



2017

## Troubleshooting Techniques

**Troubleshooting Techniques are not unique to the Traffic Signal world, but have a lot of similarities.**

**One of the Chapters in IMSA Traffic Signal Level 2 Field is dedicated to maintenance and is informative in regards to a procedure to use as a guide to successful repairs.**

**One is introduced to the concept of Observe, Identify, Determine, Repair, and Observe.**

November 7, 2017

If you are dispatched to an intersection where a concern has been reported, once arriving at the intersection the following can be a useful guide to making repairs if necessary:

Once you arrive the first step is to Observe to see if there are irregularities, such as:

- Cars backed up in one direction
- An obvious recent hole has been dug and re-filled
- There's a big dent in the cabinet, etc.

If a problem is observed, then the next step is to Identify what the cause of the problem may be, such as:

- A detection problem
- A System failure (the controller is out of step with adjacent intersections that are running a coord plan)
- A phase is being skipped

Once Identifying the problem Determine the remedy for the problem, such as:

- Find the detector that is causing the detection problem
- Find the cause of the System failure (cut interconnect cable)
- A detector was jostled from the detector rack when the cabinet was impacted by an errant vehicle

The next step is to Repair the problem:

- Replace the detector amplifier
- Repair the interconnect
- Reinsert the detector amplifier into the rack

**The final step is to Observe again to make sure that you repaired the problem.**

**If you follow these steps, a good friend may accuse you of “having a keen eye for the obvious”, but you’d be surprised how, under the stress and pressure of making a proper repair, many make hasty and incomplete repairs. There is much liability involved in making full and proper repairs and if done inadequately, may lead to claims of negligence and ultimately dismissal, or even worse... litigation.**

**Keys to successful troubleshooting are:**

- **Have a comprehensive Preventive Maintenance program**
- **Have the right tools. That should include:**
  - o **Full set of hand tools**
  - o **Fluke (or equivalent) digital multi-meter**
  - o **NEMA tester (sometimes called a suit case tester)**
  - o **CMU/MMU automatic tester (ATSI PCMT or equivalent)**
  - o **Loop analyzer**
  - o **Spectrum analyzer (if wireless is used by the jurisdiction)**
  - o **Ground analyzer (also mfg'd by ATSI, or equivalent)**
  - o **Load switch/Flash Transfer Relay/Flasher tester**
  - o **BIU tester (if TS2 is used by the jurisdiction)**

**These are not a complete list of tools, but are a good starting point.**

**Another key element of a successful Traffic Signal Maintenance Department is training, and ultimately certification. It cannot be emphasized enough the importance of training, along with hands-on OJT.**