

# MSC Towrope Tutorial

## How to:

- Splice two undamaged ropes together
- Make a towrope end with Tost or Schweizer ring and nylon thimble
- Insert a doubler rope inside a towrope section that has minor abrasion damage

Knots reduce rope strength a LOT. That is why we do not use them on our MSC towropes.



We use splices in our towropes. The splices we make in our MSC hollow-core towropes remind me of the finger toys that many of us had as kids. The harder you try to pull your fingers out, the grippier the toy becomes.



Splices in hollow-core towropes work like the finger toy illustrated above. The greater the tension on the towrope, the greater the 'squeeze' and the tighter the grip of the **Outside Rope** on the **Inside Rope**. The result is a strong rope joint upon which we can depend. And because we use no knot, we do not introduce localized strains on rope fibers that reduce rope strength.

## The basic splice procedure is pretty simple.

1. The rope to be inserted (the **Inside Rope**) has to have a temporary **Pointy End**.
2. The **Outside Rope** will have its weave loosened a bit to permit insertion of the **Pointy End** of the **Inside Rope**, and to allow the **Inside Rope** to tunnel along inside the **Outside Rope**.

Those two items are the basics: A rope inside a rope. The **Inside Rope** inside the **Outside Rope** (I *told* you it was pretty simple!). Tensioning the rope increases the grip of the **Outside Rope** on the **Inside Rope**. Works just like the finger toy. Perfect! We refine these simple splice basics just a little bit to produce safe, reliable towropes for our MSC aerotow flight operations.

## The Pointy End

To make a splice, the **Inside Rope** has to have a temporary **Pointy End**. The **Pointy End** allows the **Inside Rope** to tunnel along inside the **Outside Rope**. Here are four ways to provide a functional temporary **Pointy End** for the **Inside Rope**.

1. Use the **MSC Stainless Steel Mark III FID** in the MSC FID kit (in the MSC FOO cart). This sleek beast is the Ferrari of **FIDs**. Machined by past MSC member Dave Klatt, it features a *Clever Retaining Hook* that holds the **Inside Rope** securely in the **FID** as the **FID** pulls the **Inside Rope** through the tunnel formed by the **Outside Rope**. It doesn't get any better than this, in **FID** World. This is the only **FID** with a Moving Part - the *Clever Retaining Hook*.



## 2. Use a commercial Cheap Plastic FID.

**Cheap Plastic FIDs** require more skill to use than the **MSC Stainless Steel Mark III FID**, because the **Cheap Plastic FID** has no *Clever Retaining Hook*. Therefore the **Inside Rope** tends to slip out of the **Cheap Plastic FID** as you tunnel the **Inside Rope** through the **Outside Rope** when



using the **Cheap Plastic FID**. Remember, they are *cheap*. The performance of the **Cheap Plastic FID** can be improved, with skill and cunning, by using a short, narrow piece of tape. Use it to tape the outer barrel of the **Cheap Plastic FID** to an inch or two of the **Inside Rope** that you inserted into the **Cheap Plastic FID**.

## 3. The Torched Pointy End.

Use a robust open FLAME (from a lighter, kitchen match, or butane fire starter) to melt the **Inside Rope's** cut end into a raisin-sized **Soft Hot Glob** of **Nasty Hot Melted Smoldering Plastic**. Next, immediately use cardboard or cardstock (or a very thick leaf) to roll and form the **Soft Hot Glob** into a serviceable conical **Torched Pointy End**, which you then allow to cool before using. When well crafted, the **Torched Pointy End** resembles the conical tip of a fresh Crayola crayon. The melt-and-roll procedure is smelly and you can burn your fingers if you are careless. However, flame-broiling a **Torched Pointy End** is *satisfying*, in a primal-scream sort of way. The **Torched Pointy End** is disposable: When the splice is finished, we slide the **Torched Pointy End** out of the **Outside Rope** and cut off the **Torched Pointy End**. Then we tension the rope to slide the **Inside Rope's** freshly cut end back inside the **Outside Rope**. We do this because the **Cold Hard Blob** of the **Torched Pointy End** is, well, a **Cold Hard Blob**. A **Cold Hard Blob** inside the **Outside Rope** can cause localized fiber wear and eventual failure of the **Outside Rope**. A **Cold Hard Blob** inside an **Outside Rope** is like a Stone In Your Shoe - It's Gotta Go.



Workmanlike **Torched Pointy End**.



Embedded, ugly **Cold Hard Blob**.  
Slide it out, cut it off.



**Torched Pointy End** Ignition Sources.





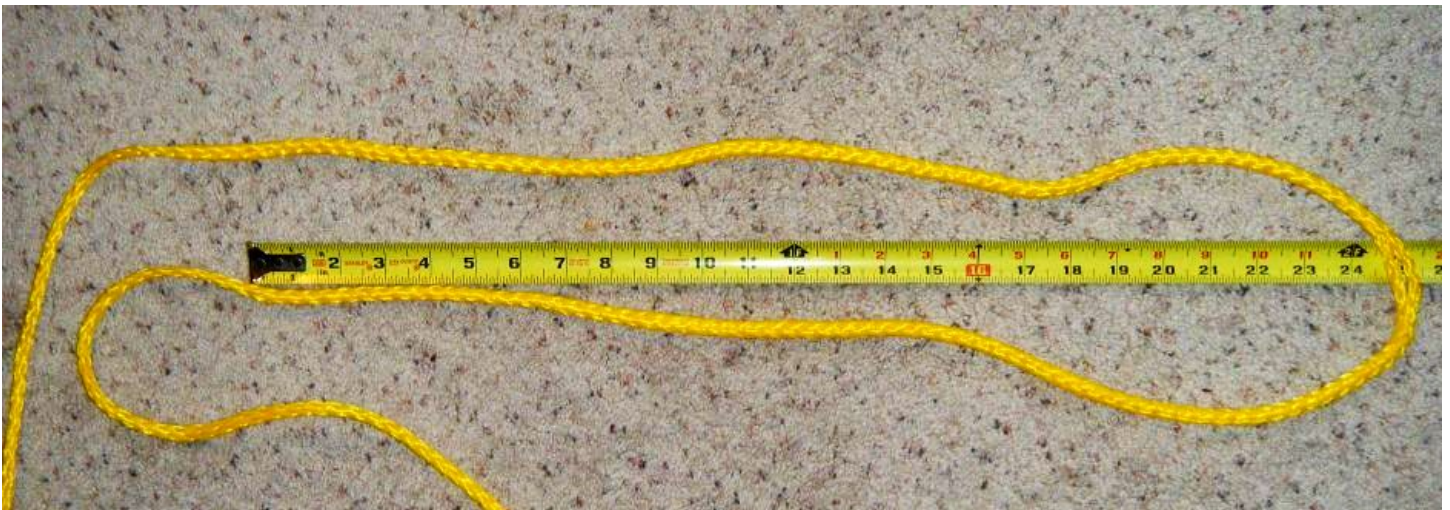
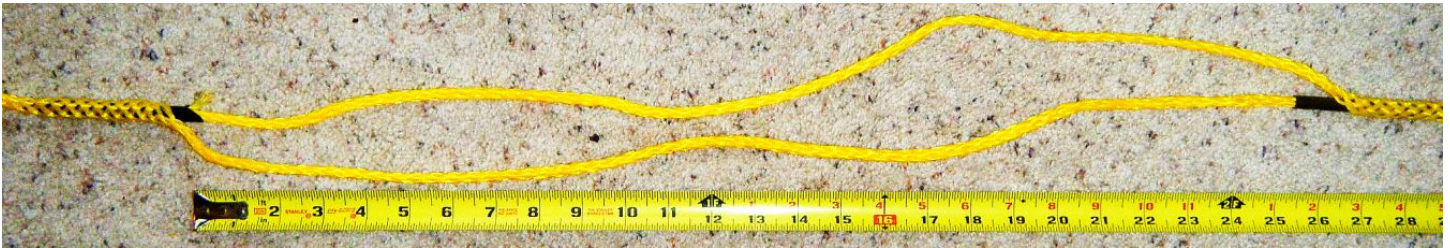
#### 4. The Taped Pointy End

Adhesive tape can be used to manufacture a **Taped Pointy End** on the **Inside Rope**. We wrap tape on the cut end of the **Inside Rope** and fashion the tape into a spiral **Taped Pointy End**. The **Taped Pointy End**, like its semi-incinerated cousin the **Torched Pointy End**, is disposable. Once the **Taped Pointy End** has done its job, we slide the **Taped Pointy End** out of the **Outside Rope**, remove all the tape, and tension the rope so that the now-tape-free end of the **Inside**



**Rope** slides back into the **Outside Rope**. We remove the tape because we do not want any **Utterly Useless Tape Blobs** inside the **Outside Rope**. **Utterly Useless Tape Blobs** can cause localized fiber wear and eventual failure of the **Outside Rope**. Think, Stone In My Shoe, again. It's Gotta Go.

Splicing two rope sections together to make a longer rope is illustrated below: The Tale Of Two **FIDs**. If each **FID** is tunneled as far as it can go, the result will be a splice with **at least 24 inches of length** on each leg. **Total splice length = 48 inches or more**. It is NOT necessary to have two **FIDs** to do the splice, of course. Make one leg of the splice at a time, using a single **FID**.



**The Splice, Completed.** Two sections of new rope, spliced together to make a single rope. The mid-point of the splice is at the 25 inch mark on the tape measure. Each leg of the splice extends to, or beyond, the left edge of the measuring tape, so you can confirm that each leg of the splice is at least 24 inches long. This spliced rope is ready for towrope service.



## Make a towrope end, complete with Tost or Schweizer ring and nylon thimble.

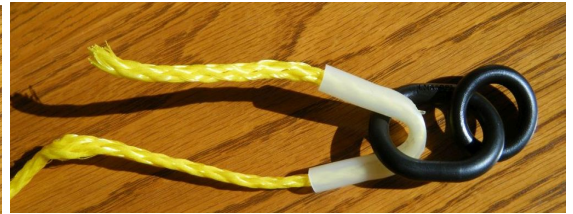
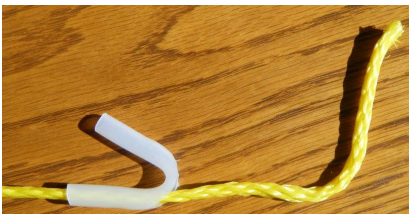
For us glider pilots, this is the Business End of the towrope. The required equipment is

- a towrope, the working end of which is called the **bitter end**
- a **nylon thimble**
- a **tow ring** (either a Schweizer round ring or a Tost compound ring)
- and of course a temporary **Pointy End**.

### Let's do it!

1. Slide the **bitter end** of the towrope end thru both legs of the **nylon thimble**.

2. *PUT THE DESIRED TOW RING on the \*#%&ing thimble!* Why so emphatic? Because it is extraordinarily easy to manufacture an utterly perfect **Towrope End Splice**, with smiles all around, only to discover that you *failed to put the tow ring on first*. Don't. Even. Ask.



3. The **Pointy End**: Slide the **bitter end** of the towrope into the **FID** (or fabricate a **Taped Pointy End** or a **Torched Pointy End** if no **FID** is available).

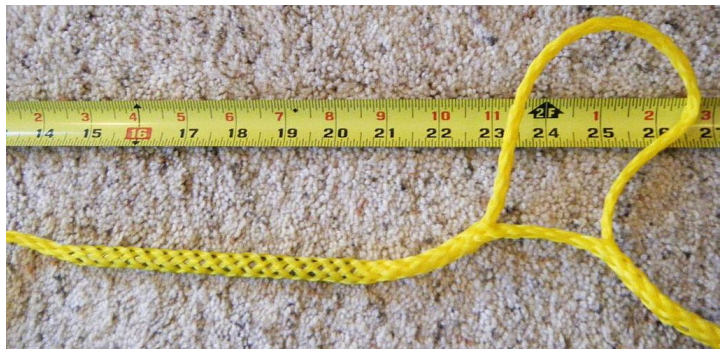


4. Tunnel the **Pointy End** into the opposite towrope as shown, right up close to the end of the **nylon thimble**.

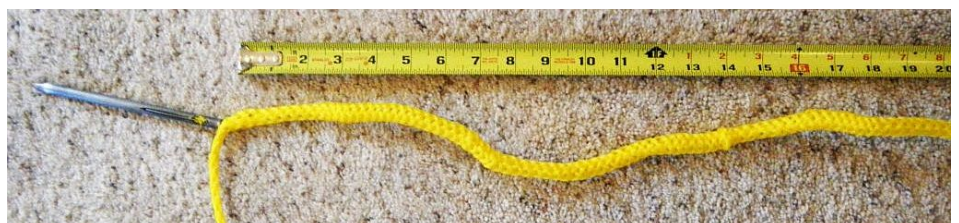
5. Continue for 24 inches, then slide the **Pointy End** out of the towrope and pull 24 inches of rope out through the exit point.



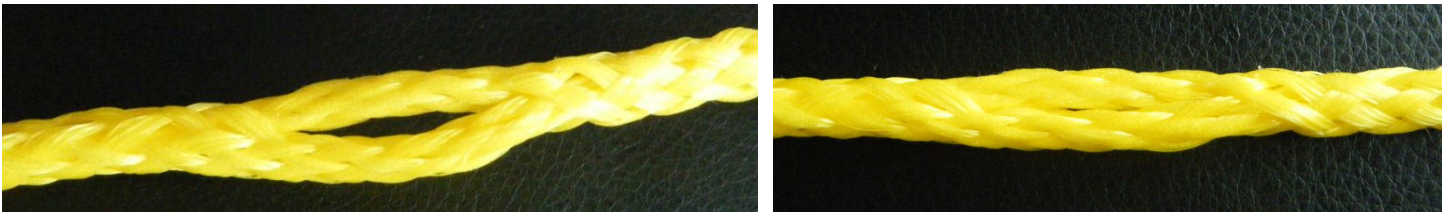
6. Tunnel the **Pointy End** back into the towrope an inch or two beyond the previous exit point, and tunnel 24 or more inches further down the towrope. This procedure makes a '**Loop Lock**' and is explained on the next page.



7. Exit the towrope, remove the **Pointy End** (the **FID**, in this example) and snug everything up. The **bitter end** will slip back inside the splice.



The **Loop Lock** serves an important function: It prevents splice slippage. When the glider releases the towrope at the termination of an aerotow, the **tow ring** end of the towrope thrashes around violently in the air for quite some time without any significant tension load on it. Remember the finger toy we evoked at the beginning of this document? The finger toy has its best grip when under strong tension. The **tow ring** splice in the towrope is similar - it grips tightest when under tension. When the glider pilot releases the towrope, tension on the **tow ring** end of the towrope snaps down to zero. Next, the **tow ring** end thrashes about violently in the air, but without any tension on the tow ring's end of the towrope. The result is a **tow ring** splice that tends to slip a little bit after each release - not good. The **Loop Lock** splice technique eliminates slippage of the **tow ring** splice despite the snap-release of the towrope by the glider and the violent thrashing the **tow ring** splice endures after glider release.



Left: Just-made, brand new **Loop Lock** in a new towrope end. Right: Slimmed **Loop Lock** after one aerotow. The first tensioning on the towrope snugs the **Loop Lock** up very nicely.

### The **Doubler** Fix

Inserting a **Doubler** for a towrope that has minor, very localized abrasion damage is a simple procedure. You will need a minimum of four feet of rope and a **Pointy End**.

#### **Let's Do It!**

I'll assume you have 50 inches of rope with clean cuts on each end and that you have a **FID**. Mark the center of damage on the towrope, which is the **Outside Rope** in this instance. Insert an end of the **Inside Rope** into the **FID**. Insert the **FID** 25 inches away from the Mark on the **Outside Rope** and tunnel through the **Outside Rope** toward the Mark. Continue tunneling beyond the Mark until the Mark has 25 inches of **Inside Rope** on each side of the Mark. Pinch and hold the Mark to prevent rope slippage. While holding the pinch, withdraw the **FID** and allow the **bitter end** of the **Inside Rope** to slide back into the **Outside Rope**. Continue to hold the pinch on the Mark as you snug the rope on either side of the pinch, then release the pinch.

The **Doubler** fix is an easy, quick fix, but is **only** suitable for very light, very localized damage or very localized abrasion of the towrope. For anything worse, cut out and discard the offending section and splice the towrope back together, after making sure that it is still sufficiently long for aerotow service. If not, then splice in a new section to achieve adequate towrope length.



## MSC Rope Repair Equipment (Stored In The FOO Cart)

