Vehicle Specifications Webinar

Co-sponsored by:
Multi-State Transit Technical Assistance Program
National Rural Transit Assistance Program

May 13, 2020
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<tr>
<th>Image</th>
<th>Name</th>
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<tr>
<td></td>
<td>Carlton Allen</td>
<td>CUTR/FDOT TRIPS</td>
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<td>Robert Westbrook</td>
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<td>Erin Schepers</td>
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<td>Richard Price</td>
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<td>Robin Phillips, Exec. Dir.</td>
<td>National RTAP</td>
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<td>Nelly Cubahiro</td>
<td>National RTAP</td>
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Welcome, Housekeeping slides, Introduction to National RTAP and MTAP
  - Robin Phillips, Executive Director, National RTAP
  - Richard Price, Associate Program Manager, MTAP/AASHTO

Introduction to TRIPS Program
  - Robert Westbrook, Transit Operations and Safety Administrator, FDOT

COVID-19- Driver Safety in the Time of Pandemics
  - Erin Schepers, Grant Programs Administrator, FDOT

Crash Standards, Reliability, Altoona Report, and Electronic Accessories
  - Carlton Allen, TRIPS Program Manager, CUTR/FDOT

Questions
Introduction
National RTAP Resources and
Multi-State Transit Technical Assistance Program (MTAP)
National RTAP Vehicle Resources

Directions for Resources
1. Go to nationalrtap.org
2. Select “Resource Library”
3. Search for any of the available resources:

Purchasing a Vehicle
- How to Buy Vehicle

Vehicle Specifications
- 2018 Vehicle Specifications 101 Webinar

Driver Safety in the Time of Pandemics

Crash Standards, Reliability, and Electronic Accessories
- 2 the Point - Emergency Management
- START Safety Training & Rural Transit Learner's Training Module (eLearning Course and Print)
- Emergency Procedures for Rural Transit Drivers Learner's Training Module
Resource Catalog

- For all of Products and Resources, visit our Resource Catalog
Additional Resources

Please see the attached handout for National RTAP and Partner Resources.
Vehicle Specifications Webinar

The Council on Public Transportation and the Multi-State Transit Technical Assistance Program (MTAP)

Richard Price
Associate Program Manager, Transit Policy and Technical Assistance
About the Multi-State Transit Technical Assistance Program (MTAP)

What We Do

- Three in-person meetings annually
- 8-10 online educational forums and exchanges
- Reports and communications
- Regulatory and legislative matters regarding state transit programs
- Transit research projects thru NCHRP

MTAP Chair
Dave Harris, New Mexico DOT

MTAP Vice Chair
Don Chartock, Washington State DOT
Council on Public Transportation and MTAP

Our Partners

Our Staff

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Our Websites
https://ptc.transportation.org/
https://mtap.transportation.org/
History of TRIPS

- In response to concerns related to the overall condition of statewide transit agency fleets and the recognition that FTA Section 5310 program funds could be more efficiently utilized, FDOT created the Transit, Research, Inspection and Procurement Services (TRIPS) Program in 1995.

Program Goals of TRIPS

- Provide safe, clean, reliable, quality transit vehicles
- Ensure compliance with Federal and State purchasing requirements
  - Maximize the use of those funds
- Promote customer satisfaction
- Conduct research that enhances product performance
TRIPS

- FDOT contracts with the Center for Urban Transportation Research (CUTR) at the University of South Florida to administer this program.
  - FDOT oversees and manages the program from the FDOT Headquarters in Tallahassee, FL
  - CUTR provides technical and administrative support from both Tampa and Tallahassee locations.
    - The second site in Tallahassee is FDOT's Springhill Facility. This facility houses three (3) full-time employees and serves as the program’s headquarters for vehicle testing, receiving, delivery, inspection; research and analysis (through our Crashworthiness Program at FSU), issue resolution and technical assistance.
TRIPS Program Elements

- Program Elements/ Deliverables
  - Specification Development
  - Vehicle orders
  - Vehicle Inspection
  - Performance Testing
  - Technical Assistance
  - Warranty Support
  - Product Evaluations
Safety in time of Pandemics

- Transit Emergency Team
- Driver Protection Guidance including Risk Assessment
- Agency Guidance for cleaning of interior surfaces

- Resource Guide
  https://ftson.org/covid-19-fl-bus-transit-systems/
Vehicle Specifications

Performance Standards

- Air Conditioning Pull Down Test
- Crashworthiness – Pre-Qualification and Full Scale Rollover
- Alternative Fuels Installation Standard
- Brake Performance Standard
- Emergency Brake Performance Standard
- Acceleration Performance Standard
- Charging System Performance Standard
- Amp Draw Performance Standard
- Electrical System Requirements – SAE Compliance
1. Technical Specification Development

- Springhill Technical Committee (STC) develops vehicle specifications. Specifications are developed using previous contract design criteria, recommendations from the Paratransit Maintenance Consortium, technology advancements, historical data and agency preference.

- FDOT and TRIPS work together to write a performance based technical specification to include the following:
  - Modifications to the OEM chassis
  - Electrical System SAE compliance and Installation
  - Suspension
  - A/C installation and Performance
  - Crash Worthiness

- Final Specification is reviewed and approved by FDOT
The Florida Standard –
Cutaway Bus
Crashworthiness

Research sponsored by:
Florida Department of Transportation (FDOT) Transit Office
Transit Research Inspection Procurement Services (TRIPS)
Robert Westbrook, Erin Schepers, Tony Bradin

Testing and research conducted by:
Crashworthiness and Impact Analysis Laboratory (CIAL)
FAMU-FSU COE http://eng.famu.fsu.edu/cial/
Sungmoon Jung, Ph.D.
Introduction

The Crashworthiness and Impact Analysis Laboratory (CIAL) located at the FAMU-FSU College of Engineering in Tallahassee, Florida has been conducting cutaway bus crashworthiness research and testing for more than 10 years.

“Springhill” is a FDOT facility located on Springhill Road in southwest Tallahassee, FL and used as the headquarters for the FDOT TRIPS Program. CIAL Crashworthiness testing is primarily conducted at Springhill.
Crashworthiness and Safety Assessment of Cutaway Buses

**Goal:** To continually improve the passenger safety of all cutaway buses purchased through FDOT / TRIPS contracts.
Motivation

Cutaway buses are constructed using a two stage build process and usually have a Gross Vehicle Weight Rating (GVWR) exceeding 10,000 lbs. In combination, these two factors exempts them from most federal safety standards.
Crashworthiness and Safety Assessment of Cutaway Buses

Rollover

Uncommon but disproportionate rate of fatalities and severe injury when they occur due to:

• Intrusion (movement of the bus body into the passenger space).
• Projection (movement of passenger resulting in impact with bus body).
• Ejection (partial or complete movement of the passenger outside of the bus body).
Rollover Standards

Quasi-static tests, such as FMVSS 220, have the advantage of being easy to perform and providing greater repeatability of results. They do not, however, resemble real accident conditions.

Dynamic tests, such as the ECE R66 motorcoach rollover test, are better representations of real accident conditions.
Crashworthiness and Safety Assessment of Cutaway Buses

Body Structure

An essential part of crashworthiness design effective in all types of crashes is strong occupant "safety cage".

Cutaway buses designed to meet FMVSS 220 inspected by CIAL were unbalanced in the design of their body structure.

• Very strong roof (able to resist local deformation)
• Relatively weak sidewalls
• Wall/roof and wall/floor connections with little resistance to rotation
Crashworthiness and Safety Assessment of Cutaway Buses

FDOT / TRIPS Crashworthiness Performance Standards
Structural based standards intended to reduce passenger injury by preventing collapse of the passenger compartment “safety cage” during rollover accidents.

PRE-QUAL – Documentation of build methods and quasi-static testing of passenger compartment frame sections.

FL-STANDARD – Tilt Table rollover of fully loaded bus based on ECE R66 rollover.
The purpose of the PRE-QUAL inspection and testing is to document the design and assembly methods of the particular bus model while also ensuring it has a minimum level of structural integrity. PRE-QUAL must be completed before first build for all cutaway buses acquired through FDOT / TRIPS contracts.
### FDOT / TRIPS PRE-QUAL Development

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<th>Test</th>
<th>Required Threshold</th>
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<tr>
<td>Wall to Floor (WF)</td>
<td>≥ 300 J of energy (per meter of panel width) required to rotate the connection 16.7 degrees</td>
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<tr>
<td>Wall to Roof (WR)</td>
<td>≥ 450 J of energy (per meter of panel width) required to rotate the connection 23.0 degrees</td>
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<td>Panel Test</td>
<td>≤ 150 mm permanent deflection after impact with 600 J of kinetic energy (per meter of panel width)</td>
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The FDOT / TRIPS Standard Rollover test is similar to the European Regulation 66 (ECE R66) rollover. The test is performed by placing a prepared bus on a tilt table which then rotates bus to point of unstable equilibrium and allows the bus to fall under its own weight 31.5” onto a flat concrete slab.
The main pass-fail criteria for the rollover test is based on the concept of Survival Space which is a three-dimensional volume defined within the passenger compartment.
The dolly rollover test is intended to be more representative of what occurs in “real world” rollovers. The bus is loaded on a sled which accelerates to 25 mph before being rapidly stopped.

ATD (test dummy) passengers were included to study injury differences between passengers wearing:

- 2 point seatbelt
- 3 point seatbelt
- No seatbelt

Test conducted at CAPE/IMMI Indianapolis, IN.
Getting the most out of the Altoona Bus testing report.

FEDERAL TRANSIT BUS TEST
Performed for the Federal Transit Administration U.S. DOT
In accordance with 49 CFR, Part 665

Manufacturer: ElDorado National-Kansas, Inc.
Model: Advantage

Tested in
7 Year / 200,000 Mile Partial Test

March 2020
Report Number: LTI-BT-R1914-P
Vehicle Inspection

Vehicle inspections are an integral part of the TRIPS Program’s overall mission.

Inspection Steps
- CUTR schedules and coordinates vehicle inspections
- Multi-point inspection occurs at the Springhill Facility in Tallahassee, FL
- Performance test are conducted
- Post-delivery Buy America compliance is reviewed
- Information is entered into the DataCenter:
  - Post-inspection report is generated
  - Post-delivery audit is generated that includes Buy America, Purchasers Requirements, and Federal Motor Vehicle Safety Standard (FMVSS) self-certifications
- If defects are found, the dealers are responsible for making the necessary repairs prior to agency delivery
Service After the Sales

3 Step Approach

- **Mechanical Issues**
  - TRIPS troubleshoots contract related mechanical issues, such as fleet defects and warranty claims.

- **Maintenance Management**
  - FDOT contracts with Florida State University to provide technical assistance to transit agencies in the form of maintenance.

Quarterly Meetings
- TRIPS conducts quarterly meetings with contracted manufacturer's and dealers.
Questions?

TRIPS Website
http://www.tripsflorida.org/index.html

CIAL Website
http://eng.famu.fsu.edu/cial/

Transit Maintenance Analysis Resource Center (TMAARC)
https://tmaarc.org

Lively Paratransit Instructional Program (LPIP)
www.LivelyPIP.com
Your Questions

• What are the recommendations for standard vehicle specifications? Each region may require various options due their climate. What should be the standard for safety, maintenance, etc.?

• Are there recommended modifications during this pandemic?

• Will there be a specification for a protective shield to separate drivers and passengers?

• In light of new recommendations from US DOT to drivers, none of the smaller buses have an option for a sneeze shield and I am retro-fitting a self-designed item. Is there something out there already available?
Your Questions

• Are there recommendations for a vehicle used for volunteer programs?
• What kind of safety devices make seniors and volunteers drivers feel safe?
• I have been asking for Toyota's to be an option for 5310 funds for several years. The Dodge Caravans we have to purchase for ADA transit are low quality. Their lifespan is less than that of a Toyota chassis. Is there a way to add a Toyota chassis?
• What role do electric and fuel cell drivetrains play in near-future light vehicle development?
• Will vehicles be available in propane?
• What are the advantages/disadvantages of alternate fuels?