

# Trolley Troubles

Real or perceived issues with the operation of Heritage Street  
Railways (Streetcar/Trolley) for revenue (passenger) service

*2018 COTMA Conference  
Perth - Thursday 13th to  
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This presentation details the issues often provided by North American municipalities and public transit agencies of why modern streetcars are preferred over heritage streetcars or trolleys. These issues may relate to similar operations throughout the world.

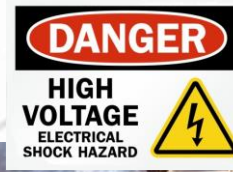
# Trolley Troubles

Real or perceived issues with the operation of Heritage Street Railways (Streetcar/Trolley) for revenue (passenger) service

The issues are listed under the following headings:

- Rolling Stock
- Public Perception and Operational Performance
- Costs
- Staffing
- Access for those with Restricted Mobility
- Other Issues

# Rolling Stock



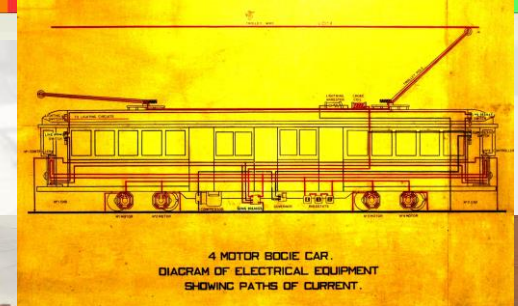
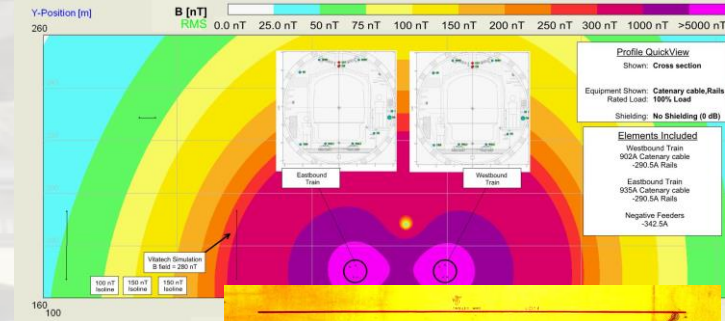
- Unknown or un-quantified ratings of materials or structures
- Wood insulation for 600VDC
- 600 volt DC accessible in the passenger compartment
- 600 volt DC equipment subject to arcing and flashover in the passenger compartment





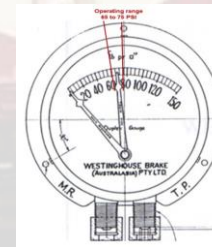
# Rolling Stock

- Age and design of equipment - more likely to fail/longer down time
- Braking - track and ABS braking
- Electromagnetic interference and susceptibility
- Lack of compliance to codes and standards i.e. fire ratings, cable ratings, enclosure ratings



# Rolling Stock

- General lack of ATC/PTC - including driver vigilance systems, anti collision systems, speed regulation (autonomous)
- LOS safe working relied upon
- Lack of failsafe systems
- High voltage and low voltage power supplies i.e. bulbs/globes interior of car, charging systems

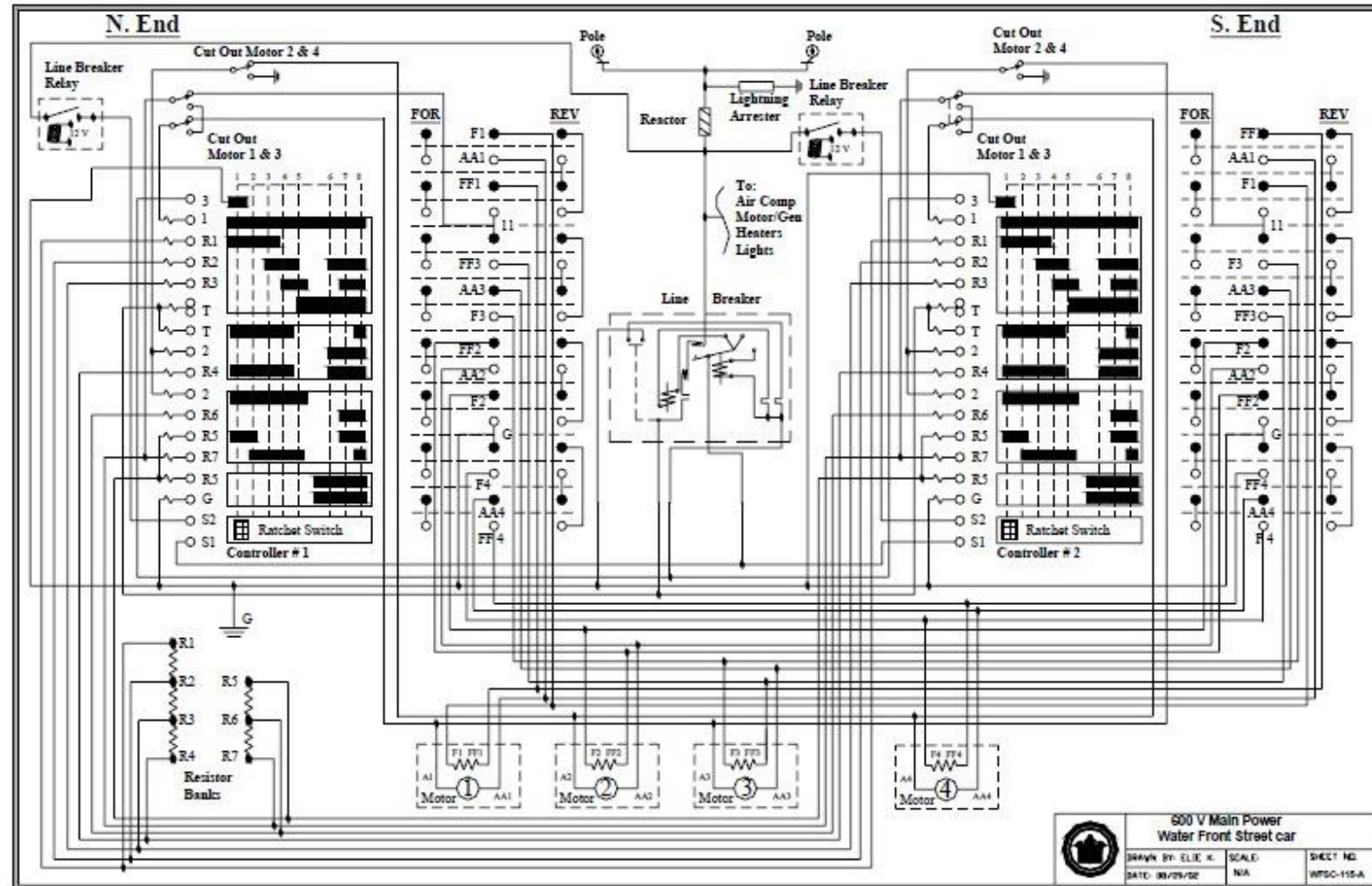


# Rolling Stock

- Buffing/collision strength/crash energy management
- Driver ergonomics
- Inability to operate in MU
- No fully automatic coupling
- No real time monitoring of critical systems including fault detection
- No automatic maintenance diagnostic systems
- Lack of traffic warning devices i.e. indicators, brake lights, effective headlights
- Many cars lack effective circuit protective devices\*







# Rolling Stock

- Combined line switch circuit breaker used in close proximity to operators head/eyes
- Use of lead acid batteries with minimal enclosure protection under passenger seats
- Minimal control lock out protection on non operating end cab
- Ungated/open passenger entrances
- Crews use of running boards due to lack of internal longitudinal isle
- Lack of CCTV monitoring interior and exterior of car
- Car body adjacent track and wayside clearance\*




- 



# Rolling Stock

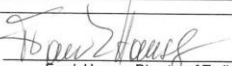



- No concealed operator trouble notification
- Passenger emergency equipment lacking
- Operators manual outdated or incomplete
- Maintenance manual outdated or incomplete
- Lack of fully documented maintenance and operation SOP's
- Configuration management on historical or recent modifications minimal or non existent\*



 **Vehicle Maintenance Procedure**

Title:	MP: K-35 Controller
SOP #:	201-014
Version:	1
Date:	12-18-2017
Page:	1 of 19

Prepared By:		
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Concurrence:		
	Victor Wiley, Safety and Security Officer Rail, MATA Trolley	Date



# Rolling Stock

**Configuration management (CM)** is a [systems engineering](#) process for establishing and maintaining consistency of a product's performance, functional, and physical attributes with its requirements, design, and operational information throughout its life

# Public Perception/Operational Performance

- Antiquated with little practical use and mainly an attraction for “trolley jolleys” or “foamers”
- Passenger capacity
- Slower passenger loading and unloading
- Slower speeds
- Trolley pole use problematic i.e. de-wirements, hazards to car crews
- Wireless options impractical (cost)



# Public Perception/Operational Performance

- Lack of fleet standardization
- Noise
- Comfort (ride quality)
- Climate control
- Updating control or operating system costly, complicated and lengthy vs software update
- Access to equipment for maintenance



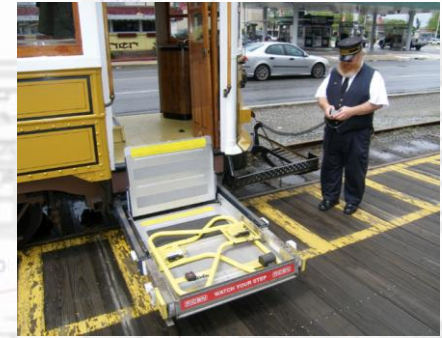
Tram Class SW6

(Original drawing provided by Yarra Trams)



# Access for those with Restricted Mobility

- Not low floor
- Non level boarding
- Uneven floor surfaces
- Restrictive entrance ways
- Restrictive isle ways
- Not ADA compliant

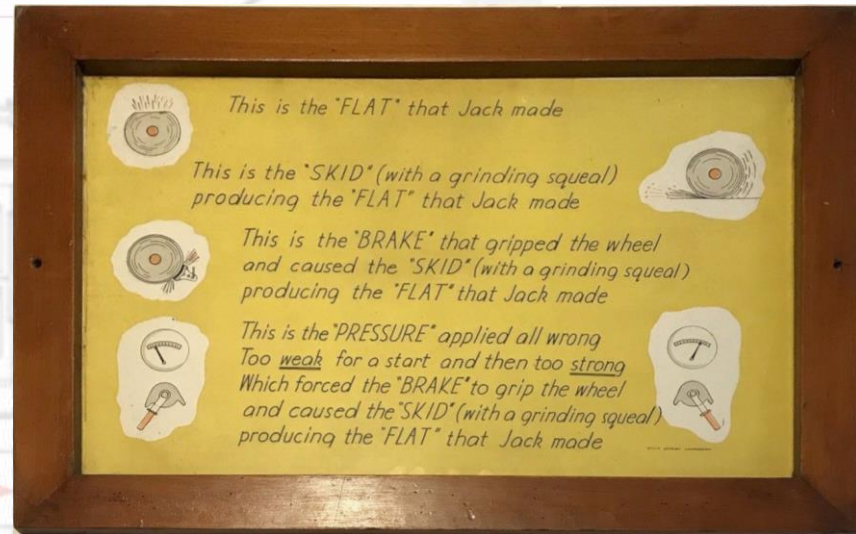


Yarra Trams)



# Costs

- Frequency and intensity of maintenance works
- Spare ratio due to more down time of maintenance and overhaul or cost of additional equipment
- Additional, type and specialization of spare parts
- Cost of training and retraining



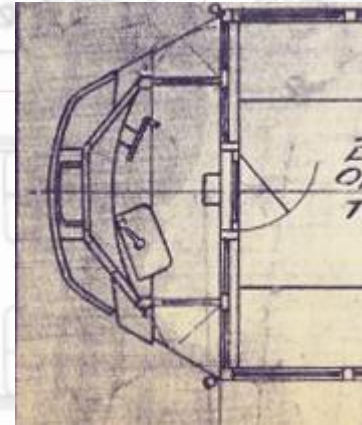
# Costs

- Vehicle reliability
- Cost of additional indoor storage and maintenance of additional buildings for heritage vehicles
- OCS damage, more maintenance



# Staffing

- Additional staff required if two person crews are used
- Additional mechanics due to extra maintenance demand
- Additional training and retraining required due to high turnover of maintenance employees and unique (outdated) equipment used
- Restrictive space for operator in car





# Other Issues

- Difficult to meet buy America and DBE requirements
- Lack of American manufacturers
- Regulatory compliance issues
- Recent history of catastrophic events and failures
  - San Francisco cable cars
  - Memphis Melbourne W2 total loss fires
  - Saint Teresa (Rio de Janeiro) toast rack derailment (5 dead with many seriously injured)



Yarra Trams)





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There are many issues with Heritage Streetcar and Trolley Systems in the United States. These issues significantly impact new System Safety Certification (FTA). There is one document that permits the continued Safety Certification and ongoing operations of these systems.

# Vintage and Heritage Trolley Vehicle Equipment

**Abstract:** This *Standard* establishes minimum requirements for equipping vintage and heritage trolley vehicles, also referred to as vintage trolleys or historic streetcars, for operation on urban heritage trolley systems.

**Keywords:** heritage trolley, historic streetcar, replica trolley, vintage trolley

**Summary:** This *Standard* includes programs and procedures that are to be established and documented in the vintage and heritage trolley system's System Safety Program Plan (SSPP), as well as equipment-related criteria that are to be documented as part of the vehicle safety certification process.

**Scope and purpose:** This *Standard* is applicable to all vintage and heritage trolleys operating in an urban public transit environment. It is not intended for application to railway museums/trolley museums, which may operate similar "heritage" or "vintage" equipment, unless they run in an urban public transit environment. Although a museum has the same obligation to conduct safe operations, there are also significant differences in the nature of a museum operating environment versus that of an urban public transit environment.

The purpose of this document is to provide APTA member transit systems and other vintage and heritage trolley operators with minimum standards for equipping and operating vintage and heritage trolley vehicles.

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