

**CAUTION:** RUNWAY ANTI-ICING FLUIDS AND CERTAIN DISINFECTANTS USED TO PREVENT THE SPREAD OF HOOF AND MOUTH DISEASE HAVE BEEN FOUND TO HAVE ADVERSE EFFECTS ON THE AIRCRAFT WHEEL AND BRAKE SYSTEM COMPONENTS. A HIGHER DEGREE OF PREVENTATIVE MAINTENANCE IS REQUIRED IN THOSE AREAS USING SUCH AGENTS.

### 1. General

This section covers maintenance which can be performed while the wheel and brake assemblies remain attached to the aircraft.

### 2. Brake Assemblies

On-aircraft maintenance of brake assemblies is essentially limited to inspection of the assembly and replacement of the linings.

#### A. Brake Inspection

- (1) Visually inspect the brakes for corrosion, cracks, or other visible damage. Check inlet fitting bosses and anchor bolt lugs for cracks. Check inlet flares on aircraft side of rigid hydraulic tubing for fatigue cracks.
- (2) Check back plate attachment bolts to insure they are properly torqued and have not worked loose. Gaps between the back plate and cylinder would be evidence of this.
- (3) Check fit of brake cylinder anchor bolts in torque plate bushings for sloppiness. This can be accomplished by grasping the cylinder and moving it; slight movement is normal. Excessive movement is cause for removal and detailed inspection.
- (4) Linings should be visually checked for extreme chipping on the edges. Lining worn to a minimum thickness of 0.100 inch (2.54 mm) must be replaced. ([Ref. Appendix A for more details.](#))
- (5) Visually check torque plate for corrosion, cracks, loose anchor bolt bushings, or other visible damage. Anchor bolt bushings must be flat against torque plate surface.
- (6) Check for any brake fluid leaks. Organic linings which have been contaminated with fluid should be replaced.

#### B. Corrective Maintenance of Brakes

On-aircraft corrective maintenance of the brake assembly involves replacement of the linings. This maintenance procedure may be accomplished without raising the aircraft or removing the main wheel.

## (1) Replacement of Brake Linings

Metallic or organic linings are used in different brake assemblies. The minimum wear thickness for replacement of metallic and organic linings is 0.100 inch (2.54 mm). [Ref. Appendix A, Figure A1](#). The metallic lining is a sintered metal composition and is attached by torque pins which press fit into the back surface (steel carrier plate) of the lining. The holes for the pins are not visible on the lining surface unless the lining is worn beyond its wear limit. [Ref. Figure 202](#).

The organic brake lining is identified by its semi hard composition and rivets used to attach the lining to the pressure plate or back plate. The rivet holes are visible on the lining. Non asbestos, lead free lining material is also being used as a replacement for the old style organic lining and is removed and installed in the same manner as the organic lining. [Ref. Figure 203](#). [Appendix C](#) provides a brake assembly / lining cross-reference information. Once it is determined which type lining is being replaced, follow the appropriate instructions listed below.

## (a) Removal of Linings from Calipers

Proceed as follows for metallic or organic linings.

**WARNING: BLOCK WHEELS AND INSURE THAT PARKING BRAKE IS IN OFF POSITION.**

- 1 Remove back plate attaching bolts and washers, and remove back plates, shims, and insulators (if applicable).
- 2 Carefully slide brake caliper out of torque plate bushing.
- 3 Slide pressure plate assembly (lining carrier) off anchor bolts.

## (b) Inspection of Caliper and Torque Plate Assembly

Inspect the caliper for corrosion, bent anchor bolts, cracks around bolts, cracks around anchor bolt lugs and inlet fittings, and other visible damage. Inspect the torque plate assemblies for corrosion around anchor bolt bushings and excessive wear in bushings.

## (c) Replacement of Metallic Linings

- 1 On models so equipped, remove center retention rivet, by drilling out with a 1/8-inch drill.

- 2 Pry off old lining using a screwdriver.
- 3 Clean pressure plate and back plate surfaces of dirt, grease, etc. before installing new linings.
- 4 Inspect pressure plate and back plates for excessive warping. Straighten pressure plate to less than 0.010 inch (0.254 mm) flatness, as shown in Figure 201.

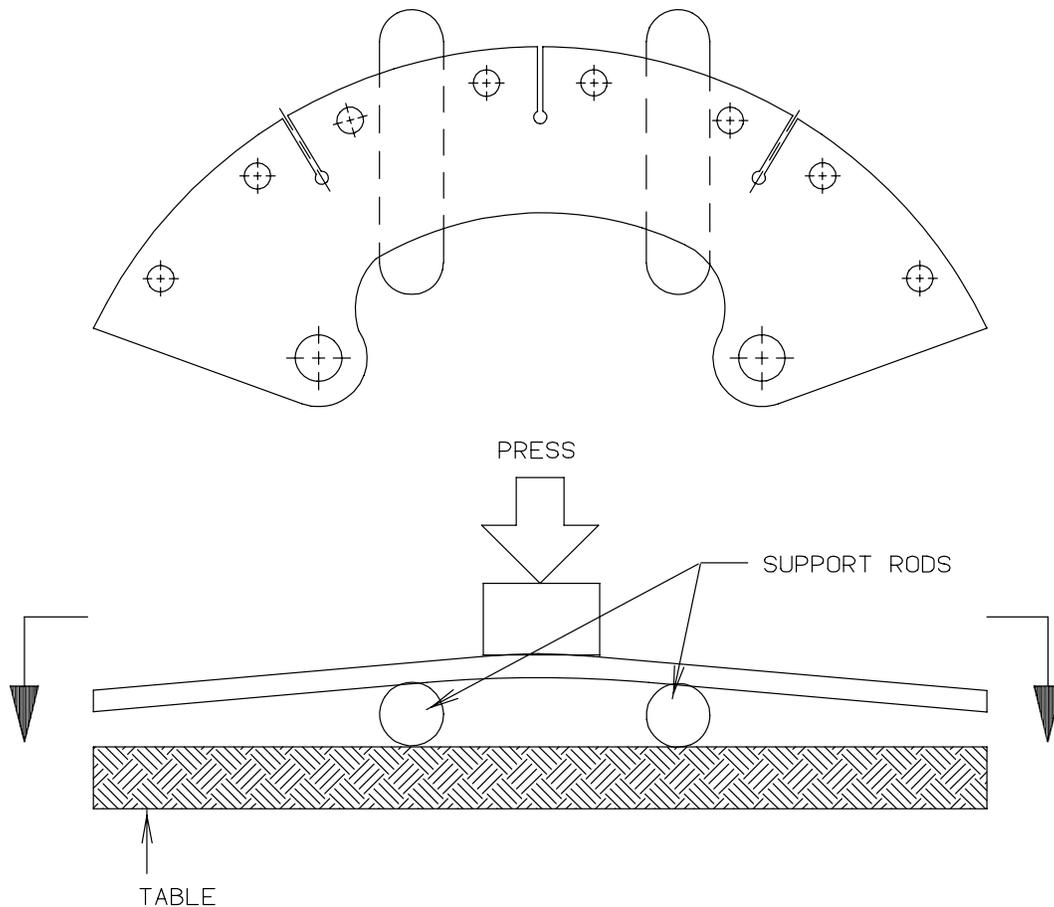


Figure 201 - Pressure Plate Straightening

- 5 Check lining attachment pins for mushroomed heads or other visible damage. Damaged attachment pins may be replaced by carefully drilling out the pins. Ref. Figure 202 and 204.
- a Install replacement pin in holes in pressure plate or back plate with tail of pin toward the counterbored side of part.
  - b Hole locations in pressure plates / back plates should allow installation of lining after pin upset.
  - c Place pins and pressure plate or back plate on a flat metal surface.
  - d Using Cleveland's 199-1 Rivet Set Kit orbital or screw type press, install pins on pressure plate or back plate.
  - e On models so equipped, install center retention rivet.
  - f Check to be sure pins are tight and movement free with no distortion of parts.
  - g Refer to Figure 204 for rivet / pin installation acceptance criteria.
- 6 Apply a light film of spray adhesive to metal backing of lining and install lining segment onto pins. Check to insure metal backing is tight against the pressure plates / back plates.
- NOTE:** The adhesive is used to maintain position of lining until brake is assembled onto disc, and will be burned off in the first few stops. Lining will remain in place on assembly trapped between the brake disc and pressure / back plates.
- 7 On design so equipped, install the center retention rivet as shown in Figure 203.

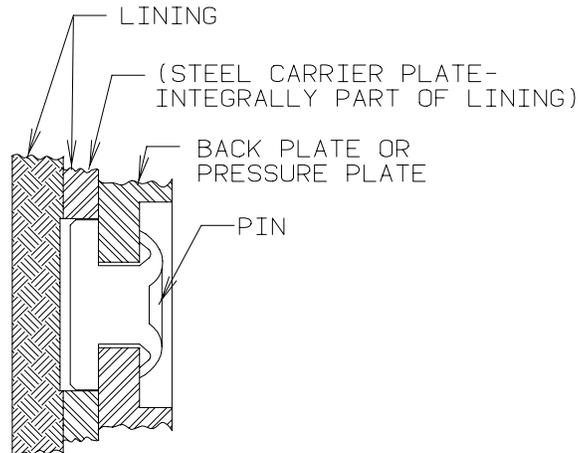


Figure 202 - Pin Installation, Metallic Lining

(d) Replacement of Organic Linings

- 1 Old organic lining may be removed by using a small drift pin or carefully drilling out the rivets with a 1/8-inch diameter drill. Use care to prevent elongating the rivet holes. Deburr the surface adjacent to the lining to allow lining to set flush.
- 2 Clean pressure plate and back plate surfaces of dirt, grease, etc. before installing new linings.
- 3 Inspect pressure plate and back plate for excessive corrosion, visible damage, or excessive warping. Pressure plate should not be used if warped in excess of 0.010 inch (0.254 mm) flatness, by using draw flattening or straightening techniques. Ref. Figure 201. Excessive warping can result in brake drag, especially when new disc and linings are installed.
- 4 Align new factory authorized replacement lining segments on pressure plate/back plates and install rivets of corresponding part number, using Cleveland's Rivet Set, P/N 199-1, or appropriate riveting tools.
- 5 Check to be sure lining is tight and movement free with no distortion of parts.

- 6 With tubular rivets, splits may result from the clinching operation. Refer to rivet sketch, Figure 204, for acceptance criteria.

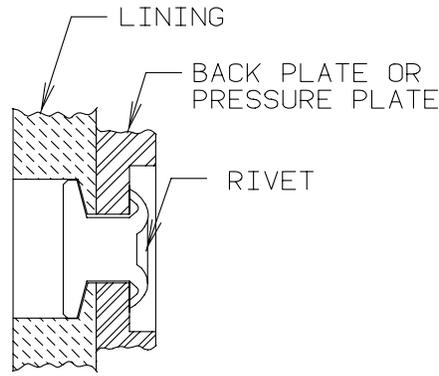


Figure 203 - Rivet Installation, Organic Lining

(e) Rivet / Pin Installation Acceptance Criteria

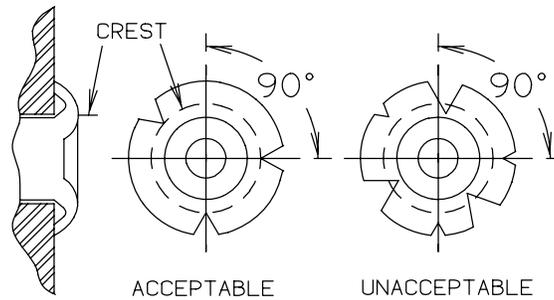


Figure 204 - Rivet / Pin Installation Acceptance Criteria

- 1 The split shall not occur inside the crest of the clenched surface.
- 2 No more than two splits shall occur in a 90° area
- 3 A total of no more than three splits shall be allowed.

- (f) Reassembly of Metallic or Organic Linings to Caliper
- 1 Carefully wipe dirt, grease, etc. from cylinder, pressure plate, and portions of piston extending beyond cylinder face, and push piston back into cylinder.
  - 2 Slide pressure plate with new lining over anchor bolts and install brake caliper into torque plate. For equipment that is operated in an amphibious environment, or in extremely wet climates, lubricate the anchor bolt with Lubriplate. For equipment used in a non-amphibious environment, lubricate anchor bolt with a dry film lubricant (silicone spray). **DO NOT USE GREASE OR OIL.** These materials will attract dirt and enhance the wear of the anchor pins.
  - 3 Install back plate attachment bolts and washers in brake caliper.
  - 4 Install insulator shims (typically used with metallic lining) and spacers as applicable.
  - 5 Slide back plates between brake disc and wheel/tire and install back plate attachment bolts and washers into back plates.
  - 6 Torque brake assembly back plate tie bolts to values listed in [Appendix A](#). Two different types of back plate tie bolts are used. The patch lock bolt (nylon material embedded in threaded end) will require replacement after 6 to 8 installations or whenever the bolts can be run in past the locking feature by use of fingers only. Bolts with drilled heads require safety wire after torquing.

- (g) Installation of 066-00504 Lining to Brake Shoe
- 1 Using an 1/8 inch drill bit, drill out six rivets and remove the old lining from brake shoe.
  - 2 Clean and deburr brake shoe as needed.
  - 3 Place new lining on brake shoe, centered as closely as possible onto lining mount surface. Using a scribe, mark centerline location of 6 holes to be drilled in new lining.
  - 4 Drill and counterbore lining as shown in Figure 205 (6 places).
  - 5 Mount new linings onto shoe with 6 rivets, P/N 105-00300; rivet head to seat to bottom of lining counterbore.

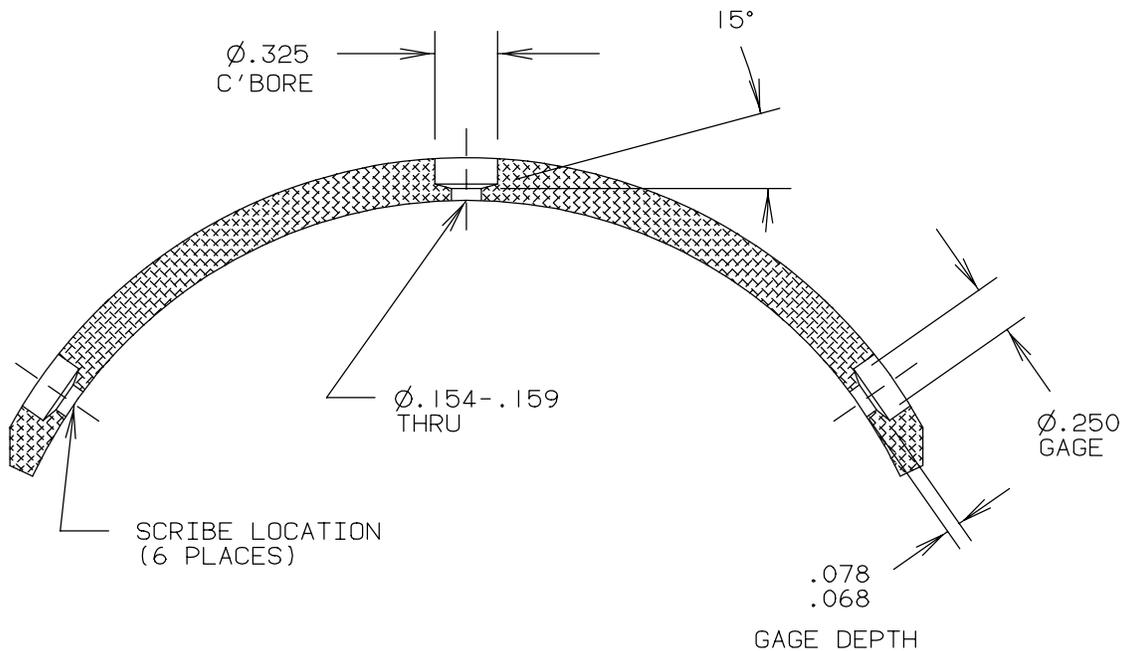


Figure 205 - Installation of 066-00504 Lining to Brake Shoe

## (2) Lining Conditioning Procedures

When new linings have been installed, it is important to condition them properly to obtain the service life designed into them. The metallic and organic linings are not conditioned in the same manner because they have different operating characteristics. Separate conditioning procedures are given for metallic and organic linings.

NONASBESTOS ORGANIC LININGS

1. Taxi aircraft for 1500 feet with engine at 1700 rpm applying brake pedal force as needed to develop a 5-10 mph taxi speed.
2. Allow the brakes to cool for 10 to 15 minutes.
3. Apply brakes and check for restraint at high static throttle. If brakes hold, conditioning is complete.
4. If brakes cannot hold aircraft during static run up, allow brakes to completely cool, and repeat steps 1 through 3.

METALLIC LININGS

1. Perform two (2) consecutive full stop braking applications from 30 to 35 knots. Do not allow the brake discs to cool substantially between the stops.
2. Allow the brakes to cool for 10-15 minutes.
3. Apply brakes and check for restraint at high static throttle. If brakes hold, conditioning is complete.
4. If brakes cannot hold aircraft during static run-up, allow brakes to completely cool, and repeat steps 1 through 3.

**CAUTION:** DUE TO THE EFFICIENCY OF THESE BRAKES, EXTREMELY HARD BRAKING ON AIRCRAFT WITH TAIL WHEELS COULD RESULT IN LIFTING THE TAIL FROM THE GROUND.

This conditioning procedure will wear off high spots and generate sufficient heat to create a thin layer of glazed material at the lining friction surface. Normal brake usage should generate enough heat to maintain the glaze throughout the life of the lining.

Properly conditioned linings will provide many hours of maintenance free service. A visual inspection of the brake disc will indicate the lining condition. A smooth surface, one without grooves, indicates the linings are properly glazed. If the disc is rough (grooved), the linings must be reglazed. The conditioning procedure should be performed whenever the rough disc condition is observed. Light use, such as in taxiing, will cause the glaze to be worn rapidly.

### 3. Wheel Assemblies

On-aircraft maintenance of wheel assemblies is limited to inspection of wheel assemblies. Inspections of the nose and trail wheels and of the main wheel are treated separately as follows.

#### A. Nose and Tail Wheel Inspection

Perform on-aircraft inspection as follows:

- (1) Visually inspect the wheels for corrosion, cracks, or other visible damage.
- (2) Check wheel nuts to be sure they are properly installed and have not worked loose. Bolt threads should be flush to 1.5 threads extending beyond the nut.

#### B. Main Wheel Inspection

Perform on-aircraft inspection as follows:

- (1) Visually inspect the wheels for corrosion, cracks, or other visible damage.
- (2) Check wheel nuts to be sure they are properly installed and have not worked loose. Bolt threads should be flush to 1-1/2 threads extending beyond the nut. Nuts should be on the side of wheel opposite the brake disc (outboard side of wheel), except in those cases where spline nuts and bolts are used to secure wheel halves.

**NOTE:** Brake Disc cracks are not allowed unless covered by a PRM (Product Reference Memo) or SB (Service Bulletin) issued specifically for a brake disc.

- (3) Inspect the brake disc for rust, excessive grooves, large cracks, or other visible damage. Refer to [Appendix A](#).

### 4. Tires

On-aircraft maintenance of tires is limited to inspection and air pressure maintenance.

#### A. Tire Inspection

- (1) Visually inspect tires for cuts, flat spots, and tread or sidewall damage.
- (2) Check inflation pressure. Proper inflation will provide maximum tire and wheel life.
  - (a) Pressure should be checked daily, when tires are cool.
  - (b) Tubeless tires have an allowable 5% pressure loss in any 24-hour period.
- (3) Refer to tire manufacturer's service and maintenance manuals for recommended servicing procedures.

# Cleveland

Wheels & Brakes

