CHAPTER 6
STRUCTURAL STEEL DETAILS

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CHAPTER SIX

BEAM FRAMES OVER TS COLUMN

BEAM FRAMES INTO TS COLUMN

BEAM SHEAR CONNECTION DETAILS

NOT TO SCALE

(DETAIL T5-CSH1)
STRUCTURAL STEEL DETAILS

BEAM FRAMES ONE SIDE OF TS COLUMN

BEAM FRAMES BOTH SIDES OF TS COLUMN

BEAM MOMENT CONNECTION DETAILS
NOT TO SCALE
(DETAIL T5-CM01)
Chapter Six

Typical Cantilever Roof Beam Details

Not to Scale

(Detail T5–CBM1)
TS COLUMN SPLICE, FILLET WELDED

TS COLUMN SPLICE, PENETRATION WELDED

TYP. TS COLUMN SPLICE DETAILS

NOT TO SCALE

(DETAIL T5-COL1)
CHAPTER SIX

**WF COLUMN SPLICE, BOLTED**

**WF COLUMN SPLICE, BUTT PLATE**

**TYP. WF COLUMN SPLICE DETAILS**

NOT TO SCALE

(DETAIL T5-Col2)
TYPICAL FUTURE COLUMN CONNECTION

NOT TO SCALE

(Detail T5-C0L3)

NOTES:

1. SEE WALL ELEVATIONS DETAILS FOR LOCATIONS.
2. DETAIL AT PERIMETER COLUMNS IS SHOWN. DETAIL AT CORNER COLUMNS IS SIMILAR.

TYPICAL COLUMN BRACE DETAIL

NOT TO SCALE

(Detail T5-BRCE1)
CHAPTER SIX

NOTE: DETAIL IS SHOWN FOR BEAMS PERPENDICULAR TO WALL, PROVIDE SIMILAR DETAIL FOR BEAMS PARALLEL TO WALL.

CMU WALL-SEE PLAN
FILL IN SNUG W/ CMU OR USE WELDED END PL 1/4 TO MATCH BEAM B/F

provide 3 courses of solidly grouted CMU 2'-0" MIN. EA. SIDE OF PLATE &

13/16" x 2" long slotted holes in beam flange (1 EA. SIDE OF WEB)

BEAM

3" MIN. BOLT PROJECTION ABOVE ERG PL

7/8" (Typ)

θ BOLT & SLOT

THICK. "T"

EMBED. "E"

2 - 5/8" DIA. BOLTS TACK WELDED TO BEARING PL

"FIXED" CONNECTION

TYPICAL BEAM BEARING ON MASONRY DETAILS
NOT TO SCALE (DETAIL T5-CMU1)
TYPICAL BEAM BEARING ON EXISTING MASONRY DETAILS

NOT TO SCALE

(Detail T5–CMU3)
CHAPTER SIX

NOTES:
1. LAP GIRTS AT COLUMN AS REQUIRED BY THE MANUFACTURER.
2. PROVIDE GIRT WEB STIFFENERS AS REQUIRED BY THE MANUF.

TYPICAL LIGHT–GAGE METAL GIRT CONNECTION DETAILS

**NOT TO SCALE**

(DETAIL TS–GIRT1)
AT TYP. GIRTS

AT COPED GIRTS

TYP. GIRT CONNECTION DETAILS

NOT TO SCALE

(DETAIL T5-GIRT4)
CHAPTER SIX

NOTE: COORD. SIZE AND LOCATION OF ROOF OPENINGS WITH ACTUAL EQUIPMENT SELECTED.

SEE PLAN (6' MAX.)

L5x3 1/2x3/8 X 0'-5" LONG L.L.H. (TYP)

L3x3x1/4

PLAN

OPENING

L4x4x1/4

SECTION

1/2" MAX CLEAR (TYP)

OPNGS SIZE VARIES

SEE PLAN (6' MAX.)

3/16" / 1" (TYP)

3/16" / (TYP)

CL JOIST (TYP)

TYP. ROOF OPENING DETAIL

NOT TO SCALE

(DETAIL T5-R01)
CENTER STUDS ON THE BEAM UNLESS OTHERWISE REQUIRED (SEE NOTE 3 BELOW)

8 x T MAX. SPACING

DECK THICKNESS (T) - SEE PLAN

5/8" DIA. PUDDLE WELD WHERE NO STUD IS REQUIRED

COMPOSITE BEAM - SEE SCHEDULE

DECK IS PERPENDICULAR OR SKewed TO BEAM

NOTES:

1. THE MIN. NUMBER OF STUDS FOR EACH BEAM IS SHOWN IN THE COMPOSITE BEAM SCHEDULE.

2. SPACE STUDS AS EVENLY AS POSSIBLE IN AVAILABLE DECK FLUTES. WHERE STUD SPACING EXCEEDS THE MAX. SPACING ALLOWED, PROVIDE ADDITIONAL STUDS TO SATISFY THE SPACING REQUIREMENTS.

3. WHERE THE NUMBER OF STUDS EXCEEDS THE NUMBER OF FLUTES, PROVIDE TWO STUDS IN EVERY OTHER FLUTE, STARTING AT EACH END OF THE BEAM. THE TRANSVERSE SPACING BETWEEN TWO STUDS IN A SINGLE FLUTE SHALL BE 4 x STUD DIAMETERS (MIN.).

4. SEE THE COMPOSITE BEAM SCHEDULE FOR ADDITIONAL REQUIREMENTS. TURN THE NATURAL BEAM CAMBER UP.

TYP. COMPOSITE BEAM ELEVATION

NOT TO SCALE

(DETAIL T5-COMPI)
CHAPTER SIX

DECK IS PARALLEL TO BEAM

<table>
<thead>
<tr>
<th>MARK</th>
<th>BEAM</th>
<th>MAX. END REACTION</th>
<th>MIDSPAN CAMBER</th>
<th>NUMBER OF STUDS</th>
<th>REMARKS</th>
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</thead>
<tbody>
<tr>
<td>GB-1</td>
<td>W10x15</td>
<td>11 KIPS</td>
<td>—</td>
<td>12</td>
<td>INTERIOR</td>
</tr>
<tr>
<td>GB-2</td>
<td>W10x15</td>
<td>8 KIPS</td>
<td>—</td>
<td>8</td>
<td>INTERIOR</td>
</tr>
<tr>
<td>GB-3</td>
<td>W10x26</td>
<td>13 KIPS</td>
<td>—</td>
<td>12</td>
<td>INTERIOR</td>
</tr>
<tr>
<td>GB-4</td>
<td>W10x15</td>
<td>8 KIPS</td>
<td>—</td>
<td>9</td>
<td>CANTILEVER</td>
</tr>
<tr>
<td>GB-5</td>
<td>W10x26</td>
<td>13 KIPS</td>
<td>—</td>
<td>5</td>
<td>CANTILEVER</td>
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<tr>
<td>GB-6</td>
<td>W10x12</td>
<td>7 KIPS</td>
<td>—</td>
<td>3</td>
<td>CANTILEVER</td>
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<tr>
<td>GB-7</td>
<td>W16x76</td>
<td>66 k (at)</td>
<td>0.6&quot;</td>
<td>22</td>
<td>GIRDER</td>
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<tr>
<td>GB-8</td>
<td>W16x40</td>
<td>36 k (at)</td>
<td>—</td>
<td>16</td>
<td>GIRDER</td>
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NOTE: NATURAL CAMBER OF BEAM SHALL BE TURNED UP.

TYP. COMPOSITE BEAM ELEVATION

(DETAIL T5-COMP2)
TYPICAL EDGE CONDITIONS

TYPICAL INTERIOR CONDITIONS

TYPICAL COMPOSITE DECK CLOSURE DETAILS

NOT TO SCALE

(DETAIL T5-COMP3)
CHAPTER SIX

1 1/2" DEEP, 22 GA., TYPE B (WIDE RIB) GALV. (G60) ROOF DECK (BOTTOM FACTORY WHITE)

CONNECT Sidelaps PER SCHEDULE

SUPPORT CONNECTION - SEE SCHEDULE

CL SUPPORT

SUPPORT

SUPPORT

SUPPORT

CONT. LAT. PER M.

SUPPORT CONN. - SEE SCHEDULE

36" WIDE SHEETS (TYP.)

TYPICAL ROOF DECK ATTACHMENT DETAIL

NOT TO SCALE

(DETAIL T5-RDIA2)
# ROOF DECK CONNECTION SCHEDULE

<table>
<thead>
<tr>
<th>ZONE</th>
<th>DECK CONNECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZONE 1</td>
<td>WELDS IN 36/7 PATTERN</td>
</tr>
<tr>
<td>(DIAPH. CAPACITY = 470#/LF)</td>
<td>(6) - #10 TEKS @ SIDELAPS</td>
</tr>
<tr>
<td>ZONE 2</td>
<td>WELDS IN 36/7 PATTERN</td>
</tr>
<tr>
<td>(DIAPH. CAPACITY = 290#/LF)</td>
<td>(3) - #10 TEKS @ SIDELAPS</td>
</tr>
<tr>
<td>ZONE 3</td>
<td>WELDS IN 36/4 PATTERN</td>
</tr>
<tr>
<td>(DIAPH. CAPACITY = 290#/LF)</td>
<td>(3) - #10 TEKS @ SIDELAPS</td>
</tr>
</tbody>
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# ROOF DECK ATTACHMENT PATTERNS

36" COVERAGE

- **36/9 PATTERN**
- **36/7 PATTERN**
- **36/5 PATTERN**
- **36/4 PATTERN**

(DETAIL T5-RDIA4)
NOTES:
1. AT JOIST NEAREST (OR ON) COLUMN CL CONNECT JOISTS WITH FIELD BOLTS PER S.J.I. REQUIREMENTS.
2. OFFSET JOISTS IF BEAM FLANGE IS LESS THAN 5" AND PROVIDE MINIMUM OF 2 1/2" JOIST BEARING.

2 1/2" MIN.
BRG. EACH SIDE

1/8" 1"

1/8" 1" TYP.

JOIST - SEE PLAN
BEAM - SEE PLAN
Φ BEAM

L2x2x3/16 BEAM BOTTOM FLANGE BRACE
(WHERE INDICATED ON PLAN) FIELD WELDED EA. END
PL 3x3x1/4 (FIELD WELD)

AT INTERIOR BEAMS

Φ BEAM

1/8" 1"
1/8" 1"

PL 3x3x1/4 (FIELD WELD)

JOIST - SEE PLAN
BEAM - SEE PLAN

L2x2x3/16 BEAM BOTTOM FLANGE BRACE
(WHERE INDICATED ON PLAN) FIELD WELDED EA. END

AT PERIMETER BEAMS

TYP. K-JOIST CONNECTION DETAILS

NOT TO SCALE

(Detail T5-J1)
NOTES:
1. AT JOIST NEAREST (OR ON) COLUMN CL, CONNECT JOISTS WITH FIELD BOLTS PER S.J.I. REQUIREMENTS.
2. OFFSET JOISTS IF BEAM FLANGE IS LESS THAN 8" AND PROVIDE MINIMUM OF 4" JOIST BEARING.

AT INTERIOR BEAMS

AT PERIMETER BEAMS

TYP. LH–JOIST CONNECTION DETAILS

NOT TO SCALE

(Detail T5–J2)
CHAPTER SIX

NOTES:
1. CONCENTRATED LOAD LOCATED AT JOIST PANEL POINT LOCATION - NO ADDITIONAL ANGLES REQUIRED.
2. CONCENTRATED LOAD (100 LBS. OR HEAVIER) NOT LOCATED AT JOIST PANEL POINT LOCATION - PROVIDE 1/8" X 1/8" TO PANEL POINT AS SHOWN.

TYP. CONCENTRATED LOAD DETAIL
NOT TO SCALE
(DETAIL T5–J5)
LH—SERIES JOISTS

K—SERIES JOISTS

TYP. JOIST TO GIRDER CONNECTION

NOT TO SCALE

(DETAIL T5–JG1)
CHAPTER SIX

TYP. DETAIL AT INTERIOR COLUMN CL

MIN. BEARING EA. SIDE PER SJ1 REGMTS.

(2) - 3/4" DIA. BOLTS AT EA.

FIELD BOLTS AT COLUMN

CONN. PER SJ1 REGMTS

GIRDER SEAT PL 3/4 (WIDTH AS REQUIRED)

TAB PL 1/2

CL COLUMN

SLOTTED HOLES PER GIRDER MANUF. REQUIREMENTS - TYP.

JOIST - SEE PLAN

JOIST GIRDER - SEE PLAN

TS 10 x 10 COLUMN

NOT TO SCALE

(DETAIL T5-JG2)
DETAIL A. AT TS COLUMN

DETAIL A. AT WF COLUMN

BRACED BAY DETAILS

NOT TO SCALE

(Detail 5-BAYD1)
CHAPTER SIX

BEAM- SEE PLAN
WORKING POINT

Fitted stiff. pl 3/8 each side of bm. web & gusset pl

1/4" x"

Erection bolt (at contractor's option) - typ.

Gusset plate 3/4
TS diagonal

DETAIL B

BEAM- SEE PLAN

COLUMN CL

TS COLUMN

Working point

Erection bolt (at contractor's option)

1/4" x"

Gusset plate 3/4
TS diagonal

DETAIL C

BRACED BAY DETAILS

NOT TO SCALE

(DETAIL TS-BAYD2)
Note: Provide bolted connection between PL 7/8" and the 3/4" gusset per the forces indicated on the braced bay elevations.

Detail A, using threaded rods.

Braced Bay Details

Not to scale

(Detail T5-BAYD4)
CHAPTER SIX

DETAIL C, USING THREADED RODS

BRACED BAY DETAILS

NOT TO SCALE

(Detail T5-BayD5)
TYPICAL CRANE RAIL CONNECTION
NOT TO SCALE

TYPICAL RUN WAY GIRDER DETAIL
DETAIL T5–CRAN1
CHAPTER SIX

HIGH CAPACITY CRANE (30 TON MAX.)

LOW CAPACITY CRANE (5 TON MAX.)

TYPICAL CRANE STOP DETAILS

NOT TO SCALE

(DETAIL T5-CRAN4)
ASSUMED CRANE WHEEL LOADINGS
(2 TON CRANE, 2 WHEELS PER END TRUCK)

ASSUMED FUTURE CRANE CONDITION
(NOT TO SCALE (DETAIL T5-CRAN8))
CHAPTER SIX

TYPICAL KNEE BRACE DETAIL

TYPICAL GIRDER BRACE DETAIL

MISC. CRANE FRAMING DETAILS

NOT TO SCALE (DETAIL T5–CRAN9)
TYPICAL FLOOR JOIST BEARING DETAIL

NOT TO SCALE

(DETAIL T5–CF1)
CHAPTER SIX

TYP. FLOOR JOIST NONBEARING DETAIL

NOT TO SCALE

(Detail T5-CF2)
TYPICAL ROOF JOIST BEARING DETAIL

(DETAIL T5–CF3)
CHAPTER SIX

TYP. BAR JOIST ROOF BEARING DETAIL

NOT TO SCALE

(Detail T5-CP7)
STRUCTURAL STEEL DETAILS

TYP. INTERIOR JOIST BEARING DETAIL

NOTE: PROVIDE DiAG. BRACES AT EACH WALL END, DOOR LOCATION AND AT A MAXIMUM OF 8'-0" IN BETWEEN.

ELEVATION – TYP. DIAGONAL BRACE

PLAN – TYP. DIAGONAL BRACE

TYPICAL PARTITION WALL BRACING DETAILS

NOT TO SCALE

(Detail T5-CFWAL)
### COLD-FORMED METAL HEADER SCHEDULE

<table>
<thead>
<tr>
<th>MARK</th>
<th>SECTION</th>
<th>DESCRIPTION</th>
<th>GAUGE</th>
<th>JAMB STUDS JACK</th>
<th>FULL-HT.</th>
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</thead>
<tbody>
<tr>
<td>H-1</td>
<td></td>
<td>(2) - 6&quot;x1 5/8&quot;</td>
<td>16 GA.</td>
<td>SINGLE</td>
<td>SINGLE</td>
</tr>
<tr>
<td>H-2</td>
<td></td>
<td>(2) - 8&quot;x1 5/8&quot;</td>
<td>16 GA.</td>
<td>SINGLE</td>
<td>DOUBLE</td>
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### TYPICAL FRAMED OPENING DETAIL

**NOT TO SCALE**

(Detail T5–CFHDR)
BRIDGING AND BRACING – FLOOR BRIDGING

Solid Bridging
(25'-0' O.C. Max.
See BB-10)

Strap Bridging
(See BB-8)

Joist
CHAPTER SIX

Top Flange Bridging
(As Required)

Strap Bridging
(Attach To Each Joist)

Jolsts

BRIDGING AND BRACING – STRAP BRIDGING
NOTE: NO. OF FASTENERS WILL VARY WITH STRENGTH REQUIRED

BRIDGING AND BRACING
Mid-Span Connection
CHAPTER SIX

NOTE: ALIGN WEBS OF ALL MEMBERS

FLOOR SYSTEMS - CENTER BEARING ON STUDS
NOTE: 1. NO. OF SCREWS WILL VARY WITH DEPTH OF JOIST
   2. ALIGN WEBS OF ALL MEMBERS
   3. WEB STIFFENER MAY BE REQUIRED

FLOOR SYSTEMS - OVERLAPPING JOISTS
CHAPTER SIX

NOTE: 1. NO. OF SCREWS WILL VARY WITH DEPTH OF JOIST
2. ALIGN WEBS OF ALL MEMBERS

FLOOR SYSTEMS - BEARING ON STEEL BEAM
WF Beam (Greater Than Joist Depth)

Bridle Hanger

Web Stiffener

Joist

Back Blocking

NOTE: 1. WELD, SCREW, OR P.A.F. ATTACH BRIDLE HANGER TO BEAM
   2. ATTACH BRIDLE HANGER TO WEB OF JOIST

FLOOR SYSTEMS - CONNECTION TO WF BEAM

REFERENCE
