

SET CALCULATION

CONTRACT NAME	Wharfdale Road, Barnsley.	Pile Load	250	kN
CONTRACT NUMBER	P3043 / 165	Factor of Safety	3.00	
PILE SIZE	220 Ø Driven Casing	Hammer Weight	500	kg
RIG TYPE/NUMBER	D500	Drop height	3000	mm
		Efficiency %	40	%
		NSF	0	kN

BASED UPON THE MODIFIED HILEY FORMULA

which states

$$R_u = \frac{E}{S+C/2} \quad \text{and thus,} \quad S = \frac{E}{R_u} - \frac{C}{2}$$

where,

- R_u = Ultimate Load Incorporating Factor of Safety (kN)
- E = Actual Transferred Energy from Hammer (kNmm)
- C = Total Temporary Compression of Pile and Ground (mm)
- S = Set per Blow (mm)

hence

Ultimate App Load	=	250 kN	x	3	=	750 kN
plus NSF		0 kN	x	2.0	=	0 kN
gives	R_u	=	750 kN	+	0.0 kN	= 750 kN
	E	=	4.905 kN	x	3000 mm	x 0.40 = 5886 kNmm
	C	=	10 mm (to be measured on site)			

Therefore

$$S = \frac{5886}{750} - \frac{10}{2}$$

$$S = 2.85 \text{ mm/Blow}$$

Set for 10 Blows = 28 mm

Using a 500 kg hammer falling over a 3 m drop
Equivalent to 9 blows per inch

CAPACITY OF CONCRETE SECTION

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Calculation of capacity of concrete section with 1no H16 Bar 35N concrete

$$N_{ult} = [0.4A_g f_g + 0.75f_y A_{st}]$$

Compression Load = 250.00 kN
 Compression Load Factor = 1.60
 ult. Compressive load = 400 kN

$f_y = 500 \text{ N/mm}^2$
 $f_g = 35 \text{ N/mm}^2$

Pile Diameter = 220 mm
 Area of Pile = 38018 mm²

Nos. of Bars = 1
 Diameter of Bar = 16 mm

$A_{st} \text{ PROV} = 201 \text{ mm}^2$
 $A_g = A_{pile} - A_{st} = 37817 \text{ mm}^2$
 $N_{ult} = 605 \text{ kN}$

ADEQUATE COMPRESSION STEEL			
% STEEL= 0.53	$A_s \geq 0.4\%$, THEREFORE % STEEL ADEQUATE	%fg= 18.79 %	%fg <25%, Therefore OK