

# Refurbishing Your HF Antenna

By Marinus A. Willemstijn ZS6MAW

I have a Hy-Gain TH3JR 3 element Tri Band (20-15-10) antenna which I purchased as new in 1989, from the estate of Normal Osborn ZS6BF, together with a Hy-Gain CD-45MKII rotator. When I bought the units they were in as new condition. I used the antenna and rotator until December 2004, when I replaced it with a used Hy-Gain TH3MKIV Thunderbird Tri Band (20-15-10) Antenna and Ham IV rotator combination.



I decided to refurbish the Hy-Gain TH3JR antenna. I thought it might be interesting to share my experiences on this project with others so that they could possibly learn something from my efforts. This article in no way claims to be the last word in antennae refurbishment, but to document my experiences doing so.

The photographs show the TH3JR and CD45MKII in its last position before it was taken down.

Before the project could commence I decided what needed to be replaced and what could be cleaned. I decided on the following steps:



1. Clean the aluminum.
2. Replace all screws, nuts and bolts that are rusted or corroded.
3. Replace all Plastics caps and fittings.

## Dismantling and Inspection

I dismantled the different pieces of the antenna and removed all plastics on the antenna. Part of the dismantling process was opening the traps of the antenna (There are 12 traps on the TH3JR). The traps were each very carefully checked. There

was definite evidence of water corrosion in some of the traps. I used a soft toothbrush with clean water to remove the grit off the windings. Some of the screws used to connect the copper wire of the winding to the aluminum tubing were also corroded. The screws holding down the aluminum trap covers had started to corrode as well and will thus be replaced.



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## Prepare cleaning solution

I purchased a cleaning solution called Alumibrite. This chemical was specifically developed to clean aluminum. It is an industrial type chemical that needs to be handled with great care. I used rubber gloves during preparation of the solution and also during the cleaning of the antenna. I prepared the solution in an old bucket with a wider throat than a normal bucket for ease of working. By changing the ratio of Alumibrite to water one can change the aggressiveness of the cleaning agent. I opted for the 9:1 water to chemical ratio which is considered to be a medium strength as per the instructions. I had another bucket with clean water to immediately rinse the aluminum after cleaning. In hindsight I could have saved lots of time and effort had I used a longer type basin where the lengths of aluminum could be totally submerged in the solution. Naturally the same applies for the rinsing process. Using Alumibrite is really very easy. I used a soft cloth to gently apply the cleaning solution to the surface of the aluminum, then rinsing the solution off with clean water. All the dirt seemed to pop right off!

The great thing about this solution is that it did not affect any of the non aluminum components of the antenna.



For instance the printing of the labels of the traps were 100% in tact after the cleaning the antenna. Later on I used a drop of Turpentine later on to clean a small paint spot from the boom and it immediately also removed some of the printing on the labels which was "spared" by the cleaning solution. Although I dried the aluminum with a soft cloth after rinsing, I allowed it to drip dry for a day or two.

I did not submerge the traps into the solution as I was not sure whether it would affect the copper wire. It would probably be better to totally disassemble the plastic portion of the trap from

the aluminum parts to enable easier cleaning but I did not believe it was worth the effort (Especially as I only needed to replace a couple of screws inside the traps).

I cleaned all the brackets with normal soap and water which restored them to an almost original condition.



## Replacing defective components

It was quite a challenge to find replacement fasteners. I used a local supplier – ScrewMan. They have just about anything you might require. I only used Stainless Steel Replacements. I could not find exact matches for the Hy-Gain supplied fasteners as they are imperial sizes, and all I could find was metric sizes, but thankfully I did not have to modify anything and the replacements did the job perfectly! I replaced all of the screws on both the inside and outside of the traps. I did not have to replace any of the brackets for the elements.

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## Replacing plastics

Replacing the Plastic Caps is much easier than getting hold of them. It is however extremely convenient having all the plastic components in one package. I found a reasonable comprehensive kit specifically made for this task supplied by Hy-Gain on their web site. It's called PK-TH3JR-PLS. Place your order for the kit well in advance as it takes at least 1 month to import. The plastic rings that can be seen on both sides of the open traps shown in the picture are not included in the plastics kit. I inspected all the rings and found that they were all as good as new – They are covered by the trap housing and unless they got lost, I cannot see you having to replace them. It would however have been a nice touch had Hy-Gain included a few of these rings in the kit in case some had to be replaced.



## Re-Assemble Antenna Pieces



Once all the pieces were cleaned, rinsed, dried and re-assembled the beam was reassembled. It's important to ensure that the traps are clearly marked to enable you to easily identify the different traps as they are not all equal in size. Despite the fact that the markings of the original measurements were still visible I decided to re-do all the measurements from scratch using the Instruction Manual.

Being a predominant phone operator I used the suggested measurements for the SSB segments of the various bands. It should be noted that when a Hy-Gain BN-86 balun is used on the

beam the one dimension for the Driven element should be changed in order to obtain maximum front-to-back ratio as indicated in the instruction manual.

I assembled the Beta Match with its new insulators, Balun and the newly cut wires connecting the Balun to the Beta Match.

## Final Assembly and Testing

Final assembly and testing is done in the back yard on a small 3M tower. A MFJ 269 HF/VHF/UHF Antenna/SWR/RF Analyzer was used to check that the SWR on all bands were acceptable.



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## Problems experienced with this project

I experienced a few obstacles in this project, some of which have been overcome quite easily. A few more difficult problems worth noting are:

1. Finding U Bolts that will fit in the boom to mast brackets. The standard ones are all non-metric sizes and cannot be found (As far as I could gather) in South Africa. The same goes for the U bolt that connects the balun to the boom. Mine is totally corroded. I had to clean it best I could and re-use the existing one.
2. Although you get close matches, it's difficult to obtain imperial sizes for fastening hardware in South Africa.

## What's next?

Now that the antenna is refurbished, I am going to tackle the CD45MKII rotator and get that looking and working as good as new. It has been a tremendous amount of fun restoring the antenna and well worth the efforts!

### References:

HY-Gain Antennas <http://www.hy-gain.com>

TH3JR Plastics Kit <http://www.hy-gain.com/products.php?prodid=PK-TH3JR-PLS>

TH3JR Instruction Manual Order No.221 (PN 801221)

Screwman <http://www.screwman.co.za>

Alumibrite is a product of Dirico CC t/a BSC Chemicals +27 12 666-9906

MFJ <http://www.mfjenterprises.com>