

# SECTION 305 TECH SUB COMM

MINUTES

SEPTEMBER 22,  
2011

3:00PM

CONFERENCE CALL

|                    |   |
|--------------------|---|
| <b>FACILITATOR</b> | <i>Dale Engelhardt, 305 Technical Subcommittee Vice Chair</i>   |
| <b>ATTENDEES</b>   | <i>Mario Bergeron, Dale Engelhardt, Ken Uznanski, Michael Burshtin, Kevin Kesler, Melissa Shurland, Jeff Gordon, Brian Marquis, Stan Hunter, Camren Cordell, Allan Paul, Curtis McDowell, Jack Madden, Charlie Poltenson, Jeff Schultz, Phillip Meraz, Ron Adams, Steve Hewitt, <b>Industry Participants:</b> Terry Monahan, Gavin Fraser, Eric Wilde, Scott Braverman, Eloy Martinez, Glen Rees, Graciella Trilanes, Tak Ishigami, James Michel, Mandy Bishop, Tom Hunt, Tony Sanchez, Jack Martinson, Josh Coran, George Mekosh, Armin Kick</i> |
| <b>ABSENTEES</b>   | <i>Greg Gagarin, Tammy Krause, Mike Trosino, Andrew Wood, Devin Rouse, Chad Edison, Whitney Phend, Anand Prabhakaran, Charles Bielitz, Nico Lindenau, Michael Coltman, Steve Fretwell, George Weber, Art Peterson, John Oimoen, Michael Treazise, Don Damron, Kevin Lawson, Shayne Gill</i>   |

## DISCUSSION/DECISIONS MADE

Vice Chairman Dale Engelhardt opened and facilitated the call. Chairman Mario Bergeron joined the call in progress.

Steve Hewitt took the roll of the "Core Team" members and confirmed that there was a quorum present. Industry participants were asked to email a notification of their attendance to Steve at [shewitt109@aol.com](mailto:shewitt109@aol.com).

On a motion by, Ron Adams, Wisconsin, seconded by Phil Meraz, Iowa, the minutes of the September 22, 2011 conference call of the Technical subcommittee, were approved without objection.

Steve Hewitt reviewed the open action items and provided a brief update on those items that were not on the agenda:

### **Maintaining Industry Participation List:**

Steve Hewitt reported that since the last update the subcommittee has added three new industry participants. The list has been updated, and now includes **188** members! The list is posted on line at the AASHTO website at [www.highspeed-rail.org](http://www.highspeed-rail.org) in the subcommittee link, and is included in the monthly S305 NGEC activities report.

### **Dual Mode Locomotive Requirements Document:**

As previously reported, the Dual Mode Locomotive Requirements Document has been submitted from the subcommittee to the Board. The Board has been asked not to consider the document until the issue of CEM has been resolved.

### **Formation of a Cars Technology Task Force:**

This action item remains as an open item for future consideration once the LTF has completed its work and if it is determined that the subcommittee has the capacity to do it.

### **Agenda Items:**

#### **Review of the September 15th Executive Board Meeting – Dale Engelhardt/Steve Hewitt:**

In the absence of the Chair, Dale Engelhardt and Steve Hewitt provided a brief overview of the key items taken up by the Executive Board on September 15, 2011 including; an ADA update; Buy America update; CEM position paper status; (all items on today's agenda for further discussion) and the appointing of a Chair of the Administrative Task Force – Al Ware, Georgia DOT.

Probably the most pertinent discussion of the Board involved the issue of revising the Diesel-electric locomotive

requirements document - primarily the issue of changing the top speed from 125 mph to 110 mph. After a long discussion, the Board determined that there would not be a change to the requirements document, rather, the RFI process would be the opportunity for the industry to weigh in as to whether or not 125 was feasible.

Steve Hewitt provided the subcommittee members on the call with the motion that was approved unanimously by the Board on September 15, 2011:

*"The Section 305 Next Generation Equipment Committee (NGEC) will utilize the RFI process to assess the capability of the industry to deliver locomotives in full compliance with spec #\_\_\_ and with sustained operating speeds up to 125 mph."*

Later in the call, Steve Hewitt also reported that the bi-level change summary had been referred to a re-formed Review Panel, named by the Board. The Review Panel is meeting on Friday, September 23, 2011 and will discuss the changes and hear from Larry Salci, consultant to the Panel. Larry has provided a report with recommendations. The Panel will report their findings to the Board for its consideration on September 27, 2011.

It was Agreed that Dale Engelhardt would attend the Review Panel conference call to provide technical perspective and/or respond to any questions the Panel may have.

**Status: FRA-CEM position paper – Kevin Kesler:**

Kevin Kesler reported that the CEM position paper has been prepared and is in the review process at FRA. The paper includes two disclaimer statements. One is in regard to clarifying the role of the document and safety standards. Kevin explained that the second disclaimer clarifies that "FRA, as a partner, does not endorse any company or product even though some names are in the specifications."

Kevin commented that the paper is being reviewed, and "when it is done, it is done", but it should not be too long before it has been approved and submitted to the Board. Steve Hewitt noted that it will be on the Executive Board's agenda for a status update on September 27<sup>th</sup>.

**Update: Standardization Pilot Program Review – Michael Burshtin:**

Michael Burshtin provided the following report for inclusion in the minutes:

*"For the Pilot Effort to verify the process flow for review of Candidates for Standardization (CFS), there were seven candidates submitted, providing at least one candidate for the five Technical Subgroups to process, to arrive at a disposition and to create draft Standard wording. The Subgroups were also to evaluate the process and look for improvements. As a Subgroup completes a Standard, it is passed along to the Standardization Working Group (SWG) for concurrence; for the Pilot effort the proposed Standards will also be passed along to the Technical Subcommittee for concurrence. The Executive Committee will then make a final determination on issuing each Standard.*

*The status as of today for these candidates is as follows:*

*CFS 0001 - Wheelsets - Subgroup is still working on draft wording; had expanded the scope to derive up to 4 standard wheelset configurations and were struggling on details. They have been directed to concentrate solely on a wheelset design suitable for the bi-level/single level car specified truck, and are expecting to complete that item by end of next week.*

*CFS 0002 - Brake Discs - Subgroup has reported out a Standard which is now being evaluated by the SWG with some questions raised by them. Some incomplete documentation within the Standard will require correction by Subgroup.*

*CFS 0003 - Brake Shoes - Subgroup has reported out a Standard which is now being evaluated by the SWG, with a question raised regarding applicability. Subgroup will need to provide correction.*

*CFS 0004 - Brake Valves - Subgroup decided to Reject the creation of a Standard for this item.*

*CFS 0005 - Seats - Subgroup decided to Reject the creation of a Standard for this item.*

*CFS 0006 - Windows - Subgroup is still working on draft wording for a Standard, and is driving toward using a single window size as a Standard. Hope to complete shortly.*

*CFS 0007 - HVAC - Subgroup decided to Reject the creation of a Standard at this time, but believes it should be*

*revisited later when the first candidate PRIIA car is being designed.*

*A conference call is being planned for next week for the Standardization Working Group to go over the results of the Pilot effort, and develop necessary improvements in the process. Several issues have been encountered during the Pilot effort:*

*- The most significant issue encountered by all Subgroups was an extreme lack of interest and participation by their members to work on the concepts of Standardization; only one quarter to one-third of their committee membership have been bothering to participate.*

*- A great lack of member urgency to respond to tasks was found as well, especially as compared to creation of a vehicle specification.*

*- Some Candidates were found to be of merit, but to create a subsystem mounting interface type of Standard, the subgroups found it difficult to proceed further without having a starting point with a candidate PRIIA car. They have reported that they find it necessary to defer further work until the design efforts have started upon the first PRIIA standard railcar order.*

*- The research work that takes place at the start of the standardization process was found much more complex than was provided for in the process flow chart. A significant amount of time is consumed to reach a determination if work on a proposed Standard should be pursued at all, and then to establish the process to be used to create a Standard (use an existing one, purchase one, write one, etc.)."*

A discussion ensued following Michael's report. Some of the discussion revolved around the difficulty in getting input from industry members of the various sub groups and Michael also noted that there have been "hiccups in the pilot, for sure."

Dale Engelhardt asked Steve Hewitt to make sure the Standardization Pilot Process was an agenda item for the Executive Board call on September 27<sup>th</sup>. Michael Burshtin will report on the pilot. Steve will send Michael the Board call in information and agenda when it is finalized by Chairman Bronte.

Kevin Kesler commented that it is important that "you do an assessment of the pilot and provide suggestions for going forward. It is good that there have been lessons learned through the process, which may change the process." In fact, Kevin noted "some assignments will go to the buyer of the first car – maybe you, Stan" (referring to Stan Hunter of Caltrans.

Kevin went on to say that "a lot of good work has been done – test driving the process". He again reiterated the importance of capturing the lessons learned in an assessment and making suggestions to improve the process going forward.

Ron Adams asked if he understood correctly from Michael's report that windows were to be standard sizes. Michael said it is what they are working towards. Josh Coran clarified that yes "in sizes of the glazing unit itself" using the superliner standard window as a base. Ron Adams will call Josh for more clarification off line.

**Update: Document Control Pilot process status – Dave Warner:**

In Dave Warner's absence, Steve Hewitt read Dave's report and provided it for inclusion in the minutes:

*"I have finished creating the PRIIA "Clones" of Specifications and Drawings, and have talked with Michael Burshtin about handling the items that will come from the Standardization Group. I am waiting for an opportunity to talk with you and/or Shayne Gill about how to make these documents available to PRIIA participants.*

*The Bi-Level Rev. A Pilot Program Change Summary is in review with the Review Panel, and approval is anticipated to occur at the next Executive Board meeting. I've been working with Camren Cordell to have the actual specification revisions issued within a few days of approval to facilitate the planned Rev. B efforts to support California's planned December issuance of the RFP.*

*To make this happen, I believe we need to have an October 14 deadline for accepting DCRs to be considered in Rev. B. I don't think this is a big problem because 1) Everyone has the specification 2) Everyone has seen the summary of changes in the review process and 3) we've said all along we're accepting DCRs for Rev. B. I have received nearly 50 DCRs to be considered for Rev. B, and I plan to begin processing them – turning the submissions into actual documents and assigning them numbers, next week."*

It was agreed that October 14, 2011 would be the deadline for accepting DCRs for Rev. B, as proposed by Dave

Warner. Dale reminded those members on the call that there would be a Rev. C for DCRs not making the October 14<sup>th</sup> deadline.

**Update: DMU Requirements Document review/approval – Dale Engelhardt:**

Dale Engelhardt reviewed the proposed DMU requirements document he had developed. He emphasized that he tried to incorporate all concerns that had been sent to him. He noted that it was a draft, and if he missed any items that members wanted to include in the document they should feel free to send them to him.

Dale also noted that there were errors in the document he sent out. Errors which included leaving a section in that he meant to take out and some other typos etc. He said he would be correcting the errors and resending the document.

Tom Hunt, Nippon Sharyo, noted that he had provided a number of comments to be considered. Dale did not remember seeing them, but told Tom he could go over them now or submit them and he would address them.

Tom provided a summary of his comments and agreed to provide them again to Dale and to Steve Hewitt. Steve said that he would include them in the minutes, and Dale agreed to address them all.

Tom's comments included:

*2.2.1 Typically DMU cars are designed as a unit with maximum efficiency in mind. That means that there is little reserve power left over to power all functions on non-powered cars at the specified performance. Powered cars connected to non-powered cars should expect to operate at reduced performance, with the performance reduction being tied to the ratio of non-powered cars.*

*2.2.2 Our research shows that the highest worldwide operating speeds for DMUs is 100mph, and the cars that operate at those speeds do not meet the Tier 1 strength requirements. We feel that 90 mph is a more realistic maximum operating speed.*

*2.4 Our engine supplier indicates that a single engine type can operate in the range from sea level to 6000 feet; the engine requires a different turbo-charger and different injectors. With engines rated near a power designation break, there may be EPA Tier 4 implications too.*

*2.7 (and 2.10.1 bullet 7) We do not feel it is necessary to include MU control trainlines on the standard DMU, or to be required to be interoperable with AMTRAK equipment. Removal of this requirement will allow use of the state of the art equipment.*

*2.10.1, bullet 8 There is hydraulic transmission technology that drives both axles on a single truck together, and the wheels in such a system are expected to be maintained to close tolerances to each other. This is an accepted and competitive technology with proven adhesive advantages, and we feel it should not be excluded.*

*2.10.1 Bullet 13 First, we believe that you meant to write that Dynamic braking should be no less than 50% of the total braking (not propulsion) power. Because mechanical transmissions are often connected to only 2 of the 4 wheels on a powered car, they can only provide 25% of the braking power.*

**(The full set of Nippon Sharyo comments submitted on September 7<sup>th</sup> is attached to these minutes – SH)**

It became clear that there are a number of issues to be addressed, including those provided by Tom Hunt, as well as other comments made throughout the discussion. This being the case, Chairman Bergeron determined that there would not be a subcommittee vote today, and that Dale would draft a revised version of the DMU requirements document based on information received today, and additional input others may wish to provide. The revised version will be distributed to subcommittee members for review and comment and discussed on the next conference call of the subcommittee.

The subcommittee anticipates considering the revised requirements document for a vote on the October 6, 2011 Technical subcommittee call. The Executive Board would then have an opportunity to vote on it on their October 11<sup>th</sup> conference call. The initial expectation was that the Board would have it for consideration on September 27<sup>th</sup>, however, Chairman Bergeron noted that it was much better to be sure members of the subcommittee have an opportunity to review and comment on the revised version, and have a chance to vote on it before it goes to the Board.

Mario and/or Dale will address the status of the DMU requirements document on the Executive Board call on September 27<sup>th</sup> and will let the Board know that there has been a lot of feedback received which the

subcommittee wants to address before submitting the document for Board consideration.

**Update: ADA working group progress – Melissa Shurland:**

Melissa Shurland provided a brief report around the concern of addressing the issue of maximum weight of new wheel chairs between 600-800 pounds. There are issues with the footprint of the newer wheelchairs and the ADA WG is going to conduct a survey of companies/organizations that provide wheelchairs to better understand the real world needs.

In response to a question posed by Eloy Martinez, wondering if the ADA WG taking into account the new rule that was just recently published in regards to platform heights?

Kevin Kesler responded that Melissa is aware of the rule and it will enter into decisions regarding wheelchairs and the range in which they need to operate.

Kevin also reminded the members that the rule applies to new construction and major approaches. "We'll have what we have for a while and lifts will still be needed."

**Update: Buy America Survey work – Kevin Kesler:**

Kevin Kesler reported that they have prepared a short briefing on the results of the survey of the industry and will provide the briefing presentation to Steve Hewitt later today for distribution to the subcommittee and the Executive Board.

He also noted that they are looking to adopt as much of the FTA guidelines as they can. He expects that within the next month FRA will issue updates to the FAQ on the website regarding Buy America.

**Other:**

The meeting adjourned about 4:00pm Eastern time. Dale reminded members that if they have agenda items they should provide them to Steve Hewitt and Dale and we'll include them on agendas.

### Action Items Update

The FRA position paper on CEM is still in the review process and will remain an agenda item until resolved.

The Standardization pilot process is ongoing. The working group will hold a call next week to do an assessment of the process, and lessons learned, and to make suggestions for improving the process going forward. Steve Hewitt will ask Chairman Bronte to include an update on the Standardization Pilot as an agenda item for September 27<sup>th</sup>. Michael Burshtin will provide the update.

It was agreed that the deadline for submission of DCRs for Bi-level car Revision B is October 14, 2011. These submissions are to be sent to Dave Warner.

In regards to the DMU requirements document, Dale Engelhardt will take comments received today, and others that may be submitted after the call, and incorporate them into a revised version. The revised document will be distributed to subcommittee members for review and comment. The subcommittee will consider approval of the revised version on October 6<sup>th</sup> (the next call). Mario and/or Dale will brief the Board on September 27<sup>th</sup> on the status of the document and the plan for moving it forward for Board approval.

Kevin Kesler will send the Buy America briefing to Steve Hewitt after the call today for distribution to subcommittee members and the executive Board.



a) New Action Items

**Technical Sub Committee Conference Call Meeting:  
Thursday September 22, 2011 3:00 EST: 1-866-209-1307 / passcode 6486648#**

Go to meeting invitation link: <https://www1.gotomeeting.com/join/608558625>

***Please call in a few minutes early so all is in attendance for Roll Call.  
Thank you***

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**Nippon Sharyo Comments**

**PRIIA Development of a DMU Requirements Document  
September 7, 2011**

In Europe, some single-engine DMU cars operate in trains at speeds up to 100 mph, but usually, like in Japan, they operate at 75 – 80 mph. We know of no service-proven DMU vehicle that can operate at 110 mph. It becomes a matter of physics, where a moderately heavy, fully FRA-compliant vehicle, using a Tier 4 Final underfloor-mounted prime movers, simply cannot produce balancing speeds of more than 90 – 100 mph, even if using an independent Auxiliary Power Supply (APS). We recommend that the top speed for a standard configuration PRIIA DMU be 90 mph, as will be further explained below.

A comparison of the relative strengths and weaknesses of DMUs vs. long-distance, locomotive-hauled equipment would reveal only minimal overlap. Thus, operators are unlikely to choose to operate them together other than in extraordinary circumstances. As such, requiring DMUs to be compatible with Amtrak long-distance trains would burden them with equipment (26C air brakes, control trainline systems, etc.) that would severely hinder all of the advantages DMUs offer. Today's DMU will be operated in metropolitan commuter service, not with Amtrak. The DMU will be used by states for regional services with dedicated rolling stock, purchased for the expanding routes, and not with Amtrak trains. The systems described below take full advantage of today's – and tomorrow's – technologies to give them the best performance, easiest maintenance and availability of replacement parts for decades to come.

To attain speeds of 100 mph or higher, more than 760 HP for traction is necessary. All modern DMU's mount their engines under the floor, and are single level vehicles. Considering the foregoing, restricting maximum speed to 90 mph allows the use of a single engine, with a minimum 760 HP rating, powering both traction and auxiliaries. The application of dual engines is no longer practical with Tier 4 emission requirements, which require exhaust after treatment systems, occupying much more underfloor space than before. In addition, unlike fuel tanks on RDC's, which closely resembled an air brake reservoir, FRA-compliant fuel tanks for locomotives, standard or M.U., are very large and extremely heavy by comparison. The most compact, efficient arrangement is for a single engine to power a hydro-mechanical transmission with a Cardan shaft connection to the adjacent inner axle of the powered truck. Final Drive gear units on both axles are also connected with a Cardan shaft. This close-coupled arrangement of the powered axles requires closer attention to maintaining wheel diameter matching of all four wheels, but in extant operations with this arrangement, wheel truing is not noticeably more frequent than standard arrangements and produces a surprising benefit: virtually no wheels turned for slid flat spots. The latter more than compensates for the former.

Diesel electric propulsion systems are also available, replacing the hydro-mechanical transmission and Auxiliary Alternator with a Main Alternator. While these lend themselves to making use of a higher horsepower prime mover, the added weight offsets the gain in power, with little net change. Where near-term conversion from DMU to EMU is a consideration, or possibly dual mode operation, the Diesel-Electric method can be considered. It must be noted, however, that one mechanical transmission manufacturer reports documented efficiencies of 97%+. While the Diesel-Electric mode may have more flexibility and use more typical maintenance practices, the mechanical transmission method is noticeably more efficient. Dynamic braking with a mechanical transmission would be to the maximum extent that the transmission could provide.

Auxiliary power can be produced by a variable voltage alternator connected to the front end (PTO) of the engine. After rectification, this feeds an APS with 480 / 120 volt AC and 72 / 24 volt DC nominal outputs. As both engine and transmission are automotive products, their standard operating voltage is 24 VDC, using an SAE J1939 CANBus typical format for inter-communications. A Traction Engine Control Unit (TECU) can be provided to communicate with car systems, trainlines, the engine and transmission. CANBus, TCN and Ethernet are available for modern, high speed communications and a Maintenance and Diagnostics System (MDS).

900 miles (with a safety margin, 800 miles between fuelings), representing the operating range offered by a 400-gallon fuel tank, is a reasonable range for DMUs. As noted before, DMUs will most often be used in regional and commuter service, and fueling opportunities

will be at least within that range. Further, the weight penalty for a larger, FRA-compliant fuel tank would infringe on the performance capabilities, as also discussed above.

Again, in consideration of the regional nature of typical DMU operation, the equipment should be allowed to be optimized for the local environment in which it is operating. Thus, equipment required for best performance at altitudes above 6,000 feet should not be required to be placed on cars that operate in systems at sea level. Such a requirement would be an unnecessary financial and performance burden on the local operator.

Meeting the performance requirements with the available space and engine options is a challenge. We don't believe it is so easy to provide electrical outlets for each passenger, and recommend making such a requirement the discretion of the customer.

Similarly, the HVAC system is a major consumer of energy. A realistic range of ambient temperatures of 130°F can be accommodated, to avoid the calculated unnecessary consumption of auxiliary power. By example, DMU's will not likely operate across geographic areas that would see a low temperature of -30°F and a high temperature of 140°F, for a differential of 170°F. Unlike Amtrak, where a coach may operate in Southern Florida during the summer and Wyoming during the winter, DMU's will, simply, not be used on routes more than 250 – 300 miles long. Providing reasonable specifications allows satisfactory train performance and suitable auxiliary power at the same time.

DMU vehicles operate more efficiently than diesel locomotive-hauled trains when the train length is less than 4 or 5 cars. There is little value in having trainline functions operate for consists above 9 or 10 cars (such as would be the case of a functioning DMU consist towing disabled consist).

Modern DMU and EMU vehicles use electronic brake systems that are not normally operated with a 26C-type train. For precise control of the braking, PWM trainline signals are used in a single throttle/braking controller. North American customers prefer this braking system because it can allow each truck to be controlled independently by its own brake control unit. Traditional 26C brake equipment does not provide independent control of brake units. A typical DMU train of two cars will operate with increased safety and dependability with independently controlled truck brakes. Compatibility with traditional trainlines on Amtrak cars and locomotives will nullify these improvements. Provisions can be made to operate in tow mode only. Making the next generation DMU compatible with Amtrak locomotive hauled trains is incompatible with the best DMU equipment designs.

Also note that potential DMU operators may require roll back protection. This is not provided in a 26C brake system.

We recommend the DMU be constructed from structural stainless steel if the goal is a service life of 40 years. The inordinate costs to maintain a mild steel car for that age would be prohibitively high.

The Next Generation Passenger Cars are all powered from 480 volt Hotel Power provided by a locomotive. The DMU must provide all auxiliary loads from the DMU diesel engine and batteries. Intelligent control of electrical loads is an important aspect for DMU design. Equipment such as battery chargers and air conditioners cannot be designed to be interchangeable with similar PRIIA single level car equipment. Standardization of these subcomponents is not practical. Full HEP (auxiliary power) redundancy is impractical. One DMU can share power with another DMU which has inoperative auxiliary power. Some loads would have to be shared with other units. The DMU auxiliary power systems do not synchronize on a common 480 volt trainline. We recommend a requirement for HEP redundancy.

We recommend an FRA-compliant stainless steel carbody, using single engine propulsion and auxiliary power and a hydro-mechanical transmission with a 90 mph maximum operating speed for the PRIIA DMU. Alternatives should be included for appropriate choices.