

**How-To**

# Convert to a Low-Friction Mainsail Hoist System

By Alex and Jack Wilken

Getting the mainsail up and down is one of the most important aspects of sailing, and yet it can be one of the most challenging, too. Often, it requires a crewmember to go forward to help raise and lower the main. This can be difficult at the best of times; and when you are short-handed in heavy weather, it can be dangerous.

Often, the cause of the difficulty is friction. Friction might come in

multiple areas, but part of the problem is likely to be friction from the sail slides in the mast track. Full-batten mainsails are becoming more prevalent and they increase friction, adding to the problem, though they have also been a catalyst for solutions.

To alleviate the friction, the mainsail track needs to be made slipperier, but don't go just shoving a bunch of grease in your mast slot! Fortunately, there are a number of slick ways to effectively reduce friction. The solutions range from low friction slides and cars designed to work with the existing mast track, to ones that need their own tracks. The new tracks come in two basic flavors: polymer and aluminum. In this article, we will go over the advantages and disadvantages of each as well as the basics and considerations of how to install them.

## Luff Attachments:

There are two basic methods for holding the sail to the mast on modern sailboats: bolt rope or slides. The bolt rope is normally fitted into a groove extruded into the mast (mast slot), and the slides are either fitted into the same groove or use their own track attached to the mast. The bolt rope is almost inherently a two-person job and makes raising and lowering the mainsail a task with few options for reducing friction. The good news for friction reduction is that fewer and fewer modern cruising boats will utilize a bolt rope luff attachment.

The increasingly popular luff attachment that utilizes slides allows you to stack the sail on the boom without detaching it from the mast. Slides can be designed and made from materials that reduce friction. This can be the cheapest friction

reducing upgrade: either moving from bolt rope to sail slides or swapping existing slides for lower friction ones can cost no more than the cost of the slides, plus the labor to attach them to the sail.

The rub is that this method is only as good as your existing mast track. Older masts can have pitting from corrosion or other damage which, though not structural to the mast, can make certain slide systems unworkable. One mast we worked on was moved and left unsupported in the middle of a boatyard, which caused a distortion at the joint in two mast sections and made it impossible to raise and lower the main without it catching.

The other important consideration in luff attachment is how the slides or cars are affixed to the main itself. Being able to remove the sail from the slides/cars without removing them from the track can be handy.

## Tracks:

There are a couple varieties of track that might be used with slides. Some masts will have the slide inside the mast slot where a boat rope once went, but many more of the low-friction style tracks are attached to the mast and externally accommodate sail slides or cars. If you can find a good slide that can use your existing slot, it may be enough to make raising and lowering the main manageable. If not, you can install a new track with slides/cars specifically made to work together.

A polymer track (Figure 1) has the advantages of being cheaper, lighter, and is easier to install since it comes in continuous lengths of up to 65 feet. It is limited in that it cannot use cars with roller bearings as they will wear a groove into the track over time, and it is not strong enough for larger mainsails. Check with the manufacturer, but a 65 foot mast is about the upper limit for this track, with sail area being the important variable.

Aluminum track has the advantages of being able to handle larger sails and use roller bearing cars for maximum friction reduction. Unfortunately, it's more expensive, heavier, and comes in shorter lengths of 7 to 18 feet (depending on the manufacturer) that can't be installed from deck level with the mast up.

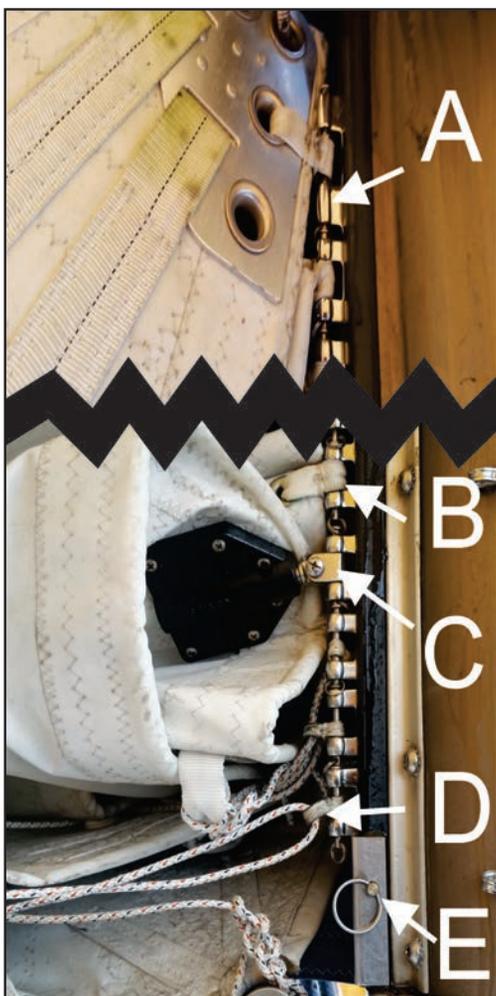


Figure 1: "A" is a headboard slide. "B" is a sewn webbing attachment. "C" is a batten attachment. "D" is a jackline attachment to allow the reef point to reach the gooseneck, and "E" is an end cap and pin.



### Slides/Cars:

Sail slides can fit into a slot or over a track (Figures 1 & 2). They can be made out of plastic, stainless steel, or aluminum. Stainless steel is probably the best, as it is hard, resists wear, and can be polished to a mirror finish so as to reduce wear on the track it is riding on. It works best on a polymer track for wear and friction reduction.

Sail-track cars use roller bearings to reduce friction (Figure 2). The best bearings at this point seem to be Torlon. Captive bearings allow the cars to be easily removed from the track without chasing the bearings all over the deck. Because they need to house the ball bearings, the cars are much bulkier than slides. Bigger ball bearings deal with dirt and debris better, but the bigger the bearing, the bigger and heavier the car. The goal is to reduce friction to the point where you are simply lifting the weight of the sail when raising it, and it falls out of the sky when you let go of the halyard; or as close to this as can reasonably be achieved while not adding much weight aloft and keeping the system simple.

Since slides are lighter and simpler,

Figure 2 (left): "A" is a headboard roller bearing car, "B" is a batten roller bearing car, "C" is a sail track slide.

Figure 3 (right): A switch track for cars to reduce stack height.

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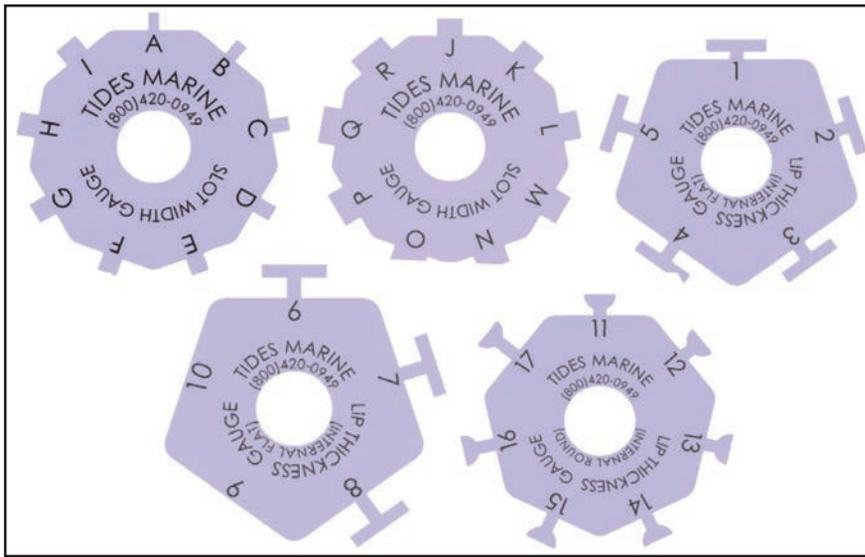


Figure 4: If you were to order a machined polymer mast track, the manufacturer would send guides like this to physically measure your sail slot for a good fit.

while the cars reduce friction more, it is possible to seek the middle ground solution by using a combination of cars at the high load points (like the headboard and batten attachments), while using slides in other places for weight and cost reduction. If you do decide to go with all cars, Harken has a unique mainsail track option called a

Switch Track (Figure 3, page 41). This system helps reduce stack height by having the cars stacking on alternative sides.

**Installation:**

Attaching the slides or cars to the sail can be done in a variety of ways depending on manufacturer and your

needs (Figure 1).

Attaching a new track has two basic installations. A polymer track can be machined to slide into or over an existing slot or track (Figure 4), or tapped and screwed into the mast. Polymer track comes rolled up and ready to go, machined to the profile, and cut to the length you have requested to fit your mast. If you have enough clearance, you do not have to remove the boom. Start feeding the track up the mast unrolling it as you go.

Once it is up and adjusted to the right height, all you need to do is put one screw through the track into the mast to hold it in place. Track manufacturers specify a self-tapping screw; we have always drilled and tapped for a machine screw. It really can be as easy as that.

When we finished installing one of these tracks for the first time, we looked at each other and said, "Is that it? That was so easy. Nothing on a boat is ever that easy." We used this same track to solve the problem with the mast we mentioned above that was distorted at the mast joint so that the slides jammed. Now, with the new polymer track and slides installed, that mainsail can be pulled up by hand to the top and when the halyard is released it simply falls from the sky. It is probably advisable to have the line around a winch to control the descent when no friction is holding the sail aloft.

An aluminum track can be held to the mast with slugs that fit into the mast slot and take a screw through the track. Or, simply tap and screw the new aluminum track to the mast. For aluminum tracks, you will need to go up the mast, or take the mast down, as each section needs to be tightened in place.

What would sailing be without the essential tool of the mainsail? As with all tools, the easier the tool works, the better we will feel about using it. Reducing friction will make all aspects of mainsail use easier and more enjoyable.



**Upwind/Downwind  
Upwind/Downwind  
Repeat**

**Tired of the Beating?  
then Reach (due west) on over to  
Eagle Harbor, on Bainbridge Island  
tie up to Harbour Marina & relive the day at the Pub 21+ Only**



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*Alex and Jack Wilken are experienced boat builders and have cruised extensively. They hold USCG Captain's Licenses and are the owners of Seattle Boat Works.*