higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NASIENRIGLYN

NASIONALE SERTIFIKAAT

BOU- EN STRUKTUURKONSTRUKSIE N5

13 AUGUSTUS 2019

Hierdie nasienriglyn bestaan uit 7 bladsye.

Kopiereg voorbehou

AFDELING A: ONTWERP

VRAAG 1: BOUTKONNEKSIE

1.1 Las = Area × spanning
Las = $\frac{\pi 12^2}{4}$ × 6 × 100✓
Las = 67 858 N/1 000✓
Las = 67,858 kN✓✓ (4)

1.2 Las = Area × spanning
Las = d × t × fc × n
Las = 12 × (12) × 240 × 3✓
Las = 103 680 N✓
Las = 103,680 kN✓✓ (4)

1.3 Las = Area × spanning
Las = f_t × [(B × t) – n(d × t)]
Las = 155 × [(60 × 8) – 3(14 × 8)]✓
Las = 22 320 N✓
Las = 22,32 kN✓✓ (4)

1.4 Las = 22,32 kN (1)
[13]

VRAAG 2: BELASTE BALK

2.1 $\frac{RL.4}{4} = \frac{(18 \times 2) + (8 \times 6) - (8 \times 2)}{4}$
RL = 17 kN✓✓

$\frac{RL.4}{4} = \frac{(18 \times 2) + (8 \times 6) - (8 \times 2)}{4}$
RL = 17 kN✓✓ (4)

2.2 By A = -8 kN✓
By B = -8 + 17 = 9 kN✓
B–C = 9 – 4 = 5 kN✓
By C = 5 – 10= -5 kN✓
C–D = 5 – 4 = -9 kN✓
By D = -9 + 17 = 8 kN✓
By E = 8 – 8 = 0 (kyk diagram op die volgende bladsy) (6)

2.3 BM by A = 0
BM by B = (-8 × 2)= -16 kN✓✓
BM by C = (-8 × 4) + (17 × 2) + (-4 × 1) = -2 kN✓✓
BM by D = (-8 × 2) = -16 kN✓✓
BM by E = 0 (kyk diagram op die volgende bladsy) (6)

2.4 $Ze = \frac{Bm\ max}{Pt}$

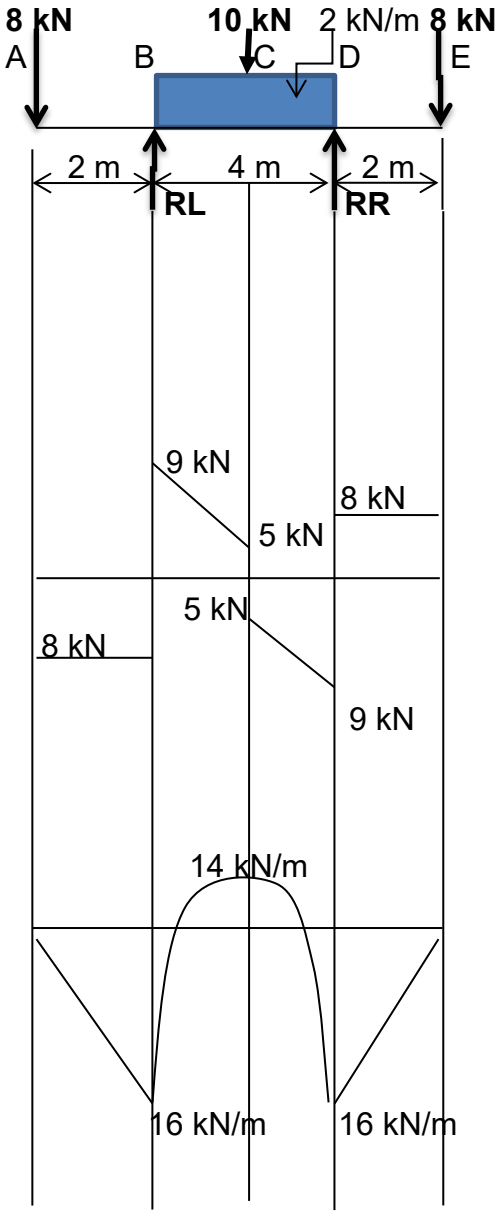
$= \frac{16}{165} \times 1\,000 = 96{,}97 \times 10^{-6}\ m^3$✓

Nuwe Ze = $116{,}0 \times 10^{-6}\ m^3$✓
Gebruik grootte 152 × 89 × 17,1 kg/m✓ (3)

2.5 $F_s = \frac{Las}{Area} = \frac{9 \times 1\,000}{152{,}4 \times 4{,}9}$✓

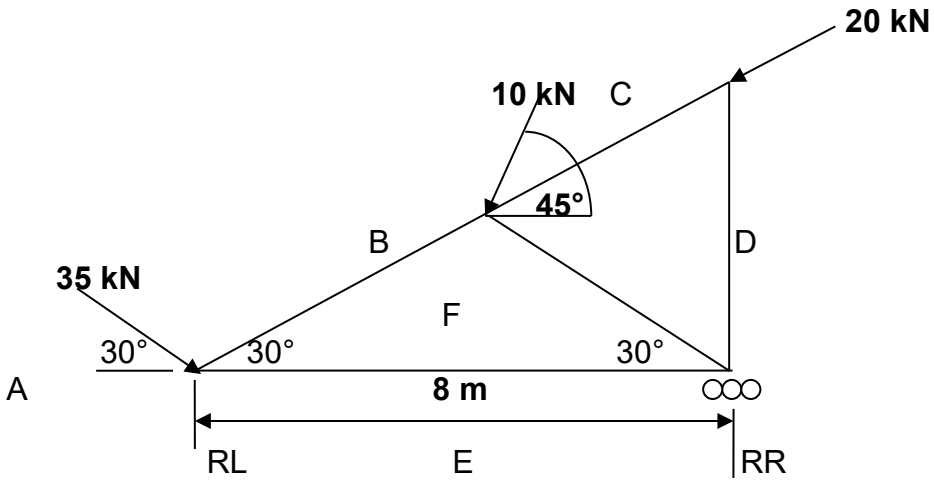
= 12,052✓

12,052 is minder as 100 MPa, dus veilig.✓



(3)
[22]

VRAAG 3: RAAM



3.1 Neem moment by RR

$$\frac{RL.8}{8} = \frac{(17,5 \times 8) + (7,071 \times 4) + (7,071 \times 2,31) + (17,321 \times 4,629)}{8}$$

RL = 33,10 kN✓✓

Neem moment by RL

$$\frac{RR.8}{8} = \frac{(7,071 \times 4) + (10 \times 8) - (7,071 \times 2.31) - (17,321 \times 4,629)}{8}$$

RR = 1,471 kN✓

$\sum$ HC = 30,31– (17,321 + 7,071)
= 5,918✓

$\sum$ RL resultaat = $\sqrt{VC^2 + \sum HC^2}$

$= \sqrt{(33,10)^2 + (5,918)^2}$✓

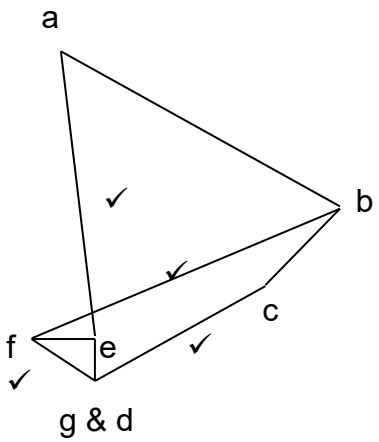
= 33,228 kN✓

Rigting = $\tan \theta = \frac{VC}{\sum HC}$

$\theta = \tan^{-1} \frac{33,10 \text{ kN}}{5,918}$

θ = 79° 15'47"✓✓ (8)

3.2



Deel	Grootte	Aard
BF	32,5√	Stut√
FE	3√	Bint√
CG	20√	Stut√
GF	3,5√	Stut√

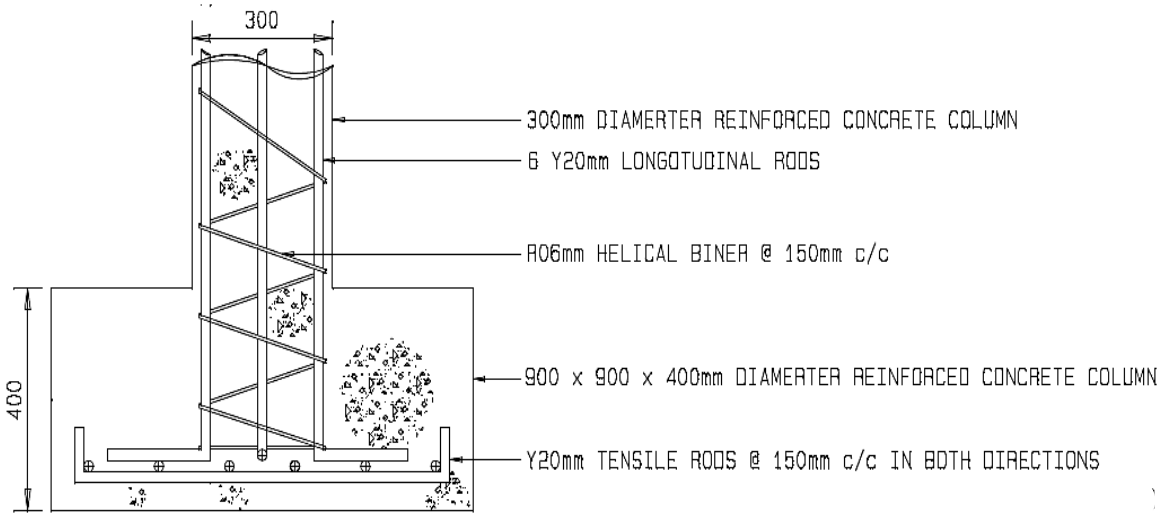
(9)
[17]

TOTAAL AFDELING A: 52

AFDELING B: TEKENWERK

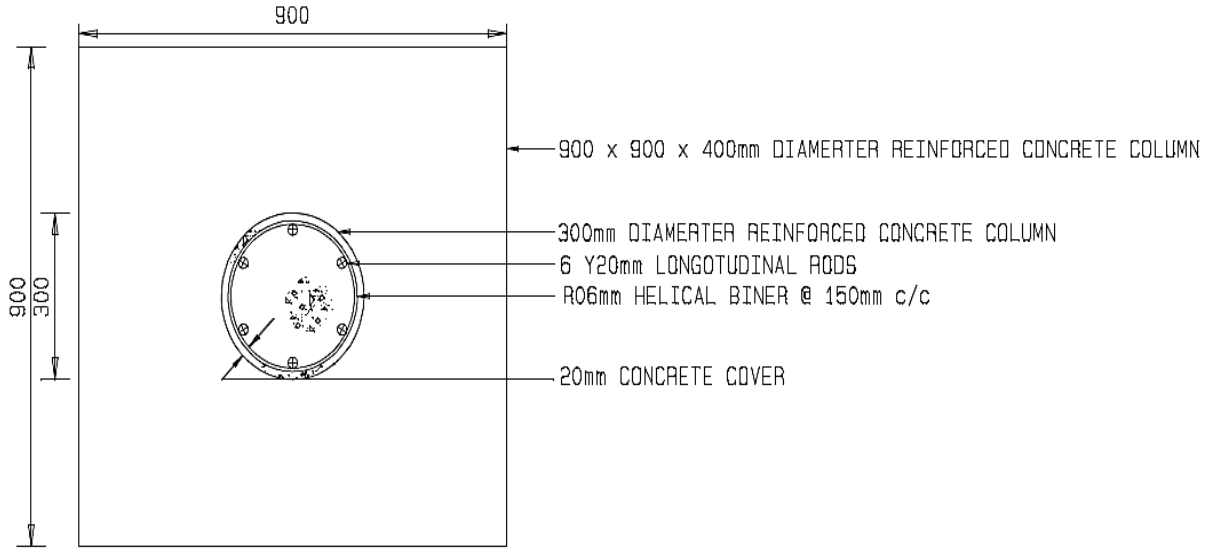
VRAAG 4: BETONFONDAMENT

4.1



(10)

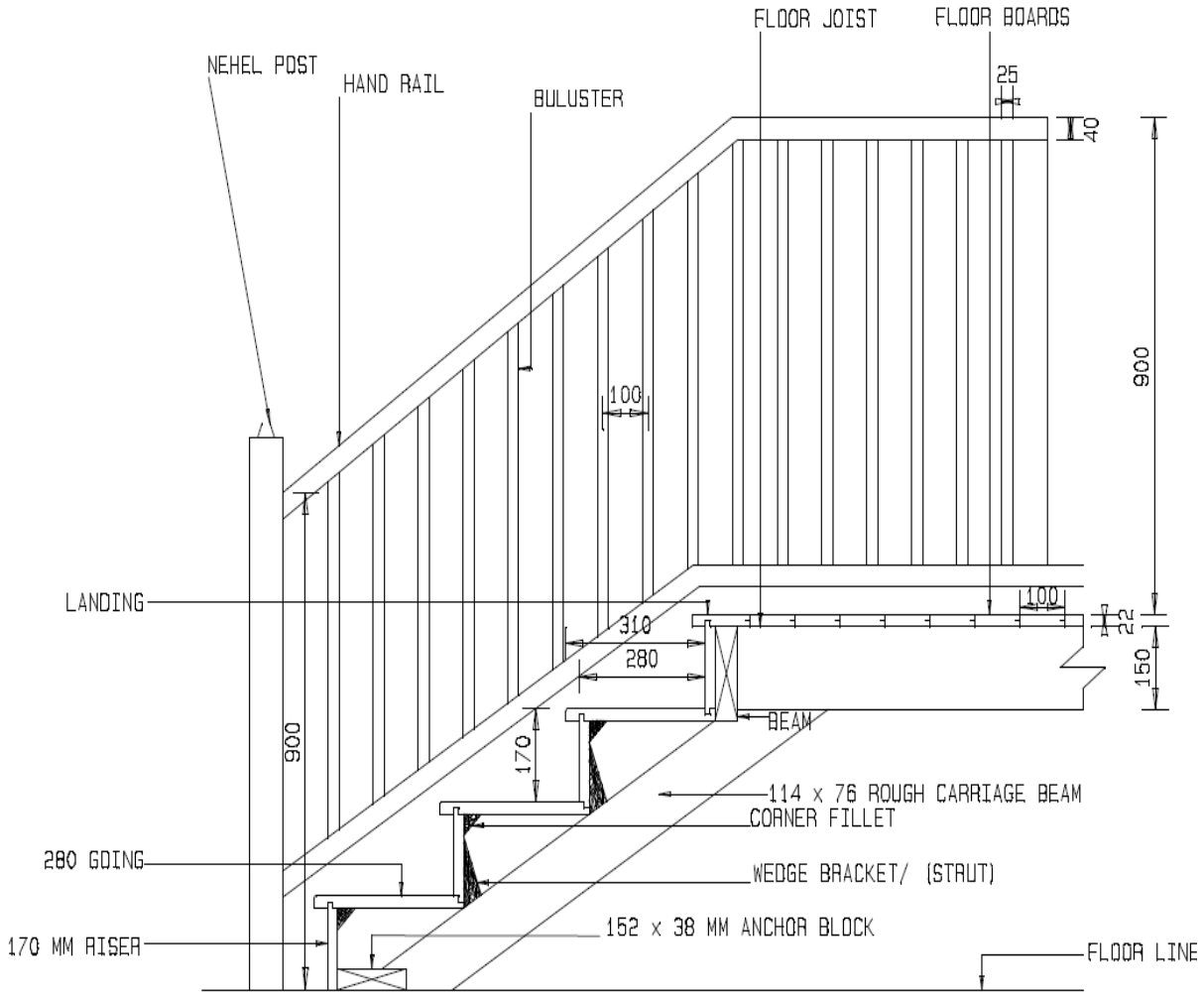
4.2



A VERTICAL AND TOP VIEW OF THE REINFORCED CONCRETE PAD FOUNDATION SSUPPORTING COLUMN. SCALE :10

(10)
[20]

VRAAG 5: HOUTTRAP

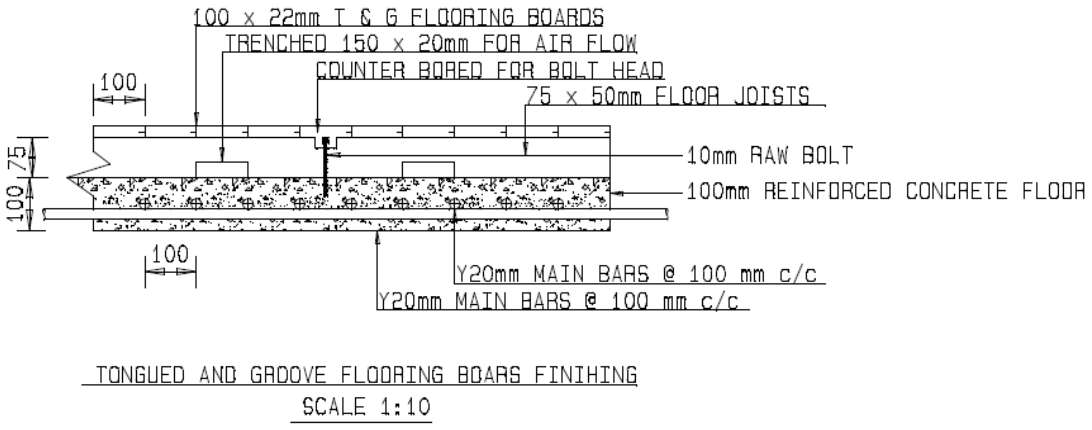


A VERTICAL LONGITUDINAL SECTION OF A WOODEN STAIRCASE
SCALE 1:10

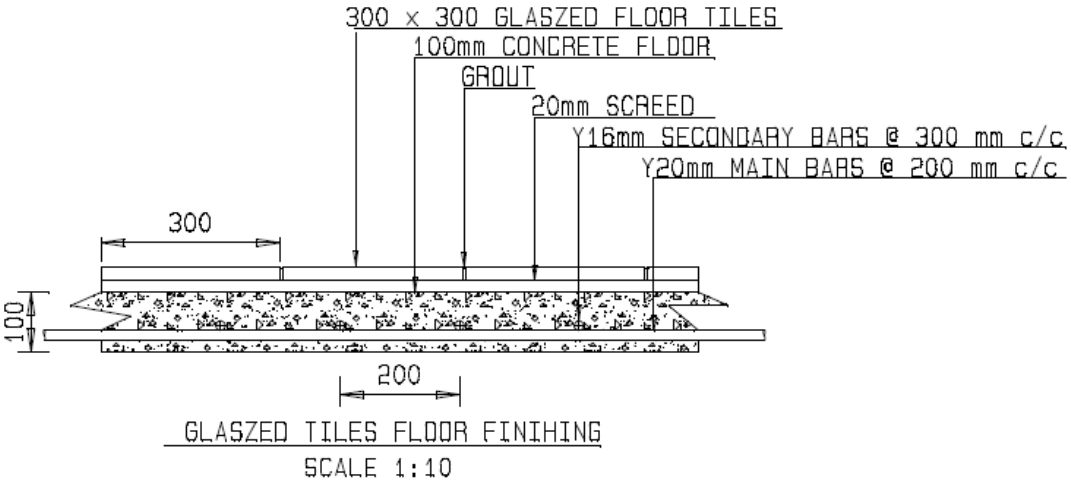
[14]

VRAAG 6: BETONVLOERE

6.1



6.2



(7)
[14]

RUBRIEK VIR VRAE 4 – 6.2						
ITEM	**BESKRYWING**	**VRAAGNOMMERS**				
		4.1	**4.2**	**5**	**6.1**	**6.2**
1	Akkuraatheid van konstruksie	4	4	5	3	3
2	Algemene lynwerk	1	1	2	-	-
3	Boukundige besonderhede	-	-	2	-	-
4	Benoeming	3	3	3	2	2
5	Titel	1	1	1	1	1
6	Skaal	1	1	1	1	1
	TOTAAL	**20**		**14**	**14**	

TOTAAL AFDELING B: 48
GROOTTOTAAL: 100

Kopiereg voorbehou