

# How SIDEPLATE SAVES TIME & MONEY

## SidePlate® Project Savings

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

## 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 ICC 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

- ICC, COLA & 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<br>SIZE & WEIGHT | SidePlate® with deep columns<br>SIZE & WEIGHT |
|---|--|---|
| Lateral Columns                               | W33x354                                | W33x221                                       |
|   | W33x354                                | W33x241                                       |
|   | W33x387                                | W33x291                                       |
|   | W33x387                                | W33x318                                       |
|   | <b>7.93 psf</b>                        | <b>5.51 psf</b>                               |
| Lateral Beams                                 | W30x108                                | W24x84, W27x94                                |
|   | W36x232                                | W33x141                                       |
|   | W36x256                                | W36x160                                       |
|   | W36x256                                | W36x182, 194                                  |
|   | <b>7.07 psf</b>                        | <b>3.83 psf</b>                               |
| 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                                       |
| <b>Total Steel Weight</b>                     | <b>26 psf (1732 tons)</b>              | <b>22.7 psf (1512 tons)</b>                   |
| Estimated Fabricated<br>& Erected Steel Costs | \$5,716,000<br>(\$3,300/T)             | \$5,140,000<br>(\$3,400/T)                    |
| SidePlate® Services & License Fee             | N/A                                    | \$124,000                                     |
| <b>Total Estimated Costs</b>                  | <b>\$5,716,000</b>                     | <b>\$5,264,000</b>                            |

### 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<br>WEIGHT              | SidePlate® system<br>WEIGHT             |
|--|---|---|
| Lateral Columns                                      | W14x211                                 | W21x93                                  |
|  | W14x233                                 | W21x122                                 |
|  | W14x455                                 | W21x132                                 |
|  |   | W21x166                                 |
|  |   | W21x182                                 |
|  | <b>5.91 psf</b>                         | <b>2.05 psf</b>                         |
| Lateral Beams  | W21x50                                  | W16x31                                  |
|  | W24x76                                  | W21x50                                  |
|  | W24x103                                 | W24x55                                  |
|  |   | W24x62                                  |
|  |   | W24x94                                  |
|  |   | W24x103                                 |
|  | <b>2.43 psf</b>                         | <b>1.41 psf</b>                         |
| 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                                |
| <b>Total Steel Weight</b>                            | <b>14.5 psf (1732 tons)<sup>1</sup></b> | <b>11.2 psf (1512 tons)<sup>1</sup></b> |
| Estimated Fabricated & Erected Steel Costs           | \$2,675,000 (\$3,460/T)                 | \$2,118,000 (\$3,560/T)                 |
| SidePlate® Services & License Fee <sup>2</sup>       | N/A                                     | \$42,000                                |
| <b>Total Estimated Costs</b>                         | <b>\$2,675,000</b>                      | <b>\$2,160,000</b>                      |
| <b>Estimated Savings w/ SidePlate® Moment Frames</b> | <b>\$2,675,000</b>                      | <b>\$2,160,000</b>                      |

(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.

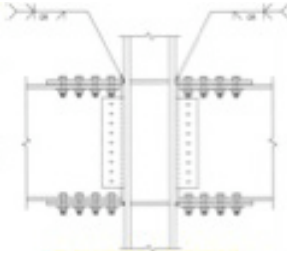
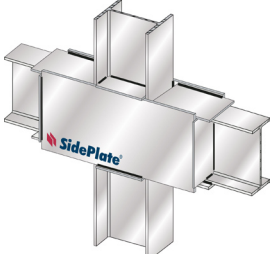
| FABRICATION  | WUF-W (A)   | SIDEPLATE® (B)                   | DELTA (B-A)                 |
|--|---|----------------------------------|-----------------------------|
| Gravity System Beams & Columns   | 11.0 psf  | 11.0 psf                         |                             |
| Lateral System 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                          |                             |
| <b>Total Steel Unit Weight (psf)</b>   | <b>18.6 psf (3111 tons)</b>                         | <b>17.4 psf (2904 tons)</b>      | <b>-1.2 psf (-207 tons)</b> |
| 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                   |
| <b>Fabrication Price (FOB)</b><br>Includes material, labor, trucking within 300 miles, detailing and profit for 05120 items only | <b>\$7,650,366 (\$2,459/ton)</b>                    | <b>\$7,688,357 (\$2,647/ton)</b> | <b>\$37,991</b>             |
| <b>ERECTION</b>  |   |                                  |                             |
| No. of pieces to be erected  | 4,674   | 4,674                            |                             |
| Qty of field welding for Lateral System  | 1G Col 1,346 lb<br>1G Bm 2,808 lb<br>3G bm 1,277 lb | 915 lb<br>1,250 lb<br>698 lb     |                             |
|  | TOTAL 5,431 lb                                      | 2,863 lb                         | -2,568 lbs                  |
| Construction Schedule  | 130 days  | 110 days                         | - 4 weeks                   |
| <b>Erection Price</b>  | <b>\$2,279,895 (\$733/ton)</b>                      | <b>11.2 psf (\$677/ton)</b>      | <b>\$(314,468)</b>          |
| <b>FABRICATION &amp; ERECTION</b>  |   |                                  |                             |
| <b>Steel Fabrication &amp; Erection Price</b><br>Includes 10% margin from Fabricator   | <b>\$10,183,583 (\$3,273/ton)</b>                   | <b>\$9,872,165 (\$3,399/ton)</b> | <b>\$(311,418)</b>          |
| <b>INSPECTION</b>  |   |                                  |                             |
| Special Inspection of field welding & Non-Destructive Testing (NDT) Inspection of Field & Shop CJP welds, as applicable          | Shop \$48,000<br>Field \$156,000                    | N/A<br>\$132,000                 |                             |
| <b>Total Steel Frame Inspection Costs</b>  | <b>\$204,000</b>                                    | <b>\$132,000</b>                 | <b>\$(72,000)</b>           |
| <b>Total Price of Steel Frame Construction</b><br>Excludes steel decking & installation, stairs, paint, primer, galvanizing      | <b>\$10,387,583</b>                                 | <b>\$10,004,165</b>              | <b>\$(383,418)</b>          |

# 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<br>(no misc. steel included) | Bolted Flange Plate <sup>1</sup><br>Skewed biaxial<br>3 & 4 sided connections               | SidePlate® system <sup>2</sup><br>Orthogonal uniaxial<br>1 & 2 sided connections     |
|---|---|--|
|   | SIZE & WEIGHT   | SIZE & WEIGHT  |
| Lateral Columns                             | W14x  | W18x and W21x  |
|   | <b>5.91 psf</b>   | <b>2.05 psf</b>  |
| Lateral Beams                               | W24x, W27x and W30x   | W24x and W30x  |
|   | <b>6.68 psf</b>   | <b>3.62 psf</b>  |
|   |           |  |
|   | All shop CJP welded   | All shop fillet welded   |
| Connection Plates                           | 1.14 psf<br>(avg. 7/8"x30" cover plate for 2,028 connections+ additional continuity plates) | 1.50 psf<br>(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.)  |
| <b>Total</b>                                | <b>15.2 psf (2639 tons)</b>   | <b>14.0 psf (2429 tons)</b>  |

- (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:

|                             | <b>Bolted Flange Plate<sup>1</sup></b><br>Skewed biaxial<br>3 & 4 sided connections           | <b>SidePlate® system <sup>2</sup></b><br>Orthogonal uniaxial<br>1 & 2 sided connections       | <b>Estimated Savings<br/>w/ SidePlate® technology</b> |
|-----------------------------|---|---|---|
| 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 = |   |
|                             | <b>\$4,968,709</b> (\$1,883/ton)  | <b>\$4,098,938</b> (\$1,687/ton)  |   |
| Field Erection              | <b>\$1,293,110</b> (\$490/ton)  | <b>\$900,000</b> (\$370/ton)  |   |
| <b>Total</b>                | <b>\$6,261,819</b> (\$2,373/ton)  | <b>\$4,998,938</b> (\$2,057/ton)  | <b>\$1,262,881</b>                                    |

## EAST COAST (MID ATLANTIC) FABRICATOR:

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

"...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.

|   | <b>Braced Frames</b><br>w/ 16'x8' deep concrete grade<br>beams & spread footings | <b>SidePlate® Moment Frames</b><br>w/ 3'x4' deep concrete grade<br>beams & spread footings |
|---|--|--|
|   | <b>SIZE &amp; WEIGHT</b>   | <b>SIZE &amp; WEIGHT</b>   |
| Lateral Columns   | W12x   | W27x   |
|   | <b>7.93 psf</b>  | <b>5.51 psf</b>  |
| Lateral Beams   | W21x50   | W24x   |
|   | W24x68   | W27x   |
|   | <b>0.91 psf</b>  | <b>2.20 psf</b>  |
| 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  |
| <b>Total Steel Weight</b>                                     | <b>11.0 psf (770 tons)</b>   | <b>13.5 psf (945 tons)</b>   |
| Estimated Fabricated &<br>Erected Steel Costs using \$2,500/T | \$1,925,000  | \$2,362,000  |
| Foundation System for Lateral<br>at \$350/CY <sup>1</sup>     | 2780 CY = \$973,000  | 937 CY = \$328,000   |
| SidePlate® Services & License Fee                             | N/A  | \$94,000   |
| <b>Total Estimated Costs</b>                                  | <b>\$2,898,000</b>   | <b>\$2,784,000</b>   |
| Architectural Furring of Braces<br>at \$750/brace             | \$90,000   | N/A  |
| <b>Total Estimated Costs</b>                                  | <b>\$2,988,000</b>   | <b>\$2,784,000</b>   |
| <b>Estimated Savings with<br/>SidePlate® Moment Frames</b>    |  | <b>\$204,000</b>   |

(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