

4.5 "TOWER & GUY WIRE NOISE"

In some repeater installations, there may be a problem with intermittent "crackling noises" on the repeater signal, (particularly on weak received signals), especially when there are high winds. This noise has been traced to poor and intermittent metal to metal connections on the antenna tower or nearby metal objects - such as guy wire connection points, tower leg joints, supporting mast intermittently touching the tower's top collar, rusty joints, etc. These metal objects pick up RF from the repeater's transmitted signal, and when moved slightly, will *arc* microscopically to any other metal object touching it. The arc, (which is a very low level effect), produces wideband RF noise which is radiated, picked up by the repeater's antenna, and heard in the receiver - which is, of course, then re-transmitted.

One stubborn case was traced to a point where a rusty steel supporting mast passed through the collar at the top of a tower, only a few feet below the repeater antenna. The cure to the intermittent connection, which produced a heavy static on windy days, was rather unique. The tower collar was packed with automotive lithium "chassis lubricant"! This grease is very lossy at VHF, and effectively 'shorted out' the poor connection, and eliminated the noise from that source.

The solution to these intermittent joints is to either bond or insulate the poor connections. Bonding involves either clamping, soldering, or welding the connections together. Wire braid, copper strap, heavy wire, etc. may be used. Any materials which can rust *must not* be used since rusty joints are the *worst* offenders. Once bonded, the connections should be waterproofed with a material such as the commonly available "Silicon Rubber". As an alternative, the connections may be insulated. Guy wires should be insulated with ceramic compression insulators only about 1" from each tower leg. Any wire or metal objects within about 50' of the antenna should not touch each other! Also, beware of "noise" on the repeater's output due to intermittent cable or antenna connections! Some fiberglass encased 6dB gain base station antennas are known to become *internally intermittent* after as little as 2 years service - thus producing a terrific noise on the transmitted signal! (Check for intermittent VSWR.)