Q&A Webinar

Pre-Engineered Beam Hangers

Question 1

Question : Are the forces unfactored/working stress?

Answer :

This question can only be answered in two parts, depending on what building code is being used for the design:

For United States, the NDS is tailored to calculate according to allowable stress design. The US version of the beam hanger design guides provides the designers allowable loads, in pounds (lbs.). This allows for simple design following the common ASD calculations.

For Canada, The CSA O86 is tailored to calculate according to limit states design. The Canadian version of the beam hanger design guides provides to the designers factored resistance derived from clause 12.10 of the CSA O86. It is important to note that the factored resistance presented in the design tables already include the $\varphi = 0.6$ and no further reduction factor is required.

Question 1.1

Question : Are the loads included in the design guides?

Answer :

Yes, the loads are included in the design guide. However, it is important to make sure you are using the right Design Guide for your country.

Question 2

Question : Does the connection allow for beam rotation when it deflects under load? What's the extent

Answer :

The design capacities of the connectors for both, United States and Canada are determined according to the test standard ASTM D7147, which is the standard required by the ICC-ESR certification agency and the CSA O86 for proprietary beam hangers.

Even if connector rotation is outside of the scope of the design standard, Myticon has investigated the interstory drift performance of the Ricon S VS and published the result in the "Inter-Story Drift Performance of Concealed Connection Systems" white paper. Additional rotational performance tests are currently ongoing for Megant, Ricon XL and double Ricon S VS connections.

Question 2.1

Question : How much rotational tolerance is there in the connection to avoid prying in a top mounted connection?

Answer :

The rotational resistance of the connector mostly depends on the type of connector used, the location of the connector in the beam section and the applied loads. The nature of the rotation will also affect the performance, depending on if the rotation is introduced by the flexion of the member, interstory drift or a combination of both.

Published results of the inter-story drift performances of the connectors may be found in the "Inter-Story Drift Performance of Concealed Connection Systems" white paper. Additional rotational performance test are currently ongoing for Megant, Ricon XL and double Ricon S VS connections.

Question 3

Question : Is the fire rating applicable in Canada?

Answer :

In Canada, fire design for general connection design is typically done according to the Annex B of the CSA O86. However, since the calculation approach is designed for a general approach it does tend to provide conservative results when compared to the actual fire test. As the Ricon S VS single and double connection and the Megant have been awarded with their fire rating by a third party, the designer may chose to use the published data in order to create a more cost effective and realistic fire design. A detailed analysis may be found in the "Fire Design for Mass Timber Connections" white paper.

Question 3.1

Question : How do you provide fire resistances greater than 1-hour? Like 2-hours.

Answer :

To provide a longer fire resistance, the wood cover has to be thicker. For example a 1-½ fire resistance would require a 2-⅛" wood cover and a 2-hour fire resistance would require a 2-⅝" wood cover. A detailed analysis may be found in the "Fire Design for Mass Timber Connections" white paper.

Question 4

Question : For fire rated connections do you always have to use fire caulking?

Answer :

The use of fire caulking is up to the discretion of the designer. In a tight concealed connection, fire caulking may not bring any additional fire resistance. It is generally accepted that a connection with a gap between the two elements smaller than 1/16" [2 mm] may be considered a tight connection.

However as fire caulking was used in the full-scale fully loaded fire test, using fire caulking is very likely to help ease the approval process with local building authorities.

Question 4.1

Question : Was fire caulk used in the fire test joint?

Answer :

Yes, fire caulking was used in the fire tests. The fire caulking used was the Hilti FS-ONE.

Question 5

Question : How do you work with beam manufacturer for the CNC of the beam ends?

Answer:

The design guide contains detailed housing instruction to be used by the CNC operator. The operation would have to be coordinated with either the glulam manufacturer or a third party in charge of cutting the glulam members. We are always available to provide further guidelines for CNC machining.

Question 6

Question : What about back to back connections?

Answer :

It is possible to do a back to back connection, however special attention must be given to detailing. Connectors mounted on both sides of a narrow header or a column, may cause fastener collision. This may be avoided by either offsetting the connectors or alternatively installing the connectors using through bolts. Our Beam Hanger design guide contains design values for these types of connections.

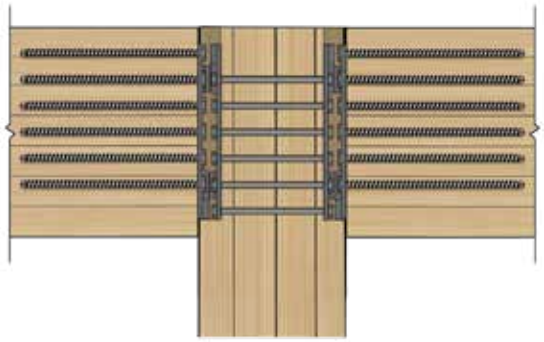
For more detail, we recommend our blog post on the subject, you can find it here.

Question 6.1

Question : How does a back to back connection look like?

Answer :

We have a few renderings in our Beam Hanger design guide and we have a blog post on this subject, you can find it here.



Question 7

Question : Are you in contact with Dlubal software?

Answer :

No, we are not in contact with Dlubal software.

Question 8

Question : Has there been any seismic testing?

Answer :

Myticon has investigated the interstory drift performance and the impacts of load amplitude variation for the Ricon S VS. The published result may be found in the "Inter-Story Drift Performance of Concealed Connection Systems" and the "Varying Load Amplitudes and Impacts on Ricon S VS Capacity" white papers.

Question 8.1

Question : Will the ICC-ESR report contain seismic drift and rotation limits?

Answer :

Seismic drift and rotation limits are expected to be outside the scope of the pending report. However, published results of the inter-story drift performances of the connectors may be found in the "Inter-Story Drift Performance of Concealed Connection Systems" white paper. Additional rotational performance tests are currently ongoing for Megant, Ricon XL and double Ricon S VS connection.

Question 9

Question : When will the Canadian guide be released?

Answer :

The new revised Canadian version of the beam hanger should be release this fall.

Question 10

Question : What are the fabrication tolerances on the connected members in order to ensure proper fit-up in the field?

Answer :

We suggest using the standard manufacturing tolerance of 1/16".

Question 11

Question : Is MyTiCon only supporting Ricon hangers?

Answer :

Myticon Timber Connector is the official North American supplier of KNAPP beam hanger products including the Ricon S VS and other connectors such as the Walco, Gigant and Megants. We also supply a full range of products, including specialised screws and lifting devices to the North American mass timber market.

Question 12

Question : With the housing of the connector inside the girder, the net section is reduced and possibly requires a larger girder to accommodate the housing. Would it be more cost effective to have the housing in the end of the beam and use the wood plug?

Answer :

The most cost effective solution may change from one project to another. For post to beam connections it is generally more cost effective to have the housing in the column element. For girder to purlin connections it is generally more cost effective to do the housing within the purlin beam end in order to avoid cross sectional reduction of the girder beam.

Question 13

Question : Will you have a booth at CRAN symposium in Cincinnati?

Answer :

We are not planning on attending the CRAN symposium in Cincinnati, but we are happy to provide a complementary technical learning session (T.L.S.) for anyone who is interested on the topic of mass timber connection systems.

TLS may be easily booked by contacting: education@myticon.com

Question 14

Question : When driving the fasteners in the connection, does it matter if the screws are inserted into the timber layers or the glue layers? Are the holes spaced in such a way to avoid screws in the glue layer?

Answer :

In general, it does not matter if the screws are inserted in the timber layers or the glue layers but some exception exist. For typical glulam members, the glue provides a strong bond between the wood layers. Previous loading test of the Ricon S VS connectors included some fasteners either installed at the glue joint or close to the glue joint. This did not appear to reduce the capacity of the connection. As for the hole spacing, the plates are designed to offer the minimum spacing requirement between the screws.

Special attention is required when detailing a connection using either split lam glulam members or the narrow face of the CLT. As split lam may have gaps between the edge of the lamination, causing possible capacity reduction. A common solution would be to fill all the holes of the connector in order to minimise the risk of capacity reduction caused by a fastener installed in a gap.