

Machining Operations in Wheel Shop

List of Tools and Plant required in wheel shop

1. EOT crane 5 tonnes
2. Wheel profiling lathe
3. Axle journal turning and burnishing lathe
4. Axle journal grinding machine for assembled wheel set.
5. Hydraulic wheel press with facility for mounting pressure diagram
6. Axle turning lathe
7. Vertical turning lathe
8. Axle centering machine
9. Axle end drilling machine
10. Axle grinder

REPAIR PROCEDURES FOR DIFFERENT CATEGORIES OF WHEELS

Detailed procedure for carrying out repairs to different categories of wheel sets is described below:

Normal Repair of Wheel sets

Normal repair wheels are of two categories.

- a. With roller bearings mounted
- b. With roller bearings removed

The activities involved in Normal Repair Wheels are as follows:

Pre-inspection of incoming wheels. Drop axle boxes, clean and inspect axle boxes. If required, repair them. Carry out Ultrasonic Flaw detection test of axle. If required, dismount roller bearings from journals. (In any case dismount roller bearings in alternate POH) If the wheels are sent for re-profiling without dismounting roller bearings from the journals, special protective covers should be fitted on the bearings on either side of a wheel to avoid entry of chips / dust or damage to the bearing during machining. Machine wheel profiles to the prescribed dimensions. The wheel tread should be checked and machined to the worn wheel profile. Clean roller bearing and assemble

components in position, if not dismantled. Inspect roller bearing and assembly in position. Check radial clearance and confirm it to be within permissible limits. Pack fresh grease. Mount cleaned and inspected axle boxes. Fit front cover with new sealing ring.

RD (Replacement of solid discs)

Wheels During pre-inspection, if it is found that tread diameters of the solid disc wheels cannot be issued at the last shop issue, the wheel is taken for replacement of discs.

The activities involved in replacement of discs:

Dismounting of Axle boxes & Roller Bearings Axle boxes are dropped from the RD Wheel. The wheel is then taken for dismantling of roller bearings from journals. Inspection of Axle journals/ Ultrasonic testing of the axle. Journal diameters should be measured with an outside diameter to confirm to be within the permissible limits. The axle should be ultrasonically tested for flaw detection and should be flawless. Pressing off rejected discs from a wheel. The wheel is taken on the wheel press for separating the rejected discs from the wheels.

Boring (Machining) of new discs. New discs are bored on the vertical boring machine. Care should be taken to ensure the finished bore is concentric to the tread of the wheel and has a smooth surface free from ridges, scores and chatter marks. The radius of 2.5 mm, which is provided on the wheel bore to facilitate mounting, should be made after the finishing cut. An inside micrometer should be used for measuring wheel bores to ensure consistent results. Each wheel bore must be checked at not less than three points in its length and on the different diameters at each of these points to ensure roundness and absence of tapers. The variation among any of these measurements must not exceed 0.05 mm. If any taper does exist, the small diameter must be at an outside end of the hub bore (reverse taper is not allowed) Machining of wheel seats on an old axle for matching of wheel disc bores. The wheel seats on the old axle (released from RD wheels) are machined to suit the bore of the wheel discs keeping interference allowance as prescribed. The bore and the wheel seat should be machined to the specified surface finish to achieve correct interference fit and pressing in pressure. Pressing on Wheel on Axle. Before pressing on operation, wheel seats on the axle and bore of the wheel should be carefully cleaned to remove rust, grit, swarf, dirt etc. The wheel seat should be lubricated with a mixture of basic carbonate white lead and boiled linseed oil, in the proportion of 1.2 kg. of white lead paste to 1 litre of boiled linseed oil. The wheel and axle should be properly aligned on the wheel press. The wheel press should be equipped with a dial pressure gauge and pressure recording gauge with graphs to record mounting pressure diagrams for each assembly. Wheels should be mounted within the prescribed pressure limits. Pressing pressure should be 400 to 600 kg/mm of diameter of wheel seat. For ICF 16t axle with wheel seat diameter from

176mm to 178mm, the pressing pressure should be 71t to 108t. Wheels should be mounted (pressed in) carefully on the axle such that the wheel gauge distance is maintained. The axle end should be stamped with the shop code, date of mounting, pressing in pressure, axle no., cast no., cons. no. to enable identification of wheels. The wheel gauge should be checked by gauging at three or more equi-angular points around the circumference.

RA (Replacement of Axles) Wheels

The activities involved in replacement of an axle are as follows:

Pressing off a rejected axle from a wheel - The wheel is taken on the wheel press for separating the rejected axle from the wheels. Machining of new axles - New axles should be machined to the correct drawing dimensions. Journal, journal fillets and shoulders should be finished smooth, concentric and without ridges, burrs or chatter marks.

Inspection of machined axles

Dimensional checks -- A machined axle should be inspected for dimensional accuracy with the help of a micrometer with least count of 0.01 mm. Journal diameters should be measured at three points along the length of journals both on the vertical and horizontal axis. The ovality and taper must not exceed the limits prescribed in the drawing.

Surface finish checks -- Surface finish of the axle on journals, wheel seat and middle portions should be checked with the help of a surface finish tester

Ultrasonic flaw detection checks Ultrasonic flaw detection test is carried out.

Machining of serviceable wheel disc

The serviceable wheel discs are re-bored on the vertical boring machine. Care should be taken that the finished bore is straight, concentric to the tread of the wheel and has a smooth surface free from ridges, scores and chatter marks. A radius of 2.5 mm is provided on the hub to facilitate mounting. It must be made after the finishing cut. Inspection of re-bored wheel disc The re-bored wheel disc should be inspected with the help of an inside micrometer to ensure consistent results. Each wheel bore must be checked at not less than three points in its length and on the different diameters at each of these points to ensure roundness and absence of tapers. The variation for any of these measurements must not exceed 0.05 mm. If any taper does exist, the small diameter must be outside ends of the hub (a reverse taper is not allowed). The surface finish of the bore should be within the permissible limits.

Machining of wheel seats for matching of wheel disc bores

The wheel seat of the axle to be used for re-axling is machined to suit the bore of the wheel disc keeping interference allowance as specified. The bore of wheel disc and wheel seat on the axle should be maintained to the specified surface finish and diameters to achieve correct interference fit and pressing in pressure. Pressing on Wheel Discs on Axle Before pressing on operation, wheel seats on the axle and bore of the wheel centres should be carefully cleaned to remove rust, grit, swarf, dirt etc. The wheel seat should be lubricated with a mixture of basic carbonate white lead and boiled linseed oil, in the proportion of 1.2 kg. of white lead paste to 1 litre of boiled linseed oil. The wheel and axle should be properly aligned on the wheel press. The wheel press should be equipped with a dial pressure gauge and pressure recording gauge with graphs to record mounting pressure diagrams for each assembly. Wheels should be mounted within the prescribed pressure limits. Wheels should be mounted (pressed in) carefully on the axle such that the wheel gauge distance is maintained. The axle end should be stamped with the shop code, date of mounting, pressing in pressure, axle no., cast no., cons. no. to enable identification of wheels. Care should be taken to ensure that wheel disc number is preserved. The wheel gauge should be checked by gauging at three or more equi-angular points around the circumference