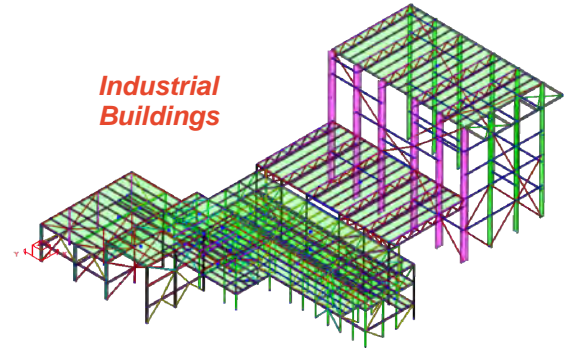




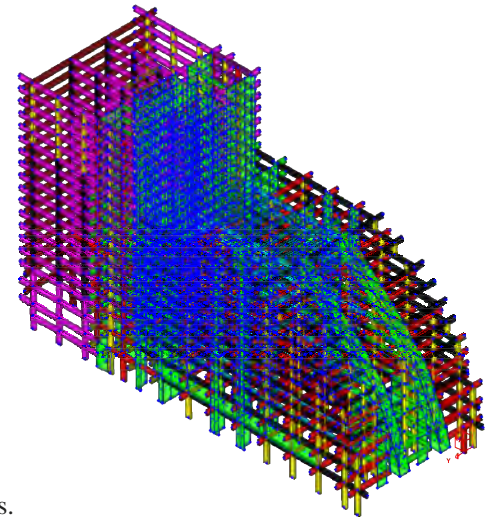
# S-PAD™



Industrial Buildings

**S-PAD™ is a stand-alone steel member design and optimization application**

- Simply input strength and stability design forces, effective lengths in compression and unsupported lengths in bending of a steel element (beam, column or brace) and run a quick code check or even an auto-design to help identify an optimum section.
- Input can be pasted in from external spreadsheet programs.
- Support for AISC 360-10 & 360-05 LRFD/ASD, AISC ASD 89, AISC LRFD 94, CSA-S16-2001 & 2009, CSA-S16.1-M94, BS 5950:1990 & 2000, EC3:2005, AS 4100-1998, NZS 3404:1997.
- Support for American, Canadian, British, European and other international section sizes.
- Code relaxation available for more conservative designs.
- Quickly checks a member's capacity (beam, column, or brace) without the need to build a complete detailed model.
- Uses a simple, intuitive spreadsheet layout which allows up to 20 design cases to be evaluated simultaneously.
- Input files can be saved and can contain multiple worksheets each with up to 20 design cases.
- Detailed design calculations can be viewed for all section shapes.
- Features exactly the same superb output as S-STEEL as well as the same comprehensive set of design constraints giving the engineer full control of **ALL** design parameters.
- For auto-design an automatically sorted list of adequate sections is produced to easily identify optimum sections and detailed design calculations can be viewed for all sections.
- Code check or automatic redesign options for strength and span deflection for steel members.
- Supports code checks for both strength and serviceability. Serviceability checks include comprehensive deflection criteria and an option to consider camber.
- Flexible output/reports for designs and code checks.



Hotels

Simple input of design forces and effective lengths

Output showing detailed code equations, intermediate results, capacities and clause references

	1	2
Title	Case 1	Case 2
Axial (kN)	-290.00	-150.00
Mx (kNm)	50.00	200.00
My (kNm)		
Vy (kN)		
Vx (kN)		
Lu (m)	2.50	2.50
kLx (m)	5.00	5.00
kLy (m)	2.50	2.50
w1x	1.00	1.00
w1y	1.00	1.00
w2	1.00	1.00

Title: Case 1 (Bending + Compression)	
Section classification ( $f_y=345$ MPa);	Section Class = 1
Governing geometrical slenderness ratio $kL_x=5.00$ m; $kL_y=2.50$ m; $k_xL/r_x=44.8$ ;	$\frac{kL/r_x}{200} = \frac{71}{200} = 0.357$
Equivalent slenderness parameter based on buckling stress $F_e$ $F_e=371$ MPa;	$\lambda_e = \left[ \frac{F_y}{F_e} \right]^{1/2} = 0.964$
Factored Compressive Resistance Check $n=1.34$ ; $\lambda_e=0.964$	$\frac{C_f}{C_{fy}} = \frac{C_f}{\phi A F_y (1 + \lambda_e^{2n})^{-1/n}} = \frac{C_f}{\phi A (213 \text{ MPa})} = \frac{290}{1098} = 0.264$
Strong axis section capacity in bending	$\frac{M_{fb}}{M_{rx}} = \frac{M_{fb}}{\phi F_y Z_x} = \frac{50}{187} = 0.267$
Bending Stability Check $L_u=2.50$ m; $\omega_2=1.000$ ;	$\frac{M_{fb, \max}}{M_{rx}} = \frac{50}{179} = 0.279$
Axial Compression and Bending overall member Strength Check $\omega_{1x}=1.00$ ; $U_{1x}=1.05$ ;	$\frac{C_f}{C_{rx}} = \frac{0.85 U_{1x} M_{fb}}{\phi Z_x F_y} = 0.432$
Axial Compression and Bending lateral torsional buckling strength check $\omega_{1x}=1.00$ ; $U_{1x}=1.05$ ;	$\frac{C_f}{C_{ry}} + \frac{0.85 U_{1x} M_{fb, \max}}{M_{rx}} = 0.509$



# S-PAD™



**Industrial Building**  
Courtesy of The Bonacci Group

Design Sections For Study ...

Section Shapes	Section Type	Section Name
	[ ] W1100 - W1000	[X] W250x167
	[ ] W920 - W690	[X] W250x149
	[ ] W610 - W530	[X] W250x
	[ ] W460 - W410	[X] W250x
	[ ] W360	[X] W250x
	[ ] W310	[X] W250x
	[X] W250 - W200	[X] W250x80
	[X] W150	[X] W250x73
	[ ] S	[X] W250x67
	[ ] HP	[X] W250x58

Section Properties Library

Exclude  
 Sections not matching Tekla  
 Sections not matching Revit

Selection Criteria  
 (\*) Weight  
 ( ) Cost  
 ( ) Surface Area  
 ( ) Depth  
 ( ) Width  
 ( ) Ix  
 ( ) Iy  
 ( ) rx

Admissible/Inadmissible sections ...

Adequate Sections List

View  
 Admissible Sections  
 InAdmissible Sections

Sort by:  
 Weight  
 Cost  
 Surface Area  
 Depth  
 Width  
 Ix  
 Iy  
 rx  
 ry

W200x31  
 W250x33  
 W200x36  
 W150x37  
 S250x38  
 W250x39  
 W200x42  
 W250x45  
 W200x46  
 S310x47

Comprehensive Design Constraints

Constraints ...

Anet/Agross: 1.00  
 Code Relaxation: 1.00

Slenderness Limits:  
 Slenderness does not govern  
 In compression, KL/r ≤ 200  
 In tension, L/r ≤ 300

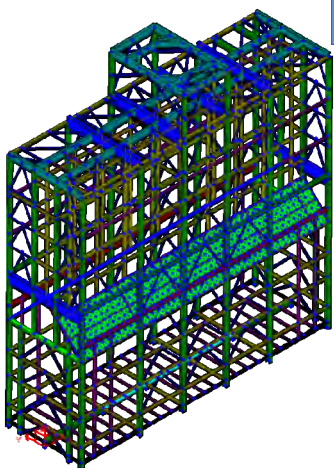
Consider Sections of Class:  
 1 (plastic)  
 2 (compact)  
 3 (non compact)  
 4 (slender)

Treat slender sections as non-compact  
 Member in unbraced frame or detailed analysis performed (U1 set as unity)  
 With Camber = L / 1000

Auto-Design



**Vancouver International Airport**  
Courtesy of Bush, Bohlman & Partners



**Refinery Heater Structure**  
Courtesy of SDI Engineering

- Full clause references to codes of practice.
- Material listing for weight, surface area and costs.
- User defined constraints for accurate design criteria.
- Unparalleled quality of printed results – complete breakdown of code results for members that pass or fail.
- Flexible output reports and integration with TEDDS®
- Least weight, cost, depth and surface area design criteria.
- Member grouping for realistic design results – making certain members continuous as required.
- Electronic online help system.
- ... and much more.