

Venture Business Parks Ltd

12541

93-95 Alfred Gelder Street

Hull

HU1 1EP

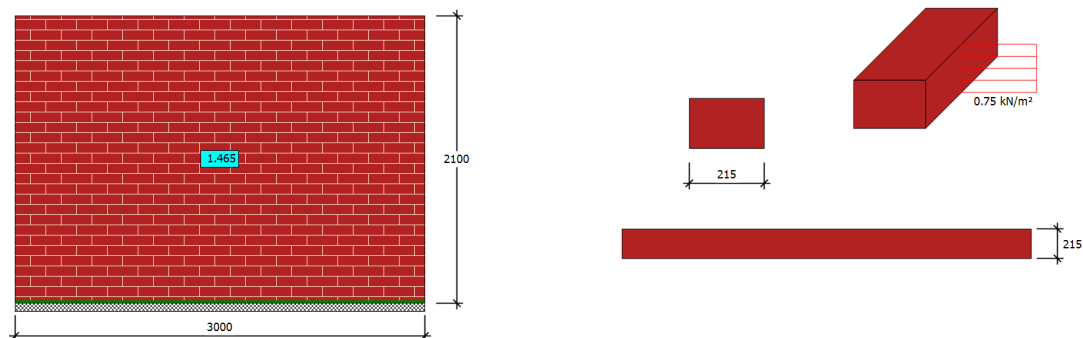
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Job Ref :
 Sheet : /
 Made by : ADH
 Date : 17 September 2020 / Ver. 2019.09
 Checked :
 Approved :

Free Standing, Vertically and Laterally Loaded, Single-leaf Wall

Design to BS 5628 : 1992

Twibell Street Wall

**Summary of Design Data**

Wall Dimensions	h=2.100 m, hef=4.200 m, L=3.000 m, Lef=3.000 m		
Support Conditions	Free Standing Wall, Bottom Cont.		
Lateral Loads	Wx=0.75 kN/m²		
Single-leaf Wall (mm)	t=215, tef=215		
Limiting Dimensions	$\lambda = 19.5 \leq \lambda_{lim} = 27$, $h \leq 12 tef$	0.814	OK

Wall Design

Partial Safety Factor (γ_{mc}/γ_{mf})	Construction Normal, Unit Manufacture Normal	3.5/3	Table 4a/4b
Unit Material	Clay water absorption < 7%, Standard bricks, $\gamma = 20$ kN/m³		
	Normalised mean compressive strength 20 N/mm²		
Mortar Material	M4/(iii), 4 N/mm²		
Compressive Strength (fk)	Standard bricks	5.8 N/mm²	Table 2
Section Properties	Area=2150 cm²/m, Zb=7704 cm³/m		
Flexural Strength fkb (Parallel)	fkb=0.5, gd=0.042 N/mm², fkb=fkb+0.9 gd. γ_{mf}	0.613 N/mm²	Table 3
Critical axial compressive case	1.4($\gamma_{tk}.h$)		
Max local stress @	X=0 m, Y=0 m < fk/ γ_{mc}	0.06 N/mm²	OK
Critical axial buckling case	1.4($\gamma_{tk}.h$)		
Max axial buckling force @	X=1.5 m, Y=0 m averaged over width of 2.15 m	12.64 kN/m	
Capacity reduction factor top, β	ex=0.0 mm, hef=4200 mm, tef=215.0 mm, t=215.0 mm	0.783	
Fr= $\beta.fk.tk/\gamma_{mc}$	0.783x5.8x215/3.5	279.0 kN/m	
Fd/Fr	12.6/279.0	0.045	OK
Mr=fkp.Zp/ γ_{mf}	1.5x7704/3	3.852 kN.m/m	
Mr=fkb.Zb/ γ_{mf}	0.613x7704/3	1.575 kN.m/m	

Design for Lateral Loads

Design Lateral Load Wd	1.4 Wx	1.050 kN/m²	
Yield Line Analysis	Load Factor, λ_p	0.682	
Ut=1/ λ_p	1 / 0.682	1.465	Warning