

Holes and Flange Interferences in TJI® Joists

Planning in advance for holes and plumbing drops are critical in eliminating damaged product, costly repairs, and time delays. Product Application Assurance (PAA) is an effort to ensure TJI® joists are properly manufactured, selected, designed, and installed so they perform as intended. All parties are responsible for making this happen. You can read more about this business principle in *Introduction to Product Application Assurance* ([TB-114](#)). The following provides key resources to help to plan for trades in advance.

Planning for Holes in TJI® Joists

The following is a summary of technical literature and software tools for planning holes in TJI® joists.

RESOURCES-HOLES

Product	Type	Description	Reference Tool
TJI® Joists	Round, square, and rectangular	- Installation guide for TJI's up to 16" deep (TJ-9001) and joists 18"-24" (TJ-9006) - Includes round, rectangular holes and holes up to 24" wide for TJI® 360 and 560 joists	TJ-9001 & TJ-9006
	Round, square, and rectangular	Includes round, rectangular holes and holes up to 24" wide for TJI® 360 and 560 joists	U.S. TJ-4000 Canada TJ-4500
	Round, square, rectangular, and typical duct holes	Online tool to provide proper hole location distance	U.S. Canada
	Job site resource	Poster for allowable holes in TJI® joists	TJ-9015
	Multiple holes, larger holes, more exact location	- Free online software which provides the most flexibility in hole size and placement - Hole types Included: multiple, square, round, oval and holes up to 20" to 24" wide	ForteWEB®
	Typical duct holes	Hole chart for typical large duct holes	TB-836

Avoiding Flange Interference in TJI® Joists

In addition to planning for holes ahead of time, it is crucial to identify plumbing drops and other potential obstructions to ensure proper joist placement.

RESOURCES-FLANGE INTERFERENCE

Product	Type	Description	Reference Tool
TJI® Joists	Shifted joist	Installation guide with information on shifting a joist ahead of time provided floor sheathing has capability and no unsupported edges	TJ-9001
	Header-off	Header-off span table for TJI® joists	TB-319
	Rafter cuts	Rafter cut on end of TJI® joists	TB-805
	Replacement Joist	Installing a replacement EWP joist adjacent to a damaged EWP joist	TB-839
	Member design	Design header-off scenarios	ForteWEB®

Analysis and Repairs for TJI® Joists

Weyerhaeuser brings decades of experience in testing the performance of TJI® joist flange and web repairs. Extensive testing has consistently shown that empirical testing provides more reliable and accurate predictions of repair performance than calculations alone. This is largely due to the complex failure modes unique to wood, such as splitting, and the challenges in accurately modeling load transfer and movement between reinforcement elements using calculations alone.

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TJI® joists behave structurally much like trusses, efficiently supporting vertical loads. The flanges resist bending forces through tension and compression, while the web carries vertical shear forces. Each component plays a distinct structural role, requiring tailored reinforcement strategies to ensure optimal performance.

Repairs are typically for one damaged member that is part of a repetitive system. Multiple damaged joists should be reviewed for sufficient redundancy and adequate floor performance. When damaged joists are part of a fire-rated floor assembly, additional protection measures may be required.

For all repair situations, a designer of record and/or authority having jurisdiction should review and approve.

RESOURCES-ANALYSIS AND REPAIRS

Problem	Type	Description	Reference Tool
Holes	Hole analysis	- Ability to design multiple holes per span - Also try design a larger hole to encompass smaller holes	ForteWEB®
	Close to end bearing	Hole too close to bearing	TB-817
	Panel repair	- Repair options for too big a hole or in the wrong location - Allows keeping the hole or covering	TB-838
Flange	Flange notch analysis	- Flange notch analysis for top and bottom flange - For side and across flange notches	ForteWEB®
	New joist	Replace or put in new joist	TJ-9001
	Header-off	Header-off of damaged flange	TB-319
	Top flange repair	TJI flange notch acceptance and repairs for top flange compression notches	TB-818
	Top flange repair	Enhanced flange repair using epoxy	TB-832
	Bottom flange repair	Flanges in tension are the most critical component and typically can't be repaired if it does not pass flange analysis in ForteWEB®. Contact Weyerhaeuser for potential repair	techsupport@wy.com
	Dropped or forklift stab	Besides visual damage, possible internal damage typically makes situations unrepairable. Contact Weyerhaeuser for further guidance	techsupport@wy.com

There are no tested repairs, wood or metal, which bring back full published code accepted design values. Repairs typically only are for a specific design load and application. Changes in loading, remodeling over time may negate impact of repair.

After Market Metal Repairs for Flanges Notches and Web Holes

- Verify that the product has a code acceptance report for specific engineered wood products to be used.
- Ensure it will fit the joist.
 - Most repair products do not match the dimensions of TJI® joists. Shims will degrade capacity, unless tested specifically with them.
- Verify spacing of fasteners into joist do not violate [TB-206](#).
 - Fasteners spaced too closely can split and damage the member.
- Repairs will not restore the joist to its published capacity.

For situations outside the scope of this bulletin, contractor training prior to “cutting” or to better understand product limitations, contact Weyerhaeuser.

If you have any questions, please contact your Weyerhaeuser representative.