EVERSTEAD
ENGINEERING & DESIGN

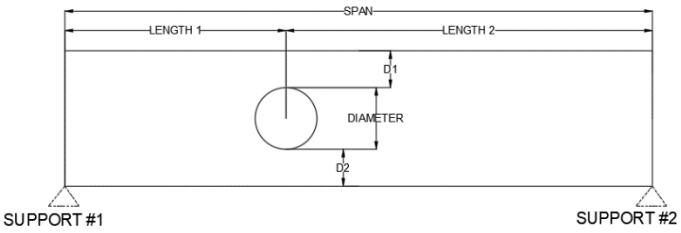
May 10, 2022

Clover & Hive
120 SE 30th St.
Lee's Summit, MO 64082

RE: Field Issue of over notched and holes bored closer than 2" together on floor joists for Lot #18 Units A and B Osage – 2017 and 2015 SW Osage Dr. Lee's Summit, MO 64082 – Permit # PRRES20213954

Unit B:

Holes for electrical bored within 2" of each other in floor joists



- D1 – over 2"
- D2 – over 2"
- Diameter of hole – 1"
- Location – at breaker box
- Loading -
  - Dead = 10 psf @ 16" oc
  - Live = 40 psf @ 16" oc

<u>Recommendations:</u>

Install a 24" - CS16 strap centered over the hole along the bottom of the floor joist. Install CS16 strap per manufacturer's recommendations shown below.

Model No.	Total L	Ga.	DF/SP Fasteners	DF/SP End Length	SPF/HF Fasteners	SPF/HF End Length	Allowable Tension Loads (160)	Code Ref.
CMST12	40'	12	(74) 16d	33"	(84) 16d	38"	9,215	I4, L3, FL
			(86) 10d	39"	(98) 10d	44"	9,215	
CMST14	52½'	14	(56) 16d	26"	(66) 16d	30"	6,490	
			(66) 10d	30"	(76) 10d	34"	6,490	
CMSTC16	54'	16	(50) 16d sinker	20"	(58) 16d sinker	25"	4,585	
CS14	100'	14	(26) 10d	15"	(30) 10d	16"	2,490	
			(30) 8d	16"	(36) 8d	19"	2,490	
CS16	150'	16	(20) 10d	11"	(22) 10d	13"	1,705	
			(22) 8d	13"	(26) 8d	14"	1,705	
CS18	200'	18	(16) 10d	9"	(18) 10d	11"	1,370	
			(18) 8d	11"	(22) 8d	12"	1,370	
CS20	250'	20	(12) 10d	6"	(14) 10d	9"	1,030	
			(14) 8d	9"	(16) 8d	9"	1,030	
CS22	300'	22	(10) 10d	7"	(12) 10d	7"	845	
			(12) 8d	7"	(14) 8d	8"	845	

1. Fastener quantities and end lengths are calculated using an increase for wind or seismic loading.
2. Use half of the required nails in each member being connected to achieve the listed loads.
3. Calculate the connector value for a reduced number of nails as follows:

$$\text{Allowable Load} = \frac{\text{No. of Nails Used}}{\text{No. of Nails in Table}} \times \text{Table Load}$$

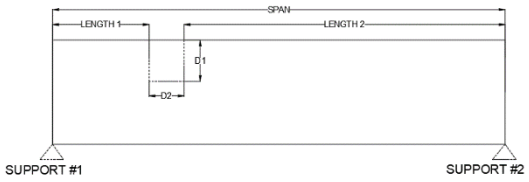
Example: CMSTC16 in DF/SP with 40 nails total.
(Half of the nails in each member being connected)

$$\text{Allowable Load} = \frac{40 \text{ Nails (Used)}}{50 \text{ Nails (Table)}} \times 4{,}585 \text{ lb.} = 3{,}668 \text{ lb.}$$

4. Tension loads apply for uplift when installed vertically.
5. **Nails:** 16d = 0.162" dia. x 3½" long, 16d sinker = 0.148" dia. x 3¼" long, 10d = 0.148" dia. x 3" long. See pp. 26–27 for other nail sizes and information.

Unit A:

Over notched floor joist for DWV:



SIMPLE SPAN

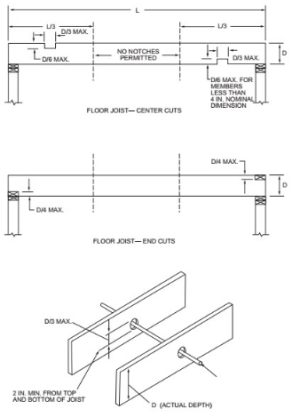
- D1 – 6"
- D2 – 4"
- Length 1 – 6'
- Length 2 - 3'
- Span – 9'
- Support #1 – W8x10 steel beam continuous
- Support #2 – W8x10 steel beam continuous
- Location – under dining
- Loading -
  - Dead = 15 psf @ 16" oc
  - Live = 40 psf @ 16" oc

<u>Recommendations:</u>

Option 1:

Add additional support to existing 2x10 notched floor joist. Sister Douglas Fir Larch #2 2x10 joist for 6' length with 4 fasteners per linear ft in "W" pattern with 2-1/2" structural screws or 10D nails to existing notched floor joist.

Notch sistered floor joist in compliance with 2018 IRC:
Max width: D/3 = 3.08"
Max depth D/6= 1.54"
Located in edge third of floor joist span



For SI: 1 inch = 25.4 mm.

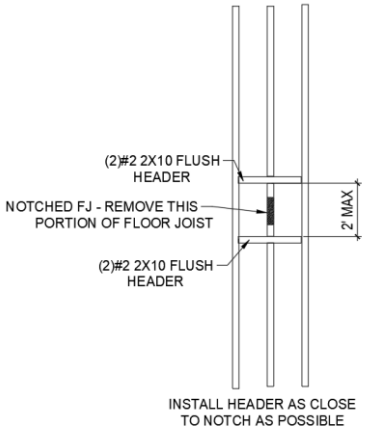
FIGURE R502.8CUTTING, NOTCHING AND DRILLING

R502.8.1 Sawn lumber.

Notches in solid lumber joists, rafters and beams shall not exceed one-sixth of the depth of the member, shall not be longer than one-third of the depth of the member and shall not be located in the middle one-third of the span. Notches at the ends of the member shall not exceed one-fourth the depth of the member. The tension side of members 4 inches (102 mm) or greater in nominal thickness shall not be notched except at the ends of the members. The diameter of holes bored or cut into members shall not exceed one-third the depth of the member. Holes shall not be closer than 2 inches (51 mm) to the top or bottom of the member, or to any other hole located in the member. Where the member is notched, the hole shall not be closer than 2 inches (51 mm) to the notch.

Option 2:

Remove plumbing and header off floor joist near notch as shown in image below:



Sincerely,

Bradley Huxol, PE