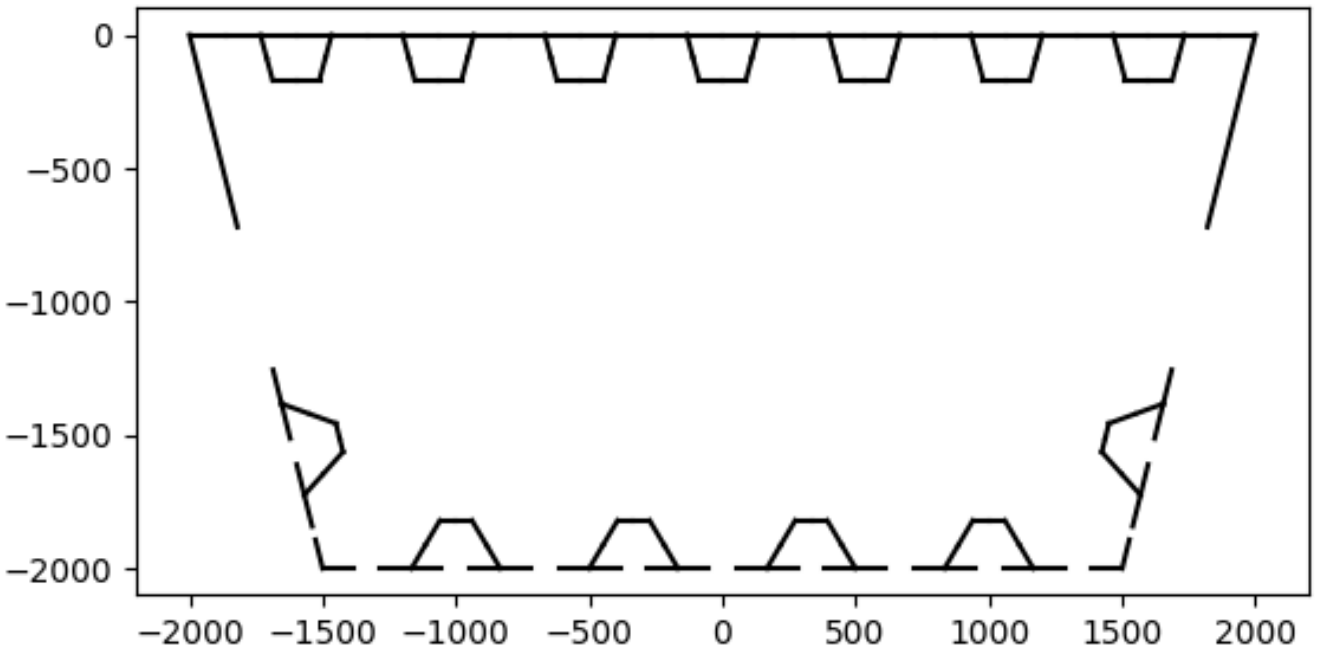

Buckling Proof according to EC 1993 Part 1-5

3.2 Effective width for elastic shear lag

Shear lag reduction for flange 1

Shear Lag is not neglectable

alpha_0: 1.6

Beta: 0.7819557364538499

Shear lag reduction for flange 3

Shear Lag is not neglectable

alpha_0: 1.6

Beta: 0.8651284996081308

4.4 Plate elements without longitudinal stiffeners

Iteratively changing the widths until M_Rd_el_eff converges to a limit of 0.02

4.5 Stiffened plate elements with longitudinal stiffeners

Side 2

4.5.2 Plate type behaviour

sigma_cr = 764.7960756476914

Lambda: 0.42516627276630536

Rho_Global: 1.0

4.5.3 Column type buckling behaviour

Column number 8

A_sl=7991.9, A_sl_eff=6178.74, I_sl=9425706.6

sigma_cr_c=24.44

e1=71.37, e2=36.82

All tension =False

Buckling Values 8

beta_A_c =0.7731250965958132

lambda_c_bar =2.7262613018060615

Phi_c =4.700409783777014

Chi_c =0.11724120829089894

Critical buckling values

Chi_c: 0.11724120829089894

sigma_cr_c: 24.444585393574965

4.5.4 Interaction between plate and column buckling

all_tension: False

rho_c = 1.0

Side 3

4.5.2 Plate type behaviour

sigma_cr = 693.1471070262279

Lambda: 0.5284959540883302

Rho_Global: 1.0

4.5.3 Column type buckling behaviour

Column number 9

A_sl=6025.64, A_sl_eff=4964.14, I_sl=9435491.89

sigma_cr_c=32.45

e1=60.88, e2=49.17

All tension =False

Buckling Values 9

beta_A_c =0.8238362289037507

lambda_c_bar =2.4423867519557727

Phi_c =3.9294181531554626

Chi_c =0.14270263741088354

Column number 10

A_sl=6025.64, A_sl_eff=4964.14, I_sl=9435491.89

sigma_cr_c=32.45

e1=60.88, e2=49.17

All tension =False

Buckling Values 10

beta_A_c =0.8238362289037509

lambda_c_bar =2.44238675195577

Phi_c =3.929418153155455

Chi_c =0.14270263741088388

Column number 11

A_sl=6025.64, A_sl_eff=4964.14, I_sl=9435491.89

sigma_cr_c=32.45

e1=60.88, e2=49.17

All tension =False

Buckling Values 11

beta_A_c =0.823836228903751

lambda_c_bar =2.44238675195577

Phi_c =3.929418153155455

Chi_c =0.14270263741088388

Column number 12

A_sl=6025.64, A_sl_eff=4964.14, I_sl=9435491.89

sigma_cr_c=32.45

e1=60.88, e2=49.17

All tension =False

Buckling Values 12

beta_A_c =0.8238362289037505

lambda_c_bar =2.442386751955767

Phi_c =3.929418153155447

Chi_c =0.14270263741088418

Critical buckling values

Chi_c: 0.14270263741088354

sigma_cr_c: 32.454870278807846

4.5.4 Interaction between plate and column buckling

all_tension: False

rho_c = 1.0

Side 4

4.5.2 Plate type behaviour

sigma_cr = 538.2014903501104

Lambda: 0.5068263469599821

Rho_Global: 1.0

4.5.3 Column type buckling behaviour

Column number 13

A_sl=7991.9, A_sl_eff=6178.74, I_sl=9425706.6

sigma_cr_c=24.44

e1=71.37, e2=36.82

All tension =False

Buckling Values 13

beta_A_c =0.7731250965958132

lambda_c_bar =2.7262613018060593

Phi_c =4.700409783777007

Chi_c =0.11724120829089911

Critical buckling values

Chi_c: 0.11724120829089911

sigma_cr_c: 24.444585393575004

4.5.4 Interaction between plate and column buckling

all_tension: False

rho_c = 1.0

Resistance to shear and interaction shear force and bending moment for side 1

5. Resistance to shear

stiffened plate; EBPlate

k_tau: 948.2774576583281

eta_3: 0.02998356174556214

7.1 Interaction between shear force, bending moment and axial force

Deck plate is ignored, as it is dimensioned with EC 3-2

Resistance to shear and interaction shear force and bending moment for side 2

5. Resistance to shear

stiffened plate; EBPlate

k_tau: 15.116578947368422

eta_3: 0.6607123212796018

7.1 Interaction between shear force, bending moment and axial force

Web -> (7.1) without iterating

7.1 Interaction between shear force, bending moment and axial force

Web -> (7.1) without iterating

Resistance to shear and interaction shear force and bending moment for side 3

5. Resistance to shear

stiffened plate; EBPlate

k_tau: 2140.0287221587755

eta_3: 0.050754962614982274

7.1 Interaction between shear force, bending moment and axial force

Flange -> (7.1), comment (5)

eta_3 <= 0.5; no interaction needed

utilisation: -1

Proofing Resistance to shear for each subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.3677777777777775

eta_3: 0.07806144827514024

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.3677777777777775

eta_3: 0.05854608620635518

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.3677777777777775

eta_3: 0.039030724137570104

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.3677777777777775

eta_3: 0.019515362068785052

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.3677777777777775

eta_3: 8.319899252222054e-19

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.3677777777777775

eta_3: 0.01951536206878506

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.3677777777777775

eta_3: 0.03903072413757011

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.3677777777777775

eta_3: 0.05854608620635519

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.3677777777777775

eta_3: 0.07806144827514024

eta_3_panel < 1: pass subpanel

Resistance to shear and interaction shear force and bending moment for side 4

5. Resistance to shear

stiffened plate; EBPlate

k_tau: 15.116578947368422

eta_3: 0.6607123212796018

7.1 Interaction between shear force, bending moment and axial force

Web -> (7.1) without iterating

7.1 Interaction between shear force, bending moment and axial force

Web -> (7.1) without iterating

Results:

EI: 16420974Nm^2

interaction side 2: -0.62515049403541

interaction side 3: -1

interaction side 4: -0.62515049403541

cost: 2948CHF/m