



# American Public Transportation Association

## Streetcar Subcommittee

### 2018 Mid-Year Meeting

RTA Randolph Facility  
2817 Canal Street  
New Orleans, Louisiana 70119

Wednesday April 18, 2018  
8:00 am – 5:00 pm

Timothy R. Borchers	Chair
Eric Sitiko	Vice Chair
James D. Schantz	Secretary

## Minutes

### 1. Welcome & Introductions

Chair Tim Borchers called the meeting to order at 8:10 am, and introduced Angele Boutte, Assistant Director of Marketing for Transdev who extended a welcome to the attendees on behalf of the New Orleans RTA. She distributed a colorful 18 page booklet that gives an overview of New Orleans current streetcar network and its history. An RTA representative, Oscar Figueroa, Director of Safety, also gave a safety briefing covering emergency procedures during the meeting.

### 2. Meeting minutes from Atlanta, GA

Jim Schantz

Minutes from the October 8, 2017 Atlanta meeting had been circulated in advance. No attendee offered corrections or additions so the minutes were declared to be accepted.

### 3. Updates

- **Light Rail Technical Forum**

Tom Furmaniak

Tom Furmaniak gave an overview of streetcar-related topics presented at recent Light Rail Technical Forum meetings, including an update from the Charlotte Area Transit System on their choice of Siemens S-70 streetcars for compatibility reasons, as S-70 light rail cars are used on the city's light rail line. As well, CAF described the cars for the Maryland Purple Line, which will be the first five section cars in the U.S. At the upcoming Denver meeting in June updates will include the Charlotte Blue Lin extension which opened in March; the I-225 extension in Denver which opened a year ago; and the Ottawa Confederation line, opening later this year. The forum is also planning an update to the streetcar vs. light rail brochure issued some years ago.

- **Community Streetcar Coalition**

Jeff Boothe

In Jeff Boothe's absence, Tom Furmaniak reported on the CSC's meeting on the prior two days, citing the value of lessons learned on startup presentations from several properties. These presentations should become available on the CSC site to members. Other presentations covered developing technology for off-wire operation, planned tests of autonomous operation of a streetcar in Oklahoma City, and evolving roles of streetcars beyond the downtown circulator model most commonly used today. The next CSC meeting will be in Tucson in February 2019.

- **Light Rail & Streetcar Conference, April 7-9, 2019 Jersey City, NJ**

Tom Furmaniak

The call for abstracts is still open, but will close soon. Papers are not required. Sessions planned so far will cover private sector role in operations, financing light rail and streetcars, the latest in fare policies, land use, and transformational technologies, among many other topics.

- **Web Site Update** Jim Schantz  
The Subcommittee's site at [www.heritagetrolley.org](http://www.heritagetrolley.org) and [www.streetcarcommitte.org](http://www.streetcarcommitte.org) continues to be updated regularly with news and other resources that could be of use to groups planning or implementing modern or heritage streetcar systems. The latest draft of the off-wire status paper and the level boarding white paper are among postings in the Technical section.
- **Streetcar Sessions at 2018 APTA Rail Conference in Denver, June 10-13, 2018** Charles Joseph  
Charles Joseph reported that there will be five presentations in the first streetcar session hosted by Eric Sitiko, to be held on Monday in the coveted position immediately after the opening general session. The streetcar committee will be held including lunch at 11:30 on Sunday, June 10.
- **Streetcar Subcommittee Charter** Charles Joseph  
Under APTA rules, subcommittees have a charter that defines officer roles, elections, and the balloting system. This will be sent out 30 days before the rail conference for comments so it may be adopted at the Denver meeting.
- **FTA Perspective:** Eric Madison, FTA  
Unfortunately Eric Madison was unable to attend the conference to report on safety certification procedures, but will plan to hold this session at the Denver meeting.
- **Work Program Update – State of the Art in Streetcar Safety Technology** John Smatlak  
This topic is planned to be covered in the meeting from the perspectives of the carbuilder, the supplier, and the practitioner, followed by a discussion of how to implement new safety practices. Streetcar operating environments (particularly those in mixed traffic) occupy the extreme end of the spectrum of rail operating environments and as such can have unique hazards as compared to other rail modes. Much technology in streetcars has been imported from Europe, where the number of systems is much higher. Some imported technology has been changed significantly when the vehicles are adapted for the U.S. market.

Baseline safety equipment for light rail and streetcars include high performance braking, door obstacle detection, deadman controls, and event recording. Streetcar specific measures include full skirting, no exposed coupler, rounded ends with a low bumper, improved cab visibility and ergonomics, lighting and audible warnings, and additional standee accommodations.

The French regulator STRMTG has developed a number of useful standards for tramways, including cab visibility, protection of pedestrians in collisions with trams, evaluating propensity to derail in automobile collision scenarios, and event recorders. These can provide useful guidance for US streetcar operators. New technology and standards include adapting driver assist technology from automobiles as a stepping stone to driverless operation. Functions include brake activation, power interruption warnings, and speed control, and energy use minimization, among others. Other safety measures being considered or pilot tested include eco driving (energy use minimization), platform spotting assistance, wrong side door inhibit, and user friendliness for drivers. The latter could include measures to minimize repetitive stress injury due to poor ergonomic design of master controllers and the related dead man feature. Groups working on all of these technologies have found they are easier to implement on new cars than to retrofit onto older ones.

A follow-up step is to determine how to get these new standards and practices “to a streetcar near

you.” This topic should be better explored after the day’s presentations.

In a separate item, John Smatlak described the need to update the APTA Modern Streetcar Vehicle Guidelines, an earlier work program of the subcommittee, particularly in the rapidly evolving area of off-wire operation.

- **Practitioners Perspective: Innovative safety technologies on trams - Real-World Scenarios – Steve Bethel, RATP-Dev**

The new Casablanca, Morocco tram system is undertaking a number of safety related projects using new technology. Steve Bethel reviewed their progress:

- Implemented unmanned shifting of cars in O&M center yard
- Installed monitor of the driver’s heart rate
- Developed software called Tachy Tram – measures operator performance with goal of increasing professionalism, passenger comfort and safety, and asset (car) protection
- Provided tools for managers, maintenance personnel, and top management – tools appropriate for each level
- Established a database of data uploaded from cars, covering operation, maintenance etc.
- Produces reports with performance metrics for operator when comes in at end of shift
- Records on a real time basis (to meet regulatory filing requirements) signal runs, overspeed instances, and other operating stats.
- Monitors whether an aggressive operator gives passengers an uncomfortable ride

- **Carbuilder’s Perspective: Barbara Schroeder, Alstom**

Driver assistance systems as a precursor to autonomous tram operations

- Started with autonomous operation tests in an O&M facility
- System detects and stops the car before hitting obstacles such as a bicycle or an orange cone and also provides underrunning protection
- Tests were successful so now integrating more systems in car such as signaling
- Testing when a car enters the yard it goes automatically to stabling position unless scheduled for maintenance in which case runs to the appropriate maintenance track
- Oklahoma City Pilot Project commissioned by the city to determine feasibility of autonomous operation – using as a laboratory 1/3 mile of non-revenue track and using one car – will put out RFP-like document to find other partners
- Update on state of art in non-US standards
  - Crashworthiness standards being enhanced in Europe for longer trams some cities are buying and for coupled cars, and also for different types of vehicle accidents including trying to prevent operator’s space from being invaded. Also pedestrian impact standards developed by French are to become Europe-wide standards
  - Fire Standard update – Europe, North America, Russia have legally defined standards. Other areas follow one or another or are customized. Not clear what Chinese follow.
  - A discussion followed about crashworthiness standards applied to various US cars, and the issue of streetcars and LRVs sharing same track (which Tempe among others will face). Standards need to be updated for this operation. Discussion followed about whether this committee should take lead on creating some US standards incorporating best ideas without onerous or extraneous requirements.

- **Car- builder’s Perspective: Joel McNeil, Brookville Corp.**

- Described automation and safety practices on the Liberty streetcar
- Offer automated off-wire transition

- Offer full automation without driver input, or operator assist, or fully manual – so far manual operation has been chosen in all orders
- Automation can be controlled by wayside, RFID, or GPS
- Silent safety alarm
  - Blue light on roof of car, when activated signal sent to operations center, and cameras start to record at higher resolution
- First responder access to video feed
  - All cameras remotely accessible in real time - Police, MDoT
  - Can move cameras remotely also
  - Cameras run overnight as well (graffiti/vandalism capture)
- Off wire Go/No go indicator
  - Lets operator know enough battery power left to change safely to offwire mode
  - Can load shed, limit acceleration if battery low
- Liberty complies with ASME RT-1, also approaches LRV crashworthiness CPUC 2G so can be sold in California
  - Energy absorbing bumper coming – up to 6.5 mph
  - Interoperability with LRV allowed by these capabilities
- Lengthy discussion followed about battery charging practice and distance car can go in battery mode. Lifecycle data is not yet available. In Detroit charging/discharging is limited to 40%-80% range. Next generation of same batteries will be 30% more efficient, enhancing car range.
- **Sub-Supplier:** **Klaus-Peter Canavan, Knorr-Bremse**  
Applying collision avoidance solutions from the automotive field, challenges and opportunities
  - Hannover – streetcar will stop automatically before hitting auto on track – capability adapted from auto safety components
  - But can't do direct substitution – streetcar will pass very close to objects (line pole or platform)- so system has to distinguish between permanent way vs car, pedestrian, etc.
  - Detecting side approaching threats is very important for rail but less so for autos
  - Left hand turns in front of a streetcar also a challenge
  - Result is to have side facing radar and cameras
  - System should have progressive steps of action – (e.g., warning light, then service brake, then emergency brake) depending on danger and time left to impact
  - VDV 191 standard establishing baseline for application of Driver Assist systems to tramways – currently being drafted – English translation should be made available when complete
  - Conclusion
    - Automotive technology is proven, but needs to be adapted to apply in a streetcar environment
    - Sensors from auto useful, but lifecycle? Parts 20 years later? (rail vehicles last much longer than autos)
    - Auto braking an option
    - Need operator input as develop these capabilities
- **Wayside Technologies** **Christian Nagel, H&K**  
Control and Safety Systems, “Train to Wayside Communications” (The Wayside Component)  
American project requests for innovative safety technology and automated solutions for tramway operations
  - Presentation described operating and regulatory environment in Germany – BOStrab has legal authority – VDV has procedures for risk management to guide system installation
  - Rail vehicle detection systems, include features such as custom LED lights which are still readable if a number of individual bulbs burn out

- Provide track turnout control units, with protection to ensure not set/operated improperly
- Offer secure and fast wayside to vehicle data transmission

#### 4. Roundtable Discussion on Streetcar Safety Technologies

Moderators: Jim Graebner and John Smatlak

How do we move from concept to implementation of new safety tools?

- Concern is the overwhelming amount of safety related data that comes to people starting new systems. Consultants can guide, but there's still too much and light rail/streetcar don't have complete standards (unlike mainline rail where all is codified)
- Streetcar projects typically started by people with no transit experience – making everything more overwhelming
- Vehicle standards successfully created – but haven't gotten right of way design and related features to same point. As an example, Kansas City and Cincinnati have very different station platforms and handled guiding track away from curb for driveways, etc. differently
- In the past, each state and SSO has had different requirements, driving up cost compared to being able to copy practices used in another city. This is now changing with FTA program to standardize SSO certification
- Need more organized guidance, not more regulations

General reaction was that this was a good discussion – but no clear recommendations came from the group. A reasonable start suggested would be to do a gap analysis of standards applicable to streetcar/light rail to identify what areas need more attention. This will be reviewed initially at the June meeting.

#### 5. Presentation: Technologies

- **Vintage DC Trolley:**

Larry Machak, ATS

Controlling vintage DC traction motors with modern technology

- American Traction Systems experience:
  - 90 KW DC propulsion systems for New Orleans Canal cars
  - St. Louis loop trolley
  - El Paso streetcars
- Newly available controller puts electronic features in front of typical series/parallel streetcar control
- Pulse width modulation controller (PWM) – chops voltage down – motor at start draws less current – so saves energy and improves performance
- Controller has speed sensor on each axle and uses this to control slip and slide
- Dynamic braking works down to about zero mph
- Remote diagnostics possible via Wi-Fi (but no control functions to avoid hackers gaining control)
- Stray currents suppressed with lubrication and isolation – problem only in high power engines
- Overall these modern controllers can extend the life of DC motors

#### 6. Next meeting:

APTA Rail Conference, Sunday June 10, 2018 at 11:30 in Denver, CO

#### 9. Other Business and Adjournment

Tim Borchers

There being no further business, Chair Tim Borchers thanked our hosts at the RTA and RATP Dev again, and declared the meeting closed at 3:50 pm.

- Minutes prepared by Jim Schantz

*Hosted by*



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