

# Calculations



CHARTERED ENGINEERS  
BUILDING  
DESIGN  
CONSULTANTS

needles 10 of 11

Job Ref:

Calc. By

Checked

Date

December 2014

Project

FRANCE ALBERT Rd NW 7SR.

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## TEMPORARY NEEDLE BEAMS UNDER EXISTING 2 STOREY STRUCTURE, FRONT WALL & FLANK WALL

Characteristic  $\downarrow$  122 kN/metre run

GRID REFERENCE: - front wall along 03 between (A) & (B)  
- FLANK WALL along (A) between (3) & (5)

Typical arrangement of needles: spacing between needles	along FRONT WALL	along FLANK WALL
Span of needle between supports	up to 2.1 metres	up to 1.6 metres
Characteristic magnitude of load of wall to be carried	1.8 metres	2.2 metres
Peak sagging Bending Moment in needle	2.1 metres x 122 kN/m = 256 kN	1.6 metres x 122 kN/m = 195 kN
	$\nabla \quad 256 \times 1.8 \times \frac{1}{4} = 115 \text{ kNm}$	$\nabla \quad 195 \times 2.2 \times \frac{1}{4} = 107 \text{ kNm}$

TRIED 203 UC 60; SECTION IS NOT STRONG ENOUGH.  
203 UC 71 is JUST ADEQUATE, NO MARGIN OF SAFETY.

USE 254 UC 73

$$l/r_{yy} = 2200 \div 64.8 = 34 \quad ; \quad \frac{P}{A} = \frac{254}{14.2} = 18 \quad ; \quad P_{bc} = 180 \text{ N/mm}^2$$

$$M_{2xx} = 115 \times 10^6 \div 898 \times 10 = \pm 128 \text{ N/mm}^2$$

$$\text{Peak shearing stress } (256 \times 10^3 \times 0.65) \div (254 \times 8.6) = 76 \text{ N/mm}^2 \text{ less than } 100 \text{ N/mm}^2 \text{ o.k.}$$

\* larger end reaction (end shear)  
 $0.60 \times 195 \text{ kN} = 117 \text{ kN}$   
Provide 4 no. 16  $\phi$  grade 8.8; allowable shearing force  $4 \times 29.4 \text{ kN} = 117.6 \text{ kN}$ .

380 x 380 x 12 thick

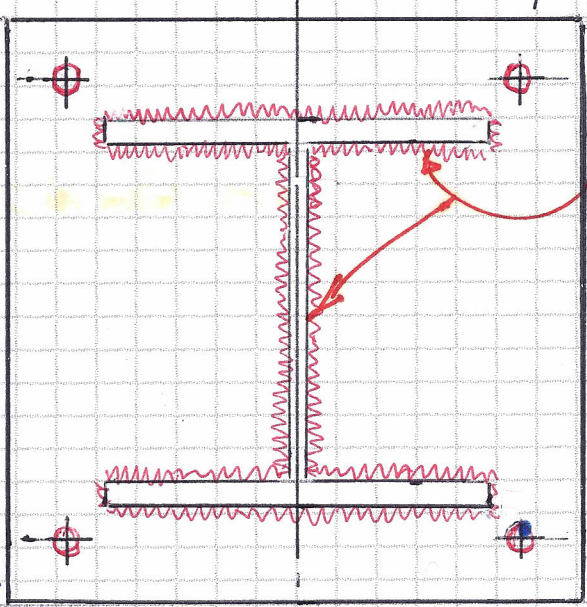
needle 11 of 11

# Calculations

**WT & L**  
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1178  
 380x380 x  
 12 THICK  
 END PLATE  
 WITH HOLES  
 4 no.  
 16φ grade 8.8  
 bolts

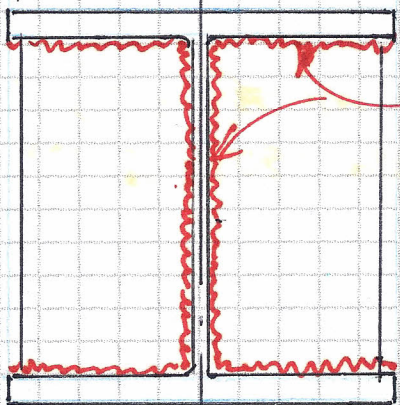


4mm LEG LENGTH CONTINUOUS  
 FILLET WELD ALONG ENTIRE  
 PERIMETER OF 254 UC 73.  
 4 no.  
 16φ grade 8.8  
 125 embedment  
 resin anchor

IF THE CONTACT FACE OF THIS END PLATE IS ONTO PILE SHAFTS (eg. UNEVEN SURFACE) THE SURFACE SHALL BE GROUND / POLISHED REASONABLY FLAT & SMOOTH; EPOXY MORTAR (OR OTHER SUITABLE EQUIVALENT) SHOULD BE APPLIED ONTO THE PILE SHAFT TO FORM A FLAT SURFACE; SUCH THAT AT THE END PLATE MAKES COMPRESSIVE & INTIMATE CONTACT WITH THE PILE SHAFT THROUGH MORTAR MEDIUM.

415 - HY 150 MAX injectable adhesive mortar.

FITTED  
TRANSVERSE  
WEB STIFFENERS  
AT SUPPORTS.



4mm LEG LENGTH CONTINUOUS FILLET WELD ALONG TRANSVERSE STIFFENER TO PERIMETER OF 254 UC 73 ROLLED SECTION INTERFACE.