

TEO Signal Committee Meeting Minutes
Meeting Date: 1/29/2014
Water's Edge Conference Rm 176
Meeting Time: 9:00am – Noon

Meeting Attendees:

Jerry Kotzenmacher	Sue Zarling	Nicole Flint
Peter Skweres	Greg Wagner	Ed Andrajack
Robin DeLage	Mike Posch	Mike Schroeder
Jim Deans	Al Espanoza	Chris Bosak
Clint McCullough	Alex Govrik	Jeff Knofczynski
Mike Gerbensky	Dave Crowley	Kevin Schwartz
Cindy Hazelton	Ben Osemenam	

Old Business-

1. ADA Pedestrian Accommodations –

- **No ped crossing sign** – The use of the R9-3a sign (no ped) for pedestrian crossings at signals that do not have a pedestrian indication will remain the same. The pedestrian committee may give different recommendations in the future but currently remains status quo.
- **APS operations** –The next step is to get the meeting minutes into a usable format that all agencies can follow. The goal is to have a statewide uniform operation for all APS buttons across the state.
- **Accessible Pedestrian Signal (APS) PA Pole Mounting Adaptor (Bosinator 5000)** – Will be placed on APL soon. The adaptor will be made of galvanized steel that any manufacturer can produce. Hopefully, multiple manufacturers will choose to make this product.
- **Accessible Pedestrian Signal (APS) Pushbutton Mounting Spacer** – Has been added to special provisions. Once an approved installation is outlined, the APS button detail will be modified to show the installation. The spacer will be needed on all signal pedestal poles since the ADA reach requirement for the APS button is not met without it. It can also be used on the ped station pole if needed.

Flashing Yellow Arrow – Outstate retrofits (who pays) – FYA retrofits are typically done by contract. Unless there is a safety need, the local agency will typically pay all costs for a FYA retrofit that they request. If MnDOT sees a benefit, it may provide funding for the MnDOT legs of the intersection if funding is available. It should be noted that when a local agency requests the FYA, this operation may not always be used at all times of the day after installation. The operator may omit the FYA from being displayed at peak times or when it may not be safe to

operate the FYA. Locals must understand this before they make the investment on a FYA retrofit.

Cabinet/Controller Committee – reminder of MN MUTCD language for start-up flash.

BNSF Letters – Final draft response letters were sent out January 30 to all districts with BNSF crossings (D1, D2, D3, D4, D8 and Metro). Make sure your comments and suggested changes get back to Jerry K. by the requested date.

New Business –

Alternative Intersection Design – Kevin Schwartz is on a national committee to review the process for alternative intersection designs. There are more options than ever when constructing intersections and interchanges. These intersections/interchanges often are within signalized corridors and require signal operations and coordination expertise. The challenge is to outline best practices for these unusual designs such as DDI's and CFI's. (Diverging Diamond Interchanges) (Continuous Flow Intersection). What is Traffic's role in the design process? Kevin suggested that he works with OTST and help any outstate districts that may be working on alternative intersections designs. Feel free to contact him or Jerry K. if your district needs assistance with these types of designs.

Some of the things the Committee is looking at include: lessons learned, developing operational standards and ring structure, need for NO TURN ON RED signs, and when is a DDI looked at for safety. A NCHRP study is being done by North Carolina.

Hand Holes – A new hand hole was recently approved and placed on the APL. There have been several questions on why the cover was chosen. Attached below is correspondence that explains the reasons why this hand hole and cover was required. In summary, the new hand hole and cover were evaluated by all vested interest groups (design, maintenance, field personal, operations). The new hand hole meets N.E.C. (314.30) and ANSI (ANSI/SCTE 77-2002) load requirements for tier 22 (vertical, horizontal, central loading). OTST is not evaluating conductive hand hole and covers.

Traffic Signal Control Cabinets Fuse Size Change – All new traffic control signal cabinets will be ordered with a .75 amp “fast blow” fuse on the output fuse panel for signal indications. This will allow these circuits to be classified as class 3 power limited circuits.

New Secondary Conduit System – A new design for a separate conduit system parallel to the existing conduits was proposed. To meet N.E.C. code, class 1 circuits must be separated from coax cable and class 2 or class 3 circuits. There are some exceptions for class 2 and 3 circuits however coax cable must not be run in the same conduit system. Currently, the luminaire circuit will be the only remaining class 1 circuit required in a traffic control signal system. If we do end up calling for a parallel high voltage (class 1) conduit system, it may better ensure that any future class 1 circuits or class 2 & 3 circuits and coax cable will have separate conduit systems which will allow MnDOT traffic control signal systems to be in full compliance with the NEC. The

general trend in traffic signal technology leans towards lower voltage components and circuits. There will also be additional ITS devices required in traffic signals to accommodate connected vehicles in the future. Some of these new devices may require coax cable and Category 6 Ethernet cable. MnDOT's present signal design has been questioned by a State Electrical Inspector. MnDOT signals do get inspected by many different State Electrical Inspectors (Authorities Having Jurisdiction) but no other inspector has questioned the MnDOT signal design in this regard to date or challenged an electrical issue beyond making a statement. This does not mean that the issue won't come up in other areas of the state. Mike P. will check if we can get an exemption from the Department of Labor and Industry Board of Electricity.

Sue Zarling, Mike Posch, Jim Deans and Peter Skweres met prior to the Signal TEO Committee meeting and determined that the new conduit system was the best overall solution moving forward in new construction of traffic control signal systems.

They estimate that cost of the parallel class 1 conduit system to be approximately \$3000.

The following NEC Code sections apply to this issue:

300.3

725.127

725.136

800.133

820.133

APS Ped Station Grounding - Ped stations must now be grounded by the stranded #6 green insulated ground wire. There is a ground lug designed into the new Accessible Pedestrian Signal (APS) Pushbutton Base that the #6 wire will attach to. This will require additional ground wires to be exothermically welded to the hand hole ground rod. Currently there is only a 4 wire weld cast available for welding to the ground rod. With the total number of ground wires being up to 5 in a hand hole, there may be a #6 ground exothermic wire splice needed in the hand hole if ground wires exceed four in a given hand hole. Alternative symbols and grounding options will be shown for these grounding requirements on the sample plan. Hand holes on wiring diagrams will have more information in them and will need to be shown larger.

Signal Head Definition – In the past, there has been confusion on meaning of signal head, face, indication and the like. OTST has now defined the meaning so future misunderstanding can be avoided. These definitions follow closely with those given in the MNMUTCD.

A. 2565 Definitions

Definitions are in accordance with 2565.1B and as follows:

Pedestrian Signal Head

A signal head, which contains the symbols WALKING PERSON (symbolizing WALK) and UPRAISED HAND (symbolizing DONT WALK), and countdown numbers that is installed

to direct pedestrian traffic at a traffic control signal. The head is comprised of a pedestrian signal housing and a pedestrian signal indication that fits within the housing.

Pedestrian Signal Housing

Polycarbonate housing that protects the light source and other required components. The housing includes an indication mounting door and sun visor.

Pedestrian Signal Indication

Light Emitting Diode (LED) hand and man countdown indication module that is installed within the pedestrian signal housing.

Signal Head

Is an assembly of one or more signal sections that is provided for controlling traffic movements. This assembly of signal sections also includes a background shield when used to control vehicles.

Signal Section

The assembly of a signal housing, signal lens, if any, and light source with necessary components to be used for displaying the signal indication. The section is comprised of two components; a signal housing and a signal indication that fits within the housing.

Signal Housing

That part of a signal section that protects the light source and other required components. Polycarbonate housing that protects the light source and other required components and includes a hinged opening (with visor) in which the signal indication is mounted. This is one of two components that make up a signal section.

Signal Indication

Is the illumination of a signal lens or equivalent device. The device is a Light Emitting Diode (LED) indication module that is installed within the signal housing. This is one of two components that make up a signal section.

Bell End and End Bell Definitions -

Bell End: The end of a piece of rigid PVC conduit that flares out to allow connection of an additional piece of conduit.

End Bell: The rigid PVC conduit fitting that is glued on at the end of a conduit to protect the conductors during pulling operations.

2014- 2016 Standard Specifications for Construction – New signal Specs are out. The new spec book has reduced the need for many special provisions. Rarely used items will still have standalone special provisions. The OTST web site will make it easier for the users. The sample special provisions posted are intended to be downloaded each time you have a project. Delete sections that you don't need for your specific project. This will ensure you are using the most current verbiage. The standalone rarely used special provisions on the web site will be "slot in"

place the portions of the standalone specifications in the most appropriate location. The next release of the Standard Specifications for Construction book is scheduled to be in in late 2015 for use during the 2016 construction season. The present plan is to update the Standard Specifications for Construction on an annual basis. This should eventually lead to a fairly small set of special provisions.

Signal Cell Libraries – LED luminaires on traffic signals can use the same symbol as used for HPS lamps. If calling for LED, you should specify in the pole notes on the plan and specify in the special provisions LED luminaire for mounting at 40 feet.

Fortran Plumizer - Field maintenance finds this signal head mounting component easy to install. Asked why it is not on the APL. The bracket has been used in the past and has lasted the test of time without issue. Has been ordered by MnDOT supply room and used as replacement part. There is no problem for maintenance to use these plumizer's as replacements. OTST will look at language to place the item on the APL.

ASC/3 Cold Weather Problems - Newer vintage ASC/3 controllers have been placing a false preemption call into the controller when temperatures reach about 6° F. Econolite has identified a range of serial numbers for the problem controllers. To date, only the problem controllers have been replaced in the field. Econolite will warranty the work needed to fix the controllers. Jim and Jesse will work with the districts to replace all ASC/3 controllers identified by Econolite as cold weather related problem controllers. All of the controllers in this serial number range should be replaced and updated.

Signal and Lighting Certification – Just a reminder that there must be a certified contractor on the job site anytime there is work being performed. Classes on the certification are now being offered.

Round Robin –

Chris B. – Metro has experienced problems related to the height of the pole foundation when completing unbonded overlay projects. When additional work is required to meet ADA rules for the sidewalk and ramps in the corners of the intersection, the sidewalk can end up being higher than the top of the pole foundation. MnDOT Bridge Office worked with Metro Signal Design and developed a detail to extend the top of the concrete foundation. The cost of using this extension is estimated to be around \$6k to \$8k. The detail is shown as an attachment to these minutes.

Next meeting: May 16th, 2014
 Waters Edge Conference Room 176
 9:00am – 12:00noon
 Send Agenda items to Jerry K.

Attachments

The following is correspondence on questions and suggestions for the new hand hole:

Comment/Suggestion: Normally if a change in equipment is considered the field people who have to deal with this are given the opportunity to review and make comment on the change. There was no consideration given to the field people with this new product.

Response: As I mentioned to you a few days back, a group of people including field maintenance and our materials laboratory, have been working on this for some years. We also worked with other states to see how best to address the new requirements.

Comment(s)/Suggestion(s) :-This hand hole is similar to a fiber pull vault which is very difficult to open during the winter. The covers edge fills with dirt and freezes in the winter. If you need to get into this hand hole you have to use a torch to heat the cover to be able to pry the cover open. If you use a pry bar on the cover during the winter it will break the side walls where the cover sits in.-The slots on the cover where you put your pulling rods into fill with dirt and freeze in winter. This makes more work to chisel out the dirt.

Response: We had similar comment(s) from field maintenance and to address those issues, we installed one in 2012, that was monitored through the winter. At the end of that evaluation, the field maintenance folks made some suggestions and those modifications were made by the manufacturer before the final approval. All handholes are difficult to work with in freezing weather irrespective of the type, we can only try to make it easier to handle during winter.

Comment(s)/Suggestion(s): -If you need to lower the hand hole on some projects the lid lip will not allow this because of the design, whereas the PVC hand hole can be cut down.

Response: That question was also raised during evaluation and field inspection and maintenance folks suggested making it a two piece, one 36" and an 8" or 4" extensions that can be used to adjust the height. The idea was that if the lip was damaged for any reason, the extension will be replaced with a new one.

Comment(s)/Suggestion(s): -The covers are heavy and bulky to work with where the PVC covers are easier to handle.

Response: The Cast Iron Cover varies in weight and the weight is in the same range with the cover of this handhole. They are both less than 100lbs.

Comment(s)/Suggestion(s): -I would like to see looking at the PVC hand hole and see what needs to be modified to meet code. Or give the designers the option to use PVC or the new one on revisions and new systems.

Response: Our goal is to have as many vendors in our approved product list(APL) for handholes as possible and we are currently looking at some other vendors and once we get all their information and everything looks good we will include their names on the APL. We can only provide the specification and suggest changes to vendor's products, we do not modify their products for them. To our knowledge at least one of the PVC manufacturers is working with someone to supply a cover for their product.

Comment(s)/Suggestion(s): -Since the PVC cover needs to be grounded consider using braided ground wire attached to the metal ring. This would give you the flexibility with the metal ring and cover to meet electric code.

Response: We explored that option but the field maintenance and inspection personnel stated that if the ground wire breaks loose, the likelihood of it being replaced is almost zero.

Comment(s)/Suggestion(s): -As with the fiber vaults, we need to have an installation detail sheet to be added to a signal or lighting plan. This will guide the contractor on the proper installation requirements.

Response: 2014 Minnesota Standard Specifications for Construction 2565.3E covers installation requirements for handholes fairly well. If something is missing from these requirements please let us know.

One other question raised by others, was on how to drill a hole on this Quazite handhole, Though we do not tell contractors how to drill holes on any material, I have attached a picture from Quazite website that shows how that may be done.

Though a lot of thought has been given to the evaluation of this product, it is possible that something may have been overlooked. We appreciate comments and any information that people may have as they begin to see these handholes in the field. Such information would be helpful in updating the specification as needed.

*Again thanks for your thoughtful comments and suggestion(s). Below is the section of the NEC that lists handhole requirements and the **ANSI/SCTE 77-2002, Specification** table listing different "Tiers" and their Loading Requirements that we used.*

NEC: 314.30 Handhole Enclosures.

Handhole enclosures shall be designed and installed to withstand all loads likely to be imposed on them. They shall be identified for use in underground systems.

*Informational Note: See **ANSI/SCTE 77-2002, Specification***

for Underground Enclosure Integrity, for additional

information on deliberate and non-deliberate traffic loading that can be expected to bear on underground enclosures.

(A) Size. Handhole enclosures shall be sized in accordance with 314.28(A) for conductors operating at 600 volts or below, and in accordance with 314.71 for conductors operating at over 600 volts. For handhole enclosures without bottoms where the provisions of 314.28(A)(2), Exception, or 314.71(B)(1), Exception No. 1, apply, the measurement to the removable cover shall be taken from the end of the conduit or cable assembly.

(B) Wiring Entries. Underground raceways and cable assemblies entering a handhole enclosure shall extend into the enclosure, but they shall not be required to be mechanically connected to the enclosure.

(C) Enclosed Wiring. All enclosed conductors and any splices or terminations, if present, shall be listed as suitable for wet locations.

(D) Covers. Handhole enclosure covers shall have an identifying mark or logo that prominently identifies the function of the enclosure, such as “electric.” Handhole enclosure covers shall require the use of tools to open, or they shall weigh over 45 kg (100 lb). Metal covers and other exposed conductive surfaces shall be bonded in accordance with 250.92 if the conductors in the handhole are service conductors, or in accordance with 250.96(A) if the conductors

in the handhole are feeder or branch-circuit conductors.

[ROP 9-88]

ANSI/SCTE 77-2002, Specification Table

APPLICATION	LOADING REQUIREMENTS			
Light Duty Pedestrian Traffic Only	Vertical	Test Load	13.3kN	3000 pounds
TIER 5 Sidewalk applications with a safety factor for occasional non-deliberate vehicular traffic	Vertical	Design Load	22.2 kN	5000 pounds
		Test Load	33.3 kN	7500 pounds
	Lateral	Design Load	28.7 kPa	600 pounds/sq.ft.
		Test Load	43.1 kPa	900 pounds/sq.ft.
TIER 8 Sidewalk applications with a safety factor for non-deliberate vehicular traffic	Vertical	Design Load	35.6 kN	8000 pounds
		Test Load	53.4 kN	12000 pounds
	Lateral	Design Load	28.7 kPa	600 pounds/sq.ft.
		Test Load	43.1 kPa	900 pounds/sq.ft.
TIER 15 Driveway, parking lot, and off-roadway applications subject to occasional non-deliberate heavy vehicular traffic	Vertical	Design Load	66.7 kN	15000 pounds
		Test Load	100.1 kN	22500 pounds
	Lateral	Design Load	38.3 kPa	800 pounds/sq.ft.
		Test Load	57.5 kPa	1200 pounds/sq.ft.
TIER 22 Driveway, parking lot, and off-roadway applications subject to occasional non-deliberate heavy vehicular traffic	Vertical	Design Load	100.1 kN	22500 pounds
		Test Load	150.1 kN	33750 pounds
	Lateral	Design Load	38.3 kPa	800 pounds/sq.ft.
		Test Load	57.5 kPa	1200 pounds/sq.ft.
AASHTO H-20 Deliberate vehicular traffic applications.	Certified precast concrete, cast iron, or AASHTO-recognized materials.			
Table 1 – Test Loads				

“WHAT’S NEW SINCE 2009”

**MnDOT HAS COMPLETELY UPDATED WHAT
HANDHOLES ARE LISTED ON THE APL**



**THIS CHANGE BRINGS HANDHOLES INTO FULL
COMPLIANCE WITH ARTICLE 314.30 OF NEC**

Attachment: Pole Foundation Extension:

