higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL CONSTRUCTION N5

03 AUGUST 2021

This marking guideline consists of 9 pages.

QUESTION 1

1.1 **Diameter of the bolts**

Force = 96 kN; Shear stress = 104 MPa

$$\text{Stress} = \frac{Load}{Area}$$

Force = area x stress x n x 2 ✓ (Double shear)

$$96 \times 10^3 = \frac{\pi d^2}{4} \times 104 \times 3 \times 2$$

$$96 \times 10^3 \times 4 = \pi \times d^2 \times 3 \times 2$$

$$d = \sqrt{\frac{96 \times 10^3 \times 4}{104 \times \pi \times 3 \times 2}} \quad ✓$$

d = 13,99 mm ✓

Use = 6M16 bolts ✓ (4)

1.2 **Maximum load**

Bearing stress = 248 MPa; Tie bars = 125 x 8 mm Connector plates = 6 mm thick and M16 bolts.

$$\text{Stress} = \frac{Load}{Area}$$

Force = area x stress x ŋ

Force = (d x t) x stress x ŋ ✓

= (16 x 6+6) x 248 x 3 ✓

Force = 142,848 kN ✓ (3)

1.3 **Tearing stress**

Force = 295 kN; Tie bars = 130 × 8 mm and M12 bolts.

$$\text{Stress} = \frac{Load}{Area}$$

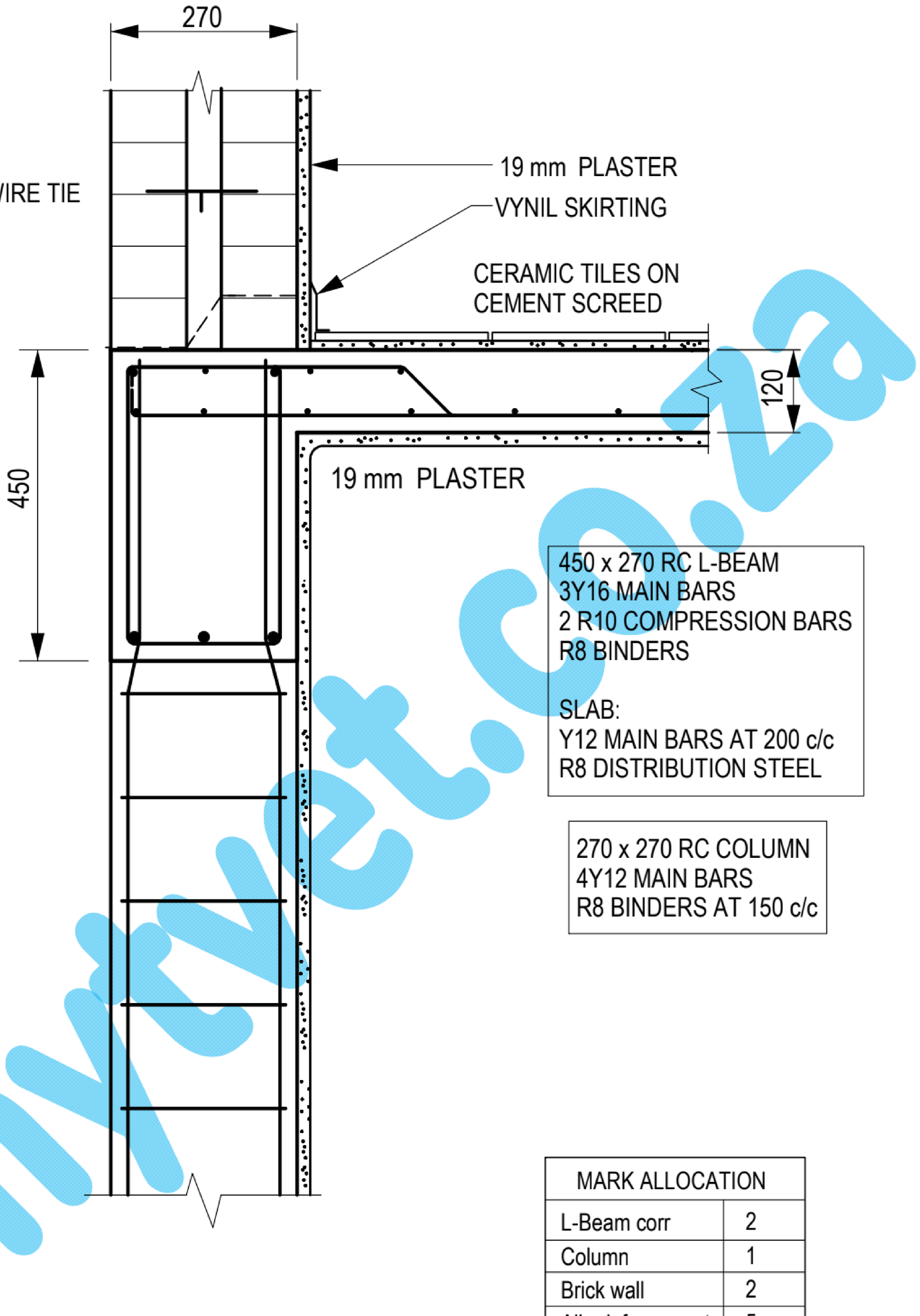
$$\text{Tearing stress} = \frac{Load}{(B \times T) - ŋ\,(d \times t)} \quad ✓$$

$$\text{Tearing stress} = \frac{295 \times 10^3}{(130 \times 8) - 3\,(14 \times 8)} \quad ✓$$

Tearing stress = 419,03 MPa ✓ (3)

[10]

QUESTION 2



450 x 270 RC L-BEAM
3Y16 MAIN BARS
2 R10 COMPRESSION BARS
R8 BINDERS

SLAB:
Y12 MAIN BARS AT 200 c/c
R8 DISTRIBUTION STEEL

270 x 270 RC COLUMN
4Y12 MAIN BARS
R8 BINDERS AT 150 c/c

MARK ALLOCATION	
L-Beam corr	2
Column	1
Brick wall	2
All reinforcement	5
Floor & details	4
Accuray	3
Labels	2
Dimensions	1
	20