



Bob's Shop Notes: Wire Bundle Tying Techniques

String ties on a wire bundle are most acceptable substitutes for nylon tye-wraps. Personally, I prefer string ties over tye-wraps for a finished product. Tye-wraps leave a bulky, un-yielding lump on the side of a wire bundle. Depending on how the tye-wrap is cut off, the trimmed end can be sharp. I've offered up many a blood sacrifice to a project after having been bitten by the end of a clipped tye-wrap. Tye wraps are third only to metal burrs and exposed ends of safety wire for causing body-leaks.

String ties still leave a lump where the knot is but it is less rigid, more rounded and has less tendency to snag. Cut ends of string offer no hazard to contacting body parts. One roll of string can handle ANY bundle tying situation ranging from a few 22AWG wires to a fist full of wires. Further, polyester flat-lace has excellent longevity characteristics under the cowl while nylon tye-wraps fall victim to ozone, hydrocarbons and ordinary embrittlement due to loss of plasticizers.

String ties do take more time and some skill. I like to build a new wire bundle using the cheapest tye-wraps I can buy . . . every time a new wire goes into the bundle, tye-wraps go around it to keep the wire in place. Old tye-wraps are clipped off after they become covered with a few new wires. When the bundle is finished, you can put string ties on and clip ALL of the tye-wraps off.

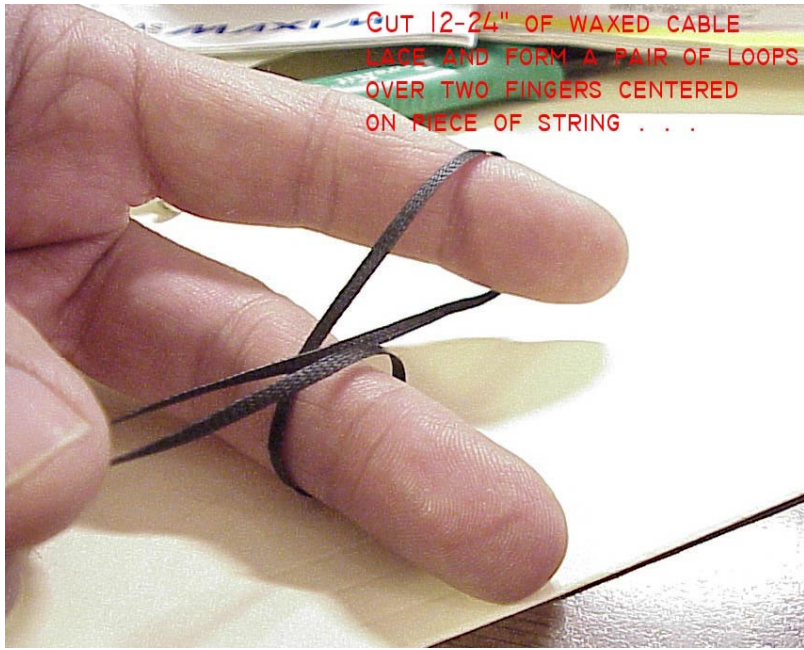
If you're interested in considering this very old but venerable technology for forming wire bundles, an exemplar product can be viewed and purchased on Wicks Aircraft website by [clicking here](#). The lacing tape I've suggested has a wax finish. This wax is just slick enough to let the tape strands slide over each other for uniform tightening and just sticky enough to keep the first tensioning of a knot snug while you throw another knot on top.

Here are some tips on how to use the stuff:

Method 1 . . .

The fastest application of string over a bundle of wires is to cut a 12" or more piece of string, put it around the wire bundle in a "clove-hitch" as show in the adjacent illustration. If the wires are small and reasonably compliant, you can pull the hitch up snug and throw a square knot on top. Trim the ends to 1/4-1/2" and you're done.





Method 2 . . .

[Click here for larger image.](#) If your bundle is large, has a mix of wires that are stiffer and less happy about laying in nice neat stacks, you may find this technique more useful.

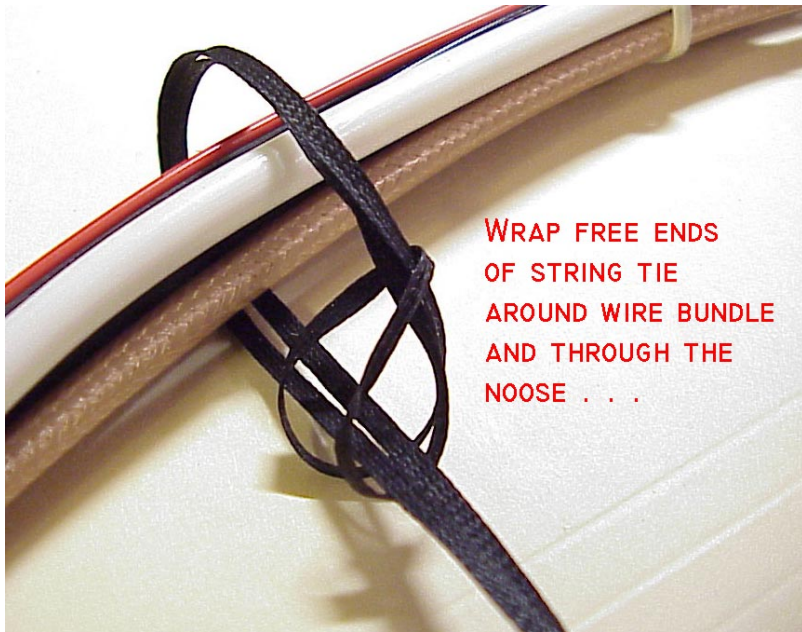
Cut a 12-24" piece of string and loop the center around two fingers as shown.

[Click here for larger image.](#)

Slip the loops off your fingers and fold to make a "noose" . . .



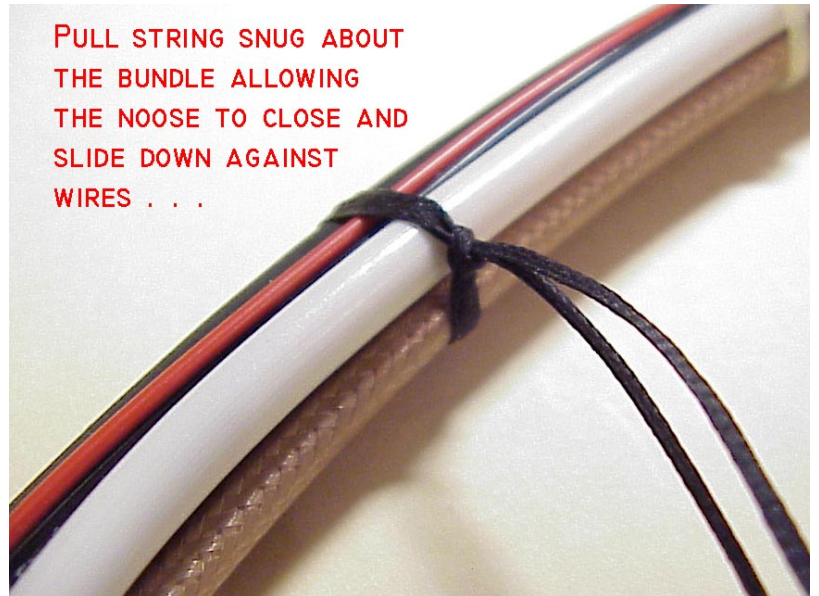
[Click here for larger image.](#) Wrap free ends of string around wire bundle 1 to 3 times depending on how much of a bear hug you want to put on the bundle. Bring the free ends through the noose as shown.



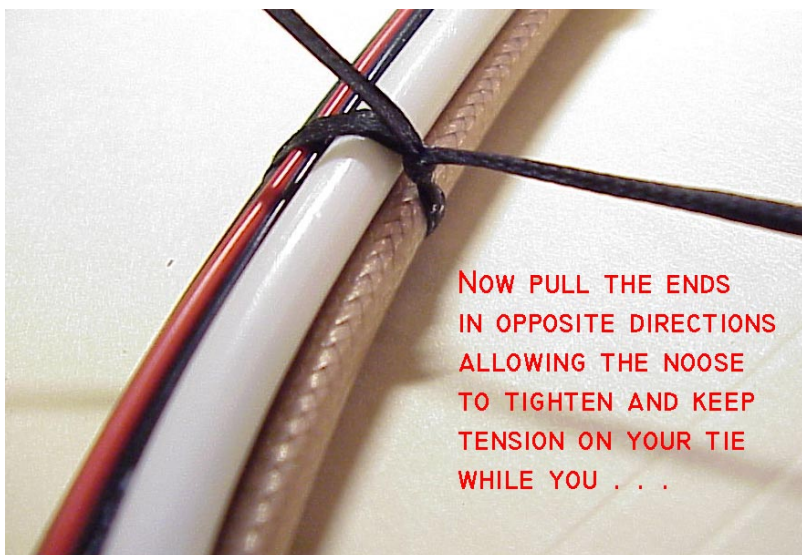
WRAP FREE ENDS
OF STRING TIE
AROUND WIRE BUNDLE
AND THROUGH THE
NOOSE . . .

[Click here for larger image.](#)

Pull the slack out of your string tie allowing the noose to tighten up and migrate down toward the wire bundle.



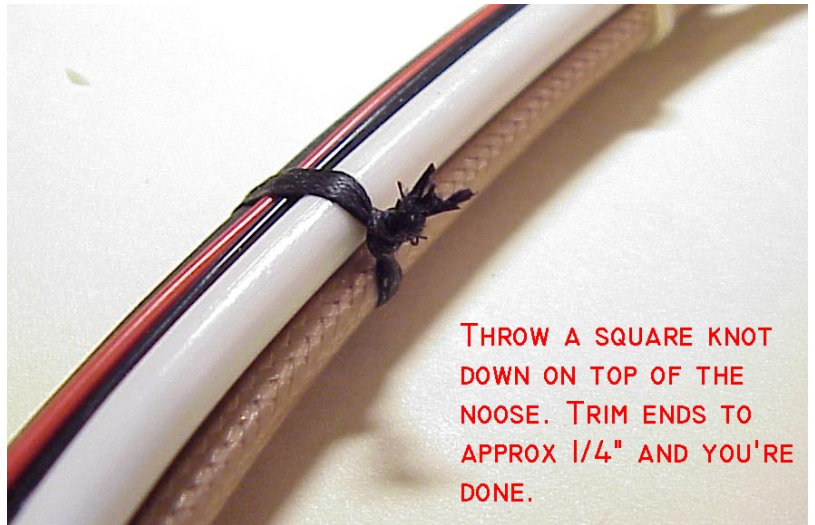
PULL STRING SNUG ABOUT
THE BUNDLE ALLOWING
THE NOOSE TO CLOSE AND
SLIDE DOWN AGAINST
WIRES . . .



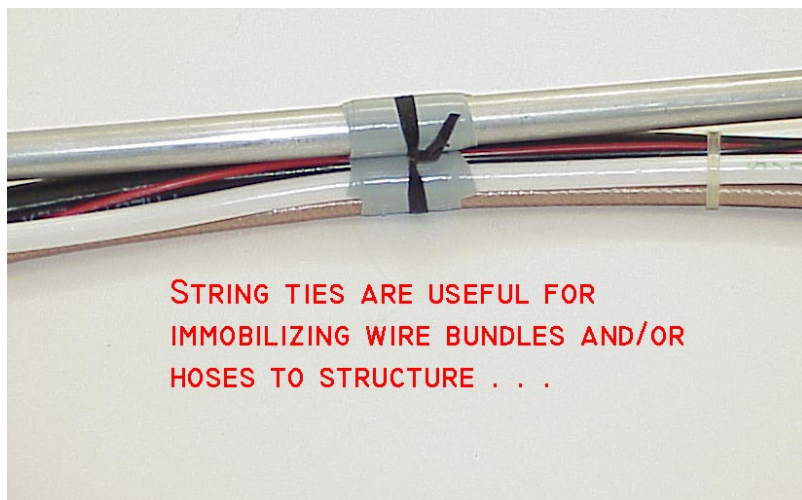
NOW PULL THE ENDS
IN OPPOSITE DIRECTIONS
ALLOWING THE NOOSE
TO TIGHTEN AND KEEP
TENSION ON YOUR TIE
WHILE YOU . . .

[Click here for larger image.](#) Pull on the free ends to tighten the grip. This technique can put a lot of force on your victim. I've used three or four, double-turn string ties as a temporary substitute for a broken clamp on a radiator hose. I've seen teflon insulation wire bundles tied so tightly that the insulation cold-flowed and allowed wires to short together. Take care lest you get carried away with your newly acquired power . . .

[Click here for larger image.](#) Finish off with a square knot down against the noose. Trim off the free ends. I've known some technicians who like to use their soldering iron to melt through the free ends instead of cutting it off. This technique produces a finished end that's similar to flicking-your-BIC and melting the freshly cut ends of a nylon rope to keep it from fraying. This is purely a matter of craftsmanship. Your corralled wires are not at risk of getting loose because your trim-ends are frayed.



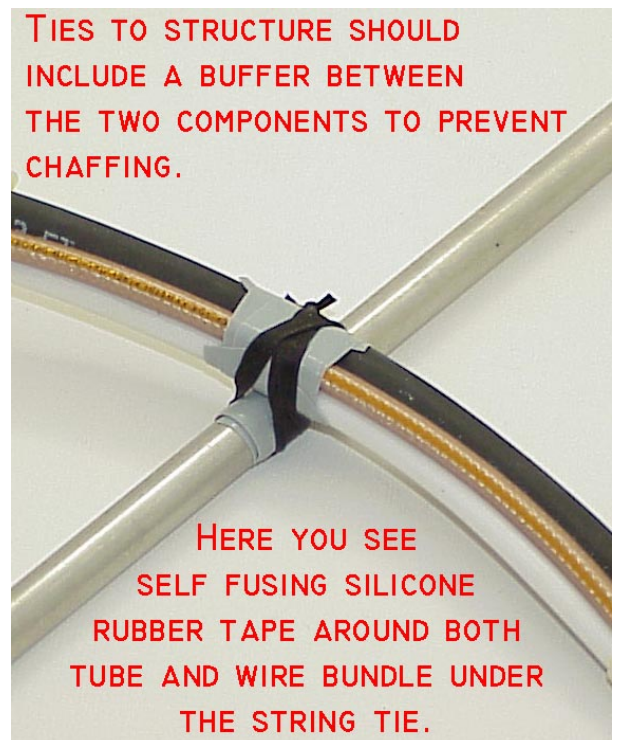
THROW A SQUARE KNOT DOWN ON TOP OF THE NOOSE. TRIM ENDS TO APPROX 1/4" AND YOU'RE DONE.



STRING TIES ARE USEFUL FOR IMMOBILIZING WIRE BUNDLES AND/OR HOSES TO STRUCTURE . . .

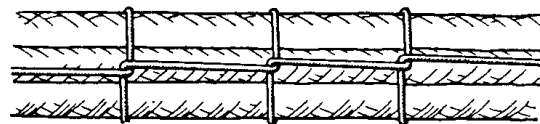
[Click here for larger image.](#)

[Click here for larger image.](#) String ties can be used to secure bundles, hoses, etc to each other or to structure. Use a buffer material between the two components before applying the string tie. Here I've illustrated a joint buffered with self fusing S894 silicone rubber tape which you can purchase from [B&C's website catalog](#).

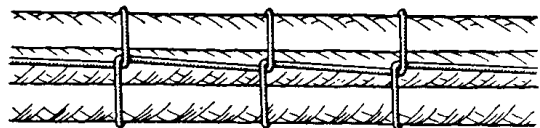


TIES TO STRUCTURE SHOULD INCLUDE A BUFFER BETWEEN THE TWO COMPONENTS TO PREVENT CHAFFING.

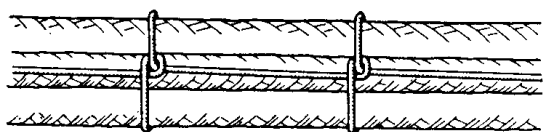
HERE YOU SEE SELF FUSING SILICONE RUBBER TAPE AROUND BOTH TUBE AND WIRE BUNDLE UNDER THE STRING TIE.



(A) WRONG



(B) RIGHT



(C) RIGHT

Fig. 18-8 — Methods of lacing cables. The method shown at C is more secure, but takes more time than the method of B. The latter is usually adequate for most amateur requirements.

[Click here for larger image.](#) Here's an image purloined from an old copy of the ARRL Amateur Radio Handbook. A long segment of flat lace can be used to put a running series of ties on a wire bundle. You'll find that you can easily work with a piece of string that is 6-8 feet long and place a series of ties at 1 to 2 inch intervals as suggested in the adjacent figure. This is pretty much a lost art in production environments but it's easy to do and should get you some extra points for craftsmanship by judges at an air show.

Questions or comments about this site?



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