Cable Truss Systems on Outrigger Beams

When properly used, cable truss systems can safely increase the maximum outreach of our various Outrigger Beam Systems. However, when improperly used, it can create an unstable situation and even cause the beam to roll over and collapse.

This beam roll over failure was caused by a beam that was too long, had sloppy connections and a cable truss that was over tightened.

This article is mainly applicable to the Bee Access 5x5 Rolling Outrigger Beam, but its principles also apply to our other beam systems.

Our 5x5 Rolling Outrigger Beam (configured in the 24 ft package with Cable Truss) uses 3 each, 8 ft long H-beam sections, mounted on Caster Dollies. The Cable Truss consists of 2 heavy duty hooks, a ½” swaged wire rope and the jack assembly. We see some people improvise with a single 5/16” wire rope fastened with fist grips to home made attachment devices. Don’t do it! The tension on the cable is very high and you will not have any kind of safety factor.
The cable truss tension puts the beam in compression, meaning that the front and rear of the beam are being pushed into each other and are compressed like a column. Over tightening the jack puts this column into an upwards curved shape, which is unstable. When applying a load to this curved shape, the cable tension can create such as force that a buckling failure can occur, causing the beam to collapse sideways and roll over. You can recognize this pattern when, upon loading the beam, it starts to look like an S-shape or a curve, instead of a straight beam. This effect is enhanced by sloppy beam connections and/or beam sections that are bent. Also, do not add a 4th beam section (with a 32 ft truss) to reduce counterweights as this lengthens the column and makes it quite weak in compression and therefore more vulnerable to a buckling failure. Exception: when double stacking he beams, consult Bee Access for proper configurations. The following graphic applies to both a top and sideways view of the beam.

![Graphic](image)

It is preferred to use splice plates with bolts and to join the beams tightly. Avoid gaps at these connections. Torque the bolts to between 125 and 150 lb.ft.

![Image](image)

*Properly fastened splice plates ensure that the beams are joined tightly*

Splice tubes have some play in them making them undesirable for use with the cable truss as they induce the curve and S-curve patterns very quickly. This is especially true with the 2 ft splice tubes. Only the 3 ft splice tubes are allowed to be used with the cable truss, provided the cable is not overtightened. Be sure to use the special Splice Tube mast head in front as the Splice Tube does not fit in a standard mast head.

![Image](image)

*3 ft Splice Tubes are OK to use with a Cable Truss*
A properly installed cable truss leaves the beam perfectly level before a load is applied and keeps it that way when suspending the load. Below are some pictures that show the right and wrong way to set up the beam system before a load is applied. (Note that there are not enough counterweights installed for the outreach being used and are shown for illustration purposes only. Refer to the counterweight chart.)

Also make sure that the Cable Truss Jack is positioned at or close to the fulcrum point. The Bee Access mast heads have a cable truss receiver already built-in to avoid mistakes.

**WRONG** - The beam curves up after the cable truss was over tightened.

**OK** - The beam is level and the cable tension is snug. (Counterweights are shown for illustration purposes only, refer to manufacturer's instructions for proper quantity.)
As always, it is important to have the stirrup distance on the platform aligned with the distance between the outrigger beams to keep the wire ropes plumb. If not, the platform can create severe sideways tension on the beam as it travels up closer to the top and create a rollover failure on the weak axis. This is even more important with long outreaches: as the arm increases more and more, it takes progressively less force to roll the beam over. This is why we recommend horizontal guy wires on outreaches over 10 ft as a precaution.

In summary, when installing adjustable cable truss systems:

- Make sure the individual beam sections are straight and in good condition
- Keep the splice plate connections tight or use 3 ft long splice tubes only
- Ensure that the beam stays level, DO NOT over tighten the cable truss
- Position the Cable Truss Jack at or near the fulcrum point
- Ensure that the hoist to hoist spacing matches the beam spacing

For questions or comments on this article, please e-mail tom@beeaccess.com.