

Q-04: Replace Brake Shoes/Adjust Brakes

SAFETY FIRST

- Follow all Caterpillar facility safety standards when performing this task.
- The Electrician performs a lock and tag after the block has been lowered to the floor.
- A tripping hazard exists when moving around catwalk.
- A heat hazard exist during the summer months when working within 10-20 feet of the ceiling.

EQUIPMENT

- Electrician hand tools
- feeler gage
- flashlight

RESOURCES

- P&H Bulletin Ed 12 (Type SBE Brakes)

Replace Brake Shoes/Adjust Brakes

Note: This task analyzed the 13-inch brake. All measurements, torque values, etc. pertain to the 13-inch brake. This task is divided into two parts. The first part replaces the brake shoes; the second part adjusts the brakes.

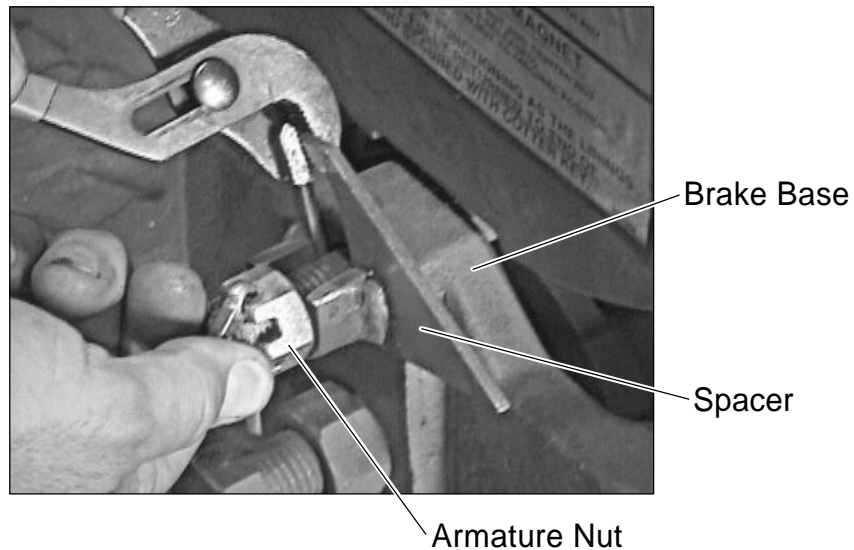
Part A: Replace Brake Shoes

Preparation

1. Lower the block and/or load to the floor.
2. Disconnect the hoist motor.
3. Release the brake using magnet assist.

- Energize the magnet, releasing the brake.
- Grasp the end of the armature bolt and pull the bolt outward.
- Using a pair of channel locking pliers, hold the thick portion of the spacer and position it between the armature nut and the brake base. See the figure below.

Note: Do not attempt to hold the spacer in place with your fingers.



- De-energize the brake coil. The spacer will prevent inward movement of the armature nut, thereby preventing the brake from resetting.

Replacing the Brake Shoes

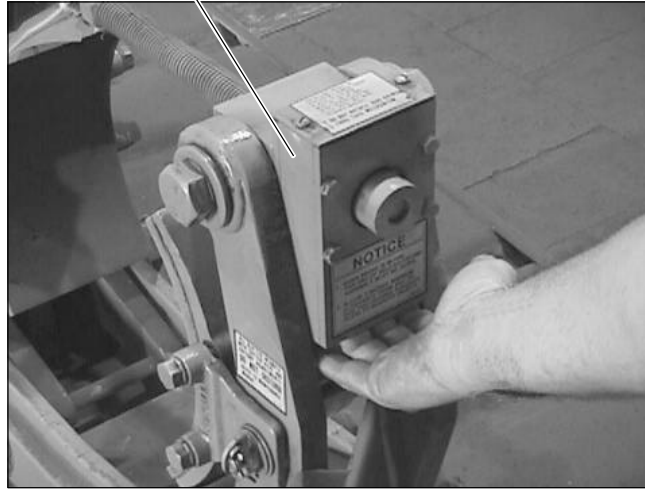
1. Move the far shoe assembly away from the brake wheel.

Note: It is easier to remove and install the brake shoes one at a time.

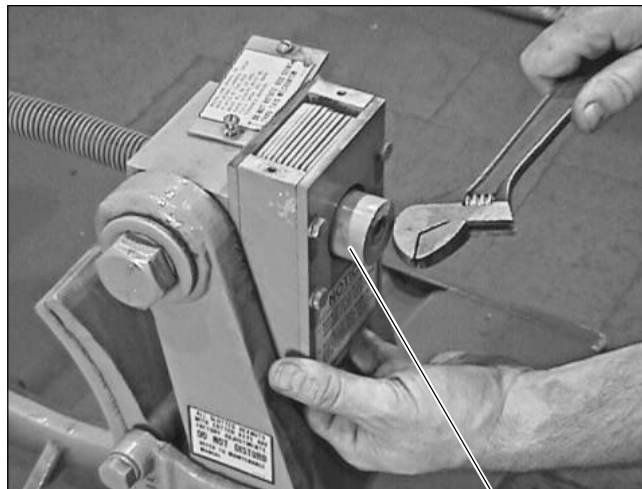
- Reach under the adjusting spacer housing and push all spacer plates (which are nearest to the front wall of the housing) up against the top cover. See the figure below.



Spacer Housing

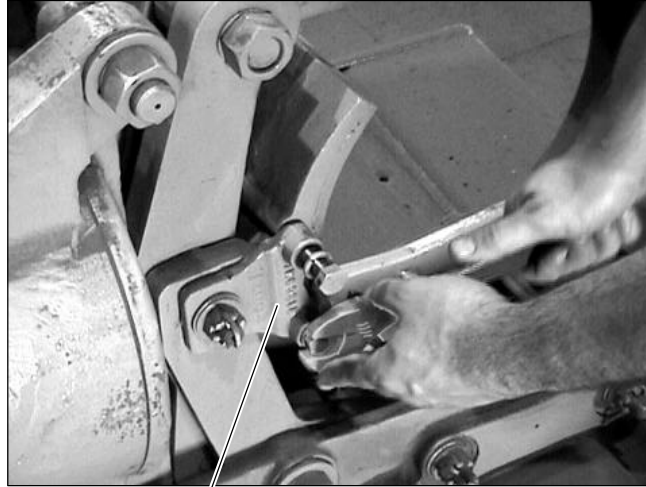


- Hold the spacer plates against the top cover and gently tap against the end of the spacer stop with an appropriate tool. See the figure below.



Spacer Stop

2. Remove the brake shoe.
 - Back out the two screws in one shoe holder until the screw ends clear the holes in the shoe. See the figure below.



Shoe Holder

Loosen Shoe Holder Screws

- Rotate the shoe holder out of the way. See the figure below.



Rotate the Shoe Holder Down

- Slide the brake shoe out of the holder.

3. Install the new brake shoe.

- Slide the new brake shoe in place between the two holders. See the figure below.



New Brake Shoe in Place

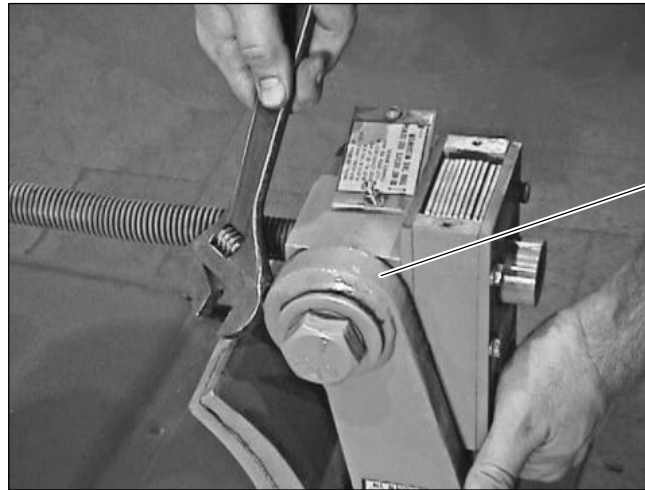
- Tap the brake shoe to achieve alignment with the far shoe holder.
 - Rotate the side holder back into position, and tighten the two screws wrench-tight.
 - Tap the holder gently, if necessary, to align the screws with the holes in the shoe assembly.
4. Move the new shoe against the brake wheel.
- Reach under the adjusting spacer housing and push any spacers that are in the down position up against the top cover. See the figure below.

Spacer Housing



- Hold the spacers against the top cover.

- Tap gently against the inside of the pivot links. Alternate between the two pivot links to position the new brake shoe evenly against the brake wheel. See the figure below.



Note: This action also moves the worn brake shoe away from the brake wheel.

5. Remove the worn brake shoe.
 - Back out the two screws in one shoe holder until the screw ends clear the holes in the shoe.
 - Rotate the shoe holder out of the way.
6. Install the new brake shoe.
 - Slide the new brake shoe in place between the two holders.
 - Tap the brake shoe to achieve alignment with the far shoe holder.
 - Rotate the side holder back into position and tighten the two screws wrench-tight.
 - Tap the holder gently, if necessary, to align the screws with the holes in the brake shoe.

Caution: Do not operate the brake unless all shoe holders are in their normal positions and the holder screws are in the clearance holes in their respective shoes.

7. Restore the brake to its normal operation.

- Energize the magnet and the spacer will fall from behind the armature nut. If the spacer does not fall, push it down using a suitable tool.

Part B: Adjust the Brakes

Preparation

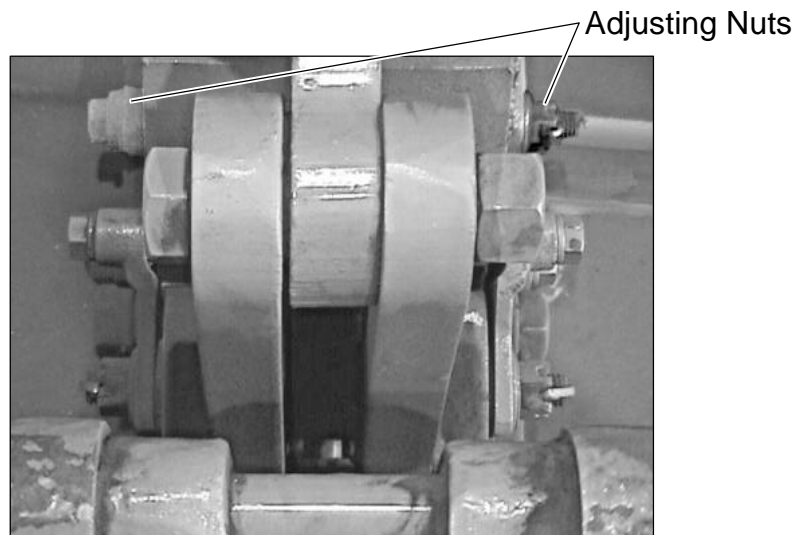
1. Lower the block and/or load to the floor.
2. Using a magnet assisted brake release, disconnect the hoist motor.

Shoe Holder Pivot Tension Adjustment

1. Lower the block and/or load to the floor.
2. Adjust the shoe holders nearest the armature.

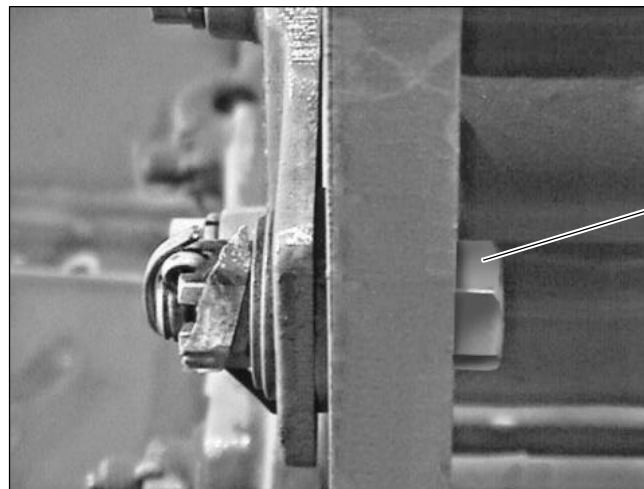
Note: The shoe holders nearest to the armature are equipped with a pivot shaft, which has a nut at each end. The other shoe holders are attached at their pivot points by a capscrew and nut.

- Tighten the nuts on each end of the pivot shaft to pull the parts together.
- Loosen both nuts an equal number of turns until completely loose. See the figure below.





- Tighten one nut finger-tight.
 - Tighten the nut an additional $\frac{1}{6}$ of a turn (60 degrees) plus an amount necessary to align a slot in the nut with the hole through the shaft.
 - Insert a cotter pin through the slot in the nut and the hole in the shaft, to lock the nut in position.
 - Tighten the other nut finger-tight.
 - Tighten the nut an additional $\frac{1}{3}$ of a turn (120 degrees).
 - Either tighten or loosen this nut to align the nearest slot in the nut with the hole in the pivot shaft.
 - Insert a cotter pin to lock the nut in position.
3. Adjust the pivot tension of the opposite shoe holder.
- Tighten the nuts on the pivot capscrews finger-tight. See the figure below.



Pivot Cap Screw

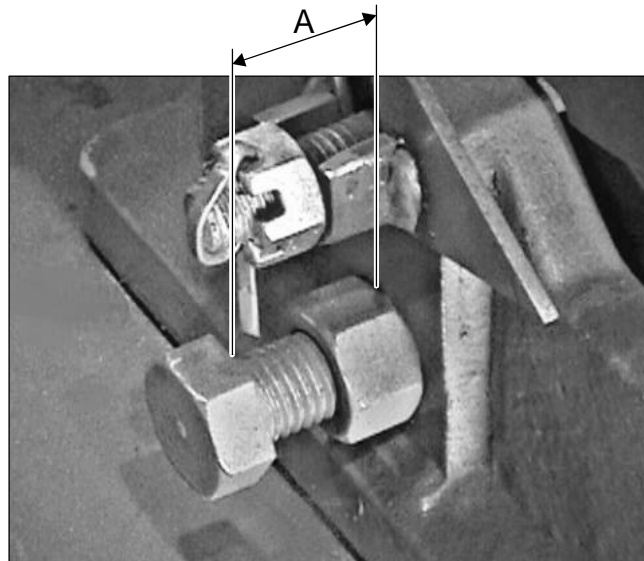
- Tighten the nuts an additional $\frac{1}{6}$ of a turn (60 degrees).
- Either tighten or loosen each nut to align the nearest slot in the nut with the hole through the capscrew.
- Insert a cotter pin to lock each nut in position.

Torque Adjustment

1. Lower the block and/or load to the floor.

Note: Adjusting to any dimension between the smallest and the largest listed on the nameplate is permissible. Do not adjust to a dimension below the minimum or above the maximum dimension listed.

2. Loosen the locknut on the adjusting bolt.
3. Turn the adjusting bolt in or out to achieve the desired dimension "A." See the figure below.



Note: Turning the nut clockwise increases the torque and turning it counterclockwise decreases the torque. Use the table below for desired torque.

Brake Size	Dimen. "A"	Torque (lb ft)
13 inches	2-1/8 in.	220
	1-5/8 in.	430
	1-3/8 in.	550
	1-1/8 in.	660

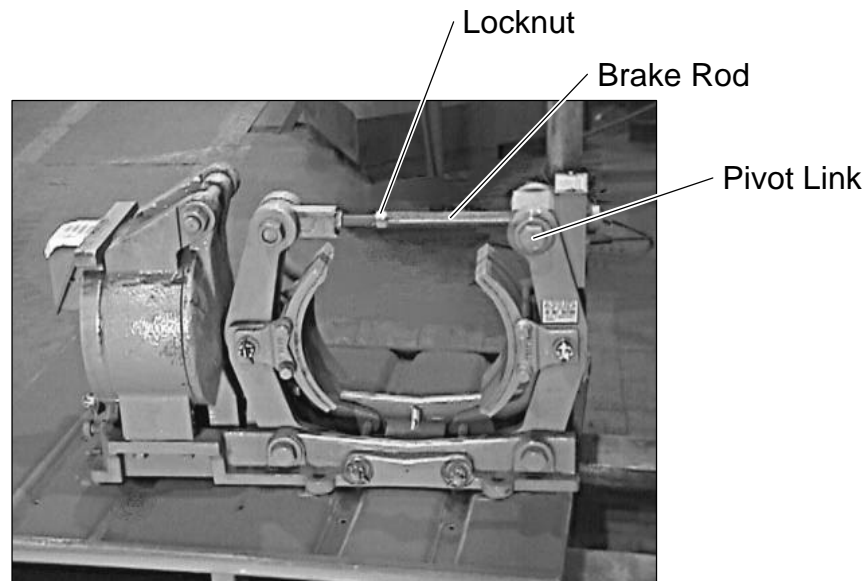
4. Hold the adjusting bolt and tighten the locknut against the base to achieve the desired setting.

Brake Rod Adjustment

1. Lower the block and/or load to the floor.

Note: Any brake rod adjustments made with worn linings must be reset when new linings are installed. Any brake rod adjustments made on a worn wheel, but with new linings, no adjustment is required for subsequent lining changes. Installing a new wheel requires a brake rod adjustment.

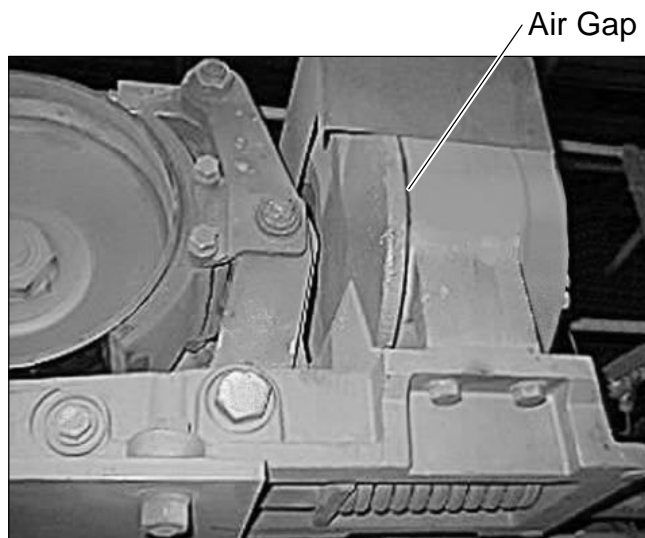
2. Close the armature against the magnet case either manually or electrically. Keep it closed during the brake rod adjustment.
3. Loosen the locknut on the brake rod. See the figure below.



4. Turn the rod out of the pivot link until four or five self-adjusting spacers fall to the down position on the brake rod.
5. Move the brake shoes about 1/8 inch away from the wheel.
6. Hold the self-adjusting spacers in the up position and screw the rod into the pivot link until the shoes are tight against the brake wheel.

Note: All the self-adjusting spacers should now be hanging free and loose within the enclosure.

7. Back the rod out of the pivot link until the first spacer plate falls to the down position.
8. Tighten the locknut against the pivot link, without disturbing the brake rod setting.
9. Release the armature.
10. Check the air gap. See the figure below.



Note: The air gap should be close to the minimum, 0.09 inches.

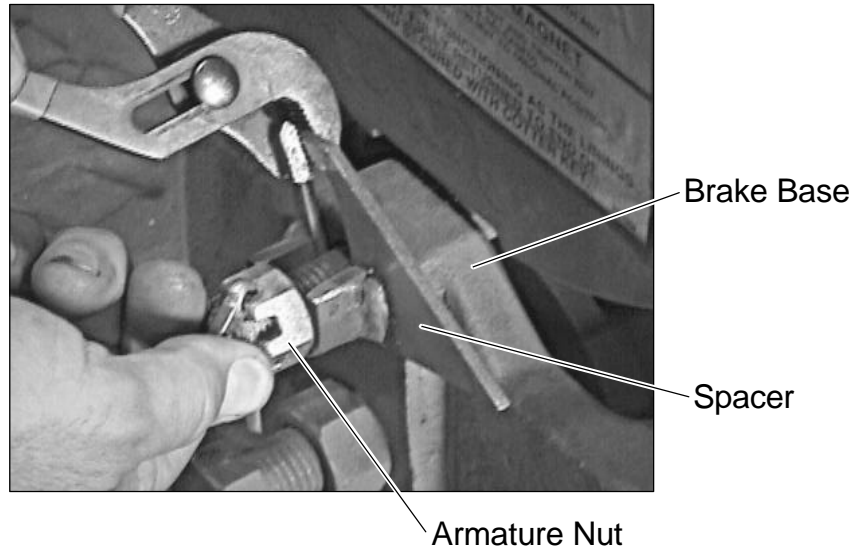
Brake Release Spacer Gap Adjustment

1. Lower the block and/or load to the floor.

Note: If the nut on the armature bolt has been disturbed, the spacer gap must be readjusted.

2. Energize the brake coil to close the gap between the magnet case and the armature (brake release).

3. Lift the spacer up so its thick portion is directly between the nut on the armature bolt and the base. See the figure below.



4. Remove the cotter pin and turn the nut in until it is finger-tight against the spacer, pinching the spacer against the brake base.
5. Loosen the nut just enough so the spacer falls freely.
6. Loosen the nut until the nearest slot aligns with the hole through the armature bolt.
7. Insert the cotter pin to lock the nut in position.
8. Check the adjustment.
 - Slide the spacer up using a suitable tool and hold it in place.
 - De-energize the magnet and release the spacer.
 - Pinch the thick end of the spacer between the nut and the base.

Note: There should be little or no gap between the magnet case and the armature.

- Energize the magnet. The spacer should fall freely to the lower position.