

MELBOURNE AND METROPOLITAN TRAMWAYS BOARD

ENGINEERING DEPARTMENT

WORKSHOPS AND RUNNINGSHEDS BRANCH

WHEEL GRINDERS RUNNINGSHEDS

1. Grind flats out of tram wheels, and on completion check that the wheel profile conforms to the flange height and contour gauge.
2. Depot Foreman to nominate the wheels that require contour or overgrinding. After grinding has been completed wheels must conform to flange height and contour gauge. Both wheels to be measured with callipers with wheels finishing the same diameter measured from the centre of the wheel tread.
3. After the grinding of wheels has been completed, the brakes must be adjusted and tram left O.K. for service.
4. TRAINING.

The main requirements for a wheel grinder are reliability both in attendance and performance of work and to be fully aware of safe working principles.

Time taken to train a wheel grinder is two weeks, working one week with one grinder learning the jacking procedure of trams and grinding tram wheels and 2nd week learning how to cut in and out motors and lift the motor brushes, the use of wandering leads and grinding tram wheels.

The Depot Foreman is responsible for instruction in safe working practices. On completion of training the Trainee will be examined by the Depot Foreman on his knowledge both practical and theoretical of wheel conditioning and safe working practices and test to see that he is capable of driving a tram safely in the depot limits.

MELBOURNE AND METROPOLITAN TRAMWAYS BOARD

ENGINEERING DEPARTMENT

WORKSHOPS AND RUNNINGSHEDS BRANCH

WHEEL GRINDERS PROCEDURE.

PROCEDURE FOR GRINDING TRAM WHEELS AND SAFETY PRECAUTIONS WHICH MUST BE TAKEN.

The man operating the tram controller, motor cut outs, motor brushes, trolley poles and wandering leads is known as the top man. The man inserting the line breaker bridging stick, operating the jacks and the lifting ramp is known as the bottom man.

Unnecessary grinding of the wheels must be avoided, and before the tram is placed on the grinder, the wheels must be examined to find which are flatted and require grinding.

When inching the tram along, while examining the wheels, the tram must be moved or stopped at the signal of the man examining the wheels underneath; at all times when the wheels are in motion hands must be kept clear.

PREPARATION FOR GRINDING:

When preparing a tram for wheel grinding the following procedure must be carried out :-

The compressor switch and the lighting switch must both be left in the "on" position during the grinding period. The top man lowers the trolley pole from the overhead wire and places it under the hook, removes the controller reverse key and places it on the top of the controller, and places the air brake handle in the emergency position. He then informs the bottom man that it is safe for him to insert the bridging stick in the linebreaker and place the lifting ramp in position on one rail only. When this is done, the bottom man informs the top man that it is safe to replace the trolley pole on the overhead wire. The top man then drives the tram slowly until the pair of wheels to be ground are directly over the grinding wheels, then removes the trolley pole from the overhead wire and places it under the hook, removes the reverse key and places it on the top of the controller, and informs the bottom man that the tram is safe for jacking. The top man then removes the carbon brushes from the motor electrically coupled with the motor on the pair of wheels to be ground, and cuts out the other pair of motors in the controller.

Except for a small number of special trams, the cut out switches on trams fitted with Clyde and English Electric controllers are :-

1 - 3 At top and

2 - 4 At bottom.

K36 and M.M.T.B. etc. are :- 2 & 4 top

1 & 3 bottom.

The actual form of cut out switches varies, but if above rules are followed, operation of the switches is simple.

When working on No.1 pair of wheels cut out 2 and 4 motors at the controller and remove No.3 brush.

When working on No.3 pair of wheels cut out 2 and 4 motors at controller and remove No.1 brush.

When working no No.2 pair of wheels cut out 1 and 3 motors at controller and remove No.4 brush.

When working on No.4 pair of wheels cut out 1 and 3 motors at controller and remove No.2 brush.

Note: Single truck trams: Do not lift brushes. Cut out appropriate motor at both controllers.

Always make sure that the pole is "off" the overhead before any of these operations are carried out.

He then replaces the reverse key, and puts the controller to the full series position on a K35 and K36 tram, and to the full parallel position on all other types, then places the grinder wandering lead on the trolley pole.

The bottom man places the lifting jacks in the vertical position under the bottom of the suspension bearing housing, ensuring that the brass caps fitted with wood inserts are correctly seated on the heads of the jacks, then raises the truck with the jack situated on the lifting ramp side, and after the wheel has been lifted sufficiently to allow the lifting ramp to be removed, levels the truck with the other jack.

The top man then places the circuit breaker controlling the grinding controller in the "on" position and operates the controller to ensure that the correct wheels revolve. Place the controller to the "off" position and after the wheels have stopped revolving slide the two loose sections of rail sideways to clear the abrasive wheels. Operators must wear protective face shields and it is advisable to use respirators at all times while operating the grinding machine or removing grinding debris from the ducts and the cyclone.

At all times when grinding or dressing the grinding wheels the suction fan must be operating.

Abrasive wheels must be correctly dressed at all times and both adjustable guards on each grinder head correctly adjusted. Wheel treads must be ground to correct profile using the standard gauge; sometimes it is necessary to slacken the brakes to allow the wheels to revolve freely.

The wheel flange height must be checked, using the standard gauge, and if necessary ground to the correct height.

When the flanges have been ground, round off both edges of the top of each flange to prevent the wheels splitting the points or binding in the brake shoes.

Note: The standard flange height is 9/16" with an allowable tolerance to $\frac{5}{8}$ ".

Reducing the wheel diameter of one wheel to correct sidethrust and prevent excessive flange wear is called overgrinding. The wheel that requires overgrinding will be designated by the Depot Foreman. The shoulder up close to the flange must first be ground away by moving the grinding wheel as close to the flange as possible without grinding it, operating the vertical feed and grinding until the shoulder is removed. The face of the wheel is then ground for approximately 20 minutes, or longer if instructed by the Depot Foreman. A close check must be kept for overheating of the suspension bearings. It is advisable before commencing overgrinding a wheel to add oil to both suspension bearing oil wells.

The other wheel on the same axle is only ground sufficiently to bring it to the correct contour.

After grinding of a pair of wheels has been completed, the top man places the grinding controller to the "off" position, removes the reverse key and places it on the top of the controller, places the circuit breaker controlling the grinder controller to the "off" position, then removes the wandering lead from the trolley pole, places the tram controller to the "off" position, removes the reverse key, and places it on the top of the controller. He then replaces the carbon brushes in their correct position in the motor, making sure that they are not turned, then cuts in all motors in the controller.

The bottom man slides the moveable rail sections into position and securely locks them either with pins or bolts, then places the lifting ramp on the top of the rail under one wheel and lowers the jacks, (first the one nearest the lifting ramp). After both wheels have been lowered, the jacks are lowered sideways, with their heads resting on the base of the rails.

If another pair of wheels have to be ground, the linebreaker bridging stick is not removed and the top man is notified that it is safe to replace the trolley pole on the overhead wire. When all wheel grinding on the tram has been completed, the linebreaker bridging stick is removed before the top man is notified that it is safe to replace the trolley pole on the overhead wire. The top man after placing the trolley pole on the overhead wire, does not drive the tram until 60 lbs. of air is indicated on the pressure gauge.

If for any reasons the grinding crew must leave the grinding machine, the top man must stop the machine and see that all switches are placed in the "off" position, and the grinding controller reverse key is removed and placed on the top of the controller.

Wheel Grinders must notify the Depot Foreman of any unusual gear noise, worn suspension bearings, brake rigging, or bent axles. The brakes on all trams must be adjusted after the tram is ground and any wheel that has been overground or has had flange height restored must have new brake shoes fitted.

Wheel Grinders must immediately inform the Depot Foreman of any defects, electrical or mechanical including wear with the grinding machine or its equipment.

Tram Nos. 750-751 must be ground with the controller handle placed in the full on position, and at least 40 lbs. of air in the reservoir.

Tram No. 980 is not to be ground except under East Preston Depot Foreman's supervision.

The Bridging Stick must not be inserted in the linebreaker at any time when wheels are being ground on Tram Nos. 750, 751.