6500000 VEHICULAR SIGNAL ASSEMBLIES
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

Charles Boyd
414-4275
charles.boyd@dot.state.fl.us

Comment: (6-30-14, Internal)
The reference to Federal Standard in 650-2.2.5 is out of date. The latest version is "C".
I suggest deleting the version letter reference as it changes every now and then. This is what we have done in other specs and manuals when calling for Federal Standard 595.

Response: Agree. Change made.

****

Chester Henson
414-4117
chester.henson@dot.state.fl.us

Comment: (7-1-14, Internal)
In Section 650, the reference to Type III sheeting in Para 650-2.1.7 should be removed. We only use Type IV in these areas.

Response: Agree, changed to Type IV.
Change made.

****

Ervin Sterling
862-519-2919
ervin.sterling@dot.state.fl.us

Comment: (7-7-14)
1. 650-3.8 Backplates: Recommend eliminating the reflectorized border/no reflectorized border vs. posted speed limits caveat. Using reflective borders on ALL signal heads would seem to provide for a safer condition, and would be CPR.

Response: This is sufficiently addressed in the PPM for CPR. This design guidance is not necessary in the specification and has been deleted.
Change made.

2. 650-3.10 Concealing Signals Not in Use: Recommend "...into service immediately, or placed out-of-service temporarily, conceal the...", and "...by securely placing burlap..."

Response: Agree. Change made.

****

Dan Hurtado
414-4155
dan.hurtado@dot.state.fl.us

Comment: (7-9-14)
Throughout the Specification, when you refer to stainless steel grades, use "SAE Type ..." to properly reference the material.

Response: Agree. Language was added to 650-2.1 to clarify.
Change made.

****

Cheryl Hudson
414-5332
cheryl.hudson@dot.state.fl.us

Comment: (7-10-14)
1. 650-2.2.1: I think they forgot "be".

650-2.2.1 Doors: *Construct each signal section with at least two hinges for mounting a door. Hinge pins must be captive. Doors must remain captive and secure at all times and be capable of either [illegible]ht swing. The door latch must hold the door tightly closed. The door must include slotted [illegible]t allow the door to be opened and closed by engaging or disengaging the latching [illegible]he outside face of the door must include four holes equally spaced around the circumference of the lens opening for the attachment of a visor. The outside face of the door must a light-tight seal between the visor and the door assembly. The lens opening in the door must have a diameter of 11 to 11-1/2 inches.*

be

Response: This was removed from 650-2.2.1 and included in 650-2.2.2.
Change made

****

Shailesh Patel

Comment: (7-21-14)
To be consistent, shouldn't this be shown as Vehicular Traffic Signal? 650-5 Basis of Payment. Price and payment will be full compensation for all work specified in this Section. Payment will be made under: Item No. 650- 51- Traffic Signal - per assembly.

Response: The terms are interchangeable and both are acceptable. However, it does no harm to make this change for added consistency.
Change made.

****

D3 Roadway Design Engineer

Comment: (7-28-14)
The thickness of the tri-stud washers in Section 659 was shown as a minimum of 0.090 inches. The thickness of the washers in this section is shown as a minimum of 3/32 inches. Is there a reason for the difference? If I have a washer that is exactly 0.090 inches thick that is acceptable under Section 659, it is my understanding that that same washer would be unacceptable under Section 650 (3/32 = 0.09375).

Response: The tri-stud washers are standard material. The .090" value was a rounded representation roughly equivalent to a 3/32" minimum. In either case, the minimum thickness of .090 is acceptable throughout.
Change made.

****

Eddy Scott
386-961-7831
eddy.scott@dot.state.fl.us

Comment: (8-1-14)
650-3.8 Suggest requiring reflectorized border in all cases regardless of speed. Speed limit can change after Signal is installed. We keeping seeing plan notes requiring this. If change is made material requirements will need to change as well to only allow aluminum.

Response: This is sufficiently addressed in the PPM for CPR. This design guidance is not necessary in the specification and has been deleted.
Change made.

****

Gary Price (and Bob Townsend)
Work Phone: 850-321-4634
garypricepe@gmail.com

Comment: (8-1-14)
Regarding both 65000000 and 65900000: As per the origination form, it states that one of the reasons for the language change is to "include hurricane resistant requirements". General Comment: With the exception of 659-2.5.8 "Qualification Loading Requirements" and the total exclusion of the Signal Safe current Design Standard, everything else is derived from the status quo of all the other manufacturers; which in some regards, makes sense only as a general baseline. But due to the fact that their span wire devices historically fail during hurricanes, why make the spec's so specific to just these manufacturers?

1. In lieu of the Department limiting itself to certain manufacturers and only their specifications, why not just add "minimum" or "equal to" preceding each spec requirement or as general note. Not providing in the spec's a means for betterment and innovation by simply adding in "at a minimum" or "equal to" only protects the status quo.

Response: The material requirements in these specifications are minimum requirements based upon nationally accepted, standard, and proven designs. Manufacturers are encouraged to submit products with innovative or alternate designs that meet the functionality required. The Department's Approved Product List certification process is able to accommodate the evaluation of alternate designs and update requirements as necessary based upon the results of product evaluation.
No change made.

2. 659-2.5.4 Cable Hanger Historically, as demonstrated repeatedly during hurricanes, the cable hanger is the most destructive and detrimental type hanger system ever utilized. Example; just one storm (Wilma) caused $43.5 million in signal repair costs – FIN. NO. 420529-2. What makes it the worst system out there is that it allows, (actually provides) for harmful wind induced erratic signal movements (due to messenger / catenary sags) during hurricanes. The basic mechanics is that turbulent winds, primarily wind gust, blow the signal assemblies upward (1-3 sec.) and then they drop due to gravity. This puts shock loading throughout the connections, which explains why areas of the structural failures always varied. In other words, the higher the fall, the greater the damage. On rigid and semi-rigid systems, the vertical range of movement is restricted and in some instances act together in resisting wind induced lift by adding weight along the messenger cable). The flexible cable hanger system not only allows a wide range of vertical movement (greater dropping height) but also lets the signals respond almost entirely independent to one another (not utilizing the adjacent signals weight/mass).

Response: See comment response in Section 659 file.

3. Re: 659-2.5.8 Qualification Loading Requirements The first requirement is basically a material test specific to just the disconnect hanger component of a typical signal assembly excluding and not applicable to signal heads, hangers or the connection points of the entire traffic control device. For the record, our devices far exceed this spec, so it is of no consequence to me; however, it is my opinion that this spec in itself, will do little to nothing in preventing post-storm "dark intersections". My recommendation would be to not make the disconnect spec an "either/or" but have it directly relative only to disconnects (659-2.5.6) and not as baseline for hurricane resistance. In fact, in my opinion, it should be incorporated as part of what is now referred to as an alternative which does address an entire assembly. Comment #3a: In my opinion, what is now referred to as an alternative, should be the primary and only specification outlining a language change that describes hurricane resistance requirements. In other words, why piecemeal individual components such as disconnect hangers? Since hurricanes have different wind speeds, are turbulent and durational, all the wind induced dynamics should be part of any test requirement. Therefore, I would suggest adding 'capable of withstanding for a minimum of one hour hurricane force winds, wind induced dynamics and a range of wind speeds no less than 70 mph. and up to 150 mph'. In other words, if the goal is hurricane resistant signal assemblies, why not test to it?

Response: See comment response in Section 659 file.

4. Is it appropriate to reference the ITE specification within this specification since FDOT is not involved in any changes that may take place in this ITE specification? Do such references to other specifications meet FDOT policy on Specification development and changes? Would it be more appropriate to include the desired requirement from another specification into this FDOT specification?

Response: The Department is regularly involved in the development of a number of national standards and sits on national committees such as ITE, AASHTO, NEMA, and TRB. The Department adopts and references national standards and has the option to exceed portions of these standards, if deemed necessary. Copying and duplicating content (in part or in whole) from adopted standards is generally unnecessary and discouraged.
No change made.

5. Consider providing a detail description of what is included in a “vehicular signal assembly” in section 650-1. Is the “assembly” different (disconnect , signal heads and back plate) or is it still “everything” from the attachment to the catinary wire of a span wire to the bottom of the signal heads?
Response: The signal assembly is everything necessary for a complete and functioning unit, including attachment hardware that is detailed in Section 659. This specification states that components include, but are not limited to, signal housing, LED signal module, visors, backplates, lenses, and assembly hardware. The material requirements in the specification reflect commonly used materials that have been proven effective. Manufacturers are encouraged to submit products with innovative or alternate designs and materials that meet the functionality required. The Department’s Approved Product List (APL) certification process is able to accommodate the evaluation of alternate designs and update requirements as necessary based upon the results of product evaluation.
No change made.

6. Revise section 650-2.27 to indicate that attaching the backplate to the signal assembly is one way, but making the backplate integral to the signal head is also acceptable. Why restrict backplates to be constructed of only aluminum or polycarbonate? Is there a documented, engineering based reason for requiring “louvers for all backplates”?

Response: See response to #5.

7. How and why is there a “flexure requirement in section 659-2.2.11 (should be 650-2.2.11)” when the required pivotal hanger is part of the assembly?

Response: The flexure requirement is considered not applicable to non-rigid devices, but is necessary to evaluate and approve rigid assemblies or components. Numbering corrected.
Change made.

8. What is the purpose of section 650-3.1. This section implies that the “assembly” consists of signal heads only.

Response: See response to #5.

****