# PCARA Update

Volume 16, Issue 4 Peekskill/Cortlandt Amateur Radio Association Inc. April 2015

## Treasures hunt

On April 19, 2015 you will have an opportunity to clean out your shack (a Spring cleaning) and maybe make a little extra cash as a result. PCARA has taken a table at the Orange County Amateur Radio Club Spring Hamfest on the same date at the Town of Wallkill Community Center at 2 Wes Warren Road in Middletown, NY. Bring along any treasures you have, and try to sell them. For event details, please visit OCARC's website at: http://www.ocarc-ny.org/. See you there.

*Mike N2HTT and Lovji N2CKD stand behind PCARA's well-stocked Club Table at the 2014 Orange County ARC Hamfest.*

What are you doing on May 9, 2015? Hopefully the PCARA Fox Hunt is on your "To Do" list! Rumor has it that the Fox for this event has been planning something special. Knowing Karl, N2KZ it is sure to be most interesting. You'd better polish up those Yagis now, you're going to need them — see the article on page 9. Rules for the Fox Hunt will be published in the May 2015 edition.

The possibility of a Special Event Station sometime over the Summer/Fall is still under investigation. If you have any ideas, please bring them along to the April 2015 meeting.

The weather is looking better for installation of the new antenna for the 449.925 MHz repeater. We will be discussing the details and trying to schedule a date at the April meeting. If you are interested in helping out, just let us know.

The first Sunday in April falls on a holiday weekend so our next regularly scheduled meeting is on **Sunday April 12**, 2015 at 3:00 pm at New York-Presbyterian / Hudson Valley Hospital. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

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Greg Appleyard, KB2CQE, kb2cqe at arrl.net
Vice President:
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## 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.

# Adventures in DXing

**- N2KZ**

### It Never Fails

There are a lot of reasons why I still like AM radio.

It is basic and timeless. Household AM radios began to become commonplace in the 1920s. 95 years later, it is still listened to by millions of people daily.

You can receive AM radio with just a diode and an earphone. Additional components are optional! It can be heard for hundreds or even thousands of miles with little effort. AM radio sneaks into the most amazing places. I work in computer rooms loaded with servers. FM radio doesn't stand a chance. Yet, a local 780 watt AM station comes through every time! AM broadcasts can sound really, really good. AM radio's audio is as analog as can be and capable of sweet high fidelity. AM's delivery system is also simple. No Internet necessary! All you have to do is turn it on! AM radio is a technology that defies time. What a great invention!


*'Aud-ion' two-transistor AM radio.*

I have enjoyed AM radio my entire life. One of the finest gifts I received as a child (around 1958) was a two-transistor AM radio with a short whip antenna. I completely wore it out! It survived hundreds of falls off my bed, countless trips around the neighborhood and on vacations and many experiments. I must have used a thousand 9 volt batteries before I was done. Held together with Scotch tape, it served me and fascinated me for years.

I wore down the tuning and volume knobs' notches until they were smooth. The little piece of plastic that made the volume control's power switch go on and off eventually wore down and no longer clicked the switch. After that, I had to take the battery out to turn the radio off! My Dad gave me a length of black and white hook-up wire and an alligator clip to clip onto the whip antenna to increase my reception. If he only knew what he started!


*9 volt battery as purchased by Karl's father on 'Radio Row.'*

AM radio is no less miraculous now. Many of the stations' programming formats have changed, but I can still hear most of what I could hear 55 years ago. My most memorable stations from around 1960 were WWVA 1170 Wheeling, WV; WKBW 1520 Buffalo, NY and WABC 770, New York. Even in the year 2015, with little effort on any given evening, you can still hear 19 states/provinces or more on AM in our area.* This is direct simplex reception using a very inexpensive device: a six-transistor hand-held radio! No Internet needed!

If you would really like to get the most out of AM radio, the possibilities are limitless. Equipped and skilled medium wave DXers have heard thousands of stations in hundreds of countries and logged some miraculous things.

The AM radio DX experience is unlike most everything you will encounter as a ham. Imagine dozens of high powered stations, spaced 10 kHz apart, on every possible frequency filling an entire band. The 'smallest' transmitters are usually at least 250 watts. Some stations run megawatts! (Compare this to my CW transmissions using milliwatt transmitters to circle the world!) Many parts of the world use 9 kHz spacing creating what North American DXers call 'splits' providing even more stations to catch!

### Avoiding elephants

Every AM broadcast station features, from a ham radio perspective, an enormous tower and an efficient ground system. Multi-tower arrays slew powerful beams in precise directions allowing more stations to be squeezed in. Tune in any evening and you'll experience quite a barrage of RF! AM radio DXing requires a whole new skill set. Instead of straining to hear flea-powered signals, you are dodging about a herd of elephants trying to see what you have missed!

*An AM station with "an enormous tower" — WKIP AM 1450, Poughkeepsie.*

The key to all medium wave DXing is learning to discern individual stations from this mêlée. Since most AM radio receivers are fitted with bi-directional antennas (either a ferrite loop or a wire loop antenna) you can create useful peaks and nulls just rotating your radio. Null the strong 'pest' stations and you'll often hear the good stuff underneath! For example, in our area

at night, 1010 kHz is occupied primarily by the news station WINS from New York City. Move your radio into the null of WINS and you will often hear CFRB from Toronto.

Most dedicated AM radio DXers build their own accessories. Receive loops and preamplifiers are regular topics of conversation and collaboration. Designs are constantly shared and improved upon. It is a lot of fun to watch the development progress!

*Ferrite sleeve loop antenna built by Gary DeBock is based on 61 ferrite rods.*

The larger the loop, the bigger the received signal and the tighter your nulls will be. You'll discover that rotating a loop, in a single horizontal plane, is only the most basic way to achieve a null. If you tip your radio or its antenna from side to side, much more interesting nulls occur. Advanced medium wave DXers will sometimes use more than one loop to dig for gold to fill their logbooks.

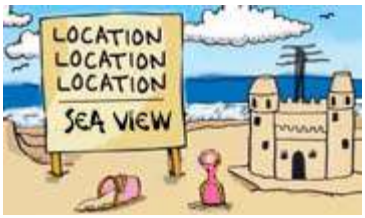
*This large box loop antenna built by Bruce Carter can be turned and tilted.*

**Beyond loops**

Experimentation is not limited to just loop antennas. If you have lots of real estate, you can construct long wire or Beverage antennas to increase you ability to hear extremely weak signals. Beverage antennas can run for 3 wavelengths or more creating narrow pickup beams similar to what you would achieve with a long Yagi on a VHF band. The longer the antenna, the tighter the directional beam. Run two or more Beverage antennas and you'll be able to switch between them to hear different points of view of reception pickup. Add a phasing box and now you can slew your beams and customize the pickup pattern for every occasion. It gets really interesting!

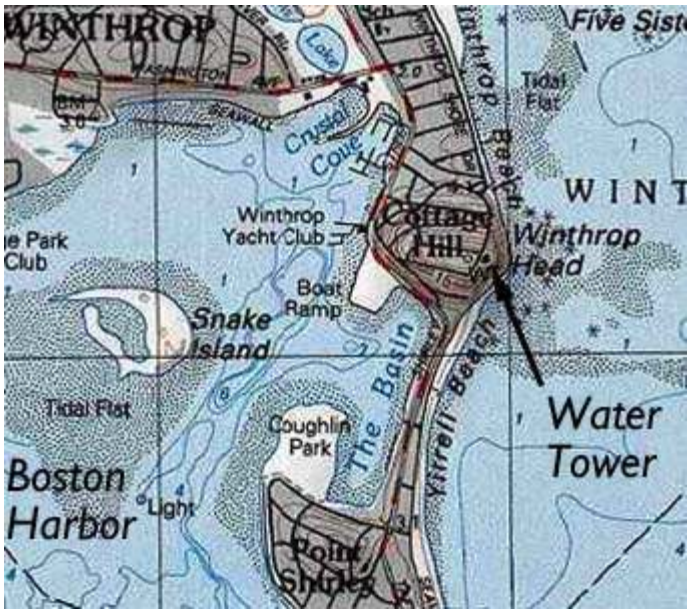
**AM in the right place**

AM radio DXing also follows this old real estate guideline: What is the most important thing? **Location, location, location!** Head for the beaches! Head for the seashore! These are pieces of heaven that we dream about. Medium wave and long wave are very dependent on good ground conductivity to propagate their signals. This is why you will often find AM radio facilities near water or in swamp land. This idea goes both ways. Finding good ground conductivity really, really helps reception, too.




One of my most revered radio folk heroes is Stew Perry, W1BB (SK). He was quite fond of 160 meters, just above the AM broadcast band. Stew had a passion for discovering all he could about the propagation of 160 and shared his knowledge and enthusiasm with everyone he could. His friendly and warm personality fueled generations of hams to try 'top band.'

One of Stew's tactics was finding locations where you could use natural attributes to enhance your reception. A seashore can be a wonderful thing to a DXer. As a volunteer in civil defense, Stew gained access to a water tower at Point Shirley in Winthrop, Massachusetts near Boston.




*Map shows location of the Water Tower at Winthrop, MA almost completely surrounded by salt water. Boston Airport is just off the map to the left.*

Mr. Perry saw opportunity and grabbed it: A dual element inverted V-beam wire antenna for 160 meters was built. The apexes of the two Vs were attached to the top edge of the tower about 265 feet above ground level. The takeoff angle, amazing ground conductivity

and the antenna's height combined to make a legendary signal.

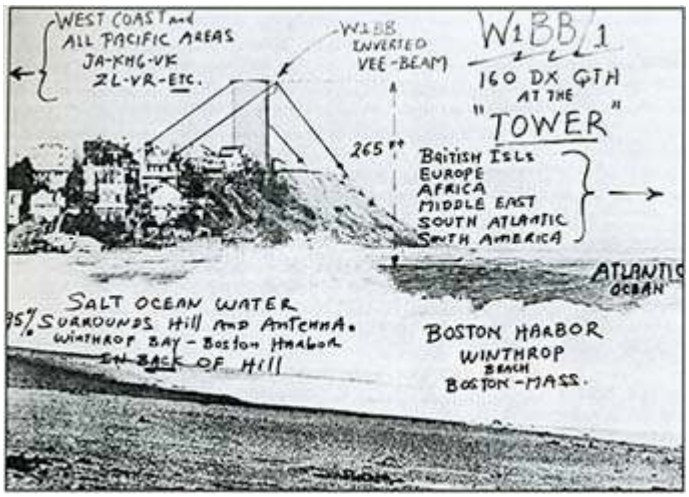



*Photo of Winthrop Beach, MA with sketch by Stew Perry, W1BB of his inverted V-beam antenna for 160 meters.*

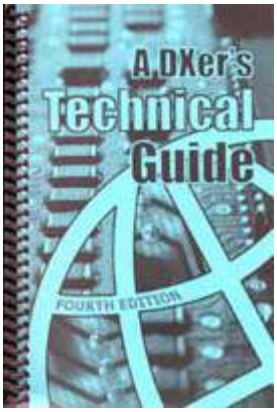
Some medium wave DXers employ the same tactics, adding topography to enhance their signal catching ability. If a seashore with great ground conductivity and takeoff works well, a seashore with a large cliff blocking a certain direction could make DX dreams a reality. You would not be surprised to discover that cliffs can provide amazing front to back ratios!

*Water tower at Winthrop, MA as it appears today.*

Chances are, if you live in the United States or Canada, you have had plenty of exposure to North American stations. Consider how wonderful it would be to have a listening station along a seashore with a cliff attenuating all the broadcast activity coming from North America. Suddenly, you can enjoy a natural filter allowing you to hunt down stations arriving from Europe, Africa or beyond. West coast? No problem. Say 'hello' to AM stations from Japan, Australia, New Zealand and beyond. A good friend of mine, who lives in the aptly-named Seaside, Oregon, has even logged Thailand, India and The Philippines. There are no limits. Broadcast stations offer attractive QSL cards, too!

**Going further with AM**

There is a wealth of information about AM radio DXing available, if you know where to look. Highly recommended is 'A DXer's Technical Guide' available from The International Radio Club of America. Details can be found at: http://www.ircaonline.org/bookst.htm. Many inexpensive journals are offered at the IRCA book store that any amateur radio low band HF enthusiast would enjoy. You'll also learn about the strategies of grayline and auroral DXing and much more. You could spend a lot of time with this book! Another must-see is Craig Healy's comprehensive site: http://www.am-dx.com.




If you want to put your toe in the water before taking a swim, you might consider AM radio DXing with an inexpensive 'ultralight.' This is a new category of sensitive and selective handheld portable radio that can bring in stations beyond your wildest expectations. A comprehensive review of the current offerings in 'ultralights,' by ace DXer Gary DeBock, is featured on the PCARA Facebook page. Take a look!


*Sangean DT-400W AM/FM/Weather-band digital radio is one of the 'ultralights'.*

There are thousands of AM radio stations out there just waiting to be caught by you! What can you really pick up? Visit my friend Gary Deacon's site reporting in from South Africa! His beautiful web site will make anyone start looking for a good AM radio to try their luck. His adventures in DXing are wonderful to read about. One day, maybe I'll get to experience his legendary QTH in person! The DX is out there! Start listening now! (http://capedx.blogspot.com/)

Enjoy the Spring and see you on the air! 73 de N2KZ Karl 'The Old Goat' dit dit.

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*Just FYI: Here are the 19 states and provinces heard nightly in our area: NY NJ MA CT RI ON QC OH PA MD WV GA NC TN KY IL MI MO VA.

# Essential$_2$ 'domes

This is one of the occasional *PCARA Update* articles explaining how chemistry is "essential$_2$" amateur radio, electronics and life in general.

*Assembly of a 68 ft Essco radome, with steerable radar dish inside.*

The subject of this article is the material we refer to as **fiberglass** — as used in fishing poles, boat hulls, quad spreaders, non-conductive support tubes and protective covers for antennas, which are also known as **radomes**.

A radome or "radar dome" was originally the cover for a radar antenna, operating in the microwave spectrum. The radar antenna usually has a moving reflector, which could be mounted on the ground or on an aircraft. The cover for the dish is made transparent to radio frequencies, allowing the antenna to operate and rotate without concerns about solar heating, wind, moisture, rain or ice. The cover also hides the moving antenna from public view.

Use of the word 'radome' was later extended to mean an insulating protective cover for *any* sort of antenna, including the vertical collinear arrays we use for VHF/UHF base stations and repeaters.

*Diamond X200A and Comet GP-1 antennas have fiberglass radomes.*

**Fiberglass** is the favorite material for manufacturing many types of radomes. Unfortunately, the word "fiberglass" has more than one meaning:

1. A material consisting of fine glass filaments, as used for building insulation,
2. A fabric woven from fine glass filaments, as used in braided sleeving and fire blankets,
3. A composite material in which fine glass filaments are embedded in a polymer matrix.

*Raw glass fibers.*

In amateur radio, our usual meaning for "fiberglass" is the third one, where fine glass filaments are surrounded by a polymer matrix. This material is also referred to as Fiberglass-Reinforced Plastic, or Fiberglass-Reinforced Polymer, abbreviated to **FRP**. The polymer involved is usually (but not always) a **polyester**.

### Back to the archives

Individual uses for polyester and glass have been covered in previous newsletter articles. In "Essential$_2$ antennas" (*PCARA Update,* September 2006) the best synthetic rope for holding up wire antennas was said to be **polyester**. The particular polyester chosen for this application is **polyethylene terephthalate** (PET), also used to manufacture clear plastic bottles for soda and fruit juice. PET containers are (literally) the number one recyclable plastic. When these lightweight, shatterproof bottles are recycled, the polymer can be re-melted, then extruded into fibers for the manufacture of rope or fabric. PET is also available as film, sold under the trade name Mylar® and used to make electrically-insulating sheets. Mylar film that has been metalized with a thin coating of aluminum is used in electrical capacitors and for those brightly-colored party balloons. See the *PCARA Update* article from September 2006 for more details of applications and chemistry.

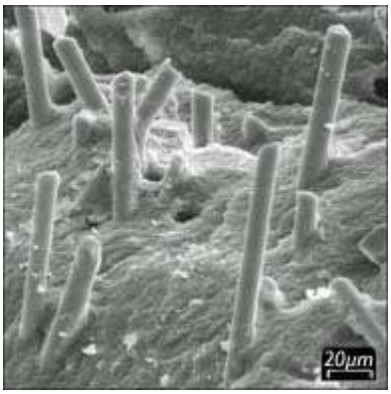

*Number one recyclable plastic.*

Two years later, in the *PCARA Update* for September 2008 there is an article entitled "Essential$_2$ clarity". This describes the manufacture of **glass** for radio and electronics. The use of borosilicate "Pyrex" glass for ovenware began 100 years ago in 1915, with Pyrex glass insulators becoming popular during the rise of radio in the 1920s. For over half a century, glass has been used for vacuum tubes and cathode ray tubes until those devices faded from popularity in recent years. Today, glass is still employed in liquid crystal displays and fiber-optic cables. See the original *PCUD* article from September 2008 for more on the chemistry and uses of glass. (Back-issues of the *PCARA Update* are available online, follow the link on the club web site http://www.pcara.org.)

## Top tubing choice


If you were choosing the best material to make an antenna support tube, you would probably *not* pick either glass or polyester. Glass tubing is brittle and shatters into sharp fragments when struck or overloaded. Polyester as used in soda bottles is flexible, while stretched polyester tubing can be used for heat-shrink applications.

This is where the magic of chemistry and material science combine. When fibers of stiff, brittle glass are incorporated into an unsaturated polyester resin containing styrene, the liquid polyester resin wets the fibers then crosslinks into a rigid thermoset material. The resulting composite of glass fiber embedded in cured polymer is much stronger than the individual components. Any force applied to the surrounding thermoset material is transmitted to the embedded fibers, which then carry most of the load. Meanwhile, the polymer matrix protects the surface of the inner fibers and prevents attack by water or acid.



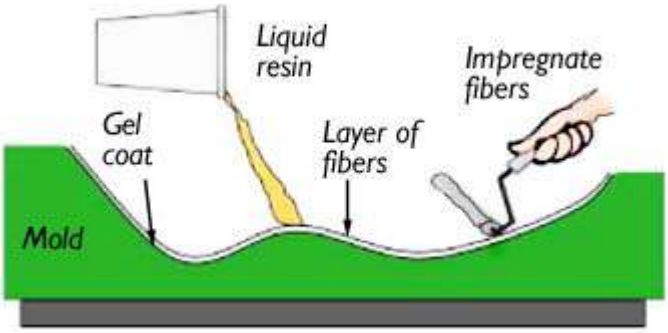

*Scanning electron microscope image of fiber-reinforced polymer (FRP).*

Fiberglass composites are strong, lightweight and maintenance-free. Weight for weight, they are stronger than concrete, steel or aluminum. They can be manufactured in a variety of shapes which can be curved, corrugated or ribbed for additional strength.

In amateur radio, we are concerned with the electrical properties of fiberglass composites. Fortunately fiberglass reinforced polyester provides excellent nonconductive properties with high dielectric strength. Typical dielectric constant = ~5.0 and dissipation factor =0.003 at 60 Hz. FRP is practically transparent to radio frequencies.

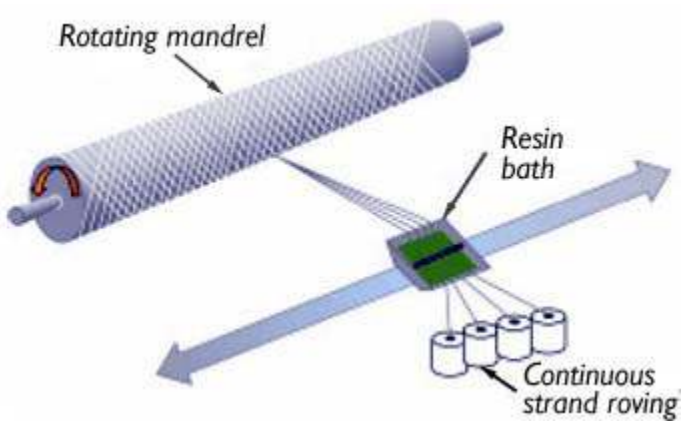
## Radome manufacture

The oldest process for making fiberglass structures is **hand lay-up** — which is still used for low-volume production of irregular shapes and large boat hulls. A gel-coat is sprayed onto a mold to ensure a high quality surface. This is followed by a layer of glass reinforcing mat. Liquid resin is then applied to the fibers by brushing, pouring or spraying. Wetting of the fibers and removal of air bubbles is achieved by hand-rolling. Additional layers of fiber and resin can then be applied until the desired thickness is built up. The liquid resin contains a catalyst to accelerate curing (hardening) of the resin without additional heat.




*Hand lay-up process as used for low-volume irregular shapes such as boat hulls, wind turbine components, concrete forms and radomes.*

Production of fiberglass **tubing**, as used for antenna radomes and supports, is accomplished with more modern processes. The first method is called **filament winding** and is used for hollow, circular-section components including tubes and pressure tanks. An untwisted bundle of fiberglass filaments, known as **tow** or **continuous strand roving** is passed through a bath of liquid resin then wound onto a rotating steel mandrel. Orientation of the fibers is controlled by the fiber-feeding mechanism and the speed of rotation of the mandrel. The feed mechanism moves backward and forward along the length of the mandrel, building up successive layers. Modern winding equipment is computer controlled to optimize these operations. Once enough material has been wound onto the mandrel, it is cured by applying heat, then the mandrel is removed.

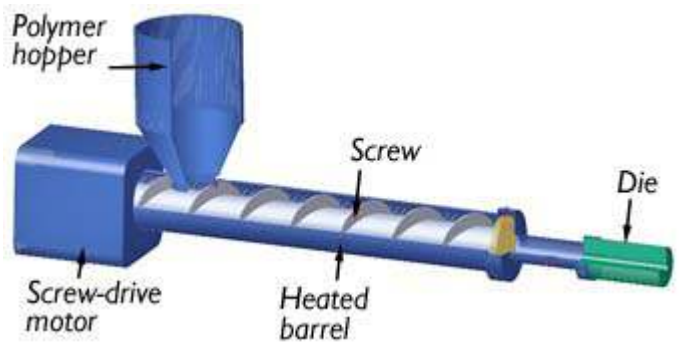



*Filament winding process as used to manufacture filament-wound pipes and ductwork. See a demonstration at https://www.youtube.com/watch?v=4ihtyjydzqA*

Filament winding provides an opportunity to produce tapered tubing. For additional strength, the polyester resin can be replaced by an epoxy. The inner

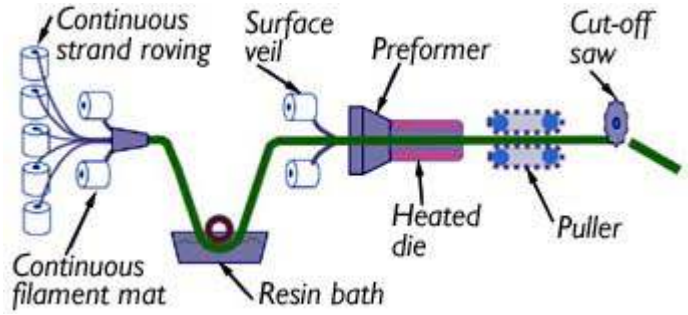
surface is smooth, but the outer surface is not and may require additional finishing.

The most popular method for making fiberglass tube today is **pultrusion**. This is a variant of the **extrusion** process, commonly used with thermoplastics such as PVC and polyethylene. Extrusion employs a rotating screw inside a hollow, heated barrel, which compresses and heats the resin particles so they melt and flow through a die, where the polymer is formed into the desired shape. The molded tube is then pulled-off through a water-cooled bath. During my days in chemistry R&D, I worked on stabilizers for extruded PVC, and we employed lab-scale extruders for preparing test samples.




*Extrusion process is widely employed to manufacture continuous lengths of thermoplastic pipe.*

Extrusion of the polymer through a heated barrel and screw would *not* be suitable for making fiberglass tubing as the long glass fibers would be broken by the rotating screw. Instead, in the **pultrusion** process, flexible glass fibers in the form of woven roving and rolls of mat are first *pulled* through a liquid resin bath then pulled through a heated die in the shape of the desired cross-section. The heated die completes impregnation of the fiber, controls the amount of resin and cures the material into the desired shape. Beyond the die the pipe passes through the pulling mechanism — usually a caterpillar track or a reciprocating puller. This is followed by a cut-off saw which cuts lengths of tubing to the appropriate size.




*Pultrusion process as used to manufacture FRP tubing of uniform cross section. Surface veil is added just before the die to improve surface finish. For a video see:* *https://www.youtube.com/watch?v=1sH9rIGWNvc*

Pultrusion produces lengths of fiberglass tubing with a **uniform** diameter. If a *tapered* tube is desired — for example for SteppIR element support tubes, for quad spreaders, or for a vertical mast which is thickest at the base — then lengths of tubing of different diameter can be nested one within another. Fiberglass tubing kits for amateur radio are available from vendors such as DX Engineering (http://www.dxengineering.com) and Max-Gain Systems Inc. (http://www.mgs4u.com).

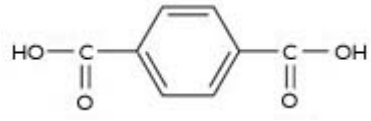
*DX Engineering fiberglass tubing kit.*

*Jackite mast extends to 31 ft.*

Lightweight telescopic masts intended for kites and windsocks can also be pressed into service to support thin wire antennas. U.S. suppliers of fiberglass telescopic poles include 'The Mast Company', http://www.tmastco.com and Jackite, http://www.jackite.com. MFJ has a range of both heavyweight and lightweight telescoping fiberglass poles.

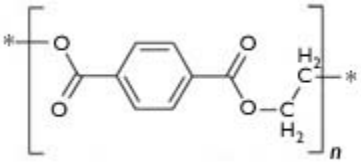
## Chemistry of polyesters

The polyesters used to manufacture glass reinforced plastic are formed by reacting a difunctional acid or anhydride with a difunctional alcohol. For example reaction of **terephthalic acid** with **ethylene glycol** produces **polyethylene terephthalate**. Use of isophthalic acid produces polyethylene isophthalate, and resins of greater strength. A proportion of **maleic anhydride** is included in the resin formulation in order to introduce unsaturation (carbon=carbon double bonds) into the polyester backbone. The unsaturated polyester is then dissolved in **styrene** to keep it liquid prior to the crosslinking reaction. "Low-styrene" resins may substitute dicyclopentadiene in place of styrene.



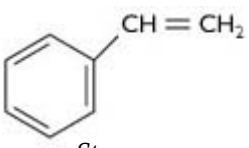

*Terephthalic acid*


*Ethylene glycol*




*Polyethylene terephthalate (PET) repeating unit.*

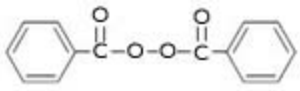

*Maleic anhydride*



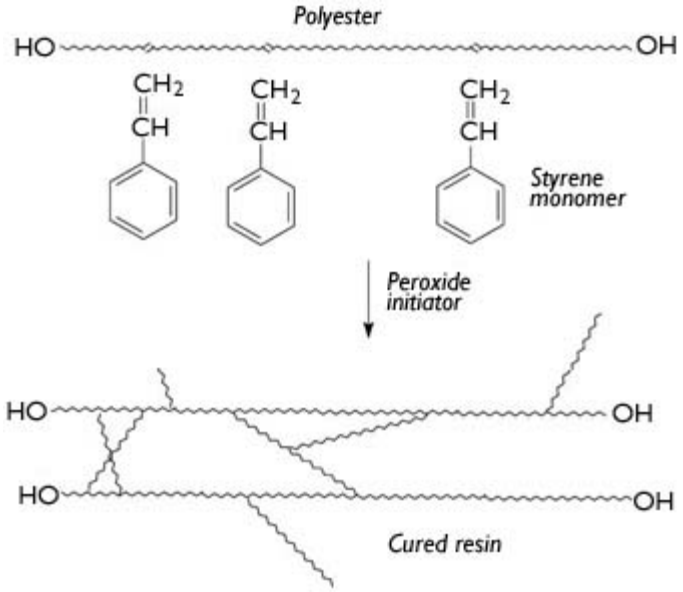

*Styrene*

## Curing agents and accelerators

The company I used to work for is the world's leading manufacturer of organic peroxide **curing agents**. These agents are added to liquid polyester resin prior to the molding process in order to initiate the crosslinking reaction between the unsaturated polyester and the unsaturated styrene. Once the liquid resin has crosslinked, it becomes a *thermoset* polymer, which cannot be easily re-melted. Peroxide products such as Perkadox CH-50 (dibenzoyl peroxide dispersed in plasticizer) and Trigonox C (tert-butyl peroxybenzoate) are recommended for pultrusion and filament winding processes. These peroxides create free radicals at the unsaturated bonds in the resin, starting a chain reaction which then crosslinks the liquid resin components into a solid.



*Dibenzoyl peroxide*




*Polyester resin curing reaction. Double bonds in the polyester backbone: ⋀//⋁⋀\\⋁ arise from maleic anhydride incorporated into the liquid resin formulation.*

In order to speed up this process, especially at room temperature, **accelerators** can be added to the liquid resin — for example cobalt octoates, copper complexes and amine accelerators such as dimethyl-p-toluidine. These items are also available from my former employer.

## Ultraviolet stability

Radomes are usually mounted in outdoor locations, where they are exposed to bright sunlight for years or decades on end. Under these circumstances, it is important that the crosslinked polyester does not degrade, otherwise cracking and crazing can occur with delamination and exposure of glass fibers. This degradation can be avoided by adding methyl methacrylate to the styrene in the resin formulation, by incorporating UV-inhibitors such as benzophenone, by adding a surface veil to the pultruded tubing or by painting the outer surface of the finished tube. If you are working with a coated fiberglass tube, be careful not to scratch the outer finish or you may compromise the long term stability.

## General safety

You should be very careful when handling old fiberglass antennas which may have already degraded due to UV exposure or weathering. Exposed fibers of glass are dangerous if they enter the skin or fragments are breathed into the lungs. Always wear gloves, long sleeves and a mask when handling an old antenna. The same precautions apply when fiberglass tubing has to be drilled, sawn or sanded. This work is best performed outdoors. Fiberglass is a tough material and carbide or diamond-tipped tools may be needed to cut it.

## Versatility

Fiber-reinforced plastic is not just used in cylindrical tubing. Protective covers for cell-phone sites and broadcast antennas are also fabricated from fiberglass in a variety of shapes. The reflector for a microwave dish can also be molded from FRP, then coated with a thin metal skin to reflect radio waves.

*Cell-site antennas require radomes.*

Going beyond RF applications, there are many more ways in which FRP is "essential$_2$" life including tanks for water and fuel, vehicle panels, electrical housings, manhole covers, grids, driveway markers, wind turbine blades and another sort of "dome" — the skylights, cupolas and observatories that are mounted on top of buildings, for illumination, ventilation and exploring the universe.

*Fiberglass cupola could provide a stealthy antenna site.*

- NM9J

# Ready for the hunt?

At this time of year, the *PCARA Update* usually offers encouragement and technical advice for PCARA's annual foxhunt, which is scheduled this year for Saturday May 9.

For example, the April 2014 article "Foxhunt fun" suggests choosing a dual-band HT with an S-meter to monitor the strength of the fox, plus the ability to listen on the 439 MHz third harmonic of the fox's transmissions on 146.565 MHz. Directional antennas such as the tape-measure Yagi and adjustable attenuators for finding the fox are also described. If you would like a more up-to-date approach, check out Lovji N2CKD's article entitled "Build a 4MHz offset active attenuator" which appeared in the July 2014 issue of the *PCARA Update*.

*Lovji, N2CKD prepares for the 2014 PCARA Foxhunt.*

### Why do we hunt foxes?

My first experience of foxhunts was in the UK at Bury Radio Society. The BRS foxhunt turned out to be a highly enjoyable and competitive event which was rounded off with a pub meal for all concerned at a local hostelry. AM DXer and BRS vice-chairman Chris, G4JAG pointed out that as well as honing skills, the fox-hunt is a visible demonstration of the club's ability to track down interference to our amateur radio operations.


*(Left) Bury Radio Society vice-chairman Chris Marcroft, G4JAG pictured with G3SUI and G6HBF in 1984.*

### Chris's words come true

Some thirty years later, an opportunity arose to put Chris's words into practice. In November 2014, interference began appearing on the 146.670 MHz PCARA repeater. Listening at home on the input frequency (146.070 MHz) I could hear a carrier that was coming on from time to time, but not bringing up the PCARA repeater on its own because of a different PL.

On my external antenna, the interfering signal was quite strong, but I was not sure how far away the source was. So I enlisted the help of N2KZ and KB2CQE — who could also hear the signal from Mount Kisco and Croton-on-Hudson. They were able to confirm my observation that presence of the mystery carrier on 146.070 corresponded with activity on certain other repeaters.

Further observation showed that emissions were not confined to 146.070 MHz, but also appeared on additional carriers nearby. I checked the direction using my 2 meter long Yagi and found it was close to due-south. I also checked the direction with my portable fox-hunt antenna.

Bob, N2CBH was able to use all this evidence to follow up with his own contacts and identify the source of the spurious signal. It took a few weeks before the source could be confirmed and an equipment fault corrected, but since then the interference has disappeared. Hurrah! A great team effort.

### Join the fun

It really is an achievement when you track down the location of a hidden transmitter. If you have not taken part in a foxhunt before, then please come along to the next PCARA event. You might want to ride-along with one of the more experienced hunters to see what is involved.

The equipment you need is not very complicated. Basic requirements are a 2 meter FM receiver with a directional antenna. Ability to deploy the equipment rapidly from a vehicle is more important than a highly sophisticated receive set-up. The other recommendation is an up-to-date map of the area, so that successive bearings from hunter to fox can be marked and correlated. Don't forget that the foxhunt always finishes at a local diner where there is a chance to cheer on the winners, compare notes and think about improvements for next time.

### Serious purpose

In the excitement of the hunt, it is worth remembering the thoughts of G4JAG... we are not just enjoying ourselves. We are also improving our skills and keeping our equipment ready for the next occasion when we have to track down **real** interference — whether deliberate or accidental.

So — get your equipment ready, take a few test bearings on local signals and join the next hunt for the furtive fox.

- NM9J

# Sound memories

Sounds can be very evocative. When was the last time you heard...

- A ringing telephone with a **real** bell inside?
- The click of a camera with an actual shutter mechanism?
- A cassette tape being rewound, speeding up at the end then suddenly stopping?
- Crackles from an LP phonograph record and the sound of the stylus in the lead-out track at the end?
- The ka-ching sound as a cash register's drawer opens?
- The hiss of a soda syphon?

- •The screech of a dial-up modem negotiating a connection?
- •Clicks and clacks from a mechanical typewriter?
- •The rat-tat-tat of a teletype, printing out an incoming telex message?

- The rapid buzzing of a busy dot-matrix printer?
- The hiss of a spinning floppy disk? (5¼" of course.)
- Inverter whine from a mobile transceiver?
- The whirr of a film projector in a cinema?
- The crackle and spit of a coal fire?
- The crinkle of carbon paper?
- Happy gurgles from a coffee percolator?
- Hiss and crackle from a carbon microphone?
- The clink of glass milk bottles being delivered to the doorstep?

- •The wind singing in the telegraph wires?
- •The tick-tick-tick of a rotary telephone as the number pulses out?
- •Phone calls passing through an analog Strowger exchange with clanking uniselectors, crossed lines and sideband sibilants?

- The half second delay on an overseas satellite call?
- The scary sounds of an ARRL VEC Morse code test tape?

Do you have any memorable sounds of your own that haven't been heard in a while? Send them in!

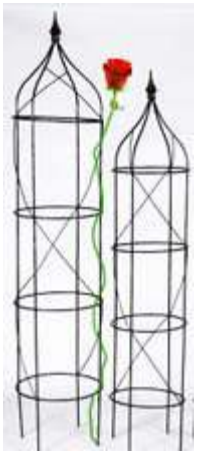
# More show and tell

At the March meeting, Ray W2CH brought along a couple of interesting items. Ray has a new antenna analyzer — the Comet CAA-500. This looks somewhat different from the more-familar MFJ line of antenna analyzers. The Comet CAA-500 covers MF to UHF frequencies, from 1.8 MHz all the way to 500 MHz including the amateur 222 MHz band. The large cross-needle analog meter indicates SWR as well as impedance in ohms, while the red LED digital display below the meter shows the frequency of the built-in RF oscillator.


*Comet CAA-500 antenna analyzer with its protective cover — as demonstrated by Ray, W2CH.*

*AsiaRadio 'Sky Tower' antenna.*

If you would like an unusual antenna to try your analyzer on, look no further than Ray's AsiaRadio "Sky Tower". This is a dual-band VHF/UHF mobile antenna available from Hong Kong, with claimed gain of 3.5 dBi on 144 MHz and 5.5 dBi on 430 MHz. To your editor, this model looks rather like a 440 MHz Folded Franklin antenna (as described in the February 2015 *PCUD)*, with a separate half-wave or five-eighths wave antenna for 144 MHz clamped alongside. The overall appearance is more like a wrought-iron garden trellis than a high-gain antenna. Perhaps some climbing roses would improve the SWR?



- NM9J

# Peekskill / Cortlandt Amateur Radio Association

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*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 and July/August break.

### 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 Apr 12:** PCARA Meeting, NewYork-Presbyterian / Hudson Valley Hospital, 3:00 p.m.

### Hamfests

**Sun Apr 12:** Splitrock ARA North Jersey Hamfest, Roxbury Snr Cntr, 72 Eyland Avenue, Succasunna, NJ. 8:00 a.m.
**Sun Apr 19:** Orange County ARC Spring Hamfest, Town of Wallkill Community Center, 2 Wes Warren Dr., Middletown, NY. 8:00 a.m. **Club table**.
**Sat May 30:** Bergen ARA Spring Hamfest, Westwood Regional HS, 701 Ridgewood Rd, Township of Washington, NJ. 8:00 a.m.
**Sun May 31:** Mt Beacon ARC Hamfest, Employee Rec. Center, 83 Red Schoolhouse Rd., Fishkill, NY. 8:00 a.m.

### VE Test Sessions

(Yonkers – no VE Test Sessions in April.)
**Apr 4, 11, 18, 25:** Westchester ARC Radio Barn, 4 Ledgewood Pl, Armonk NY. 12n. Pre-reg M. Rapp, (914) 907-6482
**Apr 9:** WECA, Westchester Co Fire Trg Cen, 4 Dana Rd., Valhalla, NY. 7:00 pm. S. Rothman, 914 831-3258.
**Apr 20:** Columbia Univ VE Team ARC, 531 Studebaker Bldg, 622 W 132nd St, New York. 6:30 pm. Alan Crosswell, 212 854-3754.

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