

2023 ITS Maryland Annual Meeting and BRTB Regional Traffic Signal Forum

Traffic Signal Condition
Assessment





Question...



- *Does a healthy heart mean a healthy body?*





Answer...



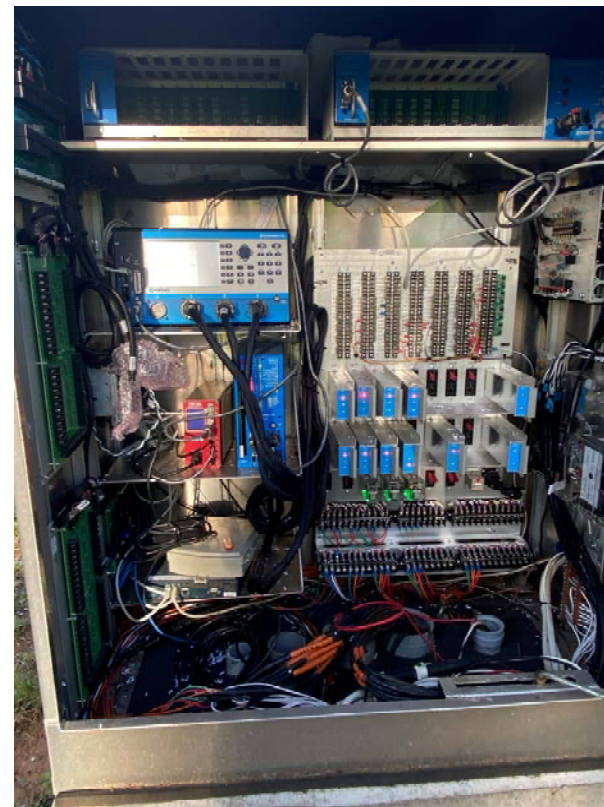
- No!
- There are lots of ailments that plague us that are un-related to our heart.
- The same can be said for traffic signals.
- Just like we go to the doctor for a check-up, a traffic signal also needs a periodic check-up to ensure that it is in good health and functioning as efficiently as possible.





Heart of a Traffic Signal...

- *Most people probably think that as long as the traffic signal is cycling through its colors efficiently everything is OK!*
- You can have a state-of-the-art cabinet and controller...but the traffic signal can still be in poor health.



If you don't do your due diligence...this is how you find out.

- Catastrophic Failure:





Traffic Signal Condition Assessment

- Remedial Inspection: “The care and servicing by personnel for the purpose of maintaining equipment and facilities in satisfactory operating condition by providing for systematic inspection, detection, and correction of incipient failures either before they occur or before they develop into major defects”.
- www.thefreedictionary.com
- “before they occur or before they develop into major defects



Traffic Signal Condition Assessment

- A little history:
 - Montgomery County - 2016
 - Traffic Signal Forum - 2017
 - Howard County - 2018
 - Frederick County - 2019
 - City of Annapolis - 2021
 - Montgomery County - 2023



The Inspection Process:

- Key Structural Elements...poles and foundations, mast-arms, and span wires
- Supplemental Items...cabinet and controller, MUTCD requirements, and accessibility issues (button placement).
- Maintenance Items...signing and marking, rodent/bug infestation, LED degradation, and is everything tight.
- Complete Photographic Inventory.



Structures:



STRUCTURES:				POINTS	SCORE
Signal Age:	0-10 yrs: 0 pts.	11-20 yrs: 5 pts.	>20 yrs: 10 pts.	0-10	0
Design Type:	(mast-arm = 0 pts, span wire = 5 pts)			0-5	0
Pole Type:	(painted = 5 pts, galvanized = 0 pts)			0-5	0
General condition of the poles:	(good = 0 pts, fair = 5 pts, poor = 10 pts)			0-10	0
Any abnormal bending or pole rake?	(moderate = 5 pts, severe = 10 pts)			0-10	0
Pole back guys in use?	(1 back guy = 3 pts, 2 back guys = 5 pts, 3 or more back guys = 10 pts)			0-10	0
Is the pole base welded steel or cast iron?	(cast iron = 10pts)			0-10	0
Any signs of cracking at or near base plate welds?	(10 pts any signs of cracking)			0-10	0
Any abnormal bending or sagging of the mast arms?	(yes = 5 pts, no = 0 pts)			0-5	0
Any signs or rust or corrosion at or near the mast arm mounting plates?	(yes = 5 pts, no = 0 pts)			0-5	0
Any abnormal sagging of the span wires?	(1 span = 5 pts, 2 or more spans = 10 pts)			0-10	0
Any signs of rust on the span wires?	(surface area: 25% or less = 5 pts, 25%-50% = 10 pts, greater than 50% = 15 pts)			0-15	0
Any span wire splices?	(1 splice = 5 pts, 2 splices = 10 points, 3 or more splices = 15 pts)			0-15	0
Any signs of erosion around any of the pole bases?	(yes = 5 pts, no = 0 pts)			0-5	0
Base plate mounted directly to foundation with no leveling nuts?	(yes = 5 pts, no = 0 pts)			0-5	0
Rust or corrosion on the base plate, anchor bolts, or nuts?	severe 25 pts, moderate 15 pts, light 5 pts, no 0 pts)			0-25	0
Any exposed rebar or abnormal exposure of the anchor bolts?	(yes = 5 pts, no = 0 pts)			0-5	0
Any abnormal cracking or spalling of concrete at any of the pole foundations?	(moderate = 3 pts, severe = 5 pts)			0-5	0
OTHER:					
Any apparent violations of the Maryland High Voltage Act?	(yes = 10 pts)			10	0
Any equipment obstructions to walking or biking paths?	(1 obstruction = 1 pt, 2 obstructions = 3 pts, 3 or more = 5 pts)			0-5	0
Cabinet conduit capacity:	(Below = 0 pt, At = 3 pts, Above = 5 pts)			0-5	0
Overall condition of the hand boxes:	(Good = 0 pt, Fair = 3 pts, Poor = 5 pts)			0-5	0
Conduit fill capacity in hand boxes:	(Below = 0 pts, At = 3 pts, Above = 5pts)			0-5	0
General condition of the electrical service:	(Good = 0 pts, Fair = 3 pts, Poor = 5pts)			0-5	0
OVERALL SCORE:				(Maximum Points = 200)	0



Supplemental Items:

CONTROLLER TYPE:	TS 1	☐	TS 2 Type 1	☐	TS 2 Type 2	☐				
CABINET TYPE:	TS 1	☐	TS 2	☐	Other	☐				
	Base Mount	☐	Pole Mount	☐						
SUPPLEMENTAL ITEMS:							POINTS	SCORE		
Is the cabinet in an accessible location?						(No = 1 pt)	0-1	0		
Cabinet condition:						(Good = 0 pts, Fair = 1 pt, Poor = 2 pts)	0-2	0		
Per the MUTCD, are there two indications per movement?				1 pt per movement not meeting this requirement)		0-4	0			
Per the MUTCD, are there near-side signal heads were necessary?				(1 pt per approach not meeting this requirement)		0-4	0			
Are the pedestrian indications appropriately aligned with crosswalks?				(1 pt per crossing not meeting this requirement)		0-4	0			
Are pedestrian push buttons accessible?				(1 pt for each button that is not accessible)		0-8	0			
Are there any utility lines touching mast-arms or span wires?				(1 pt per mast-arm or span wire)		0-4	0			
Are there any signal heads that are obstructed by utility line?				(1 pt per approach with utility line obstruction)		0-4	0			
SUPPLEMENTAL SCORE:								0		
<i>The Supplemental Score is a secondary score for non-critical items and is not included in the location's Overall Score.</i>										

The Supplemental Score is a secondary score for non-critical items and is not included in the location's Overall Score.

[illegible]



Photographic Inventory:





Pole Bases:





Pole Bases:





Side By Side Comparison – 5 Years



March 2016



July 2021



Side by Side Comparison – 5 Years



March 2016



August 2021



Our “four legged friends”



Traffic Light Pole In Japan Snaps And Collapses After Dogs
Constantly Peed On It - WORLD OF BUZZ

[Visit >](#)



Buried Foundations:





Pole Bases – Decorative Caps:



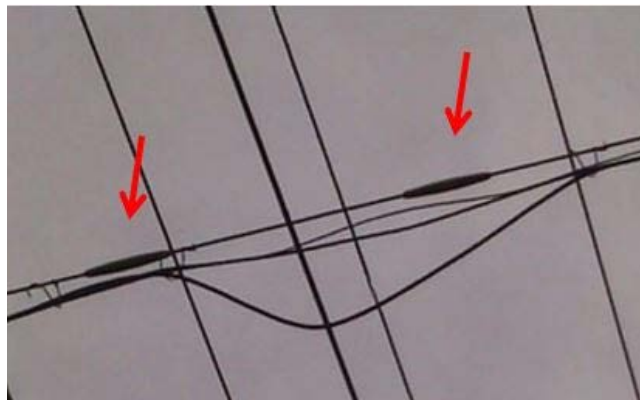


Overhead:



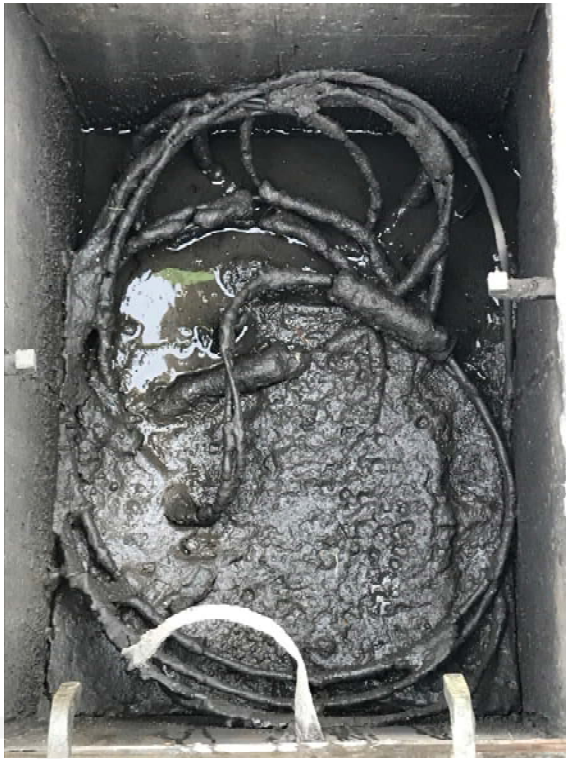


Span Wires





Hand Boxes





Accident Damage





Maintenance Issues:

- Faded signs and worn pavement markings
- Loose anchor bolt tightening nuts
- Damaged hand boxes (shifted lids)
- Cabinet damage
- Damage to electrical services
- Conduits not plugged
- Paint coating failure



Success Stories...

- Montgomery County, MD
- Howard County, MD
- Frederick County, MD
- City of Annapolis, MD





Montgomery County, MD

- First Inspection Cycle in 2016
- Developed a Top 25 List
- In 5 Years Completed Reconstruction of their Top 25
- Just wrapped up their 2nd complete inspection cycle
- New Top 25 List



Howard County, MD

- Completed their 1st inspection cycle in 2018
- Completed reconstruction of their Top 10 locations.
- Completed remedial repairs to extend the life of several locations.



Howard County





Howard County





Frederick County, MD

- Condition evaluation to see if they had any major issues developing.
- Used the inspection process as a training tool for their signal maintenance staff.





City of Annapolis, MD

- Completed their 1st inspection cycle in 2021
- Prioritized list if needed repairs
- Began almost immediate design on traffic signal reconstruction at Church Circle.
- New signals were recently turned on.



City of Annapolis, MD





Final Thoughts...

- Quite a bit of aging infrastructure...
- Just because its on and working **does not** mean its healthy!
- Take the time...spend the money.
- Identify and correct the minor issues before they become major issues.
- Useful for justifying funding.
- Asset Management Tool.