SAFETY WIRE TYING

In aviation there are three things that you can't be without; velcro, duct tape and SAFETY WIRE. This article is about Safety Wire.

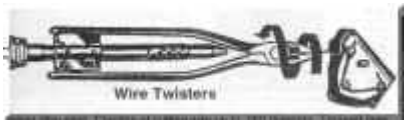
It comes in several different thickness and alloys for different applications. It is very light, corrosion resistant, strong, and easy to install.

Wire .020 inch diameter is very thin, not very strong, but you can bend it around just about anything. You use tie wire on light bolts or fittings where you need to bend the wire around a lot of corners and where the wire does not have a lot of pull on it.

Wire .032 inch diameter is easier to work with, and reasonably strong and should work on anything you might need safety wire in aviation.

Wire .041 inch diameter is extremely strong, because it is twice as thick and is very stiff and difficult to work with. It doesn't bend easily and will not tighten around a tight radius; when using it on wide turns, extra strength will be needed to use the safety wire.

While there are different materials used to make safety wire; like Copper, Brass and Aluminum, we don't recommend them. The type we recommend is 302/304 soft temper stainless steel.



With the thicker wires a safety wire tool makes the job a lot faster and easier. There are several different tools ranging from a unit that looks like a screw driver, wire winder tool and safety wire pliers. These tools make a beautiful finished job, with the right tightness and strength.

They are easy to use. You wrap the safety wire around whatever it is you are securing, bring both ends back into the pliers mouth, close the mouth down on the wires, lock it (it has a little spring loaded locking mechanism) then pull a round knob in the middle of the handle back. When you pull on the knob of the pliers the handles turn and the wire wraps around itself.

Areas where you might use safety wire include around bolt heads, or nuts where there is no means of locking them. Areas of special concern are propeller bolts, control system linkages, areas of movement, Aircraft Engines or vibration. Another area of use is on turnbuckles to prevent them from backing off in flight.

A bolt that is properly safety wired like that in the examples just doesn't hold the fastener in place; it serves to pull it tighter. Each bolt holds the other and actually tightens the other if it starts to come loose.

HOW TO PROPERLY INSTALL SAFETY WIRE

There are a couple of basic rules to follow when safety wiring something.

They are:

1. If you are safety wiring a nut or bolt FIRST torque the nut or bolt to its proper torque. Where possible align the holes that are going to be used to safety wire the units in place. BUT DON'T OVER TORQUE or UNDER TORQUE them to achieve this!
2. After installation the safety wire should be tight! So as not to allow the unit(s) to move.
3. Safety wire should always be installed so as to make the nut or bolt "TIGHTEN" itself when the safety wire has been installed. That is the safety wire should come around the top of head of the bolt/nut and back onto the securing unit so that the safety wire PULL is in a tightening direction!
4. NEVER over stress the safety wire. This weakens it, which could cause it to break under vibration or load. This is generally caused when you "over wind" the safety wire. Safety wire should never be nicked, or kinked.
5. When cutting the safety wire always leave 4 to 6 turns after the loop. REMEMBER always bring the safety wire AROUND the head of the bolt/nut in a tightening direction, in as small a contour to the bolt/nut as you can get.

A guide to using safety wire pliers!

After you have wrapped the safety wire around the object, grip both ends of the wire in the jaws of the safety wire pliers and slide the outer sleeve down with your thumb to lock the handles.

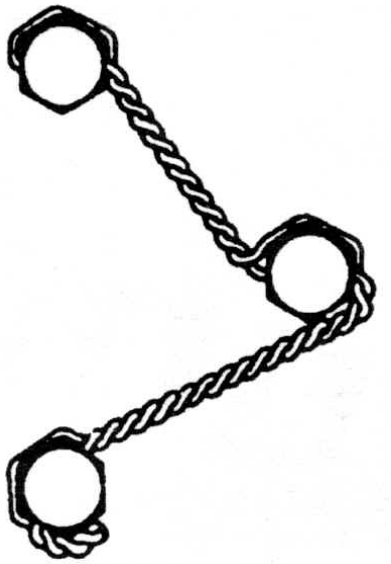
Now grasp the knob located in the middle of the pliers and gently pull out. This will cause the pliers handles to turn, twisting the safety wire!

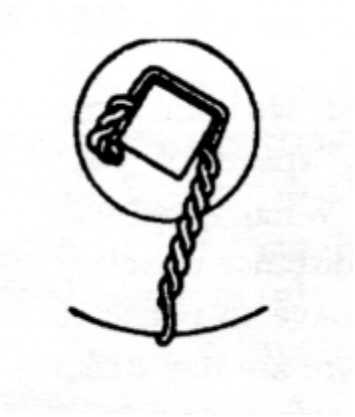
When you have the amount of twists required, grasp the handles and squeeze. This will release the safety wire from the jaws of the pliers.

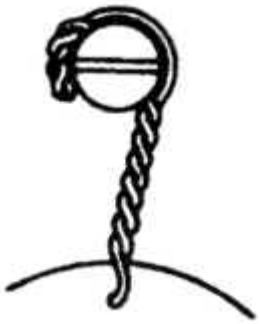
Use the cutters in the jaws to cut the safety wire to the proper length and then bend the end of the wires over so that you don't poke yourself on them the next time you reach into work on something.

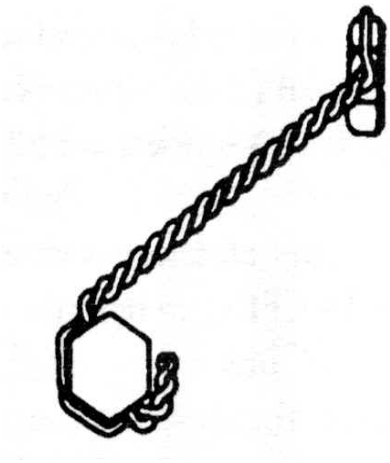
See next pages for examples

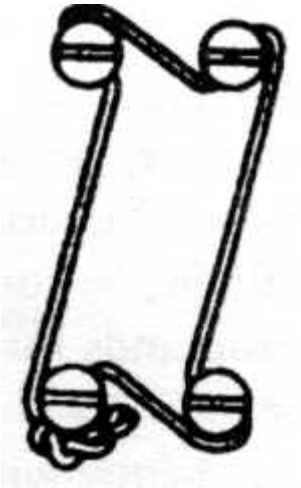
HERE ARE SOME EXAMPLES OF PROPER SAFETY WIRE TECHNIQUES

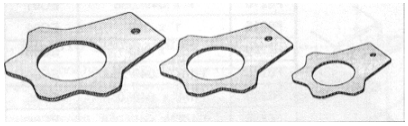












These units are used where a nut or bolt does not have a hole for safety wire. You install them under the nut/bolt bend the tabs over the side of the nut/bolt and then safety wire the tab with the hole in it.