

## 2.2 HERCULES (Heavy-Duty) FINGER JOINTS - HFJ Series

Hercules Finger Joints have been developed to fill the need for a heavy-duty expansion joint with large movement capacity. This type of expansion joint has been adopted as standard design for large movement expansion joint by many design authorities and government agencies worldwide because of their low & easy maintenance features.

The proven design & performance of finger joints are internationally recognized & are being installed in thousands of projects across the world for the last many years.

### 2.2.1 Design Features & Advantages.

- ▶ Robust & Heavy-Duty      Pre-tensioned cast in anchorage enables the joint to resist the high horizontal braking and acceleration forces.
- ▶ Watertight                      Durable steel membrane system is continuous and connected such that the debris and water can be directed to the design drain pipes at the lower side of the deck [see detail].
- ▶ Safe & Smooth Ride          All fingers are tapered to accommodate differential gradient across the joint due to settlement & etc.
- ▶ Low Replacement Rate      All materials used in finger joint design are durable.
- ▶ Easy Maintenance              Finger joints are installed in length of 795mm allowing maintenance works to be carried lane by lane without causing traffic congestion.
- ▶ Flexible Fingers                All fingers can be custom-designed to suit skewed bridges.

### 2.2.2 Material

Finger & Base Plates -	Structural Mild Steel to BS 4360 or SG ductile Iron	BS N4395 or BS 3692. Complete with non-skid profile on the running surface.
Pre-tensioned Rods	- M 20 Gr. 8.8 to BS 6349	
Cast in Sleeve	- PVC Extrusion	
Watertight Membrane	- Continuous hot-dipped galvanized sheet or	Stainless Steel sheet.
Corrosion Protection	- Hot-dip galvanized.	

### 2.2.3 Installation Method Statement

HFJ joints are usually delivered with preset to account for the movement range & time of installation. There are more than one way to install Hercules Finger Joint depending on the individual construction method is cast in situ or precast segments.

#### **Method 1 -Installed in Concrete block out [preferred for cast in situ deck]**

- ▶ Prepare a concrete block out to the required dimensions.
- ▶ HFJ can be installed before or after laying the premix. If the joint is to be laid after laying of premix, the premix can be saw cut to the required width.
- ▶ Clean the concrete recess; add additional transverse reinforcement bars if required.

#### **2.2.3 Installation Method Statement (Cont ...)**

- ▶ Assemble finger elements to complete length of expansion joint outside the concrete recess using the connection angles and suspension beam.
- ▶ Adjust and tighten the anchors prior to lowering the entire assembly into the block out.
- ▶ Lower the entire joint assembly into the block out.
- ▶ Adjust to the correct alignment & level. The top of the joint surface flush with the premix.
- ▶ Block the gap of expansion joint then pour concrete with careful vibration. Aggregate of approx. 16mm is recommended.
- ▶ Remove the finger elements to install the watertight membrane if required.
- ▶ Re-install the finger elements after fixing the watertight membrane.

- ▶ Stress the fixing rods when the concrete achieved 3,000 psi.
- ▶ Fill the counter-bore holes with pure hot bitumen or equivalent.

**Method 2 - Installed WITHOUT Concrete block out [preferred for precast deck]**

- ▶ Assemble the cast in anchorages to the desired centers & location using a timber template.
- ▶ Install the watertight membrane after the segments on both sides of the joint have been launched in position.
- ▶ If required, use bedding mortar to level the seating location before placing the finger elements
- ▶ Stress the fixing rods when the concrete has achieved 3,000 psi.
- ▶ Fill the counter-bore holes with pure hot bitumen or equivalent.

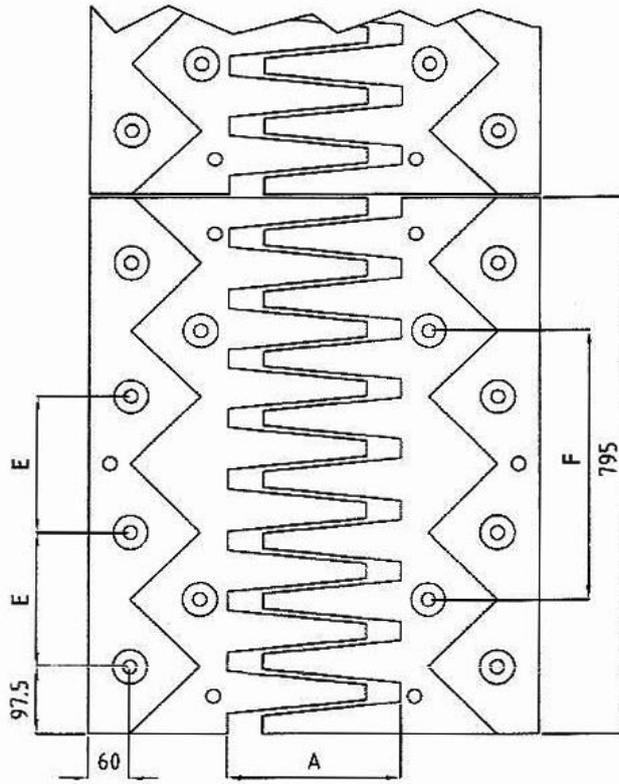
**2.2.4 Maintenance / Replacement Method Statement**

If maintenance requires replacement of membrane or finger plates, this can easily be carried out by de-tensioning the hold-down rods followed by removing 4-5 segments of finger plates in one lane and allowing traffic to continue using other lanes without causing congestion.

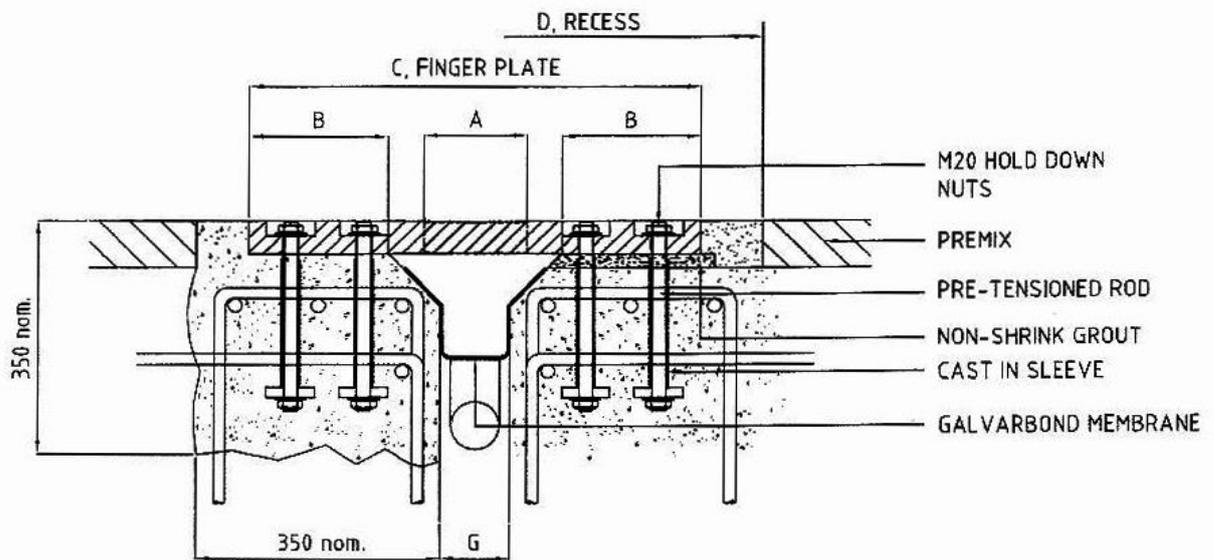
**TABLE 9.2 PART NUMBERS AND DESIGN PARAMETERS**

Steel Nosing	HFJ/SN 100	HFJ/SN 150	HFJ/SN 200	HFJ/SN 250	HFJ/SN 300	
Concrete Nosing	HFJ/CN 100	HFJ/CN 150	HFJ/CN 200	HFJ/CN 250	HFJ/CN 300	
<b>Tot. Movement (mm),#</b>	100	150	200	250	300	
<b>Nominal Dimensions (mm)</b>	A	120	170	220	270	320
	B	110	110	150	150	200
	C	340	390	520	570	720
	D	390	440	570	620	770
	E	200	200	200	200	200
	F	400	400	400	400	400
	G min.	100mm or to Design Engineer's Specification				

Larger movements or movements other than the above can be custom-designed or by presetting the joint to suit engineer's requirements.



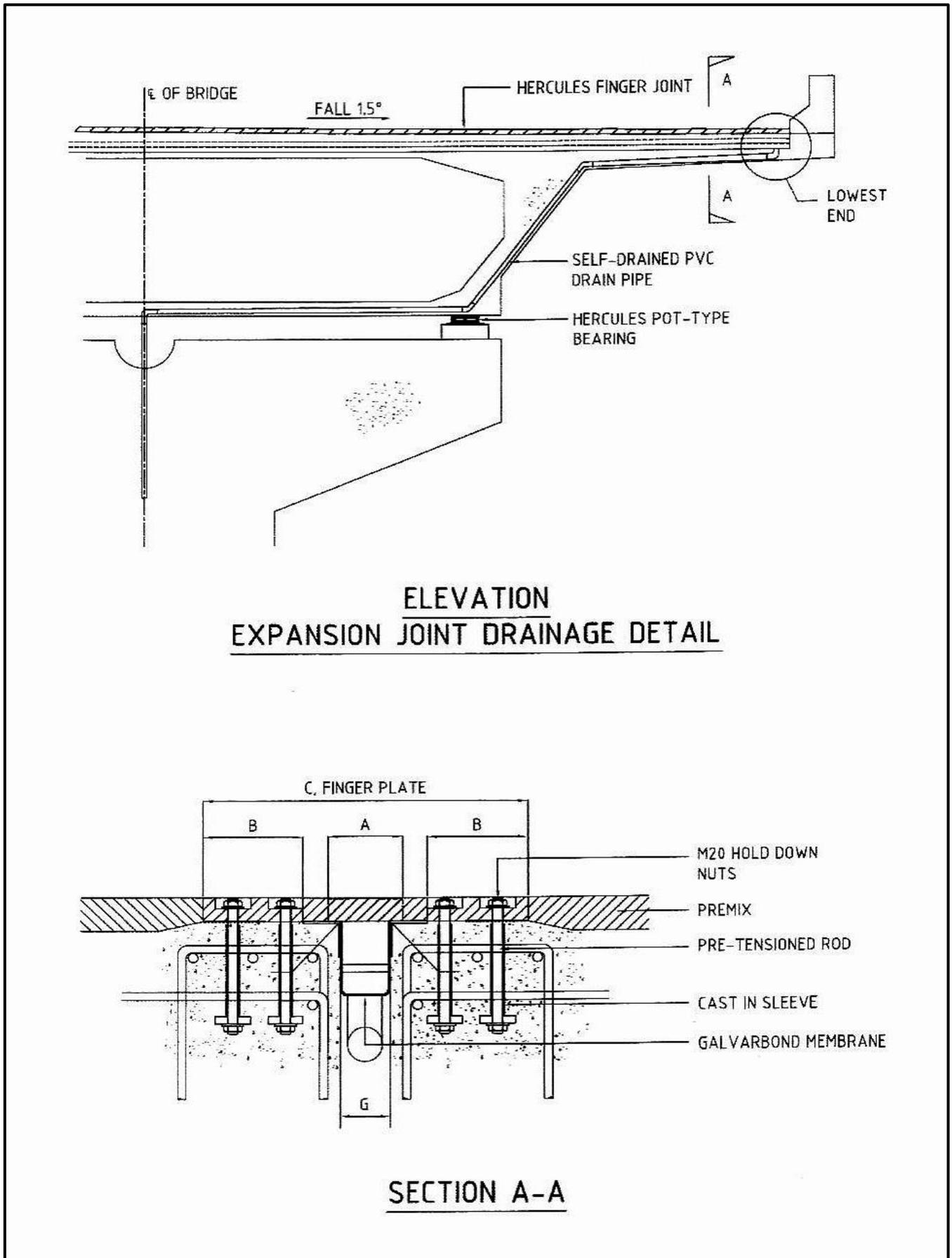
**PLAN**



METHOD 1      METHOD 2

**SECTION**

**HERCULES FINGER JOINT**  
**PART NO: HFJ/CN SERIES-CONCRETE NOSING**



**HERCULES FINGER JOINT**  
**PART NO.: HFG/SN SERIES-STEEL NOSING**