CDXA Newsletter

October, 1997

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Editorial

Recently, while sweating heavily atop one of the N4ZC towers, I had a moment's pause to consider the fate of our hobby, my role in it, life in general, & several other deep-seated questions. It was, as they say, profound.

Our hobby's received some interesting & positive exposure lately. Yet you continue to hear cries & wails bemoaning our fate. Probably part of it (the hobby, that is) is going to hell in the proverbial handbasket. Probably Wayne Green (God bless him) was right once upon a time—maybe incentive licensing was a mistake. I remain, however, unconvinced either view is complete. I remain positive about the hobby. I watched AE4PB work a PY5 Sunday afternoon as we wrapped up work at ZC's. The look on his face made the day. Not that my efforts at 120-feet had anything to do with Jerry's QSO, but the simple pleasure he found in working DX re-affirmed my belief this is one of the neatest hobbies ever. Period. For a few brief seconds, there was something magical taking place on the good old short waves. Jerry spent half the day thanking Roger & me. I took this to mean he felt he learned some things. If we had (or can find) just a few more folks with his interest & enthusiasm, then our hobby won't be going down the road in the proverbial basket. At least not so soon, nor perhaps as fast.

Let's somehow make a concerted effort to promote OUR club & get some new members. They HAVE to be out there—right here in the Carolinas. I think it's a job worth doing! I have no ready-made answers (unlike Mr. Green), merely this suggestion. One idea is to have a CDXA representative speak to other area clubs—shamelessly promoting ourselves & what we have to offer. I'll volunteer right now, if you know of a need.

Summer seems to have come & gone, although temperatures may indicate otherwise. The K4ZA antenna farm remains a fantasy. Some tower sections are here, right next to some aluminum. The public utilities have finally buried all the wires on my property. Now, if contest season weren't here, perhaps I could consider raising something. Plans & drawings & the odd walks around the property continue (with a guy location tool—figuring what can fit where). I'll probably be pouring concrete in the snow, in true ham fashion.

As we approach winter (gasp!), & sunspots seem to have finally returned, thoughts turn, naturally enough, to radio once again. As we approach the DX season, we should also consider our up-coming annual CDXA elections, the fate of this newsletter, the state of our PacketCluster network (modifications, new rigs & links, etc.), the club's budget, & certain other issues. By next month, a dummy CDXA World Wide Web "page" will be available for review. It's inevitable, I think, that CDXA have its own site, like other radio clubs. In the long run, it could save us money (in not sending the newsletter, for instance) & aid our recruiting efforts. Please take time to review it; full details in the next Pileup.

It's about to be the best of times, I believe. We'll leave the worst of times for consideration by Mr. Green & Mr. Dickens.

--K4ZA

Tech Tips

By now, many of you have overheard some of the repeater chatter regarding member-use of TV hardline. This coax has excellent electrical characteristics, is rugged, and is often free-for-the-asking. Its 75 ohm impedance sometimes stumps users, who believe they must use 50 ohm coax. The secret is to use an asynchronous transformer at each end of the 75 ohm hardline. (For those with extensive libraries, an explanatory article can be found in ham radio, September, 1978, p. 31.) Here's how :

1. start at your transmitter with 50 ohms
2. place .815 wavelength of 75 ohm coax (usually RG-11)
3. next, place .815 wavelength of 50 ohm coax (usually RG-213)
4. next, the hardline, any length necessary
5. next, another .815 wavelength of 50 ohm coax (again, usually RG-213)
6. next, another .815 wavelength of 75 ohm coax (again, usually RG-11)
7. then, end at your 50 ohm antenna

Make certain you are using the correct velocity factor for your RG-11 & RG-213 (it's best to measure): solid poly is .66; Belden foam is .78; PTFE is .694. (Obviously, such usage is designed for monoband antennas. Even if you do not use such transformers (ham are notoriously cheap & lazy), the SWR from the mis-match will only be 1.4:1, which is insignificant. Most DX/contest types are, however, using such antennas & trying to get maximize performance.)

For those who acquire such coax, here's a quick summary of how to create a good connector. (Again, those with good libraries may wish to consult ham radio, May, 1981, p. 50, for full details.)

Assuming your cable is ¾-inch, the first step to building a connector is to obtain some Amphenol PL-258 double female connectors. (Cheap imports will NOT work.) One end of the PL-258 is held on with a snap-retaining ring, inside the connector. Using a sharp pointed tool, remove this ring. (I use two dental picks. Be careful—these rings are apt to fly across the room. Patience & practice make perfect.) Insert the 258 metal shell into a copper plumbing fitting used to join ½-inch OD tubing to ½-inch threaded pipe. Leave a small amount of the 258's shoulder (about 1/32-inch) above the copper fitting. (Remember that ½-inch pipe is ¾-inch OD—the key to making this adapter.) Now, solder the

258 & pipe adapter together. (I use silver solder, but ordinary rosin core will work fine.) Turn your attention to the parts removed from the 258. Using a ¼-inch bit or reamer, ream out one of the insulators. Go slow; the plastic is brittle. A lathe is ideal for this, although not necessary if you're careful. Spread the prongs of one end of the 258 center conductor so it's a snug fit on the hard line center conductor. Don't do anything to the opposite end. Insert the smaller end of the reamed-out insulator into the new connector, followed by the spread end of the conductor. Insert the other insulator, small end up, and re-install the snap ring. On the hardline, with a sharp tubing cutter, cut off 5/8-inch of the aluminum jacket. Do NOT cut the foam insulation. Using a ½-inch pipe die, thread approximately ¾-inch of threads on to the jacket. Clean the threads, then trim off the foam (a sharp single-edge razor blade works well). Be careful you don't nick the copper plated aluminum center conductor. Carefully round the end of the center conductor. Fill the threads with NOALOX or other Al/Cu joint compound & thread your connector onto the hardline. You will feel when it's tight. Weatherproof as normal. Then test & install.

Solar Predictions

A slow, but steady increase in sunspot numbers & monthly 10.7 cm flux levels, as well as a rapid shift upward in solar activity within the past few weeks, make it clear Cycle 23 has begun. Scientists now say the minimum in smoothed monthly sunspot numbers was officially May 1996, with a value of 8.1. Scientists also agree that October 1996 should be considered the official onset date of Cycle 23. Here are their predictions regarding this new cycle:

- a smoothed monthly sunspot maximum of 160, ranging from 130 to 190
- a smoothed monthly 107 cm solar flux maximum of 205 with a range of 175 to 235
- a predicted date of maximum activity in March 2000, ranging from June 1999 to January 2001

This will be a large cycle. Not as big as Cycle 19, the largest known solar cycle, which reached a smoothed monthly maximum of 201 during March 1958. Good news, indeed! Thanks to N4UH for forwarding the Space Environment Center's User Notes.

Some More Words About Fasteners, Etc.

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Efforts in rebuilding & modifying antennas at N4ZC have reminded me I promised a few more words on this topic earlier this year. Herewith, some thoughts on:

HOSE CLAMPS

Hams who build any type of hf beam antenna will inevitably have to answer the question of "how to fasten" aluminum tubing together. Beam tubing joints, which can telescope together quite nicely, must be made solid, both mechanically & electrically. I recommend only top-quality worm-gear-type hose clamps with through slots. Clamps with "formed" slots are worthless. Stainless steel is the only way to go—for both the clamp & the screw mechanism. (Ideal & Trident are both quality brand names.) Look for hex-head type of screws—which can be turned either with a screwdriver or a 5/16-inch nutdriver. I usually try to put the screw itself directly over the slot in the larger tubing before tightening. And, I usually do not try to over-tighten these clamps. (I have broken them on occasion. One of these days, I promise I'm going to buy a torque wrench….) Aircraft manuals specify 15-inch lbs. of torque for hose clamps. And that's for a pressurized system. Something less than that will work fine for holding elements together. Obviously, I believe the mechanical joint is the fundamental building block. Electrical continuity can be obtained by driving a stainless steel sheet metal screw through the mechanical connection.

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CORROSION

Sometimes, when you take apart one of those nifty aluminum antenna joints, you'll discover some fine white powder at the connection. Since it takes a lot of energy to extract aluminum ore from the earth, then create that swell tubing we take for granted, it's easy to see how, in the long run, this metal will return to its natural, corroded state—as it "releases" all the energy we've put into it. In the air, aluminum oxidizes easily, forming aluminum oxide, that white power you encounter. Another type of corrosion hams encounter frequently is bi-metallic corrosion. This occurs when two metals with the right properties connect, & an electrolyte is present. It's a chemical process (which is sometimes hard for folks to grasp, since we're talking metals, but that's what it is—just like a battery). Simply put, electrons flow from one metal (called the anode) across the joint to the second metal (called the cathode). Hydrogen gas forms at the surface of the cathodic metal junction. Positive ions left in the anodic metal then oxidize. In bi-metallic joints, the more anodic metal always corrodes away. The electrolyte can be some kind of salt—anything which makes the joint conductive. Acid rain, even dew or salts deposited from your hands, are sufficient to start the process. I've included a chart of galvanic metal activity, which shows the electro-potential of these metals or alloys. They are listed by decreasing potential—from most anodic to most cathodic. Generally, it's best to choose those that are close together on the chart for trouble-free results. For instance, you can see that a junction of aluminum & zinc would be good, while a joint of aluminum & copper would be bad. (Now you know why those gold-plated edge connectors on one of your plug-in computer cards corroded so easily in the tin-plated motherboard socket.)

Remember that electrical connection means mating surfaces will have microscopic bumps & points where these metals meet. The joint impedance is proportional to the number of such points. Lots of points with little getting in the way means a good joint. For aluminum, I've found it's best to clean joints with steel wool, emery cloth, wet/dry sandpaper, or even a small wire brush if necessary. (ScotchBright scouring pads work well, too.) Do not contaminate the clean surface with your fingers after cleaning. Joint pressure is important because oxides start to form immediately after cleaning—the pressure must be great enough to "break" through this layer. As the metals flex, a phenomenon called "fretting corrosion" occurs, whereby the clean metal part of the open connection oxidizes & builds up. This is why antennas (which worked just fine when you put them up) sometimes seemingly fail all by

themselves up in the air. Joint compounds help seal these connections, & inhibit electrolytic activity. They are available from electrical supply houses, hardware stores, some home improvement warehouses (like The Home Depot), even a couple of antenna manufacturers ship them. These compounds will not, alas, last forever. They dry out; they harden & crack. Over time & through temperature variations, they will simply flow away from joints. Some sort of finish or overcoat is also a good idea. Choose something that will flex & resists ultraviolet light.

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SCOTCH 130

For the past three years, I've been using this product at Roger's antenna farm. It's a "linerless rubber tape" product which the electrical industry uses to seal high voltage connections. "Linerless" means there is no adhesive on this tape. It will NOT stick to connections. Indeed, as you peel it off the roll, it hangs limply in your fingers, & you're not sure it's going to be any use whatsoever. It does, however, stick to itself. It should be wound around connectors—starting from the bottom up like roof shingles—under tension. It stretches & molds itself easily around connectors, like PL-259s. It must be protected from the elements (we use Scotch electrical tape), but it works. It will take a few moments of effort to get a knife or blade sawing through the connector after a couple of years, but once you get an end loose, you can peel the whole mess away, & be surprised with a new-looking connector. It's somewhat expensive (I buy mine at Home Depot), but the ability to protect a connector & have it reusable is invaluable.

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SCOTCH LIQUID ELECTRICAL TAPE

Another quality Scotch product, although one I've only used for about a year. If you have the time to wait for it to set up, & the ability to brush it on to the connector (for instance, if you're not hanging upside down & backward 120 feet in the air), it works perfectly to seal the 130-tape-covered connector. It's also a good choice for covering normally exposed antenna electrical connections—such as the feedpoint. It solves the perennial mistake many hams make in using normal sealants or caulk. (If the sealer you use emits a vinegar-like smell, it's quietly dissolving your connections inside its silicon base. That vinegar smell is acetic acid, which doesn't do metal any good.) Try this liquid electrical tape for such joints.

--K4ZA

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FCC RF SAFETY UPDATE

As you may know, the FCC has passed some new safety regulations which will take effect on January 1, 1998. While you may have read about them, you may have had questions, felt further discussion or more extensive research and reference need be done. Naturally, some of what you were thinking about and looking for can be found right here on the Internet. Specifically, the university of Texas has a WWW page dedicated to this very topic. And, the site has an on-line calculator which will perform the necessary calculations for you - once you answer some mathematical questions. It can be found at http://www.cs.utexas.edu/users/kharker/rfsafety/

To read the actual FCC guidelines, visit: http://www.fcc.gov/oet/info/documents/bulletins/#65

We'll all have to know this information, and claim compliance whenever we renew or otherwise modify our licenses. Study, know, and get used to it!

A Review

Did you know one of our CDXA members was a cartoonist? I didn't. But Tom Irwin, N0IR (you may remember him as AA0ME) is the author of "Just When Tom Had Jean Convinced That His Friends Were Normal, He Took Her To A Hamfest," published by The Grandpa Press. Tom sent me a short note indicating he's been in the hospital & may have to give up ham radio. Naturally, this is shocking news. You may wish to send Tom a note of support. His very own book would be an appropriate gift—if it was someone else! Many of these 100 cartoons are "dead nuts on" when it comes to depicting some of the foibles of our hobby. The book's available for $5.95 (shipping is $2.00) from: The Grandpa Press, 3010 Pinecrest Road, Iowa City, IA 52245.

For those wishing to contact Tom directly: 3321 Woodwardia Drive, Charlotte, 28210. Or you might call 704.554.9986. From all of us, Tom, a heartfelt best wishes!

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