MOSLEY ELECTRONICS, INC.

CHECKING TRAPS

Checking Mosley Antenna Systems...

One of the wishes an Amateur Radio Operator has for his/her antenna system is that it work forever without repair. MOSLEY antennas are well designed, but, as with all electro-mechanisms, failures do occur. When they do occur, the trouble must be located and repairs made as soon as possible. It is hoped that the test procedures set forward here will help you maintain and repair your MOSLEY trap-type antenna system. The procedures described will apply to any MOSLEY dipole, beam, or vertical antenna system.

Your MOSLEY trap antenna consists of a series of 1/4 wave elements. In the case of a vertical antenna, there is basically only one 1/4 wave element. In the case of a dipole or beam, there are two 1/4 wave elements joined together to make a 1/2 wave element.

In the vertical, beam, or dipole, the 1/4 wave element may be effectively broken at predetermined intervals. This may be done with insulators, by terminating the tubing, or by installing parallel resonant circuits. Only in the last case can you construct an antenna system that will automatically change bands. In MOSLEY antenna systems these resonant circuits are called "Trap Assemblies". These highly efficient assemblies usually have two parallel resonant circuits within them. The resonant circuit operating on the highest frequency, i.e. 28.0 Mhz. is nearest the base of the vertical. In the case of a dipole or beam, it is nearest the antenna center or closest to the boom In the opposite end of this assembly another resonant circuit is found that operates on the next lowest frequency. This circuit usually works at about 21.0 Mhz. Individual traps cannot be checked by a grid -dip meter.

Due to the circuitry of trap-type antennas, it will be found that any malfunction of the antenna system on the highest resonant frequency will also cause the antenna system to operate incorrectly on the lower resonant frequencies. It is possible that the highest frequency portion of the antenna may work properly and the lower frequencies may not work properly. In very rare cases, we find that only the two highest resonant frequencies will work properly and the lowest resonant frequency will not work properly.

A very good check of the antenna is to check the standing-wave-ratio on all the bands on which the antenna is designed to operate. This check should be done every 100 kcs. in and out of the band. A malfunction on any of the bands will be indicated by higher than normal SWR readings. When checking SWR, be sure of the accuracy of your measuring instrument and that the proper connection is used. Nothing should be installed between the SWR instrument and the antennas except the connecting transmission line. Filters, relays etc. may cause incorrect readings when installed between the SWR bridge and the antenna. Be sure the transmitter is operating on the correct frequency and no serious harmonics are present. When you are making these tests, use low power. Some SWR instruments do not indicate minimum SWR at the true resonant frequency.

In cases where a high SWR is indicated on all bands of operation, and if all components, other than the antenna, are known to be functioning correctly, check all the following:

Transmission line and its connections. Check the overall antenna lengths up to the the highest frequency resonant circuit, which is the portion of the trap assembly nearest to boom on a beam or dipole or the portion of the vertical nearest the ground.

In the cases where a high SWR is obtained on the lower resonant frequencies and a normal SWR

is obtained on the highest resonant frequency, the indications are that something is wrong with the outer resonant circuit. This portion of the trap assembly is located on the outboard ends of the antenna, furthest from the center on a beam or dipole or furthest above ground on a vertical.

In the rare cases where only the lowest frequency of a tri-band element is operating incorrectly, it is advisable that the element lengths be checked. This length would consist of the element from the outboard end of the trap assembly to the tip of the antenna element.

In vertical antenna systems, it is possible that more than one trap assembly will be used. This could also be true of beams and dipoles. These systems incorporate even lower frequency resonant circuits. These traps may not necessarily be in the same assembly as noted for the higher resonant frequencies. Use of the traps is the same and defective assemblies may be located by noting at what band a high SWR is first located. The frequency band at which the high SWR is first located (going from highest band to lowest band) indicates that the defective component is used on this band and is affecting the lower bands.

Trap assemblies can be visually inspected. Before disassembly, not that the color coding is still on all components or devise some method to insure reassembly of the trap onto the antenna in the correct position.

We have been asked frequently by BEAM users how to correctly install the traps when the color coding has weathered off. The following system of color coding is used on all trap assemblies used on BEAMS:

Both coils used to make on trap assembly are color coded with the SAME color. On the coil, which is placed closest to the boom, the code will appear on the tubing and will be visible when the plastic trap seals are installed.

On the JUNIOR series of beams, the outboard coil is coded on the short end of the tubing extending beyond the coil form. To inspect for this code, it is necessary to remove the coils from the trap assembly.

On the SENIOR series of beams, the outboard coil is color coded on the plastic coil form. It is not necessary to remove this coil for inspection. This color code will be covered by the trap seals. The outboard color code is not used for assembly when assembly is performed as stated in the assembly instructions.

To disassemble the trap assembly, begin by pulling the trap seals from the ends of the trap assemblies. These seals can be removed without damaging them. The removal of these seals will expose a wire which is terminated to the end of the outside metal cover. Remove the outer screw terminating this wire. Place one hand on the cover, or largest tube. Place the other hand around the small tubing and the thumb of this hand on the wire. Pull the assembly apart using the thumb to keep the wire from unwinding or loosing any tension. Tape this unterminated wire to the plastic coil from and inspect the coil form. Damage may be noted by shorted turns, deformed coil forms, melted plastic form and other abnormalities. It is important that these coils have the correct number of turns. The instructions pertinent to the antenna being inspected usually give these turns and overall antenna lengths.

When reassembling the antenna, note that the wire on each coil form is tight because loose wires will detune these coils and cause additional troubles. Be sure screw is pulled down tightly and wire and screw are clean.