



---

# **SYDNEY TRAMWAY MUSEUM**

**HISTORICAL TRAM OPERATIONS ON THE MUSEUM  
TRAMWAY**

**MAY 2019**

**SYDNEY TRAMWAY MUSEUM**

# Document Control Record

**1. Document Details:**

**Name:** Historical Tram Operations On The Museum Tramway

**Number** STM 6082

**Version Number:** 1.16

**Document Status:**  Working Draft

Approved for Issue

Archived

**Next Scheduled Review**

**Date:** .....

**2. Version History:**

Version Number	Date	Reason/Comments
1.0	31/10/2006	Initial issue
1.1	16/02/2008	Amendments made to document for changes to tramcars
1.2	10/12/2008	Amended the placing of conductors
1.3	19/01/2009	J car details added
1.4	24/11/2009	42s and 99u details added
1.5	17/12/2009	Amended the wording for 42s and 99u.
1.6	31/10/2011	Amended the wording as tram 2001 is now a 2 person car
1.7	29/02/2012	Fix anomalies and include the process for operating coupled sets
1.8	31/03/2012	Amend the procedure to show Adelaide H cars a 2 person operation
1.9	30/11/2012	Amended to allow for only 2 crew when shunting trams
1.10	09/03/2015	Amended to allow for only 2 crew on the Y1611 and 11W
1.11	11/08/2015	Amended to allow Cat 1 medical member to shunt alone.
1.12	31/03/2016	Amended Distribution List format and document number
1.13	30/04/2016	Add the summary of crew positions to the back of the procedure
1.14	7/8/2017	Altered the layout of the summery of trams
1.15	24/11/2017	Added minimum crew numbers for Works vehicles and removed Bendigo 11 as it has returned to Bendigo Tramways
1.16	2/05/2019	Correct the position of Observer on footboard cars.

**Approved by** ..... **Signature & Date** .....

**3. Distribution List**

Position	Date	Location of Documents
Rail Safety Manager		Original held on GOOGLE secure Website
STM WEB SITE		Updated regularly and put onto the STM Web site.
STM Office		STM Office Computer
STM Office		STM Office cupboard

# Task: Historical Tram Operations on the Museum Tramway

## **Context**

The Museum operates historical trams over a total of 3.6 kilometres of track, including within the Museum grounds, and on exclusive right of way north of the museum boundary towards Sutherland for approximately one kilometre, and south of the museum boundary over the former National Park Railway for approximately two kilometres. Single track sections are protected by traditional staff and ticket safeworking.

There is a grade crossing with the Princes Highway on the National Park line, protected by traditional rail crossing warning signs, flashing lights and warning bells, activated by trams passing over an induction loop. In addition the RTA has erected additional flashing orange warning signals some 200 metres either side of the crossing.

There are three minor crossings on the Sutherland line protected by stop signs and advance warning 'side road' signs on the adjacent roadway.

About 28,000 passengers are carried annually using approximately four or five trams from an available pool of around twenty accredited trams for regular use.

The Museum is open on Sundays, Wednesdays and Public Holidays and throughout school holidays.

A pool of some 70 volunteer drivers and conductors is rostered for duties on a needs and availability basis.

Maximum point to point journey time is ten minutes, with a minimum stand over time of five to ten minutes, so fatigue factors have never been assessed as a risk issue.

All trams carry a minimum two-person crew of driver and conductor.

Apart from two trams equipped with dead man handle or pedal controls, other trams do not have such equipment fitted. Operating speeds do not exceed 20 kph.

## **Activities and Working Conditions**

The tram is put into motion by the driver on receipt of the starting signal from the conductor. The driver moves the controller for power. A service brake and hand brake are available. The driver is generally solo in the cab, with conductors required to maintain contact. The driver must not operate the tram before given the 'signal to proceed' by the conductor to proceed.

## **Health Attributes**

The key requirements are:

- The need for accredited drivers and conductors to maintain good physical health;
- An adequate level of fitness and dexterity to cater for an emergency; and
- A need to possess a certificate of fitness from a qualified medical practitioner.

## **Engineering and Procedural Environment**

Of necessity, the risk and health assessment has been dealt with on a tram by tram basis grouped according to operating similarities and conditions.

## **SYDNEY TRAMWAY MUSEUM**

In the event of sudden driver incapacity, it is possible although unlikely, that a tram could proceed at an unchecked speed for an unspecified period before it will stop (thereby placing passengers and others at risk).

### **Risk Analysis and Categorisation: SCW (Category 2)**

Whether a driver has a SCW Category 1 or 2 medical, the operation of the tramcar will be the same. Depending on the individual attributes of the tramcar, as outlined in a separate section, “RISK CONTROL MEASURES FOR THE OPERATION OF INDIVIDUAL TRAMCARS”, there must be a second person present who is capable of monitoring and stopping the tram. Provided this procedure is employed, the task assigned to drivers and conductors, and where necessary, third crew members, need to be assigned to persons who possess a Safety Worker Health Assessment as for SCW (Category 2).

### **Health Assessment Requirements**

No tramcar shall be operated in service, other than as determined in accordance with the “RISK CONTROL MEASURES FOR THE OPERATION OF INDIVIDUAL TRAMCARS” section.

All tramcar drivers, conductors and crew members must possess a current safety Critical Worker Health Assessment as for SCW (Category 2).

No colour vision requirements.

## **RISK CONTROL MEASURES FOR THE OPERATION OF INDIVIDUAL TRAMCARS**

### **Health Assessment Requirements**

ALL operating procedures for the operation of tramcars shall remain in force as documented.

The following additional procedures MUST be observed to meet health and safety requirements for their use as set by tramcar type.

**IN ALL CASES, except for tramcars fitted with a dead man handle or pedal, TO MEET HEALTH ASSESSMENT RISKS, A SECOND PERSON MUST BE AVAILABLE, IN THE EVENT OF THE SUDDEN INCAPACITY OF THE DRIVER, TO BE IN AN IMMEDIATE POSITION TO TAKE CONTROL OF THE TRAM AND BRING IT TO A SAFE STOP.**

## **OPERATING CONDITIONS OF TRAMCARS**

A summary of the crew positions is shown in Appendix A and B.

### **BALLARAT - 37**

This car MUST be operated with a three-person crew, with a driver, conductor and driver observer.

The second person, whilst the tram is in motion, must be positioned in the driver’s cab so as to observe the driver, and take action to remove the power to the controller and apply the brakes, in the event of sudden incapacity of the driver.

The conductor must be positioned at the rear of the saloon

### **BRISBANE TRAMCARS - 295 and 548**

These tramcars are fitted with an emergency brake lever located in the centre of the tramcar. Before operating either tramcar the driver’s door must be wedged in the open position so that the driver can be observed from behind.

The second person, who may also be acting as the conductor, MUST be positioned in the centre of the tram whilst it is in motion so as to maintain a clear line of sight to the driver and be in a position to activate the emergency brake lever in the event of sudden incapacity of the driver.

# SYDNEY TRAMWAY MUSEUM

## BRISBANE TRAMCARS - 180

This tramcar may be operated by a two-person crew, as driver and conductor.

The second person, who may also be acting as the conductor, must be positioned on the front platform near the driver. In the event of sudden incapacity of the driver the second person must be ready to take control of the tram by applying the hand brake to bring it to a stop

## SYDNEY C TYPE TRAMCARS - 29 and 290

These tramcars may be operated by a two-person crew, qualified as drivers for this type of tramcar.

The second person, who may also be acting as the conductor, must be positioned on the front platform behind the driver. In the event of sudden incapacity of the driver the second person must be ready to take control of the tram and bring it to a stop by removing the power to the controller and apply the brakes.

## SYDNEY 'F' CLASS TRAMCAR – 393

These cars must be operated with a three person crew, with a driver, conductor and driver observer.

The driver observer **MUST** be positioned in the driver's cabin so as to observe the driver, and be in a position to take action to remove the power to the controller and apply the brakes, in the event of sudden incapacity of the driver.

The conductor, whilst the tram is in motion, must ride at the rear of the tram in the open saloon.

## SYDNEY 'J' CLASS TRAMCAR – 675

This tramcar must be operated with a three person crew, with a driver, conductor and driver observer.

The driver and observer must be qualified as drivers for this type of tramcar.

The driver observer **MUST** be positioned in the driver's cabin so as to observe the driver, and be in a position to take action to remove the power to the controller and apply the brakes, in the event of sudden incapacity of the driver.

## SYDNEY CORRIDOR TRAMS - 1979 and 2001

These tramcars are fitted with an emergency brake lever located in the centre of the tramcar. Before operating either tramcar the driver's doors on either side of the driver's cabin must be locked in the open position so that the driver can be observed from behind.

The second person, who may also be acting as the conductor, **MUST** be positioned in the centre of the tram whilst it is in motion so as to maintain a clear line of sight to the driver and be in a position to activate the emergency brake lever in the event of sudden incapacity of the driver

## SYDNEY CORRIDOR TRAM - 1740 and 1971

This car **MUST** be operated with a three person crew, with a driver, conductor and driver observer.

The driver's doors on either side of the driver's cabin must be locked in the open position.

The second person, whilst the tram is in motion, must be positioned in the driver's cab so as to observe the driver, and take action to remove the power to the controller and apply the brakes, in the event of sudden incapacity of the driver.

The conductor must be positioned at the rear of the saloon.

## ALL SYDNEY FOOTBOARD TRAMCARS – 141s, 154, 728, 805, 1111 and 1497

These cars must be operated with a three person crew, with a driver, conductor and driver observer.

The driver observer **MUST** be positioned in or near the driver's cabin so as to observe the driver, and be in a position to take action to remove the power to the controller and apply the brakes, in the event of sudden incapacity of the driver.

## SYDNEY TRAMWAY MUSEUM

The conductor, whilst the tram is in motion, must ride on the footboard at the rear near driver's cab, left hand side. These conditions apply to 141s if carrying passengers on special days (i.e. 3 persons when tram is driven and 1 person (conductor) when trailing).

### COUPLED SET OF TRAMCARS

When operating as a coupled set (i.e. 805+1111 or 141s+1111), the trams must have a three-person crew on the lead tram and one person (conductor) on the trailing tram. However when the coupled set crosses the Princes Highway, the total tram crew should be 5 staff. This is made up of the driver, the observer and 3 conductors. Normally there should be 2 conductors on each footboard tram to ensure that passengers do not stand on the footboards. However the observer can also check the "RIGHTHAND SIDE of the first tramcar (i.e. RIGHTHAND SIDE of the driver in the direction of travel) so that only 2 conductors are needed on the second tramcar to monitor the footboard on this car.

### SYDNEY WORKS TRAMS - No 3 Reciprocating Rail Grinder, 24s, 42s, 99u, 134s and 141s

These cars must be operated with a two-person crew, with a driver and a driver observer unless the driver has a Category level 1 medical in which case he can drive alone on "Works days only". If operating during Traffic days (i.e. there are public on site) then a two-person crew must be used.

The driver observer MUST be positioned in the driver's cabin so as to observe the driver, and be in a position to take action to remove the power to the controller and apply the brakes, in the event of sudden incapacity of the driver.

Any additional workers are to be located in the rear driver's position. Subject to the special provisions below relating to 99u no person is permitted to travel on the deck of these cars. These cars are not to be used to carry passengers. On 42s a sign to that affect is fixed on the bulkhead at the rear of each cab facing the deck. Also, warning signs about the risk of live overhead wires are fixed in similar positions on that car.

Overhead line workers may be carried on the tower or deck of 99u while that car is in motion but only in the following circumstances:

1. The safety railing is to be raised and in place on the tower platform;
2. Any overhead line worker is to be safely positioned in a secure area of the deck;
3. And in either case:
  - a) The worker/s is/are to travel in either position only if it is necessary to do so in order to carry out, in an effective manner, inspection/maintenance/construction work on the overhead or supporting structures;
  - b) The car is not to exceed slow while so operated; and
  - c) The observer is to keep a careful watch on the overhead worker/s during such work.

### MELBOURNE W2 TRAMCAR - 249

This car must be operated with a two-person crew, a driver and conductor. The tramcar is fitted with an emergency brake lever located in the centre of the tramcar and as the door to the driver's cabin has a clear glass panel fitted, it allows the conductor to see the driver at all times.

The second person, who may also be acting as the conductor, MUST be positioned in the centre of the tram whilst it is in motion so as to maintain a clear line of sight to the driver and be in a position to activate the emergency brake lever in the event of sudden incapacity of the driver.

### MELBOURNE - Z111 and PCC- 1014

These cars are fitted with a dead man control and may be operated with normal two people, in accordance with existing operating procedures, i.e. the conductor must be at the rear of the tram.

### MELBOURNE TRAMCAR – Y1 611

This tramcar must be operated by a two-person crew, as driver and conductor.

## SYDNEY TRAMWAY MUSEUM

The second person, who may also be acting as the conductor, must be positioned in the middle or forward of the middle of the car. In the event of sudden incapacity of the driver the second person must be ready to take control of the tram by applying the air brake and then removing the power.

### MELBOURNE WORKS TRAMCAR – 11W

This tramcar must be operated by a two-person crew, as driver and observer.

As it is a WORKS tramcar it will NOT carry passengers so the second person must be positioned beside the driver. In the event of sudden incapacity of the driver the second person must be ready to take control of the tram by applying the hand brake to bring it to a stop

### ADELAIDE H cars - 357 and 358

These cars must be operated with a two-person crew, with a driver, and a conductor.

The conductor MUST be positioned near the driver's cabin so as to observe the driver, and be in a position to take action to remove the power to the controller and apply the brakes, in the event of sudden incapacity of the driver.

On reaching a turn-back location where doors are opened, and before the driver changes ends, the conductor will move to the rear of the tram to isolate that door.

### BERLIN TRAMCARS - 5133

These cars must be operated with the drivers' doors in the open position, with the second person, who may also be the conductor, positioned at the rear of the tram, so as to observe both the driver and the passengers in the tramcar whilst the tram is in motion, and be in a position to remove the power to the controller and apply the hand brakes, in the event of sudden incapacity of the driver.

### NAGASAKI CAR - 1054

This car must be operated with the second person, positioned in the middle of the tram near the emergency brake handle, so as to observe both the driver and the passengers in the tramcar whilst the tram is in motion, and be in a position to pull the emergency brake handle and apply the brakes, in the event of sudden incapacity of the driver.

### MUNICH TRAMCAR - 2656

A clear glass screen behind the seat protects the driver's station with open space to either side. Visibility of the driver's station is good from all parts of the saloon. The tramcar is single ended but has a spring-loaded reversing controller of two notches at the rear end. This controller station is not separated from the saloon. It is clearly visible from all parts of the saloon.

An emergency brake handle is located above windows on the right hand side in the centre of the saloon.

The driver can be monitored by a second crew member from any position within this tramcar and the emergency brake handle can be easily and quickly accessed by the second crew member (who would have other duties as the conductor) in the event of sudden incapacity of the driver.

SHUNTING TRAMS WITHIN THE MUSEUM COMPLEX WHEN SHUNTING, WITHOUT carrying passengers, around the museum site, a crew of 2 (driver and observer) is required to operate the tram at all times. The exceptions will be the Melbourne Z111 and the PCC-1014 cars which can shunt with only one qualified person as they both have dead-man controls.

However qualified members who have a Category Level 1 medical are permitted to shunt without an observer provided that it is within the confines of the fenced area of the Museum and that NO PUBLIC ARE PRESENT at the time.

## SYDNEY TRAMWAY MUSEUM

### APPENDIX A - SUMMARY OF POSITION OF TRAM CREWS FOR PASSENGER TRAMS

Tram Number		No. Of Crew	Position of Conductor		Position of Observer
12	Ballarat	2	Centre of tramcar	See NOTE 2	None
29	Sydney	2	Front platform beside driver	See NOTE 3	None
37	Sydney	2	Front platform beside driver	See NOTE 3	None
37	Ballarat	3	Rear of the saloon		See NOTE 4
111	Melbourne	2	Rear of the tramcar	Has dead man controls	None
141s	Sydney	2	Beside the rear driver's cabin		See NOTE 4
154	Sydney	3	Beside the rear driver's cabin		See NOTE 4
180	Brisbane	2	Front platform beside driver	See NOTE 1	None
249	Melbourne	2	Centre of tramcar	See NOTE 2	None
290	Sydney	2	Front platform beside driver	See NOTE 3	None
295	Brisbane	2	Centre of tramcar	See NOTE 2	None
357	Adelaide	2	Front platform beside driver	See NOTE 3	None
358	Adelaide	2	Front platform beside driver	See NOTE 3	None
393	Sydney	3	Rear of Saloon		See NOTE 4
548	Brisbane	2	Centre of tramcar	See NOTE 2	None
611	Melbourne	2	Middle or forward of the middle	See NOTE 3	None
675	Sydney	3	Beside the driver		See NOTE 4
728	Sydney	3	Beside the rear driver's cabin		See NOTE 4
805	Sydney	3	Beside the rear driver's cabin		See NOTE 4
1054	Nagasaki	2	Centre of tramcar	See NOTE 2	None
1111	Sydney	3	Beside the rear driver's cabin		See NOTE 4
1497	Sydney	3	Beside the rear driver's cabin		See NOTE 4
1740	Sydney	3	Rear of the saloon		See NOTE 4
1979	Sydney	2	Centre of tramcar	See NOTE 2	None
2001	Sydney	2	Centre of tramcar	See NOTE 2	None
5133	Berlin	2	Rear of the tramcar	See NOTE 3	None
2656	Munich	2	Centre of tramcar	See NOTE 2	None
1014	PCC	2	Rear of the tramcar	Has dead man controls	None

NOTE 1 – Conductor position: *The conductor must be positioned on the front platform near the driver and must be ready to take control of the tram by applying the hand brake to bring it to a stop.*

NOTE 2 – Conductor position: *The conductor MUST be positioned in the centre of the tram whilst it is in motion so as to maintain a clear line of sight to the driver and be in a position to activate the emergency brake lever in the event of sudden incapacity of the driver.*

NOTE 3 – Conductor position: *The conductor must be ready to take control of the tram by removing the power to the controller and apply the brakes.*

NOTE 4 – Observer position: *The Observer MUST be positioned in or near the driver's cabin so as to observe the driver and take action to remove the power to the controller and apply the brakes (i.e. on the right hand side of the driver). When crossing the Princes Highway the Observer should be preferably in the Driver's cabin.*



# SYDNEY TRAMWAY MUSEUM

## APPENDIX B - SUMMARY OF POSITION OF TRAM CREWS FOR WORKS TRAMS

Tram Number		No. Of Crew	Position of Observer	Notes
3	Reciprocating Rail Grinder	2	Front platform beside driver	1 and 4
11w	Track Scrubber	2	Front platform beside driver	1 and 2
24s	Freight Car	2	Front platform beside driver	1 and 2
42s	Ballast Motor	2	Front platform beside driver	1 and 2
99u	Overhead Line car	2	Front platform beside driver	1, 2 and 3
134s	Track Scrubber	2	Front platform beside driver	1
141s	Breakdown Car	2	Front platform beside driver	1

NOTE 1 – None of the Works trams can carry passengers except 42s and 99u (see Note 2 below).

NOTE 2 - Any additional workers are to be located in the rear driver's position. Subject to the special provisions in Note 3 relating to 99u, no person is permitted to travel on the deck of these cars.

NOTE 3 - Overhead line workers may be carried on the tower or deck of 99u while that car is in motion but only in the following circumstances:

- a) The safety railing is to be raised and in place on the tower platform;
- b) Any overhead line worker is to be safely positioned in a secure area of the deck;
- c) And in either case:
  - i) The worker/s is/are to travel in either position only if it is necessary to do so in order to carry out, in an effective manner, inspection/maintenance/construction work on the overhead or supporting structures;
  - ii) The car is not to exceed slow while so operated; and
  - iii) The observer is to keep a careful watch on the overhead worker/s during such work.

NOTE 4 – Whilst there may be room for **two persons in the cab of the Rail Grinder** they may need to be of adequate stature. So if 2 persons cannot fit into the cab it should not operate.

ooo000ooo