6590000 MAST ARM, SPAN WIRE, AND POLE MOUNTING ASSEMBLIES
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

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

Comment: (7-9-14)
1. Throughout the Specification, whenever grades of stainless steel are called out, you have to specify the grading system. 304, 316, 302, etc. are SAE grades and should be referred to as, "SAE Type 304" etc.

Response:

2. 659-2.1: The sentence "Hardware (studs, bolts and u-bolts) must be a minimum of 5/16 inch diameter unless otherwise specified." is improper. If something is labeled 1/4", then it meets the Spec.

Response:

3. 659-2.1: The sentence, "Grade 8 bolts and nuts are acceptable where high stress and strong load bearing pressures are present" is improper. The words "strong" and "high" are not defined and arbitrary. Also, "Grade 8" is an SAE Grade and should be referenced correctly.

Response:

4. 659-2.1: The sentence, “All assemblies must be constructed to support the wind load and weight of any combination of signal indications with all accessories such as back plates and visors.” needs clarification. Where are the wind design parameters?

Response:

5. Throughout the Specification, language like, “a minimum yield strength 22 (16) ksi…”. Why are there two different numbers? This appears several times in the Spec. If the two numbers refer to different ASTM testing methods, you have to list the methods each time they are referenced.

Response:

6. 659-2.4: You have to provide a Specification for the T5 temper designation. Is this an ASM designation? This occurs elsewhere in the Spec.

Response:

7. 659-2.4.3: “Type 316 or 304 stainless steel aircraft grade”. Aircraft grade is not a defined term. You have to provide a material Specification.

Response:

8. 659-2.4.5: Capitalize “National Pipe Thread Straight” and “National Pipe Thread Taper”

Response:

9. 659-2.5.6: Define "RMS"

Response:

10. 659-2.5.6: "with Type 304 or 316 stainless steel or brass fastening hardware." You need to provide a material Spec for the Brass hardware.

Response:

11. 659-4: Insert the word "Section" before "5-11"

Response: We do not use the word "Section" when referring to an Article or subarticle.
No change made.

****

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

Comment: (7-10-14)
1. 650-2.2.11: Should be Volume 3.

659-2.2.11 Qualification Loading Requirements: *Vehicular traffic signal assemblies must be designed to withstand 740 pounds loading (flexure) and 7400 pounds loading (tension). Alternatively, test results that demonstrate a complete assembly (from span wire to bottom of signal) is capable of withstanding 150 miles per hour wind speeds and meet the requirements of the Department's Structures Manual, Volume 9 without structural damage that would breach the serviceability of the signal (i.e., the traffic signal continues to function properly and indication can be seen by approaching motorists) are acceptable evidence of load testing.*

Response:

****

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

Comment: (7-30-14)
1. Is there a need to reference either 603 or 608. Very similar information is included.

Response:

2. Check numbering. There are two articles 659-5.

Response:

3. Method of Measurment Article - Please modify to either add all types of mounting assemblies (should match title or description)not just signals. Or just say "mounting assemblies".

Response:

4. Basis of Payment Article - Suggest using a new pay item series "659-", changing the Description and modifying the BOE to match. Additionally the BOE 650-2 series has other items besides mounting assemblies included which likely need to be included in a seperate Spec if not already done so. Note that there is also a 659-series in the BOE for the same work.

Response:

****

D3 Roadway Design Engineer
850-330-1206

Comment: (7-30-14)
1. Section 659-2.1, Paragraph 5 discusses tri-stud washers. I suggest changing the last sentence to the following (changes in red): Tri-stud washers must be a minimum of 0.090 inches thick unless otherwise specified.

Response:

2. Section 659-2.4: Do the yield strength and tensile strength shown in parentheses apply to clamps, while the strengths not shown in parentheses apply to the mounting assemblies? This is a little unclear to me as I read it. It may be clearer just to spell out the requirements for the mounting assemblies and then have a separate sentence that spells out the requirements for the clamps. Also suggest changing the next to last sentence to read, "… a minimum yield strength of 22 (16) ksi…"

Response:

3**. Section 659-2.4** gives a different minimum yield strength [22 (16) ksi] than the minimum yield strengths shown in Sections 659-2.4.1 and 659-2.4.2 [18 (16) ksi]. Please verify that the intent is to have different values for these assemblies.

Response:

4. Sections 659-2.4.1 and 2.4.2 both refer to minimum ultimate yield strength, while Section 659-2.4 simply refers to minimum yield strength. Is there a reason for the difference?

Response:

****

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:

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:

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:

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:

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? Comment#5: 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:

6. 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:

7. What is the purpose of section 650-3.1. This section implies that the "assembly" consists of signal heads only.

Response:

****

Gordon Andersen
405-340-3434
gordon.andersen@pelcoinc.com

Comment: (8-1-14)
1. 659-2.4 Mast Arm Mounting Assemblies We believe it is not correct to specify the temper of "T5 or higher" because it implies the casting must be heat treated. There are casting alloys that meet the specified minimum yield and ultimate tensile strengths without artificial aging.

Response:

2. 659-2.4 Top Support Arm As with our above comment, we believe it is not correct to specify the temper of "T5 or higher" because it implies the casting must be heat treated. There are

casting alloys that meet the specified minimum yield and ultimate tensile strengths without artificial aging.

Response:

3. 659-2.4.7 Bottom Support Arm Here again, we believe the T5 minimum temper requirement should be eliminated.

Response:

4. 659-2.4.7 Bottom Support Arm For the bottom support arm cover change to read: "can be either aluminum or plastic, such as 0.156" ABS with UVV inhibitor, with haircell on one side," *and be strong….* Pelco has used that plastic cover material for years without issues of installation problems or wrapping over time.

Response:

5. 659-2.5.1 Span Wire Clamp As requested by Pelco in our May 2014 comments we strongly urge that the material required for the span wire clamp not be restricted to just Aluminum alloy 535.0-F. Pelco has never had a span wire clamp failure in the material it uses which is not 535 alloy. Rather, the aluminum alloy should be specified to have a minimum ultimate tensile strength of 32 ksi and minimum tensile yield strength of 22 ksi in accordance with ASTM B28 or ASTM B108

Response:

6. 659-2.5.3 Adjustable Hanger it is not clear which specific devices are included in this category. But, with all due respect to FDOT, Pelco believes that calling out a specific aluminum alloy in a "serrated adjustable hanger" unfairly limits suppliers in providing improved designs in this area. Rather, the performance requirements should be identified and suppliers should have the freedom to design assemblies that meet the performance requirements without being constrained by such a narrow material specification.

Response:

****