

How SIDEPLATE SAVES TIME & MONEY

SidePlate® Project Savings

PROJECT	LOCATION	SAVINGS
Children's Hospital	Los Angeles, CA	\$4,100,000
DoD Pacific Command Center	Oahu, HI	\$2,000,000+
Overlake Hospital	Bellevue, WA	\$1,520,000
Army Corps Classroom Building	Ft. Leavenworth, KS	\$1,008,000
GSA Federal Courthouse	<i>Unlisted</i>	\$1,580,000

Up to 25% (1 – 5psf) Net Reduction in Total Tonnage and/or Significant Reduction in Number of Moment Connections Required

- 40% lighter beams due to use of full-depth side plates & rigid panel zones
- Up to 60% lighter columns due to use of deep columns with SidePlate prequalification under AISC and COLA as well as OSHPD approved design guidelines

Up to 50%-65% Reduction in Field Welding Man-Hours

- Lighter girders & deep columns have thinner flanges & webs, which reduce field welding hours by 50-65%
- Eliminating removal of bottom girder flange backing bar saves time:
- No Back gouging
- No Reinforcing fillet welds

Projects Stay on Schedule & within Budget

- OSHPD prequalification means faster plan check and no full-scale testing required
- Column procurement is predictable & typically stays domestic
- Special Inspection time & costs are reduced by up to 50%
- Ease & speed of erection = open for business sooner & save on construction loan interest paid

Bottom Line:

SIDEPLATE® SAVES NET 10-15% (\$1-\$5/SF) IN STEEL FABRICATION/ERECTION COSTS!

REDUCED BEAM SECTION (DOG BONE) VS. SIDEPLATE®

5-Story Hospital in High Seismic

DELTA: 220 TONS (3.3PSF)

AREA: 133,000 S.F.

	RBS with deep columns SIZE & WEIGHT	SidePlate® with deep columns SIZE & WEIGHT
Lateral Columns	W33x354	W33x221
	W33x354	W33x241
	W33x387	W33x291
	W33x387	W33x318
	7.93 psf	5.51 psf
Lateral Beams	W30x108	W24x84, W27x94
	W36x232	W33x141
	W36x256	W36x160
	W36x256	W36x182, 194
	7.07 psf	3.83 psf
Gravity Columns	1.00 psf	1.05 psf
Gravity Beams	7.00 psf	7.05 psf
Connection Plates	0.65 psf	2.9 psf
Misc Steel	2.3 psf	2.3 psf
Total Steel Weight	26 psf (1732 tons)	22.7 psf (1512 tons)
Estimated Fabricated & Erected Steel Costs	\$5,716,000 (\$3,300/T)	\$5,140,000 (\$3,400/T)
SidePlate® Services & License Fee	N/A	\$124,000
Total Estimated Costs	\$5,716,000	\$5,264,000

Recommendation:

Use SidePlate® connection technology and *save the owner*:

- \$452,000 in steel fabrication/erection costs (\$3.40/sf) PLUS
- 2 weeks construction schedule

BOLTED END PLATE (BEP) VS. SIDEPLATE®

5-Story Office Building in high seismic

LATERAL SYSTEM: STEEL MOMENT FRAMES

AREA: 106,600 S.F.

	Bolted End Plate WEIGHT	SidePlate® system WEIGHT
Lateral Columns	W14x211	W21x93
	W14x233	W21x122
	W14x455	W21x132
		W21x166
		W21x182
	5.91 psf	2.05 psf
Lateral Beams	W21x50	W16x31
	W24x76	W21x50
	W24x103	W24x55
		W24x62
		W24x94
		W24x103
	2.43 psf	1.41 psf
Gravity Columns	0.08 psf	0.45 psf
Gravity Beams	4.34 psf	4.79 psf
Connection Plates	0.09 psf	0.81 psf
Misc Steel	1.65 psf	1.65 psf
Total Steel Weight	14.5 psf (1732 tons)¹	11.2 psf (1512 tons)¹
Estimated Fabricated & Erected Steel Costs	\$2,675,000 (\$3,460/T)	\$2,118,000 (\$3,560/T)
SidePlate® Services & License Fee ²	N/A	\$42,000
Total Estimated Costs	\$2,675,000	\$2,160,000
Estimated Savings w/ SidePlate® Moment Frames	\$2,675,000	\$2,160,000

(1) Based on data obtained from ETABS Model and SidePlate Systems, Inc. for connection weight

(2) See Attached List for Services Included with selection of SidePlate® Connection Technology

Recommendation:

Use SidePlate® connection technology and *save the owner*:

- \$515,000 in steel fabrication & erection costs (\$4.83/sf) PLUS
- 24% (50) fewer moment connections to install in the field resulting in faster construction schedule

WELDED UNREINFORCED FLANGE (WUF-W) VS. SIDEPLATE®

6-story Federal Courthouse in low seismic

LATERAL (LOAD RESISTING) SYSTEM: STRUCTURAL STEEL MOMENT FRAMES

AREA: 334,000 S.F.

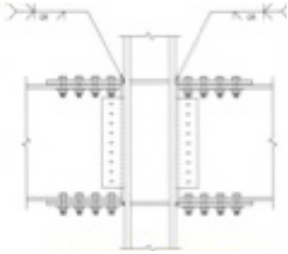
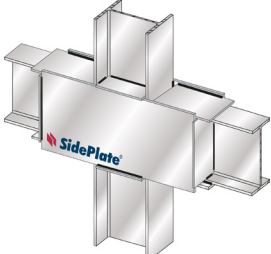
FABRICATION	WUF-W (A)	SIDEPLATE® (B)	DELTA (B-A)
Gravity System Beams & Columns	11.0 psf	11.0 psf	
Lateral System Beams	3.02 psf	2.41 psf	
Lateral System Columns	3.79 psf	2.25 psf	
Moment Connection Plates	0.12 psf	1.03 psf	
Misc. gravity connections, base plates, etc.	0.7 psf	0.7 psf	
Total Steel Unit Weight (psf)	18.6 psf (3111 tons)	17.4 psf (2904 tons)	-1.2 psf (-207 tons)
Lateral System: (Lineal inches of CJP/Fillet Welds for WUF-B and Fillet Welds only for SidePlate)	535,524 in.	1,265,513 in.	
Shop Man Hours (Gravity & Lateral System)	40850 hrs (13.1Mh/ton)	42400 hrs (14.6 Mh/ton)	1,550 hrs
Fabrication Price (FOB) Includes material, labor, trucking within 300 miles, detailing and profit for 05120 items only	\$7,650,366 (\$2,459/ton)	\$7,688,357 (\$2,647/ton)	\$37,991
ERECTION			
No. of pieces to be erected	4,674	4,674	
Qty of field welding for Lateral System	1G Col 1,346 lb 1G Bm 2,808 lb 3G bm 1,277 lb	915 lb 1,250 lb 698 lb	
	TOTAL 5,431 lb	2,863 lb	-2,568 lbs
Construction Schedule	130 days	110 days	- 4 weeks
Erection Price	\$2,279,895 (\$733/ton)	11.2 psf (\$677/ton)	\$(314,468)
FABRICATION & ERECTION			
Steel Fabrication & Erection Price Includes 10% margin from Fabricator	\$10,183,583 (\$3,273/ton)	\$9,872,165 (\$3,399/ton)	\$(311,418)
INSPECTION			
Special Inspection of field welding & Non-Destructive Testing (NDT) Inspection of Field & Shop CJP welds, as applicable	Shop \$48,000 Field \$156,000	N/A \$132,000	
Total Steel Frame Inspection Costs	\$204,000	\$132,000	\$(72,000)
Total Price of Steel Frame Construction Excludes steel decking & installation, stairs, paint, primer, galvanizing	\$10,387,583	\$10,004,165	\$(383,418)

BOLTED FLANGE PLATE (BFP) VS. SIDEPLATE®

8-Story Federal Courthouse in low seismic

AREA: 347,031 S.F. WITH PLAN IRREGULARITIES,
20' OR LESS STANDOFF & CURVED STEEL MOMENT FRAMES

Progressive Collapse Design Cost Comparison

Steel Elements (no misc. steel included)	Bolted Flange Plate ¹ Skewed biaxial 3 & 4 sided connections	SidePlate® system ² Orthogonal uniaxial 1 & 2 sided connections
	SIZE & WEIGHT	SIZE & WEIGHT
Lateral Columns	W14x	W18x and W21x
	5.91 psf	2.05 psf
Lateral Beams	W24x, W27x and W30x	W24x and W30x
	6.68 psf	3.62 psf
		
	All shop CJP welded	All shop fillet welded
Connection Plates	1.14 psf (avg. 7/8"x30" cover plate for 2,028 connections+ additional continuity plates)	1.50 psf (avg. cover plate and side plates for 1,117 connections)
Gravity	3.73 psf (25% of total wt.)	5.04 psf (36% of total wt.)
Total	15.2 psf (2639 tons)	14.0 psf (2429 tons)

- (1) BFP connection full-scale testing and prequalifications per FEMA 350 *Acceptance Criteria* is **not applicable** to curved moment frame and biaxial applications; skewed connections have **not been tested**.
- (2) SidePlate® connection full-scale testing and prequalification per per FEMA 350 *Acceptance Criteria* is **applicable** to curved moment frame applications; connections remain orthogonal **as tested**.

BOLTED FLANGE PLATE (BFP) VS. SIDEPLATE® (CONT.)

Progressive Collapse Design Cost Comparison - Federal Courthouse

WEST COAST FABRICATOR EXPERIENCE:

	Bolted Flange Plate¹ Skewed biaxial 3 & 4 sided connections	SidePlate® system² Orthogonal uniaxial 1 & 2 sided connections	Estimated Savings w/ SidePlate® technology
Material & Shop Fabrication	[(2,639 tons x \$600/ton-Material)+(15.6 man-hours/ton x 2,639 tons x \$42/hr-Labor)] x 1.5 =	[(2,429 tons x \$600/ton-Material)+(12.5 man-hours/ton x 2,429 tons x \$42/hr-Labor)] x 1.5 =	
	\$4,968,709 (\$1,883/ton)	\$4,098,938 (\$1,687/ton)	
Field Erection	\$1,293,110 (\$490/ton)	\$900,000 (\$370/ton)	
Total	\$6,261,819 (\$2,373/ton)	\$4,998,938 (\$2,057/ton)	\$1,262,881

EAST COAST (MID ATLANTIC) FABRICATOR:

Estimated Minimum Savings using SidePlate® Connection System	
Shop Labor Savings	\$323,215
Field Labor Savings	\$135,563
210 Tons of Raw Material at \$540/Ton	\$124,740
Total	\$613,518

"...there is no question that the GSA is going to save money using the SidePlate Connection on this project."

DEWAYNE MINNICK

V.P. Sales and Marketing
Banker Steel Company, Inc. Lynchburg, VA

SPECIAL CONCENTRIC BRACE FRAME (SCBF) VS. SIDEPLATE® MOMENT FRAME

5- Story medical office building in high seismic

AREA: 140,000 S.F.

	Braced Frames w/ 16'x8' deep concrete grade beams & spread footings	SidePlate® Moment Frames w/ 3'x4' deep concrete grade beams & spread footings
	SIZE & WEIGHT	SIZE & WEIGHT
Lateral Columns	W12x	W27x
	7.93 psf	5.51 psf
Lateral Beams	W21x50	W24x
	W24x68	W27x
	0.91 psf	2.20 psf
Lateral Braces	HSS 1.02 psf	N/A
Gravity Columns	1.11 psf	1.00 psf
Gravity Beams	5.18 psf	5.00 psf
Connection Plates	0.2 psf	1.4 psf
Additional Misc Steel	1.9 psf	1.9 psf
Total Steel Weight	11.0 psf (770 tons)	13.5 psf (945 tons)
Estimated Fabricated & Erected Steel Costs using \$2,500/T	\$1,925,000	\$2,362,000
Foundation System for Lateral at \$350/CY ¹	2780 CY = \$973,000	937 CY = \$328,000
SidePlate® Services & License Fee	N/A	\$94,000
Total Estimated Costs	\$2,898,000	\$2,784,000
Architectural Furring of Braces at \$750/brace	\$90,000	N/A
Total Estimated Costs	\$2,988,000	\$2,784,000
Estimated Savings with SidePlate® Moment Frames		\$204,000

(1) Does *not* include savings in construction schedule and reduced excavation costs

Recommendation:

Use SidePlate® connection technology and *save the owner*:

- \$204,000 in steel fabrication/erection and foundation costs (\$1.46/sf) PLUS
- Faster construction schedule