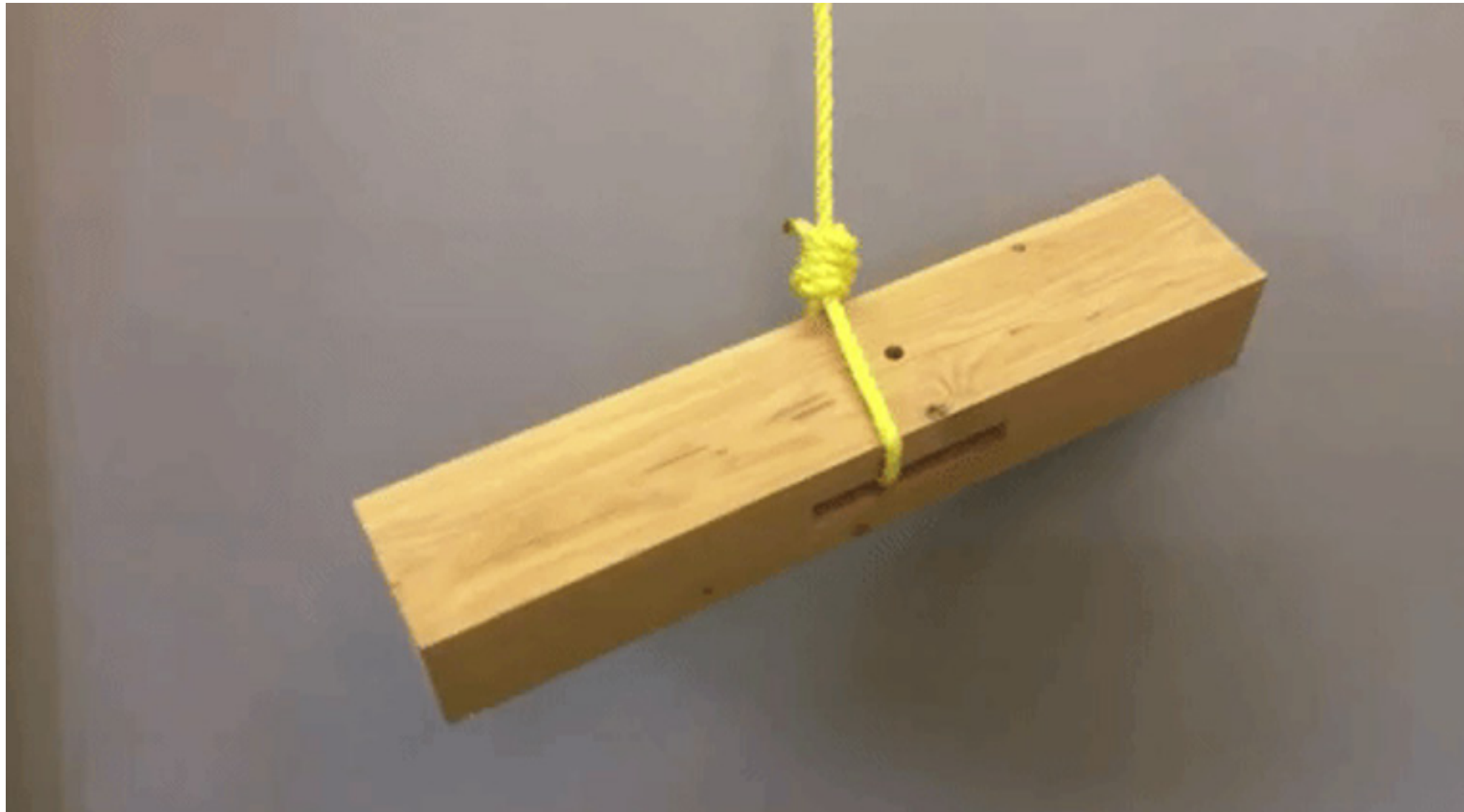


# The Beam Hanger Webinar



Webinar #3



# Wood Construction Evolution

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Source: APA – The Engineered Wood Association

# Wood Construction Evolution

---



Source: APA – The Engineered Wood Association

# Wood Construction Evolution

---



# Wood Construction Evolution

---



Source: APA – The Engineered Wood Association

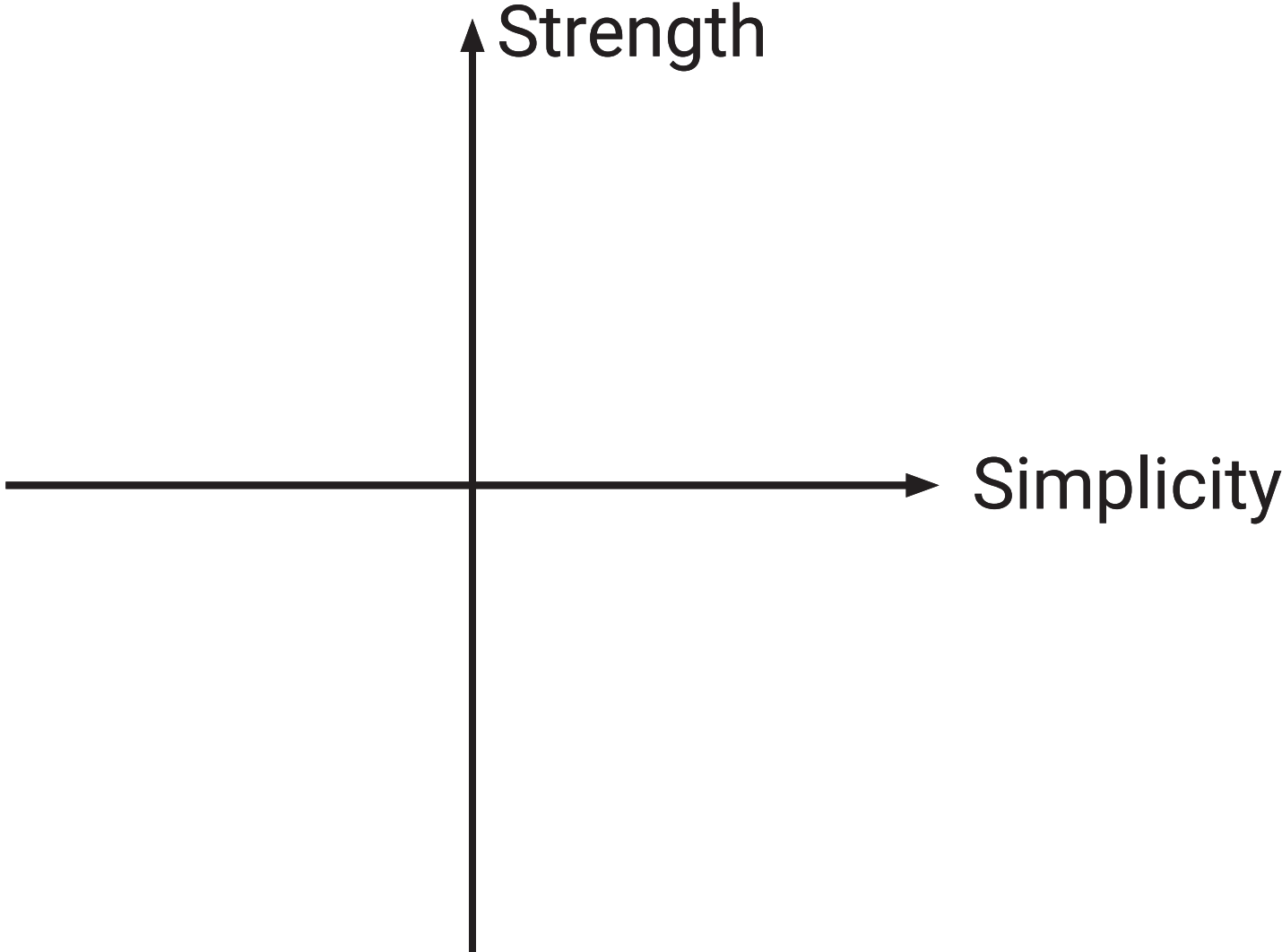
# Wood Construction Evolution

---



# Current State of the Market

---



# Current State of the Market

---

## ***Complex***

- Detailing
- Calculations
- Installation



Simplicity Axis

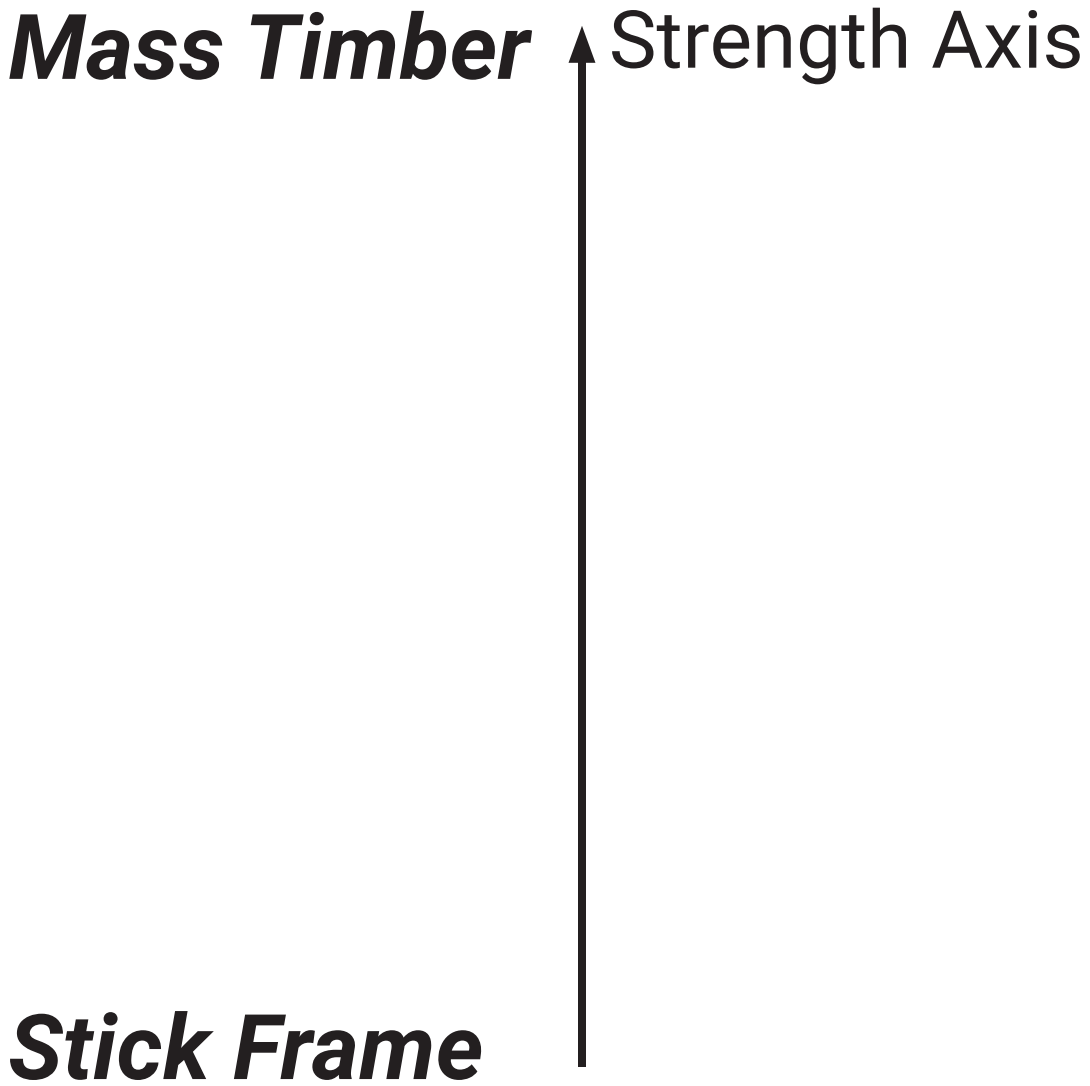
## ***Simple***

- Pre-engineered



# Current State of the Market

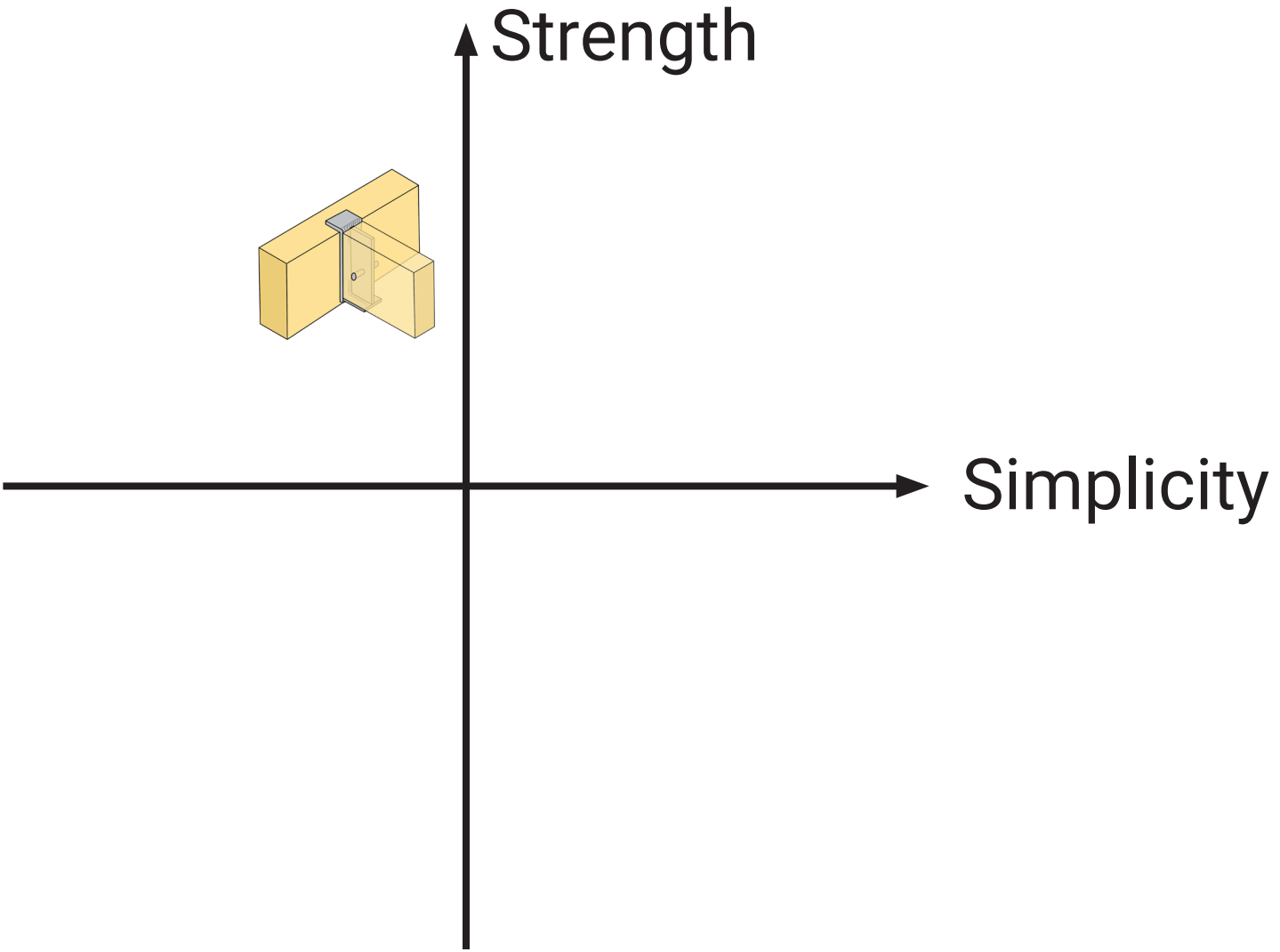
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# Current State of the Market

---

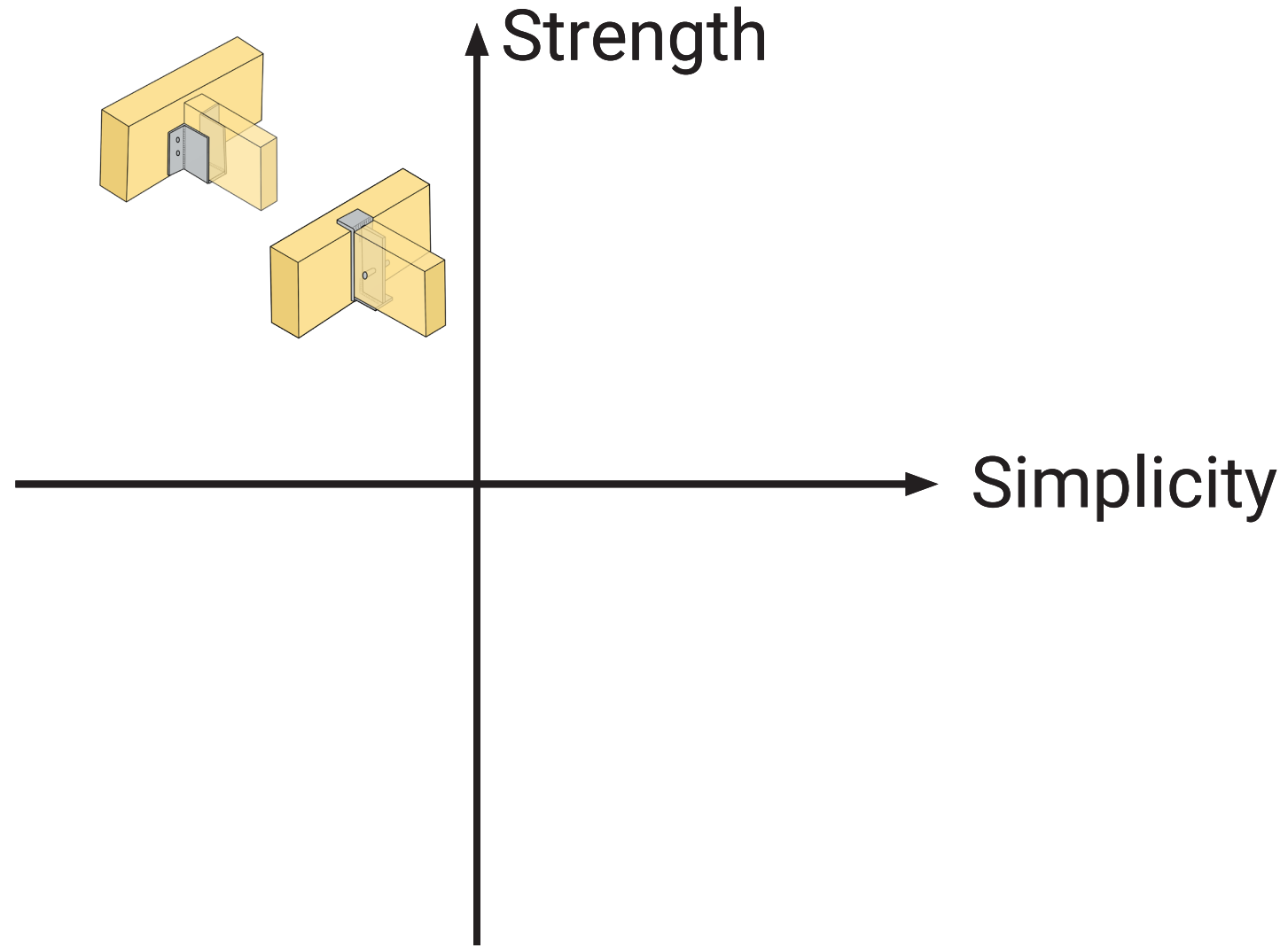
Knife Plate



# Current State of the Market

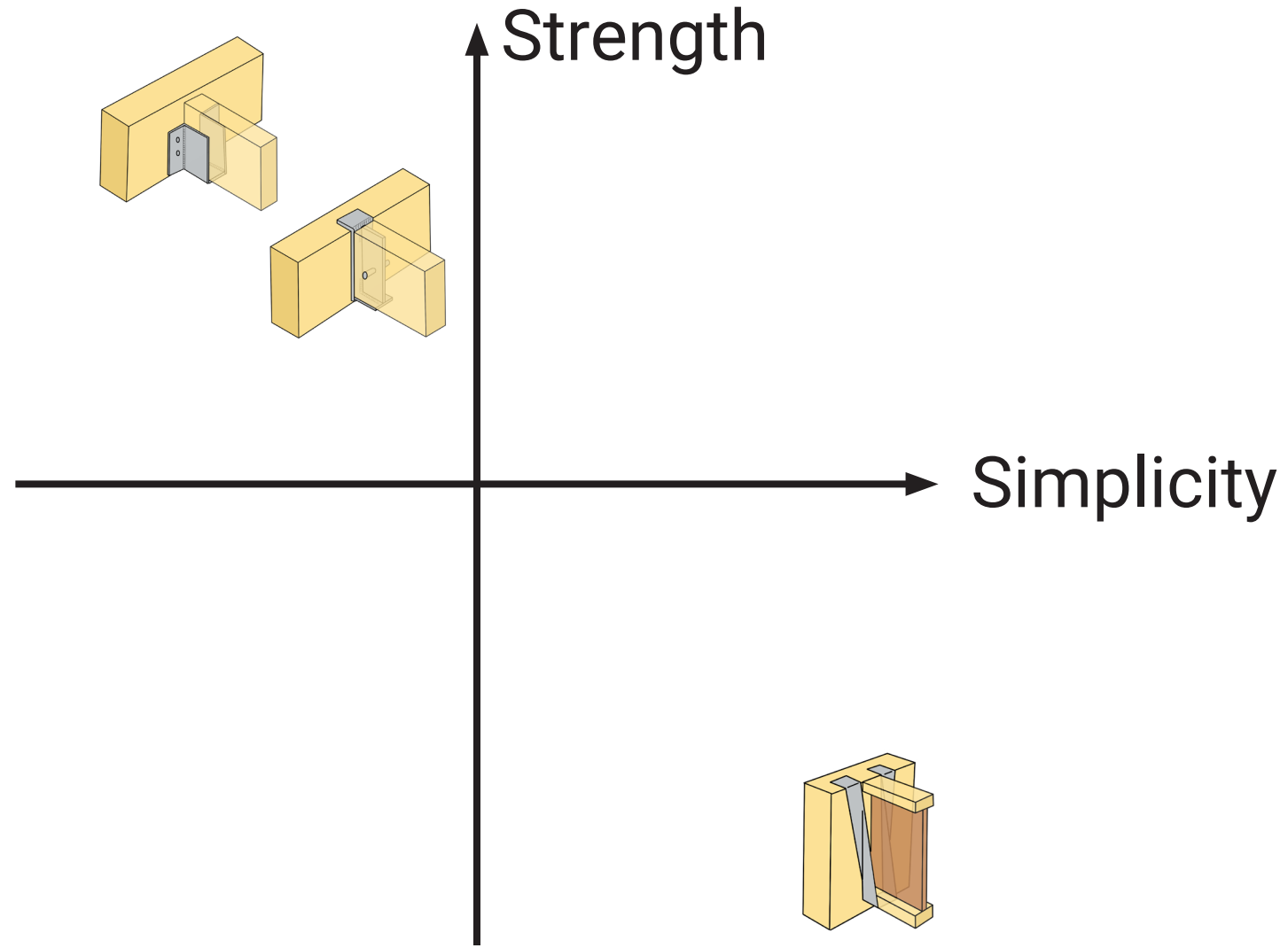
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Bucket Seat



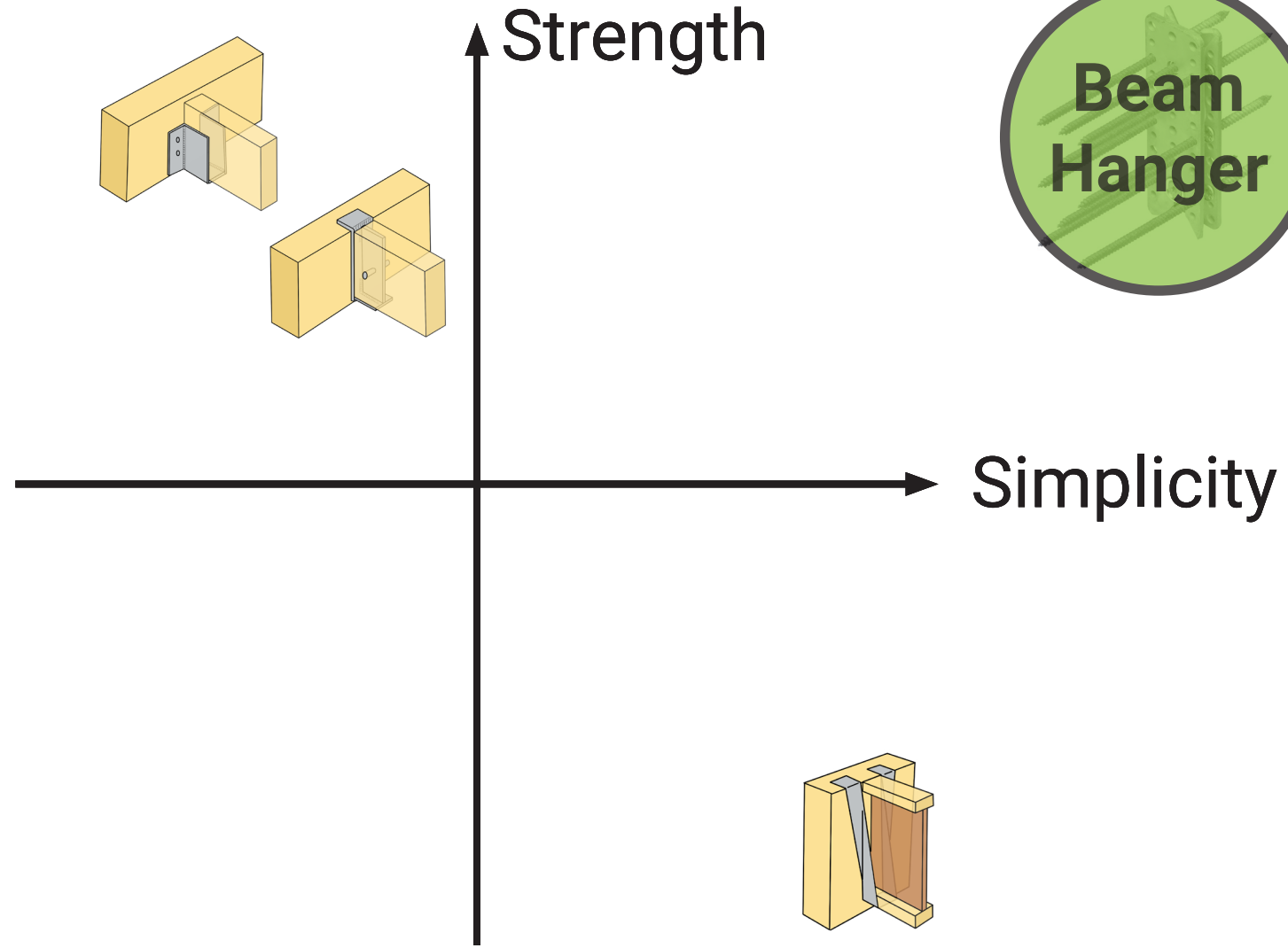
# Current State of the Market

Pre-Engineered  
for Stick Frame



# Current State of the Market

Our Solution



# Opportunities with Mass Timber

---



Source: OREGON FOREST RESOURCES INSTITUTE

**First Tech Credit Union Project in Hillsboro, Oregon**

# About MyTiCon

---

## *Your Host*

- Dominique Robitaille, EIT

## *MyTiCon*

- Specialized Mass Timber Connection System Supplier



# Objectives of the Webinar

## ***What?***

Hardware Presentation

## ***Why?***

Cost-effective

## ***How?***

Design Guide





# The Beam Hanger Webinar

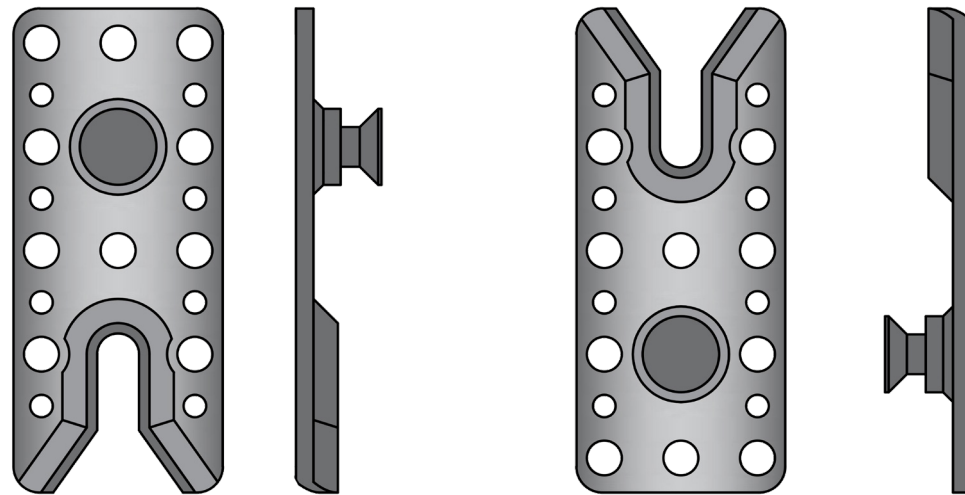


**What?**

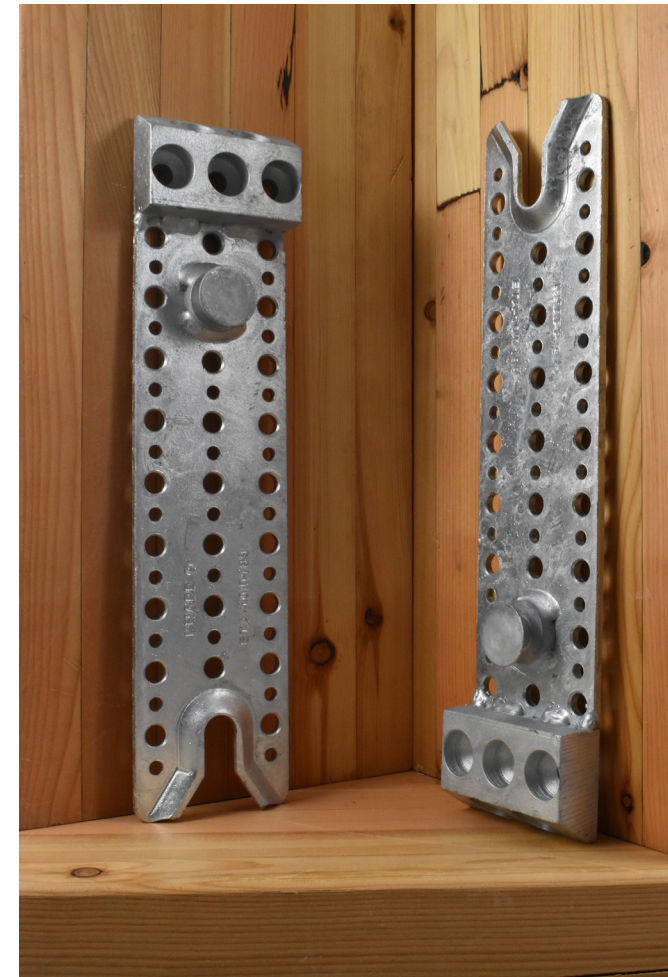
# What is it?

---

- Two identical components
- Male and female system



The Beam Hanger System

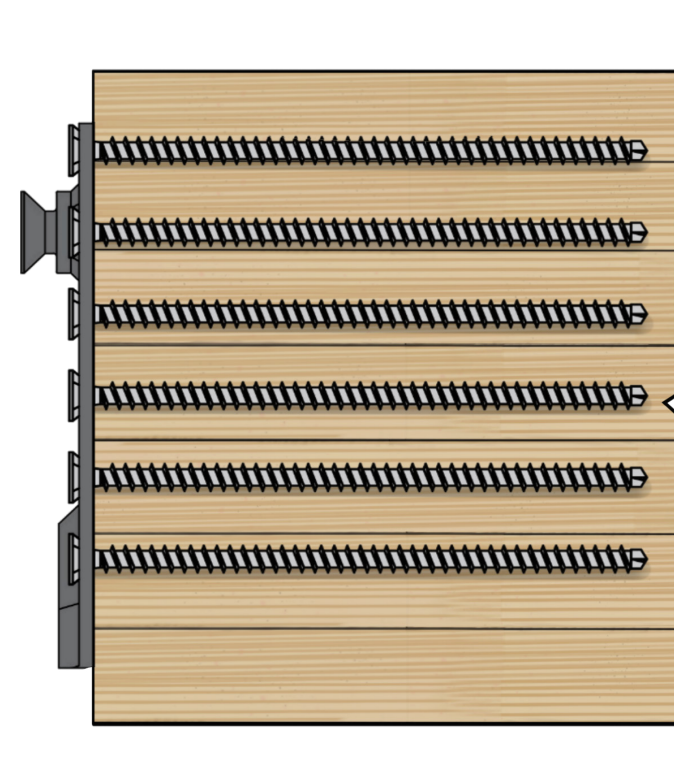
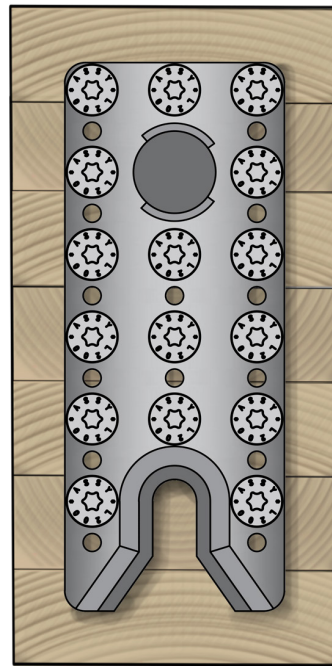


Ricon XL 390 x 80

# Installation

---

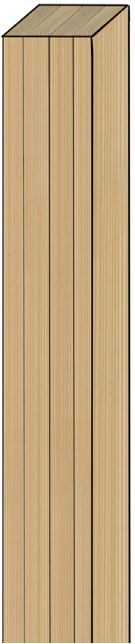
- Using fully threaded screws



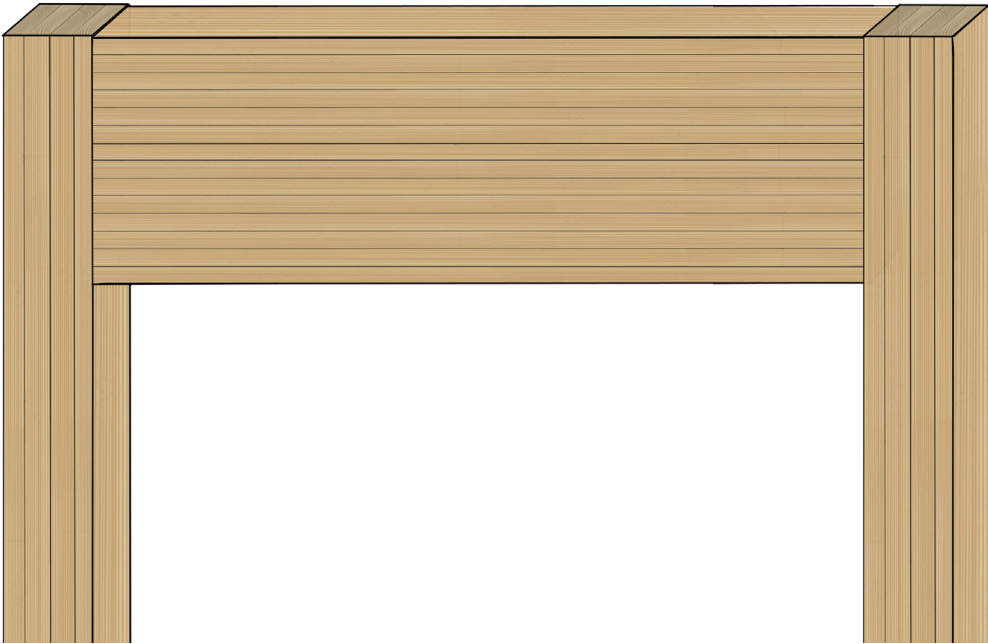
**Joist Installation**

# Installation

---



**Header Installation**

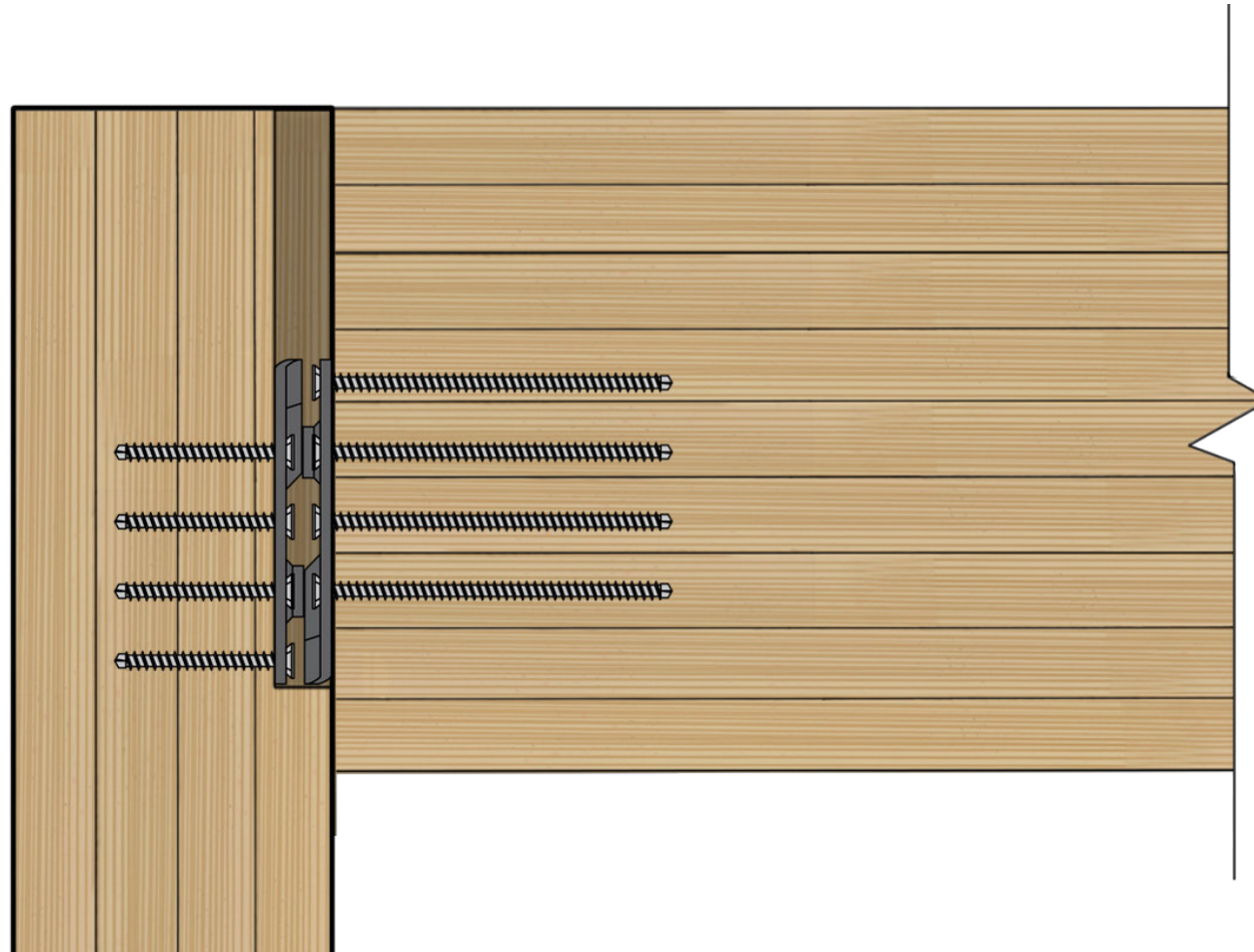


**Joist Installation**

# Installation

---

- Fully concealed connection



# The Beam Hanger Webinar



## What?

Simple Pre-engineered Solution  
for Mass Timber

# The Beam Hanger Webinar

**Why?**

# Pre-installed

---

- Repetitive and simple installation
- Controlled work environment
- Superior quality control



Shop Installation



# On-site Installation

---

- Drop-in assembly
- Reduced crane time
- Reduced personnel
- No power tools required



On-site

# Pre-engineered System

---

- Tabulated design values
- Installer friendly tolerances
- Simple tilted and sloped connections
- Reduced detailing time



MyTiCon Timber Connectors

[www.myticon.com](http://www.myticon.com) | 1.866.899.4090 | [info@myticon.com](mailto:info@myticon.com)

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August 20, 2018



# Concealed - Fire Rated

---

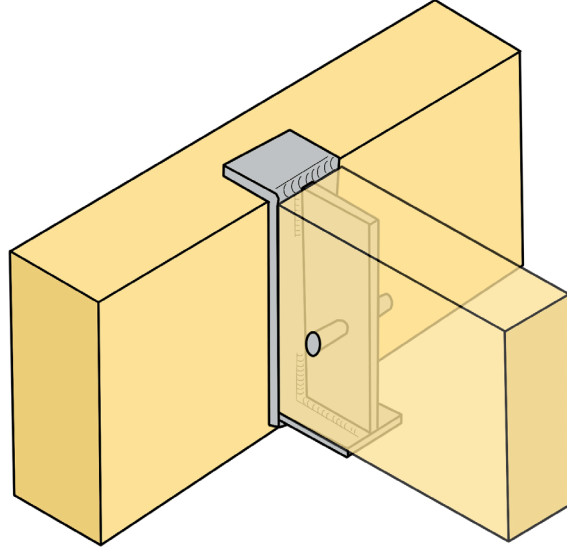
- Fire tested
- No special detailing required



**Fire Rating with Char Layer**

# Cost-Effective

---



■ Hardware



Beam Hanger

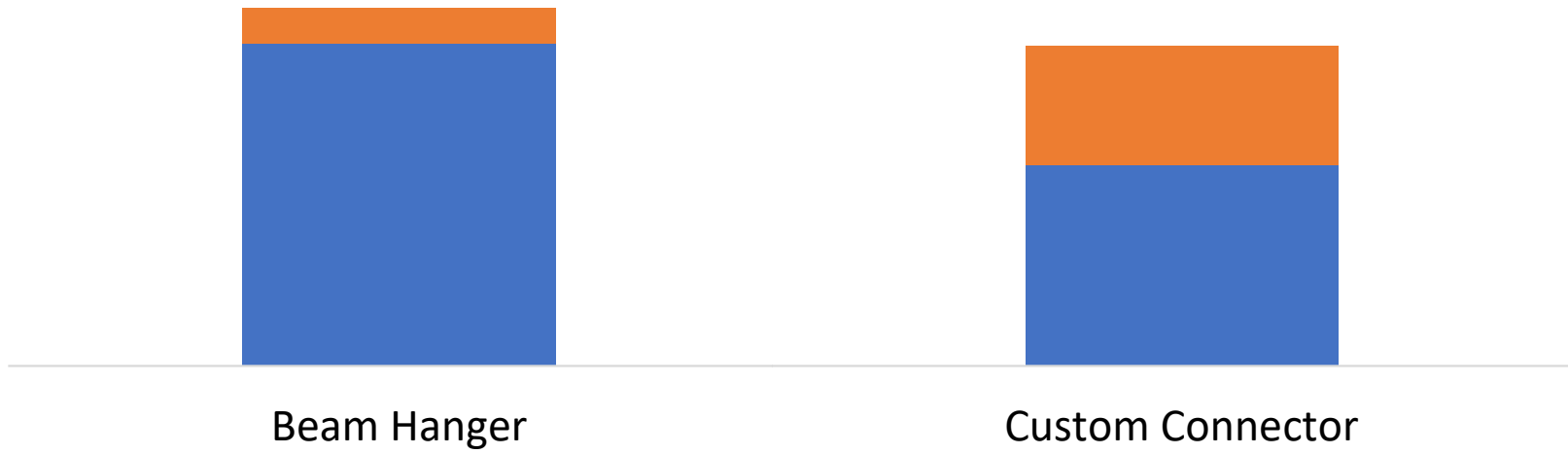


Custom Connector

# Cost-Effective

---

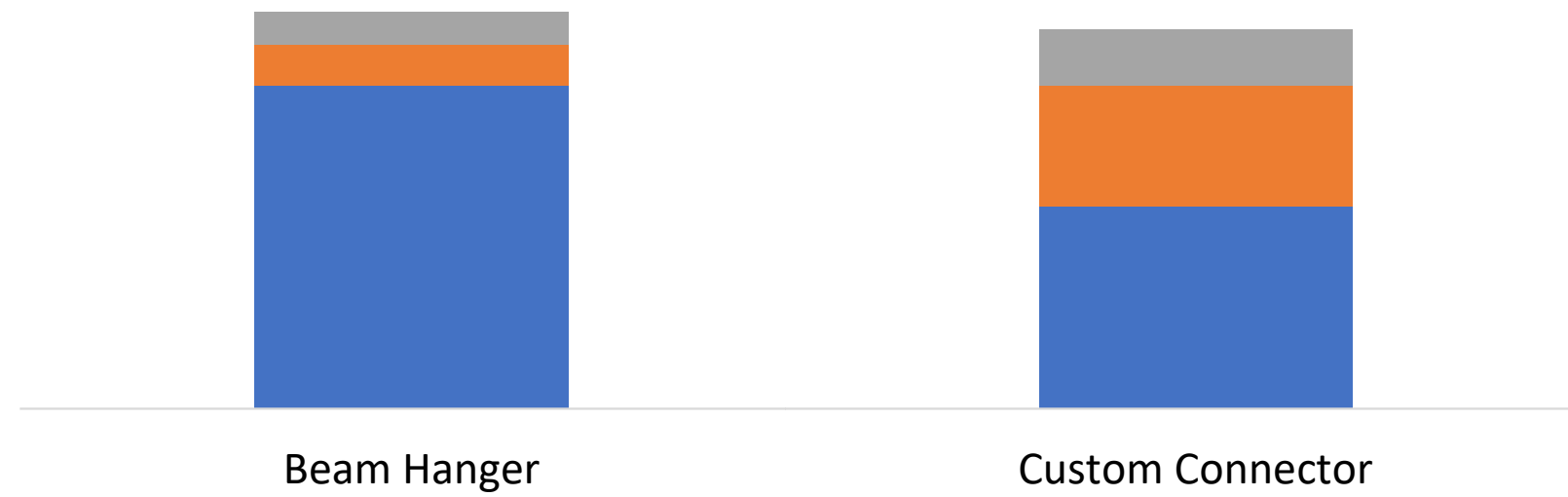
- Engineering
- Hardware



# Cost-Effective

---

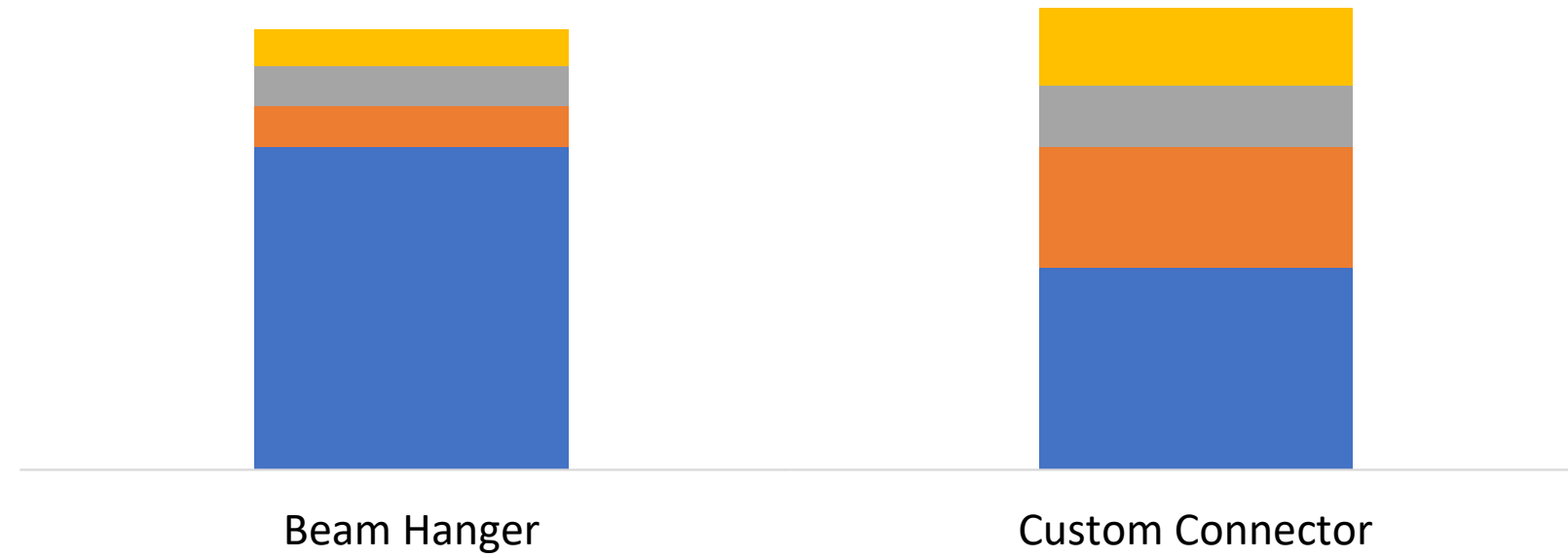
- Detailing
- Engineering
- Hardware



# Cost-Effective

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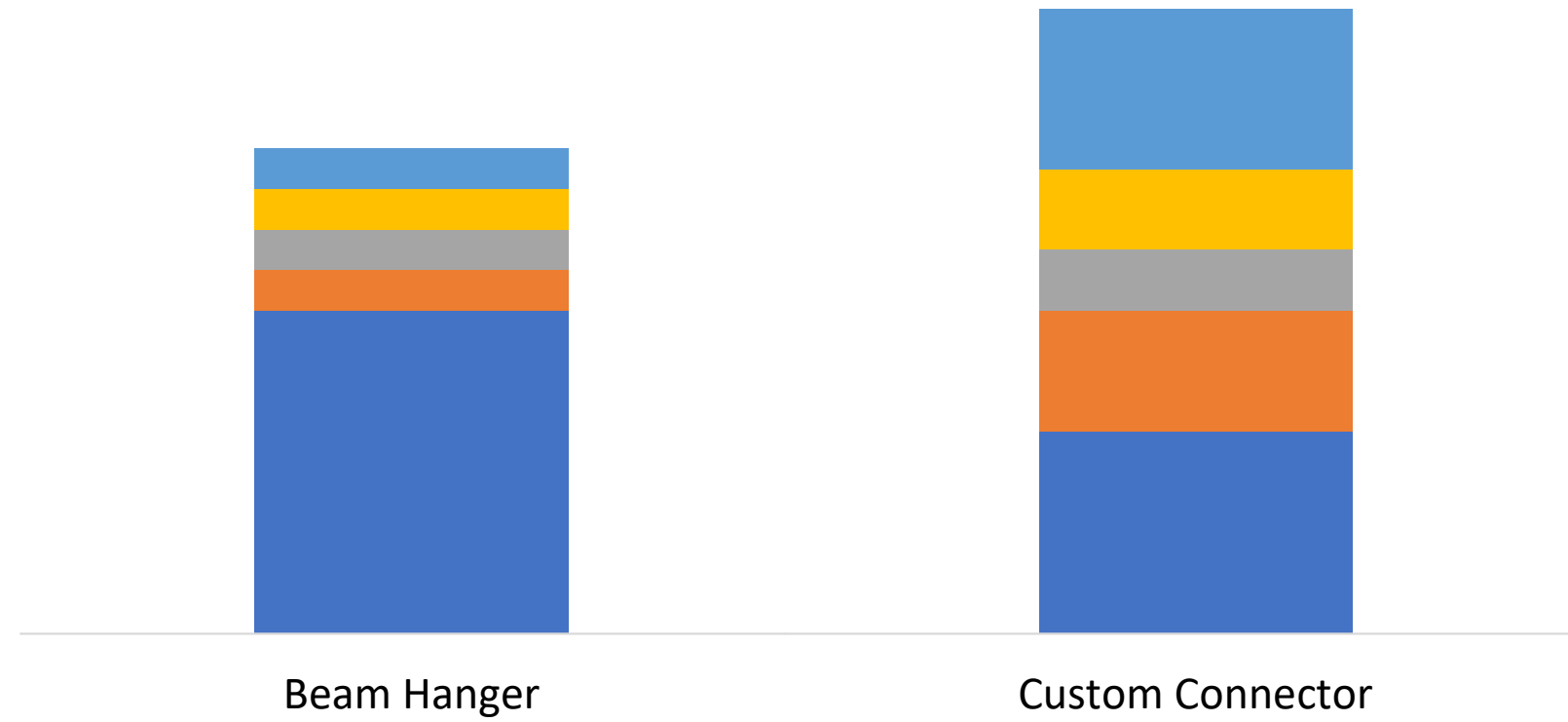
- Installation
- Detailing
- Engineering
- Hardware



# Cost-Effective

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- On-site Work
- Installation
- Detailing
- Engineering
- Hardware

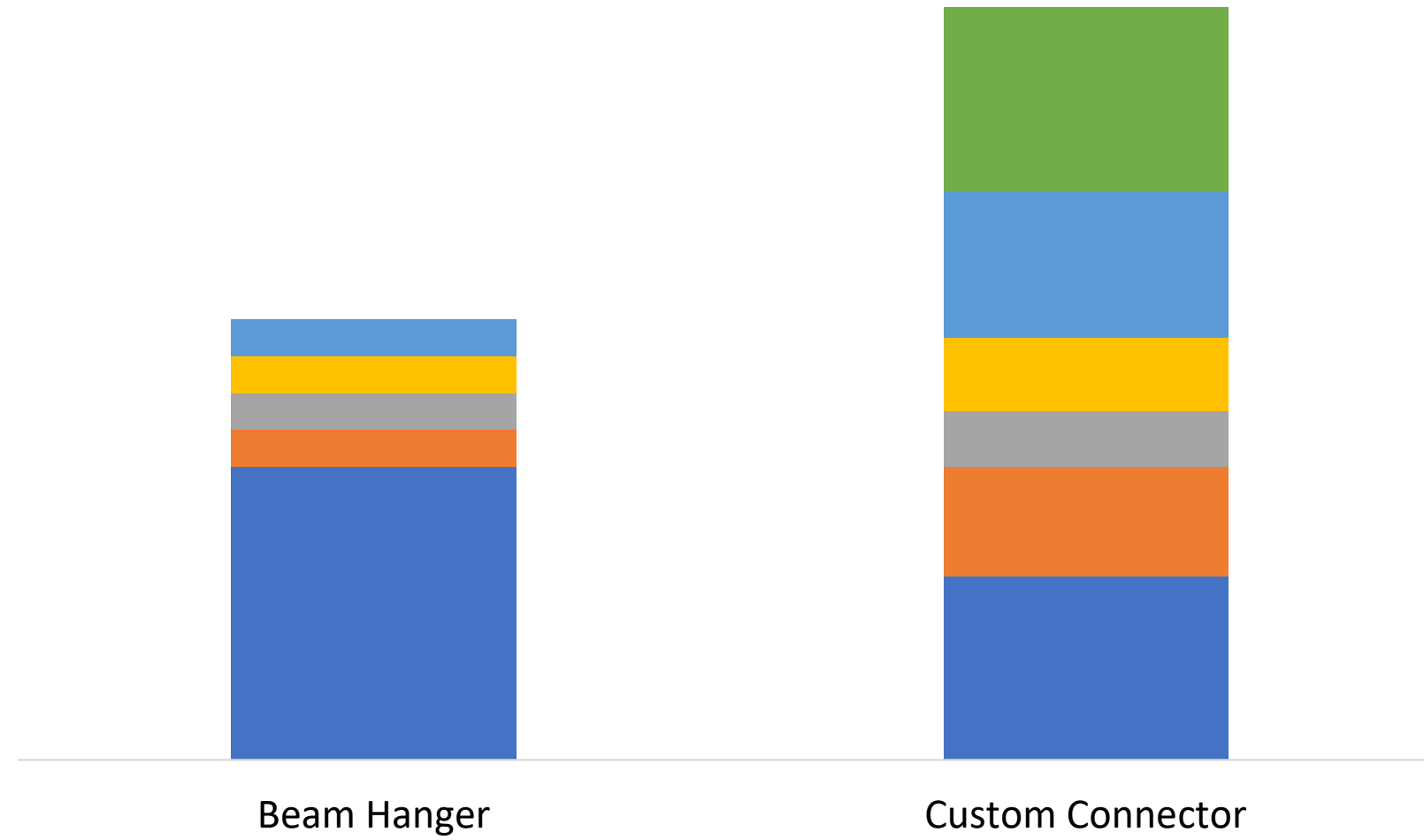




# Cost-Effective

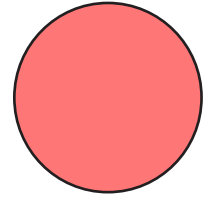
---

- R & D
- On-site Work
- Installation
- Detailing
- Engineering
- Hardware



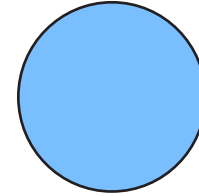
# Why the Beam Hanger?

---



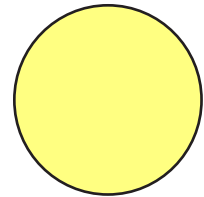
## ***Pre-Installed***

- Repetitive installation
- Superior quality control
- Drop-in assembly



## ***Fully Concealed***

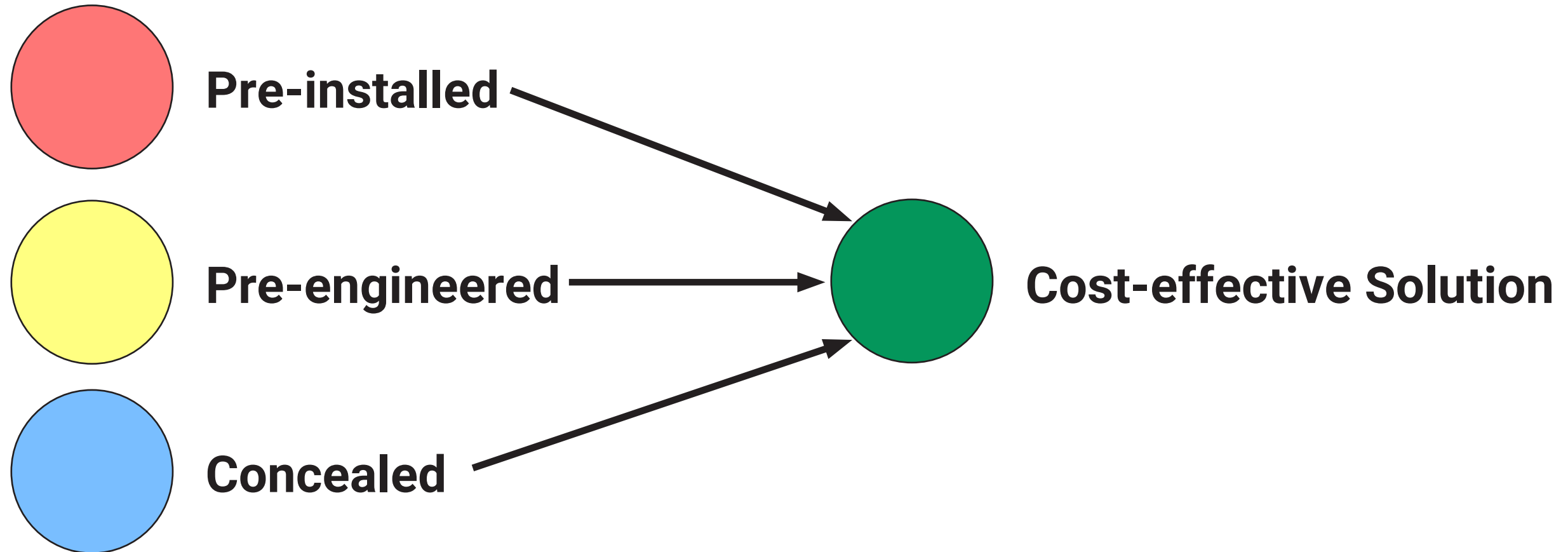
- Architecturally appealing
- Fire design



## ***Pre-engineered***

- Clear and detailed instructions
- Installer-friendly tolerance

# Why the Beam Hanger?



# The Beam Hanger Webinar



# How?

# The Beam Hanger Design Guide



## Step 1: Beam Hanger Selection



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# Step 1: Beam Hanger Selection

- 5 Connectors
- Allowable loads: 3 kips to 17 kips

### Beam Hanger Selection

Table 1 Quick Selection for Glulam Members Made From Douglas Fir

Min. Beam Depth	Min. Beam Width			
	3-7/8"	4-6/8"	6-6/8"	8-1/8"
7"	3.7 kips RICON S VS 140 x 60		7.4 kips 2 RICON S VS 140 x 60	
8"				
9"				
9-3/8"				
10"	7.6 kips RICON S VS 200 x 80		15.2 kips 2 RICON S VS 200 x 80	
11"				
12"				
13"				
14"	9.1 kips RICON S VS 290 x 80		18.2 kips 2 RICON S VS 290 x 80	
15"				
16"	5.3 kips RICON S VS 200 x 60	10.6 kips 2 RICON S VS 200 x 60		
17"				
18"				
20"				
22"	17.1 kips RICON XL 390 x 80		34.2 kips 2 RICON XL 390 x 80	
26"				
30"				
36"				

### Hardware Requirements

RICON S VS and XL Beam Hangers

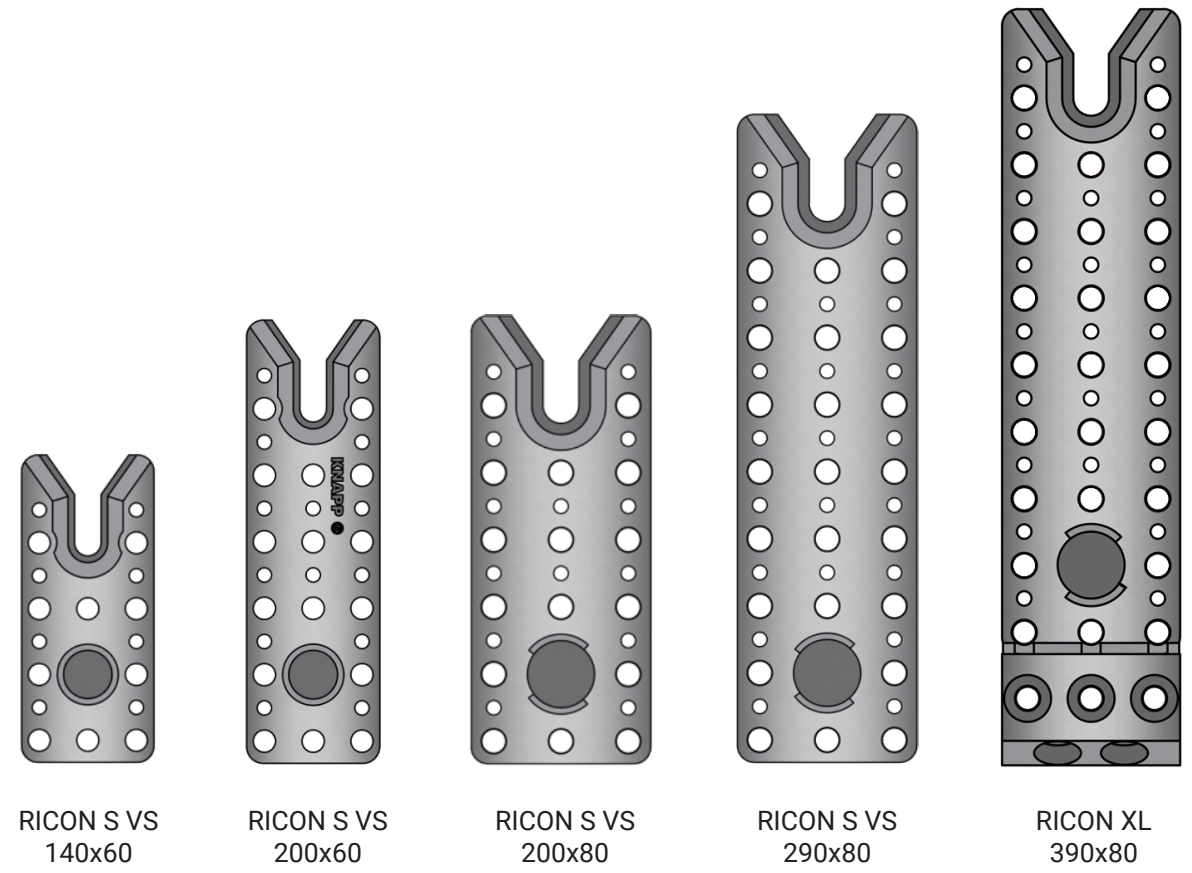
**ASSY® VG CSK**

Item #	D	L	D <sub>max</sub>	Bit
	In. (mm)	In. (mm)	In. (mm)	
14080080000	3-1/8 (80)	2-1/2 (61)	0.681 (15)	AW 40
14080160000	3-1/4 (86)	2-1/2 (61)	0.681 (15)	AW 40
14100100000	4 (100)	3 (77)	0.728 (18.5)	AW 50
14100200000	3/8 (10)	7-7/8 (200)	7-1/4 (185)	AW 50

**Bits - AW® Drive**

The AW® Bits are engineered and patented for proper installation of all ASSY® screws and offer exceptional fit and durability. The AW® Bit series is engineered for:

- Optimum torque transfer
- Snug fit
- Self centering
- Reduced wobbling



# Step 1: Beam Hanger Selection

- 5 Connectors
- Allowable loads: 3 kips to 17 kips

### Beam Hanger Selection

Table 1 Quick Selection for Glulam Members Made From Douglas Fir

Min. Beam Depth	Min. Beam Width			
	3-7/8"	4-6/8"	6-6/8"	8-1/8"
7"	3.7 kips RICON S VS 140 x 60		7.4 kips 2 RICON S VS 140 x 60	
8"	7.6 kips RICON S VS 200 x 80		15.2 kips 2 RICON S VS 200 x 80	
9"	9.1 kips RICON S VS 290 x 80		18.2 kips 2 RICON S VS 290 x 80	
10"	10.6 kips RICON S VS 200 x 60		21.2 kips 2 RICON S VS 200 x 60	
11"	12.1 kips RICON XL 390 x 80		24.2 kips 2 RICON XL 390 x 80	
12"	13.6 kips RICON XL 290 x 80		27.2 kips 2 RICON XL 290 x 80	
13"	15.1 kips RICON XL 200 x 80		30.2 kips 2 RICON XL 200 x 80	
14"	16.6 kips RICON XL 140 x 60		33.2 kips 2 RICON XL 140 x 60	
15"	18.1 kips RICON XL 100 x 60		36.2 kips 2 RICON XL 100 x 60	
16"	19.6 kips RICON XL 80 x 60		39.2 kips 2 RICON XL 80 x 60	
17"	21.1 kips RICON XL 60 x 60		42.2 kips 2 RICON XL 60 x 60	
18"	22.6 kips RICON XL 40 x 60		45.2 kips 2 RICON XL 40 x 60	
19"	24.1 kips RICON XL 30 x 60		48.2 kips 2 RICON XL 30 x 60	
20"	25.6 kips RICON XL 20 x 60		51.2 kips 2 RICON XL 20 x 60	
21"	27.1 kips RICON XL 15 x 60		54.2 kips 2 RICON XL 15 x 60	
22"	28.6 kips RICON XL 10 x 60		57.2 kips 2 RICON XL 10 x 60	
23"	30.1 kips RICON XL 8 x 60		60.2 kips 2 RICON XL 8 x 60	
24"	31.6 kips RICON XL 6 x 60		63.2 kips 2 RICON XL 6 x 60	
25"	33.1 kips RICON XL 4 x 60		66.2 kips 2 RICON XL 4 x 60	
26"	34.6 kips RICON XL 3 x 60		69.2 kips 2 RICON XL 3 x 60	
27"	36.1 kips RICON XL 2 x 60		72.2 kips 2 RICON XL 2 x 60	
28"	37.6 kips RICON XL 1 1/2 x 60		75.2 kips 2 RICON XL 1 1/2 x 60	
29"	39.1 kips RICON XL 1 1/4 x 60		78.2 kips 2 RICON XL 1 1/4 x 60	
30"	40.6 kips RICON XL 1 1/8 x 60		81.2 kips 2 RICON XL 1 1/8 x 60	
31"	42.1 kips RICON XL 1 1/2 x 40		84.2 kips 2 RICON XL 1 1/2 x 40	
32"	43.6 kips RICON XL 1 1/4 x 40		87.2 kips 2 RICON XL 1 1/4 x 40	
33"	45.1 kips RICON XL 1 1/8 x 40		90.2 kips 2 RICON XL 1 1/8 x 40	
34"	46.6 kips RICON XL 1 1/2 x 30		93.2 kips 2 RICON XL 1 1/2 x 30	
35"	48.1 kips RICON XL 1 1/4 x 30		96.2 kips 2 RICON XL 1 1/4 x 30	
36"	49.6 kips RICON XL 1 1/8 x 30		99.2 kips 2 RICON XL 1 1/8 x 30	

### Hardware Requirements

RICON S VS and XL Beam Hangers

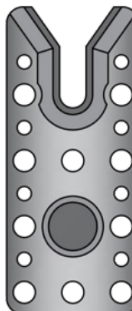
ASSY® VG CSK

Item #	D	L	D <sub>max</sub>	Bit
	In. (mm)	In. (mm)	In. (mm)	
14080080000	3/16 (5)	2-1/2 (63)	0.061 (1.5)	AW 40
14080160000	1/8 (3)	2-1/2 (63)	0.061 (1.5)	AW 40
14100100000	3/8 (10)	3 (76)	0.061 (1.5)	AW 40
14100200000	3/8 (10)	3 (76)	0.061 (1.5)	AW 40

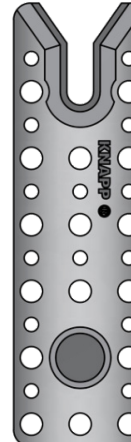
Bits - AW® Drive

The AW® Bits are engineered and patented for proper installation of all ASSY® screws and offer exceptional fit and durability. The AW® Bit series is engineered for:

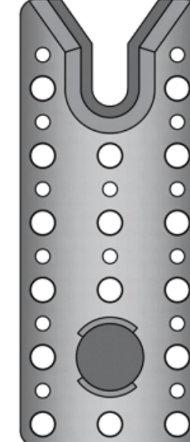
- Optimum torque transfer
- Snug fit
- Self centering
- Reduced wobbling



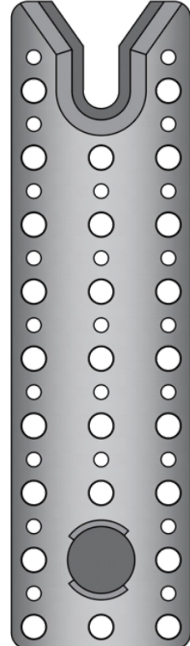
RICON S VS  
140x60



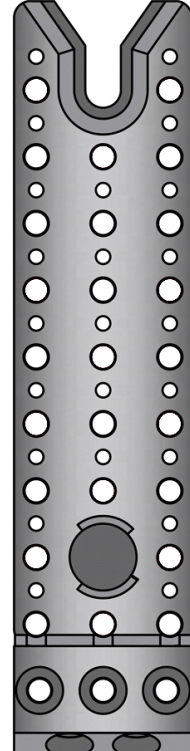
RICON S VS  
200x60



RICON S VS  
200x80



RICON S VS  
290x80



RICON XL  
390x80

# Step 1: Beam Hanger Selection

Min. Beam Depth	Min. Beam Width			
	3-7/8"	4-5/8"	6-5/8"	8-1/8"
7"	up to 3.7 kips RICON S VS 140 x 60		up to 6.3 kips 2 RICON S VS 140 x 60	
8"				
9"				
9-3/8"	up to 5.3 kips RICON S VS 200 x 60	up to 7.6 kips RICON S VS 200 X 80	up to 9 kips 2 RICON S VS 200 x 60	up to 13.3 kips 2 RICON S VS 200 X 80
10"				
11"				
12"				
13"		up to 9.1 kips RICON S VS 290 X 80		up to 15.9 kips 2 RICON S VS 290 X 80
14"				
15"				
16"	up to 17.1 kips RICON XL 390 X 80	up to 29.9 kips 2 RICON XL 390 X 80		
17"				
18"				
20"				
22"				
26"				

## Example:

- 5" x 14" Section



# Step 1: Beam Hanger Selection

Min. Beam Depth	Min. Beam Width			
	3-7/8"	4-5/8"	6-5/8"	8-1/8"
7"	up to <b>3.7 kips</b> RICON S VS 140 x 60		up to <b>6.3 kips</b> 2 RICON S VS 140 x 60	
8"				
9"				
9-3/8"	up to <b>5.3 kips</b> RICON S VS 200 x 60	up to <b>7.6 kips</b> RICON S VS 200 X 80	up to <b>9 kips</b> 2 RICON S VS 200 x 60	up to <b>13.3 kips</b> 2 RICON S VS 200 X 80
10"				
11"				
12"				
13"				
14"				
15"	up to <b>9.1 kips</b> RICON S VS 290 X 80	up to <b>15.9 kips</b> 2 RICON S VS 290 X 80		
16"				
17"				
18"	up to <b>17.1 kips</b> RICON XL 390 X 80	up to <b>29.9 kips</b> 2 RICON XL 390 X 80		
20"				
22"				
26"				

## Example:

- 5" x 14" Section
- Allowable load 9 kips
- Select RICON S VS 290 x 80

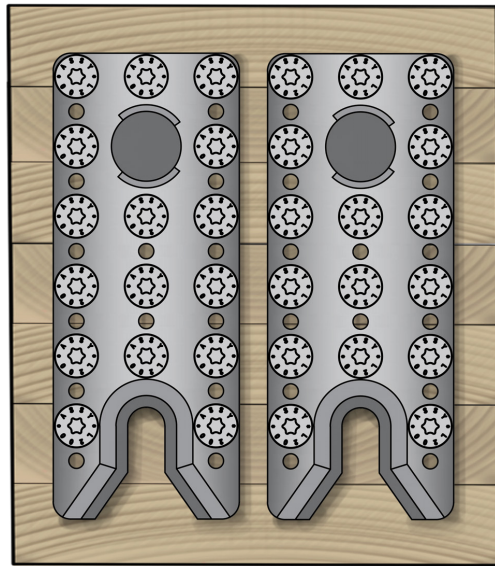


# Step 1: Beam Hanger Selection

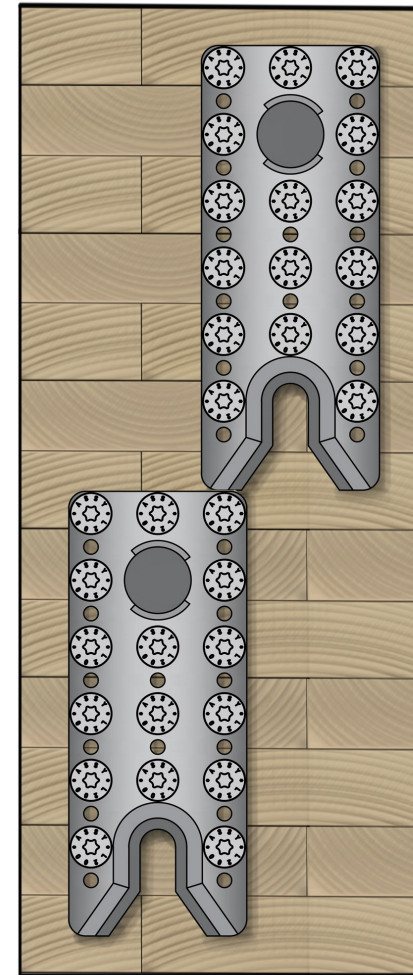
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## *Double Connections*

- Parallel
- Staggered



**Parallel Double Connection**



**Staggered Double Connection**

# The Beam Hanger Design Guide



Step 1: Beam Hanger Selection  
Step 2: Detailing

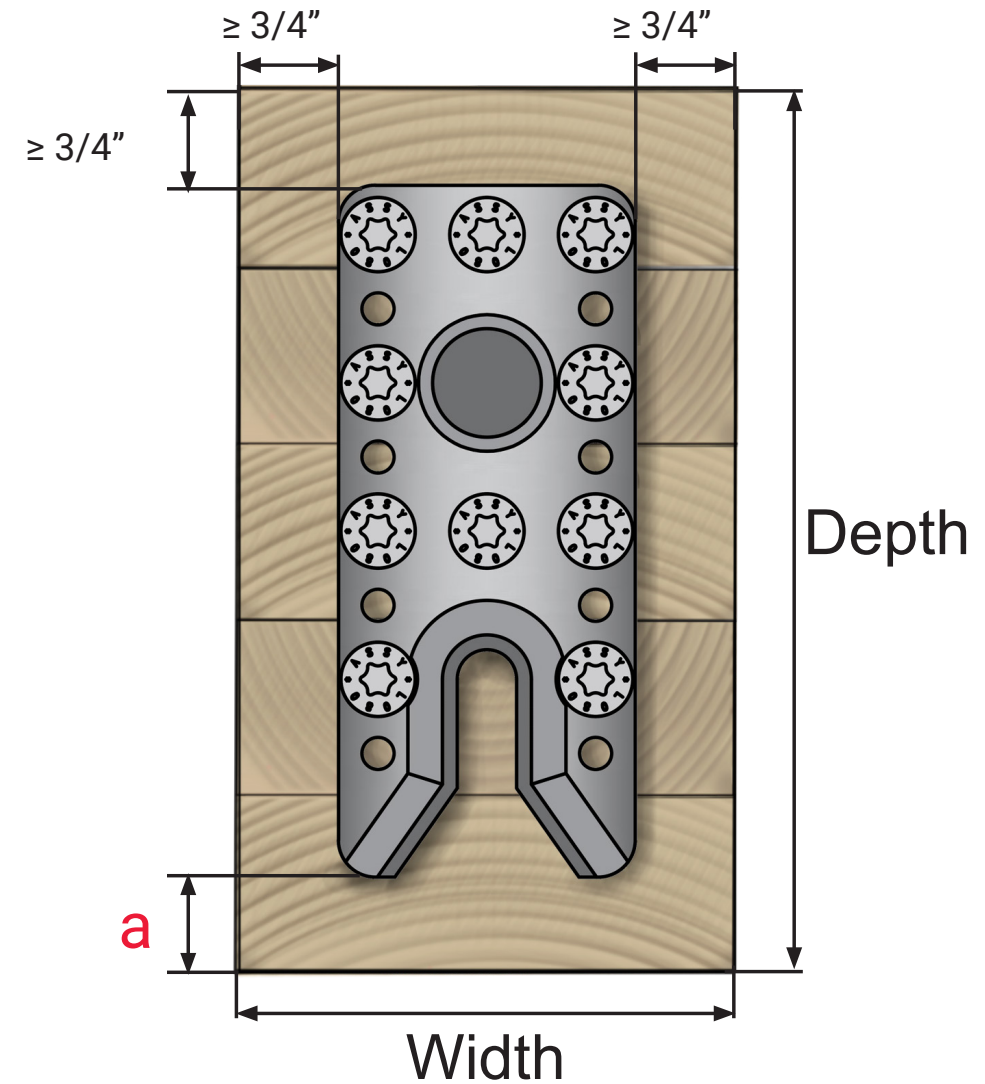


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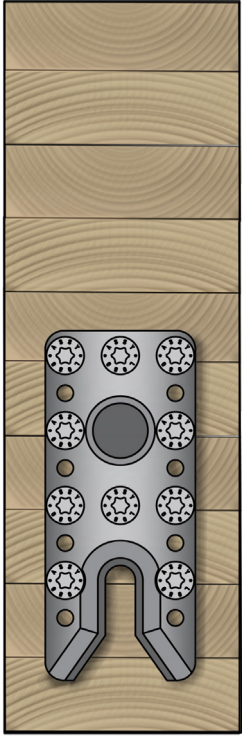
## Step 2: Detailing

- Installer-friendly tolerances
- Minimum beam size
- Edge distance
- Spacing
- Positioning

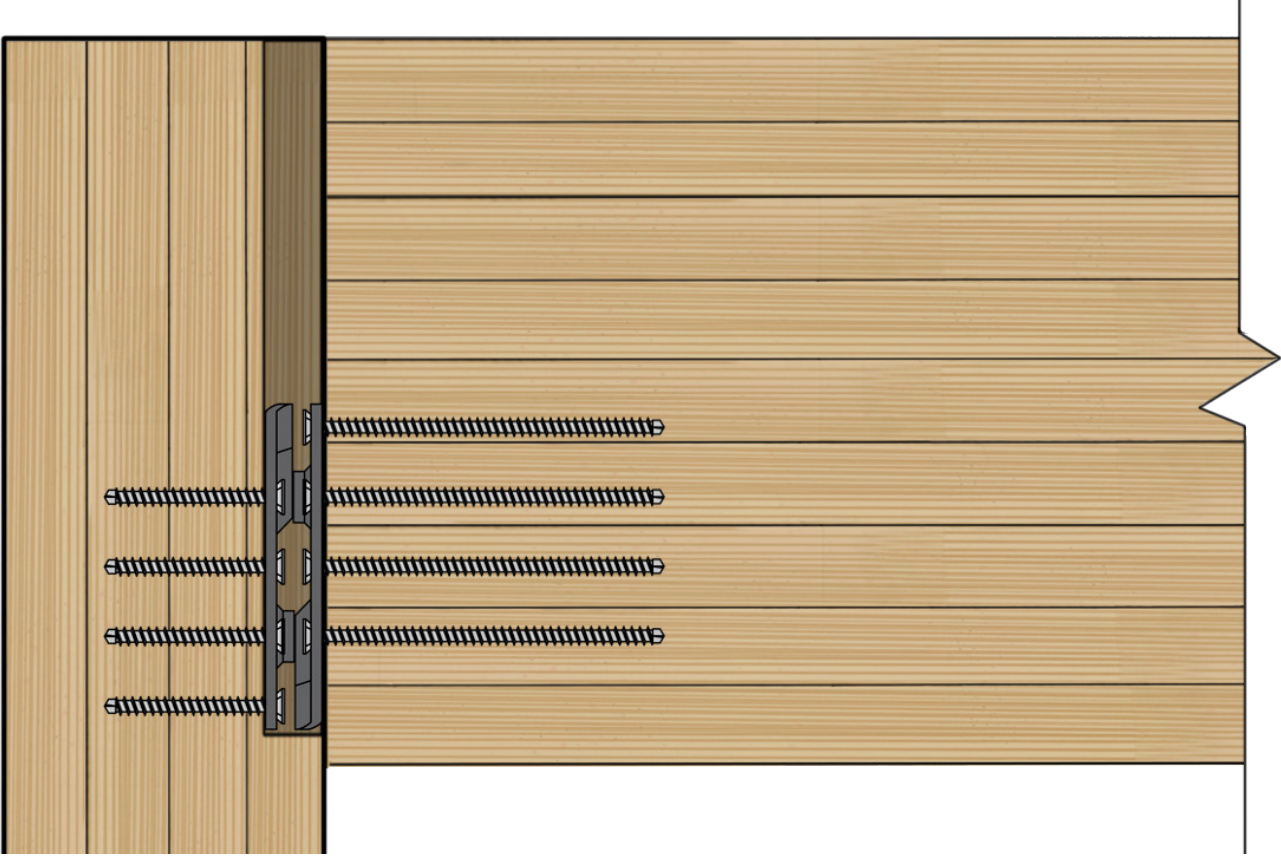


# Step 2: Detailing - Positioning

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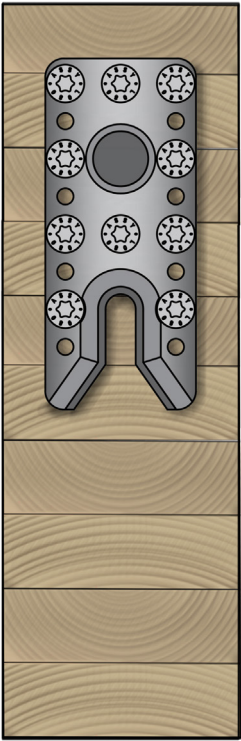
Front View



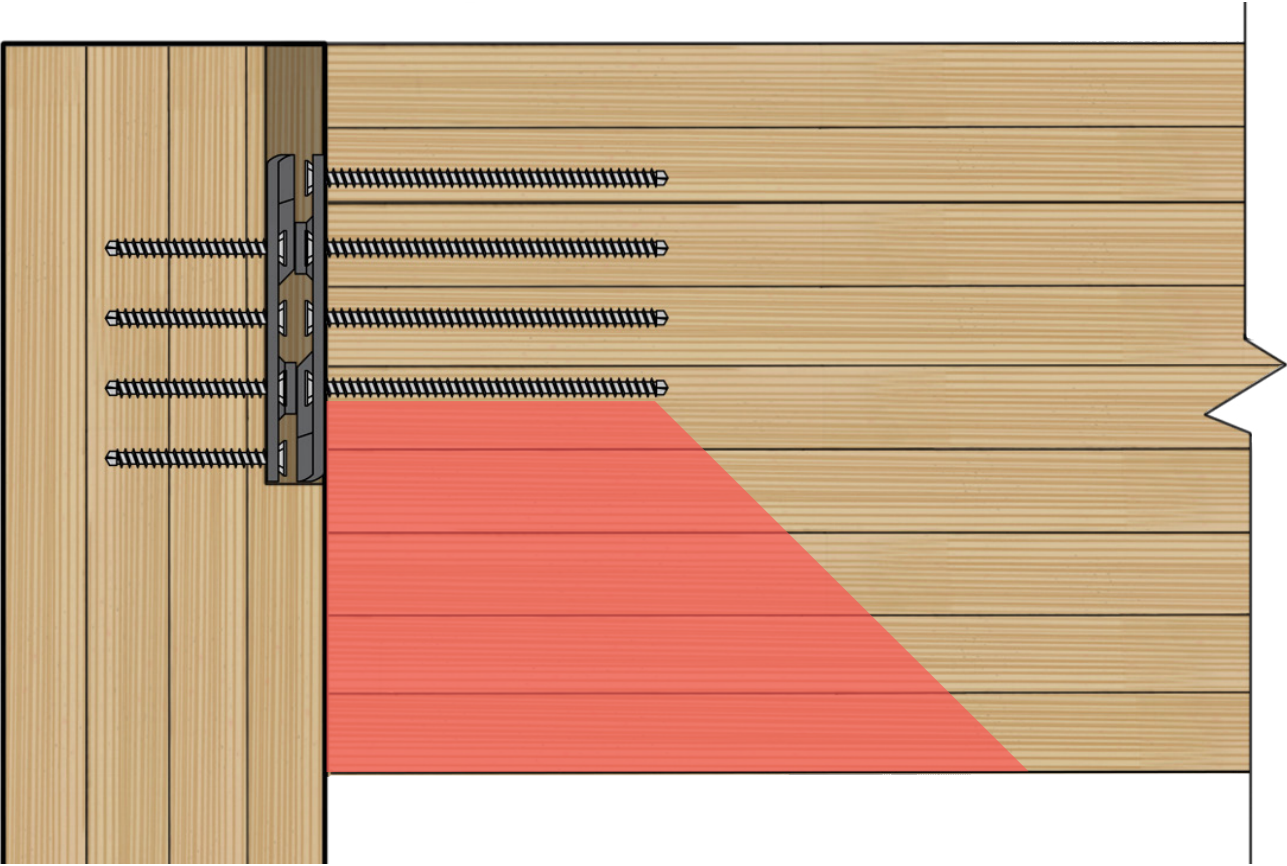
Side View

# Step 2: Detailing - Positioning

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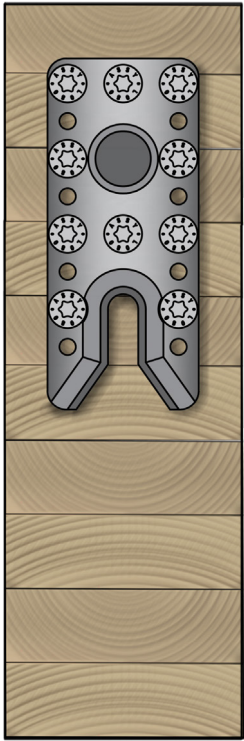
Front View



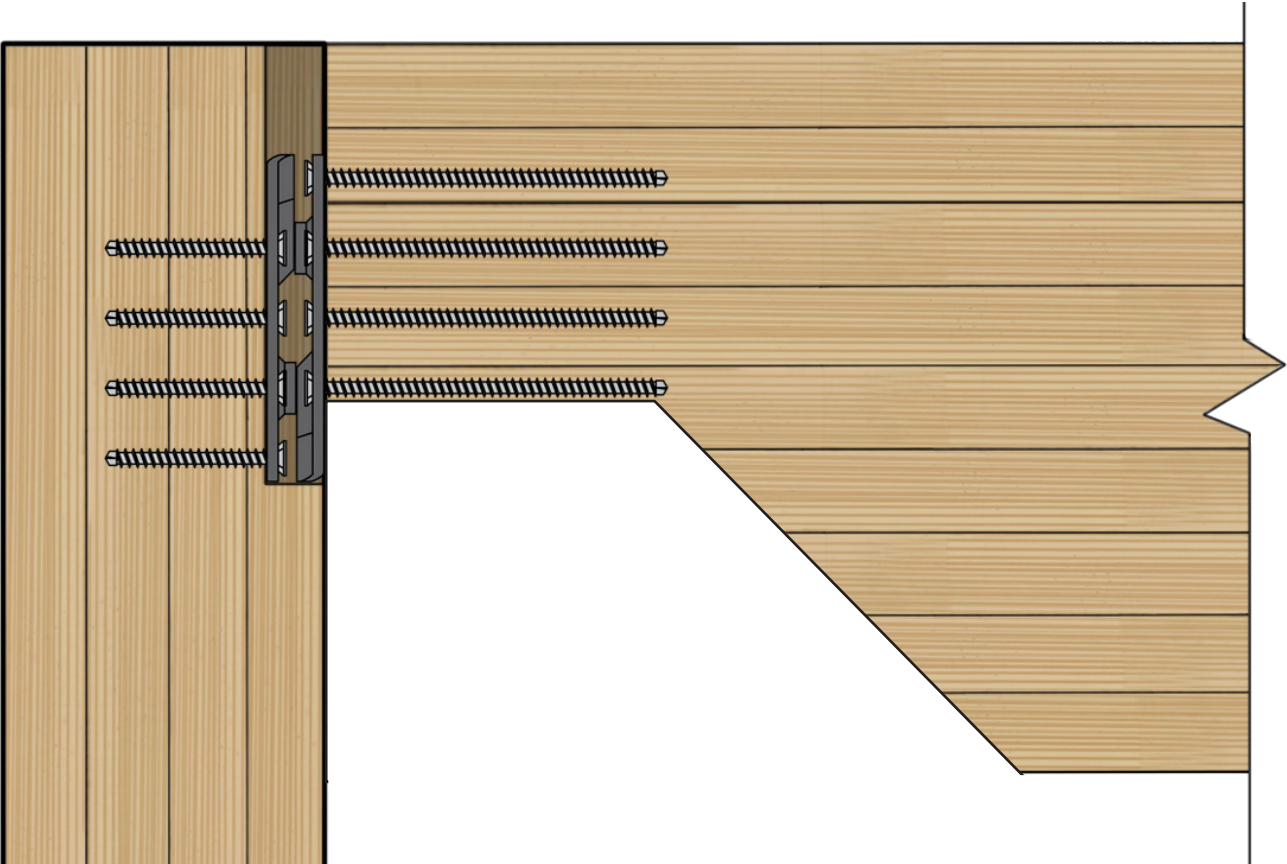
Side View

# Step 2: Detailing - Positioning

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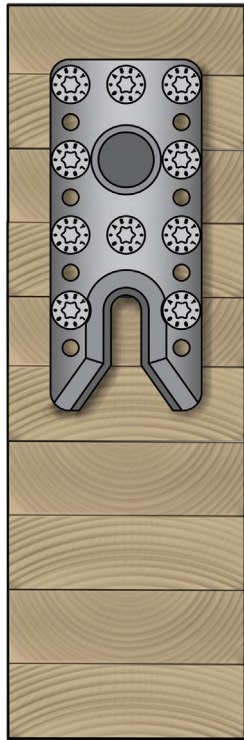
Front View



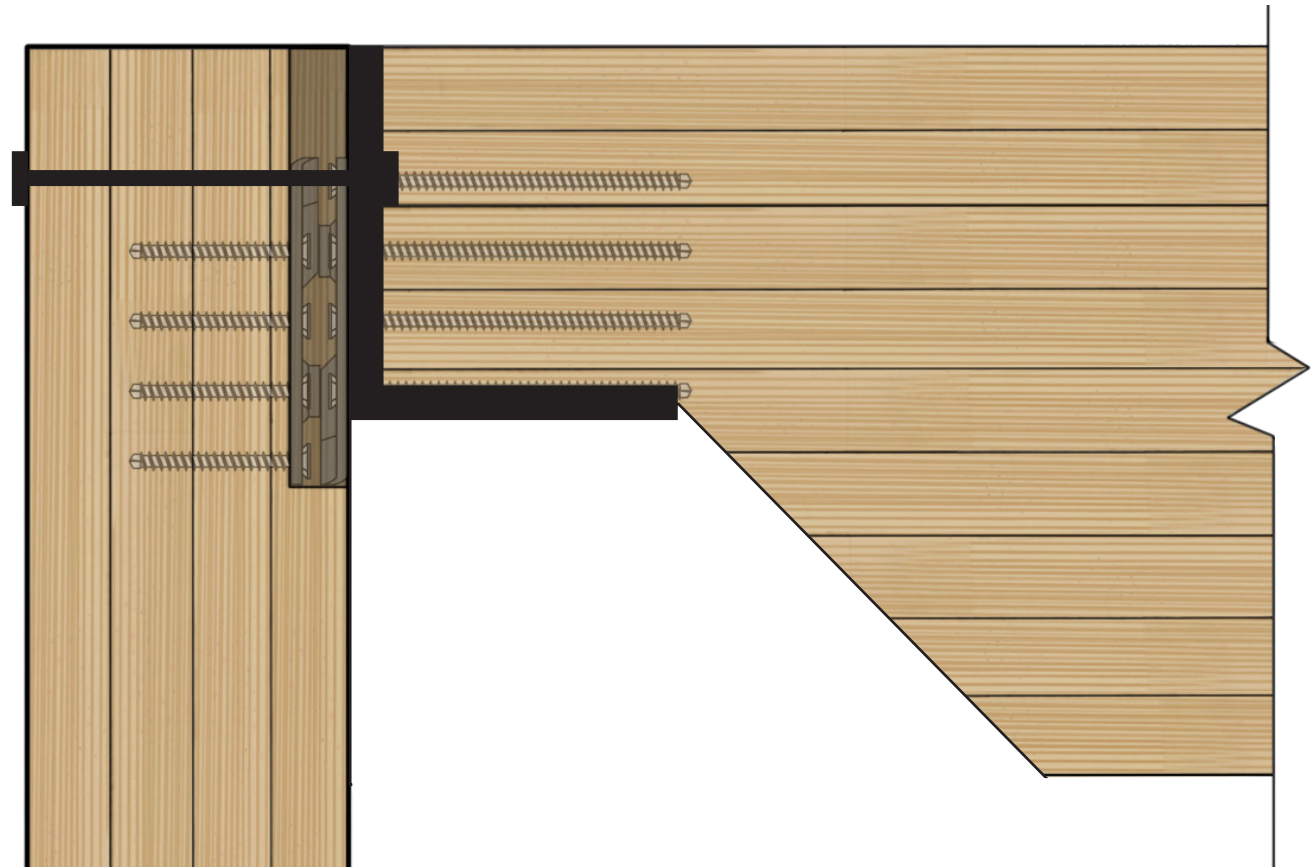
Side View

# Step 2: Detailing - Positioning

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Front View

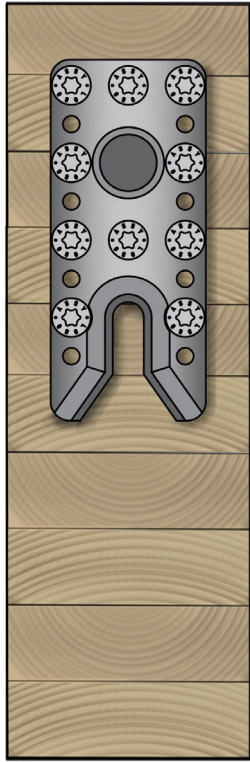


Side View

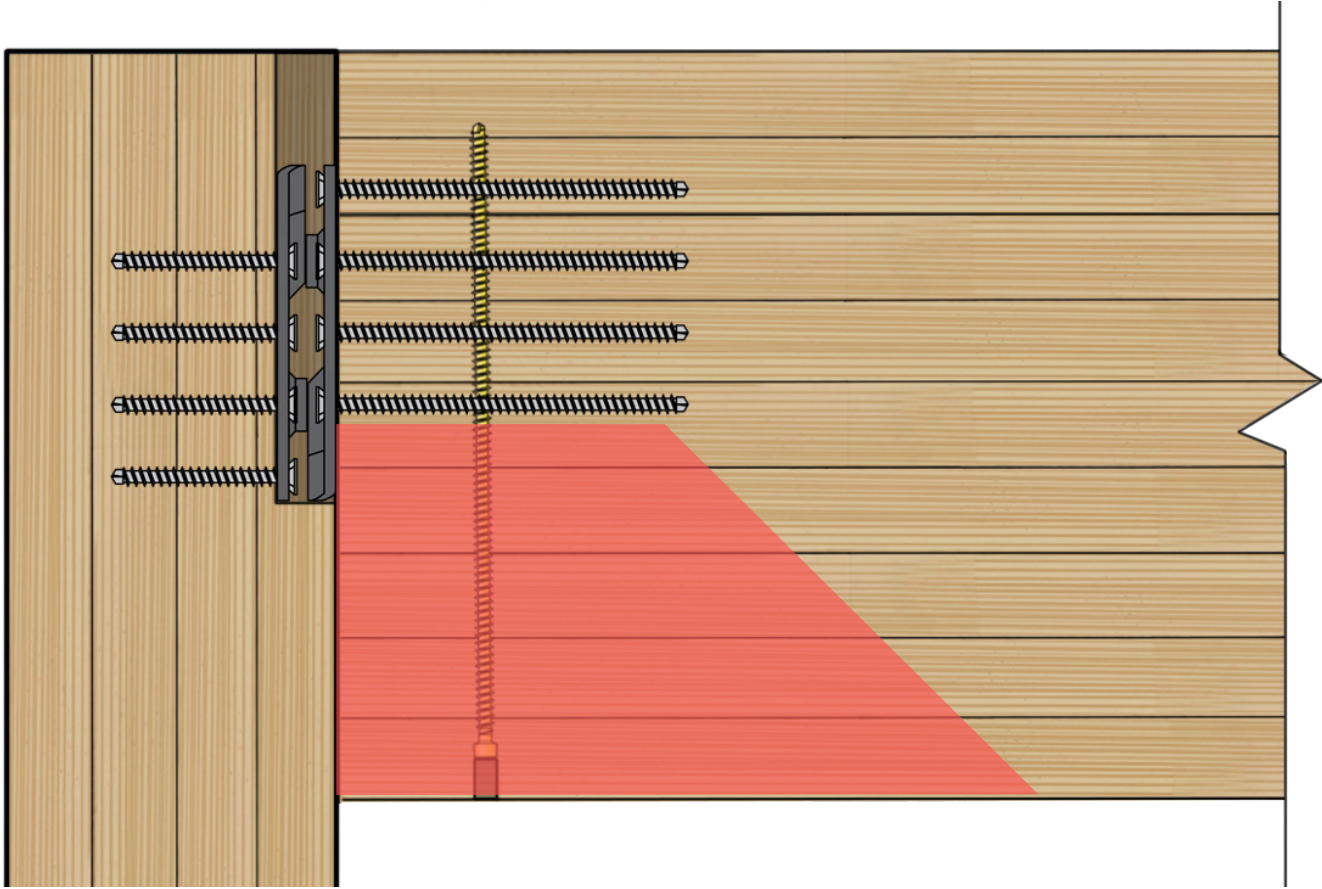


# Step 2: Detailing - Positioning

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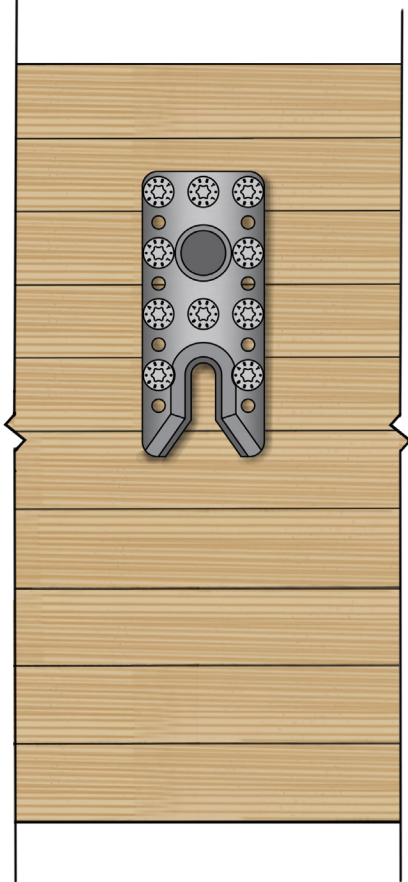
Front View



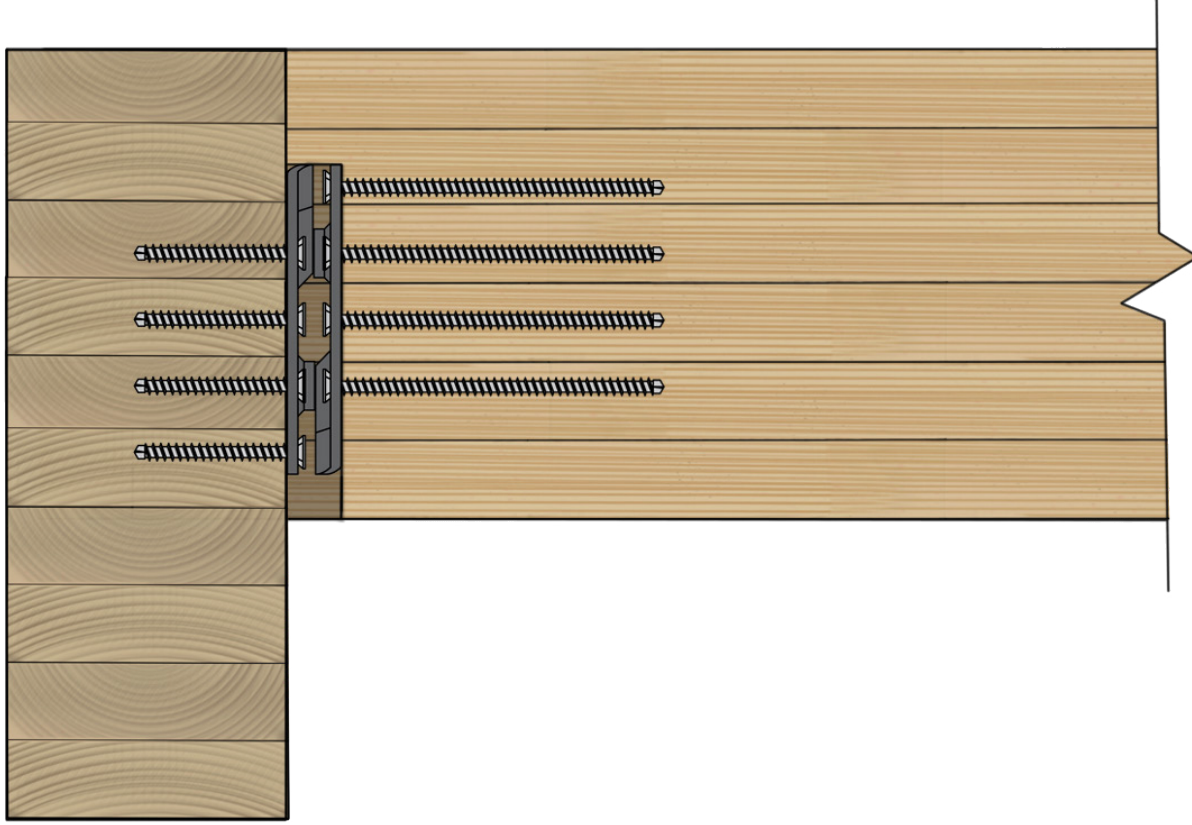
Side View

# Step 2: Detailing - Positioning

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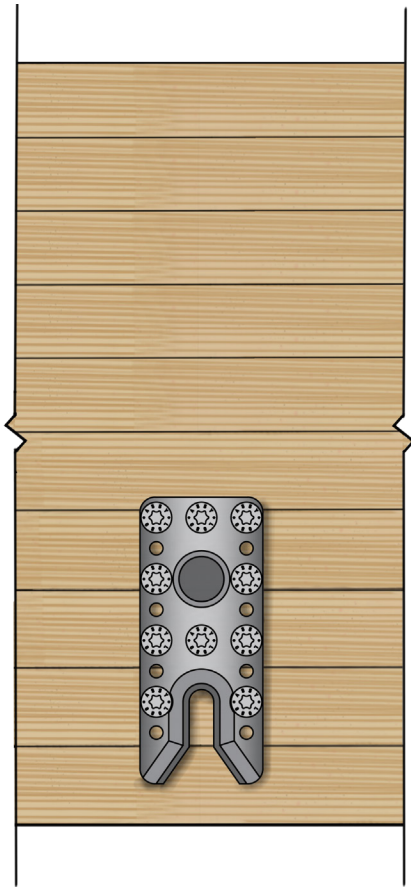
Front View



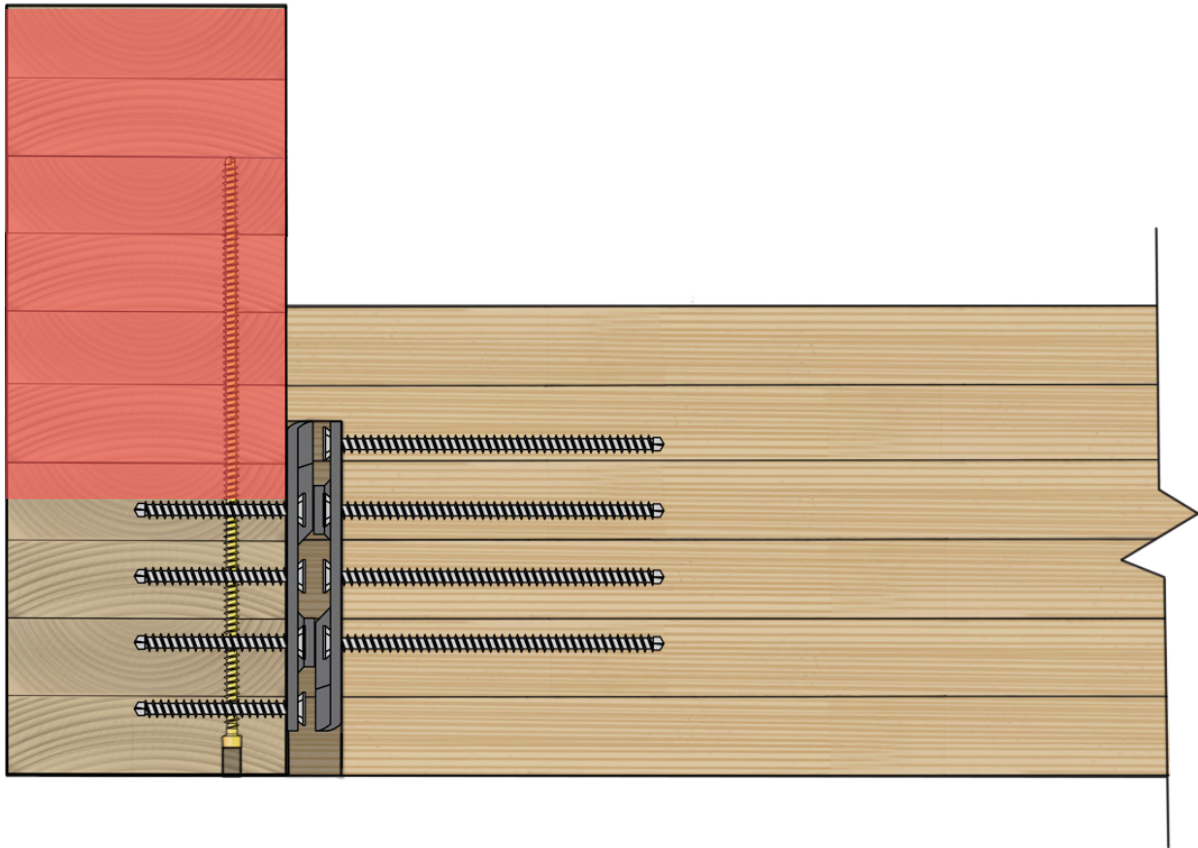
Side View

# Step 2: Detailing - Positioning

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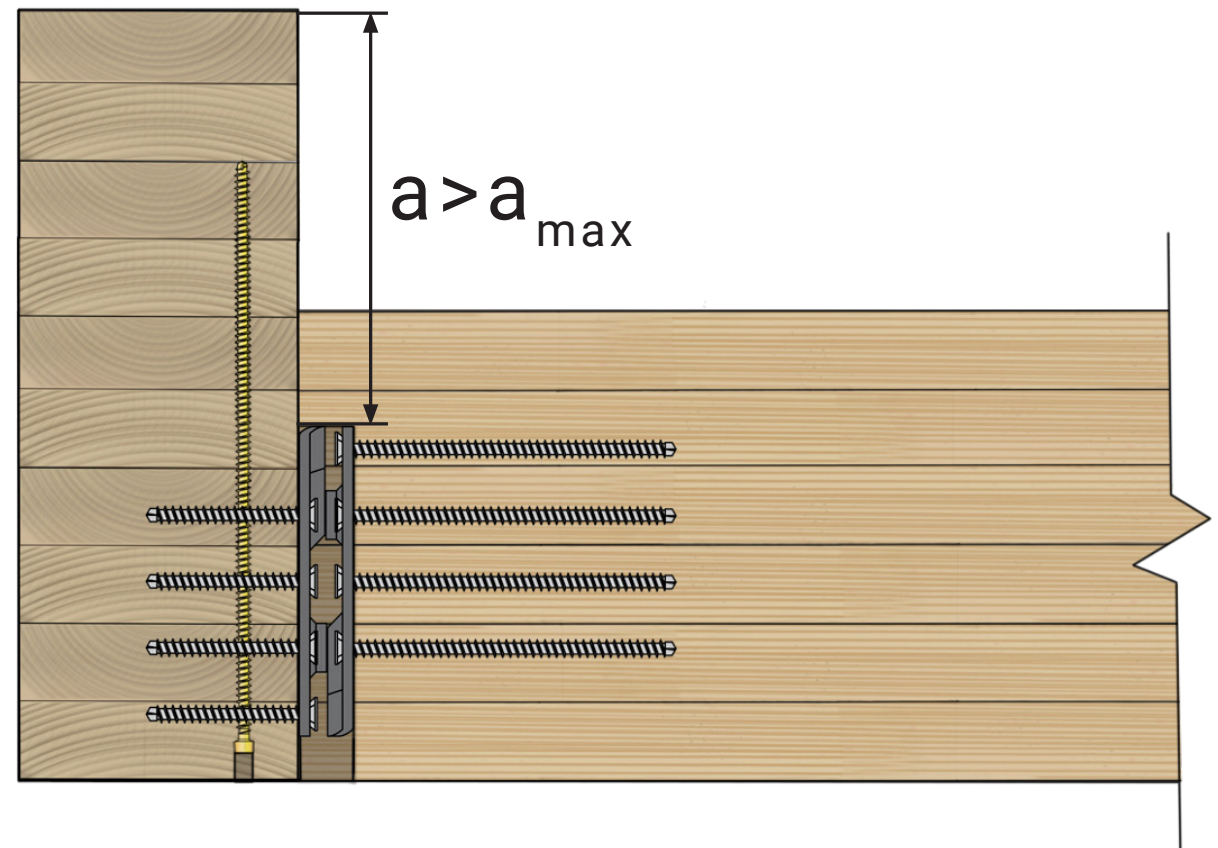
Front View



Side View

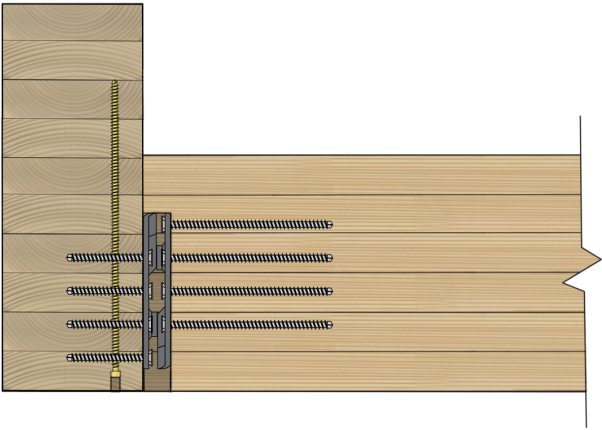
## Step 2: Detailing -Reinforcement

- Positioning
- Fully threaded screw
- ICC approved

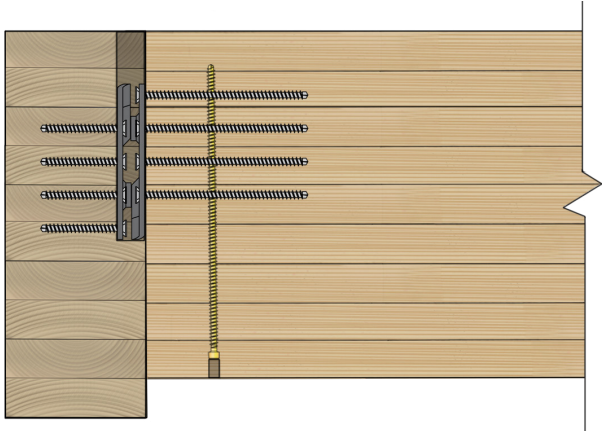


Header Reinforcement from Below

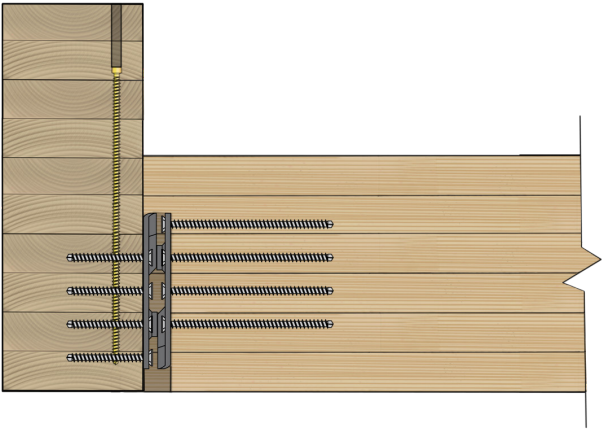
# Step 2: Detailing -Reinforcement



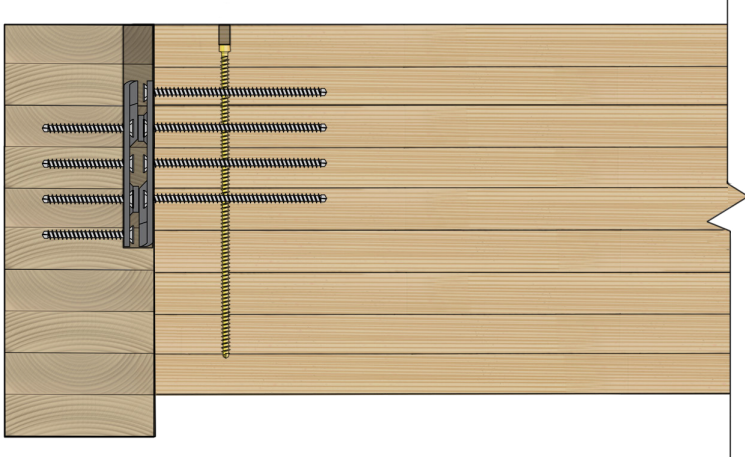
**Header Reinforcement from Below**



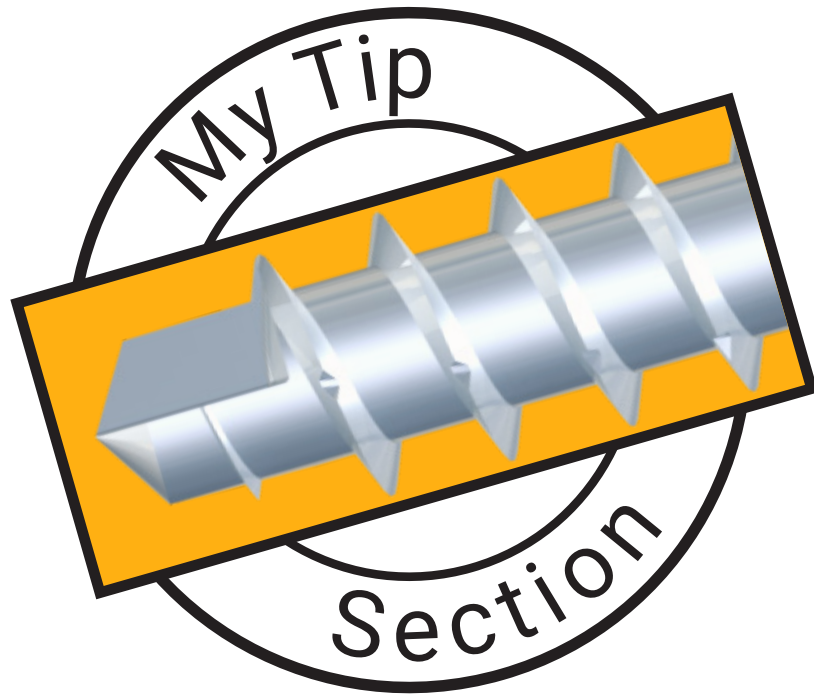
**Joist Reinforcement from Below**



**Header Reinforcement from Above**

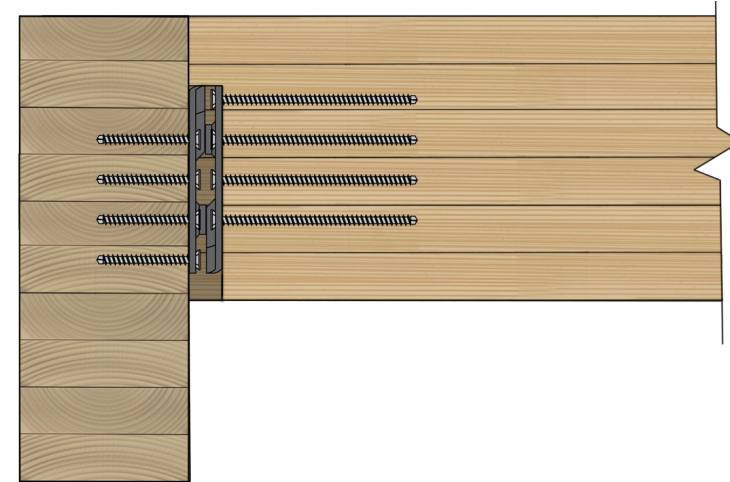


**Joist Reinforcement from Above**

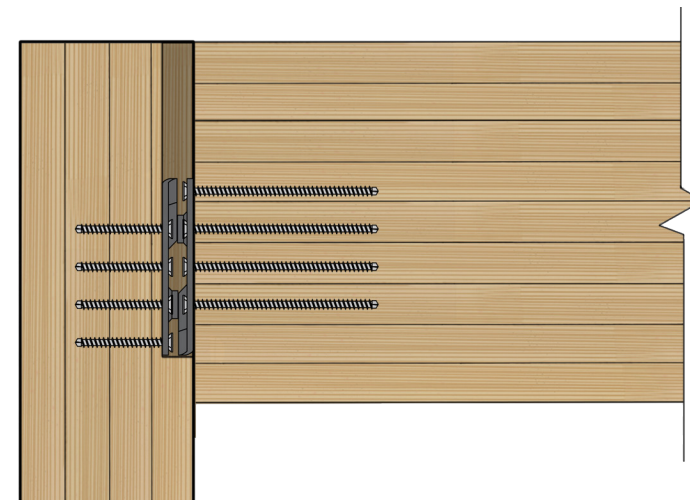


## ***Positioning***

- Do it right the first time



**Girder Connection**



**Joist Connection**

# The Beam Hanger Design Guide



- Step 1: Beam Hanger Selection
- Step 2: Detailing
- Step 3: Housing



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# Step 3: Housing Design

## Installation and Tolerances

### Routing in Primary Member

The red dots indicate the positioning holes and should be aligned with the main holes on the members which are also marked red in the following figures.

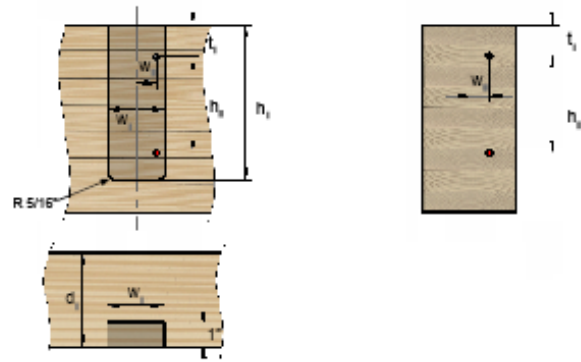
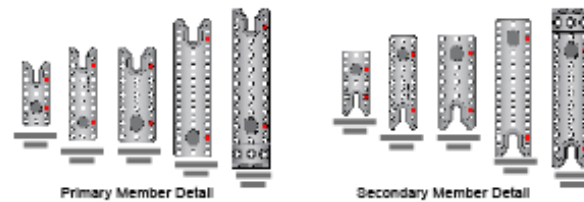
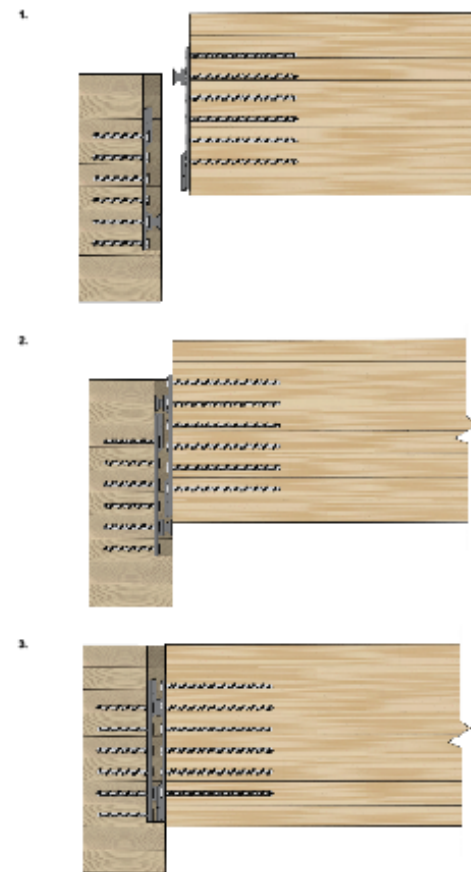


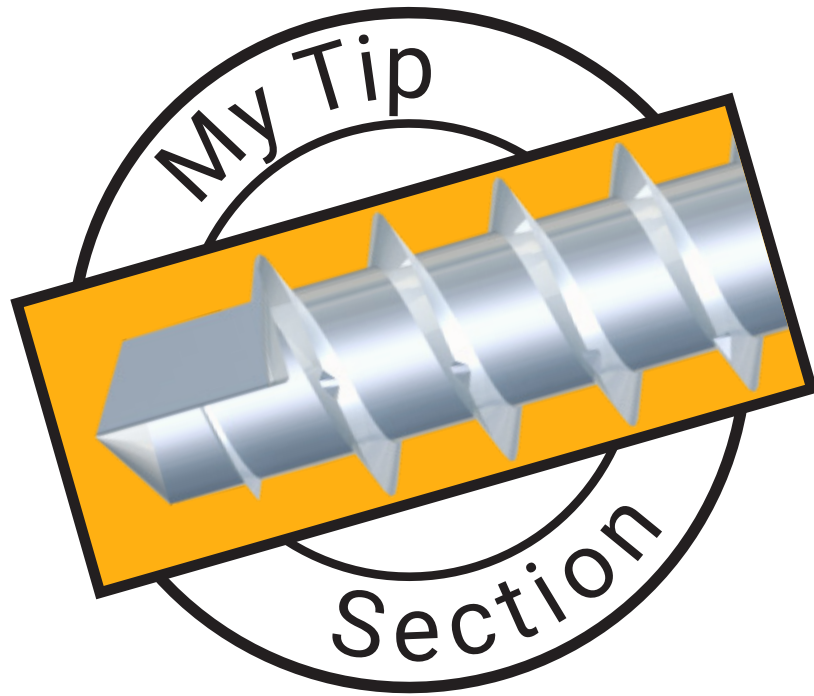
Table 18.1 Routing in Primary Member Installation Measurements

Connector	$h_1$ [in]	$h_2$ [in]	$t_1$ [in]	$d_1$ [in]	$w_1$ [in]	$w_2$ [in]
RICON B V8 140x60	>6-5/16	2-3/8	>2-3/8	>4	2-3/8	7/8
RICON B V8 200x60	>8-7/8	4-3/4	>2-3/8	>4	2-3/8	7/8
RICON B V8 200x80	>8-7/8	4-3/4	>2-3/8	>4-3/4	3-3/16	1-3/16
RICON B V8 290x80	>12-3/16	8-1/4	>2-3/8	>4-3/4	3-3/16	1-3/16
RICON XL 390x80	>16-1/8	8-1/4	>4-5/16	>4-3/4	3-3/16	1-3/16

### Joist Installation, routing in primary member.





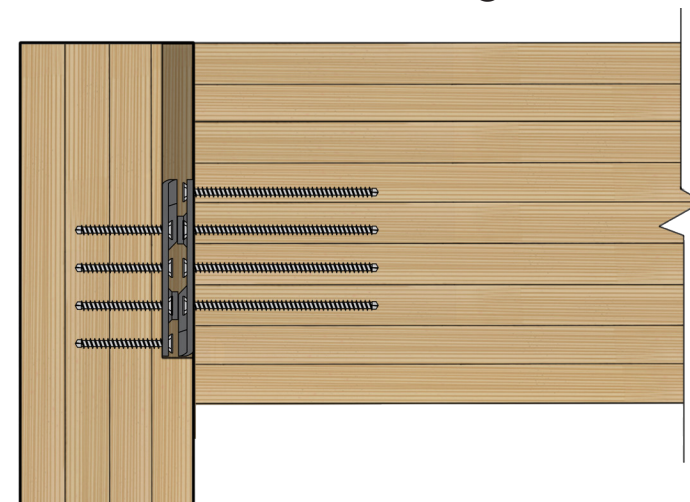


## ***Housing in Girder or Post***

- No wood plug
- Better access for CNC machining
- Simplified fire design



**Joist Housing**



**Primary Beam Housing**

# The Beam Hanger Design Guide

Step 1: Beam Hanger Selection

Step 2: Detailing

Step 3: Housing

Step 4: Fire Design



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# Step 4: Fire Design

- Clear and detailed instructions
- No research and development needed
- No special detailing

### Fire Design

#### Loaded Full Scale Fire Test

The NDS section 16.3 and CSA O86 Annex B recognize wood as a combustible material and a poor conductor of heat and refer to the property of wood in developing an insulating char layer in fire. Therefore, wood can protect non-combustible elements such as the Beam Hanger through an appropriately designed wood cover. The American Wood Council Technical Report 10 provides guidelines on char layer design for the Beam Hanger in fire scenarios.

Full scale fire resistance testing of fully loaded specimen with the Beam Hanger at the Southwest Research Institute in San Antonio Texas confirmed the char layer calculations and awarded the beam hanger with a 1.5" cover a 1h fire rating.

**Char Layer Design**

**Table 17 Estimated Char Layer Thickness and Charring Rate Results**

Required Fire Resistance	Effective Char Layer Thickness		Wood cover
	$t_{ch}$ [in.]	$t_{ch}$ [in.]	$t_{ch} \times 1.2$ [in.]
1 -hour	1.75	1.48	1.78
1 1/2 -hour	2.5	2.08	2.50
2 -hour	3.2	2.67	3.24

The wood cover must be thicker than the effective char thickness ( $t_{ch}$ ) divided by 1.2, as per the Manual for Engineered Wood Construction 2015 edition, from the American Wood Council section M16.3.

**Char Layer Fire Design**

### Fire Design Example

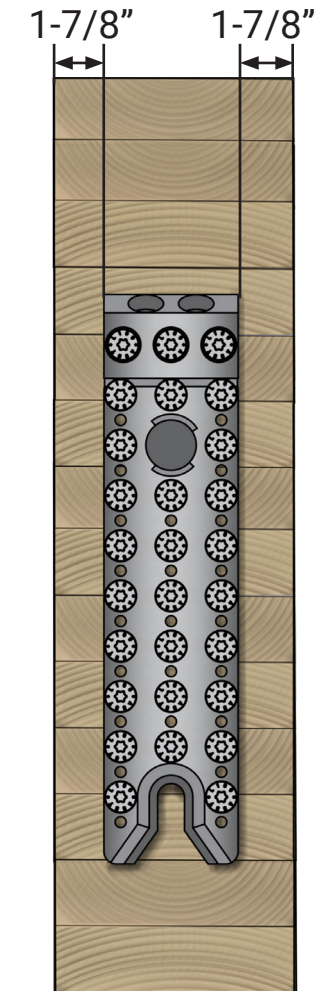
As an example, a 6'-0" by 21" beam can be connected to a column with the RICON XL 390x80. In accordance with TR10, the required cover for a concealed beam to column connection to achieve a FRR of 60 minutes is 1.5 in.

According to the proposed design, a char layer of 1-7/8" on each side and 1-1/4" on the bottom is provided, which meets the requirements of the American Wood Council Technical Report 10.

For more design details please refer to TR 10 and the NDS.

Example of Fire Design, Front View

Example of Fire Design, Side View



# Step 4: Fire Design

---

- USA based
- Full scale fire testing
- 1 Hour fire rating awarded
- Through wood charring



Fire Rating Achieved with Char Layer

# The Beam Hanger Design Guide

Step 1: Beam Hanger Selection

Step 2: Detailing

Step 3: Housing

Step 4: Fire Design

Step 5: Uplift Solutions



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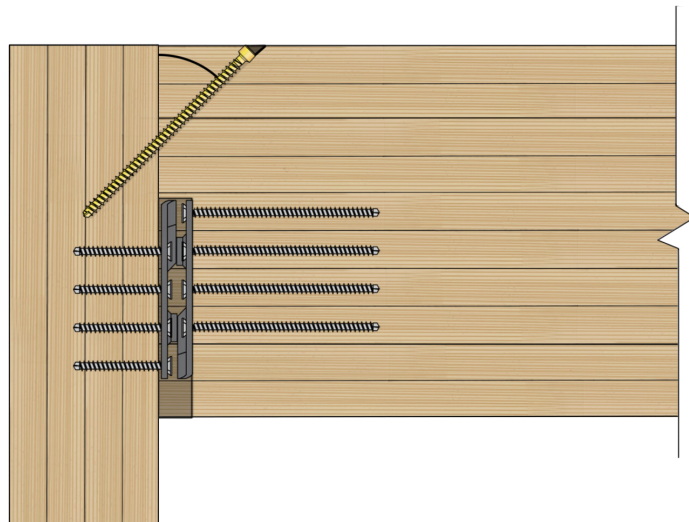
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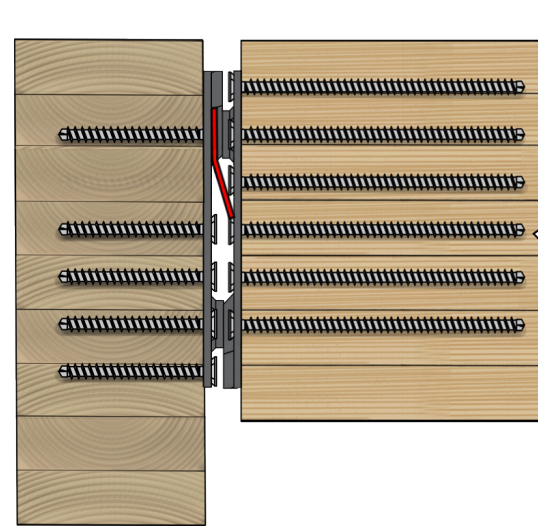
# Step 5: Uplift Solutions

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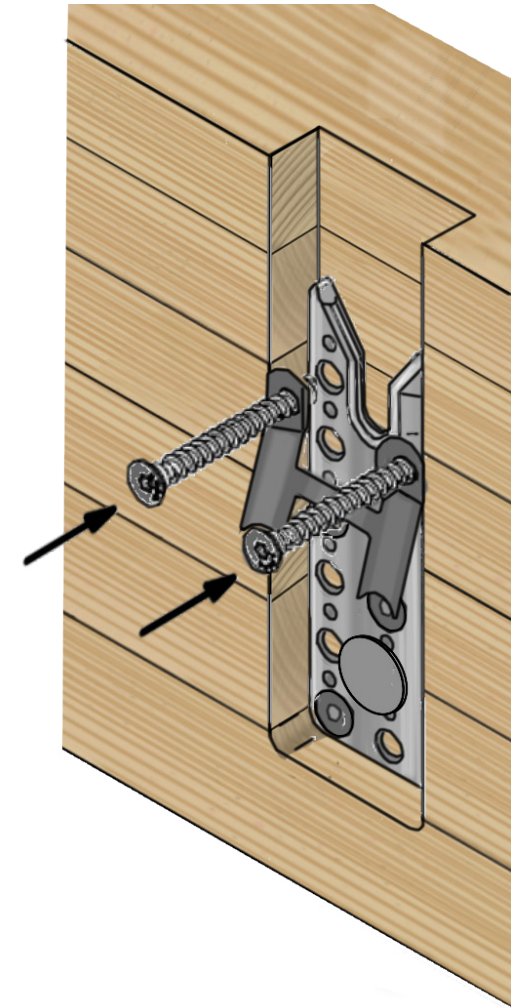
- Fully threaded toe screw
- Spring steel clip lock brace



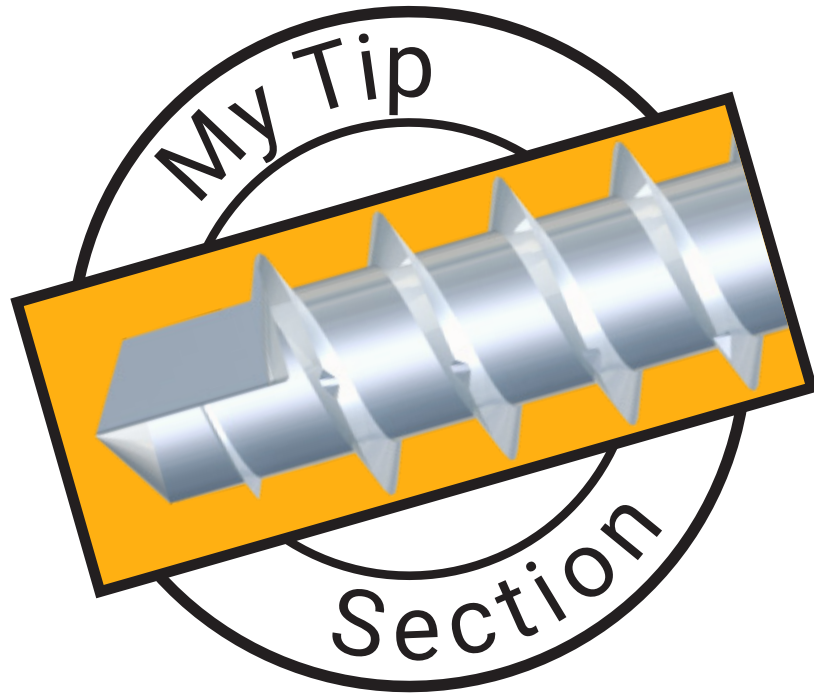
Toe Screw Installation



Clip Lock Brace



Clip Lock Brace Installation

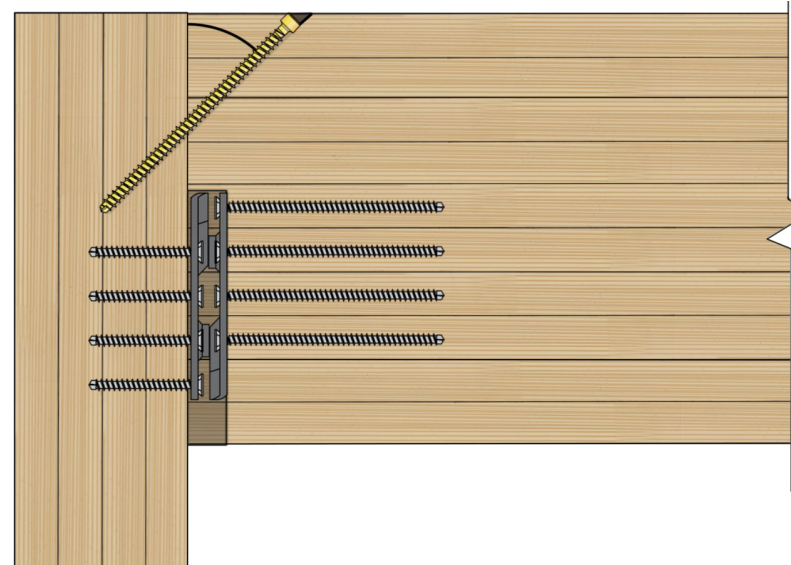


## ***Toe Screws***

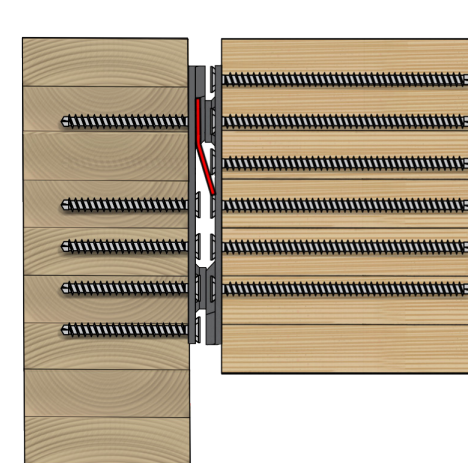
- More adaptable
- Higher capacities

## ***Clip Lock***

- Integrated



**Toe Screw Installation**



**Clip Lock Brace**

# The Beam Hanger Design Guide

- Step 1: Beam Hanger Selection
- Step 2: Detailing
- Step 3: Housing
- Step 4: Fire Design
- Step 5: Uplift Solutions
- Other Special Connections

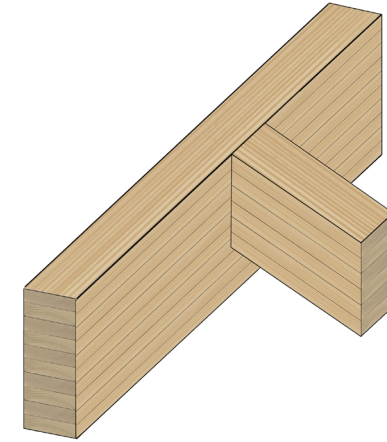




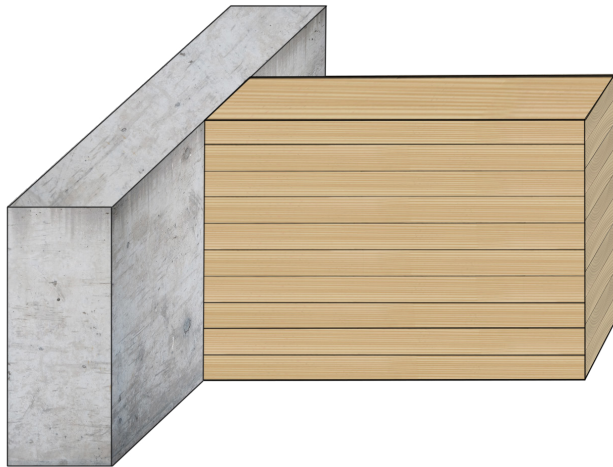
# Special Connections

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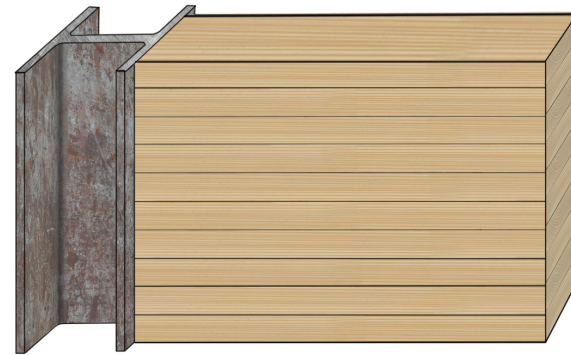
- Wood to concrete connections
- Wood to steel connections
- Skewed connections



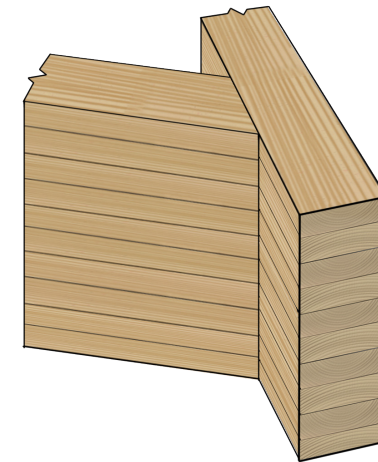
**Rafter to Ridge Beam Connection**



**Wood to Concrete Connection**



**Wood to Steel Connection**



**Joist to Beam Connection**

# Special Connections

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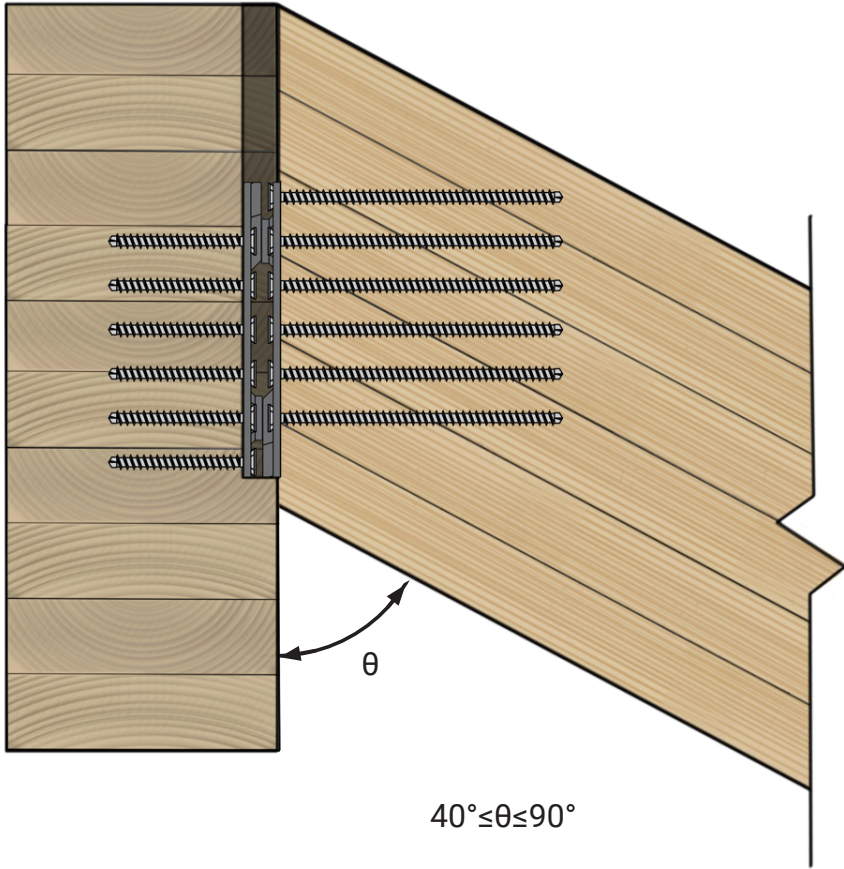
- Double tilt connection
- Simple detailing
- Only needs parallel faces



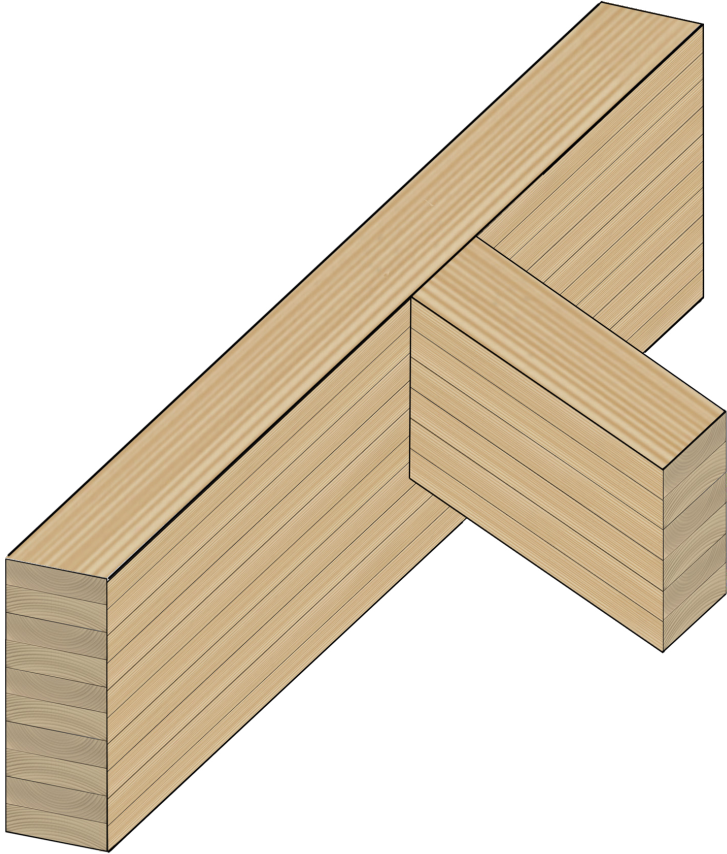
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# Sloped Connections

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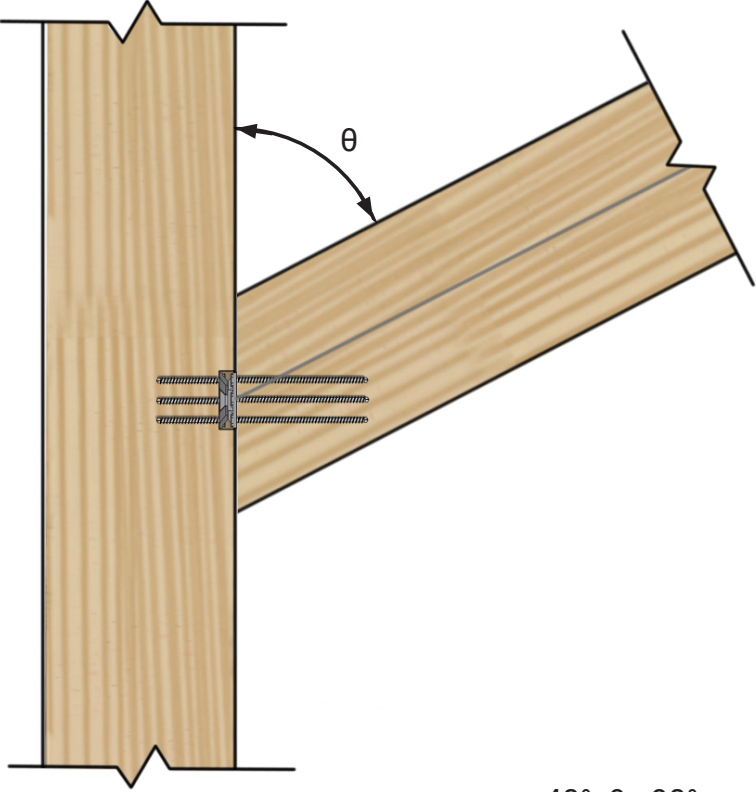
**Rafter to Ridge Beam Connection**



**Rafter to Ridge Beam Connection**

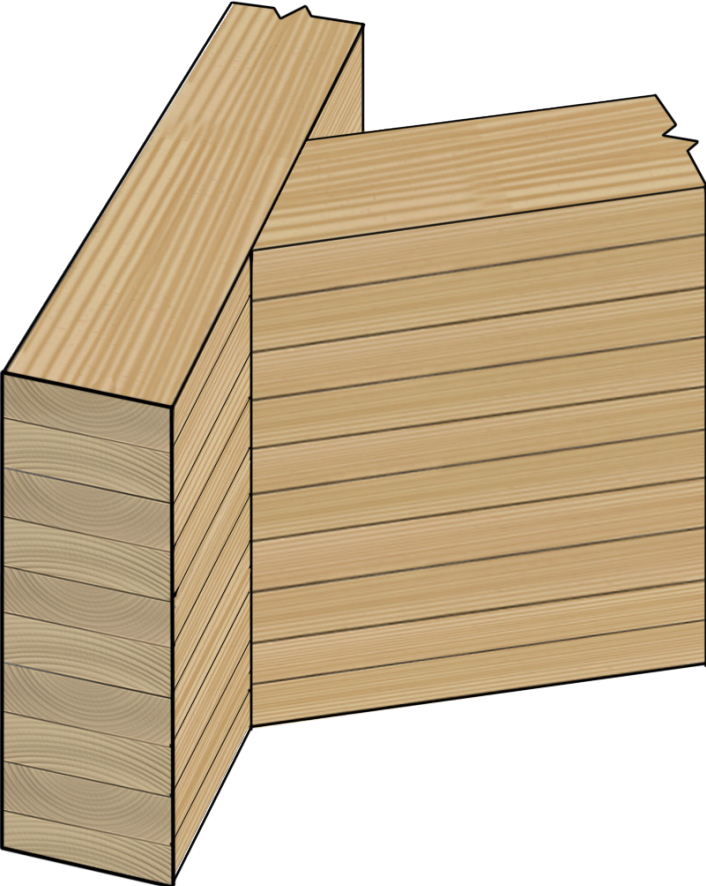
# Skewed Connections

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$40^\circ \leq \theta \leq 90^\circ$

**Joist to Beam Connection**

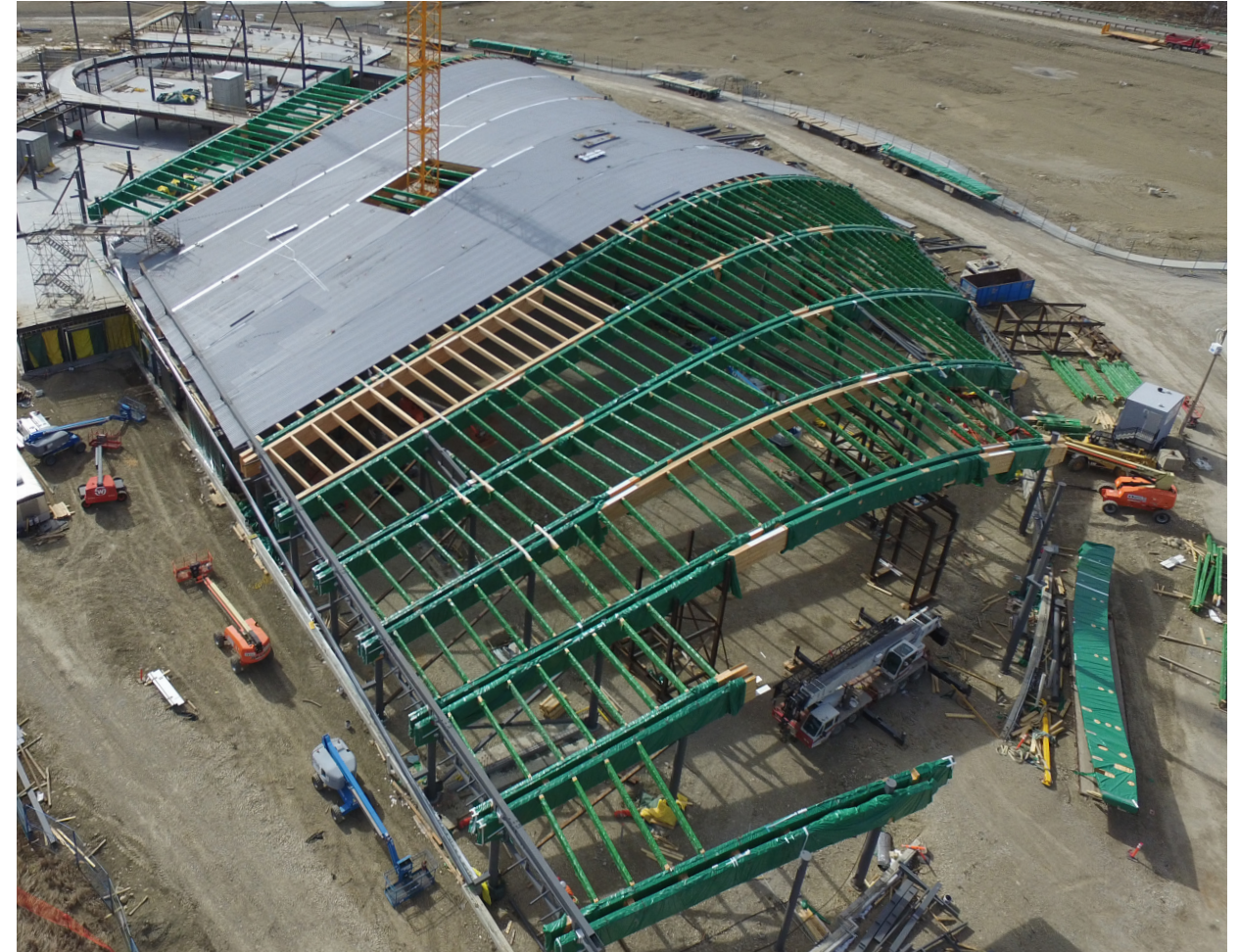


**Joist to Beam Connection**

# Double Tilt Connection

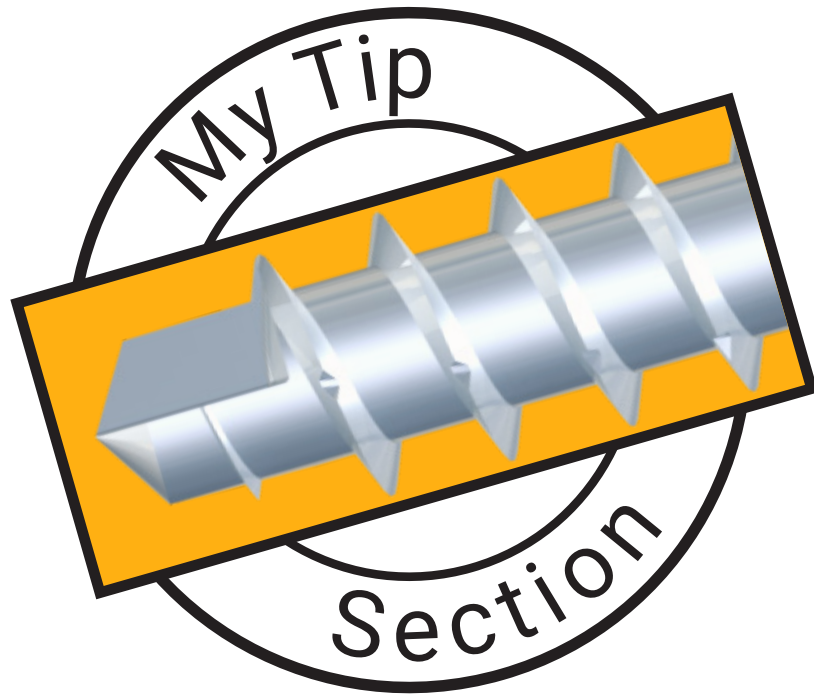
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- One of the largest wood roof structure in the world



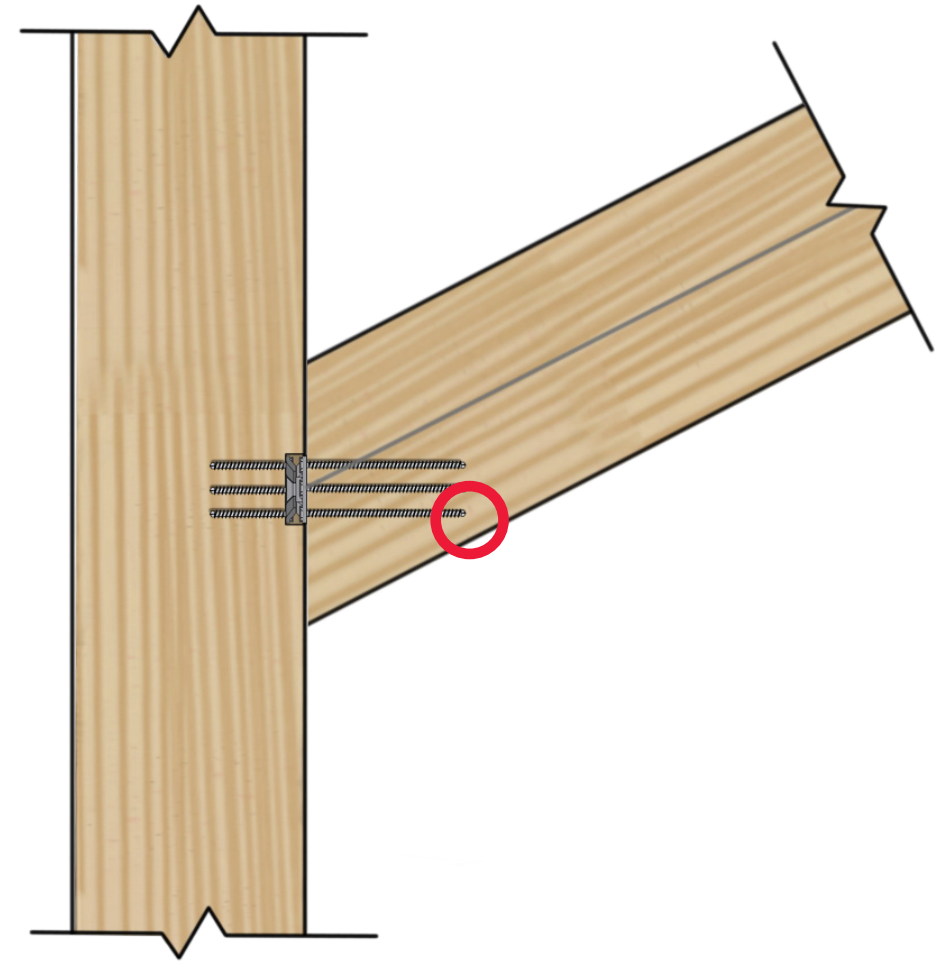
Source: STRUCTURLAM

**Rocky Ridge Recreation Facility**



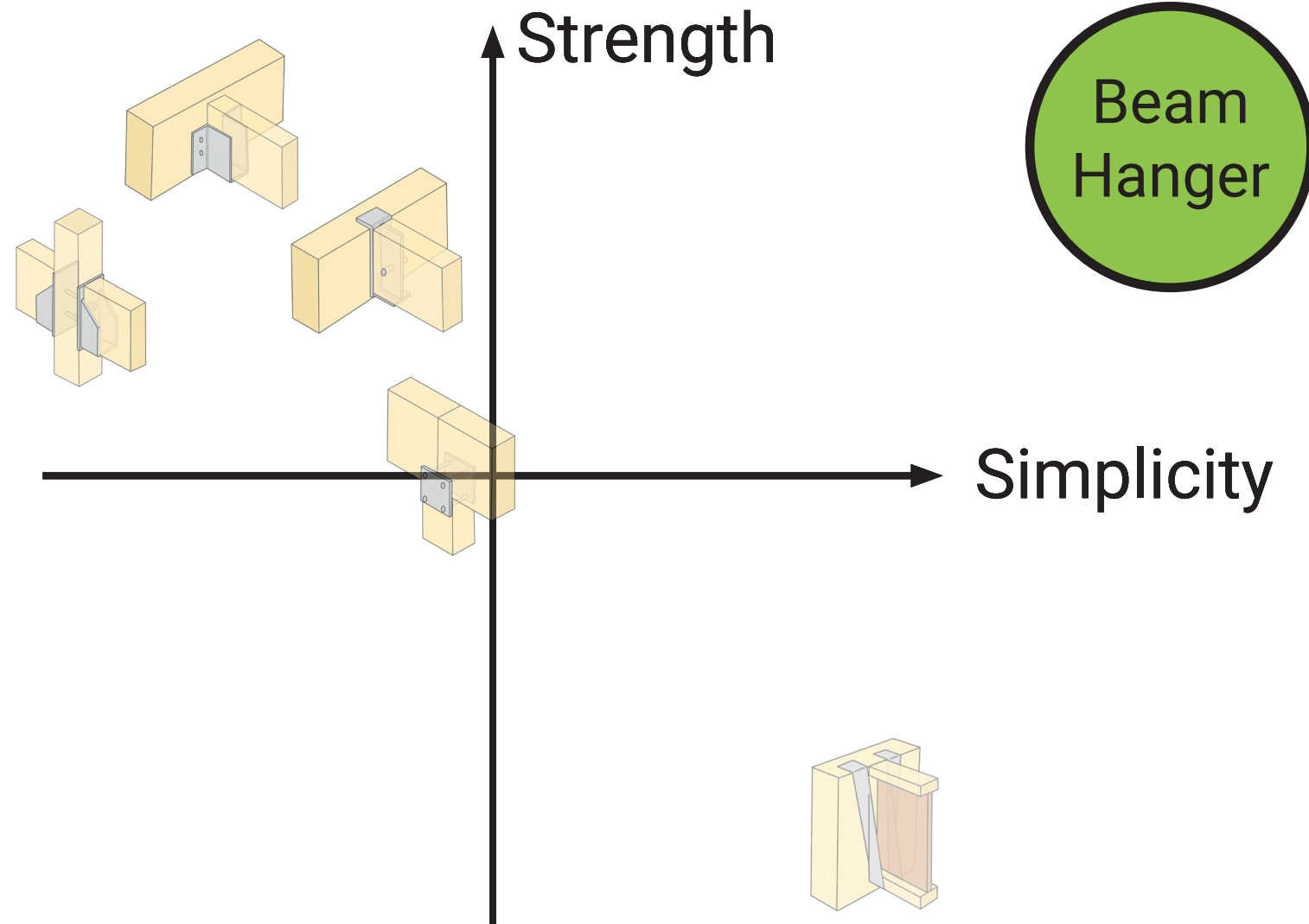
## ***Reduced Screw Length***

- Edge distance
- Improved end grain angle
- Secondary beam only

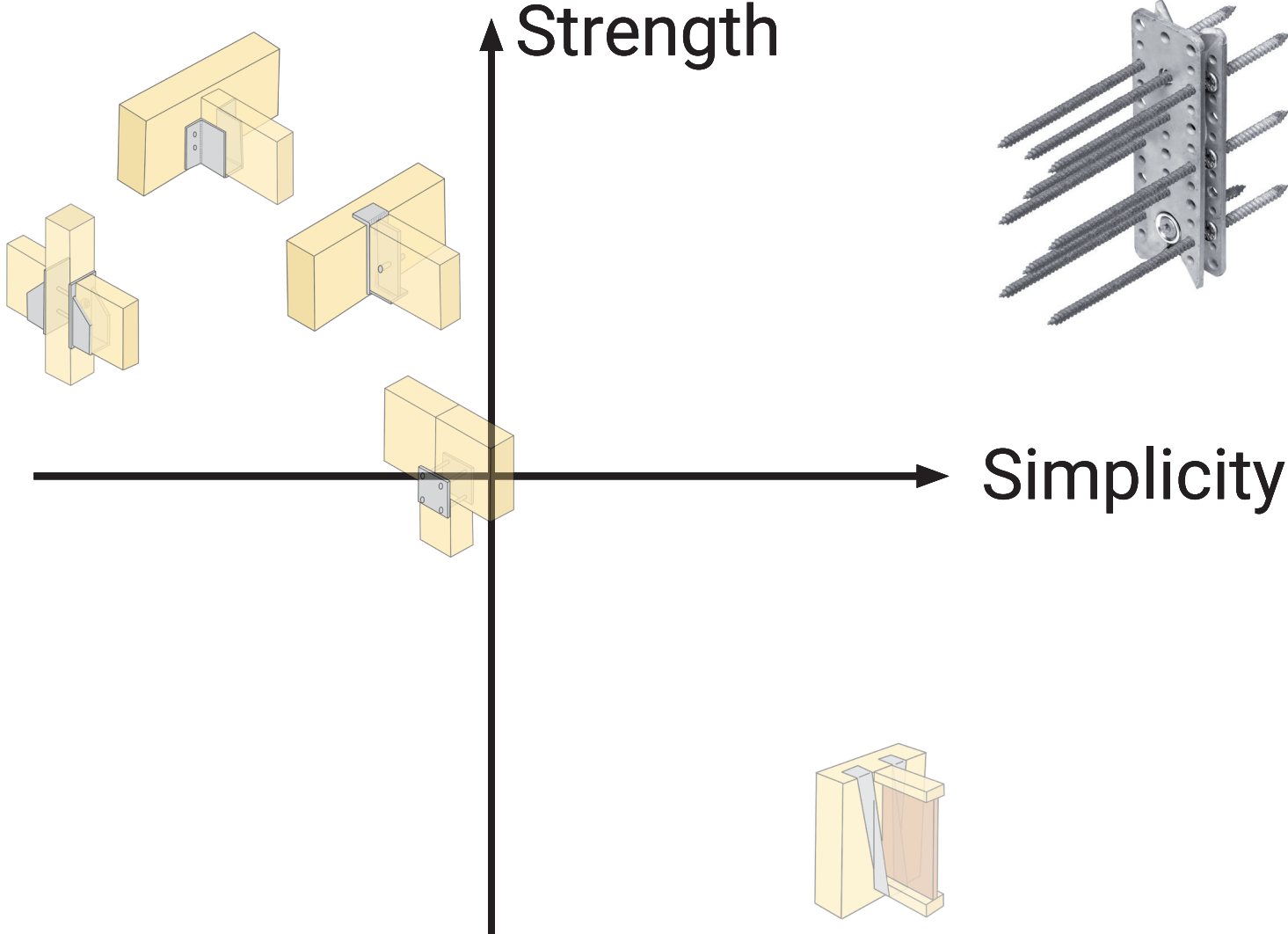


**Top View**  
Joist to Beam Connection

# What Is the Beam Hanger?

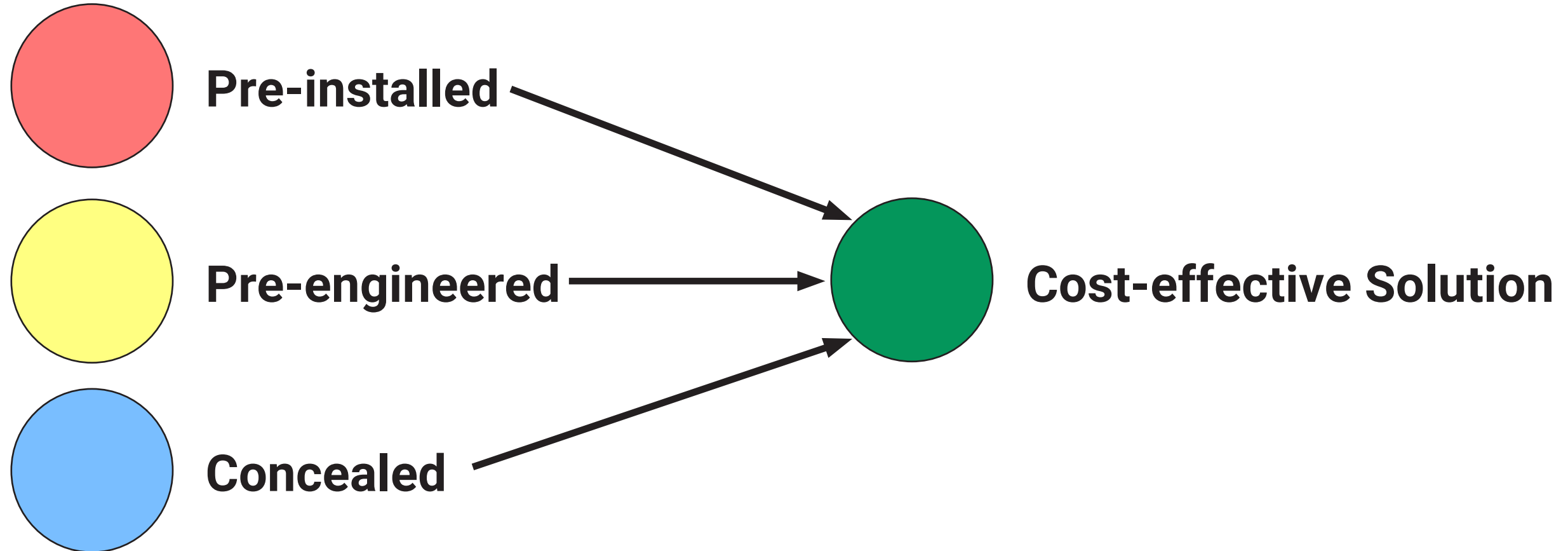


# What Is the Beam Hanger?





# Why the Beam Hanger?



# How to Use the Beam Hanger?

## *The Design Guide Provides*

- Step-by-step
- Detailed
- Adaptable

## *Instructions*



# Questions?

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- Technical Support
- [support@myticon.com](mailto:support@myticon.com)

Thank you to the  
**Oregon Forest Resources Institute**  
For the Pictures and Video



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# Heavy & Mass Timber Handbook

