

Check members of raking shores

- refer to next pages for analysis input and output
- FOS wind = uls = 1.4

A - Vertical shore check

Compression check

L effective = 3.1 m
 Fsls A = 24 kN
 Fuls A = 34 kN (gf = 1.4)

Try 152x152x30UC S275:

Pcy = (Le=8m) = 147 kN (from Blue Book) Fuls/Pcy = 0.16 hence OK

Bending check

L effective = 2x1.85m = 3.7 m
 Msls = 4 kNm
 Muls = 5.9 kNm

Try 152x152x30UC S275:

Mb = (Le=3.7m) = 48.8 kN (from Blue Book) Muls/Mb = 0.09 hence OK

Combined check

Fus/Pcy + Muls/Mb = 0.25 < 1.0 OK

def at top = 3.2 mm
 H/top L = 1.85m = 578 > L/180 OK

Use 152UC30 S275

B - Raking shore check

L effective = 6.5 m
 Fsls = 25 kN
 Fuls = 36 kN (gf = 1.4)

Try 152x152x30UC S275:

Pcy = (Le=6.5m) = 187 kN (from Blue Book) Fuls/Pcy = 0.19 hence OK

Bending check

L effective = 3.8 m
 Msls = 1 kNm
 Muls = 1.3 kNm

Try 152x152x30UC S275:

Mb = (Le=3.2m) = 52.3 kN (from Blue Book) Muls/Mb = 0.02 hence OK

Combined check

Fus/Pcy + Muls/Mb = 0.21 < 1.0 OK

Use 152UC30 S275

Uplift of vertical rake resisted by fixing to existing wall and new RC wall

Vertical uplift force = 24.2 kN

cv > 170 = Edge 1 s = 800 = 1 fb_n = C30 = 1

Vrd c = (Vrd-nom=35.2kN) 35.2 kN / anchor

Shear capacity for 4 anchors = 140.8 kN > Vuls 24 kN

Check uplift of the rake

- to be resisted by self weight of existing front façade
- walling beams to be fixed to front steel frame

Ex. Wall = 225thk wall x 2m(h) x (2x1.1m+2x0.8m) = 38 kN FOS = 1.6 > 1.5 OK

We have allowed in the above calculations wind pressure = 0.70 kN/m². According to BS wind pressure could be allowed as 0.60 kN/m². See check wind load calculations with direction factor for critical 220 degree.

Vertical uplift = 24.2 kN x 0.60/0.70 = 20.9 kN

FOS = 38 kN / 20.9 kN = 1.82