Poor Man's Cheap and Easy Spar Alignment Tool For Idiots / Dummies "Made Easier"

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This document may have been updated!
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WARNING

I have been told of gliders rigged and flown where the spar alignment tool was mistakenly left installed instead of the correct manufacturer's steel spar pin!

THIS CAN BE A DEADLY ERROR!!

Be sure to mark your spar alignment tool to clearly differentiate it from the steel spar pin to prevent this from occurring! In my case the handles of my glider's steel spar pins are painted **safety red** while I painted my spar alignment tool **safety orange**.

See later slides for details.

Please Fly safe!

PLEASE NOTE

This document is may have been updated with new information, changes, and corrections.

Be sure to visit my presentation web site and download the latest version of this document. It could make an important difference to your work!

http://aviation.derosaweb.net/presentations

Thank you, John

Overview

During sailplane rigging the most difficult part seems to be inserting the main spar pins into the spar bushings. This is due to the close tolerances involved. In other words, things have to be **“just right”** to get the $#%^@ pins in!

The use of a smaller diameter “alignment” tool can be helpful to get the wing spars in close enough proximity and allow the main spar pins to be inserted more easily.

Commercial nylon eccentric alignment tools are available for sale on many web sites.

Detailed here in this presentation is a “poor man’s” version of a non-eccentric alignment tool. Enjoy!

Spar Tool General Approach

1. Find a hardwood dowel that is slightly smaller in diameter than your glider's main spar pins.
2. Cut the dowel longer than the main spar pins.
3. Sand the end of the hardwood dowel to form a taper to ease insertion into the spar bushings.
4. Add a handle.
5. Try it out.
6. Repeat until perfect.

This process may have to be trial and error to work with your particular glider!

Measuring Your Spar Pin

Use a caliper type measuring tool to determine the precise diameter of your spar pin.

Use the caliper's lock to retain the measurement for use in the next step.

Finding Alignment Tool Material

Go to your local garden store and look at the other long handled implements (shovels, hoes, etc). The handles of these tools are most often made from ash, a hardwood.

Use your caliper from the previous step to locate an implement handle that has the correct diameter (slightly smaller).

Some handles are tapered so measure at different points along the handle to find a section that is appropriate. You will need a piece about 6-10” (15-25cm) long.

Usually, you will find you have lots of material to work with for several tries to get this correct.

Alignment Tool Material (ASW-27)

I looked at the garden implements at Home Depot and found the correct size for the alignment tool for my glider. A diameter difference of less than 1mm! Perfect and quite inexpensive!

Cut to Length the Hardwood

Start by cutting the length of your handle material about 2” longer than your spar pin. You may need to reduce the length later for your glider. You will probably have plenty of extra material for retries.

You might try using the tapered “tang” portion of the handle found within the metal shovel sleeve. This could be better than a straight section for your ship. Your mileage may vary.

Tapering the Alignment Tool

The business end of the wooden alignment tool should be tapered to allow for ease of insertion. Several ideas;

#1 Sand down the end of the wooden tool at a shallow angle. A bench top belt sander makes short work of this.
#2 The butt end of the handle is typically already rounded/tapered. That might work too.
#3 Try tapered portion of the garden tool handle from within the metal (shovel) sleeve.

Trial Use of the Alignment Tool

Insert the wooden alignment tool into your wing spare for a trial fit. For best use you might find that the overall length of the tool will need to be shortened (or lengthened) and/or the taper increased.

Use trial and error during assembly to get the correct fit.

Make an Alignment Tool Handle

Adding a handle to the alignment tool is important to allow it to be easily inserted and, more importantly, easily removed from the spar under load.

The simplest handle is a 3/8” metal rod about 6” long and then inserted into an appropriately sized hole in the alignment tool. It can easily be removed for storage.

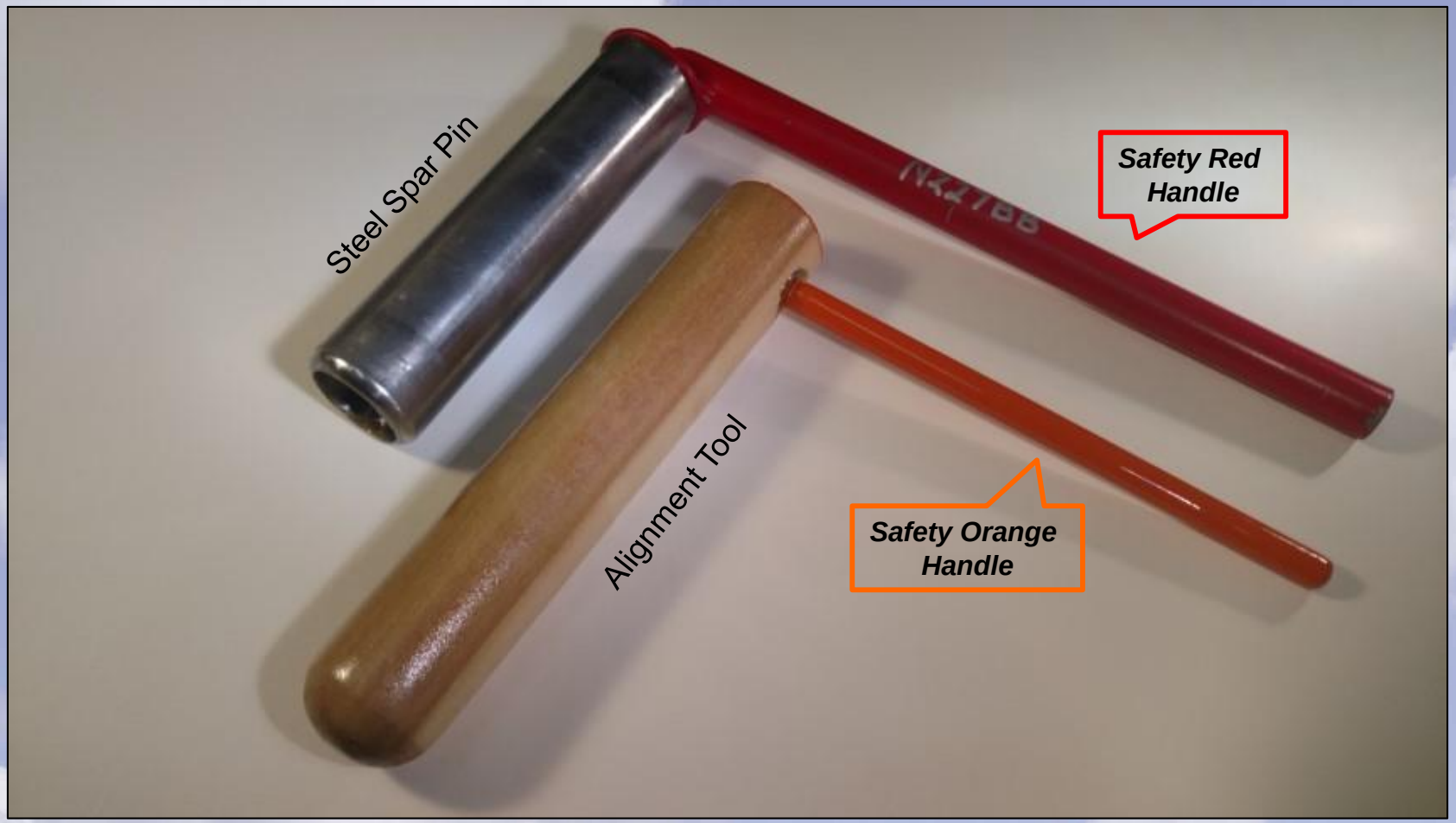
An advanced version of this handle is shown in later slides.

Finish of the Alignment Tool

Typically the shovel handles come finished with varnish or polyurethane.

Light sanding and then applying an additional spray finish, plus a light waxing of the tool, can help with the insertion into the spar bushings.

Completed Spar Alignment Tool



Painting the Alignment Tool

The different coloring of the handles (**safety red** and **safety orange**) is critical to differentiate each pin during rigging to avoid launching with the incorrect alignment tool installed rather than the proper manufacturer's steel spar pin!

Advanced Alignment Tool Handle

The simple handle shown previously is not held very firmly in the alignment tool. Adding a threaded insert into the wooden alignment tool makes the connection to the alignment tool much more rigid. The next few slides detail the process to create this better handle.

Advanced Alignment Tool Handle

Drill a 9/16” hole about ½ way through the tool.

Using a forstner bit is best as its center point prevents wandering and it creates nice flat bottomed holes. A brad point bit is also a good option.

Avoid using a standard drill bit as it is difficult to center and will tear out the wood.

My $0.02.

Advanced Alignment Tool Handle

Install a brass 3/8-16 wood insert using the nut and bolt combination shown below.

Advanced Alignment Tool Handle

Simplest - Use a 3/8-16 threaded rod. This will be tough on hands during use unless the unused threads are covered.
Best - Cut new threads into a smooth rod with a 3/8-16 die.

Strengthening the Tool's End

You can strengthen the wooden tool by adding a hose clamp at the end nearest the handle. You will have to experiment on positioning this clamp so as to not interfere with the tool's use.

Advanced Alignment Tool Handle

Completed Advanced Handle

Thanks for Watching!