

EFFECTIVENESS OF FILLERS AND BATTENS FOR OPEN WEB STEEL JOISTS



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by

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Executive Summary

Fillers and battens are used in open web steel joists to restrain independent buckling of double angle members. However, joist manufacturers employ a variety of filler and batten details with limited industry-wide experimental validation. This study evaluated the effectiveness of five filler details and two batten details through physical testing of 27 full-scale joist specimens. Experimental strengths were compared with predictions based on SJI 100 using measured material properties.

All five filler details were found to effectively restrain independent buckling of double angle top chord members, resulting in increased compression strength compared with specimens without fillers. Measured strengths exceeded those predicted by the current SJI design provisions, indicating conservative strength predictions for all filler details investigated.

Both batten details effectively restrained independent buckling of double angle web members, changing the governing failure mode from z -axis buckling to x -axis buckling and increasing strength by approximately 40 percent. The measured strengths of the web members without battens for z -axis buckling were generally consistent with design predictions, however the measured strengths of the web members with battens for x -axis buckling were somewhat lower than strengths calculated according to the current specification.

Overall, the results confirm the effectiveness of the filler and batten details investigated, provide experimental validation of commonly used joist details, and establish a technical basis for potential future refinement of SJI design guidance.

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Introduction

In open web steel joists, fillers are used in double angle chord members to restrain independent buckling of the angles, reduce z-axis slenderness, and increase axial compression strength. Similarly, battens are used to restrain independent buckling of the angles in double angle web members. Joist manufacturers use a variety of details for fillers and battens. While some joist manufacturers have evaluated the effectiveness of their details for fillers and battens through load testing, there is no industry-wide guidance on what details are effective and what details are not. The purpose of this research is to quantify the effectiveness of a variety of types of fillers and battens for open web steel joists through physical testing.

Materials and Methods

A matrix of test specimens is shown in Table 1. Six configurations of “filler tests” were performed with three replicates each for a total of 18 specimens. Three configurations of “batten tests” were performed with three replicates each for a total of 9 specimens. Three replicates of each configuration were tested to evaluate repeatability and limit the impact of outliers on the data analysis. All 27 specimens were manufactured with cold formed angle and channel members by New Millennium in Salem, Virginia. The specimens were designed to be similar to those used for flexure and shear tests described in the SJI Design Verification Inspection Program.

Table 1. Test matrix

Group Name	Joist Mark	Filler/Batten Detail	Expected Failure
F0	SJ11A	None	z-axis buckling of top chord
F1	SJ11B	Hot rolled angle (one leg welded)	z-axis buckling of top chord
F2	SJ11C	Rod	z-axis buckling of top chord
F3	SJ11D	Cold formed channel (horizontal)	z-axis buckling of top chord
F4	SJ11E	Cold formed channel (vertical)	z-axis buckling of top chord
F5	SJ11F	Hot rolled angle (both legs welded)	z-axis buckling of top chord
B0	SJ12A	None	z-axis buckling of W3
B1	SJ12B	Hot rolled angle (nested)	x-axis buckling of W3
B2	SJ12C	Cold formed angle (lapped)	x-axis buckling of W3

The filler test specimens were 20K special joists with a span of 30 feet. Other than the filler details, the joists were nominally identical. Based on design calculations, the expected failure mode of all the filler test specimens (with and without fillers) was z-axis buckling of the top chord. Other members were designed to have a maximum utilization ratio of 0.75. Details of the fillers are described in Table 2.

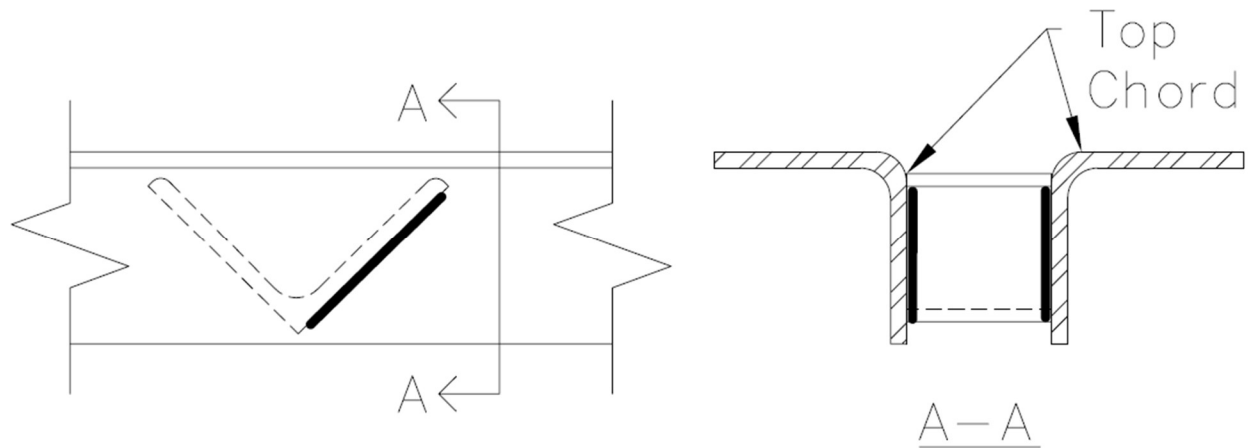
The batten test specimens were 24K special joists with a span of 18 feet, one standard underslung end, and one square end. Other than the batten details, the joists were nominally identical. Based on design calculations, the expected failure mode of the joists without battens was z-axis buckling of the W3 web member (i.e., the first compression member from the underslung end) while the expected failure mode of the joists with battens was x-axis buckling of

the W3 web member. Other members were designed to have a maximum utilization ratio of 0.75. Details of the battens are described in Table 3.

Table 2. Filler details

Angle fillers used in the F1 specimens:

The filler consisted of a 1.2-inch-long segment of hot rolled angle (L 1-3/4 x 1-3/4 x 0.15) between the chord angles with the heel pointed down. One leg of the filler angle was welded to the vertical legs of the chord angles (two lines of weld total). Welds not shown to scale.



Rod fillers used in the F2 specimens:

The filler consisted of a 2-1/4-inch-long segment of 1-1/2-inch-diameter round bar between the chords with the longitudinal axis of the round bar aligned with the longitudinal axis of the chords. Four lines of weld connected the sides of the round bar to the vertical legs of the chord angles. Welds not shown to scale.

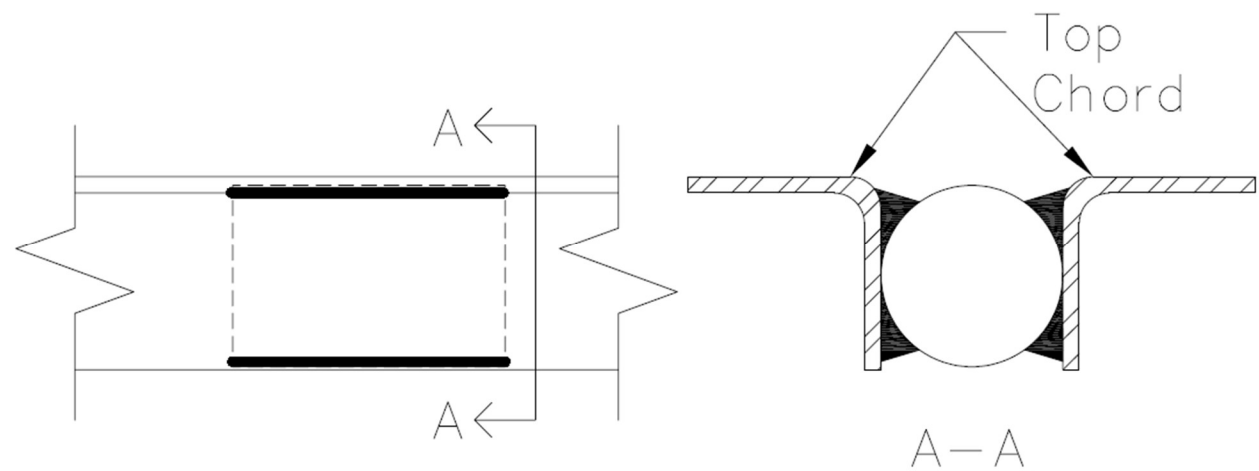
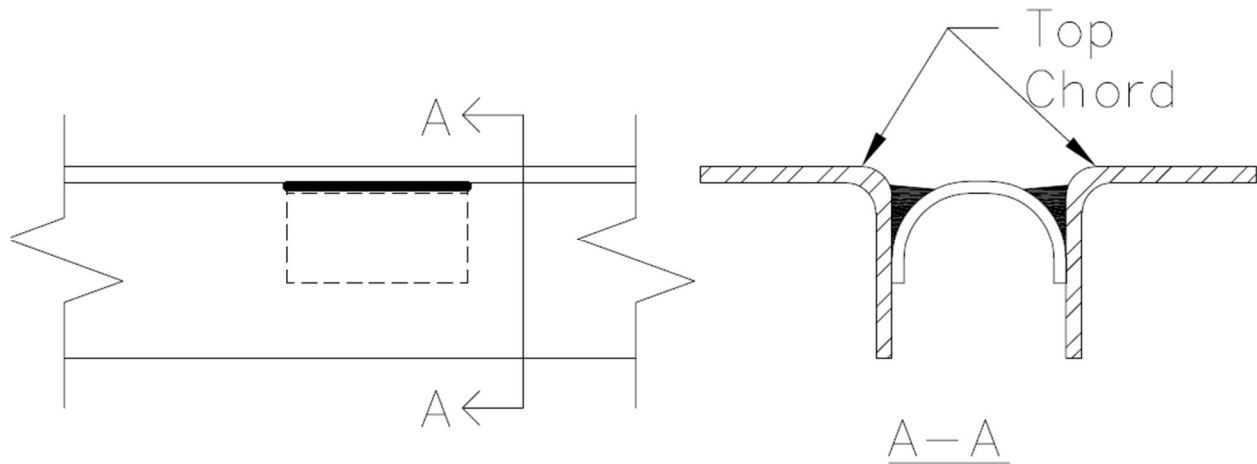


Table 2. Filler details (continued)

Horizontal channel fillers used in the F3 specimens:

The filler consisted of a 1-1/2-inch-long segment of cold formed channel (depth = 1.2 in., flange width = 0.85 in., thickness = 0.1 in.) oriented horizontally with toes pointed down. The chord gap was equal to the channel depth. Two lines of weld connected the outside of the heels of the channel to the vertical legs of the chord angles. Welds not shown to scale.



Vertical channel fillers used in the F4 specimens:

The filler consisted of a 1-1/2-inch-long segment of cold formed channel (depth = 1.2 in., flange width = 0.85 in., thickness = 0.1 in.) oriented vertically. The chord gap was equal to the channel depth. Two lines of weld connected the outside of the heels of the channel to the vertical legs of the chord angles. Welds not shown to scale.

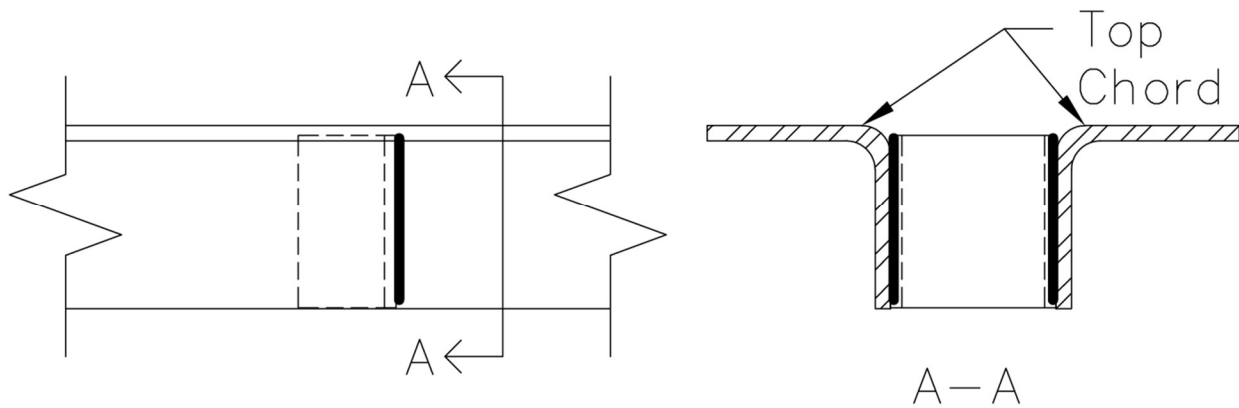


Table 2. Filler details (continued)

Angle fillers used in the F5 specimens:

Initially, the F5 specimens were intended to investigate the effect of placing the angle fillers at the toe of the chords. However, due to the relative size of the angles used for the fillers and the chords, the placement of the fillers was essentially the same in the F1 specimens. The fillers for the F5 specimens were different in that both legs of the filler angle were welded to the vertical legs of the chord angles (four lines of weld total). Welds not shown to scale.

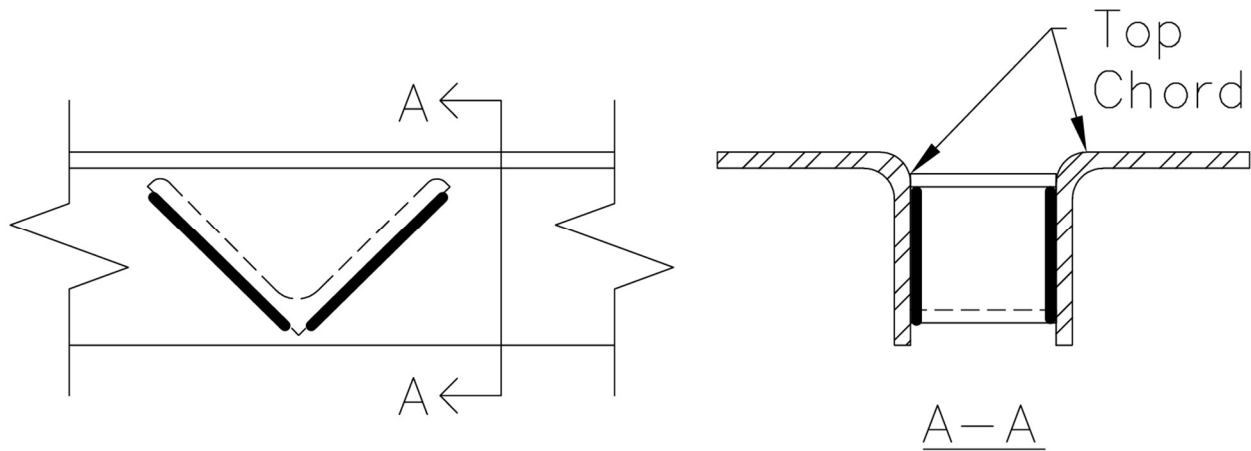
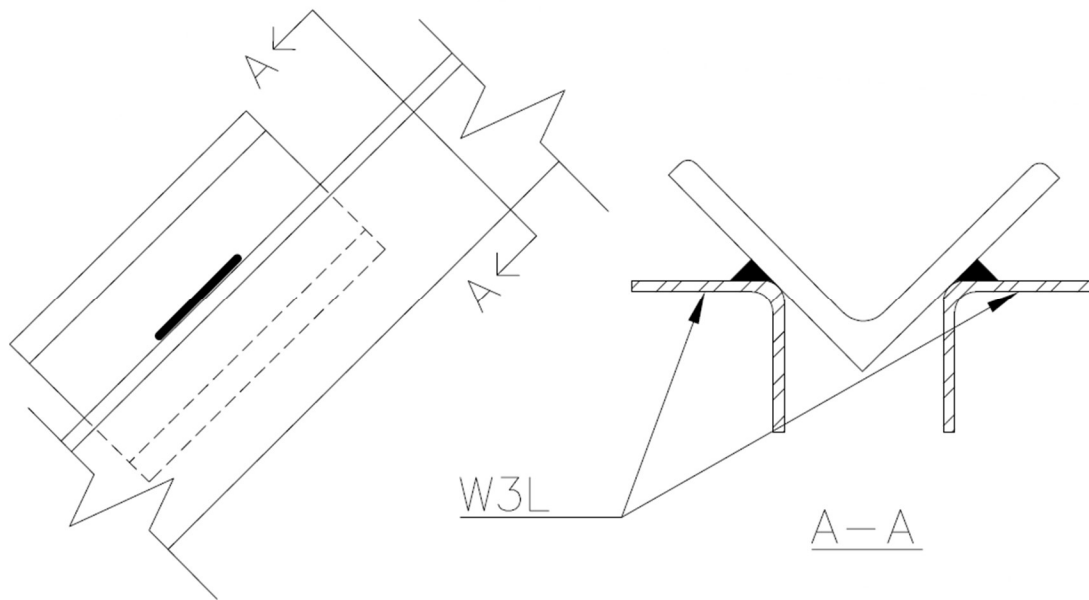


Table 3. Batten details

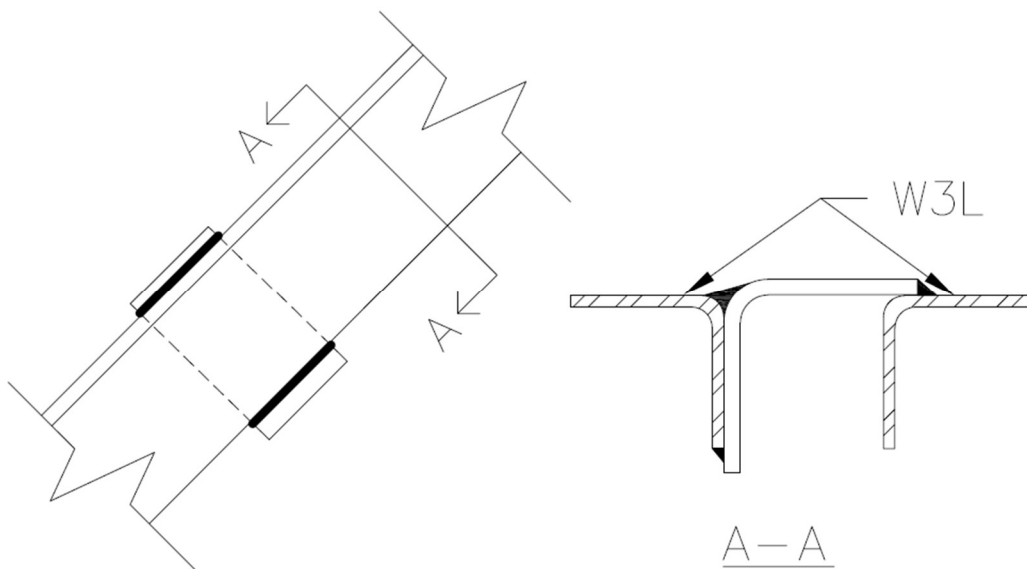
Nested batten used in the B1 specimens:

The batten consisted of a 3-inch-long segment of hot rolled angle (L 2-1/2 x 2-1/2 x 1/4) nested at between the two web angles. 1-inch lengths of weld connected each leg of the batten to the outside heel of the angle (two lines of weld total). Welds not shown to scale.



Lapped batten used in the B2 specimens:

The batten consisted of a 1-inch-long segment of cold formed angle (L 1-3/4 x 1-3/4 x 0.15) with one leg flush against the leg of one web angle and the other leg extending out to the outside heel of the other web angle. Three lines of weld connected the batten to the web angles. Welds not shown to scale.



A schematic of the test setup for the filler tests is shown in Figure 1. The filler tests were supported at both ends by steel pedestals (upon which the joist seats were bearing). Load was applied to a load distribution beam centered at midspan of the joist that distributed load from the hydraulic cylinder to two equal point loads spaced at 8 feet. Lateral bracing was provided at a 2-foot spacing in the bending span (i.e., between points of load application) and at 2 points in either shear span (i.e., between the support and point of load application).

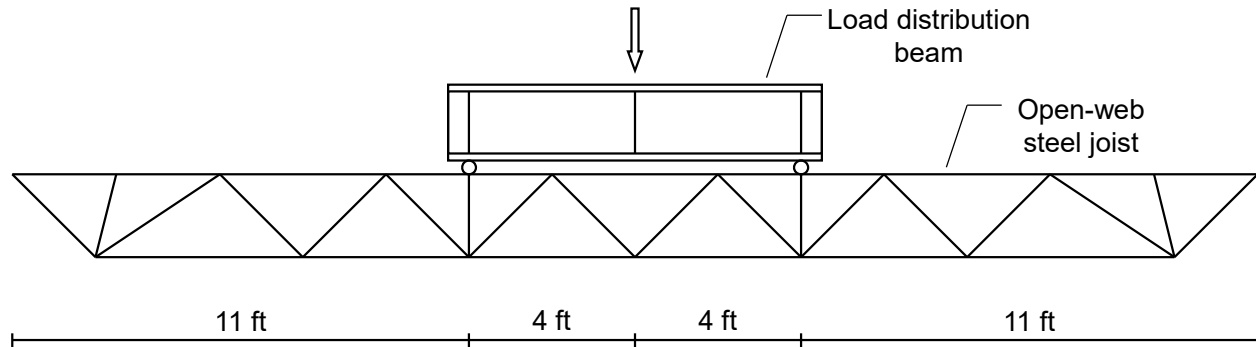


Figure 1: Schematic of joist and load distribution beam for the filler tests

A schematic of the test setup for the batten tests is shown in Figure 2. The batten specimens were supported at one end by a steel pedestal (upon which the joist seat was bearing) and the other end by a fabricated roller support (upon which the bottom chord was bearing). The distance from the end of the joist to the point of load application was 8 feet. Lateral bracing was provided at a 2-foot spacing.

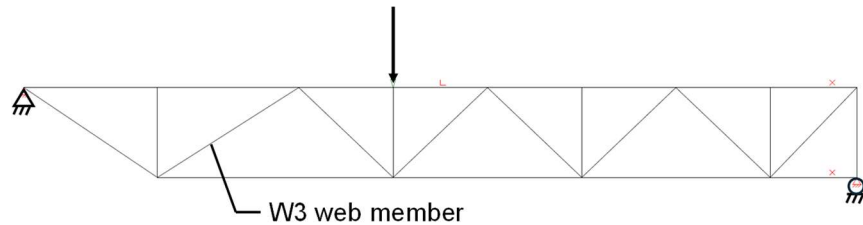


Figure 2: Schematic of joist for the batten tests

Details of the angle used for the top chord of the filler tests and the angle used for the W3 web member of the batten tests are listed in Table 4. Tensile coupons were water jet cut from extra lengths of angles supplied by New Millennium. The coupons were tested in accordance with ASTM E8 (ASTM 2022). Coupon test results listed in Table 4 are based on the average of four samples for the test chord angle (used in the filler tests) and the average of three samples for the test web angle (used in the batten tests). The slender element reduction factor, Q , in Table 4 was calculated using Equations E7-10, E7-11, and E7-12 of the 2010 edition of the AISC *Specification* (AISC 2010) and measured material properties.

For all tests, load was applied to failure using a hydraulic cylinder controlled with a hand pump. The loading rate was approximately 0.2 in./min for the filler tests and 0.1 in./min for the batten tests. Data was recorded continuously during testing with a data acquisition system. Recorded data included applied load measured with a load cell in line with the hydraulic cylinder and

displacement measured with a linear variable differential transformer (LVDT) located approximately one foot from the point of load application.

Table 4. Details of the test angle sections (values shown for a single angle)

Value	Symbol	Units	Test Chord Angle	Test Web Angle
Leg length	b	in.	1.594	1.375
Thickness	t	in.	0.133	0.102
Inside radius	—	in.	0.25	0.1875
Cross-sectional area	A	in. ²	0.3882	0.2597
Principal-axis radius of gyration	r_x, r_y	in.	0.4962	0.4298
Minor-axis radius of gyration	r_z	in.	0.2945	0.2573
Center of gravity	$\bar{x}, \bar{y}$	in.	0.4686	0.3969
Principal-axis moment of inertia	I_x, I_y	in. ⁴	0.0956	0.0480
Minor-axis moment of inertia	I_z	in. ⁴	0.0337	0.0172
Product of inertia	I_{xy}	in. ⁴	0.0619	0.0308
Yield stress	F_y	psi	54,800	59,700
Ultimate stress	F_u	psi	77,100	86,500
Elongation (2 in. gage)	—	—	24%	24%
Slender element reduction factor	Q	—	0.944	0.875

Results

The maximum applied load achieved and failure mode for each specimen is listed in Table 5. A plot of the load-deformation response of each specimen is presented in Figure 4. Additionally, photographs of the specimens are presented in Appendix A. Results are not shown for specimen F3c because it had a manufacturing error.

Table 5: Testing results, see Figure 3 for definition of top chord regions

Specimen	Applied Load (lbs)	Failure Mode
F0a	6,703	z-axis buckling of top chord in regions 3-6
F0b	6,873	z-axis buckling of top chord in regions 3-6
F0c	7,043	z-axis buckling of top chord in regions 3-4
F1a	8,496	splaying of the joist seat
F1b	9,221	z-axis buckling of the top chord in region 3
F1c	9,002	z-axis buckling of the top chord in regions 1 and 3
F2a	9,873	z-axis buckling of the top chord in region 6
F2b	9,654	z-axis buckling of the top chord in region 8
F2c	9,168	z-axis buckling of the top chord in region 1
F3a	9,512	flexural torsional buckling of the top chord in regions 3-4
F3b	9,572	z-axis buckling of the top chord in regions 6 and 8
F3c	---	---
F4a	9,385	flexural torsional buckling of the top chord in regions 5-6
F4b	7,956	z-axis buckling of the top chord in region 6
F4c	8,215	z-axis buckling of the top chord in region 3
F5a	8,840	z-axis buckling of the top chord in region 6
F5b	9,960	z-axis buckling of the top chord in regions 6 and 8
F5c	9,574	z-axis buckling of the top chord in regions 6 and 8
B0a	9,772	z-axis buckling of test web member
B0b	7,711	z-axis buckling of test web member
B0c	8,874	z-axis buckling of test web member
B1a	14,496	x-axis buckling of test web member
B1b	14,485	x-axis buckling of test web member
B1c	15,450	x-axis buckling of test web member
B2a	14,741	x-axis buckling of test web member
B2b	14,758	x-axis buckling of test web member
B2c	13,742	x-axis buckling of test web member

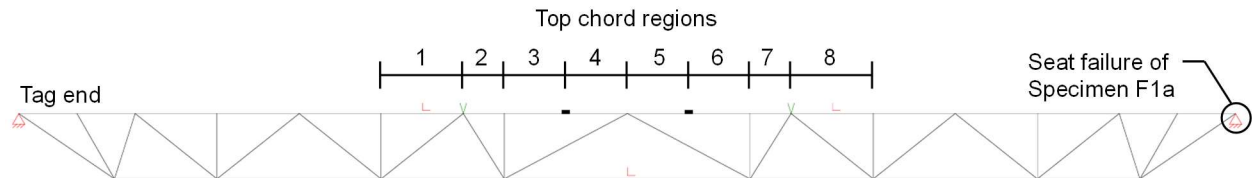


Figure 3: Notation for failure mode of filler test specimens

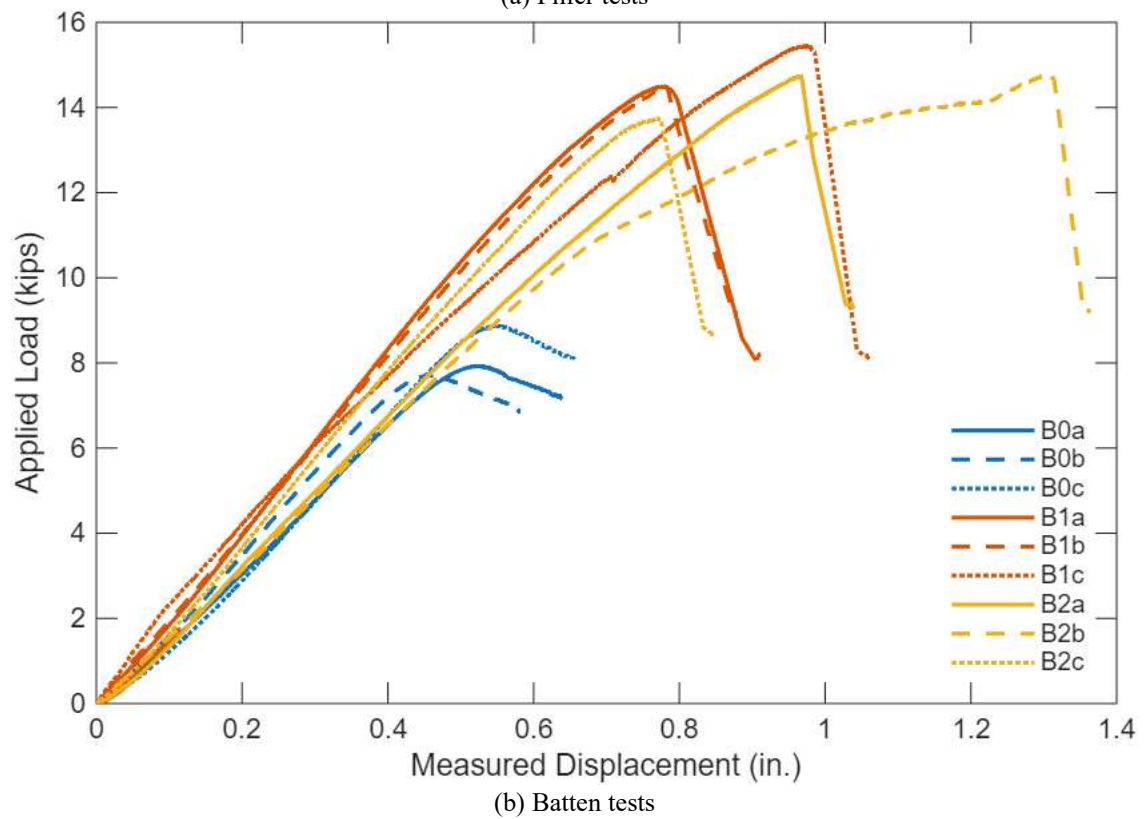
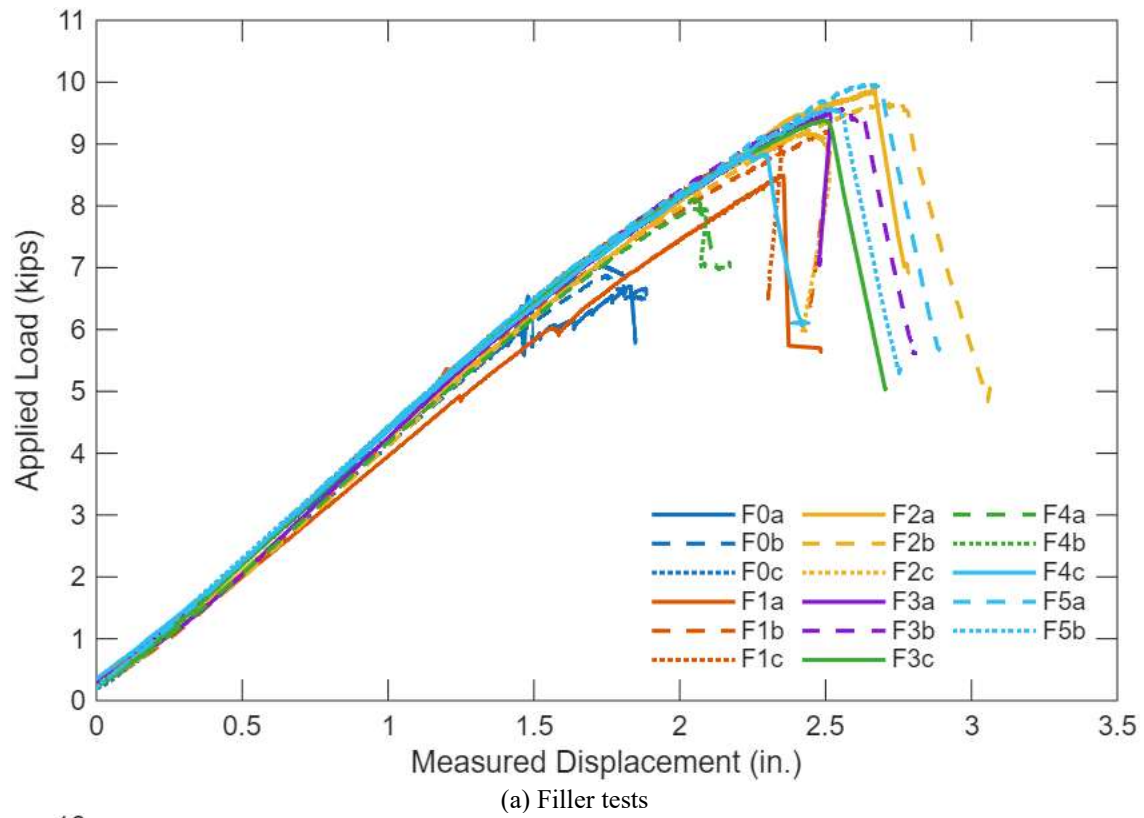


Figure 4: Measured load-deformation response

Filler Tests

Specimen F1a was the first of the filler test specimens tested. It failed by splaying of the seat as shown in Figure 5. This failure mode was prevented in all other specimens by welding a 1/4-inch-thick plate to each seat to represent the joist support as shown in Figure 6. In practice, joist seats should be attached to their support prior to loading, preventing this failure mode.



Figure 5: Seat splaying failure of specimen F1a



Figure 6: Plate added to seats to prevent splaying

The load-deformation response (Figure 4a) shows that the stiffness of all the joists was similar. This was expected given that the only difference between the designs is the presence and detail of the fillers. Buckling corresponded with a sharp drop-off in load carrying capacity. Under load, the buckling mode was not always clear and often consisted of a combination of x -axis, y -axis, and z -axis deformations and twisting. The failure modes described in Table 5 were based on observations of permanent deformation after the applied load was removed.

Batten Tests

Specimen B2b was the second batten test specimen tested. For this specimen, deformation of the top chord angles was observed at the point of load application (away from the test web member). The test was continued despite the unexpected deformation of the top chord since the load continued to rise. Eventually, the W3 web member buckled. The deformation of the top chord angles was permanent, indicating that yielding occurred. This additional deformation is seen in the load-deformation response shown in Figure 4b. Shims were used with the remaining batten test specimens to more directly transfer the applied load to the vertical web member.

Failure modes observed in the experiments (Table 5) matched those predicted in design (Table 1) with z -axis buckling controlling for the specimens without battens and x -axis buckling controlling for the specimens with battens. Little difference in failure mode and maximum applied load was noted between the B1 and B2 series specimens indicating that the two batten details were equally effective for these specimens. The maximum applied load for the B0 was approximately 40% less than that of the B1 and B2 series specimens.

Discussion

To enable comparisons to design provisions, the applied load results of Table 5 were converted to member forces by statics calculations, then compared to computed strengths according to SJI 100 (SJI 2025) but using measured material properties.

Filler Tests

The experimental results clearly demonstrate that all five filler details provided effective restraint of the double angle top chord members. Although the details differed considerably in geometry, each increased the measured strength relative to specimens without fillers and each produced strengths exceeding those predicted by the current SJI design provisions as shown in Table 6.

The chord force, P_{exp} , in Table 6 was computed using the following equations based on simple truss analysis of the joist and neglecting self-weight.

$$M = (130 \text{ in.}) \frac{P_{applied}}{2} \quad (1)$$

$$P_{exp} = \frac{M}{d_{eff}} = \frac{M}{19.06 \text{ in.}} \quad (2)$$

According to SJI 100 (SJI 2025), the axial compression strength of top chord interior panels consisting of two shapes without fillers is controlled by z -axis buckling and the effective length factor is $k_z = 0.75$. For top chord interior panels consisting of two shapes with fillers, x -axis, y -axis, or z -axis buckling, whichever has the largest slenderness, controls and the effective length factors are $k_z = 1.0$, $k_x = 0.75$, and $k_y = 0.94$.

For these specimens, the x -axis slenderness is $(kl/r)_x = (0.75)(36 \text{ in.})/(0.496 \text{ in.}) = 54.4$. The y -axis slenderness is $(kl/r)_y = (0.94)(36 \text{ in.})/(1.144 \text{ in.}) = 26.6$, assuming the y -axis unbraced length is 36 in. This value of unbraced length was used because buckling was observed to occur of this length. Twist of the chord was also observed; however, flexural torsional buckling calculations were not performed because they are not included in SJI 100. Both the x - and y -axis slenderness values are less than all the z -axis slenderness values listed in Table 6, thus z -axis buckling controls.

Calculated strengths are not shown for specimens F1a which did not fail by top chord buckling and F3c which had a manufacturing error. No adjustment was made to the calculations for the specimens where buckling occurred away from the middle panels (e.g., F2b). Thus, the strengths for these specimens should be considered as lower bounds.

The test-to-predicted ratios (i.e., P_{exp}/P_n) from Table 6 are shown graphically in Figure 7. Individual test results are shown with $\times$'s and the average of each specimen group is shown with horizontal bars. The test-to-predicted ratio for all specimens is greater than unity indicating that the design provisions are conservative. The average test-to-predicted ratio is less for the channel fillers (i.e., F3 and F4) than for the other filler details. This difference is relatively small and may simply reflect normal experimental variability. No consistent difference in observed buckling

behavior suggested that the channel fillers were fundamentally less effective than the other filler details.

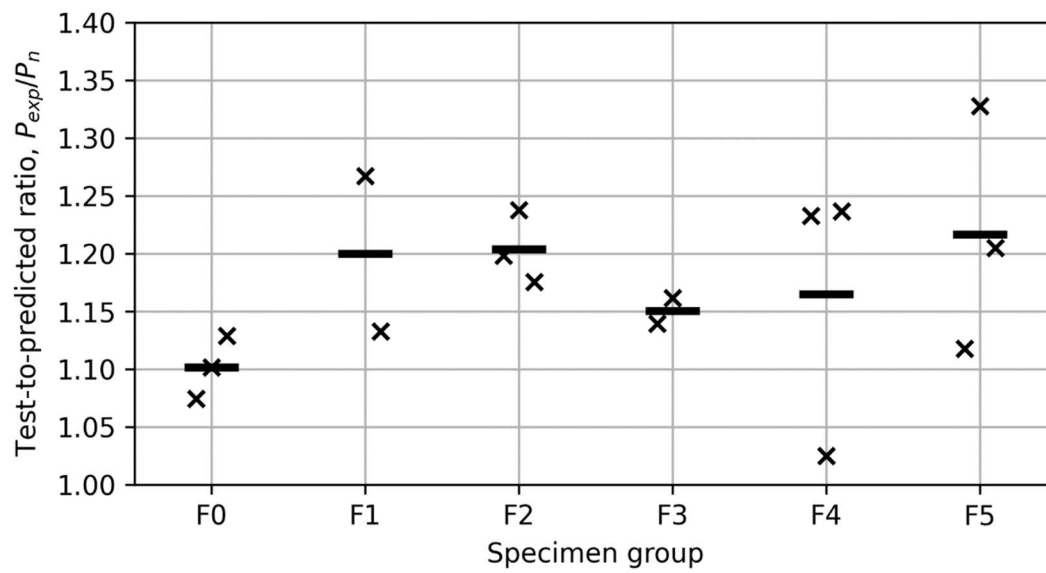


Figure 7: Test-to-predicted ratios for the filler tests

Specimen	Applied Load	P _{exp}	k _z	I _z	(kl/r) _z	F _e	F _{cr}	P _n	P _{exp} /P _n
---	lbs	lbs	---	in.	---	psi	psi	lbs	---
F0a	6,703	22,859	0.75	36.0	91.7	34,062	27,396	21,273	1.075
F0b	6,873	23,439	0.75	36.0	91.7	34,062	27,396	21,273	1.102
F0c	7,043	24,019	0.75	36.0	91.7	34,062	27,396	21,273	1.129
F1a	8,496								
F1b	9,221	31,446	1.0	23.5	79.8	44,964	31,962	24,818	1.267
F1c	9,002	30,699	1.0	21.3	72.1	54,990	34,895	27,096	1.133
F2a	9,873	33,670	1.0	20.3	68.8	60,555	36,181	28,094	1.198
F2b	9,654	32,923	1.0	21.8	73.8	52,490	34,247	26,593	1.238
F2c	9,168	31,265	1.0	21.8	73.8	52,490	34,247	26,593	1.176
F3a	9,512	32,439	1.0	19.9	67.5	62,862	36,659	28,465	1.140
F3b	9,572	32,643	1.0	20.3	68.8	60,555	36,181	28,094	1.162
F3c									
F4a	9,385	32,006	1.0	22.4	76.0	49,599	33,433	25,961	1.233
F4b	7,956	27,132	1.0	21.9	74.3	51,892	34,084	26,466	1.025
F4c	8,215	28,015	1.0	25.6	87.0	37,816	29,181	22,659	1.236
F5a	8,840	30,147	1.0	21.4	72.6	54,348	34,733	26,970	1.118
F5b	9,960	33,966	1.0	22.8	77.2	47,977	32,943	25,580	1.328
F5c	9,574	32,650	1.0	21.3	72.1	54,990	34,895	27,096	1.205

Table 6. Data analysis results for the filler test specimens.

Batten Tests

Unlike the filler tests, the batten tests produced mixed findings. The experiments clearly demonstrated that both batten details effectively restrained independent buckling, as evidenced by the change in failure mode from z -axis to x -axis buckling. However, the experimentally back-calculated effective length factors suggest that the current design assumptions for x -axis buckling may be somewhat optimistic. Results of the data analysis for the batten test specimens are shown in Table 7.

The web force, P_{exp} , in Table 7 was computed using the following equations based on simple truss analysis of the joist and neglecting self-weight.

$$V = \left(\frac{118 \text{ in.}}{212 \text{ in.}} \right) P_{applied} \quad (3)$$

$$P_{exp} = \frac{l_{web}}{d_{eff}} V = \left(\frac{42.67 \text{ in.}}{22.91 \text{ in.}} \right) V \quad (4)$$

According to SJI 100 (SJI 2025), the axial compression strength of web members consisting of two shapes without battens is controlled by z -axis buckling and the effective length factor is $k_z = 0.75$. For web members consisting of two shapes with fillers, x -axis, y -axis, or z -axis buckling, whichever has the largest slenderness, controls and the effective length factors are $k_z = 1.0$, $k_x = 0.75$, $k_y = 1.0$. For these specimens, the x -axis slenderness is $(kl/r)_x = (0.75)(42.7 \text{ in.})/(0.4298 \text{ in.}) = 74.5$. The y -axis slenderness is calculated as follows.

$$\begin{aligned} \left(\frac{kl}{r} \right)_{y,m} &= \sqrt{\left(\frac{kl}{r} \right)_y^2 + \left(\frac{k_t l_s}{r_z} \right)^2} \\ &= \sqrt{\left(\frac{(1.0)(42.7 \text{ in.})}{(1.197 \text{ in.})} \right)^2 + \left(\frac{(0.50)((42.7 \text{ in.})/2)}{(0.2573 \text{ in.})} \right)^2} \\ &= 54.7 \end{aligned} \quad (5)$$

Both the x - and y -axis slenderness values are less than all the z -axis slenderness values listed in Table 7, thus z -axis buckling controls.

The test-to-predicted ratios (i.e., P_{exp}/P_n) from Table 7 are shown graphically in Figure 8. Individual test results are shown with $\times$'s and the average of each specimen group is shown with horizontal bars. The average test-to-predicted ratio for the specimens without battens is 1.04. The average test-to-predicted ratio for the specimens with battens is 1.00 for the B1 specimens and 0.925 for the B2 specimens.

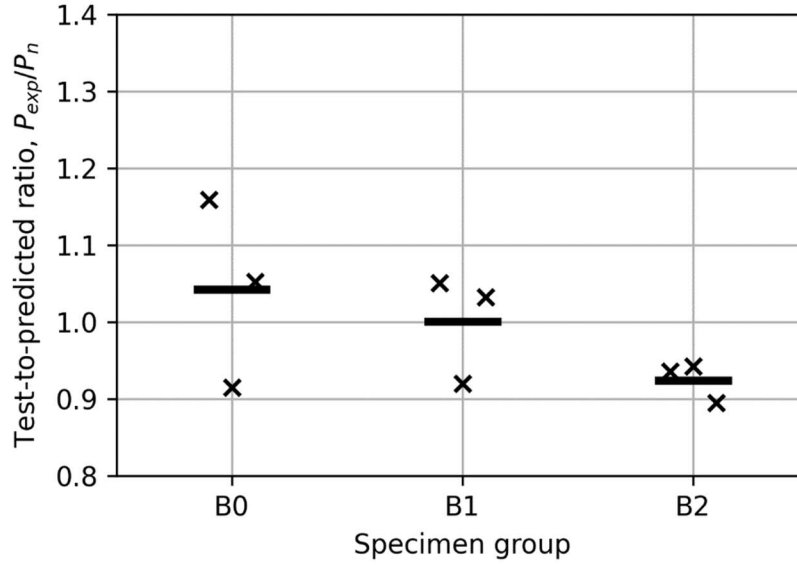


Figure 8: Test-to-predicted ratios for the batten tests

To further examine the results, experimental effective length factors were calculated for z -axis and x -axis buckling as shown in Table 8. The experimental critical stress was calculated by dividing experimental web force by two times the cross-sectional area of a single angle listed in Table 4. The experimental slenderness, $(kl/r)_{exp}$, was back-calculated using the experimental critical stress and SJI 100 (SJI 2025) Equations 4.2-5 and 4.2-6.

For a particular specimen, the design provisions can be considered conservative if either experimental effective length factor is less than or equal to the value used in design (i.e., $k_{z,exp} \leq k_z$ or $k_{x,exp} \leq k_x$). If this is the case, then the slenderness used in design will be greater than the experimental slenderness, the critical stress used in design will be less than the experimental critical stress, and the nominal strength used in design will be less than the experimental strength, indicating a safe result.

The effective length factor used in design of web members of two shapes without battens is $k_z = 0.75$. The average value of $k_{z,exp}$ for the B0 specimens is 0.724, indicating that design provisions are conservative for the specimens without battens.

The effective length factors used in design of web members of two shapes with battens are $k_z = 1.0$ and $k_x = 0.75$. The average value of $k_{z,exp}$ for the B1 and B2 specimens is 1.005. This value is based on a measured value of l_z that accounts for batten not being positioned exactly at mid-length of the web member. If l_z was taken as $l_{web}/2$, the average value of $k_{z,exp}$ for the B1 and B2 specimens would be 1.054. The average value of $k_{x,exp}$ for the B1 and B2 specimens is 0.880. None of these experimental effective length factor values are less than the design values, indicating that the design provisions are somewhat unconservative. However, given that the observed failure mode was x -axis buckling and the strength of the B1 and B2 specimens were similar, it appears that both batten details were effective. The lower-than-expected strength of the x -axis buckling mode may warrant further investigation.

Specimen	Applied Load	P _{exp}	k _z	I _z	(kl/r) _z	F _e	F _{cr}	P _n	P _{exp} /P _n
---	lbs	lbs	---	in.	---	psi	psi	lbs	---
B0a	9,772	10,131	0.75	42.7	124.4	18,506	16,230	8,428	1.159
B0b	7,711	7,994	0.75	42.7	124.4	18,506	16,230	8,428	0.915
B0c	8,874	9,200	0.75	42.7	124.4	18,506	16,230	8,428	1.053
B1a	14,496	15,028	1.0	24.2	94.1	32,337	26,569	13,797	1.051
B1b	14,485	15,017	1.0	21.7	84.4	40,213	30,331	15,751	0.920
B1c	15,450	16,017	1.0	22.7	88.3	36,750	28,816	14,964	1.032
B2a	14,741	15,282	1.0	21.7	84.4	40,213	30,331	15,751	0.936
B2b	14,758	15,300	1.0	21.8	84.9	39,754	30,141	15,653	0.943
B2c	13,742	14,247	1.0	22.2	86.3	38,423	29,573	15,357	0.895

Table 7. Data analysis results for the batten test specimens.

Specimen	$F_{cr,exp}$ psi	$(F_{cr}/QF_y)_{exp}$ ---	$(QF_y/F_e)_{exp}$ ---	$(kl/r)_{exp}$ ---	$k_{z,exp}$ ---	$k_{x,exp}$ ---
B0a	19,508	0.373	2.349	113.4	0.684	1.143
B0b	15,394	0.295	2.977	127.7	0.770	1.286
B0c	17,716	0.339	2.586	119.0	0.718	1.199
B1a	28,939	0.554	1.412	87.9	0.935	0.886
B1b	28,917	0.553	1.413	88.0	1.043	0.886
B1c	30,843	0.590	1.259	83.1	0.941	0.837
B2a	29,428	0.563	1.371	86.7	1.027	0.873
B2b	29,462	0.564	1.369	86.6	1.021	0.872
B2c	27,434	0.525	1.539	91.8	1.064	0.925

Table 8. Data analysis results for the batten test specimens – experimental effective length factors

Conclusions and Recommendations

An experimental study was performed to investigate the effectiveness of various filler and batten details for open web steel joists. Twenty-seven full-scale joist specimens were tested, including 18 specimens evaluating five filler details and nine specimens evaluating two batten details. The following conclusions are drawn from this study:

- All five filler details evaluated effectively restrained independent buckling of the chord angles and increased the compression strength of the top chord relative to specimens without fillers.
- For all filler details investigated, the measured strengths exceeded the nominal strengths calculated using the provisions of SJI 100. Average test-to-predicted strength ratios for all filler configurations were greater than those of the specimens without fillers, indicating that the current design provisions provide conservative strength predictions for these filler details.
- Both batten details evaluated successfully changed the governing failure mode of the web member from z -axis buckling to x -axis buckling, demonstrating that both details effectively restrained independent buckling of the web angles.
- The experimental strengths of the specimens without battens were well-predicted by the SJI 100 design provisions.
- For specimens with battens, measured strengths were generally close to those predicted by SJI 100. However, experimentally back-calculated effective length factors were somewhat larger than the values currently assumed for battened web members, indicating that the current design assumptions for x -axis buckling may be slightly unconservative. Although both batten details performed effectively, the lower-than-expected x -axis buckling strength warrants additional investigation before broader conclusions are drawn.

Based on these findings, the filler details investigated in this study should all be considered effective for providing restraint between double angle top chord members. Additionally, the two batten details investigated should both be considered effective for restraining independent buckling of double angle web members, although additional research is recommended to confirm or better quantify the effective length factors associated with x -axis buckling.

The findings of this research should not be used to limit filler and batten details to those tested. While experimental testing such as presented in this report is the best way of evaluating the effectiveness of filler and batten details, this research shows that a range of different details can be effective.

Acknowledgements

This work was funded by the Steel Joist Institute. The joists were designed, manufactured, and delivered by New Millennium. The author thanks Jonathan Trueblood, Prajjwal Devkota, Larry Roberts, Aaron Burns, and Andy Baker for their work in performing the physical tests.

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Appendix A: Additional Specimen Photographs

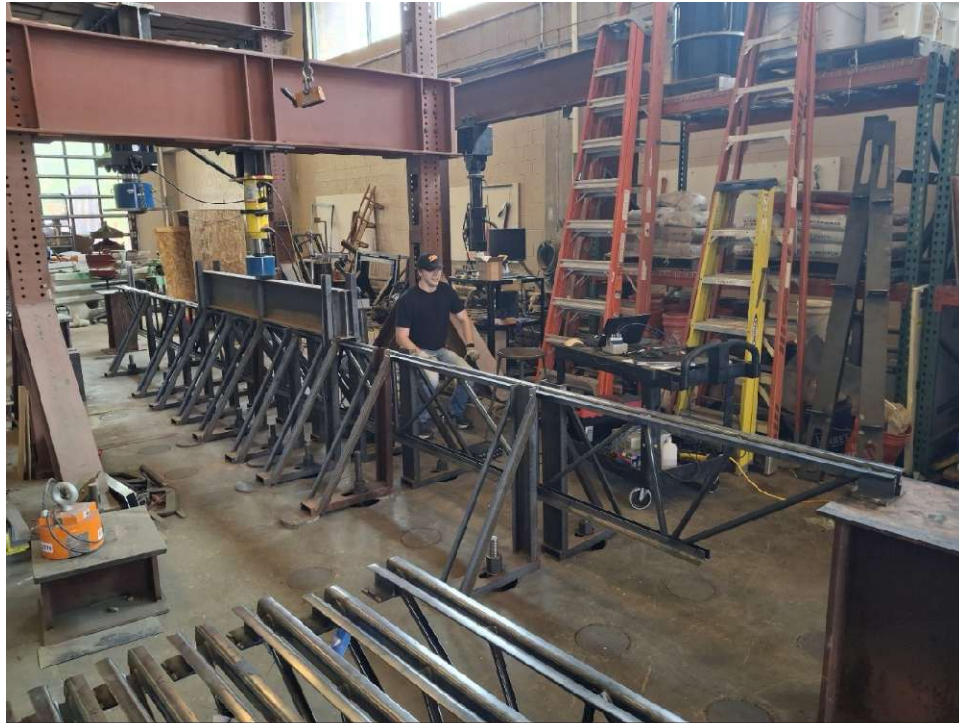


Figure 9. Overall test setup for filler tests



Figure 10. Typical failure mode for filler tests (specimen F1b shown)



Figure 11. Typical failure mode for specimen group F0 (specimen F0a shown)



Figure 12. Failure mode for specimen F3a including twist of the top chord



Figure 13. Overall test setup for the batten tests



Figure 14. Typical failure mode for specimen group B0 (specimen B0c shown)



Figure 15. Typical failure mode for specimen group B1 (specimen B1a shown)



Figure 16. Typical failure mode for specimen group B2 (specimen B2a shown)

Appendix B: Joist Designs

STRESS ANALYSIS - PAGE 1



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1A

Geometry

Base Length: 30-0	Working Length: 29-8	Joist Depth: 20.00	Effective Depth: 19.06	BC Panel Length: 7 Special	SDS Value: 1.0000	Shape: Parallel Chords	TC Slope: 0.0000
Variable	Left End	Right End					
BC Panel	2-6	2-6					
TC Panel	1-7	1-7					
First Half	0-6	0-6					
First Diag.	3-0	3-0					
Depth	20.00	20.00					
Trib Width	0-0	0-0					

Loads

Load Type	Category	Load1	Load2	Position	Direction	Loc/Begin	Sp/End	Reference
Uniform (plf)	LL (1)	50.00	50.00	TC	+	0-0	30-0	L-BL
Conc Load (lbs)	LL (1)	0.00	0.00	TC	+	11-0	11-0	L-BL
Conc Load (lbs)	LL (1)	0.00	0.00	TC	+	19-0	19-0	L-BL
Conc Load (lbs)	LL (3)	2,500.00	0.00	TC	+	11-0	11-0	L-BL
Conc Load (lbs)	LL (3)	2,500.00	0.00	TC	+	19-0	19-0	L-BL

Stress Analysis Summary

Int. Panel TC: 36.00		Max Panel BC: 72.00		Reaction LE: 2,500.00		Reaction RE: 2,500.00		Minimum Shear: 625.00		Max TC Comp.: 17,048.91		Max BC Tension 17,048.91	
Member	TC Tension	TC Compression	BC Tension	BC Compression	Web Tension	Web Comp.	Web Length	PP Dist.					
W2	0.00	3,672.07	0.00	0.00	4,442.31	0.00	33.87	0-2					
V1S	0.00	3,672.07	0.00	0.00	0.00	86.97	22.01	1-7					
W3	0.00	3,672.07	4,458.94	0.00	0.00	2,620.91	19.98	2-6					
W4	0.00	7,606.44	4,458.94	0.00	4,019.54	0.00	30.65	3-0					
W5	0.00	7,606.44	10,753.93	0.00	0.00	4,019.54	30.65	5-0					
W6	0.00	13,901.42	10,753.93	0.00	4,019.54	0.00	30.65	7-0					
W7	0.00	13,901.42	17,048.91	0.00	38.87	4,019.54	30.65	9-0					
W8	0.00	17,048.91	17,048.91	0.00	323.98	738.52	22.53	11-0					
W9	0.00	17,048.91	17,048.91	0.00	297.16	1,335.57	40.74	12-0					
W9	0.00	17,048.91	17,048.91	0.00	297.16	1,335.57	40.74	15-0					
W8	0.00	17,048.91	17,048.91	0.00	323.98	738.52	22.53	18-0					
W7	0.00	13,901.42	17,048.91	0.00	38.87	4,019.54	30.65	19-0					
W6	0.00	13,901.42	10,753.93	0.00	4,019.54	0.00	30.65	21-0					
W5	0.00	7,606.44	10,753.93	0.00	0.00	4,019.54	30.65	23-0					
W4	0.00	7,606.44	4,458.95	0.00	4,019.54	0.00	30.65	25-0					
W3	0.00	3,672.07	4,458.95	0.00	0.00	2,620.91	19.98	27-0					
V1S	0.00	3,672.07	0.00	0.00	0.00	86.97	22.01	28-5					
W2	0.00	3,672.07	0.00	0.00	4,442.31	0.00	33.87	27-6					

Standard Verticals

Member	Position	Max Tension	Max Comp.	Length
V2	Interior	0.00	116.61	19.06

STRESS ANALYSIS - PAGE 2



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1A

Chord Properties

Chord	Area	Rx	Rz	Ryy	Y	Ix	Q	Material
TC	0.3882	0.4962	0.2945	1.1443	0.4686	0.0956	0.9950	A24B = 1.594 x 1.594 x 0.133
BC	0.3882	0.4962	0.2945	1.1443	0.4686	0.0956	0.9950	A24B = 1.594 x 1.594 x 0.133

Axial and Bending Analysis

K: 0.75	Fy: 50,000.00	Fb: 30,000.00	Mom of Inertia: 141.45	LL 360: 202.39	LL 240: 303.59	Max Bridg TC: 14-10 5/8	Max Bridg BC: 22-10 5/8
Top Chord Check	End Panel LE	First Panel LE	Interior Panel	First Panel RE	End Panel RE	Gap Between Chords: 1.1250	
Length	17.00	17.00	36.00	17.00	17.00	Min Weld Len 2X: 0.5000	
Bending Load	50.00	50.00	50.00	50.00	50.00	Max Load Fillers TC: 17,362.43	
Axial Load	3,672.07	3,672.07	17,048.91	3,672.07	3,672.07	Max Load no Fillers TC: 12,375.66	
fa	4,729.61	4,729.61	21,958.92	4,729.62	4,729.61	TC OAL/Ryy: 311.11	
Maximum K L/r	57.72	57.72	61.12	57.72	57.72	BC OAL/Ryy: 311.11	
Fcr	39,041.41	39,041.41	37,911.81	39,041.41	39,041.41	BC Stress: 0.73	
Fa	23,424.85	23,424.85	22,747.09	23,424.85	23,424.85	BC L/Rz: 244.4822	
F'e	243,844.75	243,844.75	96,668.22	243,844.75	243,844.75	TC Shear Stress: 13,445.47	
Cm	0.9903	0.9903	0.8478	0.9903	0.9903	BC Shear Stress: 11,848.17	
Panel Point Moment	112.48	152.17	450.00	152.17	112.48		
Mid Panel Moment	96.30	18.20	225.00	18.20	96.30		
Panel Point fb	662.05	895.64	2,648.69	895.64	662.05		
Mid Panel fb	236.02	44.60	551.44	44.60	236.02		
Fillers	0	0	2	0	0		
Panel Point Stress	5,391.66	5,625.26	24,607.61	5,625.26	5,391.67		
Mid Panel Stress	0.2091	0.2033	0.9878	0.2033	0.2091		

Web Design

Member	Web Tension	Allow Tension	Web Comp	Allow Comp	Weld	Qty	Material
W2	4,442.31	7,046.95	0.00	4,063.18	2.93 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
V1S	0.00	4,802.89	86.97	3,058.31	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W3	0.00	5,758.64	2,620.91	3,932.87	2.00 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W4	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W5	0.00	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W6	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W7	38.87	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W8	323.98	4,802.89	738.52	3,021.63	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W9	297.16	7,829.95	1,335.57	3,155.25	2.00 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W9	297.16	7,829.95	1,335.57	3,155.25	2.00 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W8	323.98	4,802.89	738.52	3,021.63	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W7	38.87	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W6	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W5	0.00	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W4	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W3	0.00	5,758.64	2,620.91	3,932.87	2.00 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
V1S	0.00	4,802.89	86.97	3,058.31	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W2	4,442.31	7,046.95	0.00	4,063.18	2.93 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
V2	0.00	4,802.89	116.61	3,275.47	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077

STRESS ANALYSIS - PAGE 3



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1A

TCX Design

TCX Left		TCX Right	
TCX Length	0-0	TCX Length	0-0
TCX Type	R	TCX Type	R
TCX Depth	3	TCX Depth	3
BPL Length	0-4	BPL Length	0-4
Clear Bearing	0-4 5/8	Clear Bearing	0-4 5/8
BPL Material: 2018 = 2 x 2 x 0.188		BPL Material: 2018 = 2 x 2 x 0.188	
Total Load	50.00	Total Load	50.00
Reqd TL Def L/80	0.00	Reqd TL Def L/80	0.00
Live Load	50.00	Live Load	50.00
Reqd LL Def L/120	0.00	Reqd LL Def L/120	0.00
Section Modulus	0.0000	Section Modulus	0.0000
Reqd SM	0.0000	Reqd SM	0.0000
Mom of Inertia	0.0000	Mom of Inertia	0.0000
Reqd MI	0.0000	Reqd MI	0.0000
Seat Type: Lapped		Seat Type: Lapped	

Load Combinations

Case 1: DL	Case 5c_mr: 0.6(DL)+WL+AX+IP-M
Case 2a: LL	Case 5d: 0.6(DL)+WL-AX+IP-M
Case 2b: SL	Case 5d_mr: 0.6(DL)+WL-AX+IP+M
Case 3a: DL+CL+TL+LL	Case 5e: (0.6-0.14(SDS))DL+AX+SM+M
Case 3b: DL+CL+TL+SL	Case 5e_mr: (0.6-0.14(SDS))DL+AX+SM-M
Case 3c: DL+CL+TL+LL+FEM	Case 5f: (0.6-0.14(SDS))DL-AX+SM-M
Case 3d: DL+CL+TL+SL+FEM	Case 5f_mr: (0.6-0.14(SDS))DL-AX+SM+M
Case 3e: DL+CL+TL+LL	Case 6a: DL+CL+0.85(TL)+WL+AX+M
Case 3f: DL+CL+TL+SL	Case 6a_mr: DL+CL+0.85(TL)+WL+AX-M
Case 4a: DL+WL+AX+M	Case 6b: DL+CL+0.85(TL)+WL-AX-M
Case 4a_mr: DL+WL+AX-M	Case 6b_mr: DL+CL+0.85(TL)+WL-AX+M
Case 4b: DL+WL-AX-M	Case 6c: DL+CL+0.85(TL)+WL+C+AX+IP+M
Case 4b_mr: DL+WL-AX+M	Case 6c_mr: DL+CL+0.85(TL)+WL+C+AX+IP-M
Case 4c: DL+WL+AX+IP+M	Case 6d: DL+CL+0.85(TL)+WL+C-AX+IP-M
Case 4c_mr: DL+WL+AX+IP-M	Case 6d_mr: DL+CL+0.85(TL)+WL+C-AX+IP+M
Case 4d: DL+WL-AX+IP-M	Case 6e: DL+CL+0.85(TL)+WL+AX+IP+M
Case 4d_mr: DL+WL-AX+IP+M	Case 6e_mr: DL+CL+0.85(TL)+WL+AX+IP-M
Case 4e: (1+0.14(SDS))DL+SM+AX+M	Case 6f: DL+CL+0.85(TL)+WL-AX+IP-M
Case 4e_mr: (1+0.14(SDS))DL+SM+AX-M	Case 6f_mr: DL+CL+0.85(TL)+WL-AX+IP+M
Case 4f: (1+0.14(SDS))DL+SM-AX-M	Case 6g: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX+M
Case 4f_mr: (1+0.14(SDS))DL+SM-AX+M	Case 6g_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX-M
Case 5a: 0.6(DL)+WL+AX+M	Case 6h: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX-M
Case 5a_mr: 0.6(DL)+WL+AX-M	Case 6h_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX+M
Case 5b: 0.6(DL)+WL-AX-M	Case 7a: DL+CL+0.85(TL)+0.75(WL+AX+LL+M)
Case 5b_mr: 0.6(DL)+WL-AX+M	Case 7a_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL-M)
Case 5c: 0.6(DL)+WL+AX+IP+M	Case 7b: DL+CL+0.85(TL)+0.75(WL-AX+LL-M)

STRESS ANALYSIS - PAGE 4



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Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1A

Load Combinations Continued

Case 7b_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+M)
Case 7c: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP+M)
Case 7c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP-M)
Case 7d: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP-M)
Case 7d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP+M)
Case 7e: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP+M)
Case 7e_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP-M)
Case 7f: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP-M)
Case 7f_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP+M)
Case 7g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL+M)
Case 7g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL-M)
Case 7h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL-M)
Case 7h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL+M)
Case 8a: DL+CL+0.85(TL)+0.75(WL+AX+SL+M)
Case 8a_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL-M)
Case 8b: DL+CL+0.85(TL)+0.75(WL-AX+SL-M)
Case 8b_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+M)
Case 8c: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP+M)
Case 8c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP-M)
Case 8d: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP-M)
Case 8d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP+M)
Case 8e: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP+M)
Case 8e_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP-M)
Case 8f: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP-M)
Case 8f_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP+M)
Case 8g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX+M)
Case 8g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX-M)
Case 8h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX-M)
Case 8h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX+M)

STRESS ANALYSIS - PAGE 1



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1B

Geometry

Base Length: 30-0	Working Length: 29-8	Joist Depth: 20.00	Effective Depth: 19.06	BC Panel Length: 7 Special	SDS Value: 1.0000	Shape: Parallel Chords	TC Slope: 0.0000
Variable	Left End	Right End					
BC Panel	2-6	2-6					
TC Panel	1-7	1-7					
First Half	0-6	0-6					
First Diag.	3-0	3-0					
Depth	20.00	20.00					
Trib Width	0-0	0-0					

Loads

Load Type	Category	Load1	Load2	Position	Direction	Loc/Begin	Sp/End	Reference
Uniform (plf)	LL (1)	50.00	50.00	TC	+	0-0	30-0	L-BL
Conc Load (lbs)	LL (1)	0.00	0.00	TC	+	11-0	11-0	L-BL
Conc Load (lbs)	LL (1)	0.00	0.00	TC	+	19-0	19-0	L-BL
Conc Load (lbs)	LL (3)	2,500.00	0.00	TC	+	11-0	11-0	L-BL
Conc Load (lbs)	LL (3)	2,500.00	0.00	TC	+	19-0	19-0	L-BL

Stress Analysis Summary

Int. Panel TC: 36.00		Max Panel BC: 72.00		Reaction LE: 2,500.00		Reaction RE: 2,500.00		Minimum Shear: 625.00		Max TC Comp.: 17,048.91		Max BC Tension 17,048.91	
Member	TC Tension	TC Compression	BC Tension	BC Compression	Web Tension	Web Comp.	Web Length	PP Dist.					
W2	0.00	3,672.07	0.00	0.00	4,442.31	0.00	33.87	0-2					
V1S	0.00	3,672.07	0.00	0.00	0.00	86.97	22.01	1-7					
W3	0.00	3,672.07	4,458.94	0.00	0.00	2,620.91	19.98	2-6					
W4	0.00	7,606.44	4,458.94	0.00	4,019.54	0.00	30.65	3-0					
W5	0.00	7,606.44	10,753.93	0.00	0.00	4,019.54	30.65	5-0					
W6	0.00	13,901.42	10,753.93	0.00	4,019.54	0.00	30.65	7-0					
W7	0.00	13,901.42	17,048.91	0.00	38.87	4,019.54	30.65	9-0					
W8	0.00	17,048.91	17,048.91	0.00	323.98	738.52	22.53	11-0					
W9	0.00	17,048.91	17,048.91	0.00	297.16	1,335.57	40.74	12-0					
W9	0.00	17,048.91	17,048.91	0.00	297.16	1,335.57	40.74	15-0					
W8	0.00	17,048.91	17,048.91	0.00	323.98	738.52	22.53	18-0					
W7	0.00	13,901.42	17,048.91	0.00	38.87	4,019.54	30.65	19-0					
W6	0.00	13,901.42	10,753.93	0.00	4,019.54	0.00	30.65	21-0					
W5	0.00	7,606.44	10,753.93	0.00	0.00	4,019.54	30.65	23-0					
W4	0.00	7,606.44	4,458.95	0.00	4,019.54	0.00	30.65	25-0					
W3	0.00	3,672.07	4,458.95	0.00	0.00	2,620.91	19.98	27-0					
V1S	0.00	3,672.07	0.00	0.00	0.00	86.97	22.01	28-5					
W2	0.00	3,672.07	0.00	0.00	4,442.31	0.00	33.87	27-6					

Standard Verticals

Member	Position	Max Tension	Max Comp.	Length
V2	Interior	0.00	116.61	19.06

STRESS ANALYSIS - PAGE 2



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1B

Chord Properties

Chord	Area	Rx	Rz	Ryy	Y	Ix	Q	Material
TC	0.3882	0.4962	0.2945	1.1443	0.4686	0.0956	0.9950	A24B = 1.594 x 1.594 x 0.133
BC	0.3882	0.4962	0.2945	1.1443	0.4686	0.0956	0.9950	A24B = 1.594 x 1.594 x 0.133

Axial and Bending Analysis

K: 0.75	Fy: 50,000.00	Fb: 30,000.00	Mom of Inertia: 141.45	LL 360: 202.39	LL 240: 303.59	Max Bridg TC: 14-10 5/8	Max Bridg BC: 22-10 5/8
Top Chord Check	End Panel LE	First Panel LE	Interior Panel	First Panel RE	End Panel RE	Gap Between Chords: 1.1250	
Length	17.00	17.00	36.00	17.00	17.00	Min Weld Len 2X: 0.5000	
Bending Load	50.00	50.00	50.00	50.00	50.00	Max Load Fillers TC: 17,362.43	
Axial Load	3,672.07	3,672.07	17,048.91	3,672.07	3,672.07	Max Load no Fillers TC: 12,375.66	
fa	4,729.61	4,729.61	21,958.92	4,729.62	4,729.61	TC OAL/Ryy: 311.11	
Maximum K L/r	57.72	57.72	61.12	57.72	57.72	BC OAL/Ryy: 311.11	
Fcr	39,041.41	39,041.41	37,911.81	39,041.41	39,041.41	BC Stress: 0.73	
Fa	23,424.85	23,424.85	22,747.09	23,424.85	23,424.85	BC L/Rz: 244.4822	
F'e	243,844.75	243,844.75	96,668.22	243,844.75	243,844.75	TC Shear Stress: 13,445.47	
Cm	0.9903	0.9903	0.8478	0.9903	0.9903	BC Shear Stress: 11,848.17	
Panel Point Moment	112.48	152.17	450.00	152.17	112.48		
Mid Panel Moment	96.30	18.20	225.00	18.20	96.30		
Panel Point fb	662.05	895.64	2,648.69	895.64	662.05		
Mid Panel fb	236.02	44.60	551.44	44.60	236.02		
Fillers	0	0	2	0	0		
Panel Point Stress	5,391.66	5,625.26	24,607.61	5,625.26	5,391.67		
Mid Panel Stress	0.2091	0.2033	0.9878	0.2033	0.2091		

Web Design

Member	Web Tension	Allow Tension	Web Comp	Allow Comp	Weld	Qty	Material
W2	4,442.31	7,046.95	0.00	4,063.18	2.93 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
V1S	0.00	4,802.89	86.97	3,058.31	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W3	0.00	5,758.64	2,620.91	3,932.87	2.00 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W4	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W5	0.00	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W6	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W7	38.87	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W8	323.98	4,802.89	738.52	3,021.63	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W9	297.16	7,829.95	1,335.57	3,155.25	2.00 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W9	297.16	7,829.95	1,335.57	3,155.25	2.00 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W8	323.98	4,802.89	738.52	3,021.63	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W7	38.87	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W6	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W5	0.00	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W4	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W3	0.00	5,758.64	2,620.91	3,932.87	2.00 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
V1S	0.00	4,802.89	86.97	3,058.31	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W2	4,442.31	7,046.95	0.00	4,063.18	2.93 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
V2	0.00	4,802.89	116.61	3,275.47	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077

STRESS ANALYSIS - PAGE 3



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1B

TCX Design

TCX Left		TCX Right	
TCX Length	0-0	TCX Length	0-0
TCX Type	R	TCX Type	R
TCX Depth	3	TCX Depth	3
BPL Length	0-4	BPL Length	0-4
Clear Bearing	0-4 5/8	Clear Bearing	0-4 5/8
BPL Material: 2018 = 2 x 2 x 0.188		BPL Material: 2018 = 2 x 2 x 0.188	
Total Load	50.00	Total Load	50.00
Reqd TL Def L/80	0.00	Reqd TL Def L/80	0.00
Live Load	50.00	Live Load	50.00
Reqd LL Def L/120	0.00	Reqd LL Def L/120	0.00
Section Modulus	0.0000	Section Modulus	0.0000
Reqd SM	0.0000	Reqd SM	0.0000
Mom of Inertia	0.0000	Mom of Inertia	0.0000
Reqd MI	0.0000	Reqd MI	0.0000
Seat Type: Lapped		Seat Type: Lapped	

Load Combinations

Case 1: DL	Case 5c_mr: 0.6(DL)+WL+AX+IP-M
Case 2a: LL	Case 5d: 0.6(DL)+WL-AX+IP-M
Case 2b: SL	Case 5d_mr: 0.6(DL)+WL-AX+IP+M
Case 3a: DL+CL+TL+LL	Case 5e: (0.6-0.14(SDS))DL+AX+SM+M
Case 3b: DL+CL+TL+SL	Case 5e_mr: (0.6-0.14(SDS))DL+AX+SM-M
Case 3c: DL+CL+TL+LL+FEM	Case 5f: (0.6-0.14(SDS))DL-AX+SM-M
Case 3d: DL+CL+TL+SL+FEM	Case 5f_mr: (0.6-0.14(SDS))DL-AX+SM+M
Case 3e: DL+CL+TL+LL	Case 6a: DL+CL+0.85(TL)+WL+AX+M
Case 3f: DL+CL+TL+SL	Case 6a_mr: DL+CL+0.85(TL)+WL+AX-M
Case 4a: DL+WL+AX+M	Case 6b: DL+CL+0.85(TL)+WL-AX-M
Case 4a_mr: DL+WL+AX-M	Case 6b_mr: DL+CL+0.85(TL)+WL-AX+M
Case 4b: DL+WL-AX-M	Case 6c: DL+CL+0.85(TL)+WL+C+AX+IP+M
Case 4b_mr: DL+WL-AX+M	Case 6c_mr: DL+CL+0.85(TL)+WL+C+AX+IP-M
Case 4c: DL+WL+AX+IP+M	Case 6d: DL+CL+0.85(TL)+WL+C-AX+IP-M
Case 4c_mr: DL+WL+AX+IP-M	Case 6d_mr: DL+CL+0.85(TL)+WL+C-AX+IP+M
Case 4d: DL+WL-AX+IP-M	Case 6e: DL+CL+0.85(TL)+WL+AX+IP+M
Case 4d_mr: DL+WL-AX+IP+M	Case 6e_mr: DL+CL+0.85(TL)+WL+AX+IP-M
Case 4e: (1+0.14(SDS))DL+SM+AX+M	Case 6f: DL+CL+0.85(TL)+WL-AX+IP-M
Case 4e_mr: (1+0.14(SDS))DL+SM+AX-M	Case 6f_mr: DL+CL+0.85(TL)+WL-AX+IP+M
Case 4f: (1+0.14(SDS))DL+SM-AX-M	Case 6g: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX+M
Case 4f_mr: (1+0.14(SDS))DL+SM-AX+M	Case 6g_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX-M
Case 5a: 0.6(DL)+WL+AX+M	Case 6h: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX-M
Case 5a_mr: 0.6(DL)+WL+AX-M	Case 6h_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX+M
Case 5b: 0.6(DL)+WL-AX-M	Case 7a: DL+CL+0.85(TL)+0.75(WL+AX+LL+M)
Case 5b_mr: 0.6(DL)+WL-AX+M	Case 7a_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL-M)
Case 5c: 0.6(DL)+WL+AX+IP+M	Case 7b: DL+CL+0.85(TL)+0.75(WL-AX+LL-M)

STRESS ANALYSIS - PAGE 4



NEW MILLENNIUM
A Steel Dynamics Company

Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1B

Load Combinations Continued

Case 7b_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+M)
Case 7c: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP+M)
Case 7c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP-M)
Case 7d: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP-M)
Case 7d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP+M)
Case 7e: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP+M)
Case 7e_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP-M)
Case 7f: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP-M)
Case 7f_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP+M)
Case 7g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL+M)
Case 7g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL-M)
Case 7h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL-M)
Case 7h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL+M)
Case 8a: DL+CL+0.85(TL)+0.75(WL+AX+SL+M)
Case 8a_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL-M)
Case 8b: DL+CL+0.85(TL)+0.75(WL-AX+SL-M)
Case 8b_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+M)
Case 8c: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP+M)
Case 8c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP-M)
Case 8d: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP-M)
Case 8d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP+M)
Case 8e: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP+M)
Case 8e_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP-M)
Case 8f: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP-M)
Case 8f_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP+M)
Case 8g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX+M)
Case 8g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX-M)
Case 8h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX-M)
Case 8h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX+M)

STRESS ANALYSIS - PAGE 1



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1C

Geometry

Base Length: 30-0	Working Length: 29-8	Joist Depth: 20.00	Effective Depth: 19.06	BC Panel Length: 7 Special	SDS Value: 1.0000	Shape: Parallel Chords	TC Slope: 0.0000
Variable	Left End	Right End					
BC Panel	2-6	2-6					
TC Panel	1-7	1-7					
First Half	0-6	0-6					
First Diag.	3-0	3-0					
Depth	20.00	20.00					
Trib Width	0-0	0-0					

Loads

Load Type	Category	Load1	Load2	Position	Direction	Loc/Begin	Sp/End	Reference
Uniform (plf)	LL (1)	50.00	50.00	TC	+	0-0	30-0	L-BL
Conc Load (lbs)	LL (1)	0.00	0.00	TC	+	11-0	11-0	L-BL
Conc Load (lbs)	LL (1)	0.00	0.00	TC	+	19-0	19-0	L-BL
Conc Load (lbs)	LL (3)	2,500.00	0.00	TC	+	11-0	11-0	L-BL
Conc Load (lbs)	LL (3)	2,500.00	0.00	TC	+	19-0	19-0	L-BL

Stress Analysis Summary

Int. Panel TC: 36.00	Max Panel BC: 72.00	Reaction LE: 2,500.00	Reaction RE: 2,500.00		Minimum Shear: 625.00	Max TC Comp.: 17,048.91	Max BC Tension 17,048.91	
Member	TC Tension	TC Compression	BC Tension	BC Compression	Web Tension	Web Comp.	Web Length	PP Dist.
W2	0.00	3,672.07	0.00	0.00	4,442.31	0.00	33.87	0-2
V1S	0.00	3,672.07	0.00	0.00	0.00	86.97	22.01	1-7
W3	0.00	3,672.07	4,458.94	0.00	0.00	2,620.91	19.98	2-6
W4	0.00	7,606.44	4,458.94	0.00	4,019.54	0.00	30.65	3-0
W5	0.00	7,606.44	10,753.93	0.00	0.00	4,019.54	30.65	5-0
W6	0.00	13,901.42	10,753.93	0.00	4,019.54	0.00	30.65	7-0
W7	0.00	13,901.42	17,048.91	0.00	38.87	4,019.54	30.65	9-0
W8	0.00	17,048.91	17,048.91	0.00	323.98	738.52	22.53	11-0
W9	0.00	17,048.91	17,048.91	0.00	297.16	1,335.57	40.74	12-0
W9	0.00	17,048.91	17,048.91	0.00	297.16	1,335.57	40.74	15-0
W8	0.00	17,048.91	17,048.91	0.00	323.98	738.52	22.53	18-0
W7	0.00	13,901.42	17,048.91	0.00	38.87	4,019.54	30.65	19-0
W6	0.00	13,901.42	10,753.93	0.00	4,019.54	0.00	30.65	21-0
W5	0.00	7,606.44	10,753.93	0.00	0.00	4,019.54	30.65	23-0
W4	0.00	7,606.44	4,458.95	0.00	4,019.54	0.00	30.65	25-0
W3	0.00	3,672.07	4,458.95	0.00	0.00	2,620.91	19.98	27-0
V1S	0.00	3,672.07	0.00	0.00	0.00	86.97	22.01	28-5
W2	0.00	3,672.07	0.00	0.00	4,442.31	0.00	33.87	27-6

Standard Verticals

Member	Position	Max Tension	Max Comp.	Length
V2	Interior	0.00	116.61	19.06

STRESS ANALYSIS - PAGE 2



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1C

Chord Properties

Chord	Area	Rx	Rz	Ryy	Y	Ix	Q	Material
TC	0.3882	0.4962	0.2945	1.1443	0.4686	0.0956	0.9950	A24B = 1.594 x 1.594 x 0.133
BC	0.3882	0.4962	0.2945	1.1443	0.4686	0.0956	0.9950	A24B = 1.594 x 1.594 x 0.133

Axial and Bending Analysis

K: 0.75	Fy: 50,000.00	Fb: 30,000.00	Mom of Inertia: 141.45	LL 360: 202.39	LL 240: 303.59	Max Bridg TC: 14-10 5/8	Max Bridg BC: 22-10 5/8
Top Chord Check	End Panel LE	First Panel LE	Interior Panel	First Panel RE	End Panel RE	Gap Between Chords: 1.1250	
Length	17.00	17.00	36.00	17.00	17.00	Min Weld Len 2X: 0.5000	
Bending Load	50.00	50.00	50.00	50.00	50.00	Max Load Fillers TC: 17,362.43	
Axial Load	3,672.07	3,672.07	17,048.91	3,672.07	3,672.07	Max Load no Fillers TC: 12,375.66	
fa	4,729.61	4,729.61	21,958.92	4,729.62	4,729.61	TC OAL/Ryy: 311.11	
Maximum K L/r	57.72	57.72	61.12	57.72	57.72	BC OAL/Ryy: 311.11	
Fcr	39,041.41	39,041.41	37,911.81	39,041.41	39,041.41	BC Stress: 0.73	
Fa	23,424.85	23,424.85	22,747.09	23,424.85	23,424.85	BC L/Rz: 244.4822	
F'e	243,844.75	243,844.75	96,668.22	243,844.75	243,844.75	TC Shear Stress: 13,445.47	
Cm	0.9903	0.9903	0.8478	0.9903	0.9903	BC Shear Stress: 11,848.17	
Panel Point Moment	112.48	152.17	450.00	152.17	112.48		
Mid Panel Moment	96.30	18.20	225.00	18.20	96.30		
Panel Point fb	662.05	895.64	2,648.69	895.64	662.05		
Mid Panel fb	236.02	44.60	551.44	44.60	236.02		
Fillers	0	0	2	0	0		
Panel Point Stress	5,391.66	5,625.26	24,607.61	5,625.26	5,391.67		
Mid Panel Stress	0.2091	0.2033	0.9878	0.2033	0.2091		

Web Design

Member	Web Tension	Allow Tension	Web Comp	Allow Comp	Weld	Qty	Material
W2	4,442.31	7,046.95	0.00	4,063.18	2.93 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
V1S	0.00	4,802.89	86.97	3,058.31	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W3	0.00	5,758.64	2,620.91	3,932.87	2.00 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W4	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W5	0.00	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W6	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W7	38.87	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W8	323.98	4,802.89	738.52	3,021.63	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W9	297.16	7,829.95	1,335.57	3,155.25	2.00 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W9	297.16	7,829.95	1,335.57	3,155.25	2.00 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W8	323.98	4,802.89	738.52	3,021.63	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W7	38.87	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W6	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W5	0.00	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W4	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W3	0.00	5,758.64	2,620.91	3,932.87	2.00 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
V1S	0.00	4,802.89	86.97	3,058.31	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W2	4,442.31	7,046.95	0.00	4,063.18	2.93 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
V2	0.00	4,802.89	116.61	3,275.47	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077

STRESS ANALYSIS - PAGE 3



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1C

TCX Design

TCX Left		TCX Right	
TCX Length	0-0	TCX Length	0-0
TCX Type	R	TCX Type	R
TCX Depth	3	TCX Depth	3
BPL Length	0-4	BPL Length	0-4
Clear Bearing	0-4 5/8	Clear Bearing	0-4 5/8
BPL Material: 2018 = 2 x 2 x 0.188		BPL Material: 2018 = 2 x 2 x 0.188	
Total Load	50.00	Total Load	50.00
Reqd TL Def L/80	0.00	Reqd TL Def L/80	0.00
Live Load	50.00	Live Load	50.00
Reqd LL Def L/120	0.00	Reqd LL Def L/120	0.00
Section Modulus	0.0000	Section Modulus	0.0000
Reqd SM	0.0000	Reqd SM	0.0000
Mom of Inertia	0.0000	Mom of Inertia	0.0000
Reqd MI	0.0000	Reqd MI	0.0000
Seat Type: Lapped		Seat Type: Lapped	

Load Combinations

Case 1: DL	Case 5c_mr: 0.6(DL)+WL+AX+IP-M
Case 2a: LL	Case 5d: 0.6(DL)+WL-AX+IP-M
Case 2b: SL	Case 5d_mr: 0.6(DL)+WL-AX+IP+M
Case 3a: DL+CL+TL+LL	Case 5e: (0.6-0.14(SDS))DL+AX+SM+M
Case 3b: DL+CL+TL+SL	Case 5e_mr: (0.6-0.14(SDS))DL+AX+SM-M
Case 3c: DL+CL+TL+LL+FEM	Case 5f: (0.6-0.14(SDS))DL-AX+SM-M
Case 3d: DL+CL+TL+SL+FEM	Case 5f_mr: (0.6-0.14(SDS))DL-AX+SM+M
Case 3e: DL+CL+TL+LL	Case 6a: DL+CL+0.85(TL)+WL+AX+M
Case 3f: DL+CL+TL+SL	Case 6a_mr: DL+CL+0.85(TL)+WL+AX-M
Case 4a: DL+WL+AX+M	Case 6b: DL+CL+0.85(TL)+WL-AX-M
Case 4a_mr: DL+WL+AX-M	Case 6b_mr: DL+CL+0.85(TL)+WL-AX+M
Case 4b: DL+WL-AX-M	Case 6c: DL+CL+0.85(TL)+WL+C+AX+IP+M
Case 4b_mr: DL+WL-AX+M	Case 6c_mr: DL+CL+0.85(TL)+WL+C+AX+IP-M
Case 4c: DL+WL+AX+IP+M	Case 6d: DL+CL+0.85(TL)+WL+C-AX+IP-M
Case 4c_mr: DL+WL+AX+IP-M	Case 6d_mr: DL+CL+0.85(TL)+WL+C-AX+IP+M
Case 4d: DL+WL-AX+IP-M	Case 6e: DL+CL+0.85(TL)+WL+AX+IP+M
Case 4d_mr: DL+WL-AX+IP+M	Case 6e_mr: DL+CL+0.85(TL)+WL+AX+IP-M
Case 4e: (1+0.14(SDS))DL+SM+AX+M	Case 6f: DL+CL+0.85(TL)+WL-AX+IP-M
Case 4e_mr: (1+0.14(SDS))DL+SM+AX-M	Case 6f_mr: DL+CL+0.85(TL)+WL-AX+IP+M
Case 4f: (1+0.14(SDS))DL+SM-AX-M	Case 6g: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX+M
Case 4f_mr: (1+0.14(SDS))DL+SM-AX+M	Case 6g_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX-M
Case 5a: 0.6(DL)+WL+AX+M	Case 6h: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX-M
Case 5a_mr: 0.6(DL)+WL+AX-M	Case 6h_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX+M
Case 5b: 0.6(DL)+WL-AX-M	Case 7a: DL+CL+0.85(TL)+0.75(WL+AX+LL+M)
Case 5b_mr: 0.6(DL)+WL-AX+M	Case 7a_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL-M)
Case 5c: 0.6(DL)+WL+AX+IP+M	Case 7b: DL+CL+0.85(TL)+0.75(WL-AX+LL-M)

STRESS ANALYSIS - PAGE 4



NEW MILLENNIUM
A Steel Dynamics Company

Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1C

Load Combinations Continued

Case 7b_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+M)
Case 7c: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP+M)
Case 7c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP-M)
Case 7d: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP-M)
Case 7d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP+M)
Case 7e: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP+M)
Case 7e_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP-M)
Case 7f: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP-M)
Case 7f_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP+M)
Case 7g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL+M)
Case 7g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL-M)
Case 7h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL-M)
Case 7h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL+M)
Case 8a: DL+CL+0.85(TL)+0.75(WL+AX+SL+M)
Case 8a_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL-M)
Case 8b: DL+CL+0.85(TL)+0.75(WL-AX+SL-M)
Case 8b_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+M)
Case 8c: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP+M)
Case 8c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP-M)
Case 8d: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP-M)
Case 8d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP+M)
Case 8e: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP+M)
Case 8e_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP-M)
Case 8f: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP-M)
Case 8f_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP+M)
Case 8g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX+M)
Case 8g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX-M)
Case 8h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX-M)
Case 8h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX+M)

Mark:
SJI1D

Member	Position	Max Tension	Max Comp.	Length
V2	Interior	0.00	116.61	19.06

STRESS ANALYSIS - PAGE 2



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1D

Chord Properties

Chord	Area	Rx	Rz	Ryy	Y	Ix	Q	Material
TC	0.3882	0.4962	0.2945	1.1443	0.4686	0.0956	0.9950	A24B = 1.594 x 1.594 x 0.133
BC	0.3882	0.4962	0.2945	1.1443	0.4686	0.0956	0.9950	A24B = 1.594 x 1.594 x 0.133

Axial and Bending Analysis

K: 0.75	Fy: 50,000.00	Fb: 30,000.00	Mom of Inertia: 141.45	LL 360: 202.39	LL 240: 303.59	Max Bridg TC: 14-10 5/8	Max Bridg BC: 22-10 5/8
Top Chord Check	End Panel LE	First Panel LE	Interior Panel	First Panel RE	End Panel RE	Gap Between Chords: 1.1250	
Length	17.00	17.00	36.00	17.00	17.00	Min Weld Len 2X: 0.5000	
Bending Load	50.00	50.00	50.00	50.00	50.00	Max Load Fillers TC: 17,362.43	
Axial Load	3,672.07	3,672.07	17,048.91	3,672.07	3,672.07	Max Load no Fillers TC: 12,375.66	
fa	4,729.61	4,729.61	21,958.92	4,729.62	4,729.61	TC OAL/Ryy: 311.11	
Maximum K L/r	57.72	57.72	61.12	57.72	57.72	BC OAL/Ryy: 311.11	
Fcr	39,041.41	39,041.41	37,911.81	39,041.41	39,041.41	BC Stress: 0.73	
Fa	23,424.85	23,424.85	22,747.09	23,424.85	23,424.85	BC L/Rz: 244.4822	
F'e	243,844.75	243,844.75	96,668.22	243,844.75	243,844.75	TC Shear Stress: 13,445.47	
Cm	0.9903	0.9903	0.8478	0.9903	0.9903	BC Shear Stress: 11,848.17	
Panel Point Moment	112.48	152.17	450.00	152.17	112.48		
Mid Panel Moment	96.30	18.20	225.00	18.20	96.30		
Panel Point fb	662.05	895.64	2,648.69	895.64	662.05		
Mid Panel fb	236.02	44.60	551.44	44.60	236.02		
Fillers	0	0	2	0	0		
Panel Point Stress	5,391.66	5,625.26	24,607.61	5,625.26	5,391.67		
Mid Panel Stress	0.2091	0.2033	0.9878	0.2033	0.2091		

Web Design

Member	Web Tension	Allow Tension	Web Comp	Allow Comp	Weld	Qty	Material
W2	4,442.31	7,046.95	0.00	4,063.18	2.93 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
V1S	0.00	4,802.89	86.97	3,058.31	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W3	0.00	5,758.64	2,620.91	3,932.87	2.00 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W4	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W5	0.00	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W6	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W7	38.87	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W8	323.98	4,802.89	738.52	3,021.63	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W9	297.16	7,829.95	1,335.57	3,155.25	2.00 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W9	297.16	7,829.95	1,335.57	3,155.25	2.00 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W8	323.98	4,802.89	738.52	3,021.63	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W7	38.87	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W6	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W5	0.00	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W4	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W3	0.00	5,758.64	2,620.91	3,932.87	2.00 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
V1S	0.00	4,802.89	86.97	3,058.31	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W2	4,442.31	7,046.95	0.00	4,063.18	2.93 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
V2	0.00	4,802.89	116.61	3,275.47	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077

STRESS ANALYSIS - PAGE 3



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1D

TCX Design

TCX Left		TCX Right	
TCX Length	0-0	TCX Length	0-0
TCX Type	R	TCX Type	R
TCX Depth	3	TCX Depth	3
BPL Length	0-4	BPL Length	0-4
Clear Bearing	0-4 5/8	Clear Bearing	0-4 5/8
BPL Material: 2018 = 2 x 2 x 0.188		BPL Material: 2018 = 2 x 2 x 0.188	
Total Load	50.00	Total Load	50.00
Reqd TL Def L/80	0.00	Reqd TL Def L/80	0.00
Live Load	50.00	Live Load	50.00
Reqd LL Def L/120	0.00	Reqd LL Def L/120	0.00
Section Modulus	0.0000	Section Modulus	0.0000
Reqd SM	0.0000	Reqd SM	0.0000
Mom of Inertia	0.0000	Mom of Inertia	0.0000
Reqd MI	0.0000	Reqd MI	0.0000
Seat Type: Lapped		Seat Type: Lapped	

Load Combinations

Case 1: DL	Case 5c_mr: 0.6(DL)+WL+AX+IP-M
Case 2a: LL	Case 5d: 0.6(DL)+WL-AX+IP-M
Case 2b: SL	Case 5d_mr: 0.6(DL)+WL-AX+IP+M
Case 3a: DL+CL+TL+LL	Case 5e: (0.6-0.14(SDS))DL+AX+SM+M
Case 3b: DL+CL+TL+SL	Case 5e_mr: (0.6-0.14(SDS))DL+AX+SM-M
Case 3c: DL+CL+TL+LL+FEM	Case 5f: (0.6-0.14(SDS))DL-AX+SM-M
Case 3d: DL+CL+TL+SL+FEM	Case 5f_mr: (0.6-0.14(SDS))DL-AX+SM+M
Case 3e: DL+CL+TL+LL	Case 6a: DL+CL+0.85(TL)+WL+AX+M
Case 3f: DL+CL+TL+SL	Case 6a_mr: DL+CL+0.85(TL)+WL+AX-M
Case 4a: DL+WL+AX+M	Case 6b: DL+CL+0.85(TL)+WL-AX-M
Case 4a_mr: DL+WL+AX-M	Case 6b_mr: DL+CL+0.85(TL)+WL-AX+M
Case 4b: DL+WL-AX-M	Case 6c: DL+CL+0.85(TL)+WL+C+AX+IP+M
Case 4b_mr: DL+WL-AX+M	Case 6c_mr: DL+CL+0.85(TL)+WL+C+AX+IP-M
Case 4c: DL+WL+AX+IP+M	Case 6d: DL+CL+0.85(TL)+WL+C-AX+IP-M
Case 4c_mr: DL+WL+AX+IP-M	Case 6d_mr: DL+CL+0.85(TL)+WL+C-AX+IP+M
Case 4d: DL+WL-AX+IP-M	Case 6e: DL+CL+0.85(TL)+WL+AX+IP+M
Case 4d_mr: DL+WL-AX+IP+M	Case 6e_mr: DL+CL+0.85(TL)+WL+AX+IP-M
Case 4e: (1+0.14(SDS))DL+SM+AX+M	Case 6f: DL+CL+0.85(TL)+WL-AX+IP-M
Case 4e_mr: (1+0.14(SDS))DL+SM+AX-M	Case 6f_mr: DL+CL+0.85(TL)+WL-AX+IP+M
Case 4f: (1+0.14(SDS))DL+SM-AX-M	Case 6g: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX+M
Case 4f_mr: (1+0.14(SDS))DL+SM-AX+M	Case 6g_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX-M
Case 5a: 0.6(DL)+WL+AX+M	Case 6h: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX-M
Case 5a_mr: 0.6(DL)+WL+AX-M	Case 6h_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX+M
Case 5b: 0.6(DL)+WL-AX-M	Case 7a: DL+CL+0.85(TL)+0.75(WL+AX+LL+M)
Case 5b_mr: 0.6(DL)+WL-AX+M	Case 7a_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL-M)
Case 5c: 0.6(DL)+WL+AX+IP+M	Case 7b: DL+CL+0.85(TL)+0.75(WL-AX+LL-M)

STRESS ANALYSIS - PAGE 4



NEW MILLENNIUM
A Steel Dynamics Company

Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1D

Load Combinations Continued

Case 7b_mr: $DL+CL+0.85(TL)+0.75(WL-AX+LL+M)$
Case 7c: $DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP+M)$
Case 7c_mr: $DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP-M)$
Case 7d: $DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP-M)$
Case 7d_mr: $DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP+M)$
Case 7e: $DL+CL+0.85(TL)+0.75(WL+AX+LL+IP+M)$
Case 7e_mr: $DL+CL+0.85(TL)+0.75(WL+AX+LL+IP-M)$
Case 7f: $DL+CL+0.85(TL)+0.75(WL-AX+LL+IP-M)$
Case 7f_mr: $DL+CL+0.85(TL)+0.75(WL-AX+LL+IP+M)$
Case 7g: $(1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL+M)$
Case 7g_mr: $(1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL-M)$
Case 7h: $(1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL-M)$
Case 7h_mr: $(1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL+M)$
Case 8a: $DL+CL+0.85(TL)+0.75(WL+AX+SL+M)$
Case 8a_mr: $DL+CL+0.85(TL)+0.75(WL+AX+SL-M)$
Case 8b: $DL+CL+0.85(TL)+0.75(WL-AX+SL-M)$
Case 8b_mr: $DL+CL+0.85(TL)+0.75(WL-AX+SL+M)$
Case 8c: $DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP+M)$
Case 8c_mr: $DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP-M)$
Case 8d: $DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP-M)$
Case 8d_mr: $DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP+M)$
Case 8e: $DL+CL+0.85(TL)+0.75(WL+AX+SL+IP+M)$
Case 8e_mr: $DL+CL+0.85(TL)+0.75(WL+AX+SL+IP-M)$
Case 8f: $DL+CL+0.85(TL)+0.75(WL-AX+SL+IP-M)$
Case 8f_mr: $DL+CL+0.85(TL)+0.75(WL-AX+SL+IP+M)$
Case 8g: $(1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX+M)$
Case 8g_mr: $(1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX-M)$
Case 8h: $(1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX-M)$
Case 8h_mr: $(1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX+M)$

STRESS ANALYSIS - PAGE 1



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1E

Geometry

Base Length: 30-0	Working Length: 29-8	Joist Depth: 20.00	Effective Depth: 19.06	BC Panel Length: 7 Special	SDS Value: 1.0000	Shape: Parallel Chords	TC Slope: 0.0000
Variable	Left End	Right End					
BC Panel	2-6	2-6					
TC Panel	1-7	1-7					
First Half	0-6	0-6					
First Diag.	3-0	3-0					
Depth	20.00	20.00					
Trib Width	0-0	0-0					

Loads

Load Type	Category	Load1	Load2	Position	Direction	Loc/Begin	Sp/End	Reference
Uniform (plf)	LL (1)	50.00	50.00	TC	+	0-0	30-0	L-BL
Conc Load (lbs)	LL (1)	0.00	0.00	TC	+	11-0	11-0	L-BL
Conc Load (lbs)	LL (1)	0.00	0.00	TC	+	19-0	19-0	L-BL
Conc Load (lbs)	LL (3)	2,500.00	0.00	TC	+	11-0	11-0	L-BL
Conc Load (lbs)	LL (3)	2,500.00	0.00	TC	+	19-0	19-0	L-BL

Stress Analysis Summary

Int. Panel TC: 36.00		Max Panel BC: 72.00		Reaction LE: 2,500.00		Reaction RE: 2,500.00		Minimum Shear: 625.00		Max TC Comp.: 17,048.91		Max BC Tension 17,048.91	
Member	TC Tension	TC Compression	BC Tension	BC Compression	Web Tension	Web Comp.	Web Length	PP Dist.					
W2	0.00	3,672.07	0.00	0.00	4,442.31	0.00	33.87	0-2					
V1S	0.00	3,672.07	0.00	0.00	0.00	86.97	22.01	1-7					
W3	0.00	3,672.07	4,458.94	0.00	0.00	2,620.91	19.98	2-6					
W4	0.00	7,606.44	4,458.94	0.00	4,019.54	0.00	30.65	3-0					
W5	0.00	7,606.44	10,753.93	0.00	0.00	4,019.54	30.65	5-0					
W6	0.00	13,901.42	10,753.93	0.00	4,019.54	0.00	30.65	7-0					
W7	0.00	13,901.42	17,048.91	0.00	38.87	4,019.54	30.65	9-0					
W8	0.00	17,048.91	17,048.91	0.00	323.98	738.52	22.53	11-0					
W9	0.00	17,048.91	17,048.91	0.00	297.16	1,335.57	40.74	12-0					
W9	0.00	17,048.91	17,048.91	0.00	297.16	1,335.57	40.74	15-0					
W8	0.00	17,048.91	17,048.91	0.00	323.98	738.52	22.53	18-0					
W7	0.00	13,901.42	17,048.91	0.00	38.87	4,019.54	30.65	19-0					
W6	0.00	13,901.42	10,753.93	0.00	4,019.54	0.00	30.65	21-0					
W5	0.00	7,606.44	10,753.93	0.00	0.00	4,019.54	30.65	23-0					
W4	0.00	7,606.44	4,458.95	0.00	4,019.54	0.00	30.65	25-0					
W3	0.00	3,672.07	4,458.95	0.00	0.00	2,620.91	19.98	27-0					
V1S	0.00	3,672.07	0.00	0.00	0.00	86.97	22.01	28-5					
W2	0.00	3,672.07	0.00	0.00	4,442.31	0.00	33.87	27-6					

Standard Verticals

Member	Position	Max Tension	Max Comp.	Length
V2	Interior	0.00	116.61	19.06

STRESS ANALYSIS - PAGE 2



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1E

Chord Properties

Chord	Area	Rx	Rz	Ryy	Y	Ix	Q	Material
TC	0.3882	0.4962	0.2945	1.1443	0.4686	0.0956	0.9950	A24B = 1.594 x 1.594 x 0.133
BC	0.3882	0.4962	0.2945	1.1443	0.4686	0.0956	0.9950	A24B = 1.594 x 1.594 x 0.133

Axial and Bending Analysis

K: 0.75	Fy: 50,000.00	Fb: 30,000.00	Mom of Inertia: 141.45	LL 360: 202.39	LL 240: 303.59	Max Bridg TC: 14-10 5/8	Max Bridg BC: 22-10 5/8
Top Chord Check	End Panel LE	First Panel LE	Interior Panel	First Panel RE	End Panel RE	Gap Between Chords: 1.1250	
Length	17.00	17.00	36.00	17.00	17.00	Min Weld Len 2X: 0.5000	
Bending Load	50.00	50.00	50.00	50.00	50.00	Max Load Fillers TC: 17,362.43	
Axial Load	3,672.07	3,672.07	17,048.91	3,672.07	3,672.07	Max Load no Fillers TC: 12,375.66	
fa	4,729.61	4,729.61	21,958.92	4,729.62	4,729.61	TC OAL/Ryy: 311.11	
Maximum K L/r	57.72	57.72	61.12	57.72	57.72	BC OAL/Ryy: 311.11	
Fcr	39,041.41	39,041.41	37,911.81	39,041.41	39,041.41	BC Stress: 0.73	
Fa	23,424.85	23,424.85	22,747.09	23,424.85	23,424.85	BC L/Rz: 244.4822	
F'e	243,844.75	243,844.75	96,668.22	243,844.75	243,844.75	TC Shear Stress: 13,445.47	
Cm	0.9903	0.9903	0.8478	0.9903	0.9903	BC Shear Stress: 11,848.17	
Panel Point Moment	112.48	152.17	450.00	152.17	112.48		
Mid Panel Moment	96.30	18.20	225.00	18.20	96.30		
Panel Point fb	662.05	895.64	2,648.69	895.64	662.05		
Mid Panel fb	236.02	44.60	551.44	44.60	236.02		
Fillers	0	0	2	0	0		
Panel Point Stress	5,391.66	5,625.26	24,607.61	5,625.26	5,391.67		
Mid Panel Stress	0.2091	0.2033	0.9878	0.2033	0.2091		

Web Design

Member	Web Tension	Allow Tension	Web Comp	Allow Comp	Weld	Qty	Material
W2	4,442.31	7,046.95	0.00	4,063.18	2.93 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
V1S	0.00	4,802.89	86.97	3,058.31	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W3	0.00	5,758.64	2,620.91	3,932.87	2.00 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W4	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W5	0.00	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W6	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W7	38.87	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W8	323.98	4,802.89	738.52	3,021.63	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W9	297.16	7,829.95	1,335.57	3,155.25	2.00 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W9	297.16	7,829.95	1,335.57	3,155.25	2.00 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W8	323.98	4,802.89	738.52	3,021.63	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W7	38.87	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W6	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W5	0.00	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W4	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W3	0.00	5,758.64	2,620.91	3,932.87	2.00 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
V1S	0.00	4,802.89	86.97	3,058.31	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W2	4,442.31	7,046.95	0.00	4,063.18	2.93 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
V2	0.00	4,802.89	116.61	3,275.47	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077

STRESS ANALYSIS - PAGE 3



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1E

TCX Design

TCX Left		TCX Right	
TCX Length	0-0	TCX Length	0-0
TCX Type	R	TCX Type	R
TCX Depth	3	TCX Depth	3
BPL Length	0-4	BPL Length	0-4
Clear Bearing	0-4 5/8	Clear Bearing	0-4 5/8
BPL Material: 2018 = 2 x 2 x 0.188		BPL Material: 2018 = 2 x 2 x 0.188	
Total Load	50.00	Total Load	50.00
Reqd TL Def L/80	0.00	Reqd TL Def L/80	0.00
Live Load	50.00	Live Load	50.00
Reqd LL Def L/120	0.00	Reqd LL Def L/120	0.00
Section Modulus	0.0000	Section Modulus	0.0000
Reqd SM	0.0000	Reqd SM	0.0000
Mom of Inertia	0.0000	Mom of Inertia	0.0000
Reqd MI	0.0000	Reqd MI	0.0000
Seat Type: Lapped		Seat Type: Lapped	

Load Combinations

Case 1: DL	Case 5c_mr: 0.6(DL)+WL+AX+IP-M
Case 2a: LL	Case 5d: 0.6(DL)+WL-AX+IP-M
Case 2b: SL	Case 5d_mr: 0.6(DL)+WL-AX+IP+M
Case 3a: DL+CL+TL+LL	Case 5e: (0.6-0.14(SDS))DL+AX+SM+M
Case 3b: DL+CL+TL+SL	Case 5e_mr: (0.6-0.14(SDS))DL+AX+SM-M
Case 3c: DL+CL+TL+LL+FEM	Case 5f: (0.6-0.14(SDS))DL-AX+SM-M
Case 3d: DL+CL+TL+SL+FEM	Case 5f_mr: (0.6-0.14(SDS))DL-AX+SM+M
Case 3e: DL+CL+TL+LL	Case 6a: DL+CL+0.85(TL)+WL+AX+M
Case 3f: DL+CL+TL+SL	Case 6a_mr: DL+CL+0.85(TL)+WL+AX-M
Case 4a: DL+WL+AX+M	Case 6b: DL+CL+0.85(TL)+WL-AX-M
Case 4a_mr: DL+WL+AX-M	Case 6b_mr: DL+CL+0.85(TL)+WL-AX+M
Case 4b: DL+WL-AX-M	Case 6c: DL+CL+0.85(TL)+WL+C+AX+IP+M
Case 4b_mr: DL+WL-AX+M	Case 6c_mr: DL+CL+0.85(TL)+WL+C+AX+IP-M
Case 4c: DL+WL+AX+IP+M	Case 6d: DL+CL+0.85(TL)+WL+C-AX+IP-M
Case 4c_mr: DL+WL+AX+IP-M	Case 6d_mr: DL+CL+0.85(TL)+WL+C-AX+IP+M
Case 4d: DL+WL-AX+IP-M	Case 6e: DL+CL+0.85(TL)+WL+AX+IP+M
Case 4d_mr: DL+WL-AX+IP+M	Case 6e_mr: DL+CL+0.85(TL)+WL+AX+IP-M
Case 4e: (1+0.14(SDS))DL+SM+AX+M	Case 6f: DL+CL+0.85(TL)+WL-AX+IP-M
Case 4e_mr: (1+0.14(SDS))DL+SM+AX-M	Case 6f_mr: DL+CL+0.85(TL)+WL-AX+IP+M
Case 4f: (1+0.14(SDS))DL+SM-AX-M	Case 6g: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX+M
Case 4f_mr: (1+0.14(SDS))DL+SM-AX+M	Case 6g_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX-M
Case 5a: 0.6(DL)+WL+AX+M	Case 6h: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX-M
Case 5a_mr: 0.6(DL)+WL+AX-M	Case 6h_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX+M
Case 5b: 0.6(DL)+WL-AX-M	Case 7a: DL+CL+0.85(TL)+0.75(WL+AX+LL+M)
Case 5b_mr: 0.6(DL)+WL-AX+M	Case 7a_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL-M)
Case 5c: 0.6(DL)+WL+AX+IP+M	Case 7b: DL+CL+0.85(TL)+0.75(WL-AX+LL-M)

STRESS ANALYSIS - PAGE 4



NEW MILLENNIUM
A Steel Dynamics Company

Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1E

Load Combinations Continued

Case 7b_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+M)
Case 7c: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP+M)
Case 7c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP-M)
Case 7d: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP-M)
Case 7d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP+M)
Case 7e: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP+M)
Case 7e_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP-M)
Case 7f: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP-M)
Case 7f_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP+M)
Case 7g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL+M)
Case 7g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL-M)
Case 7h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL-M)
Case 7h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL+M)
Case 8a: DL+CL+0.85(TL)+0.75(WL+AX+SL+M)
Case 8a_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL-M)
Case 8b: DL+CL+0.85(TL)+0.75(WL-AX+SL-M)
Case 8b_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+M)
Case 8c: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP+M)
Case 8c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP-M)
Case 8d: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP-M)
Case 8d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP+M)
Case 8e: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP+M)
Case 8e_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP-M)
Case 8f: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP-M)
Case 8f_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP+M)
Case 8g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX+M)
Case 8g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX-M)
Case 8h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX-M)
Case 8h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX+M)

STRESS ANALYSIS - PAGE 1



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1F

Geometry

Base Length: 30-0	Working Length: 29-8	Joist Depth: 20.00	Effective Depth: 19.06	BC Panel Length: 7 Special	SDS Value: 1.0000	Shape: Parallel Chords	TC Slope: 0.0000
Variable	Left End	Right End					
BC Panel	2-6	2-6					
TC Panel	1-7	1-7					
First Half	0-6	0-6					
First Diag.	3-0	3-0					
Depth	20.00	20.00					
Trib Width	0-0	0-0					

Loads

Load Type	Category	Load1	Load2	Position	Direction	Loc/Begin	Sp/End	Reference
Uniform (plf)	LL (1)	50.00	50.00	TC	+	0-0	30-0	L-BL
Conc Load (lbs)	LL (1)	0.00	0.00	TC	+	11-0	11-0	L-BL
Conc Load (lbs)	LL (1)	0.00	0.00	TC	+	19-0	19-0	L-BL
Conc Load (lbs)	LL (3)	2,500.00	0.00	TC	+	11-0	11-0	L-BL
Conc Load (lbs)	LL (3)	2,500.00	0.00	TC	+	19-0	19-0	L-BL

Stress Analysis Summary

Int. Panel TC: 36.00		Max Panel BC: 72.00		Reaction LE: 2,500.00		Reaction RE: 2,500.00		Minimum Shear: 625.00		Max TC Comp.: 17,048.91		Max BC Tension 17,048.91	
Member	TC Tension	TC Compression	BC Tension	BC Compression	Web Tension	Web Comp.	Web Length	PP Dist.					
W2	0.00	3,672.07	0.00	0.00	4,442.31	0.00	33.87	0-2					
V1S	0.00	3,672.07	0.00	0.00	0.00	86.97	22.01	1-7					
W3	0.00	3,672.07	4,458.94	0.00	0.00	2,620.91	19.98	2-6					
W4	0.00	7,606.44	4,458.94	0.00	4,019.54	0.00	30.65	3-0					
W5	0.00	7,606.44	10,753.93	0.00	0.00	4,019.54	30.65	5-0					
W6	0.00	13,901.42	10,753.93	0.00	4,019.54	0.00	30.65	7-0					
W7	0.00	13,901.42	17,048.91	0.00	38.87	4,019.54	30.65	9-0					
W8	0.00	17,048.91	17,048.91	0.00	323.98	738.52	22.53	11-0					
W9	0.00	17,048.91	17,048.91	0.00	297.16	1,335.57	40.74	12-0					
W9	0.00	17,048.91	17,048.91	0.00	297.16	1,335.57	40.74	15-0					
W8	0.00	17,048.91	17,048.91	0.00	323.98	738.52	22.53	18-0					
W7	0.00	13,901.42	17,048.91	0.00	38.87	4,019.54	30.65	19-0					
W6	0.00	13,901.42	10,753.93	0.00	4,019.54	0.00	30.65	21-0					
W5	0.00	7,606.44	10,753.93	0.00	0.00	4,019.54	30.65	23-0					
W4	0.00	7,606.44	4,458.95	0.00	4,019.54	0.00	30.65	25-0					
W3	0.00	3,672.07	4,458.95	0.00	0.00	2,620.91	19.98	27-0					
V1S	0.00	3,672.07	0.00	0.00	0.00	86.97	22.01	28-5					
W2	0.00	3,672.07	0.00	0.00	4,442.31	0.00	33.87	27-6					

Standard Verticals

Member	Position	Max Tension	Max Comp.	Length
V2	Interior	0.00	116.61	19.06

STRESS ANALYSIS - PAGE 2



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1F

Chord Properties

Chord	Area	Rx	Rz	Ryy	Y	Ix	Q	Material
TC	0.3882	0.4962	0.2945	1.1443	0.4686	0.0956	0.9950	A24B = 1.594 x 1.594 x 0.133
BC	0.3882	0.4962	0.2945	1.1443	0.4686	0.0956	0.9950	A24B = 1.594 x 1.594 x 0.133

Axial and Bending Analysis

K: 0.75	Fy: 50,000.00	Fb: 30,000.00	Mom of Inertia: 141.45	LL 360: 202.39	LL 240: 303.59	Max Bridg TC: 14-10 5/8	Max Bridg BC: 22-10 5/8
Top Chord Check	End Panel LE	First Panel LE	Interior Panel	First Panel RE	End Panel RE	Gap Between Chords: 1.1250	
Length	17.00	17.00	36.00	17.00	17.00	Min Weld Len 2X: 0.5000	
Bending Load	50.00	50.00	50.00	50.00	50.00	Max Load Fillers TC: 17,362.43	
Axial Load	3,672.07	3,672.07	17,048.91	3,672.07	3,672.07	Max Load no Fillers TC: 12,375.66	
fa	4,729.61	4,729.61	21,958.92	4,729.62	4,729.61	TC OAL/Ryy: 311.11	
Maximum K L/r	57.72	57.72	61.12	57.72	57.72	BC OAL/Ryy: 311.11	
Fcr	39,041.41	39,041.41	37,911.81	39,041.41	39,041.41	BC Stress: 0.73	
Fa	23,424.85	23,424.85	22,747.09	23,424.85	23,424.85	BC L/Rz: 244.4822	
F'e	243,844.75	243,844.75	96,668.22	243,844.75	243,844.75	TC Shear Stress: 13,445.47	
Cm	0.9903	0.9903	0.8478	0.9903	0.9903	BC Shear Stress: 11,848.17	
Panel Point Moment	112.48	152.17	450.00	152.17	112.48		
Mid Panel Moment	96.30	18.20	225.00	18.20	96.30		
Panel Point fb	662.05	895.64	2,648.69	895.64	662.05		
Mid Panel fb	236.02	44.60	551.44	44.60	236.02		
Fillers	0	0	2	0	0		
Panel Point Stress	5,391.66	5,625.26	24,607.61	5,625.26	5,391.67		
Mid Panel Stress	0.2091	0.2033	0.9878	0.2033	0.2091		

Web Design

Member	Web Tension	Allow Tension	Web Comp	Allow Comp	Weld	Qty	Material
W2	4,442.31	7,046.95	0.00	4,063.18	2.93 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
V1S	0.00	4,802.89	86.97	3,058.31	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W3	0.00	5,758.64	2,620.91	3,932.87	2.00 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W4	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W5	0.00	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W6	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W7	38.87	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W8	323.98	4,802.89	738.52	3,021.63	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W9	297.16	7,829.95	1,335.57	3,155.25	2.00 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W9	297.16	7,829.95	1,335.57	3,155.25	2.00 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W8	323.98	4,802.89	738.52	3,021.63	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W7	38.87	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W6	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W5	0.00	10,745.45	4,019.54	5,824.78	2.10 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
W4	4,019.54	5,758.64	0.00	2,782.70	3.01 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
W3	0.00	5,758.64	2,620.91	3,932.87	2.00 x 0.090	1	C12BB = 1.125 x 0.799 x 0.090
V1S	0.00	4,802.89	86.97	3,058.31	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W2	4,442.31	7,046.95	0.00	4,063.18	2.93 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
V2	0.00	4,802.89	116.61	3,275.47	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077

STRESS ANALYSIS - PAGE 3



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1F

TCX Design

TCX Left		TCX Right	
TCX Length	0-0	TCX Length	0-0
TCX Type	R	TCX Type	R
TCX Depth	3	TCX Depth	3
BPL Length	0-4	BPL Length	0-4
Clear Bearing	0-4 5/8	Clear Bearing	0-4 5/8
BPL Material: 2018 = 2 x 2 x 0.188		BPL Material: 2018 = 2 x 2 x 0.188	
Total Load	50.00	Total Load	50.00
Reqd TL Def L/80	0.00	Reqd TL Def L/80	0.00
Live Load	50.00	Live Load	50.00
Reqd LL Def L/120	0.00	Reqd LL Def L/120	0.00
Section Modulus	0.0000	Section Modulus	0.0000
Reqd SM	0.0000	Reqd SM	0.0000
Mom of Inertia	0.0000	Mom of Inertia	0.0000
Reqd MI	0.0000	Reqd MI	0.0000
Seat Type: Lapped		Seat Type: Lapped	

Load Combinations

Case 1: DL	Case 5c_mr: 0.6(DL)+WL+AX+IP-M
Case 2a: LL	Case 5d: 0.6(DL)+WL-AX+IP-M
Case 2b: SL	Case 5d_mr: 0.6(DL)+WL-AX+IP+M
Case 3a: DL+CL+TL+LL	Case 5e: (0.6-0.14(SDS))DL+AX+SM+M
Case 3b: DL+CL+TL+SL	Case 5e_mr: (0.6-0.14(SDS))DL+AX+SM-M
Case 3c: DL+CL+TL+LL+FEM	Case 5f: (0.6-0.14(SDS))DL-AX+SM-M
Case 3d: DL+CL+TL+SL+FEM	Case 5f_mr: (0.6-0.14(SDS))DL-AX+SM+M
Case 3e: DL+CL+TL+LL	Case 6a: DL+CL+0.85(TL)+WL+AX+M
Case 3f: DL+CL+TL+SL	Case 6a_mr: DL+CL+0.85(TL)+WL+AX-M
Case 4a: DL+WL+AX+M	Case 6b: DL+CL+0.85(TL)+WL-AX-M
Case 4a_mr: DL+WL+AX-M	Case 6b_mr: DL+CL+0.85(TL)+WL-AX+M
Case 4b: DL+WL-AX-M	Case 6c: DL+CL+0.85(TL)+WL+C+AX+IP+M
Case 4b_mr: DL+WL-AX+M	Case 6c_mr: DL+CL+0.85(TL)+WL+C+AX+IP-M
Case 4c: DL+WL+AX+IP+M	Case 6d: DL+CL+0.85(TL)+WL+C-AX+IP-M
Case 4c_mr: DL+WL+AX+IP-M	Case 6d_mr: DL+CL+0.85(TL)+WL+C-AX+IP+M
Case 4d: DL+WL-AX+IP-M	Case 6e: DL+CL+0.85(TL)+WL+AX+IP+M
Case 4d_mr: DL+WL-AX+IP+M	Case 6e_mr: DL+CL+0.85(TL)+WL+AX+IP-M
Case 4e: (1+0.14(SDS))DL+SM+AX+M	Case 6f: DL+CL+0.85(TL)+WL-AX+IP-M
Case 4e_mr: (1+0.14(SDS))DL+SM+AX-M	Case 6f_mr: DL+CL+0.85(TL)+WL-AX+IP+M
Case 4f: (1+0.14(SDS))DL+SM-AX-M	Case 6g: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX+M
Case 4f_mr: (1+0.14(SDS))DL+SM-AX+M	Case 6g_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX-M
Case 5a: 0.6(DL)+WL+AX+M	Case 6h: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX-M
Case 5a_mr: 0.6(DL)+WL+AX-M	Case 6h_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX+M
Case 5b: 0.6(DL)+WL-AX-M	Case 7a: DL+CL+0.85(TL)+0.75(WL+AX+LL+M)
Case 5b_mr: 0.6(DL)+WL-AX+M	Case 7a_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL-M)
Case 5c: 0.6(DL)+WL+AX+IP+M	Case 7b: DL+CL+0.85(TL)+0.75(WL-AX+LL-M)

STRESS ANALYSIS - PAGE 4



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Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 10:22:15 AM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 20K50/50	Mark: SJI1F

Load Combinations Continued

Case 7b_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+M)
Case 7c: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP+M)
Case 7c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP-M)
Case 7d: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP-M)
Case 7d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP+M)
Case 7e: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP+M)
Case 7e_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP-M)
Case 7f: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP-M)
Case 7f_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP+M)
Case 7g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL+M)
Case 7g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL-M)
Case 7h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL-M)
Case 7h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL+M)
Case 8a: DL+CL+0.85(TL)+0.75(WL+AX+SL+M)
Case 8a_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL-M)
Case 8b: DL+CL+0.85(TL)+0.75(WL-AX+SL-M)
Case 8b_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+M)
Case 8c: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP+M)
Case 8c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP-M)
Case 8d: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP-M)
Case 8d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP+M)
Case 8e: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP+M)
Case 8e_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP-M)
Case 8f: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP-M)
Case 8f_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP+M)
Case 8g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX+M)
Case 8g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX-M)
Case 8h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX-M)
Case 8h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX+M)

STRESS ANALYSIS - PAGE 1



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 2:08:06 PM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 24K50/50	Mark: SJI2A

Geometry

Base Length: 18-0	Working Length: 17-8	Joist Depth: 24.00	Effective Depth: 22.91	BC Panel Length: 3 @ 4-0	SDS Value: 1.0000	Shape: Parallel Chords	TC Slope: 0.0000
Variable	Left End	Right End					
BC Panel	3-0	2-0					
TC Panel	3-0	2-0					
First Half	3-0	2-0					
First Diag.	6-0	4-0					
Depth	24.00	24.00					
Trib Width	0-0	0-0					

Loads

Load Type	Category	Load1	Load2	Position	Direction	Loc/Begin	Sp/End	Reference
Uniform (plf)	LL (1)	50.00	50.00	TC	+	0-0	18-0	L-BL
Conc Load (lbs)	LL (1)	0.00	0.00	TC	+	8-0	8-0	L-BL
Conc Load (lbs)	LL (2)	8,847.00	0.00	TC	+	8-0	8-0	L-BL

Stress Analysis Summary

Int. Panel TC: 24.00	Max Panel BC: 60.00	Reaction LE: 4,924.27	Reaction RE: 3,922.73	Minimum Shear: 1,231.07	Max TC Comp.: 20,200.38	Max BC Tension 16,091.83		
Member	TC Tension	TC Compression	BC Tension	BC Compression	Web Tension	Web Comp.	Web Length	PP Dist.
W2	0.00	7,306.52	0.00	0.00	8,811.00	0.00	41.00	0-2
V1S	0.00	7,306.52	0.00	0.00	0.00	148.58	22.91	3-0
W3	0.00	7,306.52	15,042.84	0.00	0.00	9,170.55	42.67	3-0
W4	0.00	20,200.38	15,042.84	0.00	7,130.83	76.20	33.18	6-0
V2	0.00	20,200.38	15,042.84	0.00	0.00	8,948.00	22.91	8-0
W5	0.00	20,200.38	16,091.83	0.00	5,680.49	166.71	33.18	8-0
W5	0.00	11,983.28	16,091.83	0.00	76.20	5,680.49	33.18	10-0
V3	0.00	11,983.28	16,091.83	0.00	0.00	104.52	22.91	12-0
W4	0.00	11,983.28	7,874.73	0.00	5,680.49	0.00	33.18	12-0
W3	0.00	3,766.17	7,874.73	0.00	0.00	5,680.49	33.18	14-0
V1S	0.00	3,766.17	0.00	0.00	0.00	97.73	22.91	16-0
W2	0.00	3,766.17	0.00	0.00	5,438.00	0.00	31.77	16-0
V0	0.00	3,766.17	0.00	0.00	0.00	3,941.56	22.91	17-10

STRESS ANALYSIS - PAGE 2



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 2:08:06 PM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 24K50/50	Mark: SJI2A

Chord Properties

Chord	Area	Rx	Rz	Ryy	Y	Ix	Q	Material
TC	0.5550	0.5933	0.3554	1.2664	0.5563	0.1954	0.9834	A32B = 1.906 x 1.906 x 0.158
BC	0.5206	0.5580	0.3331	1.2260	0.5292	0.1621	1.0000	A30B = 1.797 x 1.797 x 0.158

Axial and Bending Analysis

K: 0.75	Fy: 50,000.00	Fb: 30,000.00	Mom of Inertia: 282.81	LL 360: 1,916.17	LL 240: 2,874.25	Max Bridg TC: 17-11 1/4	Max Bridg BC: 24-6 1/4
Top Chord Check	End Panel LE	First Panel LE	Interior Panel	First Panel RE	End Panel RE	Gap Between Chords: 1.1250	
Length	34.00	36.00	24.00	24.00	22.00	Min Weld Len 2X: 0.5000	
Bending Load	50.00	50.00	50.00	50.00	50.00	Max Load Fillers TC: 30,164.71	
Axial Load	7,306.52	7,306.52	20,200.38	3,766.17	3,766.17	Max Load no Fillers TC: 27,227.81	
fa	6,582.45	6,582.45	18,198.54	3,392.95	3,392.95	TC OAL/Ryy: 167.40	
Maximum K L/r	95.67	101.29	50.65	67.53	61.90	BC OAL/Ryy: 172.91	
Fcr	25,462.22	23,511.80	40,886.62	35,422.76	37,327.29	BC Stress: 0.52	
Fa	15,277.33	14,107.08	24,531.97	21,253.66	22,396.37	BC L/Rz: 180.1261	
F'e	87,154.25	77,739.45	310,957.78	174,913.75	208,161.81	TC Shear Stress: 12,414.90	
Cm	0.9622	0.9577	0.9608	0.9903	0.9919	BC Shear Stress: 14,831.23	
Panel Point Moment	555.91	555.91	200.00	226.79	226.79		
Mid Panel Moment	349.88	234.35	100.00	90.21	148.48		
Panel Point fb	1,919.94	1,919.94	690.74	783.26	783.26		
Mid Panel fb	498.05	333.59	142.35	128.41	211.35		
Fillers	0	0	0	0	0		
Panel Point Stress	8,502.40	8,502.40	18,889.28	4,176.21	4,176.21		
Mid Panel Stress	0.4474	0.4778	0.7464	0.0843	0.0831		

Web Design

Member	Web Tension	Allow Tension	Web Comp	Allow Comp	Weld	Qty	Material
W2	8,811.00	12,948.81	0.00	6,912.05	3.96 x 0.150	1	C28BA = 1.125 x 1.318 x 0.150
V1S	0.00	4,802.89	148.58	2,994.24	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W3	0.00	15,659.90	9,170.55	9,215.55	6.05 x 0.102	2	A16B = 1.375 x 1.375 x 0.102
W4	7,130.83	10,745.45	76.20	5,488.33	3.72 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
V2	0.00	24,373.24	8,948.00	15,069.44	3.21 x 0.188	1	C38BA = 1.125 x 1.845 x 0.199
W5	5,680.49	7,829.95	166.71	3,851.81	3.75 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W5	76.20	14,387.57	5,680.49	7,535.83	2.55 x 0.150	1	C28BA = 1.125 x 1.318 x 0.150
V3	0.00	4,802.89	104.52	2,994.24	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W4	5,680.49	7,829.95	0.00	3,851.81	3.75 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W3	0.00	14,387.57	5,680.49	7,535.83	2.55 x 0.150	1	C28BA = 1.125 x 1.318 x 0.150
V1S	0.00	4,802.89	97.73	2,994.24	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W2	5,438.00	8,088.94	0.00	5,140.60	3.10 x 0.118	1	C18BA = 1.125 x 1.030 x 0.118
V0	0.00	8,987.71	3,941.56	5,833.02	2.25 x 0.118	1	C18BA = 1.125 x 1.030 x 0.118

STRESS ANALYSIS - PAGE 3



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 2:08:06 PM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 24K50/50	Mark: SJI2A

TCX Design

TCX Left		TCX Right	
TCX Length	0-0	TCX Length	0-0
TCX Type	R	TCX Type	R
TCX Depth	3	TCX Depth	3
BPL Length	0-4	BPL Length	0-4
Clear Bearing	0-4 3/8	Clear Bearing	0-4 3/8
BPL Material: 1714 = 1 3/4 x 1 3/4 x 0.143		BPL Material: N/A	
Total Load	50.00	Total Load	50.00
Reqd TL Def L/80	0.00	Reqd TL Def L/80	0.00
Live Load	50.00	Live Load	50.00
Reqd LL Def L/120	0.00	Reqd LL Def L/120	0.00
Section Modulus	0.0000	Section Modulus	0.0000
Reqd SM	0.0000	Reqd SM	0.0000
Mom of Inertia	0.0000	Mom of Inertia	0.0000
Reqd MI	0.0000	Reqd MI	0.0000
Seat Type: Lapped		Seat Type: Square-End	

Load Combinations

Case 1: DL	Case 5c_mr: 0.6(DL)+WL+AX+IP-M
Case 2a: LL	Case 5d: 0.6(DL)+WL-AX+IP-M
Case 2b: SL	Case 5d_mr: 0.6(DL)+WL-AX+IP+M
Case 3a: DL+CL+TL+LL	Case 5e: (0.6-0.14(SDS))DL+AX+SM+M
Case 3b: DL+CL+TL+SL	Case 5e_mr: (0.6-0.14(SDS))DL+AX+SM-M
Case 3c: DL+CL+TL+LL+FEM	Case 5f: (0.6-0.14(SDS))DL-AX+SM-M
Case 3d: DL+CL+TL+SL+FEM	Case 5f_mr: (0.6-0.14(SDS))DL-AX+SM+M
Case 3e: DL+CL+TL+LL	Case 6a: DL+CL+0.85(TL)+WL+AX+M
Case 3f: DL+CL+TL+SL	Case 6a_mr: DL+CL+0.85(TL)+WL+AX-M
Case 4a: DL+WL+AX+M	Case 6b: DL+CL+0.85(TL)+WL-AX-M
Case 4a_mr: DL+WL+AX-M	Case 6b_mr: DL+CL+0.85(TL)+WL-AX+M
Case 4b: DL+WL-AX-M	Case 6c: DL+CL+0.85(TL)+WL+C+AX+IP+M
Case 4b_mr: DL+WL-AX+M	Case 6c_mr: DL+CL+0.85(TL)+WL+C+AX+IP-M
Case 4c: DL+WL+AX+IP+M	Case 6d: DL+CL+0.85(TL)+WL+C-AX+IP-M
Case 4c_mr: DL+WL+AX+IP-M	Case 6d_mr: DL+CL+0.85(TL)+WL+C-AX+IP+M
Case 4d: DL+WL-AX+IP-M	Case 6e: DL+CL+0.85(TL)+WL+AX+IP+M
Case 4d_mr: DL+WL-AX+IP+M	Case 6e_mr: DL+CL+0.85(TL)+WL+AX+IP-M
Case 4e: (1+0.14(SDS))DL+SM+AX+M	Case 6f: DL+CL+0.85(TL)+WL-AX+IP-M
Case 4e_mr: (1+0.14(SDS))DL+SM+AX-M	Case 6f_mr: DL+CL+0.85(TL)+WL-AX+IP+M
Case 4f: (1+0.14(SDS))DL+SM-AX-M	Case 6g: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX+M
Case 4f_mr: (1+0.14(SDS))DL+SM-AX+M	Case 6g_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX-M
Case 5a: 0.6(DL)+WL+AX+M	Case 6h: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX-M
Case 5a_mr: 0.6(DL)+WL+AX-M	Case 6h_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX+M
Case 5b: 0.6(DL)+WL-AX-M	Case 7a: DL+CL+0.85(TL)+0.75(WL+AX+LL+M)
Case 5b_mr: 0.6(DL)+WL-AX+M	Case 7a_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL-M)
Case 5c: 0.6(DL)+WL+AX+IP+M	Case 7b: DL+CL+0.85(TL)+0.75(WL-AX+LL-M)

STRESS ANALYSIS - PAGE 4



NEW MILLENNIUM
A Steel Dynamics Company

Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 2:08:06 PM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 24K50/50	Mark: SJI2A

Load Combinations Continued

Case 7b_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+M)
Case 7c: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP+M)
Case 7c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP-M)
Case 7d: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP-M)
Case 7d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP+M)
Case 7e: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP+M)
Case 7e_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP-M)
Case 7f: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP-M)
Case 7f_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP+M)
Case 7g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL+M)
Case 7g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL-M)
Case 7h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL-M)
Case 7h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL+M)
Case 8a: DL+CL+0.85(TL)+0.75(WL+AX+SL+M)
Case 8a_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL-M)
Case 8b: DL+CL+0.85(TL)+0.75(WL-AX+SL-M)
Case 8b_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+M)
Case 8c: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP+M)
Case 8c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP-M)
Case 8d: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP-M)
Case 8d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP+M)
Case 8e: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP+M)
Case 8e_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP-M)
Case 8f: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP-M)
Case 8f_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP+M)
Case 8g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX+M)
Case 8g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX-M)
Case 8h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX-M)
Case 8h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX+M)

STRESS ANALYSIS - PAGE 1



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 2:08:44 PM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 24K50/50	Mark: SJI2B

Geometry

Base Length: 18-0	Working Length: 17-8	Joist Depth: 24.00	Effective Depth: 22.91	BC Panel Length: 3 @ 4-0	SDS Value: 1.0000	Shape: Parallel Chords	TC Slope: 0.0000
Variable	Left End	Right End					
BC Panel	3-0	2-0					
TC Panel	3-0	2-0					
First Half	3-0	2-0					
First Diag.	6-0	4-0					
Depth	24.00	24.00					
Trib Width	0-0	0-0					

Loads

Load Type	Category	Load1	Load2	Position	Direction	Loc/Begin	Sp/End	Reference
Uniform (plf)	LL (1)	50.00	50.00	TC	+	0-0	18-0	L-BL
Conc Load (lbs)	LL (1)	0.00	0.00	TC	+	8-0	8-0	L-BL
Conc Load (lbs)	LL (2)	8,847.00	0.00	TC	+	8-0	8-0	L-BL

Stress Analysis Summary

Int. Panel TC: 24.00		Max Panel BC: 60.00		Reaction LE: 4,924.27		Reaction RE: 3,922.73		Minimum Shear: 1,231.07		Max TC Comp.: 20,200.38		Max BC Tension 16,091.83	
Member	TC Tension	TC Compression	BC Tension	BC Compression	Web Tension	Web Comp.	Web Length	PP Dist.					
W2	0.00	7,306.52	0.00	0.00	8,811.00	0.00	41.00	0-2					
V1S	0.00	7,306.52	0.00	0.00	0.00	148.58	22.91	3-0					
W3	0.00	7,306.52	15,042.84	0.00	0.00	9,170.55	42.67	3-0					
W4	0.00	20,200.38	15,042.84	0.00	7,130.83	76.20	33.18	6-0					
V2	0.00	20,200.38	15,042.84	0.00	0.00	8,948.00	22.91	8-0					
W5	0.00	20,200.38	16,091.83	0.00	5,680.49	166.71	33.18	8-0					
W5	0.00	11,983.28	16,091.83	0.00	76.20	5,680.49	33.18	10-0					
V3	0.00	11,983.28	16,091.83	0.00	0.00	104.52	22.91	12-0					
W4	0.00	11,983.28	7,874.73	0.00	5,680.49	0.00	33.18	12-0					
W3	0.00	3,766.17	7,874.73	0.00	0.00	5,680.49	33.18	14-0					
V1S	0.00	3,766.17	0.00	0.00	0.00	97.73	22.91	16-0					
W2	0.00	3,766.17	0.00	0.00	5,438.00	0.00	31.77	16-0					
V0	0.00	3,766.17	0.00	0.00	0.00	3,941.56	22.91	17-10					

STRESS ANALYSIS - PAGE 2



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 2:08:44 PM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 24K50/50	Mark: SJI2B

Chord Properties

Chord	Area	Rx	Rz	Ryy	Y	Ix	Q	Material
TC	0.5550	0.5933	0.3554	1.2664	0.5563	0.1954	0.9834	A32B = 1.906 x 1.906 x 0.158
BC	0.5206	0.5580	0.3331	1.2260	0.5292	0.1621	1.0000	A30B = 1.797 x 1.797 x 0.158

Axial and Bending Analysis

K: 0.75	Fy: 50,000.00	Fb: 30,000.00	Mom of Inertia: 282.81	LL 360: 1,916.17	LL 240: 2,874.25	Max Bridg TC: 17-11 1/4	Max Bridg BC: 24-6 1/4
Top Chord Check	End Panel LE	First Panel LE	Interior Panel	First Panel RE	End Panel RE	Gap Between Chords: 1.1250	
Length	34.00	36.00	24.00	24.00	22.00	Min Weld Len 2X: 0.5000	
Bending Load	50.00	50.00	50.00	50.00	50.00	Max Load Fillers TC: 30,164.71	
Axial Load	7,306.52	7,306.52	20,200.38	3,766.17	3,766.17	Max Load no Fillers TC: 27,227.81	
fa	6,582.45	6,582.45	18,198.54	3,392.95	3,392.95	TC OAL/Ryy: 167.40	
Maximum K L/r	95.67	101.29	50.65	67.53	61.90	BC OAL/Ryy: 172.91	
Fcr	25,462.22	23,511.80	40,886.62	35,422.76	37,327.29	BC Stress: 0.52	
Fa	15,277.33	14,107.08	24,531.97	21,253.66	22,396.37	BC L/Rz: 180.1261	
F'e	87,154.25	77,739.45	310,957.78	174,913.75	208,161.81	TC Shear Stress: 12,414.90	
Cm	0.9622	0.9577	0.9608	0.9903	0.9919	BC Shear Stress: 14,831.23	
Panel Point Moment	555.91	555.91	200.00	226.79	226.79		
Mid Panel Moment	349.88	234.35	100.00	90.21	148.48		
Panel Point fb	1,919.94	1,919.94	690.74	783.26	783.26		
Mid Panel fb	498.05	333.59	142.35	128.41	211.35		
Fillers	0	0	0	0	0		
Panel Point Stress	8,502.40	8,502.40	18,889.28	4,176.21	4,176.21		
Mid Panel Stress	0.4474	0.4778	0.7464	0.0843	0.0831		

Web Design

Member	Web Tension	Allow Tension	Web Comp	Allow Comp	Weld	Qty	Material
W2	8,811.00	12,948.81	0.00	6,912.05	3.96 x 0.150	1	C28BA = 1.125 x 1.318 x 0.150
V1S	0.00	4,802.89	148.58	2,994.24	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W3	0.00	15,659.90	9,170.55	9,215.55	6.05 x 0.102	2	A16B = 1.375 x 1.375 x 0.102
W4	7,130.83	10,745.45	76.20	5,488.33	3.72 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
V2	0.00	24,373.24	8,948.00	15,069.44	3.21 x 0.188	1	C38BA = 1.125 x 1.845 x 0.199
W5	5,680.49	7,829.95	166.71	3,851.81	3.75 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W5	76.20	14,387.57	5,680.49	7,535.83	2.55 x 0.150	1	C28BA = 1.125 x 1.318 x 0.150
V3	0.00	4,802.89	104.52	2,994.24	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W4	5,680.49	7,829.95	0.00	3,851.81	3.75 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W3	0.00	14,387.57	5,680.49	7,535.83	2.55 x 0.150	1	C28BA = 1.125 x 1.318 x 0.150
V1S	0.00	4,802.89	97.73	2,994.24	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W2	5,438.00	8,088.94	0.00	5,140.60	3.10 x 0.118	1	C18BA = 1.125 x 1.030 x 0.118
V0	0.00	8,987.71	3,941.56	5,833.02	2.25 x 0.118	1	C18BA = 1.125 x 1.030 x 0.118

STRESS ANALYSIS - PAGE 3



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 2:08:44 PM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 24K50/50	Mark: SJI2B

TCX Design

TCX Left		TCX Right	
TCX Length	0-0	TCX Length	0-0
TCX Type	R	TCX Type	R
TCX Depth	3	TCX Depth	3
BPL Length	0-4	BPL Length	0-4
Clear Bearing	0-4 3/8	Clear Bearing	0-4 3/8
BPL Material: 1714 = 1 3/4 x 1 3/4 x 0.143		BPL Material: N/A	
Total Load	50.00	Total Load	50.00
Reqd TL Def L/80	0.00	Reqd TL Def L/80	0.00
Live Load	50.00	Live Load	50.00
Reqd LL Def L/120	0.00	Reqd LL Def L/120	0.00
Section Modulus	0.0000	Section Modulus	0.0000
Reqd SM	0.0000	Reqd SM	0.0000
Mom of Inertia	0.0000	Mom of Inertia	0.0000
Reqd MI	0.0000	Reqd MI	0.0000
Seat Type: Lapped		Seat Type: Square-End	

Load Combinations

Case 1: DL	Case 5c_mr: 0.6(DL)+WL+AX+IP-M
Case 2a: LL	Case 5d: 0.6(DL)+WL-AX+IP-M
Case 2b: SL	Case 5d_mr: 0.6(DL)+WL-AX+IP+M
Case 3a: DL+CL+TL+LL	Case 5e: (0.6-0.14(SDS))DL+AX+SM+M
Case 3b: DL+CL+TL+SL	Case 5e_mr: (0.6-0.14(SDS))DL+AX+SM-M
Case 3c: DL+CL+TL+LL+FEM	Case 5f: (0.6-0.14(SDS))DL-AX+SM-M
Case 3d: DL+CL+TL+SL+FEM	Case 5f_mr: (0.6-0.14(SDS))DL-AX+SM+M
Case 3e: DL+CL+TL+LL	Case 6a: DL+CL+0.85(TL)+WL+AX+M
Case 3f: DL+CL+TL+SL	Case 6a_mr: DL+CL+0.85(TL)+WL+AX-M
Case 4a: DL+WL+AX+M	Case 6b: DL+CL+0.85(TL)+WL-AX-M
Case 4a_mr: DL+WL+AX-M	Case 6b_mr: DL+CL+0.85(TL)+WL-AX+M
Case 4b: DL+WL-AX-M	Case 6c: DL+CL+0.85(TL)+WL+C+AX+IP+M
Case 4b_mr: DL+WL-AX+M	Case 6c_mr: DL+CL+0.85(TL)+WL+C+AX+IP-M
Case 4c: DL+WL+AX+IP+M	Case 6d: DL+CL+0.85(TL)+WL+C-AX+IP-M
Case 4c_mr: DL+WL+AX+IP-M	Case 6d_mr: DL+CL+0.85(TL)+WL+C-AX+IP+M
Case 4d: DL+WL-AX+IP-M	Case 6e: DL+CL+0.85(TL)+WL+AX+IP+M
Case 4d_mr: DL+WL-AX+IP+M	Case 6e_mr: DL+CL+0.85(TL)+WL+AX+IP-M
Case 4e: (1+0.14(SDS))DL+SM+AX+M	Case 6f: DL+CL+0.85(TL)+WL-AX+IP-M
Case 4e_mr: (1+0.14(SDS))DL+SM+AX-M	Case 6f_mr: DL+CL+0.85(TL)+WL-AX+IP+M
Case 4f: (1+0.14(SDS))DL+SM-AX-M	Case 6g: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX+M
Case 4f_mr: (1+0.14(SDS))DL+SM-AX+M	Case 6g_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX-M
Case 5a: 0.6(DL)+WL+AX+M	Case 6h: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX-M
Case 5a_mr: 0.6(DL)+WL+AX-M	Case 6h_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX+M
Case 5b: 0.6(DL)+WL-AX-M	Case 7a: DL+CL+0.85(TL)+0.75(WL+AX+LL+M)
Case 5b_mr: 0.6(DL)+WL-AX+M	Case 7a_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL-M)
Case 5c: 0.6(DL)+WL+AX+IP+M	Case 7b: DL+CL+0.85(TL)+0.75(WL-AX+LL-M)

STRESS ANALYSIS - PAGE 4



NEW MILLENNIUM
A Steel Dynamics Company

Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 2:08:44 PM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 24K50/50	Mark: SJI2B

Load Combinations Continued

Case 7b_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+M)
Case 7c: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP+M)
Case 7c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP-M)
Case 7d: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP-M)
Case 7d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP+M)
Case 7e: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP+M)
Case 7e_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP-M)
Case 7f: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP-M)
Case 7f_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP+M)
Case 7g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL+M)
Case 7g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL-M)
Case 7h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL-M)
Case 7h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL+M)
Case 8a: DL+CL+0.85(TL)+0.75(WL+AX+SL+M)
Case 8a_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL-M)
Case 8b: DL+CL+0.85(TL)+0.75(WL-AX+SL-M)
Case 8b_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+M)
Case 8c: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP+M)
Case 8c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP-M)
Case 8d: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP-M)
Case 8d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP+M)
Case 8e: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP+M)
Case 8e_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP-M)
Case 8f: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP-M)
Case 8f_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP+M)
Case 8g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX+M)
Case 8g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX-M)
Case 8h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX-M)
Case 8h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX+M)

STRESS ANALYSIS - PAGE 1



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 2:09:07 PM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 24K50/50	Mark: SJI2C

Geometry

Base Length: 18-0	Working Length: 17-8	Joist Depth: 24.00	Effective Depth: 22.91	BC Panel Length: 3 @ 4-0	SDS Value: 1.0000	Shape: Parallel Chords	TC Slope: 0.0000
Variable	Left End	Right End					
BC Panel	3-0	2-0					
TC Panel	3-0	2-0					
First Half	3-0	2-0					
First Diag.	6-0	4-0					
Depth	24.00	24.00					
Trib Width	0-0	0-0					

Loads

Load Type	Category	Load1	Load2	Position	Direction	Loc/Begin	Sp/End	Reference
Uniform (plf)	LL (1)	50.00	50.00	TC	+	0-0	18-0	L-BL
Conc Load (lbs)	LL (1)	0.00	0.00	TC	+	8-0	8-0	L-BL
Conc Load (lbs)	LL (2)	8,847.00	0.00	TC	+	8-0	8-0	L-BL

Stress Analysis Summary

Int. Panel TC: 24.00	Max Panel BC: 60.00	Reaction LE: 4,924.27	Reaction RE: 3,922.73	Minimum Shear: 1,231.07	Max TC Comp.: 20,200.38	Max BC Tension 16,091.83		
Member	TC Tension	TC Compression	BC Tension	BC Compression	Web Tension	Web Comp.	Web Length	PP Dist.
W2	0.00	7,306.52	0.00	0.00	8,811.00	0.00	41.00	0-2
V1S	0.00	7,306.52	0.00	0.00	0.00	148.58	22.91	3-0
W3	0.00	7,306.52	15,042.84	0.00	0.00	9,170.55	42.67	3-0
W4	0.00	20,200.38	15,042.84	0.00	7,130.83	76.20	33.18	6-0
V2	0.00	20,200.38	15,042.84	0.00	0.00	8,948.00	22.91	8-0
W5	0.00	20,200.38	16,091.83	0.00	5,680.49	166.71	33.18	8-0
W5	0.00	11,983.28	16,091.83	0.00	76.20	5,680.49	33.18	10-0
V3	0.00	11,983.28	16,091.83	0.00	0.00	104.52	22.91	12-0
W4	0.00	11,983.28	7,874.73	0.00	5,680.49	0.00	33.18	12-0
W3	0.00	3,766.17	7,874.73	0.00	0.00	5,680.49	33.18	14-0
V1S	0.00	3,766.17	0.00	0.00	0.00	97.73	22.91	16-0
W2	0.00	3,766.17	0.00	0.00	5,438.00	0.00	31.77	16-0
V0	0.00	3,766.17	0.00	0.00	0.00	3,941.56	22.91	17-10

STRESS ANALYSIS - PAGE 2



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 2:09:07 PM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 24K50/50	Mark: SJI2C

Chord Properties

Chord	Area	Rx	Rz	Ryy	Y	Ix	Q	Material
TC	0.5550	0.5933	0.3554	1.2664	0.5563	0.1954	0.9834	A32B = 1.906 x 1.906 x 0.158
BC	0.5206	0.5580	0.3331	1.2260	0.5292	0.1621	1.0000	A30B = 1.797 x 1.797 x 0.158

Axial and Bending Analysis

K: 0.75	Fy: 50,000.00	Fb: 30,000.00	Mom of Inertia: 282.81	LL 360: 1,916.17	LL 240: 2,874.25	Max Bridg TC: 17-11 1/4	Max Bridg BC: 24-6 1/4
Top Chord Check	End Panel LE	First Panel LE	Interior Panel	First Panel RE	End Panel RE	Gap Between Chords: 1.1250	
Length	34.00	36.00	24.00	24.00	22.00	Min Weld Len 2X: 0.5000	
Bending Load	50.00	50.00	50.00	50.00	50.00	Max Load Fillers TC: 30,164.71	
Axial Load	7,306.52	7,306.52	20,200.38	3,766.17	3,766.17	Max Load no Fillers TC: 27,227.81	
fa	6,582.45	6,582.45	18,198.54	3,392.95	3,392.95	TC OAL/Ryy: 167.40	
Maximum K L/r	95.67	101.29	50.65	67.53	61.90	BC OAL/Ryy: 172.91	
Fcr	25,462.22	23,511.80	40,886.62	35,422.76	37,327.29	BC Stress: 0.52	
Fa	15,277.33	14,107.08	24,531.97	21,253.66	22,396.37	BC L/Rz: 180.1261	
F'e	87,154.25	77,739.45	310,957.78	174,913.75	208,161.81	TC Shear Stress: 12,414.90	
Cm	0.9622	0.9577	0.9608	0.9903	0.9919	BC Shear Stress: 14,831.23	
Panel Point Moment	555.91	555.91	200.00	226.79	226.79		
Mid Panel Moment	349.88	234.35	100.00	90.21	148.48		
Panel Point fb	1,919.94	1,919.94	690.74	783.26	783.26		
Mid Panel fb	498.05	333.59	142.35	128.41	211.35		
Fillers	0	0	0	0	0		
Panel Point Stress	8,502.40	8,502.40	18,889.28	4,176.21	4,176.21		
Mid Panel Stress	0.4474	0.4778	0.7464	0.0843	0.0831		

Web Design

Member	Web Tension	Allow Tension	Web Comp	Allow Comp	Weld	Qty	Material
W2	8,811.00	12,948.81	0.00	6,912.05	3.96 x 0.150	1	C28BA = 1.125 x 1.318 x 0.150
V1S	0.00	4,802.89	148.58	2,994.24	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W3	0.00	15,659.90	9,170.55	9,215.55	6.05 x 0.102	2	A16B = 1.375 x 1.375 x 0.102
W4	7,130.83	10,745.45	76.20	5,488.33	3.72 x 0.129	1	C22BA = 1.125 x 1.162 x 0.129
V2	0.00	24,373.24	8,948.00	15,069.44	3.21 x 0.188	1	C38BA = 1.125 x 1.845 x 0.199
W5	5,680.49	7,829.95	166.71	3,851.81	3.75 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W5	76.20	14,387.57	5,680.49	7,535.83	2.55 x 0.150	1	C28BA = 1.125 x 1.318 x 0.150
V3	0.00	4,802.89	104.52	2,994.24	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W4	5,680.49	7,829.95	0.00	3,851.81	3.75 x 0.102	1	C16BA = 1.125 x 1.021 x 0.102
W3	0.00	14,387.57	5,680.49	7,535.83	2.55 x 0.150	1	C28BA = 1.125 x 1.318 x 0.150
V1S	0.00	4,802.89	97.73	2,994.24	2.00 x 0.077	1	C10AB = 1.125 x 0.756 x 0.077
W2	5,438.00	8,088.94	0.00	5,140.60	3.10 x 0.118	1	C18BA = 1.125 x 1.030 x 0.118
V0	0.00	8,987.71	3,941.56	5,833.02	2.25 x 0.118	1	C18BA = 1.125 x 1.030 x 0.118

STRESS ANALYSIS - PAGE 3



Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 2:09:07 PM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 24K50/50	Mark: SJI2C

TCX Design

TCX Left		TCX Right	
TCX Length	0-0	TCX Length	0-0
TCX Type	R	TCX Type	R
TCX Depth	3	TCX Depth	3
BPL Length	0-4	BPL Length	0-4
Clear Bearing	0-4 3/8	Clear Bearing	0-4 3/8
BPL Material: 1714 = 1 3/4 x 1 3/4 x 0.143		BPL Material: N/A	
Total Load	50.00	Total Load	50.00
Reqd TL Def L/80	0.00	Reqd TL Def L/80	0.00
Live Load	50.00	Live Load	50.00
Reqd LL Def L/120	0.00	Reqd LL Def L/120	0.00
Section Modulus	0.0000	Section Modulus	0.0000
Reqd SM	0.0000	Reqd SM	0.0000
Mom of Inertia	0.0000	Mom of Inertia	0.0000
Reqd MI	0.0000	Reqd MI	0.0000
Seat Type: Lapped		Seat Type: Square-End	

Load Combinations

Case 1: DL	Case 5c_mr: 0.6(DL)+WL+AX+IP-M
Case 2a: LL	Case 5d: 0.6(DL)+WL-AX+IP-M
Case 2b: SL	Case 5d_mr: 0.6(DL)+WL-AX+IP+M
Case 3a: DL+CL+TL+LL	Case 5e: (0.6-0.14(SDS))DL+AX+SM+M
Case 3b: DL+CL+TL+SL	Case 5e_mr: (0.6-0.14(SDS))DL+AX+SM-M
Case 3c: DL+CL+TL+LL+FEM	Case 5f: (0.6-0.14(SDS))DL-AX+SM-M
Case 3d: DL+CL+TL+SL+FEM	Case 5f_mr: (0.6-0.14(SDS))DL-AX+SM+M
Case 3e: DL+CL+TL+LL	Case 6a: DL+CL+0.85(TL)+WL+AX+M
Case 3f: DL+CL+TL+SL	Case 6a_mr: DL+CL+0.85(TL)+WL+AX-M
Case 4a: DL+WL+AX+M	Case 6b: DL+CL+0.85(TL)+WL-AX-M
Case 4a_mr: DL+WL+AX-M	Case 6b_mr: DL+CL+0.85(TL)+WL-AX+M
Case 4b: DL+WL-AX-M	Case 6c: DL+CL+0.85(TL)+WL+C+AX+IP+M
Case 4b_mr: DL+WL-AX+M	Case 6c_mr: DL+CL+0.85(TL)+WL+C+AX+IP-M
Case 4c: DL+WL+AX+IP+M	Case 6d: DL+CL+0.85(TL)+WL+C-AX+IP-M
Case 4c_mr: DL+WL+AX+IP-M	Case 6d_mr: DL+CL+0.85(TL)+WL+C-AX+IP+M
Case 4d: DL+WL-AX+IP-M	Case 6e: DL+CL+0.85(TL)+WL+AX+IP+M
Case 4d_mr: DL+WL-AX+IP+M	Case 6e_mr: DL+CL+0.85(TL)+WL+AX+IP-M
Case 4e: (1+0.14(SDS))DL+SM+AX+M	Case 6f: DL+CL+0.85(TL)+WL-AX+IP-M
Case 4e_mr: (1+0.14(SDS))DL+SM+AX-M	Case 6f_mr: DL+CL+0.85(TL)+WL-AX+IP+M
Case 4f: (1+0.14(SDS))DL+SM-AX-M	Case 6g: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX+M
Case 4f_mr: (1+0.14(SDS))DL+SM-AX+M	Case 6g_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM+AX-M
Case 5a: 0.6(DL)+WL+AX+M	Case 6h: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX-M
Case 5a_mr: 0.6(DL)+WL+AX-M	Case 6h_mr: (1+0.14(SDS))DL+(1+0.14(SDS))CL+(0.85+0.056(SDS))TL+SM-AX+M
Case 5b: 0.6(DL)+WL-AX-M	Case 7a: DL+CL+0.85(TL)+0.75(WL+AX+LL+M)
Case 5b_mr: 0.6(DL)+WL-AX+M	Case 7a_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL-M)
Case 5c: 0.6(DL)+WL+AX+IP+M	Case 7b: DL+CL+0.85(TL)+0.75(WL-AX+LL-M)

STRESS ANALYSIS - PAGE 4



NEW MILLENNIUM
A Steel Dynamics Company

Job Number: 3626-0035	Job Name: SJI FILLER PROJECT - SHOPORDERS	Date Run: 3/11/2026 2:09:07 PM
Location: KNOXVILLE, TN	Joist Description: Short Span Crimp 24K50/50	Mark: SJI2C

Load Combinations Continued

Case 7b_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+M)
Case 7c: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP+M)
Case 7c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+LL+IP-M)
Case 7d: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP-M)
Case 7d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+LL+IP+M)
Case 7e: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP+M)
Case 7e_mr: DL+CL+0.85(TL)+0.75(WL+AX+LL+IP-M)
Case 7f: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP-M)
Case 7f_mr: DL+CL+0.85(TL)+0.75(WL-AX+LL+IP+M)
Case 7g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL+M)
Case 7g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM+AX+LL-M)
Case 7h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL-M)
Case 7h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SM-AX+LL+M)
Case 8a: DL+CL+0.85(TL)+0.75(WL+AX+SL+M)
Case 8a_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL-M)
Case 8b: DL+CL+0.85(TL)+0.75(WL-AX+SL-M)
Case 8b_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+M)
Case 8c: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP+M)
Case 8c_mr: DL+CL+0.85(TL)+0.75(WL+C+AX+SL+IP-M)
Case 8d: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP-M)
Case 8d_mr: DL+CL+0.85(TL)+0.75(WL+C-AX+SL+IP+M)
Case 8e: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP+M)
Case 8e_mr: DL+CL+0.85(TL)+0.75(WL+AX+SL+IP-M)
Case 8f: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP-M)
Case 8f_mr: DL+CL+0.85(TL)+0.75(WL-AX+SL+IP+M)
Case 8g: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX+M)
Case 8g_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM+AX-M)
Case 8h: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX-M)
Case 8h_mr: (1+0.105(SDS))DL+(1+0.105(SDS))CL+(0.85+0.042(SDS))TL+0.75(SL+SM-AX+M)