

Advanced Concrete Design and Detailing for Beams, Columns and Walls

Automatically Design and detail reinforced concrete sections in an easy-to-use interactive environment. S-CONCRETE runs as a stand-alone application or fully integrated within S-FRAME Analysis, through the Integrated Concrete Design (ICD) option.

Design Codes

- ACI 318-11, 08, 05, 02 CSA A23.3-04
- EN 1992-1-1:2004 BS 8110:1997
- CP 65:1999

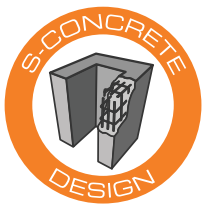
- True axial force - biaxial bending interaction where the resultant moment is applied at any angle
- Slenderness and/or imperfection effects calculations, if applicable
- Axial load and moment interaction diagrams. Axial load, flexure, shear and torsion design
- Generate moment-curvature diagrams for any shape and add reinforcing bars and/or pre-stressing strands
- Complex moment-curvature relationships can be used for more accurate deflection estimation and realistic flexural capacity evaluation which may include strain-hardening of reinforcement and tension-stiffening of concrete
- International range of reinforcing bars
- Support for fiber-reinforced concrete beam sections (ACI 318-11 and 08) which has implications on minimum shear reinforcement requirements
- CSA shear & torsion (simplified or general method)
- Batch Processing Mode to automatically code check thousands of beams, columns and walls in one run
- Batch Processing Mode supports automatic design
- Generate comprehensive design reports with equations and clause references
- Export detailed drawings to AutoCAD® or export drawings and numerical results to Microsoft Word®

Fast and Easy Section Definition and Loading. Automatically Design and Detail one or Many Sections

The screenshot displays the S-CONCRETE software interface with several key components:

- Material Properties:**
 - $f_c' = 5000$ psi
 - f_y (panel vert) = 60.0 ksi
 - f_y (panel horiz) = 60.0 ksi
 - f_y (zone vert) = 60.0 ksi
 - f_y (zone horiz) = 60.0 ksi
 - $W_c = 150$ pcf
 - $W_s = 500$ pcf
 - $h_{agg} = 0.75$ in
 - Poisson's Ratio = 0.2
 - $E_s = 29000$ ksi
 - $E_c = 4207$ ksi
 - $G_c = 1786$ ksi
- Section Properties:**
 - $Z_{top} = 0.0$ in
 - $Z_{bot} = 7.0$ in
 - $A_g = 500.0$ sq. in.
 - $I_g (y-y) = 5570E3$ in⁴
 - $I_g (z-z) = 5521.5E3$ in⁴
 - Ashear (Y) = 3840.0 sq. in.
 - Ashear (Z) = 2400.0 sq. in.
 - $S_y = 367.77$ in³
 - $S_z = 367.77$ in³
 - $A_w = 500.0$ sq. in.
 - $I_w (y-y) = 5570E3$ in⁴
 - $I_w (z-z) = 5521.5E3$ in⁴
 - Ashear (Y) = 3840.0 sq. in.
 - Ashear (Z) = 2400.0 sq. in.
 - $S_y = 367.77$ in³
 - $S_z = 367.77$ in³
- Zone Properties:**
 - Zone A:** 10 #4 Vert, #3 Ties @ 8.0 in Tangential Splice, $A_s = 7.9$ sq. in., $V_y = 405.0^\circ$, $Z = 3.68$ 38"
 - Zone B:** 10 #4 Vert, #3 Ties @ 8.0 in Tangential Splice, $A_s = 7.9$ sq. in., $V_y = 405.0^\circ$, $Z = 3.68$ 38"
 - Zone C:** 10 #4 Vert, #3 Ties @ 8.0 in Tangential Splice, $A_s = 7.9$ sq. in., $V_y = 405.0^\circ$, $Z = 3.68$ 38"
- Stair Results:**
 - Panel = 3
 - $V_u = 200.0$ kips
 - $O_{V_u} = 0.33$ kips
 - Stair Use = No
- Figure / Axial Results:**
 - Panel = 3
 - $N_u = -1000.0$ kips
 - $M_u = -2400.0$ k-ft
 - $O_{M_u} = 3.81$ 0 k-ft
 - Use Table = No
- Summary:**
 - Concrete Section
 - Job # A123.45
 - ACI 318-11 Standard
 - S-FRAME Software (UK) Ltd.
 - Mounta Zoumpre
 - Status = Warning
- Loads Table:**

No.	N (kips)	T (k-ft)	Vz (kips)	Mz (k-ft)	Vy (kips)	Mx (k-ft)
1	1.50	0	18.75	100	6.25	300
2	-1.25	0	31.25	-450	8.75	125
3	-.75	0	25	-110	6.75	400
4	-3.50	0	22	100	5.5	350
5	-1.50	0	12.5	400	25	200
6	-.75	0	12.5	400	25	-200
7	-1.25	0	18.75	-125	7.75	-300
8	-.375	0	4.75	450	28	75
9	0	0	0	0	0	0
- Results Report:**
 - Section Name: Concrete Section
 - Consultant: S-FRAME Software (UK) Ltd.
 - Summary Status: **Acceptable**
 - Maximum: 1.000
 - V & T Use: **0.265**
 - N vs M Use: **0.285**
- Section Dimensions:**
 - C-Shape
 - L1 = 240.0 in
 - L2 = 120.0 in
 - L3 = 120.0 in
 - Offset = 24.0 in
- Material:**
 - $f_c' = 5000$
 - f_y (panel) = 60.0 ksi
 - f_y (zone) = 60.0 ksi
 - $W_c = 150$
 - $W_s = 500$
 - Poisson's Ratio = 0.2
 - $h_{agg} = 0.75$
 - $E_s = 29000$
 - Steel = 250.7 lb/ft
 - $E_c = 4207$
 - Primary = 182.7 lb/ft
 - $G_c = 1786$
 - Secondary = 68.0 lb/ft
 - $f_r = 530$ p
- Quantities (approx.):**
 - Concrete = 6112 cu ft
 - Steel = 250.7 lb/ft
 - Primary = 182.7 lb/ft
 - Secondary = 68.0 lb/ft



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Beam Section Design and Detailing

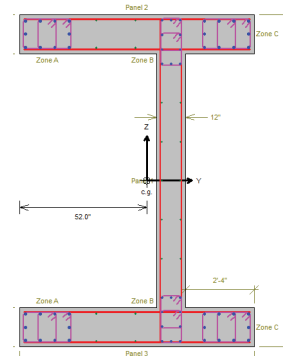
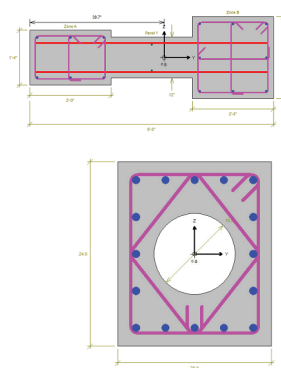
- T-beams, L-beams, slab bands, and rectangular beams
- Bar spacing and stirrup/tie spacing checks
- Crack control and steel area checks
- EC2 crack width calculations and minimum reinforcement
- Beams with any number of stirrup legs
- Multiple bar layers with different bar sizes per layer
- Face steel checks (if applicable)

Column Section Design and Detailing

- Rectangular and circular columns
- Columns with holes
- Composite columns
- Rectangular or circular ties or spiral
- Multiple bar layers
- Bar spacing and steel area checks

Shear Wall Section Design and Detailing

- Rectangular shape, I-shape, C-shape, T-shape, and L-shape wall sections
- Seismic design and detailing
- Complex zones of reinforcing
- Sectional and panel loading
- Zone reinforcing checks
- Panel reinforcing checks
- Bar spacing checks
- Anchorage checks
- Interface shear or sliding shear check (CSA Only)



Seismic Provisions for shear walls ACI 318, CSA-A23.3

- Boundary element size and detailing evaluation
- Ductility requirements
- Curtains of reinforcing, steel area and steel ratios
- Anchorage and development length including hooks
- Simplified or general method of shear design
- Concrete confinement (zone ties & configuration)
- Displacement or stress method for boundary element design (ACI)
- Bar spacing requirements
- Squat walls as defined in CSA-A23.3-04

