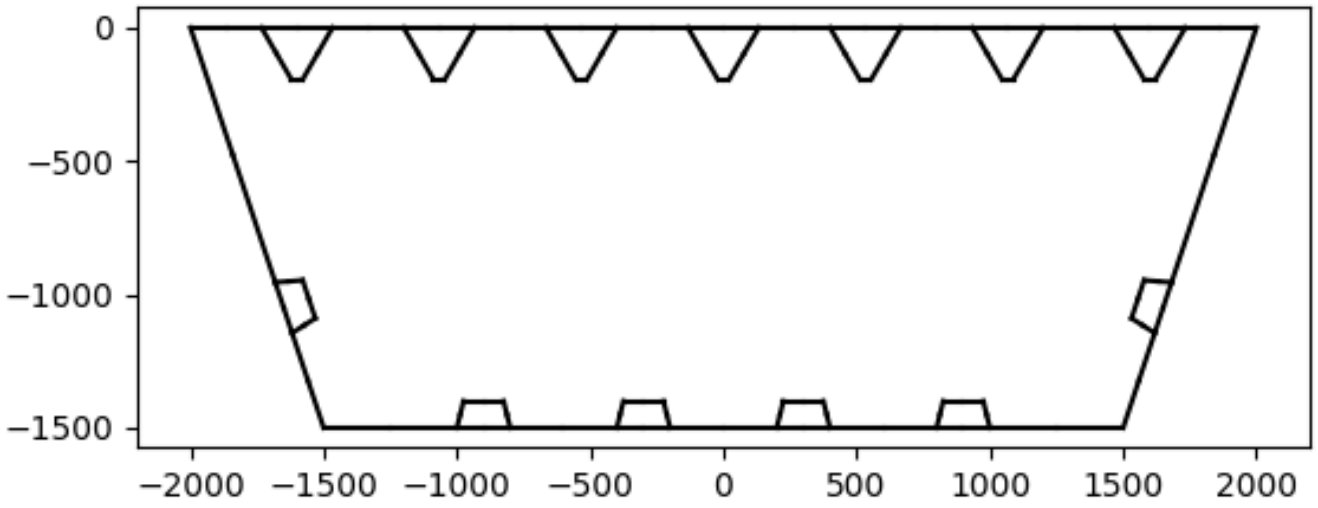
CS Analysis Tool



CONSTANTS

E: 210000

nu: 0.3

f_y: 235

G: 81000

gamma_M1: 1.05

INPUT DATA

b_sup: 4000

CS Analysis Tool

t_deck: 5

b_inf: 3000

t_bottom: 5

h: 1500

t_side: 5

a: 10000

L_e: 15000

bending type: sagging bending

cs position: neither

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

Beta: 0.6161387625504372

Shear lag reduction for flange 3

Shear Lag is not neglectable

Beta: 0.8611379451328055

4.4 Plate elements without longitudinal stiffeners

Iteratively changing the widths until M_Rd_el_eff converges to a limit of 0.005

4.5 Stiffened plate elements with longitudinal stiffeners

Side 2

4.5.2 Plate type behaviour

sigma_cr = 622.4563627716184

Lambda: 0.5190600738877355

Rho_Global: 1.0

4.5.3 Column type buckling behaviour

Column number 8

A_sl=6064.94, A_sl_eff=5720.9, I_sl=3124491.49

sigma_cr_c=106775.53

e1=37.67, e2=33.38

All tension =False

Buckling Values 8

beta_A_c =0.9432746779846787

lambda_c_bar =0.045563505842586165

Phi_c =0.4705970761215423

Chi_c =1.064981763404818

Critical buckling values

Chi_c: 1.064981763404818

sigma_cr_c: 106775.53893483618

4.5.4 Interaction between plate and column buckling

all_tension: False

rho_c = 1.064981763404818

Side 3

4.5.2 Plate type behaviour

sigma_cr = 266.7319668074863

Lambda: 0.8617797607577712

Rho_Global: 0.8641585603619245

4.5.3 Column type buckling behaviour

Column number 9

A_sl=6099.24, A_sl_eff=5047.06, I_sl=3124562.95

sigma_cr_c=106177.48

e1=37.86, e2=33.19

All tension =False

Buckling Values 9

beta_A_c =0.8274912013911483

lambda_c_bar =0.042795628137715314

Phi_c =0.4699622401193241

Chi_c =1.0661300199353032

Column number 10

A_sl=5849.24, A_sl_eff=5024.85, I_sl=3124042.12

sigma_cr_c=110697.11

e1=36.44, e2=34.61

All tension =False

Buckling Values 10

beta_A_c =0.8590614705380388

lambda_c_bar =0.04270491829572704

Phi_c =0.46968320116694273

Chi_c =1.0667566183478476

Column number 11

A_sl=5849.24, A_sl_eff=5024.85, I_sl=3124042.12

sigma_cr_c=110697.11

e1=36.44, e2=34.61

All tension =False

Buckling Values 11

beta_A_c =0.8590614705380387

lambda_c_bar =0.042704918295727035

Phi_c =0.46968320116694273

Chi_c =1.0667566183478476

Column number 12

A_sl=6099.24, A_sl_eff=5047.06, I_sl=3124562.95

sigma_cr_c=106177.48

e1=37.86, e2=33.19

All tension =False

Buckling Values 12

beta_A_c =0.8274912013911483

lambda_c_bar =0.04279562813771542

Phi_c =0.46996224011932414

Chi_c =1.0661300199353032

Critical buckling values

Chi_c: 1.0661300199353032

sigma_cr_c: 106177.48561438108

4.5.4 Interaction between plate and column buckling

all_tension: False

rho_c = 1.0661300199353032

Side 4

4.5.2 Plate type behaviour

sigma_cr = 392.34007740330185

Lambda: 0.6537937172696691

Rho_Global: 1.0

4.5.3 Column type buckling behaviour

Column number 13

A_sl=6064.94, A_sl_eff=5720.9, I_sl=3124491.49

sigma_cr_c=106775.53

e1=37.67, e2=33.38

All tension =False

Buckling Values 13

beta_A_c =0.943274677984679

lambda_c_bar =0.04556350584258626

Phi_c =0.4705970761215423

Chi_c =1.064981763404818

Critical buckling values

Chi_c: 1.064981763404818

sigma_cr_c: 106775.53893483577

4.5.4 Interaction between plate and column buckling

all_tension: False

rho_c = 1.064981763404818

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

5. Resistance to shear

stiffened plate; EBPlate

k_tau: 9487.523157149855

eta_3: 0.01518249284751341

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: 18.262807017543867

eta_3: 0.12294182924697888

7.1 Interaction between shear force, bending moment and axial force

Web -> (7.1) without iterating

eta_3 <= 0.5; no interaction needed

utilisation: -1

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

5. Resistance to shear

stiffened plate; EBPlate

k_tau: 950.3377325984843

eta_3: 0.015212535600357196

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: 5.4025

eta_3: 0.030249508765667583

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.35

eta_3: 0.015720109976581496

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.38

eta_3: 0.011640075591667376

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.35

eta_3: 0.0052400366588605

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.38

eta_3: 0.0019400125986112292

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.35

eta_3: 0.0052400366588605

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.38

eta_3: 0.011640075591667376

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.35

eta_3: 0.015720109976581496

eta_3_panel < 1: pass subpanel

5. Resistance to shear

unstiffened plate; (A.5)

k_tau: 5.4025

eta_3: 0.030249508765667583

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: 18.262807017543857

eta_3: 0.1229418292469789

7.1 Interaction between shear force, bending moment and axial force

Web -> (7.1) without iterating

eta_3 <= 0.5; no interaction needed

utilisation: -1

Results:

EI: 8005418Nm^2

interaction side 2: -1

interaction side 3: -1

interaction side 4: -1

cost: 2527CHF/m

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