8. SITE MAINTENANCE

In order to ensure that a weigh-in-motion (WIM) system performs throughout the established site design life, states need to perform maintenance at each site. Maintenance can either be corrective or preventive. Corrective maintenance repairs or replaces any malfunctioning equipment or roadway deterioration. Preventive maintenance ensures that the site will function properly by periodically inspecting the system and roadway. This section will discuss both types of maintenance and provide a checklist of items to inspect during a preventive maintenance inspection.

8.1 CORRECTIVE MAINTENANCE

Corrective maintenance is performed after a problem is detected in the system. Problems are detected during the quality assurance (QA) procedures discussed in Section 7 of this handbook. These problems can be corrected in several ways. The first corrective method is to adjust the parameters for axle weights, axle spacings, and vehicle overall length. The next corrective method is to repair or replace faulty equipment detected during the QA procedure. A third corrective method is to repair any problems detected in the roadway which could range from lane rutting before or after the sensor to extensive roadway deterioration.

8.2 PREVENTIVE MAINTENANCE

Preventive maintenance is performed in an attempt to circumvent future equipment and site problems. The California Department of Transportation's (Caltrans) successful practice includes using the checklist in Table 8.1 to perform site inspections one to two times a year (*17*). The California Maintenance Checklist provides an adequate way to perform preventive maintenance on a WIM system. The checklist provides a list of items to be inspected and tasks to be completed. Also included on the checklist is a column for notes about the inspected item. After the inspection a maintenance report is written describing the services performed on-site, other observations, and actions recommended.

Table 8.1
Caltrans Successful Practice Field Maintenance Checklist

	Item	Observation/Action
8.2.1	**WIM Sensor Operation**	
8.2.1.1	Sensor number and type	
8.2.2	**Loop Operation**	
8.2.2.3	Loop number	
8.2.3	**WIM Electronics and Equipment Functions**	
8.2.3.1	Signal Processing (loop, scale, piezo inputs)	
8.2.3.2	Watchdog	
8.2.3.3	Temperature Sensor	
8.2.3.4	Hard drive and floppy drive	
8.2.3.5	Com ports 1 & 2	
8.2.3.6	Uninterruptable power supply	
8.2.3.7	Modem	
8.2.3.8	Cabinet Fan	
8.2.4	**System Maintenance and Cleaning**	
8.2.4.1	Clean interior and exterior of all components	
8.2.4.2	Remove, clean, and inspect all circuit boards	
8.2.4.3	Maintain all electrical connectors of operation of interface components	
8.2.4.4	Test and verify control and sequence of operation of interface components	
8.2.4.5	Adjust zero point of WIM scale interface cards if necessary	
8.2.4.6	Clean Cabinet	
8.2.5	**Visual Inspection of Site**	
8.2.5.1	Frames, weighpads, induction loops, and axle sensors	
8.2.5.2	Roadway through WIM system	
8.2.5.3	Pullboxes adjacent to roadway	
8.2.5.4	Drainage outlet (when drain to side slope)	
8.2.6	**Software Maintenance**	
8.2.6.1	Upgrade software to latest version	

8.2.1 Weigh-in-Motion Sensor Operation

The WIM sensors are inspected to establish operational condition. The sensor number and type are recorded on the checklist form including any observations regarding the equipment.

8.2.2 Loop Operation

The loop detectors at the WIM site are then inspected to establish operational condition. The loop number, loop type, and observations about the equipment are recorded on the checklist form.

8.2.3 Weigh-in-Motion Electronics and Equipment Functions

The WIM electronics and equipment in the roadside cabinet are inspected to establish operational condition. This section of the checklist starts with an evaluation of the signal processing inputs from the loops, scales, and piezo sensors. Once the inputs have been checked the temperature sensor, computer, and the cabinet fan are checked to ensure that the equipment is functioning properly. The hard drive, floppy drive, com ports, uninterruptable power supply (UPS), and modem are checked on the computer. The watchdog, if it is a part of the system, is checked to ensure that it is operational. The watchdog resets the computer to the factory defaults if the system locks up.

8.2.4 System Maintenance and Cleaning

The interior and exterior of all components are cleaned. The circuit boards are cleaned and inspected. The interface components' electrical connectors and sequence of operation are tested and the control is verified. The cabinet is cleaned and the zero point on the WIM scale is adjusted if necessary.

8.2.5 Visual Inspection of Site

Once the system maintenance and cleaning is finished a visual inspection of the site is made. The frames, weighpads, induction loops, and axle sensors are checked for any visible signs of wear and tear on the components. The roadway through the WIM site is inspected for pavement deterioration, rutting, and cracking. The pullboxes and drainage outlets are inspected and, if necessary, cleared of debris.

8.2.6 Software Maintenance

The last step of the checklist is to maintain the computer software by upgrading the software to the latest version.