

Servicing & Repairing Nuffield and Leyland Tractor 'Dry' disc brakes

For the brake system to work effectively, correctly, safely and without 'Grab' or 'Wander' the complete system must be in good mechanical condition and adjusted properly. On tractors with safety cabs or without a cab, all the bushes on the cross shaft and the cross shaft itself must be in good order without any side play. Over many years of operation and lack of maintenance these bushes will be worn or seized on the cross shaft, they must be renewed or freed off before effective braking can be achieved. It's not the intention of this article to explain how this should be done but it would be very worth while removing the complete cross shaft assembly so that the work can be carried out. Correct lubrication of the cross shaft and adjustment of the brakes will go a long way to ensuring reliable braking.

On tractors with 'Quiet' cabs, master cylinders, slave cylinders, rubber hoses and brake fluid must be checked for condition. It is very common for the internal lining of brake hoses to fail causing complete blockage and brake failure. Master cylinder seals, brake hoses and brake fluid must be renewed before proceeding further. Brake fluid **MUST** be changed every two years irrespective of whether the tractor has been used or not. Brake fluid is 'Hygroscopic' that is it will absorb water from any source, including through the wall of the brake hose. Again the overhaul of these components is not covered here.

Once you have overhauled the external mechanical linkage or hydraulic operating system it's time to turn your attention to the brakes themselves. **DON'T** attempt to proceed unless the above has been carried out. If the tractor doesn't have a cab then the mud wings should be removed for easy access. On tractors with cabs access to the brakes is limited and thought should be given to removing the cab. Quiet Cab removal isn't the easiest of jobs but without removal access to the brakes is at best tricky.

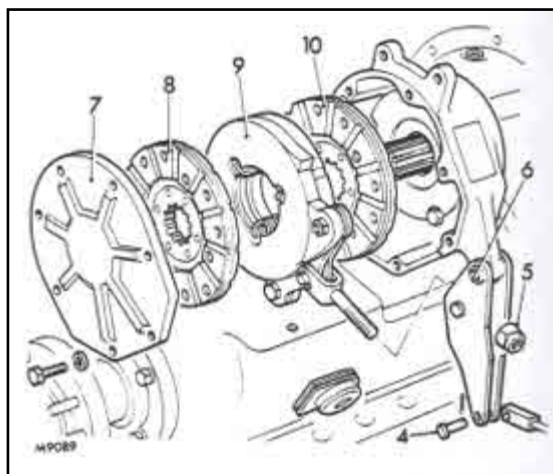


Fig 1. Exploded view of brake assembly

The main brake components are shown in Fig 1. The operation of the brake is very simple, when the threaded rod on the actuator (9) is pulled, the actuator expands forcing the two rotating friction discs (8 & 10) against the brake housing and outer cover (7). This action slows the tractor! When the friction discs, end plate and housing wear then braking action is reduced. Wear on the pinion splines and various abutment surfaces can allow the brakes to lock on! In severe cases excessive wear will allow the balls in the actuator to reach the end of their travel, again locking the brakes on. When this happens it may be possible to free the brake by reversing the tractor!

Even if the adjusting nut (5) is adjusted to reduce brake pedal travel this is only effective if the brake discs etc are in good condition. Take care when removing the cover plate and internal components, there will be a lot of brake dust. **WARNING** - Old and original disc facings will be manufactured from asbestos based material. Don't use an airline to blow the dust out and wear a face mask for protection.

The brake actuator, Fig 2, can be dismantled to check for wear in the ramps that the balls (5) sit in. The springs (4) may be weak due to heat affecting the spring steel. If the springs are loose when the actuator is removed then this is a sure sign of weakness, they should be tight to hold the actuator in the 'At rest' position. Very often heat is caused by the brakes being partially applied causing the rotating disc to touch the surfaces. Check the pins and links (2) for wear. All the the wear surfaces may be 'Glazed' this will severely reduce the braking action.

New actuators are available from various sources, many tractors of the 60's & 70's used the same brakes.

With the brakes removed the following should be checked;

1. Brake disc friction surface wear
2. Excess wear on the endplate, housing & actuator surfaces
3. Steps on the actuator abutment surfaces
4. Wear and steps on the pinion splines
5. Brake disc spline wear
6. Weak actuator springs
7. Worn actuator ramps, damaged balls & worn internal linkage

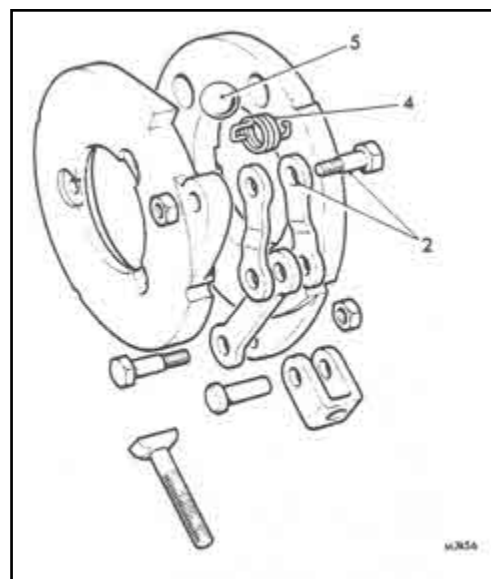


Fig 2. Exploded view of brake actuator

If the friction disc splines are in good condition then it's possible to 'Re-line' the old discs. Kits of friction material and rivets are available, but unless you have the correct riveting tools this should be carried out by a specialist brake re-lining company. An alternative is to have the new linings 'Bonded' onto the old discs, this again is a specialist job.

If the cover plate is badly worn then it can be machined to remove the wear ridge. Although it can be done it is a specialist job to machine the brake housing, if it is machined then the same amount should be removed from the outer face of the housing where the cover plate attaches. If the actuators are worn it would be better to replace them with new items.

If the brake housings are removed, the pinion seals should be renewed at the same time, they are prone to leaking. Care should be taken to protect the seals, they can be damaged by the pinion splines. Any wear ridges on the splines should be removed with a micro grinding tool. (Dremel or similar Multi Tool)

To reduce brake 'Grab' the following procedures should be carried out on the brake housing and actuator, (Fig 3.)

1. File a small 1/16" (1.59 mm) radius at each point 'A'
2. Grind or file the abutment surfaces at 'B' to a smooth finish
3. Check that the locating faces at 'C' are smooth
4. Apply a small quantity of Molycote Paste or Copper Grease on the locating faces 'C'

Don't grease the balls in the actuator or the splines of the drive pinions.

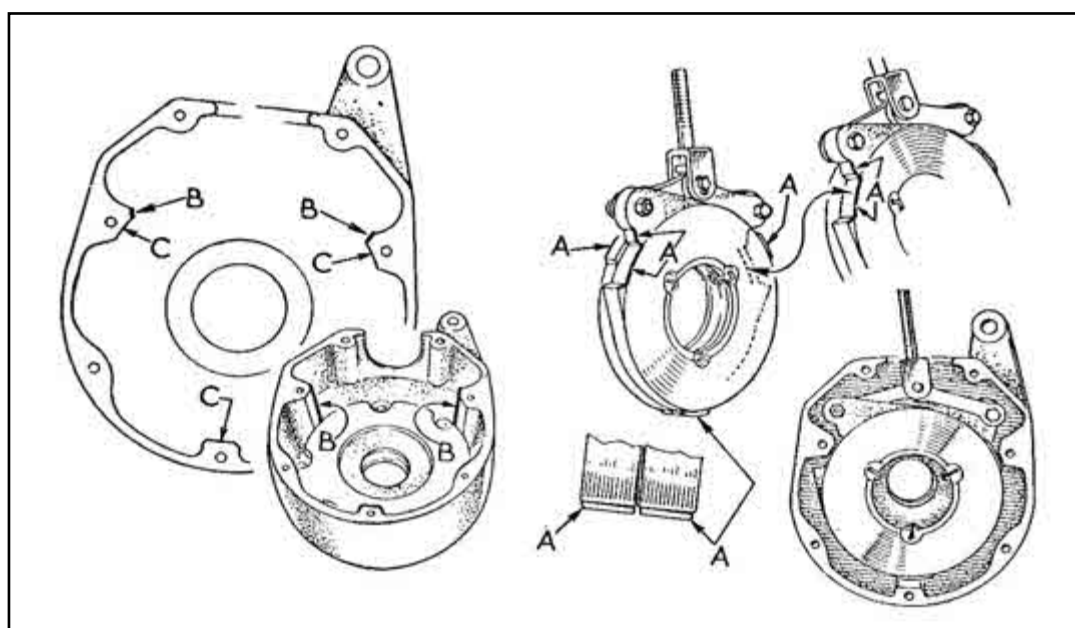


Fig 3. Abutment surfaces

Lubrication of cross shaft - The grease nipples on the cross shaft should be lubricated every 10 operating hours and the brake linkage oiled every 50 hours. Grease nipples were fitted half way through 3/45 and 4/65 production. On earlier tractors nipples can be fitted to the RH pedal pivot and the two square blocks that support the cross shaft.

Brake adjustment - Non Cab and Safety Cab Tractors - To adjust the brakes follow the procedure below.

Left Hand Brake - Screw up the 'Nyloc' nut until the brake pedal free travel is 38mm (1½ inches).

Right Hand Brake - Depress the Left Hand pedal to the extent of the free travel, maintain it in this position. Screw up the Right Hand brake 'Nyloc' adjusting nut until the brake pedal pad lines up with the pad of the Left Hand pedal when the free movement is taken up.

The free movement of both pedals when latched together should be 38mm (1½ inches), the latch dropping freely into the slot in the Right Hand pedal.

When the brakes are in good condition there should be approximately 12mm (½ inch) of thread showing through the nut.

Brake adjustment - Quiet Cab Tractors - The necessary information, along with other important clutch and brake bleeding information, is contained in the following 'Information' instruction sheet; "**Hydraulic Brake and Clutch bleeding also Brake adjustment**" - [Click Here](#) to download.

The braking system is 'Safety Critical' therefore the brakes must be in good condition and kept well maintained.