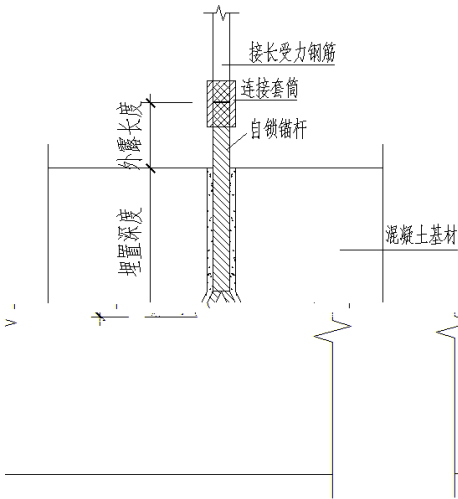


1

- 1C30 $f_{cu\ k}=30\text{N/mm}^2$;
- 220mm $A_0=245\text{mm}^2$;
- 320mm $A_1=314\text{mm}^2$;
- 48.8 $f_{yk}=640\text{N/mm}^2$;
- 5HRB400 $f_{yk}=400\text{N/mm}^2$ $f_y=360\text{N/mm}^2$



1

1
$$N_1=A_1\times f_y=0.001\times 314\times 360=109.4\text{kN}$$

2

$N_{s,d}$

d

N_d

$A_s f_y/K_s$

$N_{s,d}$

kN

N_d

kN

f_{sk}

kPa

$f_{sk}=f_{yk}$

A_s

m^2

K_s

1.3

1.2

$$N_d\ A_s f_{sk}/K_s=0.001\times 245\times 640/1.3=120\text{KN}$$
$$N_{s,d}=N_1=109.4\text{KN}$$

2

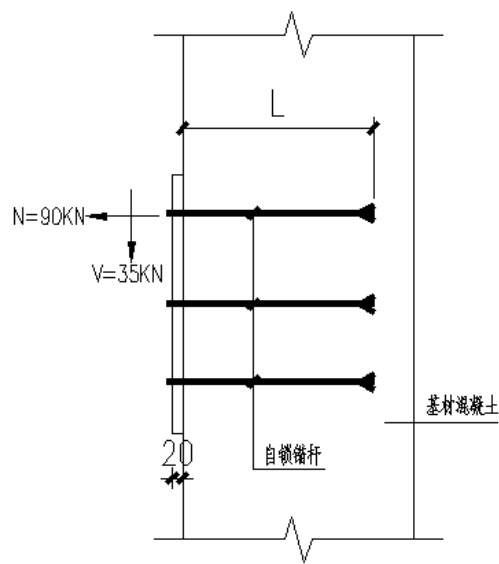
C30 $f_{cu\ k}=30\text{N/mm}^2$;
20mm $A_0=245\text{mm}^2$;
8.8 $f_{yk}=640\text{N/mm}^2$;

N=90KN V=35KN

 $f_{mck}=2.85\text{MPa}$

 $f_{msk}=6.0\text{MPa}$

D=25mm, D+=38mm



2

1

20 8.8

$N_d=120\text{KN}$ $N_{vd}=48.3\text{KN}$

2

$$H\sqrt[3]{\frac{(cN_d)^2}{9.8^2 f_{cu,k}}}$$

H

$$N_d \qquad \qquad \qquad \text{kN}$$

$$\qquad \qquad \qquad c \qquad \qquad \qquad 2$$

$$f_{cu \text{ k}} \qquad \qquad \qquad \text{kPa} \qquad \qquad \qquad f_{cu \text{ k}} > 45 \text{N/mm}^2$$

$$0.95$$

$$H=271\text{mm}$$

$$H=360\text{mm}$$

$$H = \sqrt[3]{\frac{(c N_d)^2}{9.8^2 f_{cu,k}}} = \sqrt[3]{\frac{(2 \cdot 120)^2}{9.8^2 \cdot 30}} = 271\text{mm}$$

$$3$$

$$N_d = N_{t1} + N_{t2}$$

$$K_c \qquad \qquad \qquad 2 \qquad \qquad \qquad 1.7$$

$$N_{t1} \qquad \qquad \qquad \text{kN}$$

$$N_{t2} \qquad \qquad \qquad \text{kN}$$

$$N_{t1} = mck \cdot a/2$$

$$N_{t1} = msk \cdot a/2$$

$$N_{t2} = 1.8 \cdot c \cdot l \cdot f_{ck} \cdot A_{ln}$$

$$d \qquad \qquad \qquad \text{m} \qquad \qquad \qquad d=20\text{mm}$$

$$D \qquad \qquad \qquad D=25\text{mm}$$

$$D_+ \qquad \qquad \qquad D_+=38\text{mm}$$

$$f_{mck} \qquad \qquad \qquad \text{kPa}$$

$$1$$

$$A_{ln} \qquad \qquad \qquad \text{m}^2$$

$$A_{ln} = (D_+^2 - D^2)/4 = 3.14 \times [(38)^2 - (20)^2]/4 = 819.54 \text{mm}^2$$

$$c \qquad \qquad \qquad \text{C30} \qquad \qquad \qquad 1.0$$

$$\qquad \qquad \qquad \text{C60} \qquad \qquad \qquad 0.6$$

$$l \qquad \qquad \qquad 3$$

$$N_{t1} = D \cdot f_{mck} \cdot L_a/2 = 3.14 \times 25 \times 2.85 \times 10^3 \times 360 \times 10^{-3}/2 = 40.27 \text{KN}$$

$$N_{t1} = n \cdot d \cdot f_{msk} \cdot L_a/2 = 3.14 \times 1.0 \times 20 \times 6 \times 10^3 \times 360 \times 10^{-3}/2 = 67.8 \text{KN}$$

$$N_{t1}=40.27KN$$

$$N_{t2}=1.8\times 1.0\times 3\times 20.1\times 10^3\times 819.5\times 10^{-6}=88.95KN$$

$$N_d=120KN\quad N_{t1}+N_{t2}=40.27+88.95=129.22KN$$

4

$$N_{s,d}$$

$$N_d=A_sf_{sk}/K_s$$

$$N_{s,d}\qquad\qquad\qquad kN$$

$$N_d\qquad\qquad\qquad kN$$

$$f_{sk}\qquad\qquad\qquad kPa\qquad\qquad\qquad f_{sk}=f_{yk}\qquad\qquad\qquad f_{sk}=f_{pyk}$$

$$A_s\qquad\qquad\qquad m^2$$

$$K_s\qquad\qquad\qquad 1.3\qquad\qquad\qquad 1.2$$

$$N_d=A_sf_{sk}/K_s=0.001\times 245\times 640/1.3=120KN\quad N_{s,d}=90KN$$

5

$$N_{vk}=0.5\times 0.8\times K_s\times N_d$$

$$N_{vd}=0.5\times 0.8\times N_d\qquad\qquad\qquad 8\%\qquad\qquad\qquad 0.8$$

$$N_{vd}=0.5\times 0.8\times N_d=0.5\times 0.8\times 120=48KN$$