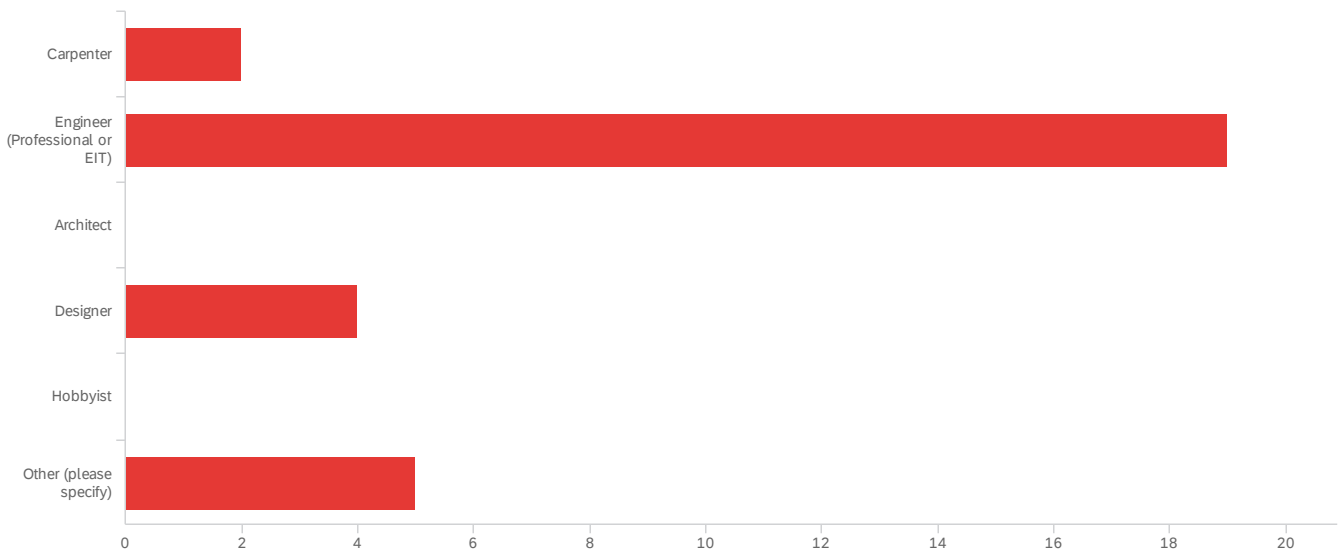


Q2 - 2.1 What is your profession? Note: multiple answers allowed.



| # | Field                          | Choice Count |
|---|--------------------------------|--------------|
| 1 | Carpenter                      | 6.67% 2      |
| 2 | Engineer (Professional or EIT) | 63.33% 19    |
| 3 | Architect                      | 0.00% 0      |
| 4 | Designer                       | 13.33% 4     |
| 5 | Hobbyist                       | 0.00% 0      |
| 6 | Other (please specify)         | 16.67% 5     |

30

Showing rows 1 - 7 of 7

Q2\_6\_TEXT - Other (please specify)

Other (please specify)

retired hvac eng

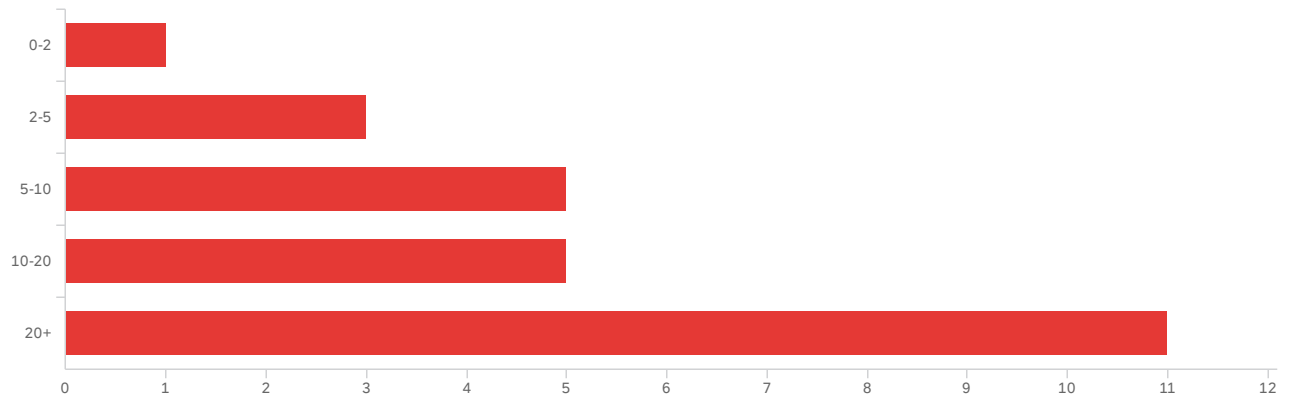
Timber Frammer / Drafter

editor, consultant

Timber Frammer

TF Company Owner

### Q3 - 2.2 How many years of experience do you have in the timber framing industry?

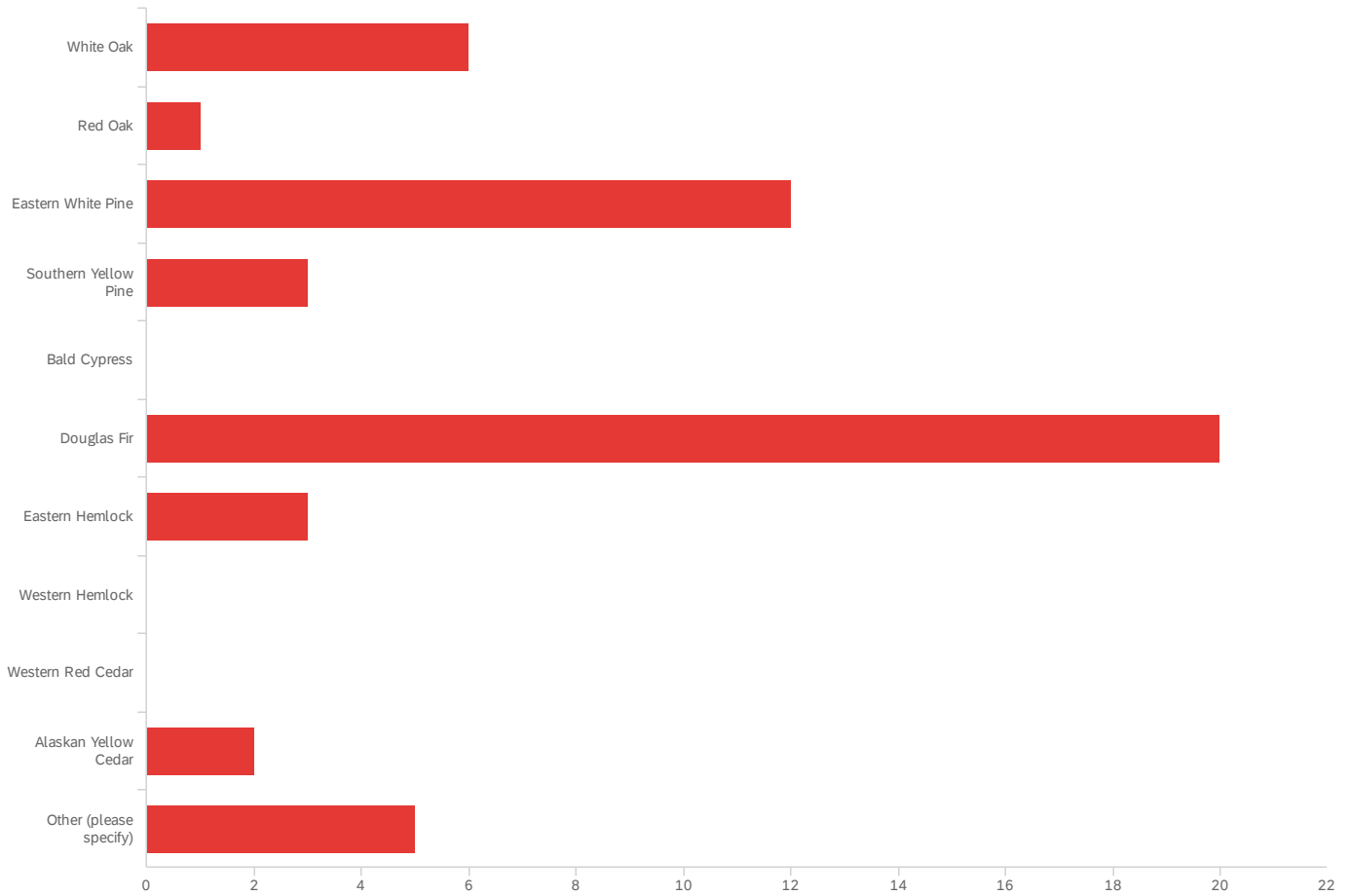


| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 2.2 How many years of experience do you have in the timber framing industry? | 1.00    | 5.00    | 3.88 | 1.21          | 1.47     | 25    |

| # | Field | Choice Count |
|---|-------|--------------|
| 1 | 0-2   | 4.00% 1      |
| 2 | 2-5   | 12.00% 3     |
| 3 | 5-10  | 20.00% 5     |
| 4 | 10-20 | 20.00% 5     |
| 5 | 20+   | 44.00% 11    |
|   |       | 25           |

Showing rows 1 - 6 of 6

Q4 - 2.3 What timber species do you primarily use for frames? Select a maximum of three species.



| # | Field                | Choice Count |
|---|----------------------|--------------|
| 1 | White Oak            | 11.54% 6     |
| 2 | Red Oak              | 1.92% 1      |
| 3 | Eastern White Pine   | 23.08% 12    |
| 4 | Southern Yellow Pine | 5.77% 3      |
| 5 | Bald Cypress         | 0.00% 0      |
| 6 | Douglas Fir          | 38.46% 20    |
| 7 | Eastern Hemlock      | 5.77% 3      |
| 8 | Western Hemlock      | 0.00% 0      |
| 9 | Western Red Cedar    | 0.00% 0      |

| #  | Field                  | Choice Count |
|----|------------------------|--------------|
| 10 | Alaskan Yellow Cedar   | 3.85% 2      |
| 11 | Other (please specify) | 9.62% 5      |
|    |                        | 52           |

Showing rows 1 - 12 of 12

Q4\_11\_TEXT - Other (please specify)

Other (please specify)

Redwood

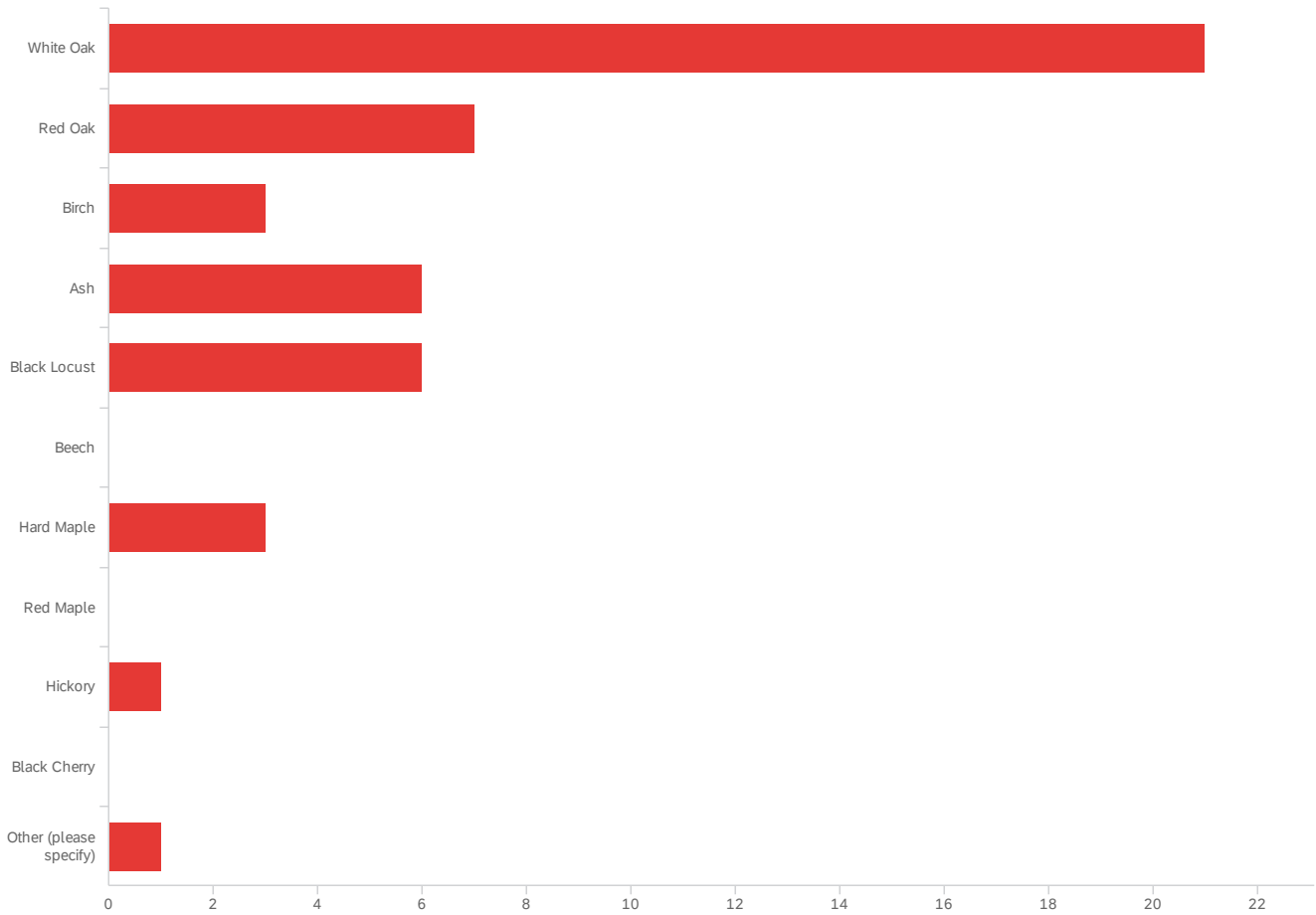
forensic engineer (no new timber specified)

Black Spruce, Eastern Hemlock

DF Glulam, Black Spruce Glulam, POC

eastern white cedar

Q5 - 2.4 What timber species do you primarily use for pegs? Select a maximum of three species.



| # | Field        | Choice Count |
|---|--------------|--------------|
| 1 | White Oak    | 43.75% 21    |
| 2 | Red Oak      | 14.58% 7     |
| 3 | Birch        | 6.25% 3      |
| 4 | Ash          | 12.50% 6     |
| 5 | Black Locust | 12.50% 6     |
| 6 | Beech        | 0.00% 0      |
| 7 | Hard Maple   | 6.25% 3      |
| 8 | Red Maple    | 0.00% 0      |
| 9 | Hickory      | 2.08% 1      |

| #  | Field                  | Choice Count |
|----|------------------------|--------------|
| 10 | Black Cherry           | 0.00% 0      |
| 11 | Other (please specify) | 2.08% 1      |
|    |                        | 48           |

Showing rows 1 - 12 of 12

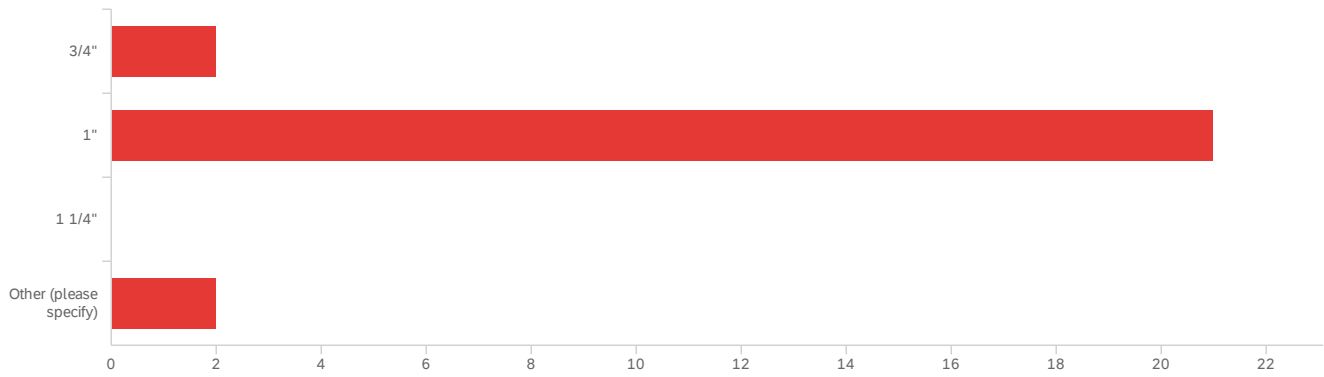
Q5\_11\_TEXT - Other (please specify)

Other (please specify)

---

forensic engineer (no new timber specified)

## Q6 - 2.5 What size timber pegs do you primarily use?



| # | Field   | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | 2.5 What size timber pegs do you primarily use? - Selected Choice | 1.00    | 4.00    | 2.08 | 0.63          | 0.39     | 25    |

| # | Field                  | Choice Count |
|---|------------------------|--------------|
| 1 | 3/4"                   | 8.00% 2      |
| 2 | 1"                     | 84.00% 21    |
| 3 | 1 1/4"                 | 0.00% 0      |
| 4 | Other (please specify) | 8.00% 2      |
|   |                        | 25           |

Showing rows 1 - 5 of 5

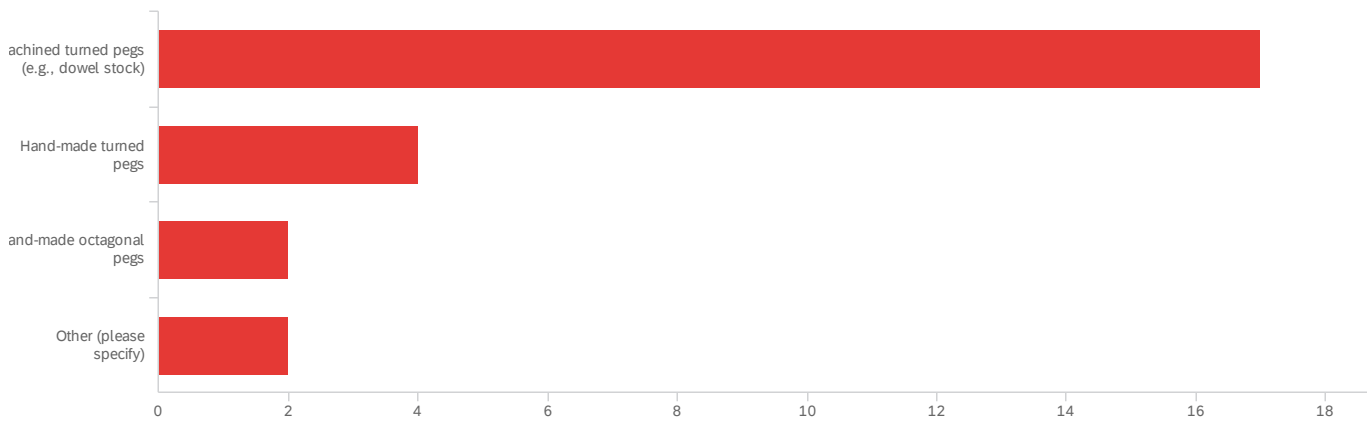
### Q6\_4\_TEXT - Other (please specify)

Other (please specify)

3/4withpine; 1with other species

forensic engineer (no new timber specified)

## Q7 - 2.6 What style of pegs do you primarily use?



| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 2.6 What style of pegs do you primarily use? - Selected Choice | 1.00    | 4.00    | 1.56 | 0.94          | 0.89     | 25    |

| # | Field                                    | Choice Count |
|---|--|--------------|
| 1 | Machined turned pegs (e.g., dowel stock) | 68.00% 17    |
| 2 | Hand-made turned pegs                    | 16.00% 4     |
| 3 | Hand-made octagonal pegs                 | 8.00% 2      |
| 4 | Other (please specify)                   | 8.00% 2      |

25

Showing rows 1 - 5 of 5

### Q7\_4\_TEXT - Other (please specify)

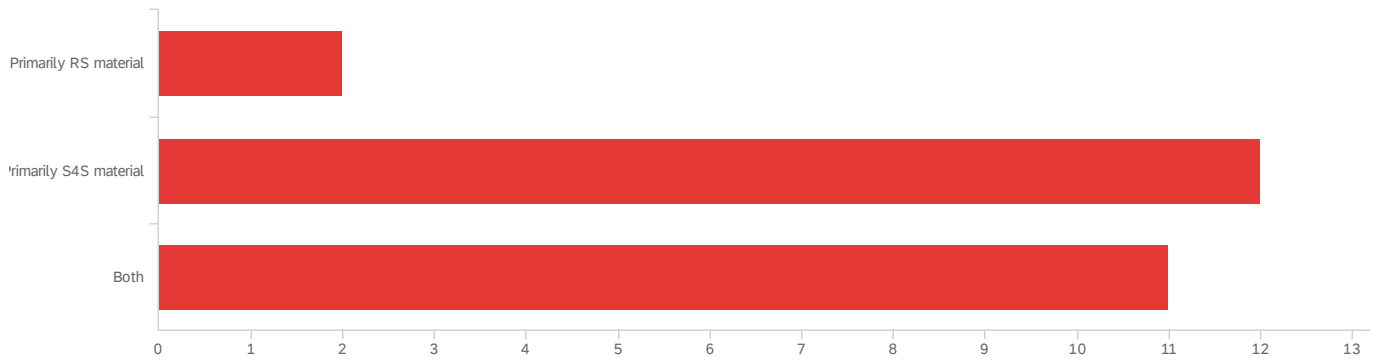
Other (please specify)

forensic engineer (no new timber specified)

Machined pegs, in bulk, but not dowel stock.



## Q8 - 2.7 Do you primarily use Rough Sawn (RS) material or Surfaced (S4S) material?

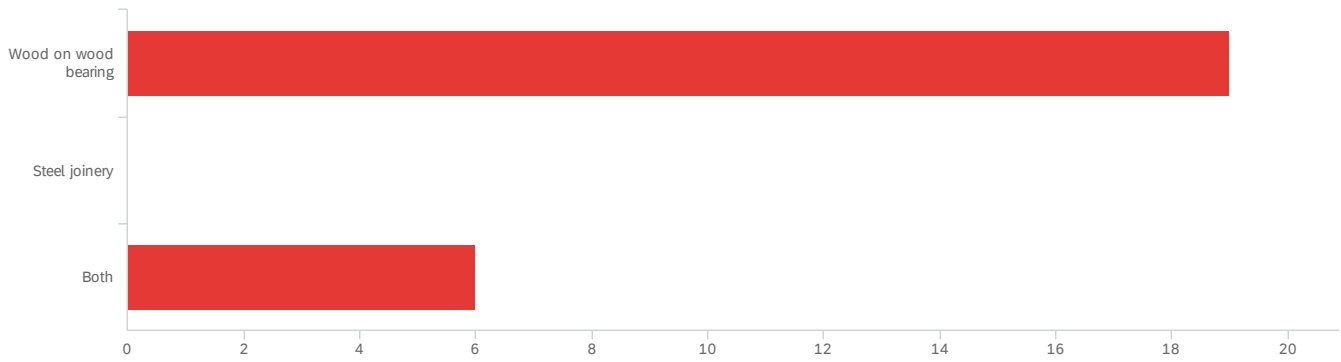


| # | Field   | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | 2.7 Do you primarily use Rough Sawn (RS) material or Surfaced (S4S) material? | 1.00    | 3.00    | 2.36 | 0.62          | 0.39     | 25    |

| # | Field                  | Choice Count |
|---|------------------------|--------------|
| 1 | Primarily RS material  | 8.00% 2      |
| 2 | Primarily S4S material | 48.00% 12    |
| 3 | Both                   | 44.00% 11    |
|   |                        | 25           |

Showing rows 1 - 4 of 4

## Q11 - 2.8 What is your preferred joinery method?

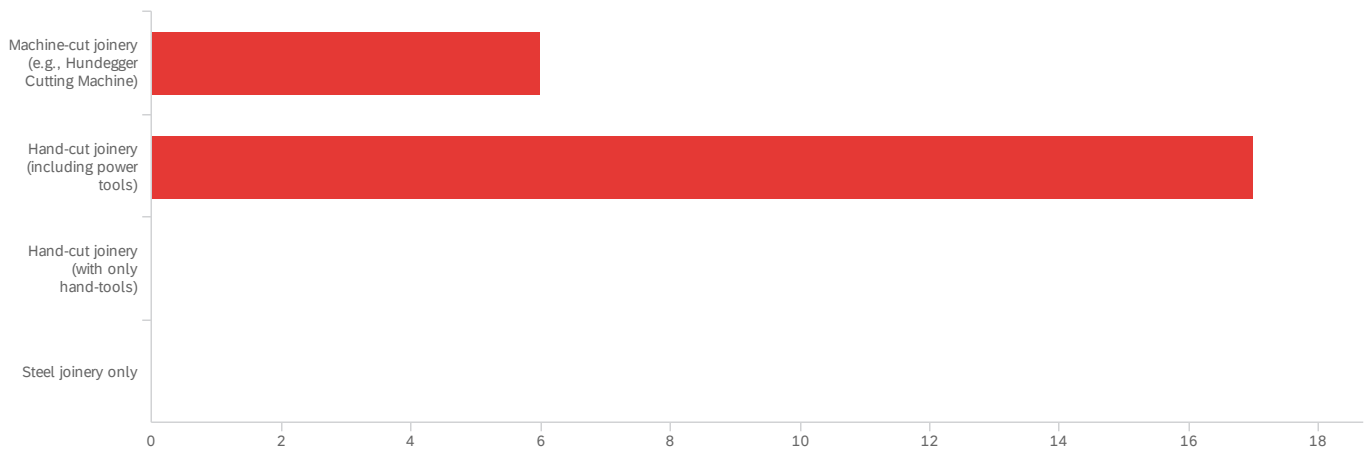


| # | Field                                      | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 2.8 What is your preferred joinery method? | 1.00    | 3.00    | 1.48 | 0.85          | 0.73     | 25    |

| # | Field                | Choice Count |
|---|----------------------|--------------|
| 1 | Wood on wood bearing | 76.00% 19    |
| 2 | Steel joinery        | 0.00% 0      |
| 3 | Both                 | 24.00% 6     |
|   |                      | 25           |

Showing rows 1 - 4 of 4

## Q9 - 2.9 What is your preferred joinery fabrication method?



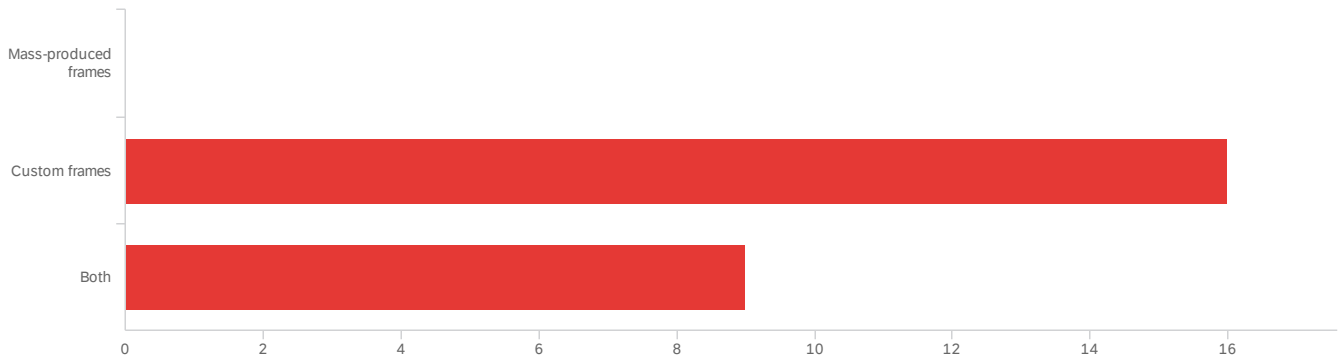
| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 2.9 What is your preferred joinery fabrication method? | 1.00    | 2.00    | 1.74 | 0.44          | 0.19     | 23    |

| # | Field   | Choice Count |
|---|---|--------------|
| 1 | Machine-cut joinery (e.g., Hundegger Cutting Machine) | 26.09% 6     |
| 2 | Hand-cut joinery (including power tools)              | 73.91% 17    |
| 3 | Hand-cut joinery (with only hand-tools)               | 0.00% 0      |
| 4 | Steel joinery only                                    | 0.00% 0      |

23

Showing rows 1 - 5 of 5

## Q10 - 2.10 Do you primarily work with mass-produced frames or custom frames?

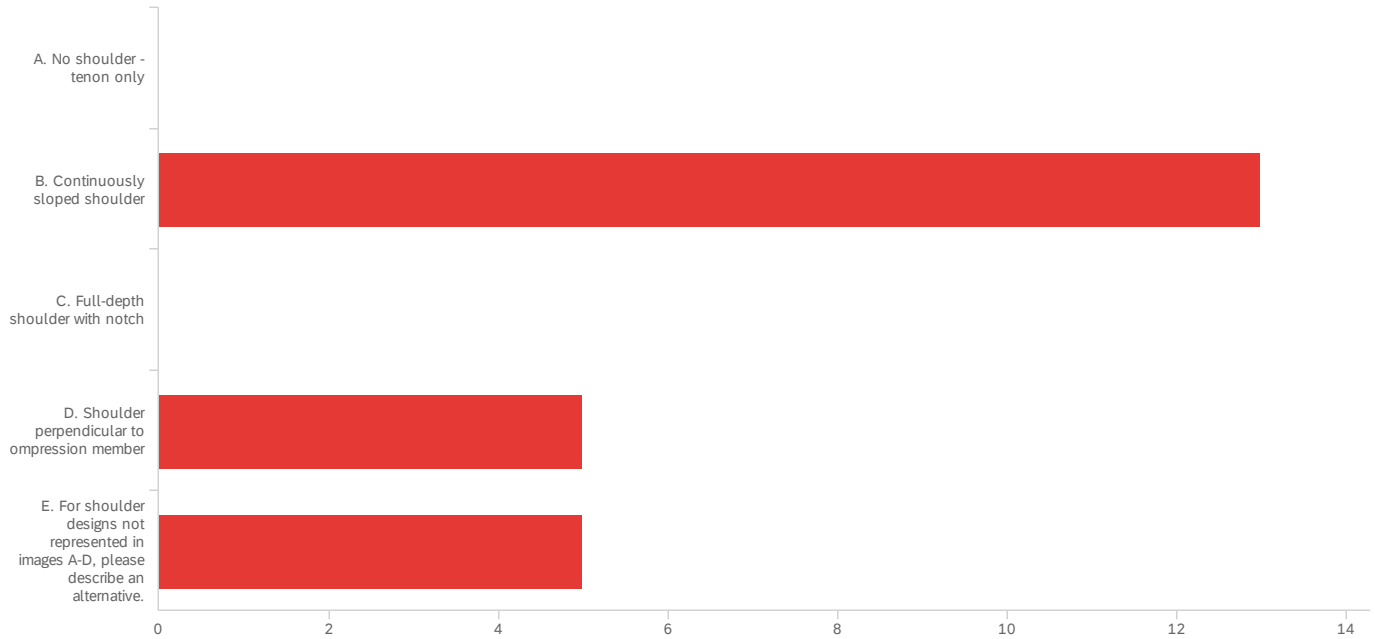


| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 2.10 Do you primarily work with mass-produced frames or custom frames? | 2.00    | 3.00    | 2.36 | 0.48          | 0.23     | 25    |

| # | Field                | Choice Count |
|---|----------------------|--------------|
| 1 | Mass-produced frames | 0.00% 0      |
| 2 | Custom frames        | 64.00% 16    |
| 3 | Both                 | 36.00% 9     |
|   |                      | 25           |

Showing rows 1 - 4 of 4

Q12 - Note: The following questions pertain to shoulder and tenon joints with two opposing compression members framing into a single tension member. 3.1 Which shoulder design most closely represents your typical detail? Note: all possible tenon designs are omitted for clarity.



| # | Field   | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | Note: The following questions pertain to shoulder and tenon joints with two opposing compression members framing into a single tension member. 3.1 Which shoulder design most closely represents your typical detail? Note: all possible tenon designs are omitted for clarity. - Selected Choice | 2.00    | 5.00    | 3.09 | 1.28          | 1.64     | 23    |

| # | Field   | Choice Count |
|---|---|--------------|
| 1 | A. No shoulder - tenon only                     | 0.00% 0      |
| 2 | B. Continuously sloped shoulder                 | 56.52% 13    |
| 3 | C. Full-depth shoulder with notch               | 0.00% 0      |
| 4 | D. Shoulder perpendicular to compression member | 21.74% 5     |

| # | Field  | Choice Count |
|---|--|--------------|
| 5 | E. For shoulder designs not represented in images A-D, please describe an alternative. | 21.74% 5     |
|   |  | 23           |

Showing rows 1 - 6 of 6

Q12\_5\_TEXT - E. For shoulder designs not represented in images A-D, please describe an a...

E. For shoulder designs not represented in images A-D, please describe an a...

A, B, D above, but with concealed steel hardware (threaded rod or long screws)

Mostly will use 'B' and sometimes 'D'

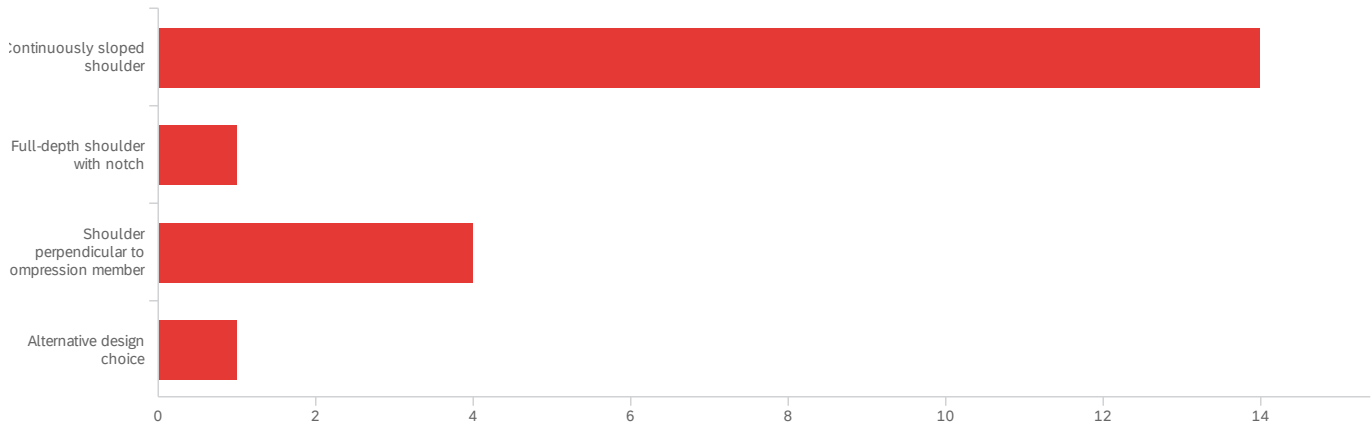
B & D, depending on forces.

Slope Shoulder with Tenon

Please refer to my emailed response

Q14 - 3.2 Based on question 3.1, which shoulder design do you find is easiest to

fabricate? Note: excluding "no shoulder."



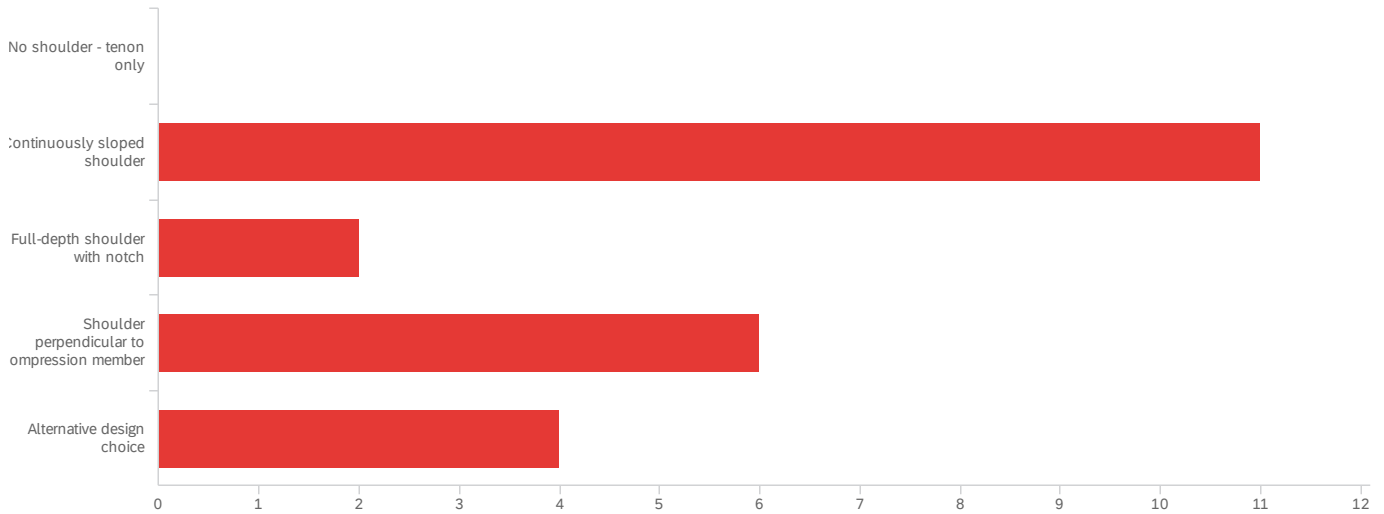
| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 3.2 Based on question 3.1, which shoulder design do you find is easiest to fabricate? Note: excluding "no shoulder." | 1.00    | 4.00    | 1.60 | 0.97          | 0.94     | 20    |

| # | Field  | Choice Count |
|---|--|--------------|
| 1 | Continuously sloped shoulder                 | 70.00% 14    |
| 2 | Full-depth shoulder with notch               | 5.00% 1      |
| 3 | Shoulder perpendicular to compression member | 20.00% 4     |
| 4 | Alternative design choice                    | 5.00% 1      |

20

Showing rows 1 - 5 of 5

Q15 - 3.3 Based on question 3.1, which shoulder design do you find is the most structurally sound?



| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 3.3 Based on question 3.1, which shoulder design do you find is the most structurally sound? | 2.00    | 5.00    | 3.13 | 1.19          | 1.42     | 23    |

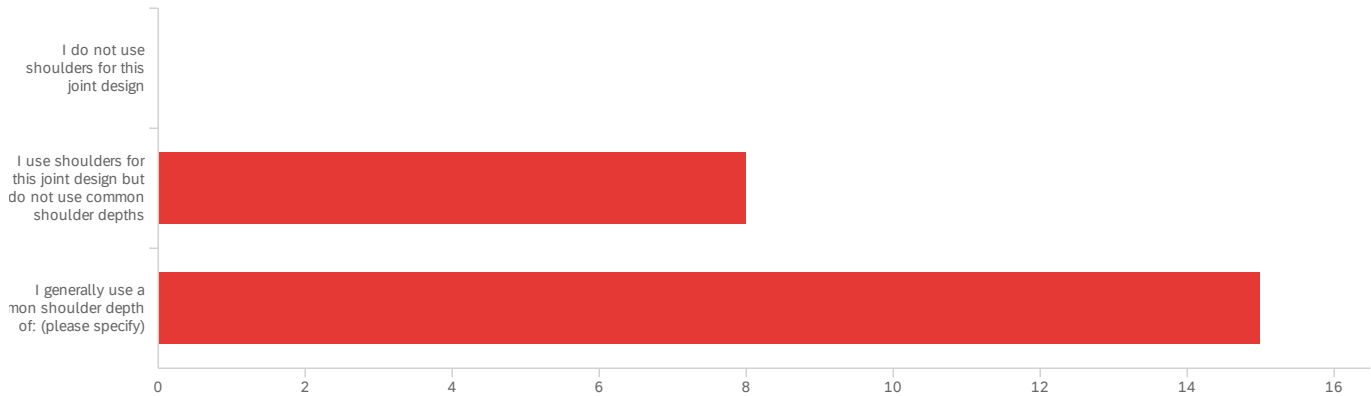
| # | Field  | Choice Count |
|---|--|--------------|
| 1 | No shoulder - tenon only                     | 0.00% 0      |
| 2 | Continuously sloped shoulder                 | 47.83% 11    |
| 3 | Full-depth shoulder with notch               | 8.70% 2      |
| 4 | Shoulder perpendicular to compression member | 26.09% 6     |
| 5 | Alternative design choice                    | 17.39% 4     |
|   |  | 23           |

Showing rows 1 - 6 of 6



## Q13 - 3.4 If shoulders are used in this joint, what are the common shoulder depths?

Note: multiple answers



| # | Field   | Choice Count |
|---|---|--------------|
| 1 | I do not use shoulders for this joint design                                | 0            |
| 2 | I use shoulders for this joint design but do not use common shoulder depths | 8            |
| 3 | I generally use a common shoulder depth of: (please specify)                | 15           |
|   |   | 23           |

Showing rows 1 - 4 of 4

Q13\_3\_TEXT - For 6x wide timbers, the common shoulder depth is:

I generally use a common shoulder depth of: (please specify)

Depends on the angle of the rafters/top-chords

1"

designed per the loads in the King Post

~1" depending on member sizes and loading

.5"

1 1/4"

I don't use a set 'X', but will leave enough net-section in the king post for tension

1 1/4"

I generally use a common shoulder depth of: (please specify)

---

1 to 1.5

1/10 slope

1"

1"

1"

1.5" min, but more if required

1.5"

Q13\_4\_TEXT - For 8x wide timbers, the common shoulder depth is:

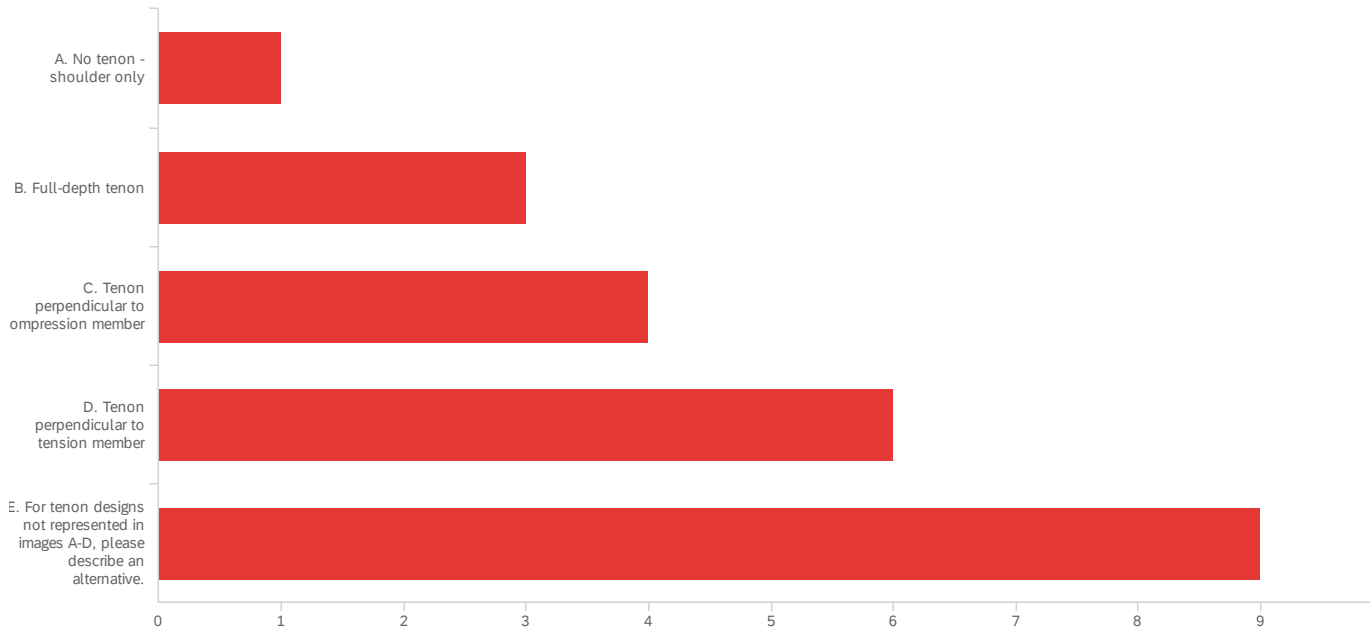
WIDGET\_ERROR.ERROR

Q13\_5\_TEXT - For 10x wide timbers, the common shoulder depth is:

WIDGET\_ERROR.ERROR

### Q16 - 3.5 Which tenon design most closely represents your typical detail? Note: all

possible shoulder designs are omitted for clarity.



| # | Field   | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | 3.5 Which tenon design most closely represents your typical detail?<br>Note: all possible shoulder designs are omitted for clarity. - Selected Choice | 1.00    | 5.00    | 3.83 | 1.20          | 1.45     | 23    |

| # | Field   | Choice Count |
|---|---|--------------|
| 1 | A. No tenon - shoulder only   | 4.35% 1      |
| 2 | B. Full-depth tenon   | 13.04% 3     |
| 3 | C. Tenon perpendicular to compression member  | 17.39% 4     |
| 4 | D. Tenon perpendicular to tension member  | 26.09% 6     |
| 5 | E. For tenon designs not represented in images A-D, please describe an alternative. | 39.13% 9     |
|   |   | 23           |

Showing rows 1 - 6 of 6

Q16\_5\_TEXT - E. For tenon designs not represented in images A-D, please describe an alte...

E. For tenon designs not represented in images A-D, please describe an alte...

---

A, with screws to keep things tight and located.

varies with framer&project&slope

Add through Bolt or Screws from above to hold it together and lifting

A, plus a through bolt or screws

We often use a short horizontal tenon usually ~4"x4"x1-1/2" on the top chord end cut.

Either 'B' with Pegs or stub tenons closely resembling 'B' with no pegs - and will use a threaded tie-rod to clamp it all together

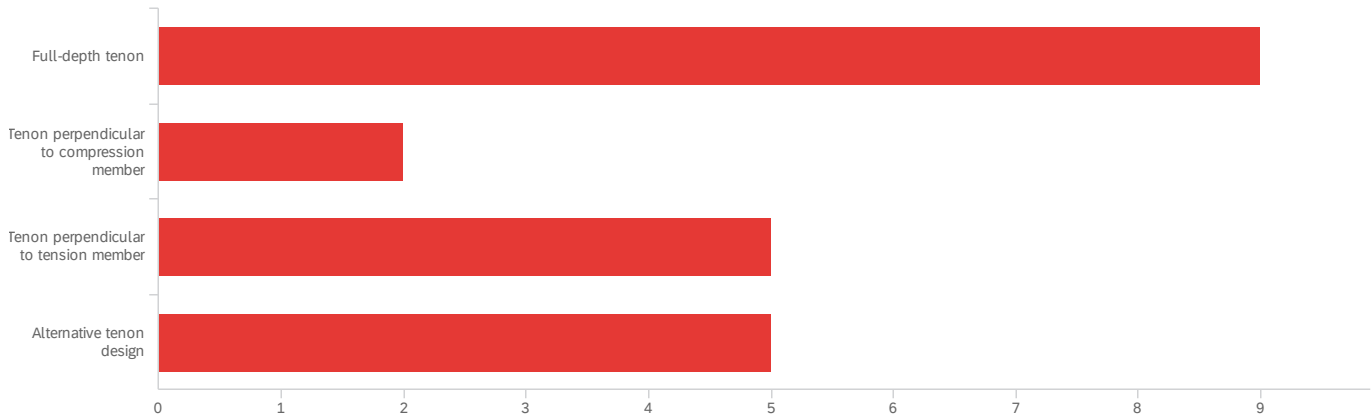
Nub Tenon

Like D, but with the tenons taller

D, but the tenon is quite a bit taller - but not quite full height

Q21 - 3.6 Based on question 3.5, which tenon do you find is easiest to fabricate? Note:

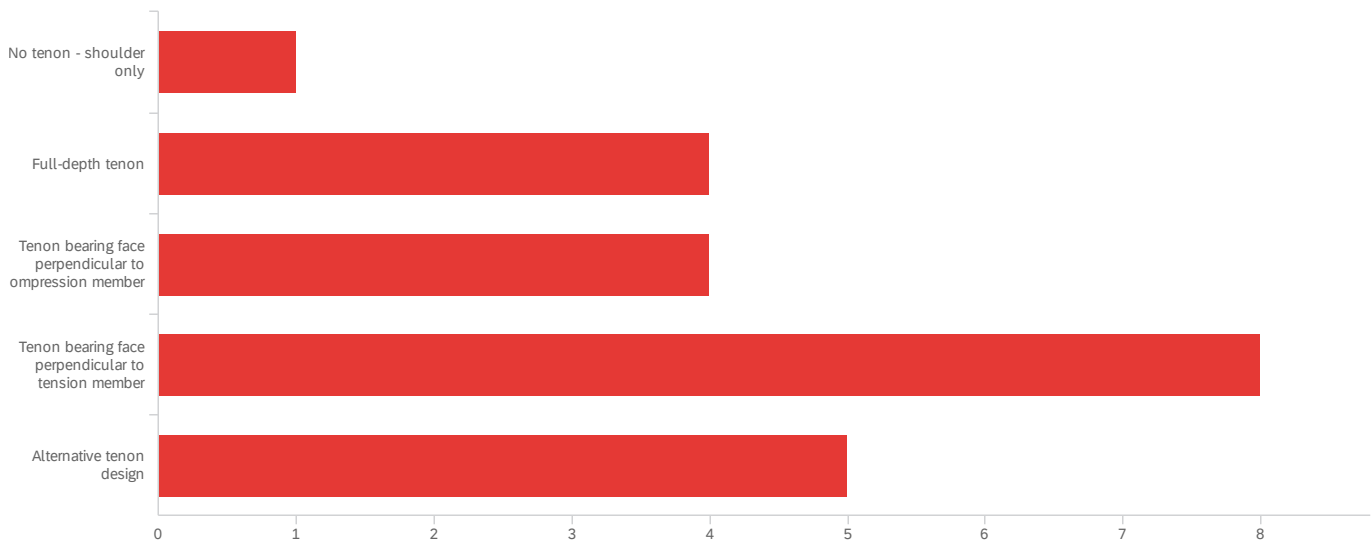
excluding "no tenon."



| # | Field   | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | 3.6 Based on question 3.5, which tenon do you find is easiest to fabricate? Note: excluding "no tenon." | 1.00    | 4.00    | 2.29 | 1.24          | 1.54     | 21    |

| # | Field                                     | Choice Count |
|---|---|--------------|
| 1 | Full-depth tenon                          | 42.86% 9     |
| 2 | Tenon perpendicular to compression member | 9.52% 2      |
| 3 | Tenon perpendicular to tension member     | 23.81% 5     |
| 4 | Alternative tenon design                  | 23.81% 5     |

## Q22 - 3.7 Based on question 3.5, which tenon do you find is most structurally sound?

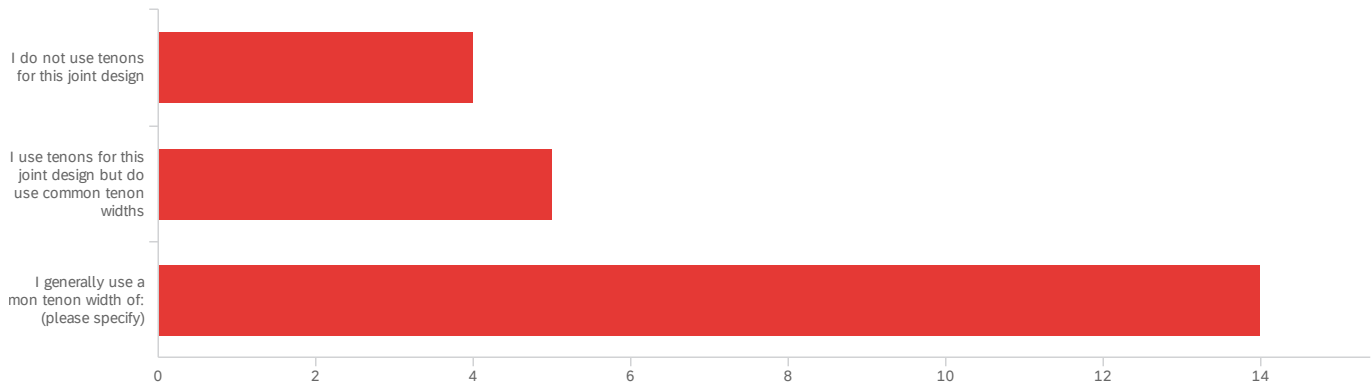


| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 3.7 Based on question 3.5, which tenon do you find is most structurally sound? | 1.00    | 5.00    | 3.55 | 1.16          | 1.34     | 22    |

| # | Field  | Choice Count |
|---|--|--------------|
| 1 | No tenon - shoulder only                               | 4.55% 1      |
| 2 | Full-depth tenon                                       | 18.18% 4     |
| 3 | Tenon bearing face perpendicular to compression member | 18.18% 4     |
| 4 | Tenon bearing face perpendicular to tension member     | 36.36% 8     |
| 5 | Alternative tenon design                               | 22.73% 5     |
|   |  | 22           |

Showing rows 1 - 6 of 6

## Q19 - 3.8 If tenons are used in this joint, is there a common tenon width?



| # | Field   | Choice Count |
|---|---|--------------|
| 1 | I do not use tenons for this joint design                             | 17.39% 4     |
| 2 | I use tenons for this joint design but do not use common tenon widths | 21.74% 5     |
| 3 | I generally use a common tenon width of: (please specify)             | 60.87% 14    |
|   |   | 23           |

Showing rows 1 - 4 of 4

### Q19\_3\_TEXT - For 6x wide timbers, the common tenon width is:

I generally use a common tenon width of: (please specify)

1/3 to 1/4 of member width

2"-varies with timber size

~4" depending on member sizes & loading (short tenon)

1.5"

2"

either 1 1/2" or 2"

Depends on load

about a third of stick width

1.5 or 2

width of member minus 1-1/2" ea side

I generally use a common tenon width of: (please specify)

---

It depends... is there a ridge beam framing into it? How much tension is in the king post? I suppose it could range from 1.5" thick to a load bearing stub tenon with through rod that is 4" thick for large trusses.

2"

1.5", 40mm, or 2", depending on who is cutting it

2"

Q19\_4\_TEXT - For 8x wide timbers, the common tenon width is:

WIDGET\_ERROR.ERROR

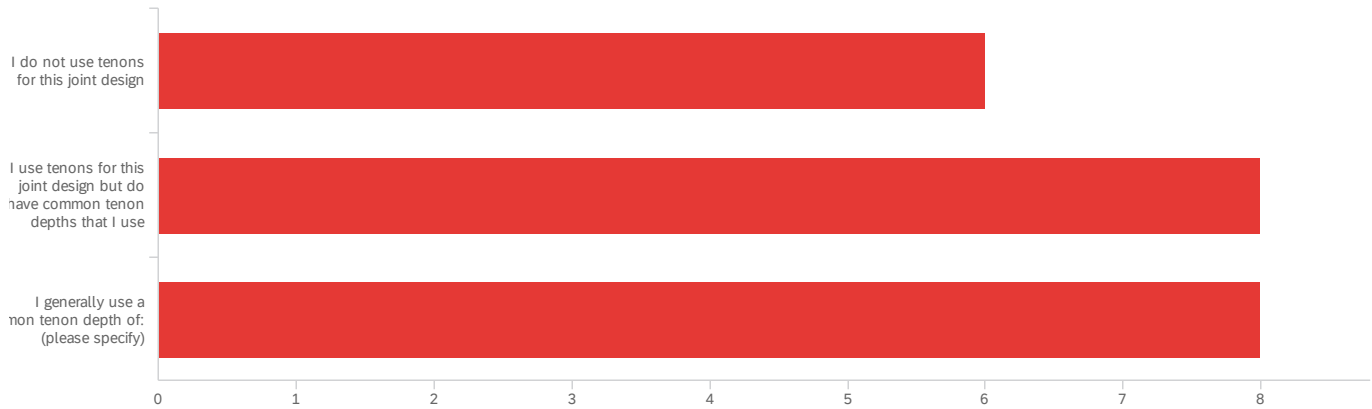
Q19\_5\_TEXT - For 10x wide timbers, the common tenon width is:

WIDGET\_ERROR.ERROR



Q20 - 3.9 If tenons are used for this joint, is there a common tenon depth? Example:

3.5C shown with desired dimension, X.



| # | Field   | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | 3.9 If tenons are used for this joint, is there a common tenon depth?<br>Example: 3.5C shown with desired dimension, X. - Selected Choice | 1.00    | 3.00    | 2.09 | 0.79          | 0.63     | 22    |

| # | Field   | Choice Count |
|---|---|--------------|
| 1 | I do not use tenons for this joint design   | 27.27% 6     |
| 2 | I use tenons for this joint design but do not have common tenon depths that I use | 36.36% 8     |
| 3 | I generally use a common tenon depth of: (please specify)                         | 36.36% 8     |
|   |   | 22           |

Showing rows 1 - 4 of 4

Q20\_3\_TEXT - For 6x wide timbers, the common tenon depth is:

I generally use a common tenon depth of: (please specify)

Load-dependent. Calculated by required bearing area.

4

Either Full-Depth or Stub Tenon on full depth of Chord Member

1.5"

I generally use a common tenon depth of: (please specify)

---

It is common for the tenons to almost meet at the middle (leaving perhaps a 1/2" to 3/4" space between for shrinkage). I don't ever see tenons oriented like you are showing in the sketch above.

1.5"

4" max, but 1/4" less than king post width

half king post width, less 1/4"

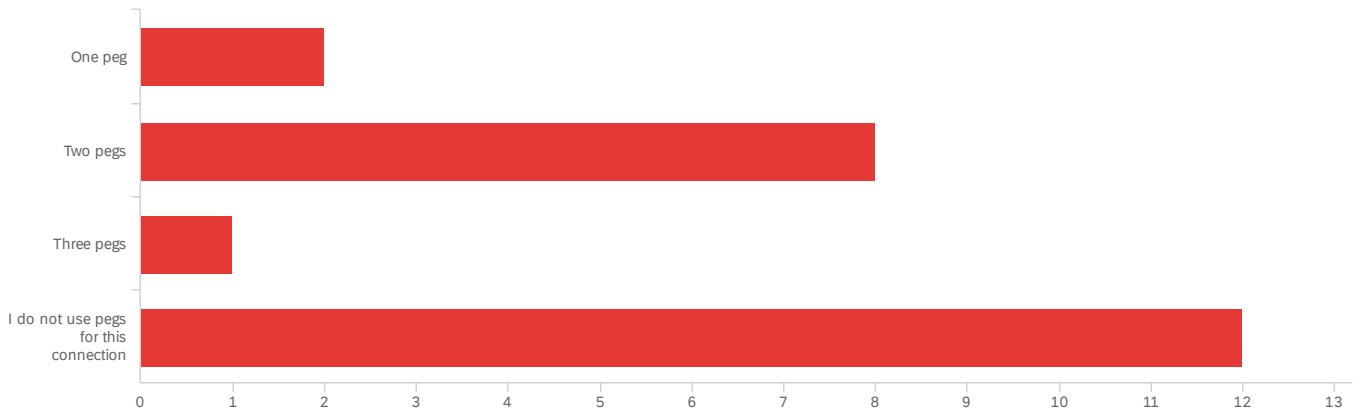
Q20\_4\_TEXT - For 8x wide timbers, the common tenon depth is:

WIDGET\_ERROR.ERROR

Q20\_5\_TEXT - For 10x wide timbers, the common tenon depth is:

WIDGET\_ERROR.ERROR

## Q23 - 3.10 How many pegs do you use for this connection?



| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 3.10 How many pegs do you use for this connection? | 1.00    | 4.00    | 3.00 | 1.10          | 1.22     | 23    |

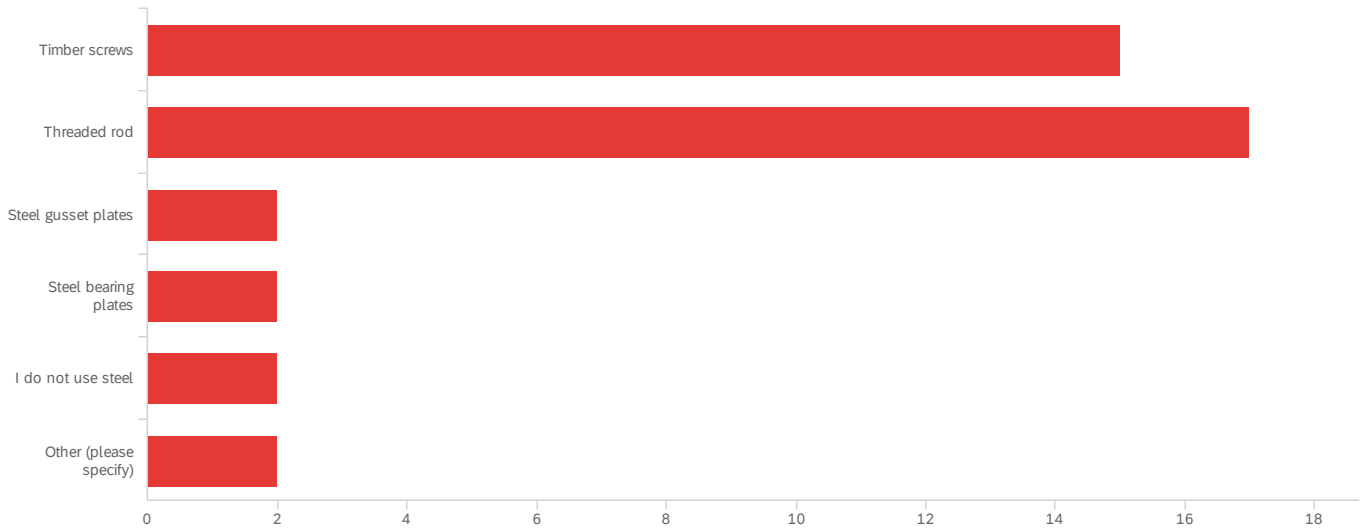
| # | Field                                 | Choice Count |
|---|---------------------------------------|--------------|
| 1 | One peg                               | 8.70% 2      |
| 2 | Two pegs                              | 34.78% 8     |
| 3 | Three pegs                            | 4.35% 1      |
| 4 | I do not use pegs for this connection | 52.17% 12    |

23

Showing rows 1 - 5 of 5

Q24 - 3.11 In addition to the timber joinery, what steel components do you use to

reinforce this joint? Note: multiple answers allowed.



| # | Field                  | Choice Count |
|---|------------------------|--------------|
| 1 | Timber screws          | 37.50% 15    |
| 2 | Threaded rod           | 42.50% 17    |
| 3 | Steel gusset plates    | 5.00% 2      |
| 4 | Steel bearing plates   | 5.00% 2      |
| 5 | I do not use steel     | 5.00% 2      |
| 6 | Other (please specify) | 5.00% 2      |

40

Showing rows 1 - 7 of 7

Q24\_6\_TEXT - Other (please specify)

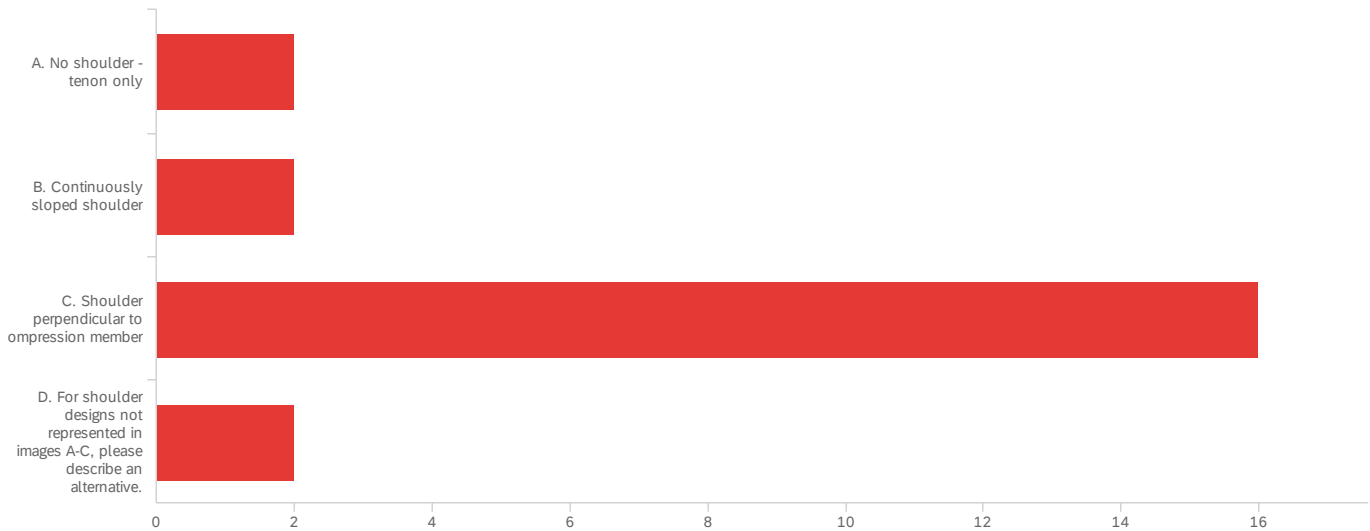
Other (please specify)

strap over top

Again, depends. Often no steel components. I generally avoid gusset plates unless that is the desired look.

Q25 - Note: The following questions pertain to shoulder and tenon joints with single compression member framing into a single tension member supported on reverse side of tension member. 4.1 Which shoulder design most closely represents your typical detail?

Note: all possible tenon designs are omitted for clarity.



| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | Note: The following questions pertain to shoulder and tenon joints with single compression member framing into a single tension member supported on reverse side of tension member. 4.1 Which shoulder design most closely represents your typical detail? Note: all possible tenon designs are omitted for clarity. - Selected Choice | 1.00    | 4.00    | 2.82 | 0.72          | 0.51     | 22    |

| # | Field  | Choice Count |
|---|--|--------------|
| 1 | A. No shoulder - tenon only  | 9.09% 2      |
| 2 | B. Continuously sloped shoulder  | 9.09% 2      |
| 3 | C. Shoulder perpendicular to compression member  | 72.73% 16    |
| 4 | D. For shoulder designs not represented in images A-C, please describe an alternative. | 9.09% 2      |

Q25\_4\_TEXT - D. For shoulder designs not represented in images A-C, please describe an a...

D. For shoulder designs not represented in images A-C, please describe an a...

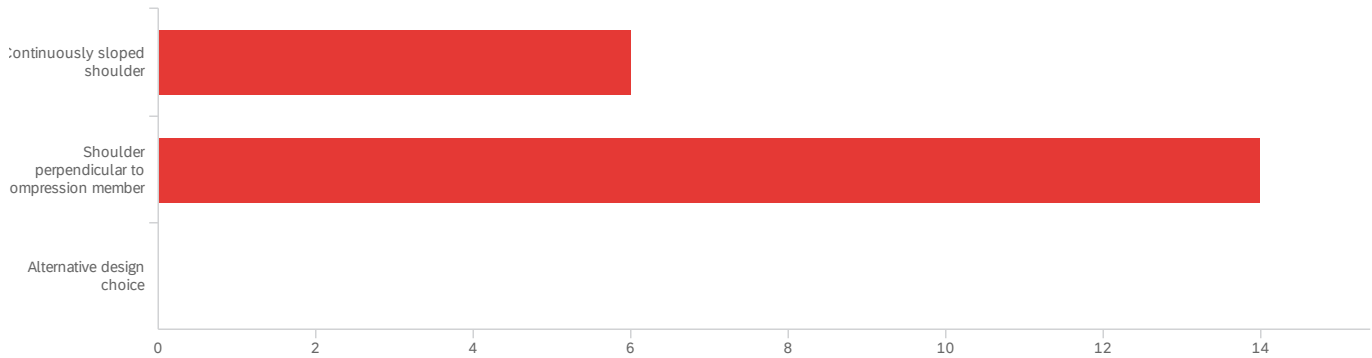
---

We either use option B or C or pick up the bottom chord to allow for a steel tension rod.

please refer to my emailed response

## Q27 - 4.2 Based on question 4.1, which shoulder do you find is easiest to fabricate?

Note: excluding "no shoulder."

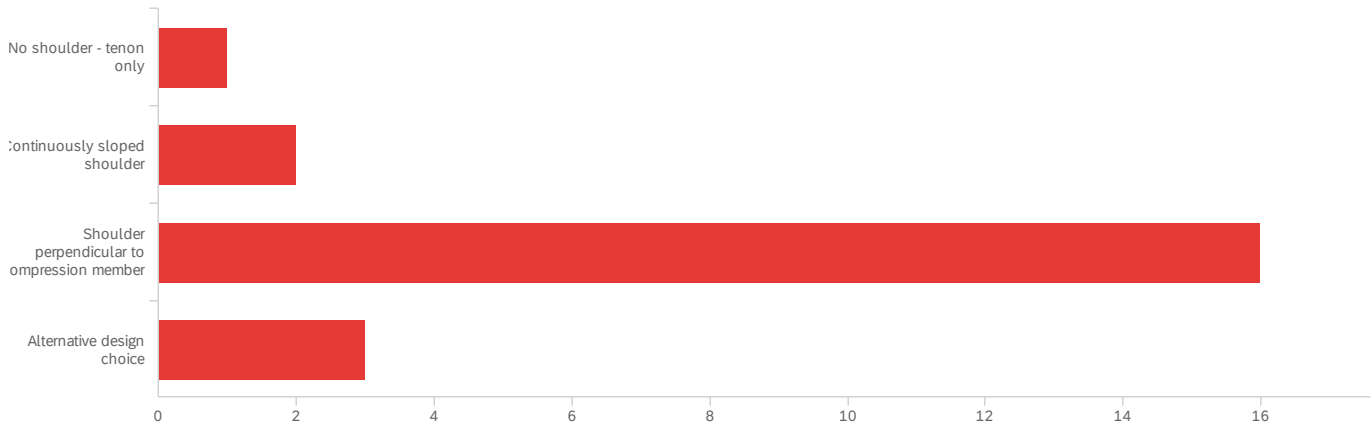


| # | Field   | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | 4.2 Based on question 4.1, which shoulder do you find is easiest to fabricate? Note: excluding "no shoulder." | 1.00    | 2.00    | 1.70 | 0.46          | 0.21     | 20    |

| # | Field  | Choice Count |
|---|--|--------------|
| 1 | Continuously sloped shoulder                 | 30.00% 6     |
| 2 | Shoulder perpendicular to compression member | 70.00% 14    |
| 3 | Alternative design choice                    | 0.00% 0      |
|   |  | 20           |

Showing rows 1 - 4 of 4

Q28 - 4.3 Based on question 4.1, which shoulder do you find is the most structurally sound?



| # | Field   | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | 4.3 Based on question 4.1, which shoulder do you find is the most structurally sound? | 1.00    | 4.00    | 2.95 | 0.64          | 0.41     | 22    |

| # | Field  | Choice Count |
|---|--|--------------|
| 1 | No shoulder - tenon only                     | 4.55% 1      |
| 2 | Continuously sloped shoulder                 | 9.09% 2      |
| 3 | Shoulder perpendicular to compression member | 72.73% 16    |
| 4 | Alternative design choice                    | 13.64% 3     |

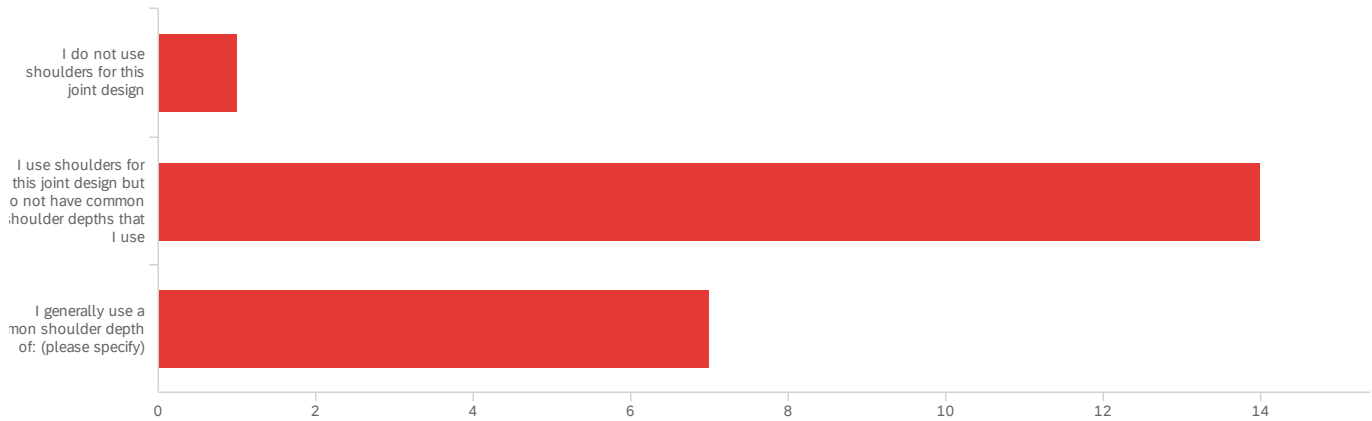
22


Showing rows 1 - 5 of 5



Q26 - 4.4 If shoulders are used in this joint, is there a common shoulder depth? Example:

4.1C shown with desired dimension, X.



  
 Data source misconfigured for this visualization.

| # | Field   | Choice Count |
|---|---|--------------|
| 1 | I do not use shoulders for this joint design  | 4.55% 1      |
| 2 | I use shoulders for this joint design but do not have common shoulder depths that I use | 63.64% 14    |
| 3 | I generally use a common shoulder depth of: (please specify)                            | 31.82% 7     |
|   |   | 22           |

Showing rows 1 - 4 of 4

Q26\_3\_TEXT - For 6x wide timbers the common shoulder depth I would use is:

I generally use a common shoulder depth of: (please specify)

2"

We engineer this joint based on loads in a truss/bent

2"

It should really be designed for the forces.

I generally use a common shoulder depth of: (please specify)

---

depends on load, but 2" is very common

1.5" typ, but more as load requires

2" is typical, but it depends on loads

Q26\_4\_TEXT - For 8x wide timbers the common shoulder depth I would use is:

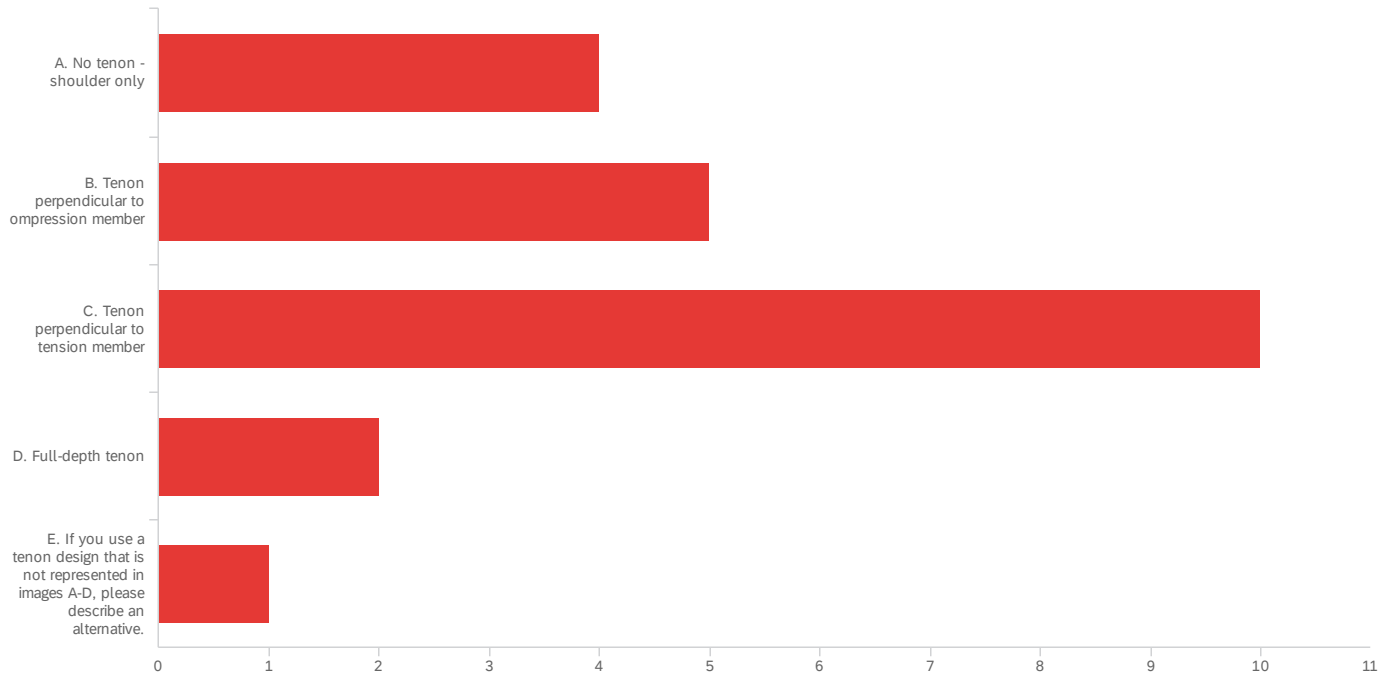
WIDGET\_ERROR.ERROR

Q26\_5\_TEXT - For 10x wide timbers the common shoulder depth I would use is:

WIDGET\_ERROR.ERROR

Q29 - 4.5 Which tenon design does your typical detail most closely represent? Note - All

possible shoulder designs are omitted for clarity.



| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 4.5 Which tenon design does your typical detail most closely represent? Note - All possible shoulder designs are omitted for clarity.<br>- Selected Choice | 1.00    | 5.00    | 2.59 | 1.03          | 1.06     | 22    |

| # | Field   | Choice Count |
|---|---|--------------|
| 1 | A. No tenon - shoulder only   | 18.18% 4     |
| 2 | B. Tenon perpendicular to compression member  | 22.73% 5     |
| 3 | C. Tenon perpendicular to tension member  | 45.45% 10    |
| 4 | D. Full-depth tenon   | 9.09% 2      |
| 5 | E. If you use a tenon design that is not represented in images A-D, please describe an alternative. | 4.55% 1      |
|   |   | 22           |

Showing rows 1 - 6 of 6

Q29\_5\_TEXT - E. If you use a tenon design that is not represented in images A-D, please...

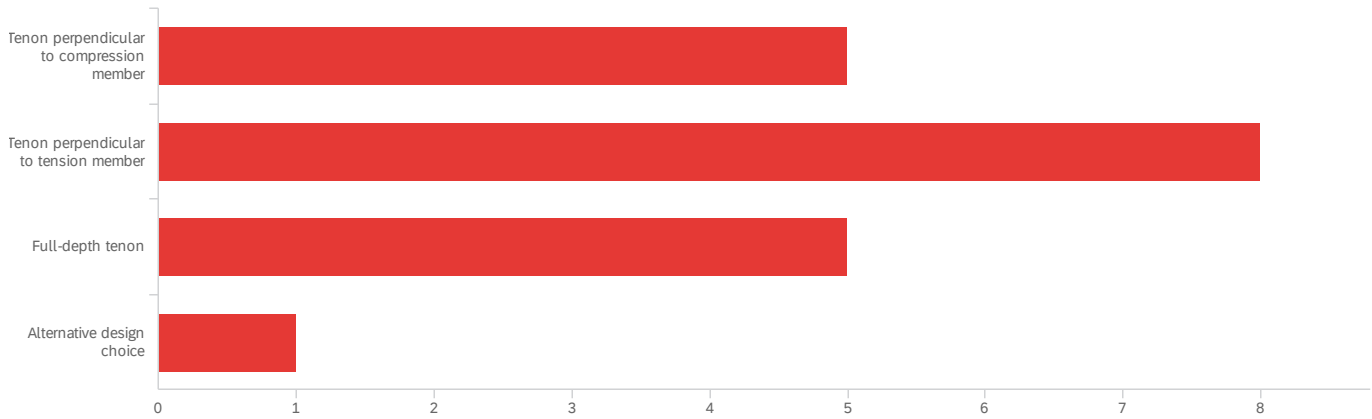
E. If you use a tenon design that is not represented in images A-D, please...

---

B and D with pegs

Q32 - 4.6 Based on question 4.5, which tenon do you find is easiest to fabricate? Note:

excluding "no tenon."



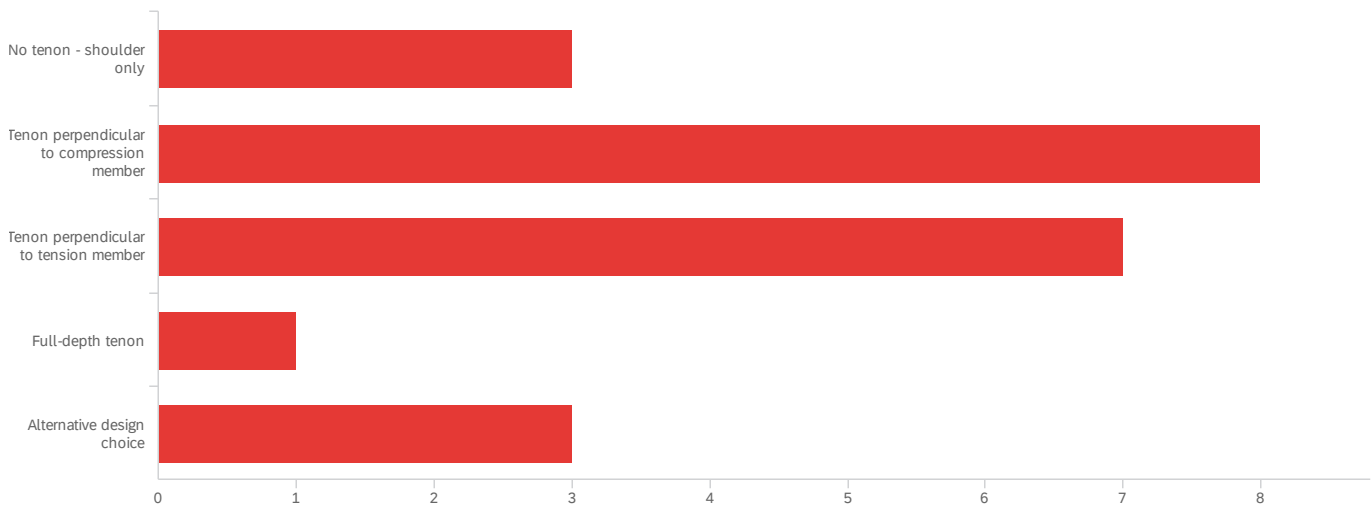
| # | Field   | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | 4.6 Based on question 4.5, which tenon do you find is easiest to fabricate? Note: excluding "no tenon." | 1.00    | 4.00    | 2.11 | 0.85          | 0.73     | 19    |

| # | Field                                     | Choice Count |
|---|---|--------------|
| 1 | Tenon perpendicular to compression member | 26.32% 5     |
| 2 | Tenon perpendicular to tension member     | 42.11% 8     |
| 3 | Full-depth tenon                          | 26.32% 5     |
| 4 | Alternative design choice                 | 5.26% 1      |

19

Showing rows 1 - 5 of 5

### Q33 - 4.7 Based on question 4.5, which tenon do you find is most structurally sound?

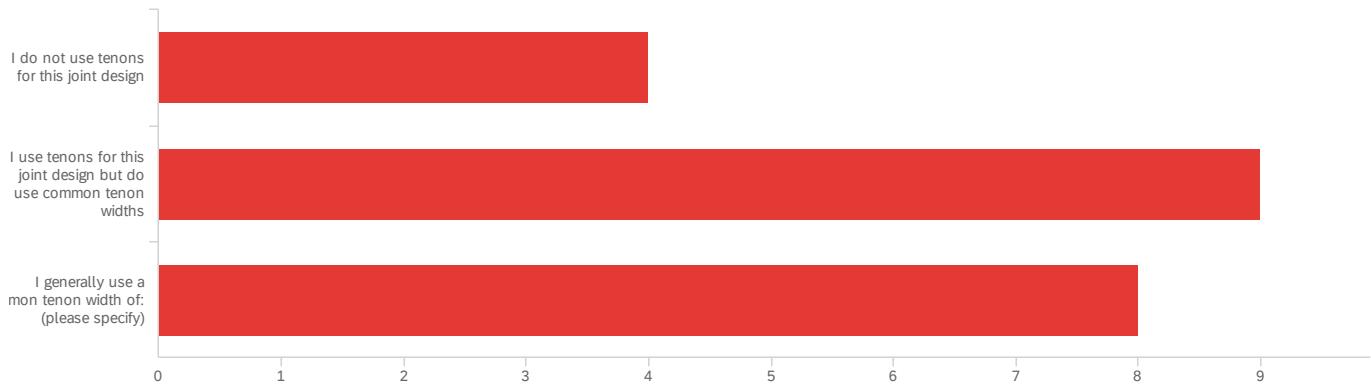


| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 4.7 Based on question 4.5, which tenon do you find is most structurally sound? | 1.00    | 5.00    | 2.68 | 1.18          | 1.40     | 22    |

| # | Field                                     | Choice Count |
|---|---|--------------|
| 1 | No tenon - shoulder only                  | 13.64% 3     |
| 2 | Tenon perpendicular to compression member | 36.36% 8     |
| 3 | Tenon perpendicular to tension member     | 31.82% 7     |
| 4 | Full-depth tenon                          | 4.55% 1      |
| 5 | Alternative design choice                 | 13.64% 3     |
|   |   | 22           |

Showing rows 1 - 6 of 6

## Q30 - 4.8 If tenons are used in this joint, is there a common tenon width?



| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 4.8 If tenons are used in this joint, is there a common tenon width? - Selected Choice | 1.00    | 3.00    | 2.19 | 0.73          | 0.54     | 21    |

| # | Field   | Choice Count |
|---|---|--------------|
| 1 | I do not use tenons for this joint design                             | 19.05% 4     |
| 2 | I use tenons for this joint design but do not use common tenon widths | 42.86% 9     |
| 3 | I generally use a common tenon width of: (please specify)             | 38.10% 8     |
|   |   | 21           |

Showing rows 1 - 4 of 4

Q30\_3\_TEXT - For 6x wide timbers the common tenon width I would use is:

I generally use a common tenon width of: (please specify)

1.5"

4"

Depends on load

about third of stick width

1.5 or 2

2"

I generally use a common tenon width of: (please specify)

---

1.5", 40mm, or 2"...

2"

Q30\_4\_TEXT - For 8x wide timbers the common tenon width I would use is:

WIDGET\_ERROR.ERROR

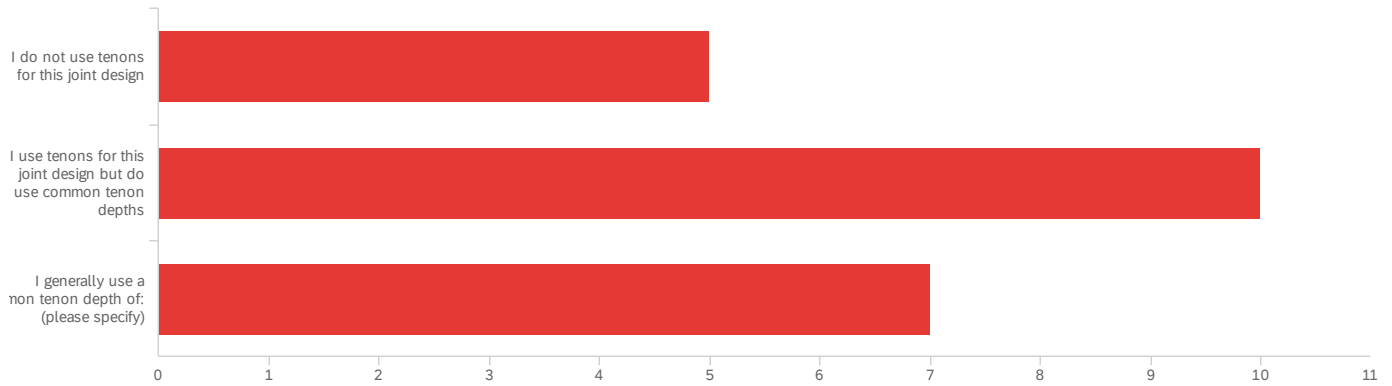
Q30\_5\_TEXT - For 10x wide timbers the common tenon width I would use is:

WIDGET\_ERROR.ERROR



Q31 - 4.9 If tenons are used for this joint, is there a common tenon depth? Example:

4.5C shows desired dimension, X.



| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 4.9 If tenons are used for this joint, is there a common tenon depth?<br>Example: 4.5C shows desired dimension, X. - Selected Choice | 1.00    | 3.00    | 2.09 | 0.73          | 0.54     | 22    |

| # | Field   | Choice Count |
|---|---|--------------|
| 1 | I do not use tenons for this joint design                             | 22.73% 5     |
| 2 | I use tenons for this joint design but do not use common tenon depths | 45.45% 10    |
| 3 | I generally use a common tenon depth of: (please specify)             | 31.82% 7     |
|   |   | 22           |

Showing rows 1 - 4 of 4

Q31\_3\_TEXT - For 6x wide timbers the common tenon depth I would use is:

I generally use a common tenon depth of: (please specify)

4-5

4"

3.5 or 4

Maximum half the bottom chord depth

I generally use a common tenon depth of: (please specify)

---

5"

4"

6"

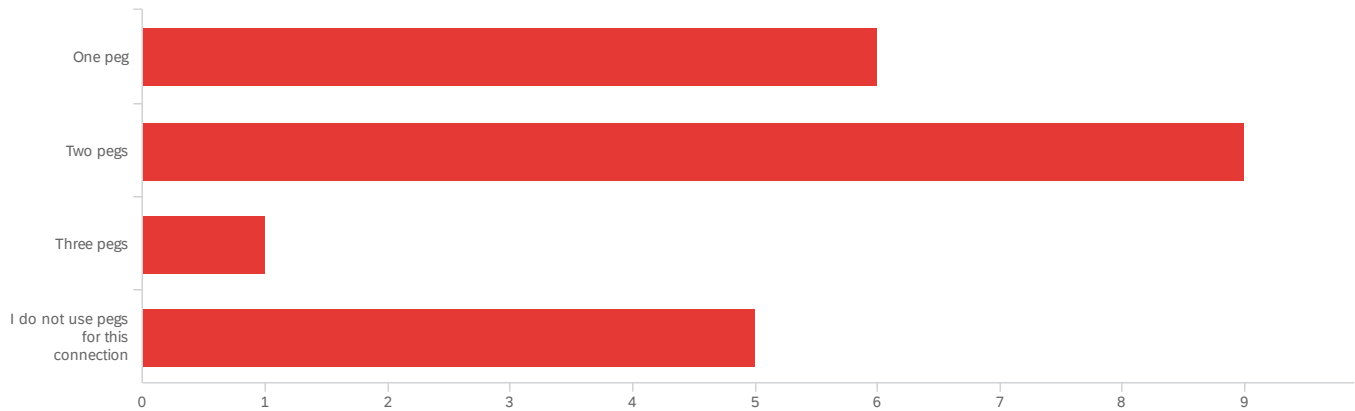
Q31\_4\_TEXT - For 8x wide timbers the common tenon depth I would use is:

WIDGET\_ERROR.ERROR

Q31\_5\_TEXT - For 10x wide timbers the common tenon depth I would use is:

WIDGET\_ERROR.ERROR

## Q34 - 4.10 How many pegs do you use for this connection?



| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 4.10 How many pegs do you use for this connection? | 1.00    | 4.00    | 2.24 | 1.11          | 1.23     | 21    |

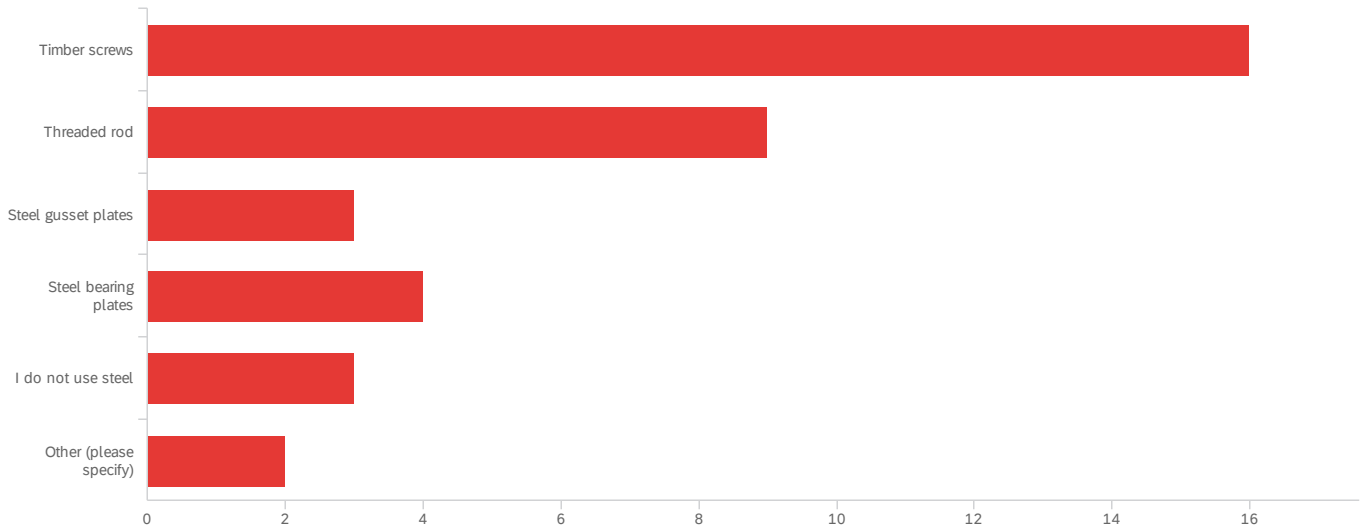
| # | Field                                 | Choice Count |
|---|---------------------------------------|--------------|
| 1 | One peg                               | 28.57% 6     |
| 2 | Two pegs                              | 42.86% 9     |
| 3 | Three pegs                            | 4.76% 1      |
| 4 | I do not use pegs for this connection | 23.81% 5     |


21

Showing rows 1 - 5 of 5

Q35 - 4.11 In addition to the timber joinery, what steel components do you use to

reinforce this joint? Note: multiple answers allowed.



  
 Data source misconfigured for this visualization.

| # | Field                  | Choice Count |
|---|------------------------|--------------|
| 1 | Timber screws          | 43.24% 16    |
| 2 | Threaded rod           | 24.32% 9     |
| 3 | Steel gusset plates    | 8.11% 3      |
| 4 | Steel bearing plates   | 10.81% 4     |
| 5 | I do not use steel     | 8.11% 3      |
| 6 | Other (please specify) | 5.41% 2      |

37

Showing rows 1 - 7 of 7

Q35\_6\_TEXT - Other (please specify)

Other (please specify)

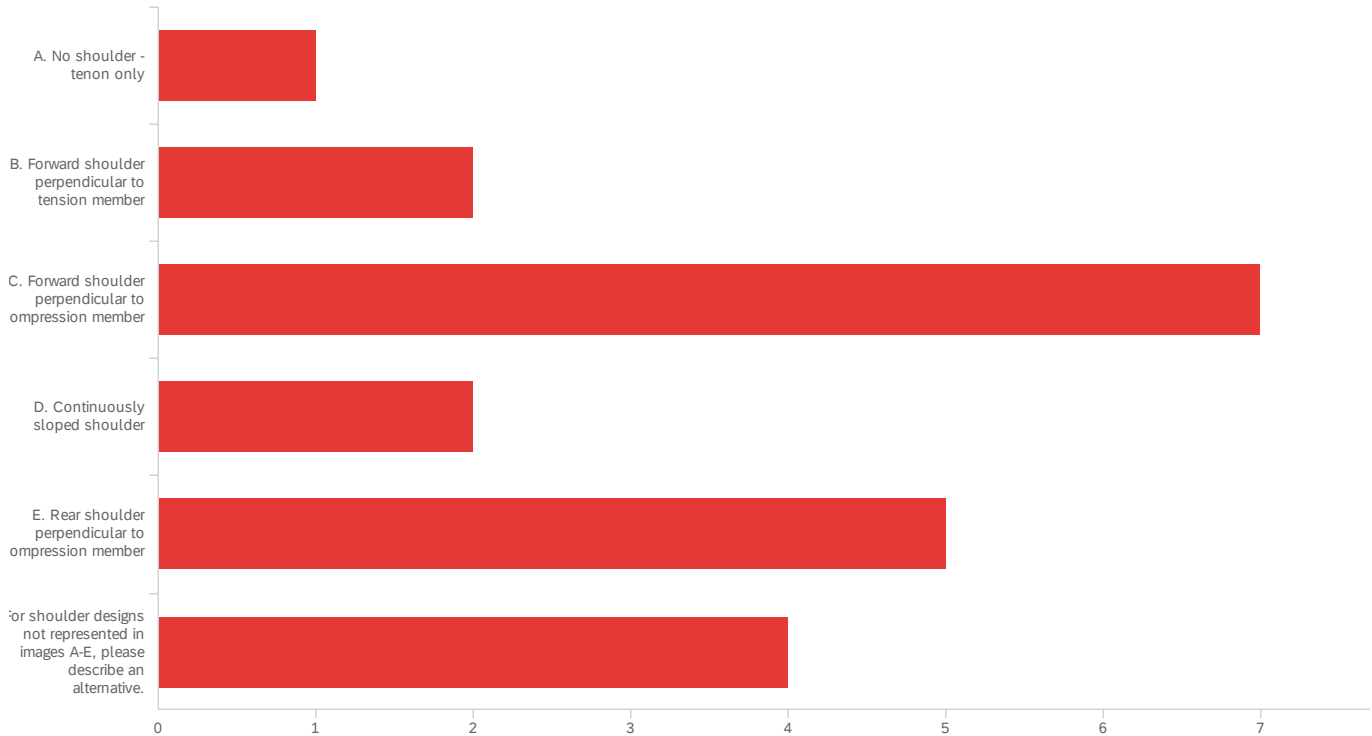
Other (please specify)

---

Fully threaded ASSY fasteners

Again, generally no gussets unless that is the desired look, and depends on loading, etc. All wood is most common.

Q36 - Note: The following questions pertain to shoulder and tenon joints with single compression member framing into longer tension member, with or without support on reverse side of tension member. 5.1 Which shoulder design most closely represents your typical detail? Note: all possible tenon designs are omitted for clarity.



| # | Field   | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | Note: The following questions pertain to shoulder and tenon joints with single compression member framing into longer tension member, with or without support on reverse side of tension member. 5.1 Which shoulder design most closely represents your typical detail? Note: all possible tenon designs are omitted for clarity. - Selected Choice | 1.00    | 6.00    | 3.95 | 1.46          | 2.14     | 21    |

| # | Field   | Choice Count |
|---|---|--------------|
| 1 | A. No shoulder - tenon only                             | 4.76% 1      |
| 2 | B. Forward shoulder perpendicular to tension member     | 9.52% 2      |
| 3 | C. Forward shoulder perpendicular to compression member | 33.33% 7     |

| # | Field   | Choice Count |
|---|---|--------------|
| 4 | D. Continuously sloped shoulder   | 9.52% 2      |
| 5 | E. Rear shoulder perpendicular to compression member                                | 23.81% 5     |
| 6 | For shoulder designs not represented in images A-E, please describe an alternative. | 19.05% 4     |

21

Showing rows 1 - 7 of 7

Q36\_6\_TEXT - For shoulder designs not represented in images A-E, please describe an alte...

For shoulder designs not represented in images A-E, please describe an alte...

All of these have their Pros and Cons...

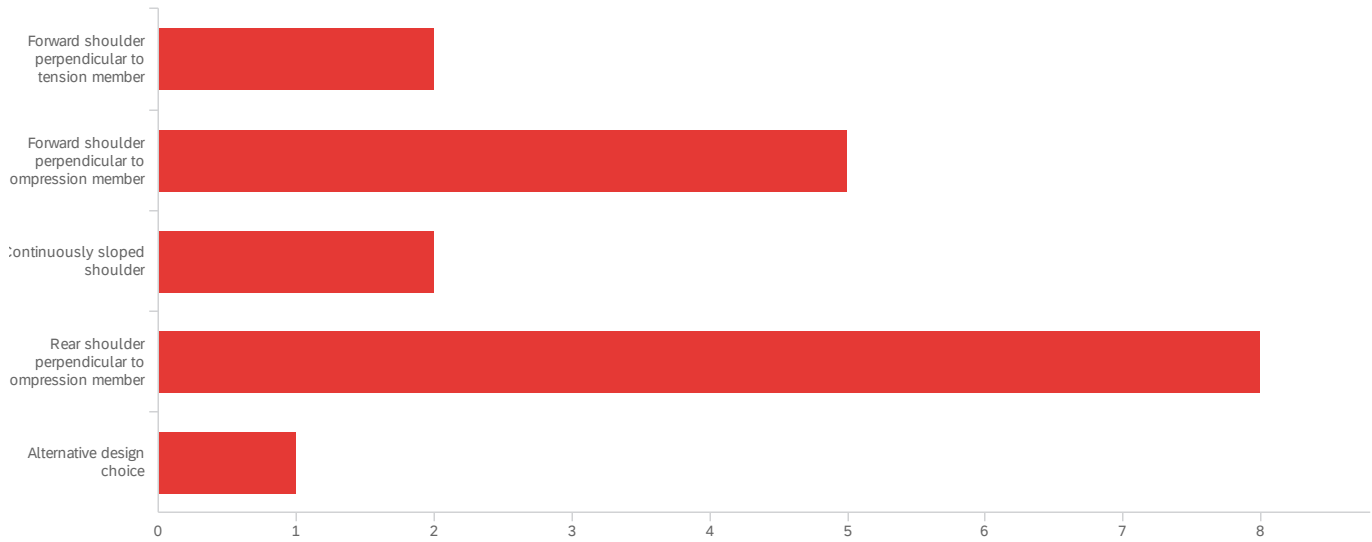
This is not a common detail for us.

B or D based on circumstance

Bor C, but bisect the angle between the rafter and bottom chord, not squire to the rafter

Q38 - 5.2 Based on question 5.1, which shoulder design do you find is easiest to

fabricate? Note: excluding "no shoulder."



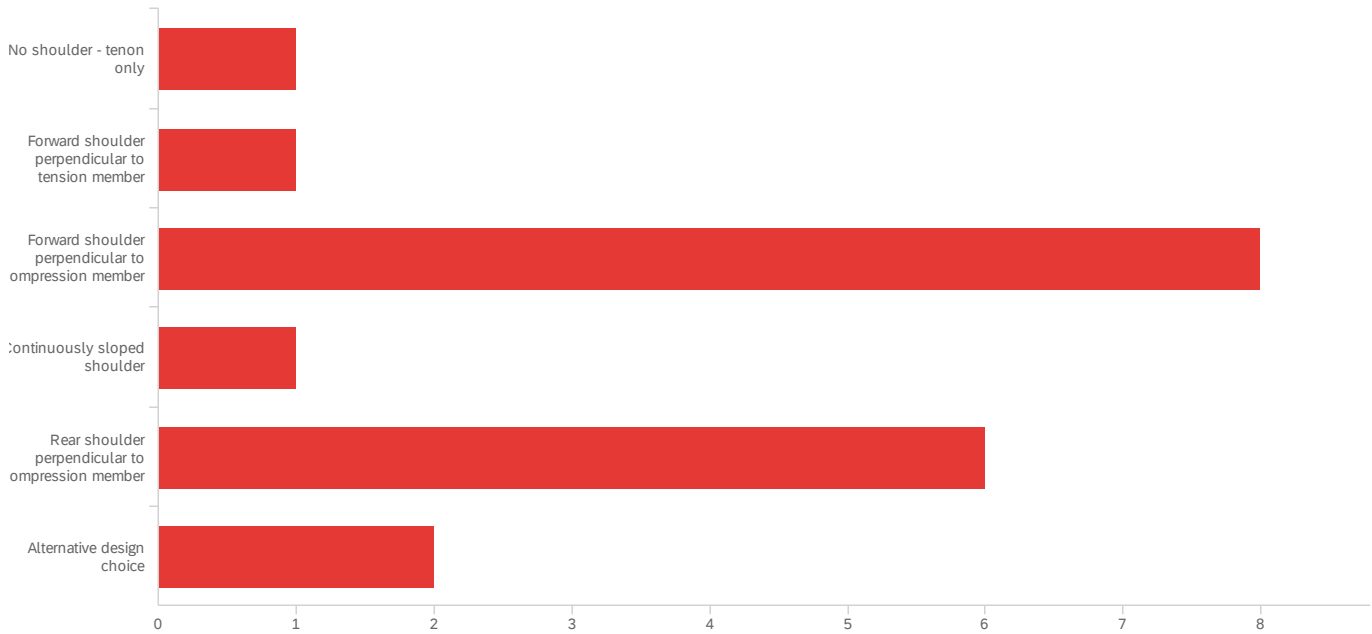
| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 5.2 Based on question 5.1, which shoulder design do you find is easiest to fabricate? Note: excluding "no shoulder." | 1.00    | 5.00    | 3.06 | 1.18          | 1.39     | 18    |

| # | Field  | Choice Count |
|---|--|--------------|
| 1 | Forward shoulder perpendicular to tension member     | 11.11% 2     |
| 2 | Forward shoulder perpendicular to compression member | 27.78% 5     |
| 3 | Continuously sloped shoulder                         | 11.11% 2     |
| 4 | Rear shoulder perpendicular to compression member    | 44.44% 8     |
| 5 | Alternative design choice                            | 5.56% 1      |
|   |  | 18           |

Showing rows 1 - 6 of 6



Q39 - 5.3 Based on question 5.1, which shoulder do you find is the most structurally sound?

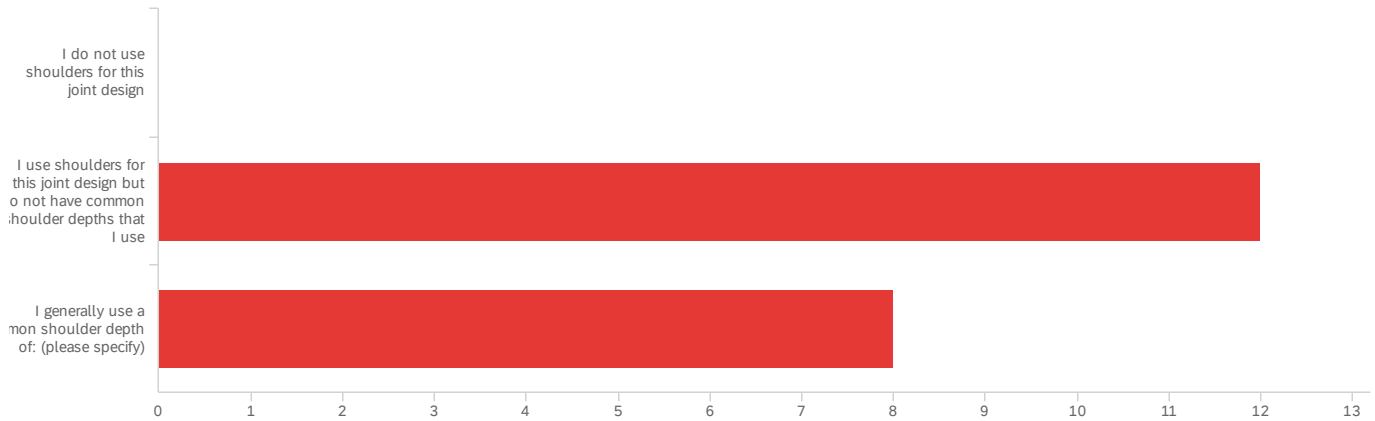



| # | Field   | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | 5.3 Based on question 5.1, which shoulder do you find is the most structurally sound? | 1.00    | 6.00    | 3.84 | 1.35          | 1.82     | 19    |

| # | Field  | Choice Count |
|---|--|--------------|
| 1 | No shoulder - tenon only                             | 5.26% 1      |
| 2 | Forward shoulder perpendicular to tension member     | 5.26% 1      |
| 3 | Forward shoulder perpendicular to compression member | 42.11% 8     |
| 4 | Continuously sloped shoulder                         | 5.26% 1      |
| 5 | Rear shoulder perpendicular to compression member    | 31.58% 6     |
| 6 | Alternative design choice                            | 10.53% 2     |

Q37 - 5.4 If shoulders are used in this joint, is there a common shoulder depth? Example:

5.1C shown with desired dimension, X.



  
 Data source misconfigured for this visualization.

| # | Field   | Choice Count |
|---|---|--------------|
| 1 | I do not use shoulders for this joint design  | 0.00% 0      |
| 2 | I use shoulders for this joint design but do not have common shoulder depths that I use | 60.00% 12    |
| 3 | I generally use a common shoulder depth of: (please specify)                            | 40.00% 8     |
|   |   | 20           |

Showing rows 1 - 4 of 4

Q37\_3\_TEXT - For 6x wide timbers the common shoulder depth I would use is:

I generally use a common shoulder depth of: (please specify)

what I need for bearing

2"

1

1"

I generally use a common shoulder depth of: (please specify)

---

more about the angle. average of two

no more than 1/3 bottom chord depth

1.5" min, but more as load requires

2", but again depends on the loads

Q37\_4\_TEXT - For 8x wide timbers the common shoulder depth I would use is:

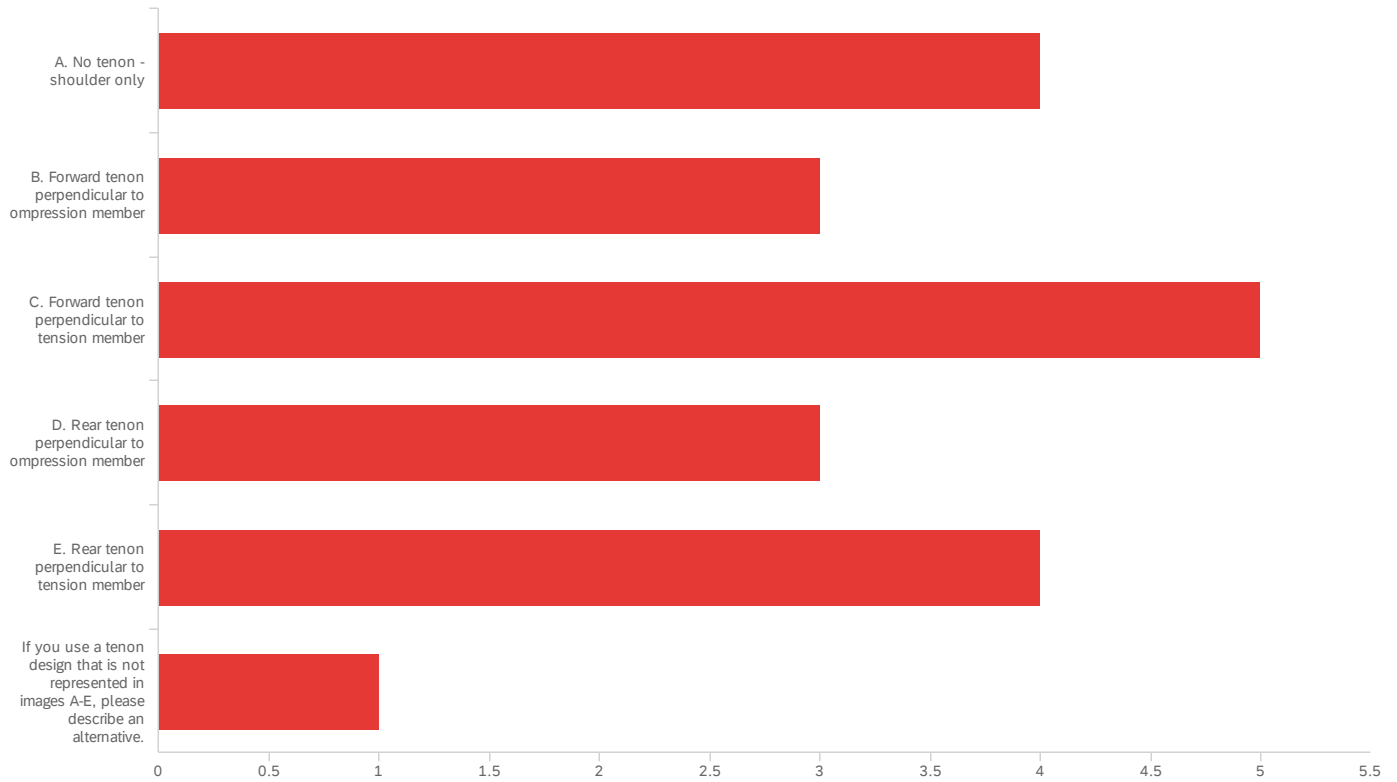
WIDGET\_ERROR.ERROR

Q37\_5\_TEXT - For 10x wide timbers the common shoulder depth I would use is:

WIDGET\_ERROR.ERROR

Q40 - 5.5 Which tenon design does your typical detail most closely represent? Note - All

possible shoulder designs are omitted for clarity.



| # | Field | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|-------|---------|---------|------|---------------|----------|-------|
|---|-------|---------|---------|------|---------------|----------|-------|

|   |   |      |      |      |      |      |    |
|---|---|------|------|------|------|------|----|
| 1 | 5.5 Which tenon design does your typical detail most closely represent? Note - All possible shoulder designs are omitted for clarity. - Selected Choice | 1.00 | 6.00 | 3.15 | 1.53 | 2.33 | 20 |
|---|---|------|------|------|------|------|----|

| # | Field  | Choice Count |
|---|--|--------------|
| 1 | A. No tenon - shoulder only  | 20.00% 4     |
| 2 | B. Forward tenon perpendicular to compression member   | 15.00% 3     |
| 3 | C. Forward tenon perpendicular to tension member   | 25.00% 5     |
| 4 | D. Rear tenon perpendicular to compression member  | 15.00% 3     |
| 5 | E. Rear tenon perpendicular to tension member  | 20.00% 4     |
| 6 | If you use a tenon design that is not represented in images A-E, please describe an alternative. | 5.00% 1      |

# Field

Choice  
Count

20

Showing rows 1 - 7 of 7

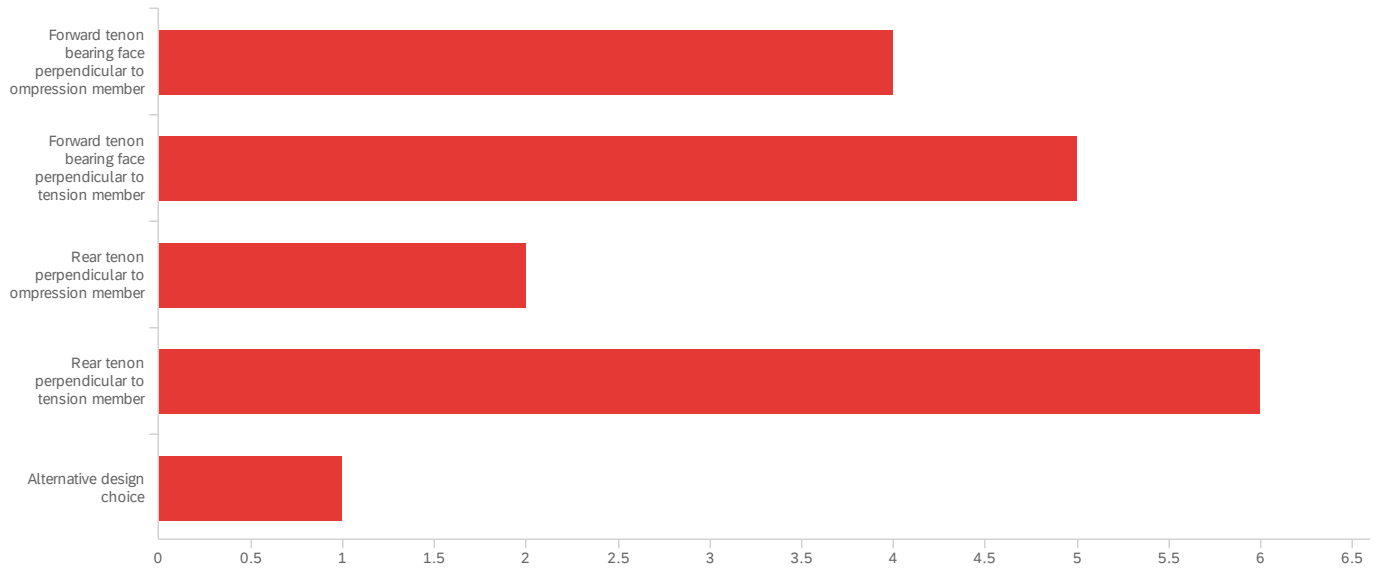
Q40\_6\_TEXT - If you use a tenon design that is not represented in images A-E, please des...

If you use a tenon design that is not represented in images A-E, please des...

Sometimes we use tenons - like C

Q43 - 5.6 Based on question 5.5, which tenon do you find is easiest to fabricate? Note:

excluding "no tenon."

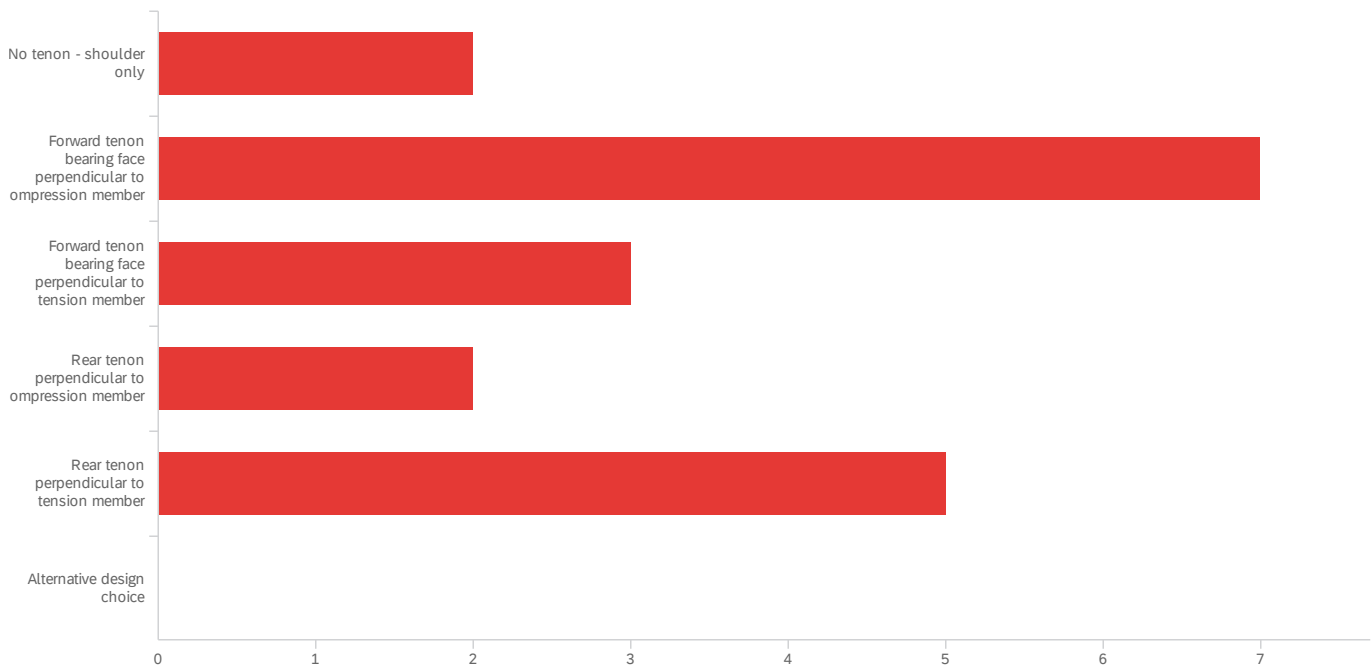


| # | Field   | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | 5.6 Based on question 5.5, which tenon do you find is easiest to fabricate? Note: excluding "no tenon." | 1.00    | 5.00    | 2.72 | 1.28          | 1.65     | 18    |

| # | Field  | Choice Count |
|---|--|--------------|
| 1 | Forward tenon bearing face perpendicular to compression member | 22.22% 4     |
| 2 | Forward tenon bearing face perpendicular to tension member     | 27.78% 5     |
| 3 | Rear tenon perpendicular to compression member                 | 11.11% 2     |
| 4 | Rear tenon perpendicular to tension member                     | 33.33% 6     |
| 5 | Alternative design choice                                      | 5.56% 1      |
|   |  | 18           |

Showing rows 1 - 6 of 6

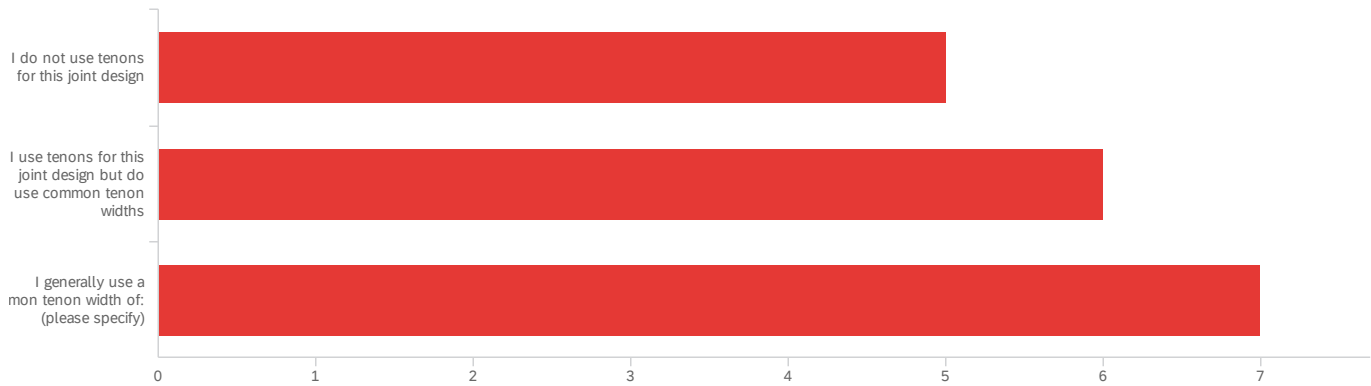
## Q44 - 5.7 Based on question 5.5, which tenon do you find is most structurally sound?



| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 5.7 Based on question 5.5, which tenon do you find is most structurally sound? | 1.00    | 5.00    | 3.05 | 1.39          | 1.94     | 19    |

| # | Field  | Choice Count |
|---|--|--------------|
| 1 | No tenon - shoulder only                                       | 10.53% 2     |
| 2 | Forward tenon bearing face perpendicular to compression member | 36.84% 7     |
| 3 | Forward tenon bearing face perpendicular to tension member     | 15.79% 3     |
| 4 | Rear tenon perpendicular to compression member                 | 10.53% 2     |
| 5 | Rear tenon perpendicular to tension member                     | 26.32% 5     |
| 6 | Alternative design choice                                      | 0.00% 0      |

## Q41 - 5.8 If tenons are used in this joint, is there a common tenon width?



| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 5.8 If tenons are used in this joint, is there a common tenon width? - Selected Choice | 1.00    | 3.00    | 2.11 | 0.81          | 0.65     | 18    |

| # | Field   | Choice Count |
|---|---|--------------|
| 1 | I do not use tenons for this joint design                             | 27.78% 5     |
| 2 | I use tenons for this joint design but do not use common tenon widths | 33.33% 6     |
| 3 | I generally use a common tenon width of: (please specify)             | 38.89% 7     |
|   |   | 18           |

Showing rows 1 - 4 of 4

Q41\_3\_TEXT - For 6x wide timbers the common tenon width I would use is:

I generally use a common tenon width of: (please specify)

|        |
|--------|
| 2      |
| 1 1/2" |
| 1.5"   |
| 4"     |
| 2"     |
| 2      |



I generally use a common tenon width of: (please specify)

---

2"

Q41\_4\_TEXT - For 8x wide timbers the common tenon width I would use is:

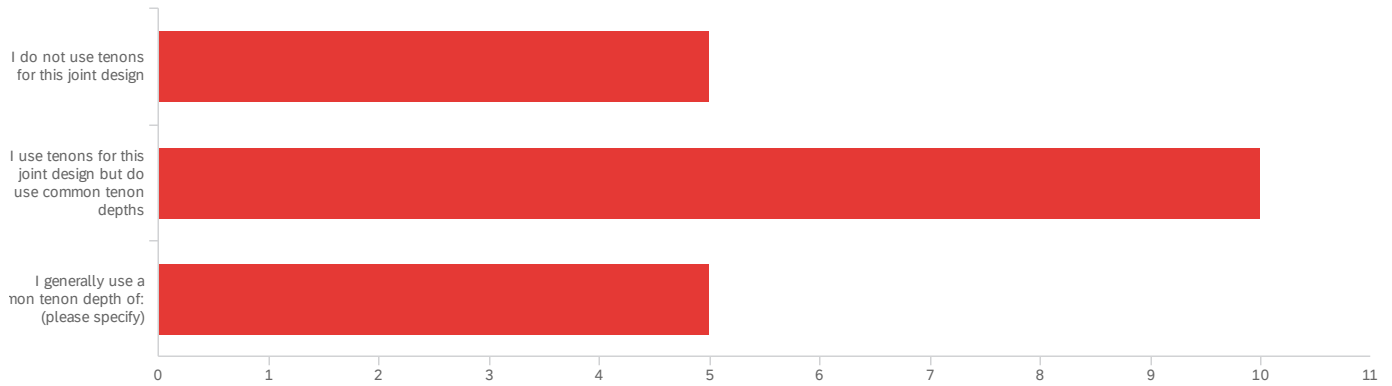
WIDGET\_ERROR.ERROR

Q41\_5\_TEXT - For 10x wide timbers the common tenon width I would use is:

WIDGET\_ERROR.ERROR

Q42 - 5.9 If tenons are used for this joint, is there a common tenon depth? Example:

5.5B shown with desired dimension, X.



  
 Data source misconfigured for this visualization.

| # | Field   | Choice Count |
|---|---|--------------|
| 1 | I do not use tenons for this joint design                             | 25.00% 5     |
| 2 | I use tenons for this joint design but do not use common tenon depths | 50.00% 10    |
| 3 | I generally use a common tenon depth of: (please specify)             | 25.00% 5     |
|   |   | 20           |

Showing rows 1 - 4 of 4

Q42\_3\_TEXT - For 6x wide timbers the common tenon depth I would use is:

I generally use a common tenon depth of: (please specify)

---

|      |
|------|
| 4-5  |
| 3-4" |
| 4"   |
| 5"   |

I generally use a common tenon depth of: (please specify)

---

6"

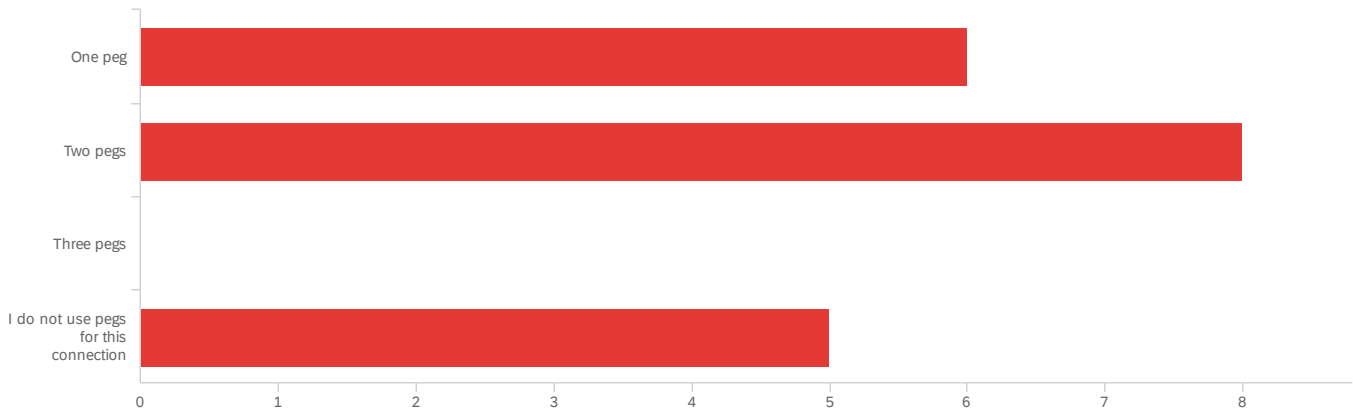
Q42\_4\_TEXT - For 8x wide timbers the common tenon depth I would use is:

WIDGET\_ERROR.ERROR

Q42\_5\_TEXT - For 10x wide timbers the common tenon depth I would use is:

WIDGET\_ERROR.ERROR

## Q45 - 5.10 How many pegs do you use for this connection?



| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 5.10 How many pegs do you use for this connection? | 1.00    | 4.00    | 2.21 | 1.15          | 1.32     | 19    |

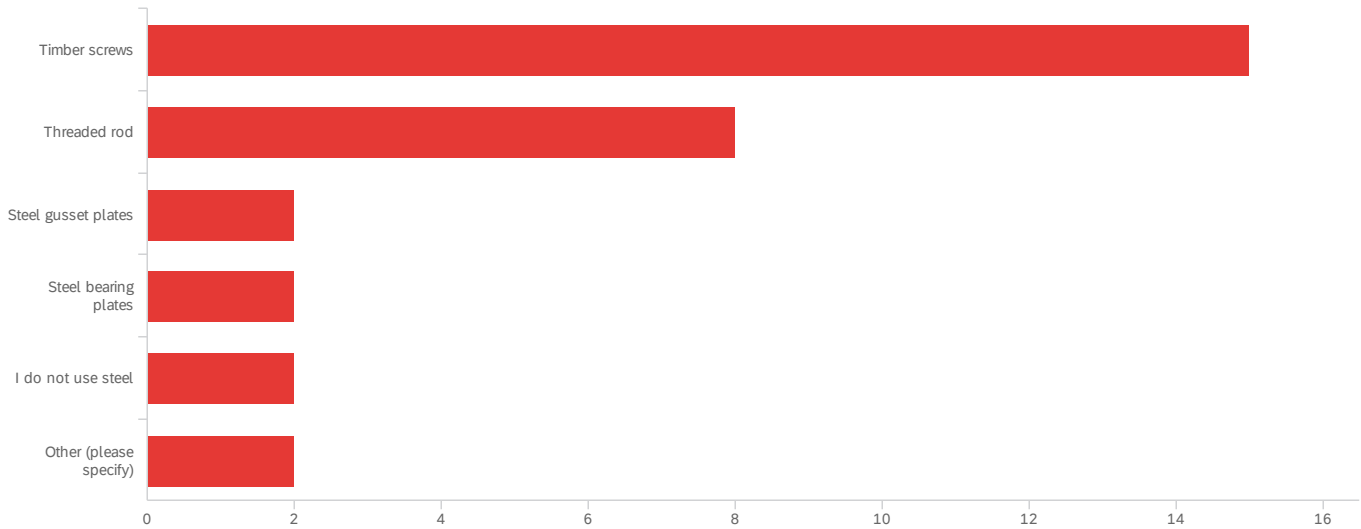
| # | Field                                 | Choice Count |
|---|---------------------------------------|--------------|
| 1 | One peg                               | 31.58% 6     |
| 2 | Two pegs                              | 42.11% 8     |
| 3 | Three pegs                            | 0.00% 0      |
| 4 | I do not use pegs for this connection | 26.32% 5     |


19

Showing rows 1 - 5 of 5

Q46 - 5.11 In addition to the timber joinery, what steel components do you use to

reinforce this joint? Note: multiple answers allowed.



  
 Data source misconfigured for this visualization.

| # | Field                  | Choice Count |
|---|------------------------|--------------|
| 1 | Timber screws          | 48.39% 15    |
| 2 | Threaded rod           | 25.81% 8     |
| 3 | Steel gusset plates    | 6.45% 2      |
| 4 | Steel bearing plates   | 6.45% 2      |
| 5 | I do not use steel     | 6.45% 2      |
| 6 | Other (please specify) | 6.45% 2      |

31

Showing rows 1 - 7 of 7

Q46\_6\_TEXT - Other (please specify)

Other (please specify)

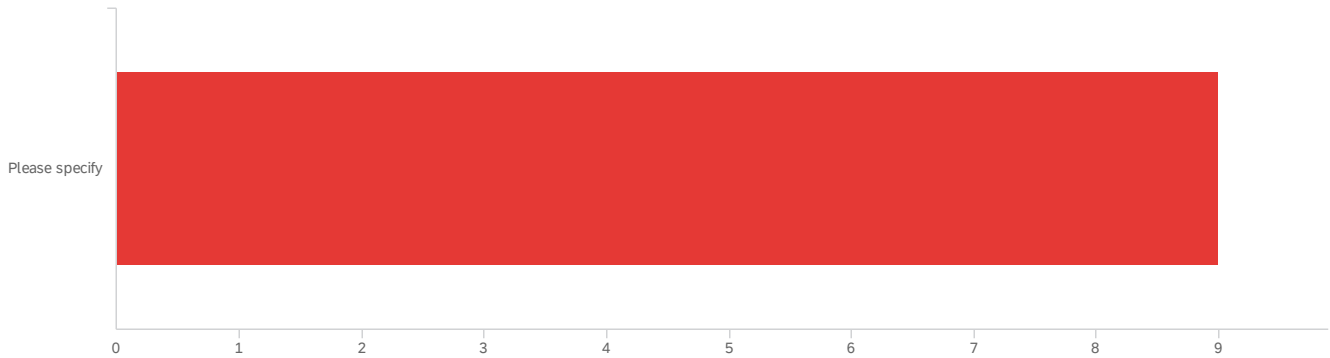
Other (please specify)

---

fully threaded

Fully threaded ASSY

Q47 - 6.1 Please include any questions, comments, and/or recommendations for this research project in the box below.



| # | Field  | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|--|---------|---------|------|---------------|----------|-------|
| 1 | 6.1 Please include any questions, comments, and/or recommendations for this research project in the box below. - Selected Choice | 1.00    | 1.00    | 1.00 | 0.00          | 0.00     | 9     |

| # | Field          | Choice Count |
|---|----------------|--------------|
| 1 | Please specify | 100.00% 9    |

Showing rows 1 - 1 of 1

Q47\_1\_TEXT - Please specify

Please specify

Questions are asked as if truss joinery uses standard sizes for notch depths particularly. In our work, every truss is modelled in a finite element program and the notch depths are calculated based on the demand on the connection. Thus we use minimum depths of 1" for notches, but depth could be 4" if demand requires.

I'd be curious to see if your testing can contribute any data to the friction components of some of these joint designs discussed in TFE4. Friction is a real force, but personally I favor an honest birdsmouth.

very interesting project for application

All the best Matthew - this looks like great work! Thanks for carrying the torch forward!

at 12:12 the joints are about identical. the Euros use an average for the angle of their bearing faces.

Please specify

Is shrinkage considered?


This little box is too small for such big ideas.

Great Work Matthew! I look forward to reading your finished thesis!



Q48 - 6.2 To supplement responses, please attach any sketches, drawings, or documents.

Q48\_Id - Id

| Thumbnail   | Name   | Size     | Type       |
|---|--------|----------|------------|
|  | 3A.JPG | 323.73KB | image/jpeg |

**End of Report**