Tips, Tools & Tricks of the Trade

Antenna Forum

Dayton 2006

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Designed to ensure safety, save time & money

- We're not professionals, but. . .
- Seen enough poor techniques, equipment, & installations . . . & so prefer . . .
- Correct & safe methods

- Yes, I can look back & consider myself lucky, but . . .

As you get older, you may find yourself changing your mind ! (Wisdom & some sense of mortality, perhaps ?)

Use proper materials

- Tower--used tower may be false economy
- Layout & design of any & all installations?
  - Follow manufacturer's guidelines !
- Systems approach--engineered for maximum efficiency to meet your operating needs

TIPS…

- Starting on the ground--some concrete DO's & DON'Ts.
- Concrete gains strength as it undergoes HYDRATION; it does not "dry out"
- Strength gained early (first 10 days = 70%)
    - Some WX-derived cautions ?

Keep concrete covered

Avoid excessive heat

Wet sides/bottom of hole prior to pour, as dry soil can draw water OUT of concrete, weakening your mix

REBAR . . . some thoughts

Name dates from 50s, although metal used to reinforce concrete since the 20s

Common Sizes: 20-foot lengths typical

#3 = (3/8-inch)

#4 = (1/2-inch)

#5 = (5/8-inch)

Grades: 40, 50, 60 (higher = harder)

What about welding rebar?
(Why it's not a good idea)

- Welding may weaken rebar. The metal itself is of "unknown" origin. Unpredictable reactions may occur.
- Can create "pockets" in concrete, potentially damaging

(Rules are all related to buildings & structural integrity, not tower

bases, but the answer is pretty simple . . . .)

Wire “ties” work fine, even on very large rebar cages!

The tower itself…?

- Used tower ? Inspect CAREFULLY-- welds, leg holes, galvanizing, interior of legs, etc. !
- Assembly on ground can ultimately save time (label accordingly)
- Use the proper hardware

Tower Hardware

- Single-most common mistake/error I see ?
- The wrong size thimbles or turnbuckles used
- Use ONLY heavy duty (H-D) thimbles, which have proper radius (“seat diameter”) to accommodate EHS guys or PLP grips !
- (Eg: 3/16-in EHS uses HD thimble sizes from 7/16 to 3/8-in)

Pre-Formed Line Products

- Towers use “BigGrips,” not simply “GuyGrips,” which are more common but intended for utility company use (Power poles, typically)
- Differences? BigGrips are longer & stronger.

  (Remember: tower guys are usually longer, meaning more torsional forces & vibration) Also made from different grade galvanized wire, more corrosion-resistant

PLP BigGrips vs. GuyGrips

- PLP data shows that “holding strength” & “applied length” are NOT proportional, so their built-in safety factor of one pitch length is indeed significant
- Eg: 1/4-inch EHS BigGrip is only 1 & 1/2-inch longer than GuyGrip, but that’s *more* than one pitch length for that size

Phillystran & Polygon Rod

- PLP BigGrips are available for these, too
- NOT as easy to apply/use, but the only way to go when working w/either guying material

Hardware sizes are important !

- Regardless of guy material--especially at higher guy tensions
- It's a "system" of guying materials--guy wire, thimbles, shackles (if used) turnbuckles, & anchor attachment points
- Typical "hardware store" items are NOT intended or designed for tower use

2nd most-common problem ?

- Water pipe . . . Yes, even in this day & age
- Water pipe used for masts

- Schedule 40 wall thickness .145 2.72 lbs/ft

So a 21-ft piece weighs nearly 58 lbs. “It’s heavy enough . . .”

Speaking of WATER . . .

- Understand the differences
  - Weather-proofing vs. Water-proofing
- One's somewhat easy. . . one's rather hard to do . . .

- Decide which you NEED
- Here's my approach on coaxial connections

Should be easy to do on tower
Should be reliable
Should be bullet-proof
Would be nice if it were inexpensive, but “good, fast, cheap” aphorism applies

TOOLS Step 1

- Teflon tape--most significant change I've made to solving this perennial problem
- (not typical plumber's tape)
- 2-in width, .003-thickness, 50% elongation
  - McMaster-Carr #6802K77
- Extremely conforming, & filling voids critical to success--with air, you'll have

Step 2

- Wrap Teflon covered connector

w/SCOTCH 130C--Linerless Rubber (excellent

physical & electrical characteristics)

Wrap w/tacky or sticky side OUT, stretching as

you go, using a 50% overlap. 130C is self-fusing,

meaning sticks to itself, not what you

Step 3

- A Few Words About VINYL Tape
- What is needed?
  - high dielectric strength
  - resistance to moisture, UV rays, abrasion, corrosion, alkalies & acids
  - adhesive performs well over a range of temperatures

Tape Solution?

- Scotch brands--you get what you pay for !
- Scotch 33 an excellent all-weather tape, w/good conforming & electrical capabilities
- Scotch 88 same formulation, simply 8.5-mils thick vs. 7.0 mils thick

- An entire Forum session could easily be devoted to tape & its myriad uses . . .

TOOLS

- With the proper tools, you have a MUCH better chance of getting whatever project you attempt done right !

Yes, you get what you pay for !

- For most hams, Craftsman will be fine, but if you're borderline . . .you'll like Snap-On wrenches & tools . . .a lot !

- I find storage/retrieval the biggest burden in working w/tools ! (Where'd I put that . . . ?)

TRICKS

Crankup installations--where tramming, bucket-truck, etc. not an option

Cantilever Arm

Offsets the antenna--out away from tower, free from motors, tilt-over mechanisms, etc.

Cantilever Arm

Mast Installations

- Working w/long, heavy masts can be difficult,

to say the least (also dangerous)

The problem is a heavy 21 - 24ft mast is awkward to control using typical ginpole

Solution . . . ?

- CONTROL movement (limit travel) of mast as it swings around above your head atop tower

A sturdy, easy-to-rig, & cheap way to do that ?

Hoop dream. . .

- After initial razzing: “Go for 3 . . . Be like Mike…” etc.

The wonderful world of RTV. . .

- RTV = Room Temperature Vulcanizing

  SILICONEs that cure at room temperature & solidify are RTV. Curing needs air & atmospheric pressure. These are mainly 1-part Silicones. IF the product says “Releases acetic acid . . .”

  You don’t want to use it !

- Dissimilar metals UNDER the SILICONE will corrode rapidly. Not harmful to plastics, etc.

- RTVs safe for electrical/electronics use ?

  GE-162

  Dow Corning 3145

  Loc-Tite Ultra

- 9 times out of 10 simple 6-way screwdriver works fine--savin weigl time

Slip-joint pliers provide wide-range of sizes, gripping strength

Favorite tower wrenches ?

Combination wrench

5-degree rotation

And finally . . .

- Some thoughts on SAFETY !
- http://www.comtrainusa.com/

Contains the “most dangerous occupation” article you have probably heard about. Also lists tower-related injuries & accidents! Also extensive information about tower climbing safety.

Diversity in concept formation of safety. . . just Google it sometime

- For hams, critical factor to remember is PPPPP
- In tower work, it's not so much the tools, the time, but HOW you do the work
- Climbing is critical example--your climbing technique should be tailored to prevent falling in the first place !
  - Are you connected or free climbing?
  - Are you using the proper safety gear?

Don’t take unnecessary risks !!

- If you are in a hurry, then you shouldn’t be climbing in the first place ! It’s always a compromise you can live with . . . !

Some suppliers/vendors . . .

- Rope

New River Nets
140 Charles Creek Road
Sneads Ferry NC 28460
Tel: (910) 327-1231
cofish@newrivernets.com

Stainless Hardware

TEK Supply

1440 Field of Drams Way

Dyersville IA 52040

800-835-7877

www.TekSupply.com

- Safety Equipment/Hardware

TESSCO

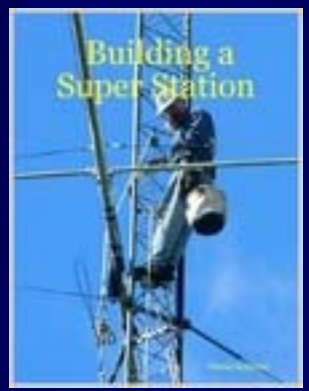
11126 McCormick Road

Hunt Valley MD 21031

800-508-5444

http://www.lulu.com/content/182762

Building a Super Station by David Robbins
K1TTT



One of the best bargains in ham radio !

Thanks for listening &
C U in the suites . . .