PCARA Update

Volume 14, Issue 10 Peekskill / Cortlandt Amateur Radio Association Inc. October 2013

Back and forth

For those of you wishing to take a trip down Memory Lane, I direct your attention to the *PCARA Update* link on the PCARA website (http://www.pcara.org/pcaraupdatenewsletter.html). Malcolm, NM9J has been busy scanning in old editions of the Update from the year 2000 into the archive. Once again I'm truly amazed by the ambitious goals that we set *and* met in those early days! Thanks Malcolm.

This year the PCARA Holiday Dinner will be taking place at a new venue. On December 1, 2013 at 5:00 pm, we will be meeting at the Cortlandt Colonial Restaurant at 714 Albany Post Road in Cortlandt Manor, NY — menu items and prices to follow.

Greg KB2CQE (left) checks out the reconstructed Samuel Morse telegraphy equipment during the talk by Bill, N1TIW at Candlewood ARA's Hamfest in September.

Just a couple of items to add to your calendars. The Bergen Amateur Radio Association (BARA) will be hosting their Annual Fall Hamfest on Saturday October 12, 2013 at Westwood High School in the Township of Washington, NJ. For more information visit the BARA website at: http://www.bara.org/.

On Saturday October 19, 2013 the New York QSO Party will take place. For rules and more information please visit: http://www.rdxa.com/. *[Also page 4 -Ed.]*

Our next meeting is on October 6, 2013 at 3:00 pm at Hudson Valley Hospital Center in Cortlandt Manor, NY. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

PCARA Officers

President:
Greg Appleyard, KB2CQE, kb2cqe *at* arrl.net
Vice President:
Joe Calabrese, WA2MCR; wa2mcr *at* arrl.net

Contents

Net night

Peekskill/Cortlandt Amateur Radio Association holds a weekly net on the 146.67 MHz W2NYW repeater on Thursdays at 8:00 p.m. Join net control Karl, N2KZ for news and neighborly information.

Henry, KB2VJP looks through components on sale at Candlewood ARA's Western CT Hamfest on Sept 8.

Adventures in DXing

– N2KZ

Could it be code?

If you just happen to be driving along at 5:15 am, listening to AM radio for stations far and wide, you might hear some interesting and unusual things. Start at the very beginning of the dial and listen closely. Most modern car radios begin their AM coverage at 530 kHz and with good ears you might just hear some Morse Code. A 25 watt privately owned aviation beacon is on the air waiting for you.

*Non-directional aviation beacon **LYQ** radiates 25 watts of CW from Manchester, TN on 529 kHz. The vertical flat top antenna is suspended between a pair of 150 foot towers.*

Broadcasting from Manchester, Tennessee, between Nashville and Chattanooga, aviation beacon LYQ is continually on the air. Operated by Aviation Transport Communications Incorporated, it shares the facilities of worldwide shortwave station WWRB. One of the mainstays there, Dave WA4SZE, describes LYQ as "25 watts, using a very good and extensive ground system. The antenna is a 150 ft high vertical flat top." It is an efficient installation. LYQ has been heard thousands of miles away!

The primary purpose of the station is to provide a radio signal reference for passing aircraft to verify their position in the sky relative to the LYQ beacon. The beacon slowly sends the letters L-Y-Q over and over again. I have been hearing it nearly every morning as it rises above an ethnic station in Ontario, a beautiful music station in Cuba and a handful of highway advisory stations around our metro area and beyond. It's quite a challenge!

Receiving a 25 watt beacon over this clutter is not easy! I am aided by a natural phenomenon well-known to medium wave DXers. Sunrise skip (SRS) is more of a strategy than a propagation mode. (Amateur radio operators often call this 'greyline' skip.) As the sun rises, stations to the east of you can no longer skip by sky wave due to an increase in ionospheric D-layer absorption as the sun appears. Think of it as a kind of natural filter that uses geography instead of bandwidth manipulation. SRS is predictable. It doesn't hurt to be listening in the right place at the right time!

SRS provides a nice advantage to the route between New York and Tennessee as all the activity in New England and locally attenuates for the duration of daylight. Want to reverse the effect? Wait until dusk when sunset skip (SSS) occurs. Stations from the east will accentuate alone before total darkness. If you want to hear a rare station in Maine or Maritime Canada, sunset would be an excellent time to try!

Beacon LYQ rises above the din nearly every greyline. If you are lucky, propagation towards Tennessee will also pickup during full nighttime hours and you'll be able to hear it then too. You logged a 25 watt station on medium wave from almost 800 miles away? Not bad! QSL requests can be sent to: Airline Transport Communications Inc., Listener Services, Box 7, Manchester, TN 37349, USA. Check out their informative web site at: http://www.wwrb.org .

Code Here!

A popular weekend NPR quiz show, 'Wait! Wait! Don't tell me!' features a few letters of code each week before their musical theme begins. This inspired me to discover other instances where Morse Code could be heard via the broadcast airwaves. I didn't realize there were so many! Morse is everywhere! Let me explain!

*NPR's radio quiz show begins with some slow Morse. (Is it: **AS C** ? AS=the prosign for 'Wait')*

A little bit of Internet research will reveal a multitude of places to hear beeps. Malcolm, NM9J, provided me with several lists of code leaks! Here is a sample of what you might hear: Probably the most startling and unintentional Morse Code can be heard in a hospital room. Heart monitors drone on sending e – e – e over and over again. When it switches to an endless T, big trouble is ahead! Telephone ringtones can send all sorts of messages: 'Connecting People,' 'CQ,' 'message,' and '73.'

Of course, the theme to the vintage TV series 'Inspector Morse' had the word "M-O-R-S-E" melded into the music. The Canadian rock band Rush recorded an instrumental called YYZ. It's a tribute to Toronto's Pearson International Airport and its aeronautical VHF VOR-DME beacon both known as YYZ. Possibly the ultimate Morse Code tribute is the 'CQ Serenade' found at: http://www.f8au.org/CQSerenadeG.mp3. The words and music were penned around 1951 by the late Maurice Durieux VE2QS, played by Maurice and his orchestra and featured vocals by Joyce Hahn. If you really want an eyeful of code, refer to an amazing document encompassing dozens of hams recollections of code injections: http://www.eham.net/articles/13934. You'll begin to believe Morse Code is everywhere!

'Mystery' series "Inspector Morse" has Morse code incorporated into the theme music.

Code Net Update

The QSY Society's CW practice net has changed days. Look for Scott, W2NTV, now on Wednesday nights at 9:00 pm Eastern (0100 UTC Thursdays) on 80 meter CW at 3576 kHz. This net is for beginning CW operators and anyone who wants to polish up their sending and receiving skills. All licensed amateurs can participate, including Technicians. Technicians must restrict their output power to 200 watts. Slow code is spoken here, so there is nothing to fear! Tune in and join in next Wednesday night!

Creepy?

You might find this creepy or wonderful. Either way, it is really amazing technology. Take a look at the world of Reverse Beacons at http://www.reversebeacon.net/main.php. This site uses software originally created to log and record reception of beacon transmitters over a long period of time. It has now been adapted to keep track of any given amateur radio band, along with signal reports and even maps graphically showing who is chatting with who. Get on the air and send CQ. If one of their monitoring stations hears you, you'll see your call and your QSO correspondents in their database. Creepy? Useful? You decide!

I have found this to be an interesting tool for DXing faraway places. It is a couple of levels beyond the plain text DX Spot sites you may be familiar with. If you are looking to log a particular station or needed country, it is a great place to research when and where you may be able to log it. Reverse Beacon also includes a useful greyline map to add another aspect to aid your strategies. You can filter their database by bands and even single callsigns. I've seen my QSOs show up via several of their monitors and I can see just how strong my signals were.

It really is pretty amazing.

Web site of the Reverse Beacon Network.

For another treat, try Remote Hams at: http://beta.remotehams.com. Download their free RCForb software and you'll be able to operate amateur radio transceivers and receivers all over the world. Upload a copy of your license and many of the remote operator volunteers will even allow you to transmit over their facilities. I use Remote Hams every week to check in to The Michigan Thumb Net (3950 kHz 75 metre SSB at 8 am Eastern 1200 UTC) while sitting at a laptop at work in Stamford, Connecticut. I remote into a transceiver located in mid-Michigan. The laptop allows me to listen and talk as if I were sitting in the remote's shack. It's almost like being there! My buddies still can't figure out how I do it, but it sure is a lot of fun.

Using remote receivers also allows you to hear exactly what your signal sounds like from afar. It's fun to compare your antennas or different rigs to see if you can reach a particular area. There is a slight lag between your sending and what you hear via your computer due to Internet delay. It gives you a few seconds to hear yourself echo back for your consideration and analysis. It is very useful technology. Try it for yourself!

Don't forget The Old Goat's Net, every Thursday night at 8 pm on the two metre PCARA repeater at 146.67 MHz -600 offset with a 156.7 PL. Someone who sounds just like me often chairs the net. We

discuss current events, DX strategies, try to answer trivia questions and ragchew over our topic of the week. A good time is had by all. Please join us!

Until next month, 73s and dit dit from N2KZ.

Surface mount

Henry, KB2VJP has been investigating surface mount components. He recommends the following helpful hints from Ramsey Electronics for SMT work:

- Use a 25 watt soldering pencil with a clean, sharp tip.
- Use bright lighting — a magnifying lamp or bench-style magnifier may be helpful.
- Do your work in stages, taking breaks to check your work.

There are instructions on the assembly of SMT kits available on Ramsey's web site, for example see: http://www.ramseyelectronics.com/downloads/manuals/MR6.pdf.

Ramsey also offers its inexpensive SM200K "Practical SMT Soldering Course" which includes construction of a surface mount "Decision Maker" kit. See http://www.ramseyelectronics.com/cgi-bin/commerce.exe?preadd=action&key=SM200K

Ramsey's SM200K surface mount soldering course includes this electronic "decision maker" kit.

Henry suggests the following Internet video sites as being very informative:

- A 9 minute video showing the basics of SMT soldering and de-soldering without expensive equipment: http://store.curiousinventor.com/guides/Surface_Mount_Soldering
- A 14 minute video on Surface Mount Soldering Techniques: http://tangentsoft.net/elec/movies/tt03.html

New York QSO Party

The New York QSO Party takes place this year on the third Saturday in October, October 19th. Start and end times are from 10:00 a.m. EDT to 10:00 p.m. EDT.

New York stations should try to work as many contacts as possible with other stations both inside and outside New York State. For stations within New York, the exchange consists of Signal Report plus County, using a three-letter code. Westchester's code is WES and Putnam County is PUT. Stations outside New York will send signal report plus State.

There are additional points for CW contacts (2 points each) and for RTTY/digital contacts (3 points each). Multipliers can be claimed for US States, for the 62 NY Counties and for Canadian Provinces worked.

Bands include 160 - 10 meters HF plus 6 meters and 2 meters on VHF. There are entry classes available for school, youth, rookie, YL and rovers.

Rochester DX Association sponsors the NY QSO Party and arranges plaques for various leading band entries. PCARA has sponsored the New York Phone plaque in the past and hopes to sponsor another plaque this time around. Further details are available at http://nyqp.org .

Wire antennas and insulation

Antenna adages

Measure twice...

Two practical suggestions when building wire antennas are as follows:

"Measure twice, cut once" - followed by -
"Always start with a longer length, then trim it shorter".

The reason for these rules is... it is much easier to *remove* a short section from a wire antenna — to bring it to resonance — rather than trying to *lengthen* a wire which has already been cut too short.

Fold and twist

A trick that I have used with HF wire antennas is to cut the wire length 3 - 6 inches longer than needed,

then thread the wire through the end-insulator and wrap it back on itself with a twist. This allows easy adjustment of the effective wire length before the antenna is permanently installed. Wrapping and unwrapping some of the twisted wire allows fine control of the resonant frequency.

Wire antenna with excess wire threaded through the end insulator, folded back then twisted round itself.

If the antenna has been assembled from **bare** copper wire, then folding the wire back on itself will result in the metal surfaces touching. The effective length of the antenna wire will then be to the tip of the loop of wire that is folded through the hole in the end insulator. This loop of wire adds some extra capacity to the end of the antenna. Once the correct length of wire has been determined, the copper wire should be permanently wrapped back onto itself, the wire joint should be soldered, then protected from corrosion.

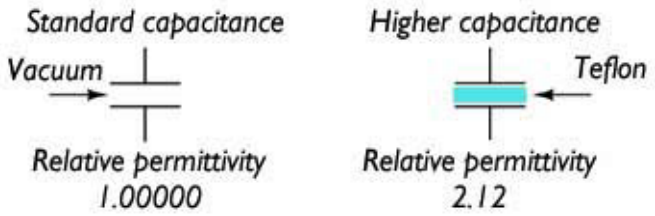
Antenna with bare copper wire threaded through the end insulator then twisted back on itself.

But what happens if the antenna has been assembled with *insulated* wire? Where is the effective end of the antenna when the folded back metallic conductor is not touching the main wire, but is instead separated from it by the insulating sheath? I have used this method of construction with insulated wire antennas for a long time. Commercial antennas also use insulated wire with great success.

The effect of wire insulation on antenna performance is scarcely mentioned in the amateur radio handbooks and antenna books. The only advice I have found is that the presence of insulation may shorten resonant length of a wire dipole by 3 to 5% (*Practical Wire Antennas* by John Heys, G3BDQ, published by RSGB). We'll need to take a little side tour into the underlying physics to understand what is going on.

Permission to leak

When choosing an insulator for a radio frequency application, there are two important physical properties of the insulating material. The first property is the **relative permittivity**, also known as the dielectric constant, with its mathematical symbol the lower-case Greek letter ε (epsilon). The dielectric constant is defined as the ratio of the capacitance of a capacitor with the insulating material as dielectric compared to the capacitance of the same capacitor with a vacuum as dielectric.

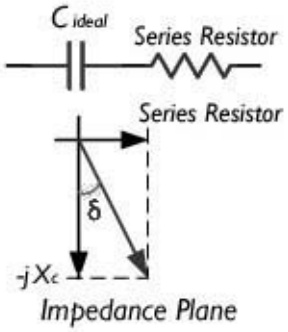


The relative permittivity or dielectric constant for a perfect vacuum is by definition 1.000. Insulating materials will always have a higher value... here are a few examples.

	Relative permittivity ε
Vacuum	1.000000
Dry air	1.000576
Teflon	2.12
Polyethylene	2.30
Polystyrene	2.55
Rigid PVC	2.8
Plasticized PVC	3.0

The second important property of an RF insulator is the **dissipation factor**, defined as the ratio of energy dissipated in the insulator to the energy stored in the dielectric material in every cycle of alternating current. For a perfect insulator, the dissipation factor is zero. For real materials, the value is a small number, between zero and 1.

A real capacitor can be represented as a perfect, lossless capacitor in series with a lossy resistor. Presence of this series resistor causes the complex impedance to deviate from the ideal capacitive reactance $-jX_c$ by a small angle δ (Greek letter lower-case delta). The dissipation factor is then equal to the geometric tangent of the loss angle δ. Dissipation factors of insulating materials are often listed in tables as the "loss tangent" or "tan δ" values.



Loss tangent of a dielectric. A capacitor with a lossy dielectric can be represented by an ideal capacitor in series with a resistor. The series resistance rotates the complex impedance vector away from the purely capacitive axis (-j) toward the resistive axis by the loss angle δ. Dissipation factor = tan δ

Dissipation factor for an insulating material is dependent on both frequency and temperature. (Relative permittivity is also affected by these variables.) Here are some Dissipation Factors for the

same insulators listed before.

	Dissipation factor, tan δ
Vacuum	0.000000
Dry air	0
Teflon	0.0002 (1 MHz - 3 GHz)
Polyethylene	0.0002 (1 MHz - 3 GHz)
Polystyrene	0.00007 (1 MHz) - 0.00033 (3 GHz)
Rigid PVC	0.016 (1 MHz) - 0.005 (3 GHz)
Plasticized PVC	0.074 (1 MHz) - 0.0106 (3 GHz)

Loss management

What do these numbers mean in practice for radio amateurs? First, the relative permittivity value for an insulating material can be useful when trying to squeeze more capacitance into a small space. Teflon, (polytetrafluroethylene), polyethylene and polystyrene are all good insulating materials with permittivity (ε) values around 2, widely used in capacitors or wire insulation for radio frequency applications. There are some special ceramic materials with *much higher* relative permittivities — for example barium titanate has ε ≅ 1000 at 1 MHz and 600 at 3 GHz. Ceramic capacitors based on these dielectrics have high capacity in a small volume.

4700 pF ceramic capacitors.

When choosing a good insulating material for high power radio-frequency applications, the **dissipation factor** is the more significant number. Teflon, polyethylene and polystyrene are non-polar materials with very low dissipation factors across the range of radio frequencies of interest to radio amateurs. They are widely used in RF applications. Teflon is a near-perfect insulator with very low loss, high melting point and high breakdown voltage. Its major drawback is high expense due to difficulty of manufacture and molding.

In contrast, polyvinyl chloride (PVC) is inexpensive, but it has a much higher dissipation factor than Teflon, and could be a poor choice for most RF applications. Our local Home Depot is well stocked with PVC pipe and fittings for plumbing, drainage and conduit as well as PVC-insulated cable for electrical and phone installations. In your editor's view, insulated copper wire is desirable for HF antennas because the insulation slows down corrosion of the copper surface and protects the wire from undue strain and abrasion at the support points. So – should we embrace PVC or avoid it as an RF insulator?

David Knight, G3YNH has an excellent web site (http://www.g3ynh.info/index.html) where he considers RF power transmission and matching in detail. He singles out **PVC**, especially plasticized PVC, as a very poor dielectric and provides several examples of its mistaken use in amateur radio — for example, for coils wound on PVC pipes, possibly with PVC-covered wire; the use of PVC-insulated wire in baluns and in twin-lead antenna feeder; and the use of PVC adhesive tape in a high RF field.

PVC past

Early in my career, I was involved in formulating and testing PVC (polyvinyl chloride). An important point is that flexible PVC — as used in cable insulation and electrical tape — is quite different from rigid PVC — which is used in pipe and fittings. Neither manufactured product consists of *pure* polyvinyl chloride. Rigid PVC products will usually include processing aids, lubricants, pigments and fillers. Flexible PVC will also contain plasticizers, plus optional extenders. Both varieties *must always* include a heat stabilizer to prevent thermal decomposition during processing and to promote subsequent UV stability. PVC formulations can vary widely depending on the supplier and the intended application.

PVC resin

My own advice would be to avoid PVC as sole insulator whenever the PVC is in a **high intensity, radio frequency electrical field**. This would exclude PVC pipe from use as a coil former, PVC twin lead from use as an antenna feeder and PVC-covered wire from use in close-wound inductors. Use of PVC electrical tape over such a coil is also not recommended. However, use of flexible PVC as insulation on a wire antenna for HF, strung in the air, should be fine.

Wires in the air

In the amateur radio literature, there are a couple of papers suggesting that PVC-insulation of copper wire should not be a problem for HF wire antennas.

The article "Conductors for HF Antennas" by Rudy Severns, N6LF compares the Q of a wide-spaced inductor wound with different types of antenna wire. There was no difference in Q-value at 1.8 MHz when comparing 12 gauge bare, solid copper wire with the same size insulated wire. The article also indicates that solid copper wire is superior to stranded wire and to Copperweld. *Iron* wire should be avoided. See: http://rudys.typepad.com/ant/files/antenna_wire_conductor.pdf for full details.

In another article, "Insulation Revisited", the late L.B. Cebik, W4RNL calculates the properties of wire antennas with various insulating sheaths using NEC/EZNEC modeling software. See: http://w4rnl.net46.net/amod116.html for details. With a half wave wire dipole for 30 MHz, increasing the relative permittivity of the insulation caused a reduction of the dipole's resonant resistance. Use of 1 mm thick insula-

tion with relative permittivity =3 over 2 mm dia. copper wire (similar to 12 gauge insulated wire) reduced the radiation resistance from 72 ohms to 68 ohms. The velocity factor dropped from 1 to 0.96, meaning the resonant length would decrease by 4%. (See the original article for LB's actual curves.)

W4RNL's models showed that increasing the dissipation factor (loss tangent) of the cable insulation from 0.0005 to 0.05 (typical of flexible PVC) increased the resonant resistance from 68 ohms to 69 ohms, and was just starting to have an effect on the antenna's efficiency. For materials with lower dissipation factors than 0.05, the cable sheath is relatively transparent to RF. W4RNL points out that since losses increase with frequency, this modeling at 30 MHz is a worst-case scenario for the whole HF range (3-30 MHz). At the higher VHF frequencies (30-300 MHz), resistive dissipation will increase in proportion to the frequency.

A practical test

No matter what theory tells us, one of the great things about amateur radio is that we can always "do the experiment" to confirm antenna predictions. I carried out some simple tests on a dipole antenna for the two meter band using my MFJ-259 antenna analyzer to measure the resonant frequency.

All measurements were made with 12 gauge solid copper wire from Home Depot which was either covered in THHN insulation or stripped to the bare metal. THHN stands for **T**hermoplastic **H**igh **H**eat-resistant **N**ylon-coated. This means the copper wire is covered in PVC insulation, with a thin nylon outer jacket for easy pulling and abrasion resistance.

We'll start with a bare wire dipole antenna for 146 MHz. Using the formula for dipole length in feet = **468/*f*** (MHz), this antenna would normally be approx. 38½ inches long. This was confirmed with an actual bare copper wire antenna, 38½ inches long, which resonated on 147.2 MHz.

If the wire for this dipole antenna is deliberately cut 12% oversize to **43 inches**, the resonant frequency for the full-size dipole was measured at 129.7 MHz — which is 12% lower in frequency. Folding the ends of this dipole back on themselves, with the copper surfaces touching and an overall length of 38½ inches moved the resonant frequency up to 143.1 MHz.

Experimental set-up for measuring the resonant frequency of insulated wire antennas. The horizontal dipole is supported on a camera tripod and connected by coaxial cable to an MFJ-259 Antenna Analyzer.

Substituting PVC-insulated wire in place of the bare copper wire, I cut the same end-to-end length of 43 inches. The resonant frequency was 122.7 MHz. This is about **3.5% lower in frequency** than with the bare copper wire. This shift in resonant frequency for a dipole made of insulated wire is in line with G3BDQ's comment and W4RNL's prediction for the velocity factor.

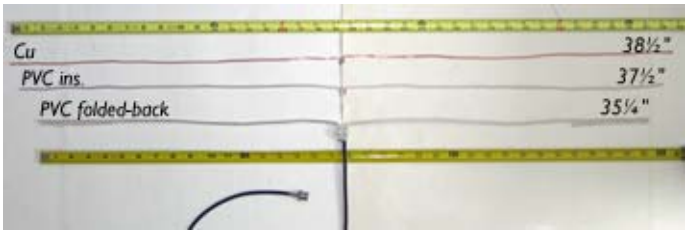
Tests were carried out using THHN insulated copper wire from Home Depot.

In order to raise the resonant frequency into the amateur band, the insulated wire had to be folded back, for an overall length of 35¼ inches. This raised the resonant frequency to 146.6 MHz.

Oversized dipole antenna made from PVC-insulated wire had its ends folded back for an overall length of 35¼".

Staying with PVC-insulated wire, if we *begin* with a length of 38½ inches, the resonant frequency is 142.0 MHz. Once again, this is about 3.5% lower than the resonant frequency with bare copper wire. In order to bring resonance up to 144.8 MHz it was necessary to shorten this antenna to 37½ inches end-to-end. This is the middle wire in the comparison photo below.

Bandwidth of these dipoles was around 5% for an



Comparison of resonant half-wave wire dipole lengths for the 2 meter band. The top antenna is 12-gauge bare copper wire cut to a length of 38½ inches. The middle antenna is PVC-insulated 12-gauge copper wire, cut to 37½ inches. The bottom antenna was cut too long, from PVC-insulated wire, then folded back, for an overall length of only 35¼ inches.

SWR less than 1.5:1. Resonance of the oversize PVC-insulated dipole at 122 MHz was not quite as sharp as for the other antennas. This suggests there might be some effect on antenna Q for PVC insulation at *VHF*.

Conclusions

Use of PVC insulated wire for **HF** antennas should not cause any problems. The resonant length will be 3-5% less than for bare metal. Folding the ends of the antenna back to shorten the effective length should also be satisfactory for a temporary setup, but for a permanently installed antenna, I would recommend soldering the wire end back on itself. With insulated wire, this will require removal of a small amount of insulation prior to soldering, followed by protection of the soldered joint from corrosion. You can use lacquer or heat-shrink tubing to cover the joint.

Commercial antenna with PVC-insulated wire threaded through an egg insulator. Insulation has been removed from the wire so the end could be wrapped around exposed conductor and soldered. The soldered joint is covered with heat-shrink tubing for added strength and corrosion protection.

If you are making wire antennas for VHF or UHF, then PVC-insulated wire is probably satisfactory, but you may prefer to use bare copper wire, or polyethylene-insulation. I would avoid use of PVC tubing as a shroud or "radome" for VHF and UHF antennas, unless you can be sure of the relative permittivity and dissipation factor of the material at the actual frequency of use. As a minimum, use of a PVC shroud will lower the resonant frequency of the antenna housed within, requiring an adjustment to the element length. And PVC tubing could be more or less lossy, depending on its formulation. Note that dark-colored tubing could be loaded with a conductive pigment such as carbon black.

A test for excessive dissipation has been suggested in which a sample of the insulating material is placed in a microwave oven, along with a container of water for safety. If the insulator stays cool, then it is not absorbing RF. However, G3YNH does not recommend this test as it only indicates losses *at the frequency of the microwave oven*, 2.45 GHz. As mentioned earlier, dielectric properties can vary greatly with frequency, especially with polar insulators.

Bear in mind that professional antennas for VHF and UHF use a *glass-fiber* tube to cover the radiating element. Fiberglass tubing is available from vendors such as DX Engineering and Max-Gain Systems. (See http://www.dxengineering.com/search/product-line/dx-engineering-fiberglass-tubing and http://www.mgs4u.com/fiberglass-tube-rod.htm)

- NM9J

Twisted-pair trouble

Henry, KB2VJP draws our attention to a recent move by Verizon to replace copper land lines with wireless technology in New York. The story begins in late October 2012, when parts of New York and New Jersey were hit by Superstorm Sandy and copper phone lines were destroyed on the barrier islands. Verizon asked the New York Public Service Commission for a variation to its tariff, allowing the company to provide voice telephone service by an alternative method.

The New York PSC said that prior to Sandy, Verizon had provided voice service to about 3,800 access lines on Fire Island, including about 2,700 lines in the western portion where a large percentage of its copper facilities were damaged "beyond repair". In addition, five of the six feeder cables that run between Fire Island and the mainland were badly damaged by Sandy.

Two steps back

In May, Verizon said it would not replace existing wireline infrastructure in western Fire Island, but would instead provide "Verizon Voice Link" service to its affected customers. Voice Link is a 4 × 4 inch wireless device with a 4 inch antenna which is installed in the customer's home or business. The device is wired into an electrical outlet and into an existing phone jack, which then connects to the other jacks in the building. The device accepts AA batteries or a rechargeable battery pack in case of a power outage. Three AA batteries provide 36 hours of standby time.

Verizon Voice Link as installed on Fire Island.

Instead of using twisted pair phone lines, calls over Voice Link are made through Verizon's cellular wireless network. Verizon states that Voice Link offers Call Forwarding, Caller ID, E911 and Voice Mail. Although compatible with answering machines, Voice Link is **not compatible** with any data services, including

dial-up modems, monitored alarm security systems, fax machines, DVR services, credit card machines and medical alert services such as the "Life Alert" pendant. For customers who previously enjoyed DSL data service over their copper phone lines, Voice Link does not provide any Internet connectivity.

In May 2013, the New York Public Service Commission authorized Verizon to offer wireless Voice Link service, as an alternative to basic landline service, for customers on Fire Island whose copper wire facilities were destroyed by Sandy. This was to be an *interim* measure, using Fire Island as a trial, while interested parties could observe and contribute to the discussion.

Critical comments

The labor union "Communications Workers of America" (CWA) was unhappy with Verizon's proposed tariff amendment, saying the scope was much wider than just affected customers on western Fire Island. If approved, Verizon could apply their "Voice Link" technology in other parts of New York State whenever copper service was degraded and in non-emergencies wherever Verizon could show that wireless service was a reasonable substitute. CWA pointed out the deficiencies of "Voice Link" wireless service, including its reliability under peak conditions, the effect of power loss, lack of Internet service, plus incompatibility with home health monitoring, alarm systems and credit card authorizations.

New York's Office of the Attorney General also raised objections to the proposed tariff, fearing that Verizon would abandon its copper landline network in rural areas across New York State. The submission from the Attorney General's office quoted this 2012 statement by Verizon Chairman and CEO Lowell McAdam:

"The vision that I have is we are going into the copper plant areas and every place we have FiOS, we are going to kill the copper. We are going to just take it out of service and we are going to move those services onto FiOS. We have got parallel networks in way too many places now, so that is a pot of gold in my view. And then in other areas that are more rural and more sparsely populated, we have got LTE built that will handle all of those services and so we are going to cut the copper off there. We are going to do it over wireless."

AARP New York also weighed in against Verizon's plans for Voice Link. AARP pointed out that the new service jeopardized public safety because it is incompatible with Life Alert systems and security systems – crucial safety measures for older consumers. It also opened the door to Verizon eliminating copper landlines statewide by allowing its copper network to deteriorate. This could jeopardize consumers' safety because dial tone might not function when needed to reach the emergency services.

On August 14, the FCC refused to automatically grant Verizon's request to replace landline service with wireless service on New York and New Jersey barrier islands affected by Sandy, saying that objections to the plan meant it needed further review. The Commission requested further data on the performance of Voice Link compared to copper phone lines and on the reliability of Voice Link for 911 emergency calls.

During a four-hour NY Public Service Commission hearing in Ocean Beach, LI on August 24, Fire Island residents described their problems with Voice Link including difficulty with 911, dropped calls, poor sound quality and difficulty receiving and making calls. Businesses described problems with lack of a busy signal when their Voice Link line was in use. Certain numbers could not be dialed and the lack of DSL Internet was a major inconvenience. The suggested alternative Internet service using fixed wireless was far too expensive.

Reversal of fortune

Following the volume of disapproval comments, Verizon announced a turnaround in its approach on September 10-11. In a further submission to the NY Public Service Commission, Verizon said it has decided to re-build its wireline network in western Fire Island with completion scheduled for Memorial Day 2014. In the interim, it would offer Voice Link only on an optional basis, rather than as sole service in the area. Verizon's new "wireline" network for Western Fire island would be based on its FiOS fiber optic technology, with FioS digital voice service available alone or in a package with FiOS Internet. FiOS televison would *not* be available. The tariff amendment submitted by Verizon also eliminated the offering of Voice Link as sole service in other areas of New York where the company's copper facilities had been substantially destroyed.

Verizon's policy reversal was widely welcomed by local politicians. The Communications Workers of America union was also positive, pointing out that Verizon should *expand* its investment in fiber optic, high speed broadband, which provides greater capacity for Internet use than wireless systems. AARP welcomed Verizon's change of heart in New York, but pointed out that Voice Link is still in Verizon's plans for New Jersey.

It is also worth noting that – compared with copper lines – FiOS phone service only offers limited battery backup time during a prolonged power outage. And Verizon expects consumers to change the sealed lead-acid battery in the battery back-up unit *themselves* after the battery fails.

- NM9J/KB2VJP

Battery backup unit for a Verizon FiOS Optical Network Terminal provides voice service backup for up to 8 hours.

Peekskill / Cortlandt Amateur Radio Association

Mail: PCARA, PO Box 146, Crompond, NY 10517
E-Mail: w2nyw@arrl.net
Web site: http://www.pcara.org

PCARA Update Editor: Malcolm Pritchard, NM9J
E-mail: NM9J @ arrl.net
Newsletter contributions are always very welcome!
Archive: http://home.computer.net/~pcara/newslett.htm

PCARA Information

PCARA is a **Non-Profit Community Service Organization.** PCARA meetings take place the first Sunday of each month* at 3:00 p.m. in Dining Room B of the Hudson Valley Hospital Center, Route 202, Cortlandt Manor, NY 10567. Drive round behind the main hospital building and enter from the rear (look for the oxygen tanks). Talk-in is available on the 146.67 repeater. *Apart from holidays.

PCARA Repeaters

W2NYW:	146.67 MHz -0.6, PL 156.7Hz
KB2CQE:	449.925MHz -5.0, PL 179.9Hz
N2CBH:	448.725MHz -5.0, PL 107.2Hz

PCARA Calendar

Sun Oct 6: PCARA monthly meeting, Hudson Valley Hospital Center. 3:00 p.m.

Hamfests

Sat Oct 12: Bergen ARA Hamfest, Westwood Regional High School, 701 Ridgewood Rd., Washington Township, NJ. 8:00 am.
Sun Oct 13: Nutmeg Hamfest/ARRL Convention, Sheraton Four-Points Hotel, 275 Research Parkway, Meriden, CT. 8:00 am.
Sun Oct 20: ***Revised date.*** Hall of Science ARC Hamfest, NY Hall of Science, 7-01 111th Street, Flushing Meadow, Corona Park, Queens, NY.

VE Test Sessions

Oct 5: Yonkers PAL Ham Radio Club, 127 N Broadway, Yonkers NY. 2:00 pm. Contact: M Rapp, 914 907 -6482.
Oct 6: Yonkers ARC, Yonkers PD, Grassy Sprain Rd., Yonkers. 8:30 am Contact D Calabrese, 914 667-0587.
Oct 10: WECA, Westchester Co Fire Trg Cen, 4 Dana Rd., Valhalla, NY. 7:00 pm. S. Rothman, 914 831-3258.
Oct 12: BARA Hamfest, Westwood Reg HS, Washington Township NJ. Donald C. Younger, (201) 265-6583. 8:00 am.
Oct 21: Columbia Univ VE Team ARC, 531 Studebaker Bldg, 622 West 132nd Street, New York, NY. 6:30 pm. Alan Crosswell, 212 854-3754.

Peekskill / Cortlandt Amateur Radio Association Inc.
PO Box 146
Crompond, NY 10517