

December 10, 2000

CONDENSED PREVENTIVE MAINTENANCE PROGRAM FOR TRAFFIC SIGNALS

I am employed by a firm that is involved in many different phases of traffic signal work, including: design, timing, construction, and inspection. In addition, we currently provide ongoing traffic signal maintenance and repair services for 5 smaller government agencies in northeast Florida and southeast Georgia, agencies that cannot afford to have their own in-house signal repair staff. To save money, most of these jurisdictions do the easy stuff themselves, such as replacing burned-out bulbs, and call us only when a more difficult problem arises.

We recommend to all of these agencies that they have us complete an annual preventive maintenance check-up of their traffic signals and most of them (but not all) support such a program - as long as it doesn't cost them too much! Since these agencies are very cost sensitive, we have developed a "condensed version" of an annual preventive maintenance check-up. This condensed version is quick (it takes about 2 hours per signal to complete) yet it covers the major items of concern. Here is what we do:

1. Remove all litter from the controller cabinet and vacuum it out. We use a small canister shop-vac that plugs into the controller cabinet electrical outlet.
2. Spread moth balls onto the floor of the cabinet to keep out rats and other small mammals.
3. Eliminate any vegetation that has grown-up around the cabinet which might make it difficult to fully open the door.
4. Wipe the dust off all internal cabinet surfaces (shelves, equipment tops, etc.) with a mild cleaning solution in a spray bottle.
5. Replace the cabinet air filter. (Replacement filters are cheap, less than a buck, and can be obtained at any hardware or home improvement store. If the cabinet has a weird filter size, we simply cut a bigger filter to fit.)
6. Check the cabinet light and replace the bulb if it is burned-out.
7. Test the electrical receptacle. If the shop-vac runs off each receptacle, the outlet is working.
8. Visually check to see if the seal between the controller cabinet and foundation is good. Look for gaps in the silicone or water stains inside the cabinet. If there are gaps in the silicone, place a new bead around the cabinet.
9. Make sure that the cabinet door gasket is good and that the door shuts properly.
10. Lubricate the cabinet door lock mechanism and cabinet hinges with WD-40. Do the same

for the police panel door. If you don't lubricate, these locks and hinges will become very stiff after a few years and may not open at some critical time when you need them to - such as during a trouble call.

11. Check the thermostat setting on the power vent (we keep it set at about 100 degrees fahrenheit in this neck of the woods).
12. Record the serial number of the controller and conflict monitor. This will let you know if someone is switching equipment around on you, and will also help you spot "problem" units.
13. Check the tightness of the power service connections (where the main power feeds and ground wire attach to the cabinet) with a rubber-handled screwdriver. These connections can vibrate loose over time and cause difficult-to-find intermittent electrical problems that will drive you nuts.
14. Check the tightness of all neutral buss bar connections, including those on the backpanel and on the detector panel with a rubber-handled screwdriver. These connections can also vibrate loose and cause intermittent electrical problems.
15. For the same reason, check the tightness of all field terminals going to the signal heads with a rubber-handled screwdriver. By taking a little time to check these screws you can reduce the potential for future trouble.
16. Check for singed, bulged or missing lightning supressors.
17. Measure and record the incoming AC voltage at the power panel (should be around 120V).
18. Measure the DC logic voltage on the backpanel (should be around 24V).
19. Test all police panel switches for proper operation (flash, power, signals, etc.) Step thru all phases of the cycle using a manual control cord to make sure that the manual control works properly.

NOTE: Traffic volumes should be low enough such that it is safe for the signal to flash for a short period of time. Busy intersections should be tested during low volume periods.

20. Record current controller timings (including coordination timings, time-of-day settings, preemption settings, etc.). Check the controller's date and time for accuracy. Before going to the field, the technician should set his or her watch to the correct "WWV time". You can get WWV time by calling (303) 499-7111.
21. Record detector settings (delay, sensitivity, frequency etc.) and make sure all loops and detectors are working properly by visually observing their operation (one at a time!). Make sure all detector test switches are working properly.
22. Record conflict monitor settings. Perform a quick test of the conflict monitor by removing a

loadswitch for one of the thru movements and making sure the signal enters flash. Also make sure that the signal returns to the proper start-up phases when the loadswitch is reinserted and the monitor reset.

NOTE: Traffic volumes should be low enough such that it is safe for the signal to flash for a short period of time. Busy intersections should be tested during low volume periods.

23. Check for burned-out pedestrian bulbs (and vehicular bulbs) by walking the entire intersection. Push each pedestrian button (one at a time!) to make sure that it brings up the proper indication and walk the intersection like a pedestrian to make sure enough crossing time is provided.
24. Check for proper documentation within the cabinet (controller manual, conflict monitor manual, traffic signal wiring diagrams, etc.)

As we do this work we complete a PM checklist for each location, and then turn these checklists in with our invoice. We note on the checklists any deficiencies that were corrected, such as replacing a burned-out bulb or a bad ped button. Items requiring major work (such as a bad loop) are reported to the agency for their action.

Notice that this condensed PM program centers on the controller cabinet and does not involve any overhead work. This keeps cost down by eliminating the need for a bucket truck and allowing a technician to complete the work from a standard pick-up truck.

We also recommend that each conflict monitor be swapped out, tested back at the office, and then returned. An additional fee is charged for this work if the agency chooses to have it done. Unfortunately, agencies are generally unwilling to pay for this important testing even though we stress to them the potential safety and liability consequences of not doing it.

Obviously, the "condensed" PM program described here is not as good as a complete PM program, but it is much better than letting signals go for years on end without any attention - which is what some smaller agencies are doing. This is another situation where "half a banana is better than no banana at all".