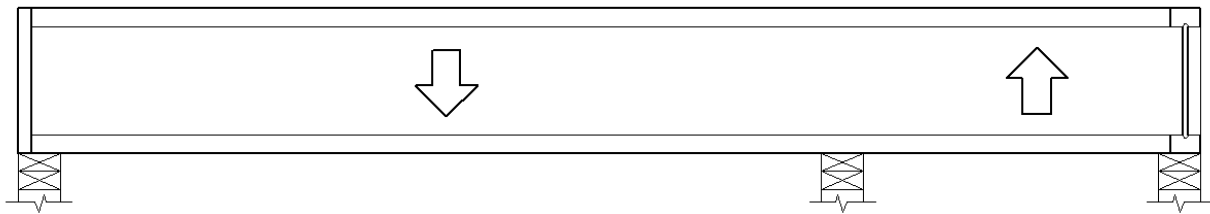


PK-USA PKI Series I-joists

Multiple Bearing Uplift Conditions

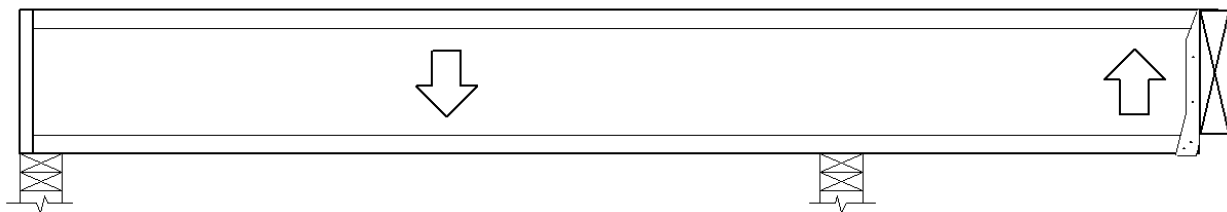
Uplift conditions

When designing floor and roof systems utilizing PKI Series I-joist it is necessary to have sufficient bearing locations to support the joist span and loads. For conditions in which multiple bearing supports are used within a given span, the location of those bearing can cause an “uplift” condition in the joist. This typically occurs when the distance between bearing support is uneven. As the span differences between bearing supports grow, the amount of uplift in the shorter span increases. Large point loads within a given span can also induce an “uplift” condition when the point load only occurs in one of the span sections.



Design failures with excessive uplift loads

When the joist design of a multiple bearing condition PKI Series I-joist occurs, the failure is typically attributed to the joist exceeding its maximum reaction capacity or exceeding the maximum allowable shear capacity at bearing. Another source of uplift failure occurs when the joist is being supported by a hanger or other hardware in which the uplift capacity of the hanger is insufficient to contain the uplift forces of the joist. This limitation is typically seen in top flange hangers or hangers with fewer nailing locations into the side of the joist or the support member.



Typical hanger and fastener uplift limitations

Limitations to fastener uplift capacity can be seen in the following referenced charts.

Model	Fasteners (in.)			Allowable Loads Header Type							
	Top	Face	Joist	Uplift (160)	LVL	PSL	LSL	DF/SP	SPF/HF	DF/SCL I-Joist	SPF/HF I-Joist
ITS Series (Standard Installation)	(4) 0.148 x 1½	(2) 0.148 x 1½	—	120	1,395	1,245	1,625	1,455	1,140	1,085	940
	(4) 0.148 x 3	(2) 0.148 x 3	—	120	1,550	1,365	1,780	1,470	1,150	—	—
	(4) 0.162 x 3½	(2) 0.162 x 3½	—	120	1,785	1,735	1,905	1,565	1,225	—	—
ITS Series (Alternate Installation)	(4) 0.148 x 3	(4) 0.148 x 3	—	120	1,735	1,595	1,885	1,955	1,230	—	—
	(4) 0.162 x 3½	(4) 0.162 x 3½	—	120	1,785	1,735	1,905	1,955	1,490	—	—
	(4) 0.148 x 3	(4) 0.148 x 3	(4) 0.148 x 1½	630	1,735	1,595	1,885	1,955	1,230	—	—
	(4) 0.162 x 3½	(4) 0.162 x 3½	(4) 0.148 x 1½	630	1,785	1,735	1,905	1,955	1,490	—	—

Note: The Table above references Simpson Strong-Tie ITS Model hanger. Copyright Simpson Strong-Tie Inc. Circa 2021.



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TECHNICAL BULLETIN

TB24

Published 01-January 2024

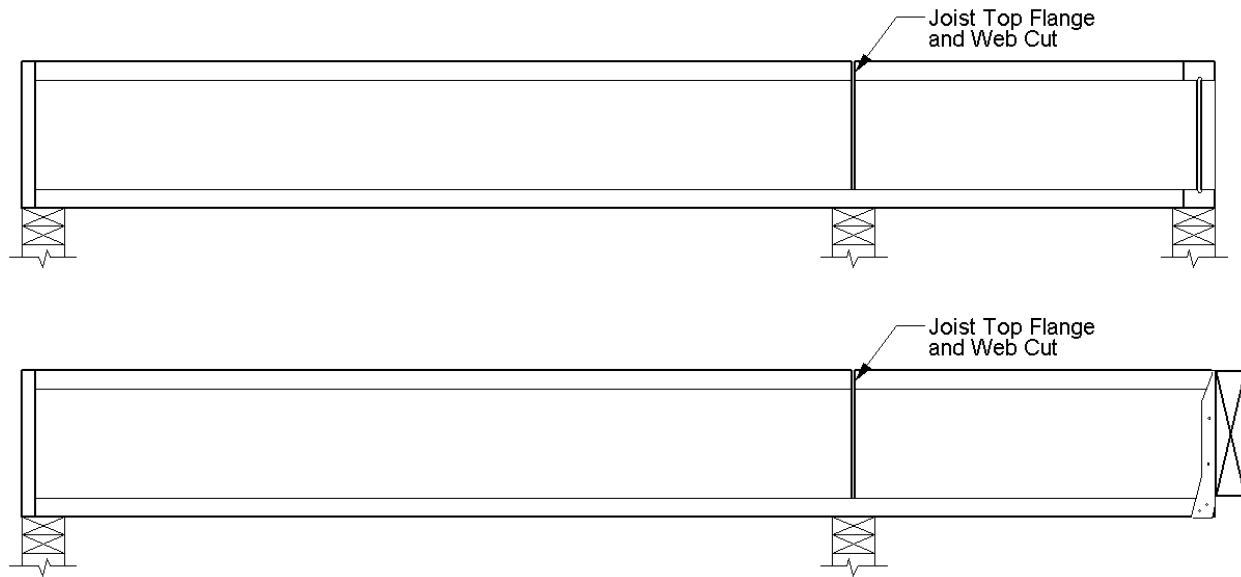
Pinkwood PKjoists®

Multiple Bearing Uplift Conditions

Design options to remove excessive uplift condition

To remove excessive uplift failures during design, two methods are typically used to bring the joist design back into compliance. The first option is to change the joist span from a multiple span to a simple span condition. This allows each joist section to be independent thus removing the uplift forces. This option requires the framer to joist each section of the affected area with short span joists.

The second option is to remove the uplift forces within the joist by cutting only the “top” flange and web section of a multi-span joist at the bearing location closest to the uplift failure. This allows for long, continuous spanning joists to be rolled by the framer thus reducing the number of joists handled during construction. This modification is typically done after the joists have been properly placed. The detail below shows the required cut needed to achieve this correction.



If you have any questions, please contact Pinkwood Ltd. for details.