

## DOCUMENTING SIGNAL STRUCTURE INSPECTIONS IN PENNDOT'S TRAFFIC SIGNAL ASSET MANAGEMENT SYSTEM

by Steve Gault, P.E., PTOE, PennDOT's TSMO Arterials & Planning Section



Traffic signals and their infrastructure components are important municipal assets that require regular maintenance and inspection. After all, motorists and pedestrians need these signals to function as intended, day-in and day-out, to keep traffic moving safely and orderly.

A recent critical failure of a traffic signal structure pole in Pennsylvania (see photo at left) has drawn attention to the importance of performing and documenting regular inspections of traffic signal structures.

To help with this task, PennDOT has developed the Traffic Signal Asset Management System (TSAMS), which provides a centralized, statewide inventory of signalized devices. It can also be effectively used to document signal structure maintenance and inspections.

Through this web-based tool, inspection data can be entered "live" in the field and accessed by municipalities and other stakeholders to assess which signals are at greatest risk for failure based on their characteristics.

### Inspecting with TSAMS

The TSAMS Access Guide is available in the Quick Links section on the TSAMS homepage, [www.tsams.penndot.gov](http://www.tsams.penndot.gov). It contains step-by-step instructions on how to obtain access to TSAMS. Although not necessary, it is highly recommended that inspectors obtain TSAMS access prior to a field inspection.

During a traffic signal structure inspection, the signal technician should document the following information in TSAMS:

- **Foundation type** – Identify the foundation standard (TC-7800/TC-8800) used or direct burial installation.
- **Number of foundation bolts** – Note the number of bolts securing the structure to the foundation.
- **Foundation conditions** – Enter the foundation and pole conditions in the comments field, including:
  - ✓ **Covered foundations** – Is the foundation partially or completely covered by dirt or debris?
  - ✓ **Missing parts** – Is a foundation bolt missing?
  - ✓ **Structural damage** – Is the pole or foundation damaged from an automobile or some other kind of accident?
- **Current photograph(s)** – Upload a current photo of the interior of each signal cabinet. It is recommended that the signal technician take and upload a photo during each visit to the signal.

While inspecting the signal structures, the signal technician should also verify that the TSAMS data reflects current field conditions. There are two options for completing this TSAMS verification and update:

- **In the field** – The technician compares field conditions to the TSAMS data and updates it, as needed, while conducting the traffic signal structure inspection on a mobile device.
- **In the office** – The technician takes photographs and notes during the inspection and then the TSAMS data verification and updates are completed online back in the office.



Photo of cabinet interior uploaded into TSAMS.

## Navigating and Updating TSAMS

There are several different ways to locate a signal of interest in TSAMS:

- **Search by geographic region** – The most effective way to search is to select your PennDOT Engineering District, county, and municipality. This search will provide a complete list of all signals within your municipality. An interactive GIS map is also available as an alternative to the list of signals. This map can be accessed by expanding the “Location Map” tab located above the list of signals.
- **Search by TSAMS signal ID** – If your municipality has many signals, searching through the entire list would be ineffective. If you know the signal’s TSAMS signal ID, select the district and county and enter the last four or five digits of the signal ID. Signal ID numbers can also be found in PennDOT OneMap at [gis.pennidot.gov/onemap/?map-id=20435](http://gis.pennidot.gov/onemap/?map-id=20435)
- **Conduct an advanced search** – For more refined search options, click the plus symbol on the Advanced Search tab to expand that tab. For greatest efficiency, always select your district, county, and municipality.



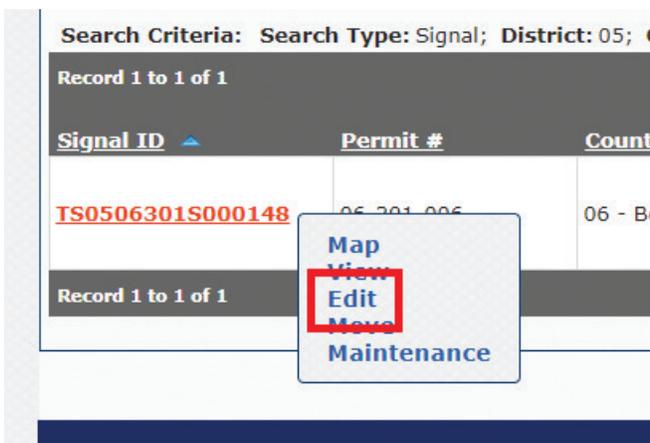
To begin your search in TSAMS, select the “search” button in the Signal module (shown at left).

**Confirming existing data** — The TSAMS data for most signals was originally collected between August 2015 and June 2016. Most of this data likely remains unchanged. However, if a signal has been updated or replaced since that time period, the TSAMS data should be updated to reflect those changes.

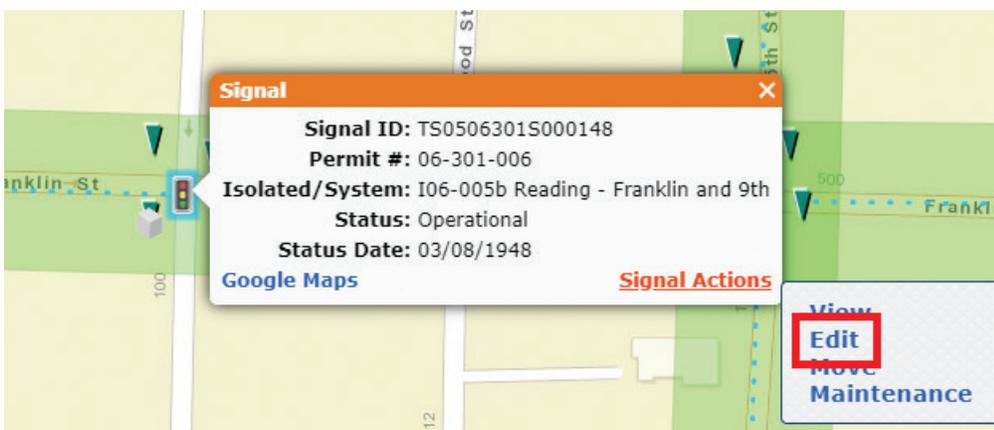
Here is how to see what data currently exists:

You will need to enter the “Edit Signal” screen to validate and update any data:

- From the signal list, select the Signal ID and then click on “Edit” from the dropdown list.



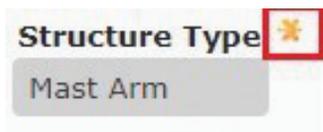
- From the map, select the signal icon and click on “Signal Actions” and then “Edit.”



Once you are in the “Edit Signal” screen, expand the “Component Information” tab. If there is existing data, click on each component to verify that the information is still current. If there is no component information, you will need to create a new structure component.

**Verifying and updating data** —To enter structure data for a signal that already has component information associated with it, you will need to validate that the existing structure component data is current. To review a structure, first select the structure from the list and then click on “Edit.”

The “Edit Component” page will load, and you should verify that the “Structure Type” is correct. If this field is accurate, continue to verify and update the rest of the structure component information. If it is not listed as the correct “Structure Type,” the current structure component will need to be deleted and recreated from scratch.



All fields marked with a yellow asterisk need to be verified and updated.

All required fields (marked with a yellow asterisk) must be verified and updated, when necessary. The table at the end of this tech sheet provides additional information on these structure component fields. Any field in the table that includes the note “This field is key for structure

documentation” must be entered or updated during a traffic signal structure inspection.

**Deleting incorrect data** — Structures with an incorrect “Structure Type” must be deleted and recreated from scratch. While in the “Component Information” tab, expand the structure component you need to delete. Make note of all the subcomponents within the structure, as these will need to be associated with the new structure. (QUICK TIP:

If you’re working from a mobile device, take a screenshot to reference later.)

Click the structure component that needs to be deleted and select “Delete” from the drop-down menu and then “Yes” in the “Confirm” popup window. The structure subcomponents will move into the main component list when the structure component is deleted. Once the new structure component is added, each of those subcomponents will need to have their “Structure Ref ID” updated to match the new structure component.

**Creating a new structure component** — If you had to delete a structure component or there was no existing structure component to begin with, you will have to create a new structure. Go to the “Component Information” tab of the TSAMS “Edit Signal” screen for the signal you wish to update and select “Structure” and “Component Type” from the dropdown in the top left corner of the section. Then, click the “Add” button.

After the “Add Component to Signal” screen loads, select the “Structure Type.” Refer to the table at the end of this tech sheet for information on the required and critical structure component fields. Any field in the table that includes the note “This field is key for structure documentation” must be entered or updated during a traffic signal structure inspection.

After these fields are completed, select the “Save & Exit” button at the bottom right of the screen.

## STRUCTURE COMPONENT FIELDS IN TSAMS

Field	Pole Type	Description/Application
Component Proprietary	All	Is this component proprietary to this intersection? Usually this is N.
Number of Mast Arms	Mast Arm	How many mast arms are on the structure?
Foundation Type	All	<b>This field is key for structure documentation.</b> The foundation standard (TC-7800/TC-8800) used or direct burial installation
Number of Foundation Bolts	All	<b>This field is key for structure documentation.</b>
Ref ID	All	This is a unique identifier for the structure. If there is no number plate on the structure, select a unique number.
Comments	All	<b>This field is key for structure documentation.</b> Use this field to describe any foundation conditions that are not captured in the other data fields. Examples include covered foundations, missing parts, or structural damage found during inspection.
Component Status	All	The current status for the structure. In most cases associated with structure inspection, this will be "Operational."
Component Status Date	All	Date the status is noted. If you are entering a new status, this will be today's date.
Latitude	All	Coordinates can be populated using the "Location Map" tab while creating a new structure. In the map, click the structure location and select "Use Coordinates."
Longitude	All	
Arm to Structure Connection	Mast Arm	How is the mast arm secured to the structure?
Length (ft)	Mast Arm	If the actual length cannot be measured, it may be listed on the permit or else provide an estimate.
Height (ft)	Mast Arm	If the actual height cannot be measured, provide an estimate.
Pedestal Height (ft)	Pedestal	If the actual height cannot be measured, provide an estimate.
Pole Height (ft)	Strain	If the actual height cannot be measured, provide an estimate.
Pole Material	Strain	What material is the pole made of?
Installation Date	All	<b>This field is key for structure documentation.</b>
Manufacturer	All	If the manufacturer is known, select it from the dropdown or click "Other" and enter the manufacturer. If the manufacturer is not known, select "Unknown."