

**§12-133.2-9 Open web steel joists. (a) General.**

- (1) Except as provided in paragraph (2), where steel joists are used and columns are not framed in at least two directions with solid web structural steel members, a steel joist shall be field-bolted at the column to provide lateral stability to the column during erection. For the installation of this joist:
    - (A) A vertical stabilizer plate shall be provided on each column for steel joists. The plate shall be a minimum of 6 inch by 6 inch (152 mm by 152 mm) and shall extend at least 3 inches (76 mm) below the bottom chord of the joist with a 13/16 inch (21 mm) hole to provide an attachment point for guying or plumbing cables.
    - (B) The bottom chords of steel joists at columns shall be stabilized to prevent rotation during erection.
    - (C) Hoisting cables shall not be released until the seat at each end of the steel joist is field-bolted, and each end of the bottom chord is restrained by the column stabilizer plate.
  - (2) Where constructibility does not allow a steel joist to be installed at the column:
    - (A) An alternate means of stabilizing joists shall be installed on both sides near the column and shall:
      - (i) Provide stability equivalent to paragraph (1);
      - (ii) Be designed by a qualified person;
      - (iii) Be shop installed; and
      - (iv) Be included in the structure specific erection drawings and site-specific erection plans.
    - (B) Hoisting cables shall not be released until the seat at each end of the steel joist is field-bolted and the joist is stabilized.
  - (3) Where steel joists at or near columns span 60 feet (18.3 m) or less, the joist shall be designed with sufficient strength to allow one employee to release the hoisting cable without the need for erection bridging.
  - (4) Where steel joists at or near columns span more than 60 feet (18.3 m), the joists shall be set in tandem with all bridging installed unless an alternative method of erection, which provides equivalent stability to the steel joist, is designed by a qualified person and is included in the site-specific erection plan.
  - (5) A steel joist or steel joist girder shall not be placed on any support structure unless such structure is stabilized.
  - (6) When steel joist(s) are landed on a structure, they shall be secured to prevent unintentional displacement prior to installation.
  - (7) No modification that affects the strength of a steel joist or steel joist girder shall be made without the written approval of the project structural engineer of record.
  - (8) Field-bolted joists.
    - (A) Except for steel joists that have been pre-assembled into panels, connections of individual steel joists to steel structures in bays of 40 feet (12.2 m) or more shall be fabricated to allow for field bolting during erection.
    - (B) These connections shall be field-bolted unless constructibility does not allow.
  - (9) Steel joists and steel joist girders shall not be used as anchorage points for a fall arrest system unless written approval to do so is obtained from a qualified person.
  - (10) A bridging terminus point shall be established before bridging is installed. (See Appendix C to this chapter.)
- (b) Attachment of steel joists and steel joist girders.**
- (1) Each end of "K" series steel joists shall be attached to the support

structure with a minimum of two 1/8-inch (3 mm) fillet welds 1 inch (25 mm) long or with two 1/2-inch (13 mm) bolts, or the equivalent.

- (2) Each end of "LH" and "DLH" series steel joists and steel joist girders shall be attached to the support structure with a minimum of two 1/4-inch (6 mm) fillet welds 2 inches (51 mm) long, or with two 3/4-inch (19 mm) bolts, or the equivalent.
  - (3) Except as provided in paragraph (4), each steel joist shall be attached to the support structure, at least at one end on both sides of the seat, immediately upon placement in the final erection position and before additional joists are placed.
  - (4) Panels that have been pre-assembled from steel joists with bridging shall be attached to the structure at each corner before the hoisting cables are released.
- (c) Erection of steel joists.
- (1) Both sides of the seat of one end of each steel joist that requires bridging under Tables A and B shall be attached to the support structure before hoisting cables are released.
  - (2) For joists over 60 feet, both ends of the joist shall be attached as specified in subsection (b) and the provisions of subsection (d) met before the hoisting cables are released.
  - (3) On steel joists that do not require erection bridging under Tables A and B, only one employee shall be allowed on the joist until all bridging is installed and anchored.

TABLE A -- Erection Bridging for Short Span Joists

Joist Span		Joist Span		Joist Span	
8L1	NM	22K10	40-0	14KCS1	NM
10K1	NM	22K11	40-0	14KCS2	NM
12K1	23-0	24K4	36-0	14KCS3	NM
12K3	NM	24K5	38-0	16KCS2	NM
12K5	NM	24K6	39-0	16KCS3	NM
14K1	27-0	24K7	43-0	16KCS4	NM
14K3	NM	24K8	43-0	16KCS5	NM
14K4	NM	24K9	44-0	18KCS2	35-0
14K6	NM	24K10	NM	18KCS3	NM
16K2	29-0	24K12	NM	18KCS4	NM
16K3	30-0	26K5	38-0	18KCS5	NM
16K4	32-0	26K6	39-0	20KCS2	36-0
16K5	32-0	26K7	43-0	20KCS3	39-0
16K6	NM	26K8	44-0	20KCS4	NM
16K7	NM	26K9	45-0	20KCS5	NM
16K9	NM	26K10	49-0	22KCS2	36-0
18K3	31-0	26K12	NM	22KCS3	40-0
18K4	32-0	28K6	40-0	22KCS4	NM
18K5	33-0	28K7	43-0	22KCS5	NM
18K6	35-0	28K8	44-0	24KCS2	39-0
18K7	NM	28K9	45-0	24KCS3	44-0
18K9	NM	28K10	49-0	24KCS4	NM
18K10	NM	28K12	53-0	24KCS5	NM
20K3	32-0	30K7	44-0	26KCS2	39-0
20K4	34-0	30K8	45-0	26KCS3	44-0
20K5	34-0	30K9	45-0	26KCS4	NM
20K6	36-0	30K10	50-0	26KCS5	NM
20K7	39-0	30K11	52-0	28KCS2	40-0
20K9	39-0	30K12	54-0	28KCS3	45-0
20K10	NM	10KCS1	NM	28KCS4	53-0
22K4	34-0	10KCS2	NM	28KCS5	53-0
22K5	35-0	10KCS3	NM	30KCS3	45-0
22K6	36-0	12KCS1	NM	30KCS4	54-0
22K7	40-0	12KCS2	NM	30KCS5	54-0
22K9	40-0	12KCS3	NM		

NM = diagonal bolted bridging not mandatory.

Table B -- Erection Bridging for Long Span Joists

Joist Span		Joist Span	
18LH02	33-0	28LH06	46-0
18LH03	NM	28LH07	NM
18LH04	NM	28LH08	NM
18LH05	NM	28LH09	NM
18LH06	NM	28LH10	NM
18LH07	NM	28LH11	NM
18LH08	NM	28LH12	NM
18LH09	NM	28LH13	NM
20LH02	33-0	32LH06	47-0 through 60-0
20LH03	38-0	32LH07	47-0 through 60-0
20LH04	NM	32LH08	55-0 through 60-0
20LH05	NM	32LH09	NM through 60-0
20LH06	NM	32LH10	NM through 60-0
20LH07	NM	32LH11	NM through 60-0
20LH08	NM	32LH12	NM through 60-0
20LH09	NM	32LH13	NM through 60-0
20LH10	NM	32LH14	NM through 60-0
24LH03	35-0	32LH15	NM through 60-0
24LH04	39-0	36LH07	47-0 through 60-0
24LH05	40-0	36LH08	47-0 through 60-0
24LH06	45-0	36LH09	57-0 through 60-0
24LH07	NM	36LH10	NM through 60-0
24LH08	NM	36LH11	NM through 60-0
24LH09	NM	36LH12	NM through 60-0
24LH10	NM	36LH13	NM through 60-0
24LH11	NM	36LH14	NM through 60-0
28LH05	42-0	36LH15	NM through 60-0

NM = diagonal bolted bridging not mandatory.

- (4) Employees shall not be allowed on steel joists where the span of the steel joist is equal to or greater than the span shown in Tables A and B except in accordance with subsection (d).
- (5) When permanent bridging terminus points cannot be used during erection, additional temporary bridging terminus points are required to provide stability. (See appendix C of this chapter.)
- (d) Erection bridging.**
  - (1) Where the span of the steel joist is equal to or greater than the span shown in Tables A and B, the following shall apply:
    - (A) A row of bolted diagonal erection bridging shall be installed near the midspan of the steel joist;
    - (B) Hoisting cables shall not be released until this bolted diagonal erection bridging is installed and anchored; and
    - (C) No more than one employee shall be allowed on these spans until all other bridging is installed and anchored.
  - (2) Where the span of the steel joist is over 60 feet (18.3 m) through 100 feet (30.5 m), the following shall apply:
    - (A) All rows of bridging shall be bolted diagonal bridging;
    - (B) Two rows of bolted diagonal erection bridging shall be installed near the third points of the steel joist;

- (C) Hoisting cables shall not be released until this bolted diagonal erection bridging is installed and anchored; and
  - (D) No more than two employees shall be allowed on these spans until all other bridging is installed and anchored.
- (3) Where the span of the steel joist is over 100 feet (30.5 m) through 144 feet (43.9 m), the following shall apply:
- (A) All rows of bridging shall be bolted diagonal bridging;
  - (B) Hoisting cables shall not be released until all bridging is installed and anchored; and
  - (C) No more than two employees shall be allowed on these spans until all bridging is installed and anchored.
- (4) For steel members spanning over 144 feet (43.9 m), the erection methods used shall be in accordance with section 12-133.2-8.
- (5) Where any steel joist specified in subsection (c)(2) and paragraphs (1), (2), and (3) is a bottom chord bearing joist, a row of bolted diagonal bridging shall be provided near the support(s). This bridging shall be installed and anchored before the hoisting cable(s) is released.
- (6) When bolted diagonal erection bridging is required by this section, the following shall apply:
- (A) The bridging shall be indicated on the structure specific erection drawing;
  - (B) The erection drawing shall be the exclusive indicator of the proper placement of this bridging;
  - (C) Shop-installed bridging clips, or functional equivalents, shall be used where the bridging bolts to the steel joists;
  - (D) When two pieces of bridging are attached to the 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; and
  - (E) Bridging attachments shall not protrude above the top chord of the steel joist.
- (e) Landing and placing loads.**
- (1) During the construction period, the employer placing a load on steel joists shall ensure that the load is distributed so as not to exceed the carrying capacity of any steel joist.
- (2) Except for paragraph (4), no construction loads are allowed on the steel joists until all bridging is installed and anchored and all joist-bearing ends are attached.
- (3) The weight of a bundle of joist bridging shall not exceed a total of 1,000 pounds (454 kg). A bundle of joist bridging shall be placed on a minimum of three steel joists that are secured at one end. The edge of the bridging bundle shall be positioned within 1 foot (.30 m) of the secured end.
- (4) No bundle of decking may be placed on steel joists until all bridging has been installed and anchored and all joist bearing ends attached, unless all of the following conditions are met:
- (A) The employer has first determined from a qualified person and documented in a site-specific erection plan that the structure or portion of the structure is capable of supporting the load;
  - (B) The bundle of decking is placed on a minimum of three steel joists;
  - (C) The joists supporting the bundle of decking are attached at both ends;
  - (D) At least one row of bridging is installed and anchored;
  - (E) The total weight of the bundle of decking does not exceed 4,000 pounds (1816 kg); and
  - (F) Placement of the bundle of decking shall be in accordance with paragraph (5).

- (5) The edge of the construction load shall be placed within 1 foot (.30 m) of the bearing surface of the joist end. [Eff 1/10/03]  
(Auth: HRS §396-4) (Imp: HRS §396-4)