sup>®</sup> Joint.



3 Fresh UHPC was transported using wheelbarrow. No vibration was needed.



4 The surface of the **Dura**<sup>®</sup> Joint was finished using a trowel and sprayed with curing compound.



The formwork was removed after 24 hours. Coating was then applied on the **Dura**<sup>®</sup> Joint.

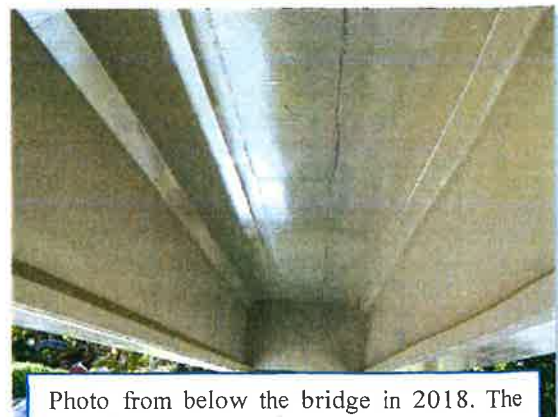
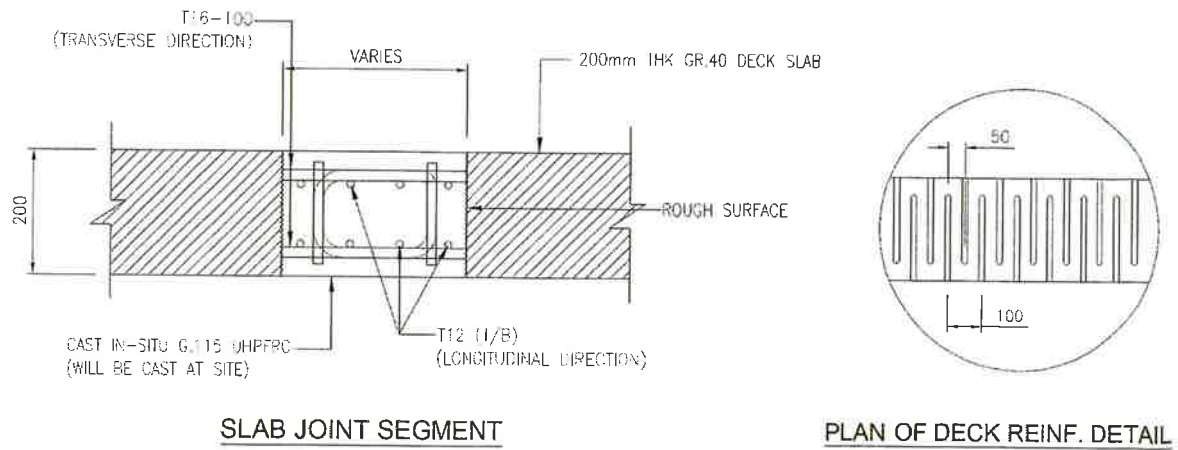


Photo from below the bridge in 2018. The **Dura**<sup>®</sup> Joint showed no signs of deterioration after 6 years in service.

**Figure 2.** Construction and Completion of Concrete Bridge at Kg Ulu Geroh, Kampar District, Perak D.R. (2011).



**Figure 3.** Case study: Upgrading of Road Works and Bridge at Sg. Nerok, Kota Tampan Air (Muaran), Jalan Lenggong / Gerik, Hulu Perak District, Perak D.R. (2013)



**Figure 3.** Typical cross-section for Dura® Joint.

**Table 1.** UHPC material properties.

Material property	Value	Standard
Compressive strength - 7 days	150.9 N/mm <sup>2</sup>	BS EN 12390-3: 2009
Compressive strength - 28 days	161.6 N/mm <sup>2</sup>	BS EN 12390-3: 2009
Flexural strength - 7 days	32.2 N/mm <sup>2</sup>	BS EN 12390-5: 2009
Flexural strength - 28 days	33.0 N/mm <sup>2</sup>	BS EN 12390-5: 2009
Ability to resist chloride ion penetration	73.0 Coulombs	ASTM C1202-19
Determination of drying shrinkage – 7 days	5.20x10 <sup>-4</sup> µm/m	BS EN 12390-16: 2019
Determination of drying shrinkage – 14 days	9.54x10 <sup>-4</sup> µm/m	BS EN 12390-16: 2019
Determination of drying shrinkage – 28 days	0.016 µm/m	BS EN 12390-16: 2019

Note: The tests were conducted by SIRIM QAS International Sdn. Bhd (Report No: 2021CB0542).

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