CODE OF STANDARD PRACTICE

FOR CJ-SERIES COMPOSITE STEEL JOISTS

Adopted by the Steel Joist Institute May 10, 2006
Revised to May 18, 2010 - Effective December 31, 2010
Revised to November 9, 2015 – Effective August 1, 2016

SECTION 1.
GENERAL

1.1 SCOPE

The practices and customs set forth herein are in accordance with good engineering practice, tend to ensure safety in composite steel construction, and are standard within the industry. There shall be no conflict between this code and any legal building regulation. This code shall only supplement and amplify such laws. Unless specific provisions to the contrary are made in a contract for the purchase of composite steel joists, this code is understood to govern the interpretation of such a contract.

1.2 APPLICATION

This Code of Standard Practice is to govern as a standard unless otherwise covered in the *specifying professional's* plans and specifications.

1.3 DEFINITIONS

Add-Load. A single vertical concentrated load that occurs at any one panel point along the joist chord. This load is in addition to any other gravity loads specified.

Bend-Check Load. A vertical concentrated load used to design the joist chord for the additional bending stresses resulting from this load being applied at any location between the joist panel points. This load shall already be accounted for in the specified joist designation load, uniform load, or Add-load and is used only for the additional bending check in the chord and does not contribute to the overall axial forces within the joist. An ideal use of this is for incidental loads which have already been accounted for in the design loading but may induce additional bending stress due to this load occurring at any location along the chord.

Buyer. The entity that has agreed to purchase *material* from the manufacturer and has also agreed to the terms of sale.

Erector. The entity that is responsible for the safe and proper erection of the materials in accordance with all applicable codes and regulations.

Material. Composite steel joists and accessories as provided by the *seller*.

Owner. The entity that is identified as such in the contract documents.

Placement Plans. Drawings that are prepared depicting the interpretation of the contract document's requirements for the *material* to be supplied by the *seller*. These floor or roof plans are approved by the *specifying professional*, *buyer* or *owner* for conformance with the design requirements. The *seller* uses the information contained on these drawings for

final *material* design. A unique piece mark number is typically shown for the individual placement of the composite steel joists and accessories along with sections that describe the end bearing conditions and minimum attachment required so that *material* is placed in the proper location in the field.

Seller. A company certified by the Steel Joist Institute engaged in the manufacture and distribution of composite steel joists and accessories.

Specifying Professional. The licensed professional who is responsible for sealing the building contract documents, indicating that he or she has performed or supervised the analysis, design and document preparation for the structure and has knowledge of the load-carrying structural system.

Structural Drawings. The graphic or pictorial portions of the contract documents showing the design, location and dimensions of the work. These documents generally include plans, elevations, sections, details, connections, all loads, schedules, diagrams and notes.

1.4 DESIGN

In the absence of ordinances or specifications to the contrary, all designs prepared by the *specifying professional* shall be in accordance with the Steel Joist Institute Standard Specification for Composite Steel Joists, **CJ**-Series, of latest adoption.

1.5 RESPONSIBILITY FOR DESIGN AND ERECTION

When *material* requirements are specified, the *seller* shall assume no responsibility other than to furnish the items listed in Section 5.2(a). When *material* requirements are not specified, the *seller* shall furnish the items listed in Section 5.2(a) in accordance with Steel Joist Institute Standard Specification for Composite Steel Joists, **CJ**-Series, of latest adoption, and this code. Pertinent design information shall be provided to the *seller* as stipulated in Section 6.1. The *seller* shall identify *material* by showing size, type, and load. In no case shall the *seller* assume any responsibility for the erection of the items furnished.

1.6 PERFORMANCE TESTS FOR CJ-SERIES STEEL JOIST CONSTRUCTION

When a performance test on a composite steel joist is required, the following criteria shall be used:

a) The performance test load shall be the maximum factored uniformly distributed composite design load for the selected composite steel joist.

b) Composite steel joist self-weight and the weight of all test materials shall be included in the calculation of applied performance test loading as appropriate for the composite steel joist during testing.

c) Loading shall be uniformly distributed across the full length of the composite steel joist top chord, and the load application shall maintain uniform distribution throughout the test. At any stage during the application of the test loading, the test load shall not be distributed in such a manner as to result in any composite steel joist component being subjected to a larger proportion of force than intended by the composite joist design.

d) At a minimum, a panel test assembly shall be comprised of a pair of composite steel joists with bridging, top deck, steel headed stud anchors and concrete slab applied as used. The concrete shall be allowed adequate cure time as determined by the *specifying professional* (typically 28 days) prior to testing. The deck attachments and bridging shall be installed per the approved joist and deck *placement plans*. All bottom chord horizontal bridging rows shall be terminated by bracing back to the top chord of the adjacent composite steel joist or by a lateral restraint system which does not inhibit the vertical deflection of the panel test assembly.

e) The performance test loading shall be applied at a rate of no greater than 25 plf per minute and shall be sustained for no less than 15 minutes. After the maximum test load has been removed for a minimum of 10 minutes, the remaining vertical displacement at midspan shall not exceed 20% of the vertical midspan deflection sustained under the full performance test load.

f) All costs associated with such testing shall be borne by the purchaser.

g) Composite steel joists that have been designed and manufactured and have satisfied the above performance test criteria shall be considered to satisfy the intent of the Standard Specification for Composite Steel Joists, **CJ**-Series, and shall be considered acceptable for use in construction. No further proof of strength of individual composite steel joist components or connections is required.

SECTION 2.
COMPOSITE JOISTS AND ACCESSORIES

2.1 COMPOSITE STEEL JOISTS

Composite steel joists shall carry the loads and meet the requirements of the Steel Joist Institute Standard Specification for Composite Steel Joists, **CJ**-Series, of latest adoption.

CJ-Series joists are furnished with parallel chords only, and with minimum standard end bearing depth of 2½ inches (64 mm). **CJ**-Series joists shall be permitted to be furnished with either underslung or square ends.

2.2 COMPOSITE STEEL JOIST LOCATION AND SPACING

The maximum composite steel joist spacing shall be in accordance with the requirements of Section 5.8, Steel Joist Institute Standard Specification for Composite Steel Joists, **CJ**-Series, of latest adoption.

Where side walls, wall beams or tie beams are capable of supporting the floor slab or roof deck, the first adjacent composite steel joists should be placed one full space from these members. **CJ**-Series joists are provided with camber. These composite steel joists may have a significant difference in elevation with respect to the adjacent structure because of this camber. This difference in elevation shall be given consideration when locating the first composite steel joist adjacent to a side wall, wall beam or tie beam.

Where partition walls are supported by parallel floor composite steel joists, there shall be at least one composite steel joist provided under each such partition, and more than one such composite steel joist shall be provided if necessary to safely support the weight of such partition and the adjacent floor. When partitions occur perpendicular to the composite steel joists, they shall be treated as concentrated loads on the supporting composite steel joists.

2.3 COMPOSITE STEEL JOIST EXTENSIONS

Composite steel joist extensions shall be specified and designed in accordance with the requirements of the Steel Joist Institute Standard Specification for Composite Steel Joists, **CJ**-Series, of latest adoption.

The magnitude and location of the loads to be supported, deflection requirements, and proper bracing of composite steel joist Top Chord Extensions (S Type), Extended Ends (R Type) or full depth cantilever ends as defined in Steel Joist Institute Standard Specification for K-Series, LH-Series, and DLH-Series Open Web Steel Joists and for Joist Girders, SJI 100-2015 (or of latest adoption) shall be clearly indicated on the structural drawings.

Extended composite steel joist ends shall be stipulated to act non-compositely. In the absence of a load diagram, the extended top chord shall be designed for the uniformly distributed load.

2.4 CEILING EXTENSIONS

Ceiling extensions shall be furnished to support ceilings that are to be attached directly to the bottom of the composite steel joists. They are not furnished for the support of suspended ceilings. The ceiling extension shall be either an extended bottom chord element or a loose unit, whichever is standard with the manufacturer, and shall be of sufficient strength to properly support any specified ceiling loads.

2.5 BRIDGING AND BRIDGING ANCHORS

a) Bridging standard with the manufacturer and complying with the applicable Steel Joist Institute Standard Specification for Composite Steel Joists, **CJ**-Series, of latest adoption shall be used for bridging all joists furnished by the manufacturer. Positive anchorage shall be provided at the ends of each bridging row at both top and bottom chords.

b) For the **CJ**-Series joists, horizontal bridging is recommended for spans up to and including 60 feet (18.3 m) except where bolted diagonal bridging is required. Refer to Section 5.5 in the Steel Joist Institute Standard Specification for Composite Steel Joists, **CJ**-Series, of latest adoption for erection stability requirements.

CJ-Series joists, exceeding 60 feet (18.3 m) in length shall have bolted diagonal bridging for all rows.

Refer to OSHA *Safety Standards for Steel Erection, 29 CFR 1926.757 – Open Web Steel Joists* for erection stability requirements.

> **Note**: The requirements as per OSHA apply for composite steel joists since, during erection, a composite steel joist is like any SJI steel joist. Only after the concrete has cured, does the joist become composite.

Horizontal bridging shall consist of continuous horizontal steel members. The ℓ/r ratio for horizontal bridging shall not exceed 300. Table 2.5-1 provides the maximum nominal (unfactored) horizontal bridging force, P_{br}, for various combinations of joist spacing and bridging angle size.

c) Diagonal cross bridging consisting of angles or other shapes connected to the top and bottom chords of **CJ**-Series joists shall be used when required by the Steel Joist Institute Standard Specification for Composite Steel Joists, **CJ**-Series, of latest adoption.

Diagonal bridging, when used, shall have an ℓ/r ratio not exceeding 200.

When the bridging members are connected at their point of intersection, the material sizes listed in Table 2.5-2 and Table 2.5-3 meet the requirements of the composite steel joist specification.

For **CJ**-Series joists, where the joist spacing is less than 70 percent of the joist depth, bolted horizontal bridging shall be provided in addition to the diagonal bridging, as shown in Table 2.5-3.

d) When bolted diagonal erection bridging is required, the following shall apply:

1. The bridging shall be indicated on the joist placement plans.
2. The joist placement plans shall be the exclusive indicator for the proper placement of this bridging.
3. Shop installed bridging clips, or functional equivalents, shall be provided where the bridging bolts to the composite steel joist.
4. When two pieces of bridging are attached to the composite steel joist by a common bolt, the nut that secures the first piece of bridging shall not be removed from the bolt for the attachment of the second piece.
5. Bridging attachments shall not protrude above the top chord of the composite steel joist.

TABLE 2.5-1

MAXIMUM NOMINAL (UNFACTORED) BRIDGING FORCE (P_{br}) FOR HORIZONTAL BRIDGING (lbs)							
JOIST SPACING (ft.-in.)	BRIDGING ANGLE SIZE (EQUAL LEG ANGLE)						
	1 x 7/64 r = 0.20"	1¼ x 7/64 r = 0.25"	1½ x7/64 r = 0.30"	1¾ x 7/64 r = 0.35"	2 x 1/8 r = 0.40"	2½ x 5/32 r = 0.50"	3 x 3/16 r = 0.60"
2'-0"	2150	3960	5600				
2'-6"	1370	2730	4410	5910			
3'-0"	950	1890	3290	4850			
3'-6"	700	1390	2420	3840	6180		
4'-0"	530	1060	1850	2960	5030		
4'-6"	420	840	1460	2340	4000		
5'-0"	340	680	1180	1890	3240		
5'-6"	-	560	980	1560	2670		
6'-0"	-	470	820	1310	2250	5490	
6'-6"	-	-	700	1120	1910	4680	
7'-0"	-	-	600	960	1650	4030	
7'-6"	-	-	520	840	1440	3510	
8'-0"	-	-	-	740	1260	3090	
8'-6"	-	-	-	650	1120	2740	5680
9'-0"	-	-	-	-	1000	2440	5060
9'-6"	-	-	-	-	890	2190	4540
10'-0"	-	-	-	-	810	1970	4100
10'-6"	-	-	-	-	-	1790	3720
11'-0"	-	-	-	-	-	1630	3390
11'-6"	-	-	-	-	-	1490	3100
12'-0"	-	-	-	-	-	1370	2850

TABLE 2.5-2

CJ SERIES JOISTS
MAXIMUM JOIST SPACING FOR DIAGONAL BRIDGING

JOIST DEPTH	BRIDGING ANGLE SIZE – (EQUAL LEG ANGLE)							
	1 x 7/64 (25 x 3 mm) **r = 0.20”** (5.08 mm)	**1-1/4 x 7/64** (32 x 3 mm) **r = 0.25”** (6.35 mm)	**1-1/2 x 7/64** (38 x 3 mm) **r = 0.30”** (7.62 mm)	**1-3/4 x 7/64** (45 x 3 mm) **r = 0.35”** (8.89 mm)	**2 x 1/8** (50 x 3 mm) **r = 0.40”** (10.16 mm)	**2 ½ x 5/32** (64x 4 mm) **r=0.50”** (12.70 mm)	**3 x 3/16** (76 x 5 mm) **r = 0.60”** (15.24 mm)	**3 ½ x 1/4** (89 x 6 mm) **r = 0.70”** (17.78 mm)
in. (mm)	**ft.-in. (mm)**	**ft.-in. (mm)**	**ft.-in. (mm)**	**ft.-in. (mm)**	**ft.-in. (mm)**	**ft.-in. (mm)**	**ft.-in. (mm)**	**ft.-in. (mm)**
12” (305)	6’-7” (2007)	8’-3” (2514)	9’-11”(3022)	11’-7” (3530)	13’-3”(4038)	16’-7”(5055)	19’-11”(6070)	23’-3”(7086)
14” (356)	6’-6” (1981)	8’-3” (2514)	9’-11”(3022)	11’-7” (3530)	13’-3”(4038)	16’-7”(5055)	19’-11”(6070)	23’-3”(7086)
16” (406)	6’-6” (1981)	8’-2” (2489)	9’-10”(2997)	11’-7” (3530)	13’-3”(4038)	16’-7”(5055)	19’-11”(6070)	23’-3”(7086)
18” (457)	6’-6” (1981)	8’-2” (2489)	9’-10”(2997)	11’-6” (3505)	13’-3”(4038)	16’-7”(5055)	19’-11”(6070)	23’-3”(7086)
20” (508)	6’-5” (1955)	8’-2” (2489)	9’-10”(2997)	11’-6” (3505)	13’-2”(4013)	16’-7”(5055)	19’-11”(6070)	23’-3”(7086)
22” (559)	6’-4” (1930)	8’-1” (2463)	9’-10”(2997)	11’-6” (3505)	13’-2”(4013)	16’-6”(5029)	19’-11”(6070)	23’-3”(7086)
24” (610)	6’-4” (1930)	8’-1” (2463)	9’-9” (2971)	11’-5” (3479)	13’-2”(4013)	16’-6”(5029)	19’-10”(6045)	23’-3”(7086)
26” (660)	6’-3” (1905)	8’-0” (2438)	9’-9” (2971)	11’-5” (3479)	13’-1”(3987)	16’-6”(5029)	19’-10”(6045)	23’-2”(7061)
28” (711)	6’-3” (1905)	8’-0” (2438)	9’-8” (2946)	11’-5” (3479)	13’-1”(3987)	16’-6”(5029)	19’-10”(6045)	23’-2”(7061)
30” (762)	6’-2” (1879)	7’-11 (2413)	9’-8” (2946)	11’-4” (3454)	13’-1”(3987)	16’-5”(5004)	19’-10”(6045)	23’-2”(7061)
32” (813)	6’-1” (1854)	7’-10”(2387)	9’-7” (2921)	11’-4” (3454)	13’-0” (3962)	16’-5”(5004)	19’-9”(6020)	23’-2”(7061)
36” (914)	5’-11”(1803)	7’-9” (2362)	9’-6” (2895)	11’-3” (3429)	12’-11”(3973)	16’-4”(4979)	19’-9”(6020)	23’-1”(7035)
40” (1016)	5’-9”(1753)	7’-7” (2311)	9’-5” (2870)	11’-2” (3403)	12’-10”(3911)	16’-4”(4979)	19’-8”(5994)	23’-1”(7035)
44” (1118)	5’-6”(1676)	7’-5” (2260)	9’-3” (2819)	11’-0” (3352)	12’-9” (3886)	16’-3”(4953)	19’-7”(5969)	23’-0”(7010)
48” (1219)	5’-4”(1626)	7’-3” (2209)	9’-2” (2794)	10’-11”(3327)	12’-8” (3860)	16’-2”(4928)	19’-7”(5969)	22’-11”(6985)
52” (1321)	5’-0”(1524)	7’-1”(2159)	9’-0” (2743)	10’-10” (3302)	12’-7” (3835)	16’-1”(4902)	19’-6”(5943)	22’-11”(6985)
56” (1422)	4’-9”(1448)	6’-10”(2083)	8’-10”(2692)	10’-8” (3251)	12’-5” (3784)	16’-0”(4877)	19’-5”(5918)	22’-10”(6960)
60” (1524)	4’-4”(1321)	6’-8”(2032)	8’-7” (2616)	10’-6” (3200)	12’-4” (3759)	15’-10”(4826)	19’-4”(5893)	22’-9”(6935)
64” (1626)	**	6’-4”(1931)	8 -5” (2565)	10’-4” (3149)	12’-2” (3708)	15’-9” (4801)	19’-3”(5867)	22’-8”(6909)
68” (1727)	**	6’-1”(1854)	8’-2” (2489)	10’-2” (3098)	12’-0” (3657)	15’-8” (4775)	19’-2”(5842)	22’-7”(6884)
72” (1829)	**	5’-9”(1753)	8’-0” (2438)	10’-0” (3048)	11’-10”(3606)	15’-6” (4724)	19’-1” (5816)	22’-6” (6858)
80” (2032)	**	5’-0”(1524)	7’-5”(2260)	9’-6” (2895)	11’-6” (3505)	15’-3” (4648)	18’-10”(5740)	22’-4” (6808)
88” (2235)		**	6’-9”(2058)	9’-0” (2743)	11’-1” (3378)	14’-11”(4546)	18’-7” (5664)	22’-1” (6731)
96” (2438)		**	6’-0”(1829)	8’-5” (2565)	10’-8”(3251)	14’-7” (4445)	18’-4” (5588)	21’-11”(6680)
104” (2642)			**	7’-9” (2362)	10’-1”(3073)	14’-2” (4318)	18’-0” (5486)	21’-8” (6604)
112” (2845)			**	7’-0” (2134)	9’-6”(2895)	13’-9” (4191)	17’-8” (5385)	21’-4” (6503)
120” (3048)				**	8’-9”(2667)	13’-4”(4064)	17’-3” (5258)	21’-1” (6426)

**INTERPOLATION BELOW THE MINIMUM VALUES SHOWN IS NOT ALLOWED.

SEE TABLE 2.5-3 FOR MINIMUM JOIST SPACE FOR DIAGONAL ONLY BRIDGING.

TABLE 2.5-3

CJ-SERIES JOISTS HORIZONTAL PLUS DIAGONAL BRIDGING REQUIREMENTS		
JOIST DEPTH	**MINIMUM JOIST SPACE FOR DIAGONAL ONLY BRIDGING (0.70 x DEPTH)***	**HORIZONTAL AND DIAGONAL MINIMUM ANGLE SIZE REQUIRED** FOR JOIST SPACING < (0.70 X DEPTH) AND JOIST SPANS > 60'-0" (18.3 m)
in. (mm)	**ft.-in. (mm)**	**in. (mm)**
52" (1321)	3'- 0" (914)	1" x 1" x 7/64" (25 x 3)
56" (1422)	3'- 3" (990)	1" x 1" x 7/64" (25 x 3)
60" (1524)	3'- 6" (1066)	1" x 1" x 7/64" (25 x 3)
64" (1626)	3'- 8" (1117)	1¼" x 1¼" x 7/64" (32 x 3)
68" (1727)	3'-11" (1193)	1¼" x 1¼" x 7/64" (32 x 3)
72" (1829)	4'- 2" (1270)	1¼" x 1¼" x 7/64" (32 x 3)
80" (2032)	4'- 8" (1422)	1¼" x 1¼" x 7/64" (32 x 3)
88" (2235)	5'- 1" (1549)	1 ½" x 1 ½" x 7/64" (38 x 3)
96" (2438)	5'- 7" (1702)	1 ½" x 1 ½" x 7/64" (38 x 3)
104" (2642)	6'- 0" (1829)	1 ¾" x 1 ¾" x 7/64" (44 x 3)
112" (2845)	6'- 6" (1981)	1 ¾" x 1 ¾" x 7/64" (44 x 3)
120" (3048)	7'- 0" (2134)	2" x 2" x1/8" (51 x 3)
*NOTE: WHEN THE JOIST SPACING IS LESS THAN 0.70 x JOIST DEPTH, BOLTED HORIZONTAL BRIDGING SHALL BE USED IN ADDITION TO DIAGONAL BRIDGING.		

2.6 CAMBERING

a) Manufacturing Tolerances

The camber tolerance for **CJ**-Series joists, as shown in Table 2.6, shall be -0 in. (0 mm), +1/4 in. (6 mm) or -0 in., + L / 1600 [where L = top chord length, in. (mm)] whichever is greater. Negative camber is not permitted.

TABLE 2.6
Camber Tolerances

TOP CHORD LENGTH feet (mm)	TOLERANCE - or + inches (mm)
20 (6,096)	-0, +1/4 (6)
30 (9,144)	-0, +1.4 (6)
40 (12,192)	-0, +1/4 (6)
50 (15,240)	-0, +3/8 (9)
60 (18,288)	-0, +1/2 (12)
70 (21,336)	-0, +1/2 (12)
80 (24,384)	-0, +5/8 (16)
90 (27,432)	-0, +5/8 (16)
100 (30,480)	-0, +3/4 (19)
110 (33,528)	-0, +7/8 (22)
120 (36,576)	-0, +7/8 (22)

b) Camber Design

It is standard practice that **CJ**-Series joists are furnished with sufficient camber for 100 percent of the non-composite dead load (joist, bridging, deck, and concrete slab). Joist bearings act as pinned/pinned-end connections with negligible end rotation restraint provided. Hence one shall obtain 100 percent (100%) of the predicted non-composite joist deflection when the full non-composite dead load has been placed on the composite steel joist. With the composite steel joist cambered for 100 percent (100%) of the non-composite dead load and the floor slab placed to a uniform thickness as suggested in Section 9, Concrete Placement, the floor shall be approximately level after the concrete has been placed.

Should the *specifying professional* strive to achieve a level floor after the composite dead and live loads are placed on the floor, joist camber can be specified on the "Required Design Parameters", see Appendix A. It is typical that the actual composite dead and live loads supported by the composite steel joist are less than the full design composite dead and live loads.

c) Shop Inspection

When a check is to be made of the camber of a **CJ**-Series joist, the composite steel joist shall be carefully laid on its side with the joist intermittently supported prior to measuring the camber. With the joist lying on its side, the joist shall be in an unstressed condition at which time the amount of camber provided can be accurately determined.

Joists having measured camber outside of the camber tolerances shown in Table 2.6 shall have their camber adjusted by the joist manufacturer. At the option of the joist manufacturer, the composite steel joists shall be permitted to be rebuilt with the corrected camber.

2.7 STEEL HEADED STUD ANCHORS

The joist manufacturer shall indicate the size, quantity and layout of steel headed stud anchors required on the stud installation drawings. Purchasing of the steel headed stud anchors and ferrules, rental of stud welding equipment, installation of steel headed stud anchors and field testing of the studs is the responsibility of the shear stud installer.

2.8 CONNECTIONS

The adequacy of the end anchorage connection (bolted or welded) between the CJ-Series joist bearing seat and the supporting structure is the responsibility of the *specifying professional*. The contract documents shall clearly illustrate the end anchorage connection. Forces to be considered include end moments, axial loads, and diaphragm boundaries. Particular attention is required where there is net uplift.

SECTION 3.
MATERIALS

3.1 STEEL

The steel used in the manufacture of composite steel joists shall comply with the Steel Joist Institute Standard Specification for Composite Steel Joists, **CJ**-Series, of latest adoption.

3.2 PAINT

CJ-Series joists shall be provided unpainted to facilitate installation of welded steel headed stud anchors, unless otherwise specified as paint may potentially hinder the installation of welded steel headed stud anchors to the joist top chord.

If the project specifications require joist shop paint, the joist manufacturer shall not be responsible for field preparation of the top chord required for welded stud installation.

It is also understood that the typical shop applied paint used to coat steel joists is a dip applied, air dried paint. The paint is intended to be an impermanent and provisional coating which shall protect the steel for only a short period of exposure in ordinary atmospheric conditions.

Since most steel joists are painted using a standard dip coating, the coating shall be permitted to not be uniform and shall be permitted to include drips, runs, and sags. Compatibility of any coating including fire protective coatings applied over the standard shop paint shall be the responsibility of the specifier and/or painting contractor.

The shop applied paint may require field touch-up/repair as a result of, but not limited to, the following:

1. Abrasions from: Bundling, banding, loading and unloading, chains, dunnage during shipping, cables and chains during erection, bridging, installation, and other handling at the jobsite.
   Note: Rusting should be expected at any abrasion.
2. Dirt.
3. Diesel smoke.
4. Road salt.
5. Weather conditions during storage.

The joist manufacturer shall not be responsible for the condition of the paint if it is not properly protected after delivery.

SECTION 4.
INSPECTION

Inspection of composite steel joists at the joist manufacturer's plant shall be in accordance with Section 5.14 of the Steel Joist Institute Standard Specification for Composite Steel Joists, **CJ**-Series, of latest adoption.

Provisions for field inspection of projects involving composite steel joists shall be made by the *specifying professional*. This field inspection shall include verifying the concrete strength, concrete thickness and placement of the steel headed stud anchors. For more information on stud placement see Section 7 of the Steel Joist Institute Standard Specification for Composite Steel Joists, **CJ**-Series, of latest adoption. This field inspection shall not be provided by SJI member manufacturers.

SECTION 5.
ESTIMATING

5.1 PLANS FOR BIDDING

Plans to serve as the basis for bids shall show the character of the work with sufficient clarity to permit making an accurate estimate and shall show the following:

- Designation and location of *materials* (see Section 6.1.1, including any special design or configuration requirements
- Locations and elevations of all steel and concrete supporting members and bearing walls
- Composite steel joist depth
- Composite steel joist span
- Distance, each side of the joist centerline, to adjacent joists or other supporting members
- Type and depth of floor deck
- Concrete unit weight
- Concrete compressive strength
- Total depth of concrete slab
- Loads and their locations as defined in Section 6.1(a)
- Location and length of joist extended ends
- Location and size of all openings in floors and roofs
- Location of all partitions
- Composite steel joists requiring extended bottom chords
- Deflection limitation
- No paint on the joist. Refer to Steel Joist Institute Standard Specification for Composite Steel Joists, **CJ**-Series, of latest adoption, Section 3.4 Paint

5.2 SCOPE OF ESTIMATE

a) Unless otherwise specified, the following items shall be included in the estimate, and requirements shall be determined as outlined in Section 6.1.

- Composite Steel Joists
- Joist Extensions
- Ceiling Extensions
- Extended bottom chord used as strut
- Bridging and bridging anchors

b) The following items shall not be included in the estimate but may be quoted and identified by the joist manufacturer as separate items:

- Headers for Composite Steel Joists, **CJ**-Series
- Shear connectors and/or ferrules
- Centering material and attachments
- Miscellaneous framing between joists for openings at ducts, dumbwaiters, ventilators, skylights, etc.
- Loose individual or continuous bearing plates and bolts or anchors for such plates
- Erection bolts for composite steel joist end anchorage
- Horizontal bracing in the plane of the top and bottom chords from joist to joist or joist to structural framing and walls
- Moment plates
- Special joist configuration or bridging layouts for ductwork or sprinkler systems
- Bridging anchors and anchorage

SECTION 6.
PLANS AND SPECIFICATIONS

6.1 PLANS FURNISHED BY BUYER

The *buyer* shall furnish the *seller* plans and specifications as prepared by the *specifying professional* showing all material requirements and composite steel joist designations.

6.1.1 Design Input Required for Composite Steel Joists

The following basic information shall be provided by the *specifying professional*:

a) Joist Depth

The joist depth includes the steel joist portion only, not the deck or concrete slab, in. (mm).

b) Composite steel joist Layout

The joist plans shall show the layout of the composite steel joists, walls, columns, beams, girders and other supports, as well as floor and roof openings and any partitions. The joist manufacturer shall determine the required composite steel joist span to be fabricated based on this information.

c) Finished Floor, Roof, and Bearing Elevations

The elevation of finished floors, roofs, and bearings shall be shown with due consideration taken for the effects of dead load deflection.

d) Adjacent Member Spacing

This is the distance to the adjacent member or to the edge of the slab (if an exterior joist), feet (m).

e) Type of Floor Deck

Review each manufacturer's deck capacity for load capacity and deflection characteristics and specify the deck depth, profile and thickness to meet the building design.

f) Concrete Unit Weight, lb/ft.^{3} (kg/m^3).

g) Concrete Compressive Strength

28 day specified compressive strength of concrete, ksi (MPa).

h) Slab Thickness above the Top Ribs of the Deck, in. (mm).

i) Loads

The Steel Joist Institute does not presume to establish the loading requirements for which structures are designed. The *specifying professional* shall provide the nominal loads and load combinations as stipulated by the applicable code under which the structure is designed. At the present time the **CJ**-Series joists are stipulated to be designed utilizing an LRFD design basis.

The *specifying professional* shall calculate and provide the magnitude and location of all joist loads including those described below. When necessary to clearly convey information, a Load Diagram or Load Schedule shall be provided.

a) Non-composite DL, lb/ft.^{2} (kPa) - Concrete, joists, deck, bridging, and any other non-composite dead loads.

b) Construction LL, lb/ft.^{2} (kPa) – It is suggested that construction live load be determined considering the tributary area for each composite steel joist. See Appendix A.

c) Composite DL, lb/ft.^{2} (kPa) - Partitions, mechanical, electrical, fireproofing, floor covering, ceilings, and other composite dead loads. The magnitude and location of composite dead loads shall be clearly dimensioned.

d) Composite LL, lb/ft.^{2} (kPa) - Reduced design live loads shall be permitted to be specified if applicable.

j) Special Loads

The *specifying professional* shall be responsible for determining the applicable building code load combinations. If the loading criteria are too complex to be adequately communicated in a simple Load Diagram, then the *specifying professional* shall provide a Load Schedule showing the specified design loads, load categories and required load combinations with applicable load factors.

The *specifying professional* shall show on the structural drawings and give due consideration to the following special loads and load effects:

1. Snow drift loads including the accumulation of snow in the vicinity of obstructions such as penthouses, signs, parapets, adjacent buildings, etc.
2. Axial loads at the joist end supports.
3. Type and magnitude of end moments. For moment resisting joists framing near the end of a column, due consideration shall be given to extend the column length to allow a plate type connection between the top of the joist top chord and the column. Whenever possible, avoid resolving joist end moment forces through the joist bearing seat connection. A note shall be provided on the structural drawings stating that all moment resisting joists shall have all dead loads applied to the joist before the bottom chord struts are welded to the supporting connection whenever the moments provided do not include dead load. The top and bottom chord moment connection details and reinforcing steel placed in the concrete slab to resist negative flexural moments shall be designed by the *specifying professional*. The joist designer shall furnish the *specifying professional* with the joist detail information if requested.
4. Structural bracing loads.
5. Ponded rain water.
6. Wind loads - When composite steel joists are utilized in roof applications, the magnitude and location of all wind uplift loads shall be clearly shown..
7. Concentrated loads from mechanical units, fans, blowers, tanks, monorails, etc. - Where concentrated loads occur, the magnitude and location of these concentrated loads shall be shown on the structural drawings when, in the opinion of the *specifying professional*, they shall require consideration by the joist manufacturer. For nominal concentrated loads, which have been accounted for in the specified uniform design loads, a "strut" to transfer the load to a panel point on the opposite chord shall not be required provided that the sum of the concentrated loads within a chord panel does not exceed 100 pounds (445 N) and the attachments are concentric to the chord. When exact dimensional locations for concentrated loads which do not meet the above criteria are provided by the *specifying professional,* the joist shall be designed for the loads and load locations provided without the need for additional field applied web members at the specified locations.

k) Camber

CJ-Series steel joists, unless otherwise specified, are cambered, in. (mm), for 100 percent (100%) of the non-composite weight of joist, bridging, deck and concrete slab. Additional camber to accommodate for actual sustained composite dead and live loads and concrete shrinkage/creep shall be identified by the *specifying professional.*

6.1.2 Required Design Parameters

A form is provided in Appendix A for filling in the required design information listed in Section 6.1.1(a), Sections 6.1.1(d) through 6.1.1(i), and Section 6.1.1(k).

6.1.3 Composite Steel Joist Limitations

The *specifying professional* must be aware of some of the limitations that have been placed on composite steel joists. These include:

- The maximum deck depth is 3 inches (76 mm)

- The minimum slab thickness above the top of the deck shall be 2 inches (51 mm)
- When steel headed stud anchors are utilized, they shall have at least 1/2 inch (13 mm) of concrete cover
- The concrete shall be placed to provide a constant thickness along the entire span

6.1.4 Connections

Minimum end anchorage for simple span gravity loading shall be in accordance with Section 5.7 of the Steel Joist Institute Standard Specification for Composite Steel Joists, **CJ-**Series, of latest adoption. The end anchorage of a composite steel joist is the connection of the joist bearing seat to the support. .

The adequacy of the end anchorage connection (bolted or welded) between the composite steel joist bearing seat and the supporting structure is the responsibility of the *specifying professional*. The contract documents shall clearly illustrate the end anchorage connection.

When the end anchorage is welded, it is recommended that the *specifying professional* consider a smaller fillet weld thickness in conjunction with a longer weld length.

The *specifying professional* is responsible for bridging termination connections. The contract documents shall clearly illustrate these termination connections.

The Joist Manufacturer is responsible for the design of the bearing seats of composite steel joists for the loads designated by the *specifying professional* in the contract documents.

6.1.5 Special Considerations

The *specifying professional* shall indicate on the construction documents special considerations including:

a) Oversized or other non-standard web openings
b) Extended ends
c) Non-SJI standard bridging

6.2 PLANS FURNISHED BY SELLER

The *seller* shall furnish the *buyer* with composite steel joist placement plans to show the *material* as specified in the construction documents and are to be utilized for field installation in accordance with specific project requirements as stated in Section 6.1. Composite steel joist placement plans shall include, at a minimum, the following:

a) Listing of all applicable loads as stated in Section 6.1 and used in the design of the composite steel joists as specified in the construction documents
b) Connection requirements for:
    - Joist supports
    - Field splices
    - Bridging attachments
c) Deflection criteria for live load and total load
d) Shear stud installation plans showing:
    - Size, quantity and location of all shear connectors to be installed on the composite steel joists
    - Design camber for each composite steel joist or reference to a table giving the design camber for each composite steel joist
e) Size, location, and connections for all bridging

f) Joist headers

All *material* shall be identified with its mark which also appears on the Bill of Materials. Composite steel joist placement plans do not require the seal and signature of the joist manufacturer's registered design professional.

6.3 DISCREPANCIES

The *specifying professional's* bid plans and specifications shall be stipulated to be correct in the absence of written notice from the *buyer* to the contrary. When the *buyer* furnishes plans that do not agree with the Architect's bid plans, such detailed plans shall be considered as a written notice of change of plans. However, it shall be the *buyer's* responsibility to advise the *seller* of those changes which affect the composite steel joists.

6.4 APPROVAL

When composite steel joist placement plans are furnished by the *seller*, they are submitted to the *buyer* and *owner* for examination and approval. The *seller* allows a maximum of fourteen (14) calendar days in their schedule for the return of placement plans noted with the *owner's* and customer's approval, or approval subject to corrections as noted. The *seller* makes the corrections, furnishes corrected prints for field use to the *owner*/customer and is released by the *owner*/customer to start composite steel joist manufacture.

Approval by the *owner*/customer of the composite steel joist placement plans, sections, notes and joist schedule prepared by the *seller* indicates that the *seller* has correctly interpreted the contract requirements and is released by the *owner*/customer to start composite steel joist manufacture. This approval constitutes the *owner's*/customer's acceptance of all responsibility for the design adequacy of any detail configuration of joist support conditions shown by the *seller* as part of the preparation of these placement plans.

Approval does not relieve the *seller* of the responsibility for accuracy of detail dimensions on the plans, nor the general fit-up of composite steel joists to be placed in the field.

6.5 CHANGES

When any changes in plans are made by the *buyer* (or the *buyer's* representative) either prior to or after approval of detailed plans, or when any *material* is required and was not shown on the plans used as the basis of the bid, the cost of such changes and/or extra *material* shall be paid by the *buyer* at a price to be agreed upon between *buyer* and *seller*.

6.6 CALCULATIONS

The *seller* shall design the composite steel joists in accordance with the Steel Joist Institute Standard Specifications, **CJ**-Series, of latest adoption, to support the load requirements of Section 6.1. The *specifying professional* may require submission of the composite steel joist calculations as prepared by a registered design professional responsible for the product design. If requested by the *specifying professional*, the composite steel joist manufacturer shall submit design calculations with a cover letter bearing the seal and signature of the joist manufacturer's registered design professional. In addition to standard calculations under this seal and signature, submittal of the following shall be included:

a) Non-SJI standard bridging details (e.g. for cantilevered conditions, net uplift)

b) Connection details for:

- Non-SJI standard connections (e.g., flush framed or framed connections)
- Field splices
- Joist headers

c) Shear stud requirements

SECTION 7.
HANDLING AND ERECTION

The *buyer* and *erector* shall comply with the requirements of the Steel Joist Institute Standard Specifications for Composite Steel Joists, **CJ**-Series, of latest adoption in the handling and erection of *material*.

> **Note**: For additional coverage of this topic, refer to the Steel Joist Institute's Technical Digest 9, "Handling and Erection of Steel Joists and Joist Girders".

The *buyer* and/or *erector* shall check all *materials* on arrival at job site and promptly report to the *seller* any discrepancies and/or damages.

When composite steel joists cannot be delivered as a single piece, they shall be permitted to be delivered in two or more pieces therefore requiring the pieces to be spliced together in the field. The manufacturer's instructions shall be followed to assure matching pieces are joined, proper bolts are used, and any required bolt tensioning is incorporated.

All composite steel joists shall be handled by methods which avoid damage to any part of the joist. This may require the use of spreader bars, multiple hoisting cables, or multiple cranes as necessary to safely handle the joist. Hoisting cables shall be attached at panel points and shall be at panel point locations selected to minimize erection stresses.

The current OSHA Safety and Health Regulations for Construction, 29 CFR Part 1926, Subpart R - Steel Erection, refers to certain joists at or near columns to be designed with sufficient strength to allow one employee to release the hoisting cable without the need for erection bridging. This Standard shall not be interpreted that any composite steel joist at or near a column line is safe to support an employee without bridging installed. Many limitations exist that prevent these joists from being designed to safely allow an employee on an un-bridged joist. Because of these limitations these joists shall be erected by incorporating erection methods ensuring joist stability and either:

1) Installing bridging or otherwise stabilizing the composite steel joist prior to releasing the hoisting cable, or
2) Releasing the hoisting cable without having a worker on the composite steel joist.

A composite steel joist shall not be placed on any support structure unless such structure is stabilized. When composite steel joists are landed on a structure, they shall be secured to prevent unintentional displacement prior to installation.

A bridging terminus point shall be established before joist bridging is installed.

Composite steel joists shall not be used as anchorage points for a fall arrest system unless written directions to do so is obtained from a "qualified person" (for definition of "qualified person" see Code of Federal Regulations (CFR) 29 Part 1926 Safety and Health Regulations for Construction, Subpart R, Steel Erection, §1926.751 Definitions, January 18, 2001).

No modification that affects the strength of a composite steel joist shall be made without the written approval of the Engineer of Record.

The *seller* shall not be responsible for improper fit of *material* due to inaccurate construction work.

SECTION 8.
INSTALLATION AND INSPECTION OF STEEL HEADED STUD ANCHORS

8.1 INSTALLATION

a) Locate steel headed stud anchors, hereafter referred to as shear studs, on composite steel joists per details shown on the manufacturer's shear stud placement drawings and as outlined in any shear stud layout tables. Start laying out shear studs from each end of the joist and working toward the center. Alternate installation of the shear studs from one top chord angle to the other. Note minimum concrete longitudinal edge distance for shear studs on ends of joists as shown on placement drawings.

b) All shear studs shall be welded through the steel deck after the deck has been placed on the joists. Welding voltage, current, time, and gun settings for lift and plunge shall be set at optimum settings for the particular size of shear studs and range of joist top chord thicknesses, based on recommendations of the shear stud manufacturer and automatic shear stud welding equipment manufacturer, or both. The shear stud installer should consult AWS C5.4, *Recommended Practices for Stud Welding*, for technique guidance. All welding shall comply with AWS D1.1, Structural Welding Code - Steel, Section 7, *Stud Welding,* with the exception that a ratio of stud diameter to top chord thickness of up to 3.0 shall be permitted..

> **Note**: The shear capacity of a single shear stud is determined from the requirements of the Steel Joist Institute Standard Specifications for Composite Steel Joists, **CJ**-Series, of latest adoption Section 4.5.4, Shear Studs where the shear stud coefficient, R_p, is based more closely on the research conducted for composite behavior than used by AISC 360

c) Each shear stud shall be provided with the appropriate ceramic ferrule (arc shield) designated by the shear stud manufacturer as designed for weld through deck application. Ferrules shall be stored in a moisture free environment and kept dry during installation.

d) Prior to welding shear studs, the top surface of the joist top chords shall be clean, unpainted and free of heavy rust, dirt, sand, oil, grease, water, or other foreign substances. The surfaces of the deck prior to stud welding shall be free of heavy rust or mill scale, moisture, dirt, sand, or other construction related waste materials.

e) Prior to welding, the steel deck shall rest tightly against the top chord of the composite steel joist.

f) Shear studs shall not be welded through more than one thickness of 16 gage deck or two thicknesses of 18 gage deck or lighter. Total galvanizing thickness on one thickness or two thicknesses of deck shall not exceed 1.25 oz. per square foot total for both sides of the deck.

g) Welding of shear studs shall not be done when the base metal is below 0°F (-18°C) or when the surface is wet or exposed to falling rain or snow. When the base metal temperature is between 0°F (-18°C) and 32°F (0°C), welding shall be permitted to only be done with appropriate set up, pre-production testing and inspection procedures as outlined in AWS D1.1 Structural Welding Code - Steel, Section 7.5, *Technique*.

h) Qualification of the stud application procedure used to weld shear studs through metal deck is outlined in AWS D1.1, Structural Welding Code –Steel, Section 7.6 *Stud Application Qualification Requirements*. This document requires that a minimum of ten (10) shear studs shall be welded using the decking and base material representative of the conditions to be used during construction. The ten (10) studs shall then be successfully

tensile or bend tested. A document recording the details and settings including the weld set up used for this test shall be prepared prior to beginning of any production shear stud welding. A copy of the Application Qualification Test Data shall be furnished to the Engineer of Record as outlined in AWS D1.1, Structural Welding Code- Steel, Section 7.6.7 *Application Qualification Test Data*. At the beginning of each day's or shift's production, Pre-production testing in accordance with AWS D1.1 Structural Welding Code - Steel, Section 7.7 *Production Control* shall be performed on the first two shear studs that are welded.

8.2 INSPECTION

a) The welding of shear studs requires special inspection. The *owner*, or the *specifying professional*, acting as *owner's* agent, shall employ one or more special inspectors who shall provide inspections of the shear stud welds on a continual and timely basis. The special inspector's duties include verifying welder's qualifications, welding preparation, welding procedures and conformance of materials. Unless otherwise specified in the contract documents, the stud installer shall be responsible for application qualification tests, pre-production tests and removal of the ferrule from each weld for inspection purposes.

b) To ensure proper welds, bend test a minimum of 1 out of every 100 shear studs production welded, by either striking the shear stud with a hammer or placing a pipe or other hollow device over the shear stud and manually or mechanically bending the shear stud 15° from its original axis. Shear studs shall be bent along the longitudinal axis of the joist toward the nearest end of the joist. If failure occurs in the weld zone, a minimum of two adjacent shear studs shall be satisfactorily bend tested. The special inspector, where conditions warrant, shall be permitted to select a reasonable number of additional shear studs to be subjected to a 15° bend test.

c) If in the judgment of the *specifying professional*, shear studs welded during the progress of the work are not in accordance with AWS D1.1, Structural Welding Code - Steel, Section 7, *Stud Welding* requirements, as indicated by inspection and testing, corrective action shall be required of the shear stud installer. At the shear stud installer's expense, the shear stud installer shall make the set-up changes necessary to ensure that shear studs subsequently welded meet code requirements.

d) The shear stud installer shall certify to the *specifying professional* that the shear studs were installed in accordance with the requirements of AWS D1.1, Structural Welding Code - Steel, Section 7, *Stud Welding.*

SECTION 9.
CONCRETE PLACEMENT

Even if the joist camber is specified to theoretically provide a flat floor surface after placing of the concrete is completed, special consideration must be given relative to concrete placement.

It is recommended that ACI 302.1R-15, Guide to Concrete Floor and Slab Construction be utilized for establishing the requirements needed for successful construction of suspended slabs. This starts with establishing responsibilities in the contract documents to address (not all-inclusive) class of floor, reinforcement, when required, and construction tolerances that include floor flatness and levelness requirements, including how and when these need to be measured. .

The levelness of suspended slabs on composite steel joists depends on the accuracy of formwork and strike-off once the concrete slab is placed, but is also influenced by the type of structural system being utilized as each type of structural frame behaves somewhat differently. The concrete contractor needs to recognize these differences and plan the work accordingly.

Regardless of the structural system and whether the concrete placement will be done shored or unshored, it is imperative that the concrete slab be placed at a constant thickness across the entire length of the composite steel joist. The main reasons for this include the following:

- Full concrete slab thickness shall be provided along the entire composite steel joist span to carry the composite steel joist compressive loads
- A full thickness slab is necessary to provide required fire protection.
- Sufficient concrete cover shall be provided over the steel headed stud anchors.
- The potential for over runs in concrete placing volume shall be greatly reduced.
- Deflections of the composite steel joist under the non-composite loading can be more accurately predicted vs. with a variable thickness slab.

Concrete construction joints should ideally be located between joists. When a construction joint is located closer than 12 in. (305 mm) from the longitudinal centerline of any given composite steel joist, it is the responsibility of the *specifying professional* to determine whether extra transverse steel reinforcing needs to be provided to assure that the composite properties of the supporting member with steel headed stud anchors has not been affected.

SECTION 10.
BUSINESS RELATIONS

10.1 PRESENTATION OF PROPOSALS

All proposals for furnishing *material* shall be made on a Sales Contract Form. After acceptance by the *buyer*, these proposals shall be approved or executed by a qualified official of the *seller*. Upon such approval the proposal becomes a contract.

10.2 ACCEPTANCE OF PROPOSALS

All proposals are intended for prompt acceptance and are subject to change without notice.

10.3 BILLING

Contracts on a lump sum basis are to be billed proportionately as shipments are made.

10.4 PAYMENT

Payments shall be made in full on each invoice without retention.

10.5 ARBITRATION

All business controversies which cannot be settled by direct negotiations between *buyer* and *seller* shall be submitted to arbitration. Both parties shall sign a submission to arbitration and if possible agree upon an arbitrator. If they are unable to agree, each shall appoint an arbitrator and these two shall appoint a third arbitrator. The expenses of the arbitration shall be divided equally between the parties, unless otherwise provided for in the agreements to submit to arbitration. The arbitrators shall pass final judgement upon all questions, both of law and fact, and their findings shall be conclusive.

APPENDIX A.
REQUIRED
DESIGN PARAMETERS
(Nominal Uniform Loads)

Date _____ **Project** _____

Joist Geometry:

1) Depth — in. (mm)
2) Span — ft. (m)
3) Adjacent Member Spacing (left) — ft. (m)
4) Adjacent Member Spacing (right) — ft. (m)

Concrete and Deck:

1) Type of Floor Deck
2) Depth of Floor Deck — in. (mm)
3) Slab Thickness above Deck — in. (mm)
4) Concrete Unit Weight — pcf (kg/m^3)
5) Concrete Compressive Strength — ksi (MPa)

Nominal Loads:

1) Non-composite Construction Dead Load
   a) Concrete — psf (kPa)
   b) Joist and Bridging — psf (kPa)
   c) Deck — psf (kPa)
   d) **Total** — psf (kPa) — plf (kN/m)
2) [1]Construction Live Load
   a) During Concrete Placement — psf (kPa) — plf (kN/m)
3) Composite Dead Load
   a) Fixed Partitions — psf (kPa)
   b) Mechanical — psf (kPa)
   c) Electrical — psf (kPa)
   d) Fireproofing — psf (kPa)
   e) Floor Covering and Ceiling — psf (kPa)
   f) Miscellaneous Dead Loads — psf (kPa)
   g) **Total** — psf (kPa) — plf (kN/m)
4) Composite Live Load
   a) Live Load (Reduced as Applicable) — psf (kPa)
   b) Moveable Partitions — psf (kPa)
   c) **Total** — psf (kPa) — plf (kN/m)

5) Total Factored Non-composite Dead Load, 1.2 x (1d)

psf (kPa) plf (kN/m)

6) Total Factored Composite Dead Load, 1.2 x (3g)

psf (kPa) plf (kN/m)

7) Total Factored Composite Live Load, 1.6 x (4c)

psf (kPa) plf (kN/m)

8) Total Factored Composite Design Load, (5) + (6) +(7)

psf (kPa) plf (kN/m)

9) Joist Designation: ____CJ_____/_____/_____
dd (8) (7) (5) dd = joist depth

Camber and Deflection (unfactored load):

1) Loads to Camber for:
   a) Non-composite Dead Load, (1d) x _____ % (typically 100%)
   b) Composite Dead Load, (3g) x _____ % (typically 0 – 50%)
   c) Composite Live Load, (4c) x _____ % (typically 0 – 25%)
2) Maximum Allowable Live Load Deflection Span / _____
3) Maximum Deflection in. (mm)

[1]When estimating construction live loading on a composite steel joist it is suggested that the construction live loading be adjusted for tributary area as shown below:

For English units

$L_c = 20 R_1$ where $12 \le L_c \le 20$, lb/ft.^{2} (Eq. A1-1)

$R_1 = 1$ for $A_t \le 200$ ft.^{2}

$R_1 = 1.2 - 0.001 A_t$ for 200 ft.^{2} < A_t < 600 ft.^{2}

$R_1 = 0.6$ for $A_t \ge 600$ ft.^{2}

Where:

L_c = Construction live load

A_t = Tributary floor area over one joist supporting the construction live load, ft.^{2} (m^2)

For Metric units

$L_c = 0.96 R_1$ where $0.58 \le L_c \le 0.96$, kN/m^2 (Eq. A1-2)

$R_1 = 1$ for $A_t \le 18.58$ m^2

$R_1 = 1.2 - 0.01076 A_t$ for 18.58 m^2 < A_t < 55.74 m^2

$R_1 = 0.6$ for $A_t \ge 55.74$ m^2