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# SYDNEY TRAMWAY MUSEUM

## DISABLED TRAMCARS

~~MARCH 2016~~ MAY 2020

Instruction Manual For Retrieving Disabled Tramcars  
Prepared for Traffic Officers-in-Charge





# SYDNEY TRAMWAY MUSEUM

This edition edited by W. M. Denham

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COVER PHOTO: City bound R car 1881 had come to grief in William Street, eventually re-railing itself, but unfortunately on the wrong track.

*Vic Solomons Collection*

**SYDNEY TRAMWAY MUSEUM**  
**DISABLED TRAMCARS**  
**INSTRUCTION MANUAL FOR**  
**OFFICERS-IN-CHARGE**

**01    GENERALLY**

From time to time Officers-in-Charge will be faced with the need to salvage disabled trams from situations ranging from a simple partial derailment to a major derailment or infrastructure failure. Officers-in-Charge will be offered instruction on the various procedures to be adopted to restore order but must be reasonably certain that they will not make the situation worse by their attempts.

**02    THE WORKING ORDERS**

It is intended that this manual will supplement the Tramway Working Orders. Officers-in-Charge will also be given the opportunity to attend review classes and where possible demonstrations of the remedial action procedures.

**03    PRELIMINARY ACTION**

Whenever a tram fails or is derailed it must immediately be chocked to prevent movement in both directions and the situation assessed to enable proper action to be taken. Injury to passengers and crew and others must be attended to as quickly as possible. Except in the case of fire, which must be tackled as a first priority, nothing further must be done until the tram is secured.

Depending on the type and severity of the incident any passengers must either be advised to remain on the tram or be led to safety by any member present who is not involved in the immediate work of restoring order. Special note must be taken of the warnings about electrical safety, especially of a derailed car. Passengers must be asked to leave any disabled tram before any attempt is made in re-railing the car.

**04    DERAILEMENTS**

While derailments are potentially serious, some consideration should be given to the location and conditions.

**04.1    PARTIAL DERAILEMENT – HARD PAVING**

Where only part of the tram is derailed and the wheels are standing on adjacent hard paving it may be possible to re-rail the car by reversing it back onto the track. This should be attempted at slow speed and stopped immediately if, for any reason, such a move appears to be making the derailment worse. If the move is successful the tram should be moved further so that the site of the beginning of the derailment can be examined. When necessary to back-up a tram it should be done with the provisions for driving trams backwards properly observed.

One person, not standing on the tram, shall be designated supervisor and will be the only person to give verbal or hand signals to the Driver to proceed. If necessary another person must stand on the tram where both the driver and supervisor can be observed to relay messages.

Any person present may give a verbal "Stop" signal which must be acted upon immediately by the driver and the tram secured before the driver leaves the controls to investigate.

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### 04.2 TOTAL DERAILMENT – HARD PAVING

Where all wheels have left the track on hard paving the tram must be considered "live" when any current collector is on the overhead wire. **First step is to make the tram safe by removing the roof mounted current collector from the overhead wire. This should be done by a qualified person not on board the tram. No one is to exit the tram until the power is removed** If possible, a suitable tram may be brought to the site and coupled to the disabled car. An attempt may be made to tow the derailed car back onto the track but this must be done at slow speed and stopped immediately if, for any reason, such a move appears to be making the derailment worse.

If the move is successful the tram should be moved further so that the site of the beginning of the derailment can be examined. When necessary to back-up a tram it should be done with the provisions for driving trams backwards properly observed.

In either situation 04.1 or 04.2 above, should the initial attempt at re-railing the tram not see the wheel flanges heading towards the track grooves then work must cease and special re-railing plates are to be brought to the site and inserted as directed.

### 04.3 PARTIAL DERAILMENT – SOFT PAVING

Where only part of the tram is derailed and the wheels are standing on adjacent soft paving it may still be possible to re-rail the car by reversing it back onto the track. In this case suitable steel plates should be inserted behind the tram up to the rear wheels. This should be attempted at slow speed and stopped immediately if, for any reason, such a move appears to be making the derailment worse. If the move is successful the tram should be moved further so that the site of the beginning of the derailment can be examined. When necessary to back-up a tram it should be done with the provisions for driving trams backwards properly observed.

### 04.4 TOTAL DERAILMENT – SOFT PAVING

Where all wheels have left the track on soft paving the tram must be considered "live" when any current collector is on the overhead wire. **Again, the procedure outlined in 04.2 is to be done.** If possible a suitable tram may be brought to the site and coupled to the disabled car. An attempt may be made to tow the derailed car back onto the track but this must be attempted at slow speed and stopped immediately if, for any reason, such a move appears to be making the derailment worse.

If the move is successful the tram should be moved further so that the site of the beginning of the derailment can be examined. When necessary to back-up a tram it should be done with the provisions for driving trams backwards properly observed.

In either situation 04.3 or 04.4 above, should the initial attempt at re-railing the tram not see the wheel flanges heading towards the track grooves then work must cease and special re-railing plates are to be brought to the site and inserted as directed.

### 04.5 DERAILMENT – OPEN BALLAST TRACK

It is unlikely that any tram derailed partially or wholly on open ballast track will be able to be re-railed by any of the procedures listed above. In this case the workshop will have to be advised so that suitable jacks and packing may be brought to the site to enable the tram to be lifted and returned to the rails.

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Traffic staff may assist by locating and if necessary moving all trams between the museum and the derailment site and bringing the designated breakdown tram out of the tram shed and up to the disabled car after calling the breakdown crew to attend.

Staff working will apply to the operation of the breakdown tram, a staff being retrieved by hand from the disabled car if necessary and handed to the driver of the breakdown tram.

### **05 FAILED TRAMS**

Where any tram fails and cannot continue its journey under power it must be secured by brake or chock. If it is not derailed or involved in a collision with another tram or a motor vehicle, consideration may be given to removing it to a stabling point clear of the main lines.

Generally speaking a similar type of tram should be brought to the disabled car and coupled on. The coupled set will then be driven by the Officer-in-Charge with a certified driver on the disabled car to work whatever braking system may still be operable. Disabled trams must be moved at slow speed, but not generally exceeding series speed of the towing vehicle.

A schedule of car types and specific towing procedures is scheduled below.

### **06 FIRE IN VEHICLE**

When fire is detected or suspected in a tram or other vehicle, the vehicle is to be moved as far as practicable away from other vehicles or structures and secured and all persons directed to alight. The Driver must then attempt to extinguish the fire, calling for extra assistance as may be required.

In the case of passenger trams or buses, the Driver will remain with the vehicle to assist the passengers, and fight the fire; the Conductor will leave immediately to raise the alarm and arrange alternative transport for the passengers.

Any tram that has been subjected to fire, when returned to the depot, must be parked as far as possible from other trams, vehicles and structures until examined by workshop staff. The possibility exists that a breeze might cause embers to reignite and cause further damage.

### **07 FIRE INVESTIGATION**

Once any fire has been extinguished, the area is to be cordoned off and left otherwise undisturbed for investigation by the Society's Safety Committee or any other persons having right of access, to enable the cause of the fire to be established, if possible, areas of responsibility and means to prevent a re-occurrence.

### **08 ELECTRICAL FIRES**

The primary duty of any person fighting an electrical fire shall be to isolate the burning equipment from electric power. This in itself may cause the fire to be extinguished. If the fire continues, it should be extinguished with non-conducting material - dry sand or soil, fire extinguishers specially marked suitable for electrical fires or a low flammability cloth. Use of water hoses should not be considered due to the risk of electrocution.

### **09 TOWING AND PROPELLING**

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When it is necessary for a disabled tramcar to be towed, an authorised member must stand at the brake on the leading end of the car being towed ready to apply the brake, if necessary, to assist the Driver in controlling the tram.

When it becomes necessary to propel a tramcar, an authorised member must stand at the brake of the car being propelled and signal to the Driver of the tram, by hand or lamp signals to start and stop the tram as necessary. Special care must be taken when towing or propelling disabled tramcars without effective brakes. Disabled trams should not be propelled around sharp curves, or generally at speeds in excess of 4 mph (7km/h).

When towing or propelling remote reverser fitted trams, one pair of motors must be cut out to prevent the fourth emergency brake from operating if the tram is towed in the direction opposite that for which the reverser is set.

### **10 COUPLING PROVISIONS**

#### **Sydney Cars:**

All trafficable Sydney cars are fitted with mechanical couplings to enable disabled like system cars to be coupled and towed away. Referenced trams are:

*Socket Only Couplings:* These require either a designated double ended bar or the tongue of a combination type to be inserted and coupling pins returned to both couplings.

C29, C290; D 134s; D117; E529+530; F393; K1296; N728; P1497; R1740\*; R1 1971\*; R1 1979\*; R1 2001\* (NOTE: \* use "long" coupling bar normally carried in driver's cabin at No.1 end of an R type car.)

*Tongue and Socket Couplings:* These will mate with like couplings -but not with socket only type. An intermediate bar is required.

L/P154; O 1111; O 141s; O 957; 24s; 42s; 93u; 99u;

The cable trailer 23 will use the special cranked coupling bar to avoid straining the low-mounted coupling.

Track tamper; low height flatcar; Weed Spray Trolley: these have special coupling bars, which must be used at all times.

#### **Melbourne Cars:** (including *ex*-Melbourne cars)

All Melbourne cars are fitted with coupling pockets on the buffer beams. Special Melbourne coupling bars are available to link Melbourne cars to each other and most other trams with socket couplings.

W2 249; Ballarat 12; Ballarat 37; Melbourne Y1 611, Z2 111

#### **Brisbane Cars:**

These are currently not fitted with couplings and must be chained to another tram with similar height bumpers. The disabled tram may be towed in this situation but a provided hardwood block with rope handle must be allowed to rest between the bumpers when the tram is being propelled.

71; 180; 295; 548

(Note: it is proposed to have a special coupling clamp manufactured to fit on the buffer beam of these cars.) A bow shackle fitted to one of the tow points on 295 or through the hole behind the

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bumper bar on 548 attached to a Melbourne tow bar can be used but this depends on either towing or propelling with the tow tram.

### **Adelaide Cars:**

These are both fitted with Tomlinson type couplings. When a disabled H type tram is to be towed and the other H car is not available then a special coupling pocket carried on each tram must be inserted in the Tomlinson coupler and used with coupling bar or coupling tongue.

H 357; H 358

### **Overseas Cars:**

*MUNI PCC 1014:* A special coupling bar is provided on the tram and must be inserted in the buffer beam pocket and fitted into a suitable socket on another tram. Care must be exercised that the towing tram will negotiate curves without straining the coupling.

*NAGASAKI 1054:* A special coupling bar is provided on the tram and must be inserted in the buffer beam pocket and fitted into a suitable socket on another tram. This bar is supported on brackets behind the fender at the A End of the tram. Care must be exercised that the towing tram will negotiate curves without straining the coupling.

*BERLIN CARS 3007, 5133-~~& 269-017~~:* Where the Scharfenberg coupling is available to be used on the disabled tram then a like fitted motor tramcar may be coupled to the disabled tram. Where the Scharfenberg coupler is damaged or another type of tram is used then a chain must be secured around the coupler or to the tram underframe and to the towing tram.

*MUNICH CARS 2656 & 2666:* A link and pin coupling is fitted below the driver's cab behind removable facings. It must be swung out and secured by the pins provided. The tram may then be coupled to another car using a coupling bar provided on the car. If the tram is to be towed in reverse then a chain must be secured around the Van Dorn type coupler or to the tram underframe and to the towing tram.

### *OTHER CARS:*

If a tramcar has no couplings fitted but retains a coupler support structure then a suitable coupling may be obtained and installed with proper swivel pins to allow the tram to be coupled to another as outlined above.

## **11 COUPLINGS - MECHANICAL**

Three main types of coupling are in general use on Australian system trams. These are:-

- a. Socket only,
- b. Tongue and Socket, and
- c. Tomlinson type automatic coupler & Scharfenberg automatic coupler.-

Methods of coupling the various types together are shown in diagrams A, B, C and D. Diagram E shows the position of the coupling latches on two of the Tomlinson type. To uncouple, pull one or both of the side levers as shown. When this type of coupling is linked to a similar unit, the coupling pins must be inserted in the holes "f"; when linked to another type, the coupling pin must be inserted into the hole "g".

The gooseneck coupling in diagram H is to be used should the Tomlinson coupler be damaged.

## **12 COUPLING PROCEDURE**

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When it becomes necessary to couple two trams, one must be secured and the other driven up to within 3 feet (1m) of the first. The couplers must be centred and the driven tram moved slowly forward against the brake. When the couplings are correctly mated, insert the coupling pins fully. Persons must not stand between the trams being brought together for coupling.

When linking Tomlinson couplers, the pins must be removed from the coupler heads and the trams brought together. The pins are then to be reinserted as shown. Both pins must be removed before the trams can be uncoupled. Because of a significant height difference between Sydney P type cars and Adelaide H type the Tomlinson couplers on these trams cannot be joined.

### **13 JACKS AND LIFTING DEVICES**

Suitable jacks, packing, re-railing ramps and other gear necessary to raise any tram will be found in the breakdown tram or equipment locker. Trams, wherever possible, should be re-railed using only metal plates and packing, but in any instance where jacking is required, should be lifted at the trucks and in accordance with the diagrams provided.

All hydraulic jacks are to be followed with substantial timber packing to prevent the tram from dropping in the event of failure of the jack.

Mechanical track jacks should never be used to lift trams.

Immediately after use all jacks should be inspected and damage rectified, and the jacks returned to the breakdown tram.

### **14 ELECTRICAL FAILURE**

Where a tram fails but can be moved by pushing or towing, a suitable tramcar, preferably a bogie car with manual acceleration and air brakes, must be brought to the site and secured to the disabled car by any of the means indicated above. Once this is done, the disabled car may be towed and/or propelled back to the tram shed and secured in a suitable location for examination by mechanical maintenance and not further moved until repaired and passed fit for further service.

### **15 ELECTRICAL EMERGENCIES**

Before any disabled tram is moved by pushing or towing consideration must be given to disabling any electrical emergency braking which may be automatically invoked. This is especially necessary when a power controller is locked in a driving notch.

#### **SYDNEY TWO MOTOR TRAMS:**

Generally only trams locked in Full Parallel will experience difficulty when moved in the direction opposite that to which the reverser is set. Otherwise the tram may be moved without any special consideration.

#### **SYDNEY FOUR MOTOR TRAMS (Including electrically coupled two-motor cars):**

The fourth emergency brake will be automatically applied if the tram is moved in the reverse direction to that for which a controller is set and the speed reaches about walking pace (7 km/h).

Remote control cars usually require traction power to be available to reset remote reversers. If traction power is not available to reverse the car then cut out at least one pair of motors.

#### **BRISBANE TWO MOTOR TRAMS:**

Generally only trams locked in Full Parallel will experience difficulty when moved in the

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direction opposite that to which the reverser is set. Otherwise the tram may be moved without any special consideration.

### BRISBANE FOUR MOTOR TRAMS:

The fourth emergency brake will be automatically applied if the tram is moved in the reverse direction to that for which a controller is set and the speed reaches about walking pace (7 km/h).

### MELBOURNE TWO MOTOR TRAMS:

Generally only trams locked in Full Parallel will experience difficulty when moved in the direction opposite that to which the reverser is set. Otherwise the tram may be moved without any special consideration.

### MELBOURNE FOUR MOTOR TRAMS:

The fourth emergency brake will be automatically applied if the tram is moved in the reverse direction to that for which a controller is set and the speed reaches about walking pace (7 km/h). In the case of a four motor tram with a pair of motors cut out the fourth emergency brake will still work on the tram.

If the Z2 class tram No.111 fails, the safety parking brake will apply. If traction/control power is available to the tram then a driver will sit in the leading end of the tram and depress the Brakes Release button then the safety pedal to release the brake and hold the button depressed while the tram is being moved. If there is no low voltage power available then mechanical means are required to release the disk brakes. It is considered that this action is beyond the normal traffic staff unless they are specially trained in this procedure.

### ADELAIDE FOUR MOTOR TRAMS:

The fourth emergency brake will be automatically applied if the tram is moved in the reverse direction to that for which a controller is set and the speed reaches about walking pace (7 km/h).

If an H type tram fails the safety parking brake will apply. If traction/control power and minimum air pressure are available to the tram then a driver will sit in the leading end of the tram and work the air handle to the release position. If there is no air pressure and/or low voltage power available then mechanical means are required to release the parking brakes. It is considered that this action is beyond the normal traffic staff unless they are specially trained in this procedure.

### OVERSEAS CARS:

#### MUNI PCC 1014:

If this tram fails the ~~drum disk~~brakes will apply to secure the tram. ~~If necessary~~The car is to be shut down, MG set turned off & battery switch opened.y, The tram must be secured to a suitable tram and the 4 brake actuator release levers on each side of each truck ~~are~~is to be unlatched. The tram may be moved after one pair of motors is cut out. The brake actuators must be relatched before the tram is uncoupled.

#### NAGASAKI 1054:

Generally only if the controller is locked in Full Parallel will difficulty be experienced when the tram is moved in the direction opposite that to which the reverser is set. Otherwise the tram may be moved without any special consideration.

#### BERLIN CARS:

Generally only if the controller is locked in Full Parallel will difficulty be experienced when the tram is moved in the direction opposite that to which the reverser is set. Otherwise the trams may be moved without any special consideration.

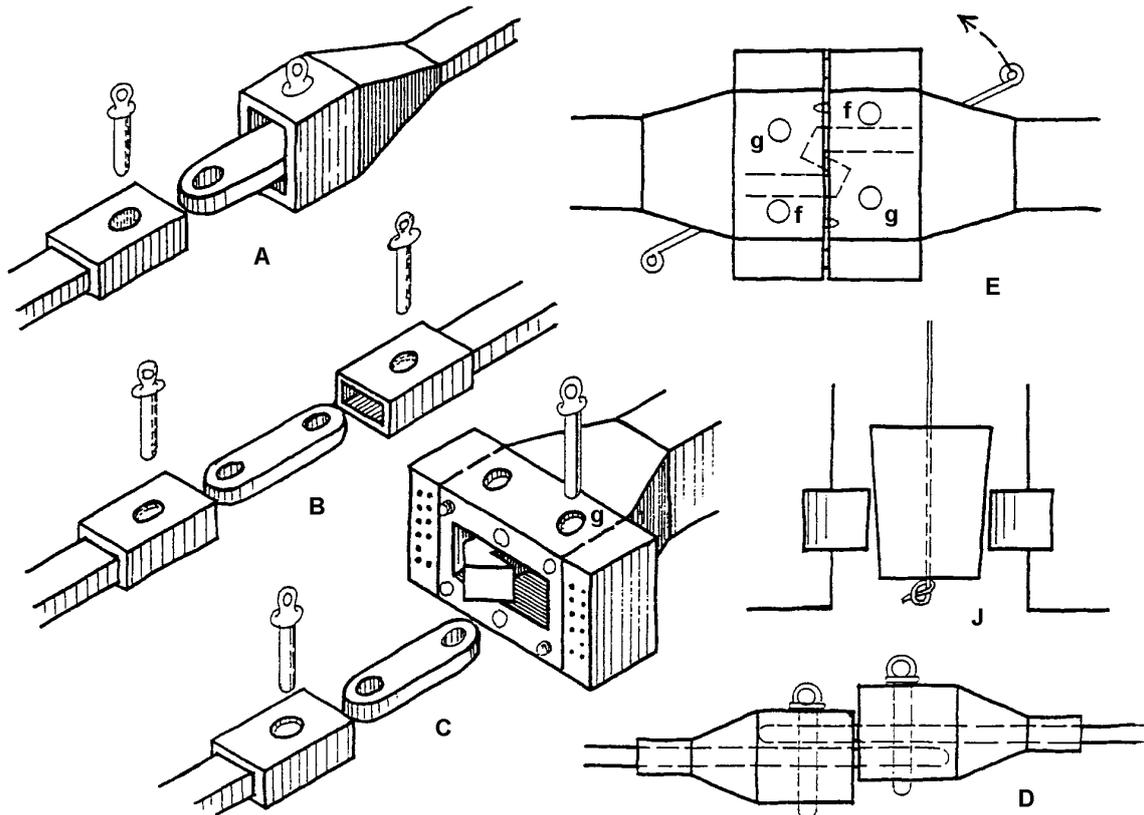
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### MUNICH CARS:

Generally only if the controller is locked in Full Parallel will difficulty be experienced when the tram is moved in the direction opposite that to which the reverser is set. Otherwise the tram may be moved without any special consideration.

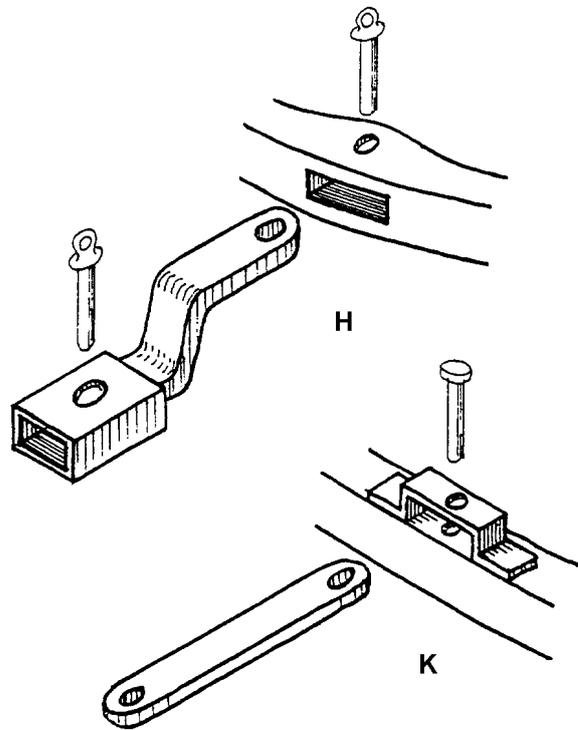
## 16 COUPLING CARS

With the exception of the E-class permanently coupled tramcars, electric coupled operation of the trams will only be permitted with the authority of the Executive Officer. For details of the correct procedure to be adopted in mechanical and electrical coupling of tramcars, see the relevant details in Part D, "Tramcar Equipment and Operation".



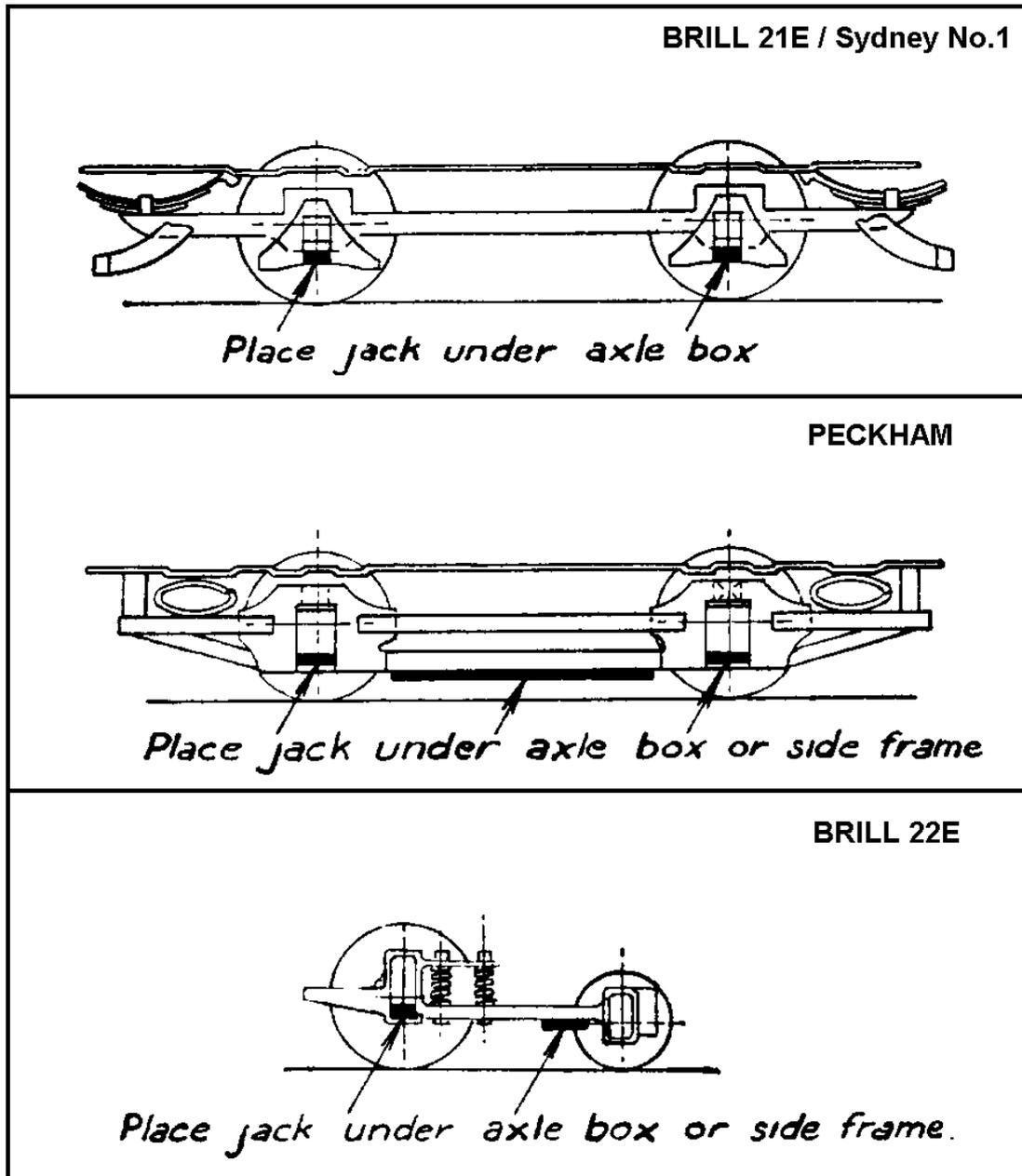
| Diagram A is questionable.

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## 17 TRUCK JACKING POINTS



BRILL 21E/Sydney No.1 type truck

- D 102 (134s); D117; E 529; E530; J 675; K 1296; Brisbane 71; Ballarat 12

PECKHAM type truck

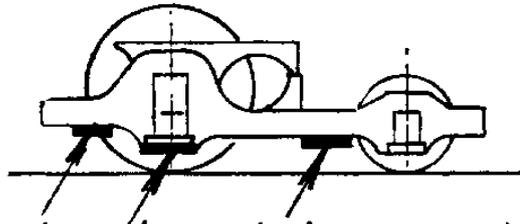
- C 29; C 290

BRILL 22E bogie

- L/P 154; F 393; N 728; Ballarat 37

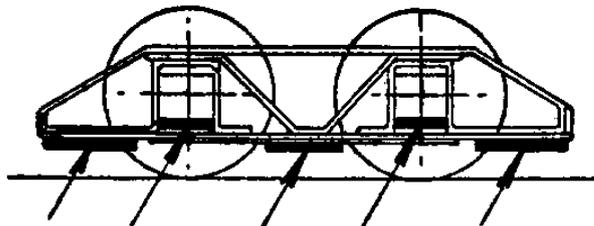
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### McGUIRE Maximum Traction Truck



*Place jack under axle box or side frame.*

### No.4 Truck



*Place jack under under axle box or side frame*

McGuire Maximum Traction bogie

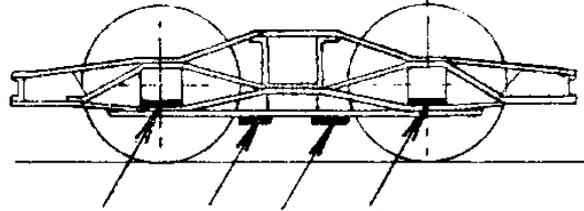
- 24s

Sydney No.4 bogie

O 957; O/P 1089; O 1111; O 1030 (141s)

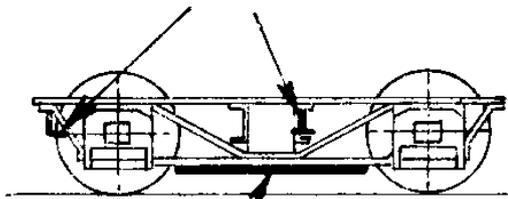
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**No.6 Truck**



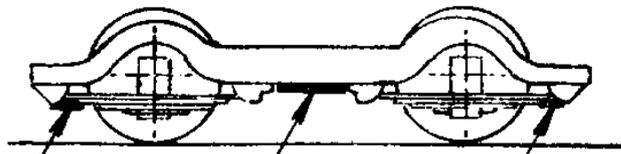
*Place jack under axle box or side frame*

**No.9 Truck**



*Place jack under fixed lifting brackets. For low trucks place jack under car body side frame midway between wheels.*

**Australian standard hornless truck**



*Place jack under outer ends of axle box spring or under side frame*

SYDNEY No.6 bogie

- 93u; 99u

SYDNEY No.9 bogie

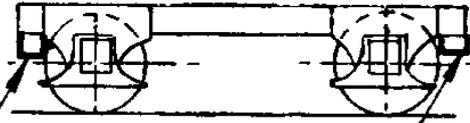
- P.1497

AUSTRALIAN STANDARD HORNLESS bogie

- R 1740; R1 1971; R1 1979, R1 2001; Brisbane 548

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### "Essanee" rail grinder



*Place jack under lifting brackets at frame ends*

### Balmain counterweight trolley



*Jack and packing to be placed so that they will not be fouled by the side guards.  
Note: 3 pieces of 3" packing 1 piece of 1" packing and 1 wedge inside dummy. Car jack to be used*