

DURA[®] PFS – Portal Frame System

Description

DURA[®] PFS – Portal Frame System is a new and innovated system for the building of warehouses and factories. **DURA[®] PFS** uses the revolutionary composite material of ultra-high performance concrete and high-carbon-high-tensile steel fibers (UHPdC). It is an excellent solution for buildings with long span requirements of up to 260 ft eaves-to-eaves. Each frame can be spaced 30 to 40 ft apart, thus significantly improving uninterrupted working space.

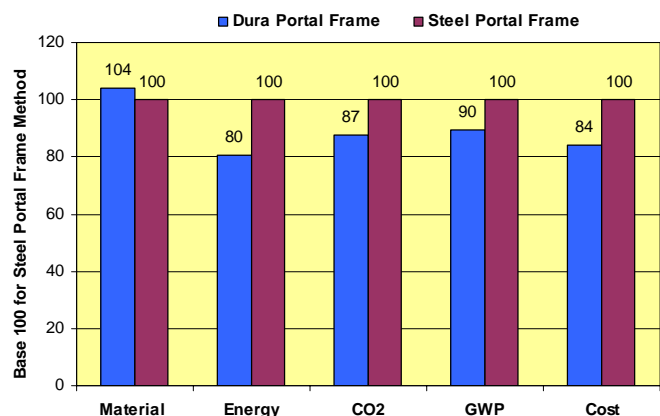
Features

- **DURA[®] PFS** comprises of two major structural elements - the prestressed Dura[®] X650 Beam/Column and Dura[®] Connector.
- Dura[®] X650 Beam/Column are typically prestress 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 AS1311; with a design tensile load of 250 kN and ultimate breaking load of 270 kN.
- The UHPdC used for the DURA[®] X650 Beam/Column and Dura[®] Connector has a characteristic compressive strength range between 120 to 140 MPa, and characteristic flexural strength of 20 MPa.
- DURA[®] X650 Beam/Column eliminates the use of conventional steel reinforcing bars and stirrups. All steel fibres used are made from high carbon steel wires with tensile strength of 2300 MPa.



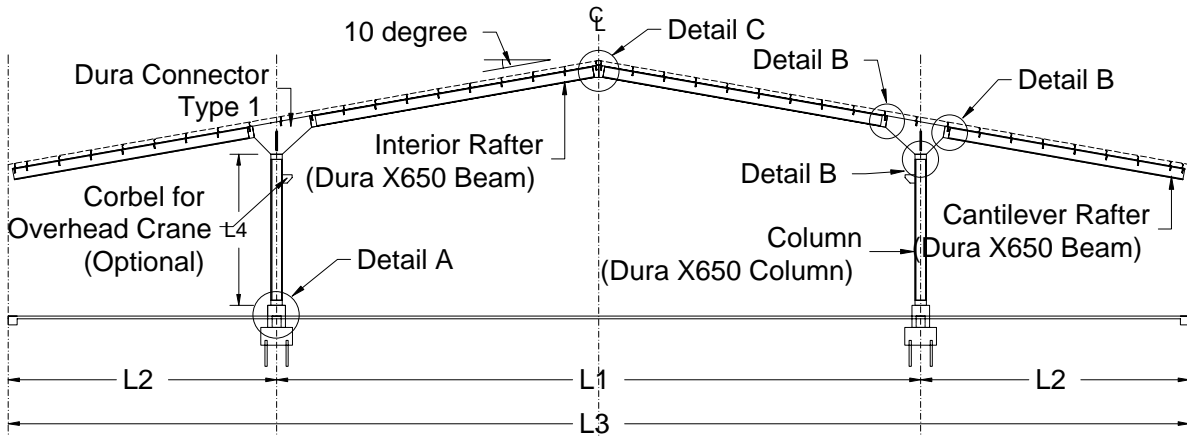
Advantages of DURA[®] PFS

- **DURA[®] PFS** are highly durable and impermeable. It is therefore suitable for use even in harsh environments.
- The construction sequence and installation method of **DURA[®] PFS** is similar to the conventional steel portal frame system where bolts & nuts are used to connect the members.
- 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 sealing of the construction joints and some minor details).
- Ease of handling/transportation and installation - **DURA[®] PSF** is about the same total weight when compared to steel structures.
- Members used in **DURA[®] PSF** are guaranteed to be volumetrically stable as they are steam-cured to reduce creep. This process accelerates all long term shrinkage of the UHPdC.
- **DURA[®] PFS** frames can be produced to desired eave-to-eave widths in 10 ft increments, from 120 to 260 ft. Widths 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.
- **Dura[®] PFS** supports the 'Green' vision as it is a more environmentally friendly material compare to structural steel.

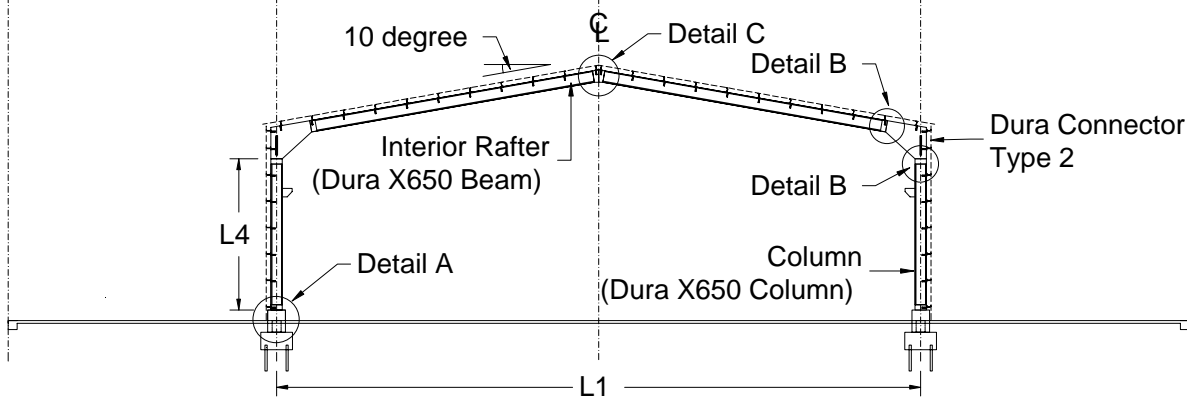


DURA[®] PFS

Detail A = Column/Foundation Connection
Detail B = Beam/Column Connection
Detail C = Beam/Beam Connection

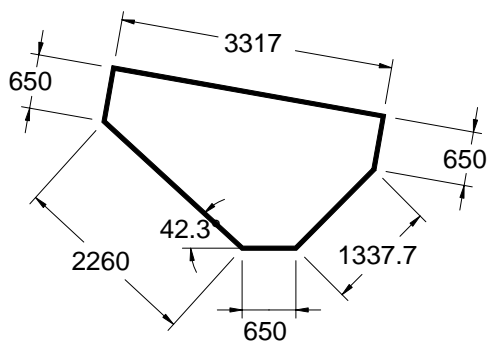


OPTION 1: PORTAL FRAME WITH CANTILEVER

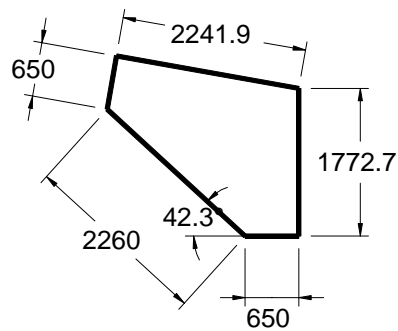


OPTION 2: PORTAL FRAME WITHOUT CANTILEVER

DURA[®] Connector



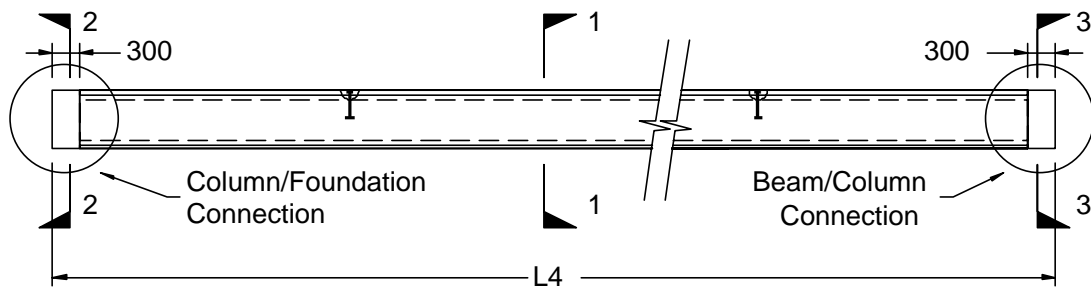
Dura Connector Type 1



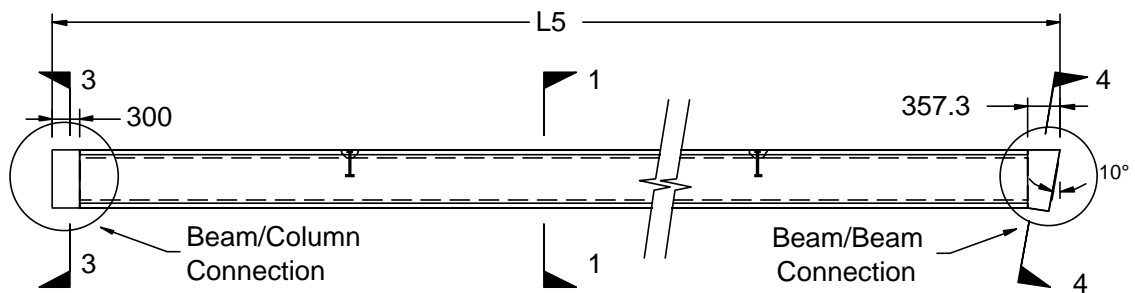
Dura Connector Type 2

Refer to table 1 for technical data

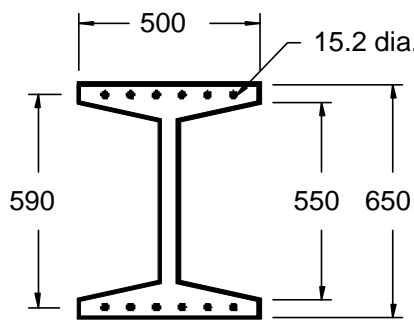
DURA[®] Prestress X650 Beam/Column



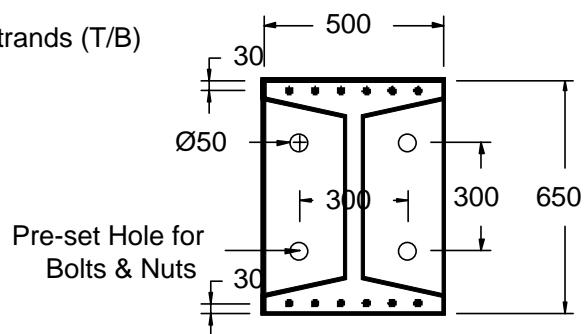
Dura X650 Column



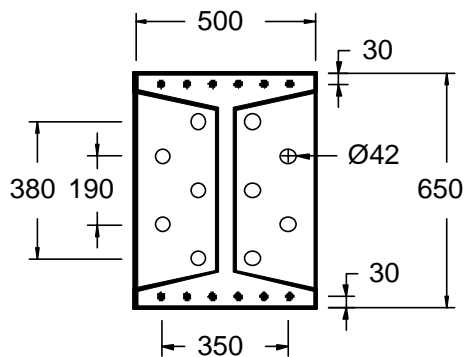
Dura X650 Beam



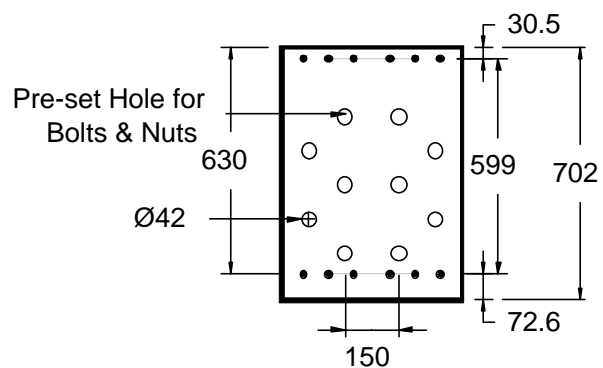
View 1-1



View 2-2



View 3-3

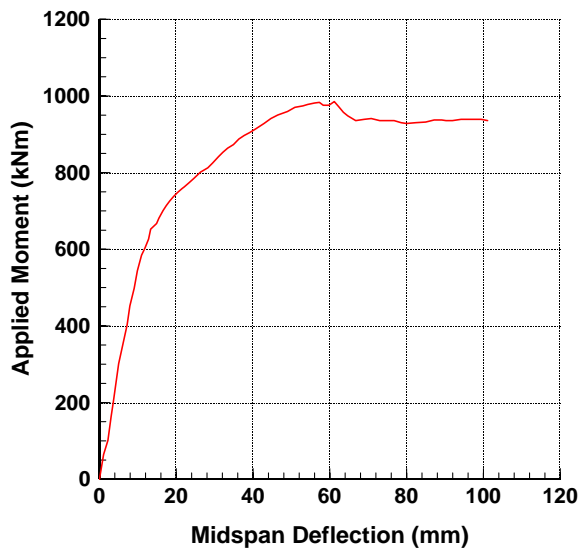


View 4-4

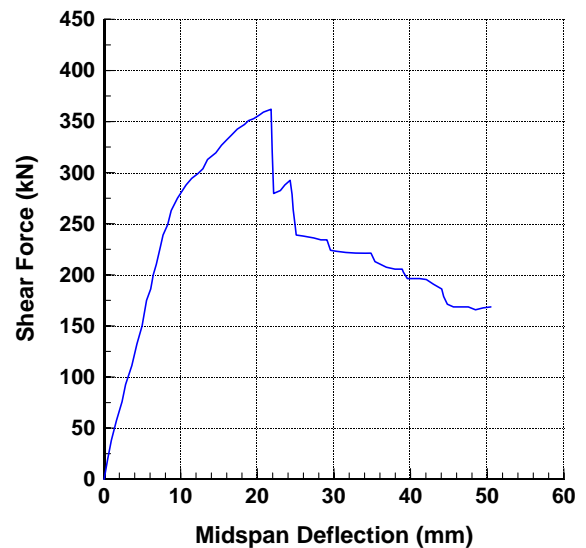
Refer to table 1 for technical data

Table 1: Technical Data for DURA[®] PSF and X650 Beam/Column

		Unit	PFS	X650
Length	L1	m (ft)	36.6 ~ 48.8 (120 ~ 160)	–
	L2	m (ft)	15.24 (50)	–
	L3	m	67 ~ 79 (220 ~ 260)	–
	L4	m	8.6	8.6
	L5	m	–	16.66 ~ 22.85
Weight	W	kN/m	–	2.4
Sectional Area	A _g	x 10 ³ mm ²	–	100
Neutral Axis	y _{top}	mm	–	325
	y _{bot}	mm	–	325
Moment of Inertia	I _{xx}	x 10 ⁹ mm ⁴	–	6.708
Section Modulus	Z _{top}	x 10 ⁶ mm ³	–	20.64
	Z _{bot}	x 10 ⁶ mm ³	–	20.64



Experimental Flexure Strength of Dura[®] X650-Beam/Column



Experimental Shear Strength of Dura[®] X650-Beam/Column

Result certified by SIRIM QAS: J20085040550/(SQAS/CBMT/T.REC/CSL/15)

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