SIMPLE Splice for 7/8" Heliax®

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INTRODUCTION

Most UHFers would tell you that their preferred transmission line is hard line – the larger the better. No wonder, as once the rest of the system has been tweaked for best performance the transmission line remains as the weakest link in overall performance. Unfortunately, as with most bigger and better things, such low-loss cable and their connectors are quite costly and often out of reach of the average Ham. Thus compromise continues to be the order of the day.

An irritating situation is finding some reasonably priced odd lengths of large coax at that are too short for our application. Or, conversely, finding a piece that is significantly longer than needed. What do you do then, cut it or accept the additional loss of the surplus? What follows will answer these questions.

THE STORY

While rummaging through a Hamfest not long ago, I came across several vendors offering reasonably priced odd lengths of Andrews 7/8" Heliax®. The source of this material was cell phone sites that were being refurbished. One fellow offered a lot consisting of about six pieces varying from about forty feet to over sixty feet in length. All had at least one type "N" connector attached and the asking price was a paltry sum of less than $100. SOLD!

But now what? I needed a length of about 82 feet in all. It wouldn't bother me to "waste" a few feet at that price if I could splice two pieces together. The choker came when I investigated the cost of a splice connector, which turned out to be more than the total price of the coax I bought! It was now time for some good old Ham ingenuity…

THE FACTS

The first thing I did was to take a hacksaw and cut off a piece in order to determine the construction of this stuff. Unlike its 1/2" size little brother, which has a spiral outer conductor, spiral dielectric and solid center conductor, the 7/8" Heliax® has a corrugated outer conductor, dense foam dielectric and hollow center conductor. Using a good hacksaw produced a relatively clean cut that could be nicely dressed with a file to a very acceptable flush surface. Observation indicated that, as opposed to a spiral pattern, the corrugated outer conductor would negate the need for any particular radial alignment when butting two pieces together. And if both interfaces were cut at the same relative point of the corrugation the resultant juncture would not alter the cable's physical appearance.

To join the center conductors one could use a longitudinally slit piece of tubing which has an initial diameter just slightly larger than the center conductor I.D. This "bullet", when inserted into the center conductors, would provide a good firm connection. This technique was widely used to join air dielectric

coax back in the "old" days. When tried, the resultant joint aligned beautifully and had only the slightest gap in the outer conductor which could be easily bridged with solder. Voila! A good – and weatherproof - splice was created…

But suppose it isn't practical to perform a solder connection, is there another simple way to join these pieces together? There sure is! By using a split cylinder made from a discarded piece of outer conductor that is then slipped over the junction, both pieces are held in perfect alignment. The junction could then be made rigid by clamping the assembly together with a hose clamp. Problem solved!

THE DETAILS

1.) Strip the outer jacket from each piece to be joined a minimum length of 1.5" (approximately 6 convolutions) being careful not to cut the outer conductor.

2.) Using a sharp tubing-cutter, cut through the outer conductor at the center of the fourth groove from the end. Use minimum pressure so as not to deform the coax all-the-while noting that the alignment remains correct.

3.) Using a fine-toothed hacksaw, carefully cut through the coax using the circumferential cut made by the tubing cutter as a guide.

4.) Clamp one of the small pieces just cut off lengthwise in a vise and again using the hacksaw cut an axial slit through the corrugated copper. Carefully remove the copper from the dielectric. De-burr it and put aside. This will be used as the outer-conductor clamp sleeve. Discard the remains.

5.) Using a broad/fine file, dress the cut ends lightly to remove any burrs. De-burr the inner edge of the center conductor I.D. with a de-burring tool or sharp knife. Also ensure that there are no burrs on the outer diameter of the inner conductor.

6.) Roll a small piece of fine-grit emery cloth (grit side out) and use to lightly sand the inside of the inner conductor. Clean the inner conductor with a rag or tissue moistened with WD-40 or similar product.

7.) Using a tubing cutter, cut off about a three-quarter inch length of 5/16" diameter brass tubing.

8.) Clamp the piece of tubing lengthwise in a vise and, using a hacksaw, cut an axial slit. De-burr. This will be used as the center-conductor joiner bullet.

9.) Slide the joiner bullet approximately halfway into the center conductor of one of the sections to be spliced.

10.) Place a 1" stainless hose clamp and the outer-conductor clamp sleeve over the other section.

11.) Carefully align and butt sections together assuring that the joiner bullet seats neatly into both inner conductors.

12.) Position the outer-conductor clamp sleeve such that it is centered over the joint. There should be two corrugations over each side of the junction.

13.) Position the hose clamp over the center of the outer-conductor clamp and, while maintaining axial pressure to the joint, tighten firmly.

NOTE: If a permanent, weatherproof splice is desired, perform the following:

A.) Clean the adjacent outer conductor surfaces of the joint sufficiently for soldering.

B.) Install the bullet, but do not install the clamp sleeve and hose clamp.

C.) Connect the sections and, while maintaining firm axial pressure, quickly tack-solder several points around the joint circumference. AVOID EXCESSIVE HEATING.

D.) Carefully solder the remaining voids. Although this is not a particularly difficult procedure, it may help to cool the joint with a dampened cloth between applications of heat to help prevent dielectric melting.

E.) Wrap exposed copper surfaces with a good quality vinyl tape for extra protection

CONCLUSION

The procedure described provides a means for joining lengths of 7/8" Heliax® for near zero cost, yet it probably introduces less discontinuity than a commercially available splice. The same technique could also be used for any cable having similar physical characteristics.

If the need for a lower loss transmission line is in your future, but your budget won't permit it, this may well be your inexpensive way to a bigger signal.

Fig.1

Shown are: the hose clamp, outer-conductor clamp sleeve, center-conductor joiner bullet and finished interfaces showing a joiner bullet installed.

Fig. 2

Photo shows final assembly of the temporary splice at left and permanent splice at right.