- Installation of a custom module to remedy chronic instability in the IC-9700 transceiver.
- Installation of a remote antenna and ground connection in the classroom so that testing of other radios can take place. without disrupting the radio room operations.
- Replacement of coax from the VHF/UHF antenna on the tower to the radio room.
- Repair of the traps on the TH7 beam.

In addition, over recent months we have disposed of a large quantity of surplus and donated items and sorted the remainder, so that the storage container is now showing good order.

More work is yet to be done and that will continue through the fall and winter with the help of members.

Repairing the Traps on our Hygain TH7 Beam

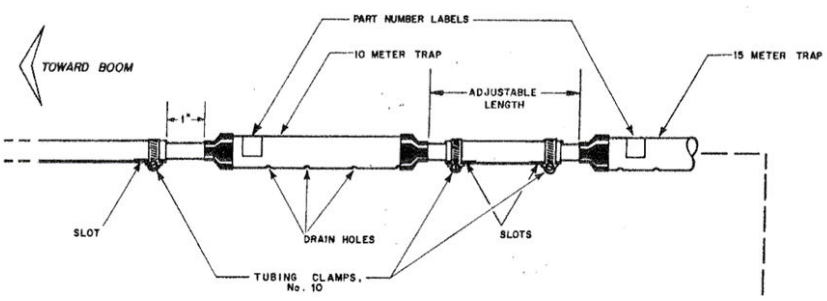
Our tri-band beam, the venerable Hygain TH7, has served us well over the years.

The TH7 relies on resonant traps to allow it to perform on 10, 15 and 20m. Traps are found on both driven and parasitic elements.

Occasionally, we have experienced erratic or higher-than-normal swr on one or more of the 3 bands, with the characteristic dip missing or shifted. This suggests a problem with the parasitic elements (i.e. directors and/or reflectors). Operation in this condition, although possible with a tuner, compromises forward gain and front-to-back ratio.

If the failure is in one of the two driven elements rather than the parasitic elements, it is usually obvious as the swr will be significantly higher than 3:1 across the band, to the extent that the impedance mismatch cannot be easily tuned out.

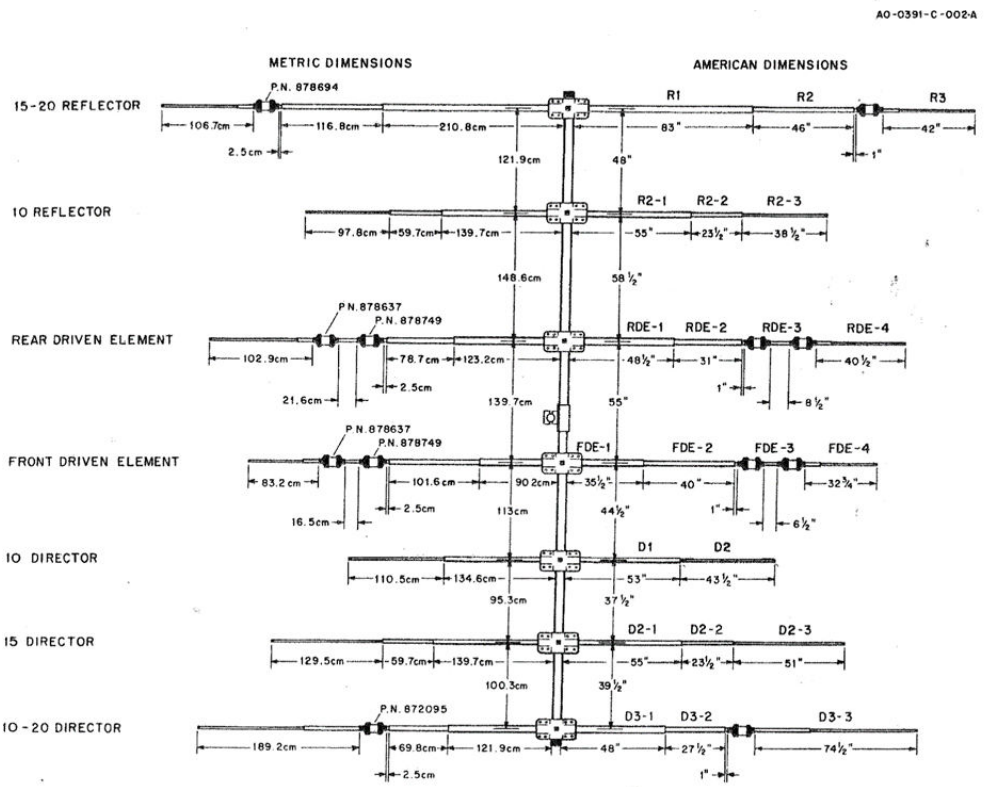
We recently experienced abnormal swr on all 3 bands, suggesting a trap failure in one

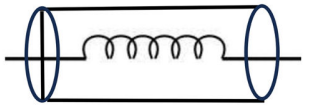


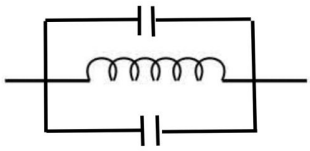
or more of the passive elements. It was not the first time.

Traps are constructed as parallel L-C resonant circuits which electrically isolate portions of the element for their respective band. When 2 traps are used on one side of the element pair, the inner trap resonates at the middle of 10m band and the outer trap at 15m. The entire length of the element is used on 20m, as the traps are effectively a short circuit at frequencies other than their resonant frequency.

Physically the trap is comprised of a coil (L) connected at both ends to the element, and a metal shield (C) electrically connected at only one end to the element.







[3—right] Upper: Physical construction of trap. Lower: equivalent parallel L-C circuit

[4—Lower left] Outer end of trap shield (shown with protective boot slid away)

[5 –0 Lower right] Inner end of Trap shield connected by screw to element and coil (shown with boot slid away). Tighten or replace screw.

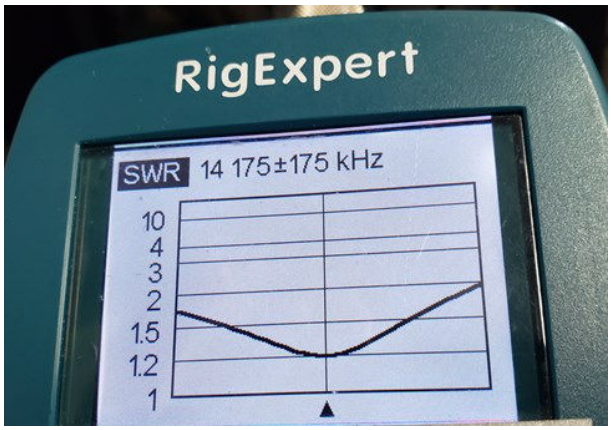
When working correctly, this configuration should provide a low resistance, as measured across opposite sides of the trap as well as between the trap casing and the element on both sides of the trap.

6 Measuring R across the trap - should be <1 ohm

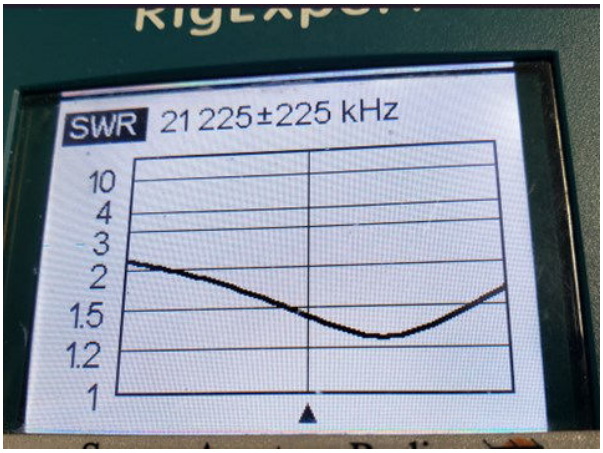
7 Measuring R between trap shield and element – should be <1 ohm

Normally, R should be below 1 ohm in both instances. If R is above 1 ohm, removal of the plastic boot from the inner end of the trap and inspection of the connection is warranted. A loose or corroded sheet metal screw will likely be found at this point. Tightening the screw is one option, but the more permanent solution is to replace the existing ½" or 3/8" #8 screw with a larger #10 stainless screw of the same length.

After repairs were completed and the tower raised, the expected swr was achieved as shown in Figures 8 and 9.



8 SWR as it should be on 20m



9 SWR as it should be on 15m

This is a job ideally performed as preventive maintenance during good weather before problems are experienced. Or would you rather do it hours before the contest starts in February?

~ John VA7XB