The End of the Line

What's the point in sending power up the coax if it never reaches the antenna? These tips on connector installation and care will help maximize your station's signal.

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As supervisor of automation and communications systems on offshore oil platforms, I have learned that the following methods and materials produce long-lasting results even in salt-spray conditions on motor vessels and oil platforms in the Gulf of Mexico. If care is not exercised initially, moisture and improperly soldered coaxial rf connections can yield undesirable operation of your antenna system.

Cable Preparation

Proper soldering of the RG-8 shield to the barrel of a PL-259 coax connector can be accomplished by tinning the braid as shown in Photo A. Tin the circumference of the braid in an area that will be under the solder holes in the connector. Tinning must extend well forward of the solder holes to allow knife cutoff of braid and center insulation as shown in Photo B. Cutting through the soldered portion of the braid requires a sharp knife and considerable pressure. Work around the cable using a rocking motion of the knife blade rather than slicing.

Place the knurled connector nut over the coax with the threaded portion facing toward the prepared end. Apply a small amount of silicone grease or petroleum jelly to the black outer insulation and thread the connector onto the coax. Make sure the tinned area is in full view in all four holes of the connector and that the center conductor is in view for soldering.

Photo A. Tin the braid in an area under the solder holes.

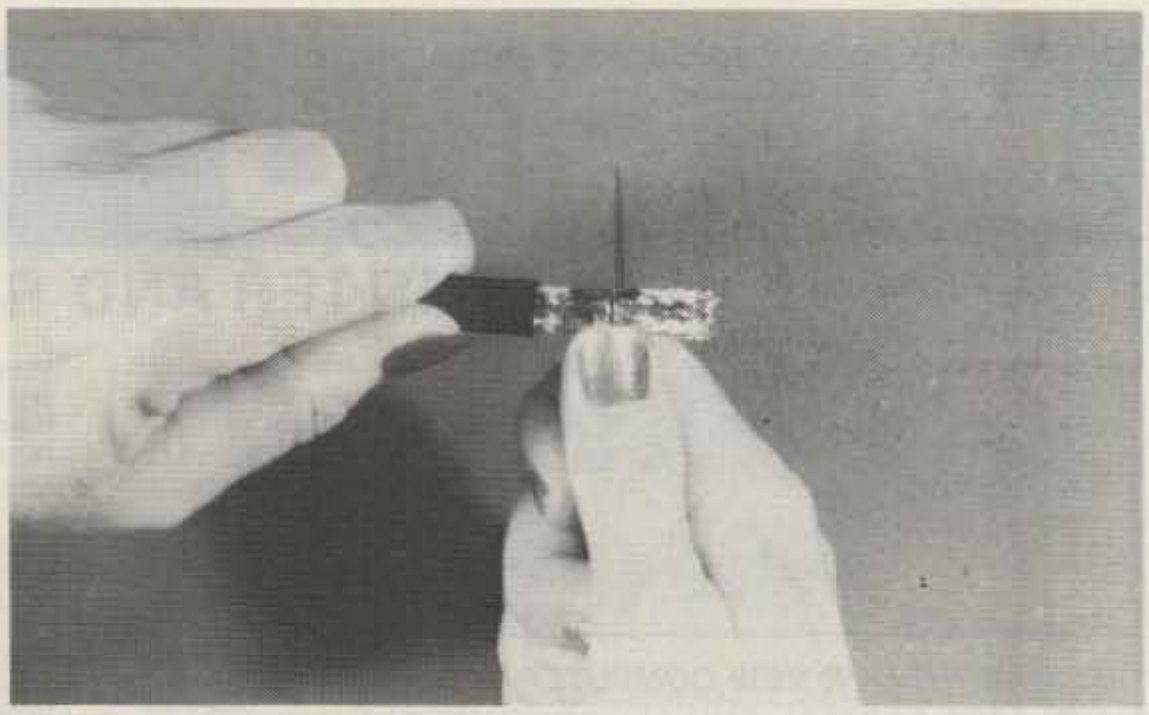

Photo B. Use a sharp knife to cut through soldered braid and insulation.

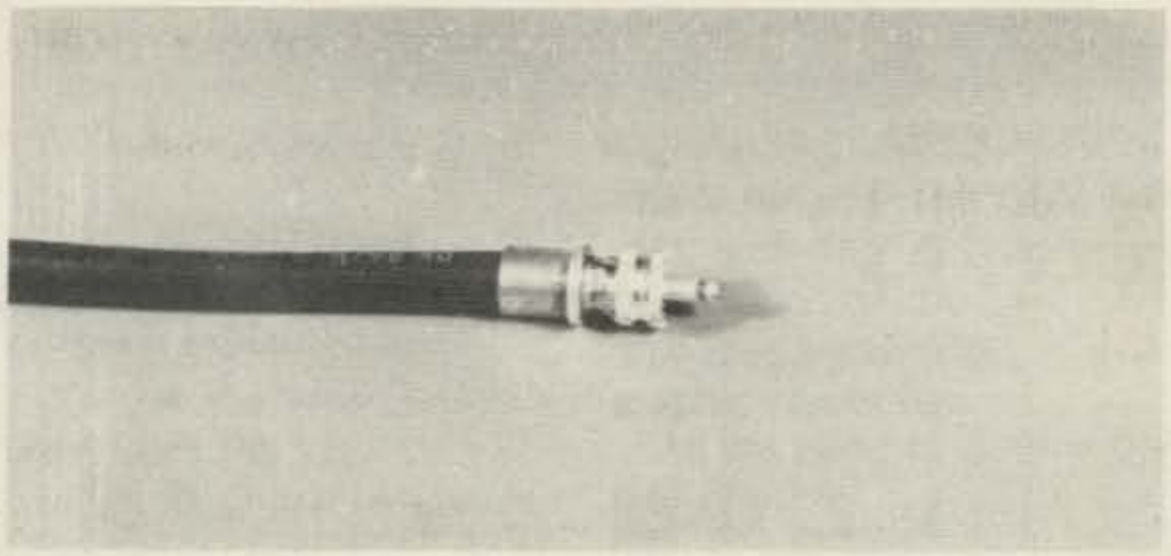

Photo C. Soldered connector with all holes filled. Use plenty of heat.

Photo D. Apply rubber tape with tension to conform to the irregular shape of connector.

Solder the Connector

Soldering must be done with enough heat to securely bond the coax shield to the connector. At least a 100-Watt soldering iron or gun is required to apply the necessary heat. Inadequate heat is responsible for most coax-connector problems.

Apply heat and then solder to each hole of the connector. Go from hole to hole around the connector with heat and solder. When the connector has absorbed enough heat, solder will freely flow into the holes and bond with the shield. It may take two or three passes in quick succession to achieve this. Next, solder the center conductor and allow to cool. The finished solder joints should be smooth and shiny—no solder beads or dull rough areas. See Photo C.

Now that your connectors are properly soldered, a check must be made to ensure that no shorts between the center conductor and shield have been created. A volt/ohmmeter, set on the 10k-Ohm range or higher and connected between center pin and body of the connector, should indicate infinite resistance if all is okay.

Protection Is a Must

Rf connectors used outside and exposed to the weather must be waterproofed to eliminate corrosion. Corroded connectors contribute to elevated swr and can radiate rf-causing TVI. A simple layer or two of vinyl electrical tape will *not* provide the necessary weather protection! The following method is used by radio technicians installing antenna systems in the Gulf of Mexico and can easily be applied by amateurs. I have used this method for eight years with no corrosion problems.

3-M Scotch® product numbers will be referred to, but other manufacturers' products are available to yield the same results.

Seal the Connector

The plug and receptacle portions of the connector must be joined firmly to provide a good electrical connection. The connector is now covered with a layer of Scotch No. 23 rubber splicing tape. Remove the protective backing and start wrapping 1/2" ahead of the connector on the coax. Stretch the tape at least twice its original length as you wrap, overlapping half the width of the tape, and continue the length of the connector. Be careful to fill voids and make the tape conform to the shape of the connector as in Photo D. This tape is both cohesive and adhesive and forms a solid covering.

A layer of Scotchkote® electrical coating is now applied liberally over the rubber tape for a sealer. See Photo E. This is a fast-drying liquid and imparts a waterproof seal. I have also used this type of sealant on bolted rf connections on antennas. It will coat the bolt and nut to retard corrosion and will allow removal of parts later. When the coating is almost tack free, start a layer of Scotch No.88 vinyl electrical tape on the coax just ahead of the rubber tape. The tape should be applied firmly with a slight amount of stretch. Continue down the connector, overlapping about half the tape width to the end, and then return in the opposite direction to the beginning. The last two wraps back at the beginning should be made with very little tension to avoid tape unwrap. Finally, one last coat of Scotchkote will seal the vinyl tape from moisture. Your finished product, in the case of a line splice, should look like Photo F.

This method should be used on all antenna connectors whether they be coaxial or coaxial cable terminated with screws and lugs. Also, many hams provide a splice connection at the tower to allow "fold-over." This splice should also be protected. ■

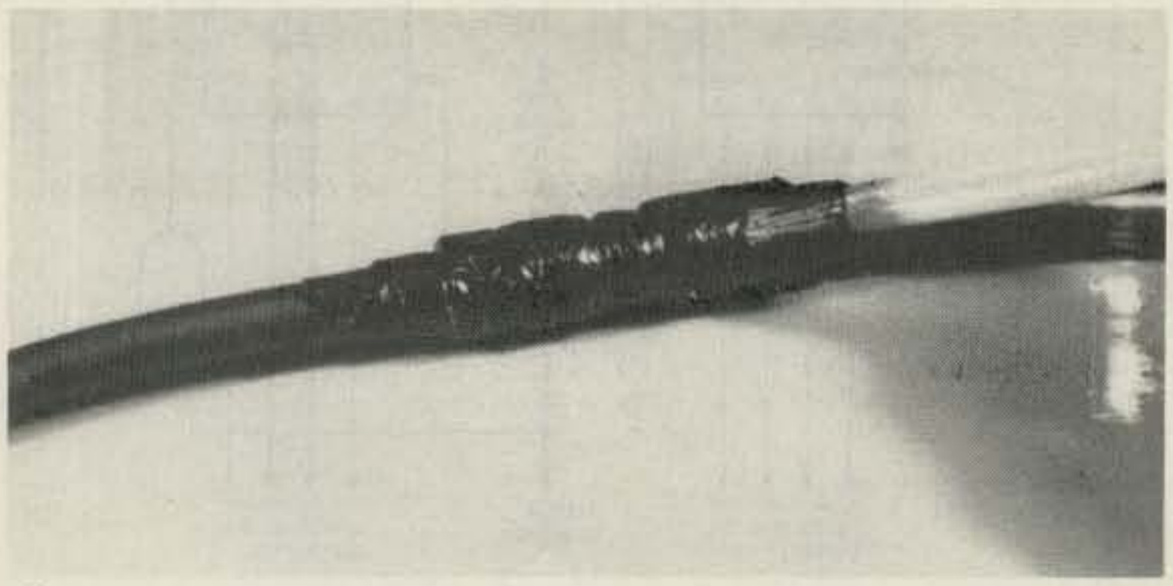

Photo E. Coat rubber tape with electrical sealer.

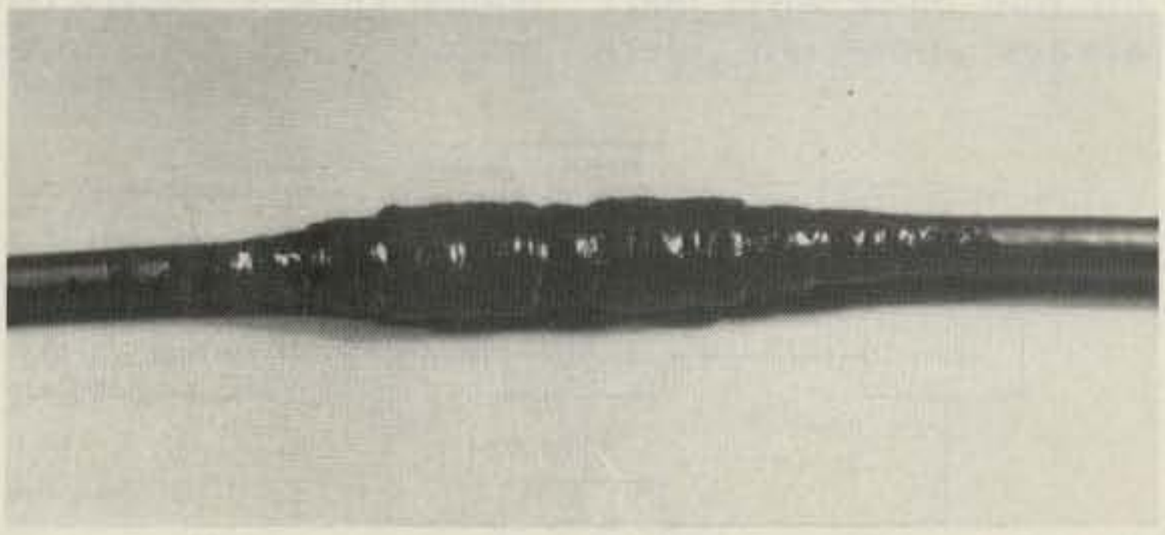

Photo F. Final covering of vinyl tape with outer coating of electrical sealer.