

# Restoring an 18AVT multi-band vertical

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In the February 2001 issue of *Amateur Radio*, Barry VK2AAB wrote about repairing the 80 m coil of an 18AVT antenna. This was helpful to me when I attempted the complete restoration of a 30 year old 18AVT which had lain on the ground in long grass for some years.

First inspection of the antenna revealed that a lot of work was in front of me. I found extensive corrosion of all screws and nuts, all the coils were open circuit, and there was surface pitting on all aluminium surfaces. The 80 m radials were missing altogether.

The first job was to give the existing aluminium tube sections a good cleanup using soaped Steelwool pads which brought the surface back to a bright finish. Some tubes had corrosion holes right through the tube wall. I rang around and found that Smart Aluminium at Wetherill Park in Sydney had a small stock of 1-1/8" OD tube which was just the right size. It was a simple matter to cut the tube to the right lengths and put a short longitudinal saw cut in each end (for later compression) using a bench-mounted circular saw.

The lower resonators for 10, 15 and 20 m are identical in construction, so once I worked out how to get one apart, the others came apart easily and all showed the same corrosion problem. Each coil has a tapered spun-aluminium weather cover which is fastened at the narrow end by three self-tapping screws. Carefully removing these screws (because they were rusted) I was able to slide each cover off one end of its coil by judicious tapping with a wooden mallet. Two black polyethylene ring spacers also came out. These sit inside the large end of the cover to maintain concentricity.

Inside is a coil of aluminium wire wound on a tubular nylon former which has a coarse pitch helical groove machined in it. In that way, the coils do not touch each other, so no form of insulation on the wire is necessary. The ends of the coil are anchored under the heads of self-tapping screws. These screws penetrate radially through the nylon former and into thick-walled aluminium tubes which protrude from the ends of the coils and slide into sections of the mast above and below. The zinc-plated self-tapping screws

had corroded, losing contact with the wire and possibly with the thick-walled aluminium tube. I cleaned up all components in these assemblies, but most particularly the ends of the wire, and used stainless steel self-tappers to replace the rusty screws. When I had ascertained that there was a good circuit though the coil, I replaced the aluminium weather covers.

After reassembling each resonator, I made two plastic weather-proofing rings to go onto the open ends of two of the coils which are positioned with their open ends upwards on the antenna (why does Hy-Gain do this – they are a perfect rain catcher?). The rings were missing from the antenna but I was able to machine two new rings from ABS plastic, using the assembly sketches in the manual as a guide for the right shape.

There is an impedance matching coil in the bottom of the antenna, just above the SO-239 connector. I drilled out the pop rivets which gave me access to the coil. It was in good condition as it is surrounded by wax. I replaced the SO-239 socket, cleaned up all the connections, and reassembled the lot using 3 mm stainless steel screws and nuts, although everything was now squeezed inside because of the presence of the nuts on the inside. Aluminium pop rivets would have been better, but I preferred to use screws in case I had to dismantle it again.

That left me to fix the 80 m resonator, and here I had a bit of luck. Unlike Barry, I was able to tap off the metal end caps and so didn't have to hacksaw through the ends of the coil to get it apart. The outer fibreglass sheath slid off easily, exposing a close-wound coil made from aluminium wire, enamel-coated to insulate the turns. The ends of the coil pass through holes in the former and are anchored by steel screws into the inside faces of bronze end plugs. The bronze end plugs are tapped 3/8"-24 through

their middle. The lower plug receives a zinc-plated steel stud, the other end of which screws into an aluminium threaded bush in the adjoining lower mast section. I thought this was a poor mismatch of metals which could lead (and had led) to corrosion, so I made two new end plugs from stainless steel and obtained a stainless steel stud. I also replaced the threaded aluminium bush in the adjoining section, so that I had only stainless steel-to-aluminium interfaces throughout my antenna. I have found that stainless steel and aluminium go well together in minimising corrosion.

I decided to anchor the coil ends by drilling and tapping M4 holes radially into the end plugs, through the wall of the coil former. The hole through the coil former was drilled out larger than the diameter of the screw head, so the screw sits low in it, and I used pan-head screws. This arrangement kept the screw heads low enough to allow the outer sleeve to slide on.

Finally I had to find out the length of the 80 m radials which had gone missing. A request on the VK2 Sunday broadcast brought four replies that the length from tip to centre of eye is 12". I used 1/8" aluminium wire, although I think stainless steel rod would be better.

To re-assemble the antenna I used stainless steel fasteners throughout. Originally, the clamps which tighten each tube section over the next-smaller tube used zinc-plated steel screws, which had rusted; so I made new square nuts out of 6 mm stainless steel plate and used M6 screws through them. I thought I had done a better job than Hy-Gain by choosing to use stainless steel fasteners throughout, but I have since noticed on their website that they have re-introduced the antenna (now known as the 18AVQII) and one of the new features is all stainless steel fasteners!

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