

# IT'S NOT A HAT RACK:

AN ARTICLE

BY

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Has your day started at 03:28 with your mechanical girlfriend calling your Cell Phone whispering, Plate Off, High V.S.W.R., Output Zero? If this story is one of the sweeter things in your chapter of "Never let this happen to you", you might be a Broadcast Engineer.

Interestingly enough many tower climbers who get to venture to the high steel and climb all over your shiny antenna somehow feel that the sturdy looking metal is there for their climbing convenience. Hat racks, foot rests, climbing pegs, safety tie off points,, these are all what tower climbers identify your antenna as when they are up enjoying the view. Unfortunately when one of them decides to perform some reconstructive metal bending on your number 4 bay, if your V.S.W.R. monitoring is not up to snuff along with your shut down circuit, some very entertaining things can happen.



Using the radiating element as a foot rest is never good for the pattern let alone the good of the operation. This kink in the arm tube of this FM bay was actually 3/4" deep and the arms were nearly touching each other at the tips when we found it.

This changed the impedance of the bay dramatically. If this were a 6 or 10 bay antenna, the change may have gone somewhat undetected but as a 4 bay, the impedance

change was a bit more dramatic than the system could reasonably handle. The change in V.S.W.R. resulted in a dramatic change in the currents in the tuner. This antenna already had a slugging issue forced by another situation with the installation, and the four port tuner was only there to put the "fine" hair on the frog.

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Things upstairs usually ran kind of warm already as the antenna only had four bays and was running around 30,000 Watts so any mismatch, any where in the system would prove to be an issue.

I know, you are sitting there in your arm chair with your whistle and football thinking,, the transmitter should have just shut off,, right? Well, yes, if the shut down circuitry was working and if the two devices watching the transmitter were actually awake.



You would think that when something went wrong after the climb on start-up that the transmitter would have just complained and took a siesta, but for some reason the Engineer did not notice the higher than usual readings, nor did the electronic safeguards. The night of the climb and damage left the transmitter on the air, the group dispersed, and one whole day elapsed before things got very quiet.

#### HEAT IN TIGHT PLACES;

We all know that low Wattage concentrated in a small space without sufficient dissipation will generate dynamically high temperatures. Many thanks to Uncle Weller. We have all seen sooty photos (I said sooty not smutty) and I should not deprive you of at least one but none were generated in this fire. This was a very unique failure. High Heat In Tight Places might not be complete without a small arcing fire. This insulator arc was actually the third failure in the cavalcade of failures in this show. Failure one was the crushing of the FM bay arm. Failure two was the extreme heat that the inner conductor of the tuner and its associated slug all tried to absorb. This heat festered for some considerable length of time and elevated the temperature of the inner conductor to a point where the heat actually melted the solder connection to the bay



arm and at that point the arcing fire in the tuner added to the joy of the failing situation and down went the transmitter but not from a V.S.W.R. failure. It tripped the Screen.

This was a full circle failure. It began with the crushing of the Bay Arm and ended up with the de-soldering of the bullet cup of the same bay arm after going round the mulberry bush to burn up the inner conductor of the tuner and arc flash the number one tuner plunger insulator.

Fortunately after some considerable disassembly and cleaning, the system limped back on to the air at greatly reduced power but the tuner would never be the same, nor would it ever be ready for high power again so back to its maker it went for re-habilitation.



#### LESSONS TO LEARN:

What can we learn from this simple game of round robin.

While the failure rarely starts and

ends in the same place, and is rarely contained in such a neat and tidy way with little soot and just a few simple parts to replace, even the bay survived and did not need re-habilitation. There are some lessons to be taken away here. Let's start with the arm chair obvious. Test your V.S.W.R. circuits semi annually. (that's twice a year for those of you) Figure out what makes your various types and styles of sensors tick and what makes them work, and more importantly what makes them mad, and piss them off in a controlled way so that you can see the progression of the failure test (hopefully not the failed test) and confirm that this might not happen to you.

Very often a 1k Ohm pot with a 9 Volt battery and some clip leads will do the trick along with a



helper to turn the pot or watch the meters. Get rid of your -20dB slugs and samples. Sure, the major manufacturers only guarantee the sample sections for 20dB (heh, heh, heh,, sorry) SO WHAT! Buy -30dB slugs. You are not going for accuracy, you are going for sensitivity. Buy two slugs. Put one in. If you have twin reflected meters, buy three slugs. Change them out every other month to compare them. If you come in and you have an issue showing on a slug, put in the spare slug and if

there is no issue, you popped a slug. SO WHAT. Get them back for matching and go again. If you put the other spare slug in and it also has issues, you have a fire brewing and you should have your favorite Line Sweeper and Tower Crew on speed dial.

This stuff needs attention. You have to touch it, watch it, look at it, and be familiar with it or it will bite you. Do not trust that protection circuits work. Don't trust meters that just lay there, and don't trust coily shorting stick cords with your life. The first discharge vaporizes the metal in the mic cord and when you encounter the next live device, both you and your stick are dead.

When you have people on the tower, even if it is not your tower, demand photos. Tell them that a minimum of 100 photos are required to document all locations that they climbed, worked, installed or removed equipment, or ate their lunch. If you do not get your photos, do not pay the crew. If there are issues with equipment after a climb, bring them to the attention of everyone on the site right away so that everyone can weigh in on their systems to be sure that there is no other lurking issue that has not been seen yet. Sure, accidents happen but most of them are caused by carelessness or a lack of training with those who climb.

Only you can prevent forest fires.