

## APRIL TECH TIP

# ***Common Repairs for the ZW – Part 2 ZW Roller and Binding Post Replacement***

By Jim Weatherford



The February Tech Tip addressed how to replace the ZW power cord. This month we will show you how to replace the carbon rollers (four each) and loose or missing binding posts (eight each). Fortunately there are third party replacement parts to rectify both of these common ZW repair problems.

So how do you know if there are bad rollers without removing the case top? Move each variable handle and feel/listen for uneven movement or grinding. Broken rollers or flat spots on the rollers produce these effects.

Since binding posts are all external, it's relatively easy to spot loose, broken, bent, missing, or poorly replaced posts. If there are binding post nuts on the terminals, turn them clockwise until tight and apply pressure to see if the post turns with the nut. This will usually indicate a bad internal connection and the post should be replaced. If there is a machine nut on a binding post that usually means the old post was replaced with a machine bolt. That too should be replaced.

If you can check the transformer with power applied, you should determine if all of the 'U' (common) binding posts are making

connection. Sometimes the binding post seems solid but the internal rivet is broken and the common strap is not making connection. With power on and the 'A' handle dialed to 8 volts, attach one end of a jumper wire to the 'A' binding post and touch the other end to each 'U' binding posts momentarily. You should get a small spark at each 'U' post. Of course you can use a multimeter to check voltages if sparks make you uncomfortable.

We're going to assume you have defective carbon rollers and loose binding posts that have to be replaced. Let's get down to business.

### ***REPLACING THE CARBON ROLLERS***

First remove the top case of the ZW by unscrewing the four screws visible on the top of the case. Next examine the carbon rollers to determine which ones need to be replaced. Look for worn rollers, rollers with a flat side, no roller at all, or rollers that won't roll.



It's usually the "A" or "D" since they are the most utilized. There are two ways to replace rollers; the easy way and the hard way. The hard way entails removal of the short contact arm assembly for the "A" or "D" rollers and the easy way is to install the new rollers in place. Installing the rollers in place means you have to remove the remains of the old rollers and the rivets.



### **REPLACING MISSING OR BROKEN TERMINAL BINDING POSTS**



Move the "B" or "C" roller arm out of the way first. Use needle-nosed pliers to crush the bad roller and cut the rivet in the middle with diagonal cutters. Remove the two rivet halves and clean up the crushed rollers pieces from the bottom of the case. Make sure there are no loose pieces rattling around in the case.

It's very common for the terminal (binding) posts to become loose, bent, or fall out altogether due to age and misuse. This isn't terrible, especially since there are bolt-on replacement posts available from your local parts dealer and they're easy to install.

Slip the new roller in the yoke and insert the new rivet from the top through the yoke and the roller. Use pliers to gently flare the open rivet end at the yoke bottom so it can't come out. Make sure the roller turns freely. I use small vise grips adjusted so you can't squeeze the rivet too much.



Make sure the 'A' and 'B' yoke arms don't touch as they roll over the secondary coil. Adjust if necessary.

Once the post is loose, this generally means the wire lug riveted to the back (inside the case) is no longer attached. All the 'U' terminals are attached to a common buss bar so even if one of them is gone, use any of the other three if you don't want to replace the terminal post right away. Posts 'A', 'B', 'C', or 'D' however, must be replaced if you want to use the related function. Find the loose wire and remove the old flattened end of the riveted post if it's still attached. All the wires have

a round lug crimped to the end that will fit over the replacement post.



Remove the old post and insert the new one in the hole. Put the loose wire lug over the threaded stud and screw on the nut until it's tight. Make sure no other bare wires are touching the end. Replacing one of the 'U' posts is easier since it's on the top row and there are no loose wires, just the solid buss bar.



(Note: I usually remove the bottom mounting plate screws that hold the front core aluminum mounting bracket so I can slip the core mounting bracket out of the way (you'll need more room for the bottom posts) when tightening the nuts for the replacement binding posts. Place a small block of wood under the core to hold it in position while working on the posts).

## **OPERATING TIPS**

by Jim Weatherford

**Tip #20 - Transformer Smoking?** - Have you noticed how your transformer sometimes smokes when you blow the whistle or horn for long periods of time? This will usually happen when you're running a heavy load through the transformer, e.g., dual-motored F3's with lighted passenger cars, and you blow the horn for more than 10 seconds. High current is flowing through the resistor wire and it will get hot and start to burn the cloth covering along with whatever dust has accumulated. The solution is to NOT activate the horn (or whistle) for more than five or six seconds and then let it cool off before doing it again. You shouldn't have this problem with small, single motored locomotives but it's still better to follow the short horn rule.