

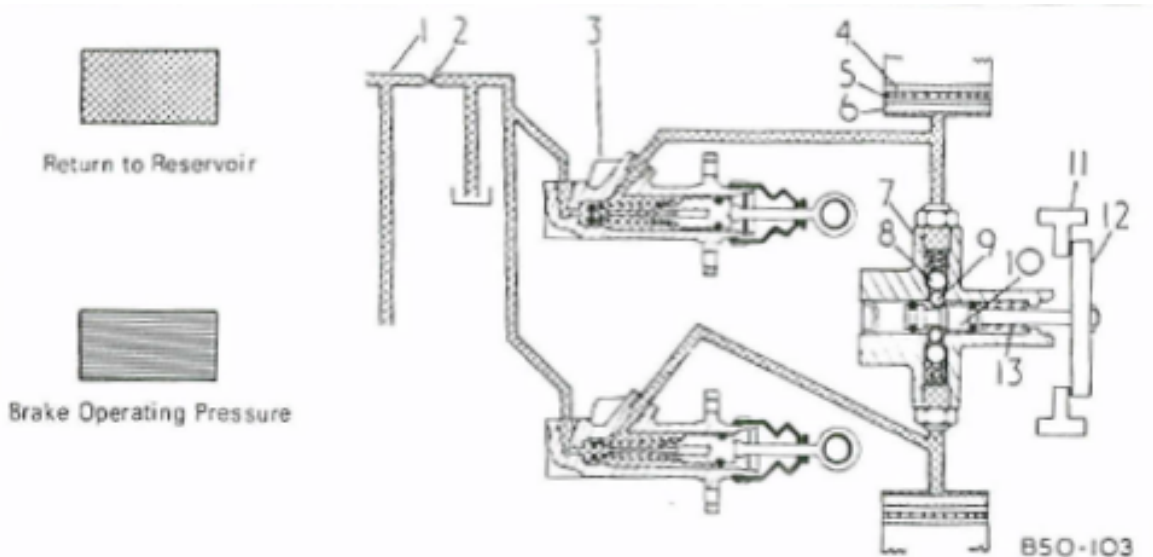
## 674 Loss of Brakes.

The problem and suggested solutions apply to all IH 74, 84series & IH 85 L series tractors including hydro and industrial versions.

There are several causes of brake loss due to air ingress into the braking system:-

- A) Brake loss due to worn seals on the pistons in the axle,
- B) Air ingress due to worn equaliser seals
- C) Air ingress due to cavitation of the hydraulic system.
- D) Badly adjusted or positioned PTO lever.

Firstly we need to understand the layout of the system.



Brake supply oil is supplied from the Oil cooler return pipe 1 through a small plastic orifice with screen at the rate of  $\frac{1}{2}$  to 1litre in 3 minutes (This assy is fastened to the rear of the battery carrier and the return hose, after orifice goes down to gearbox lid). The brake supply oil then feeds to each master cylinder, which when pressurised by pressing

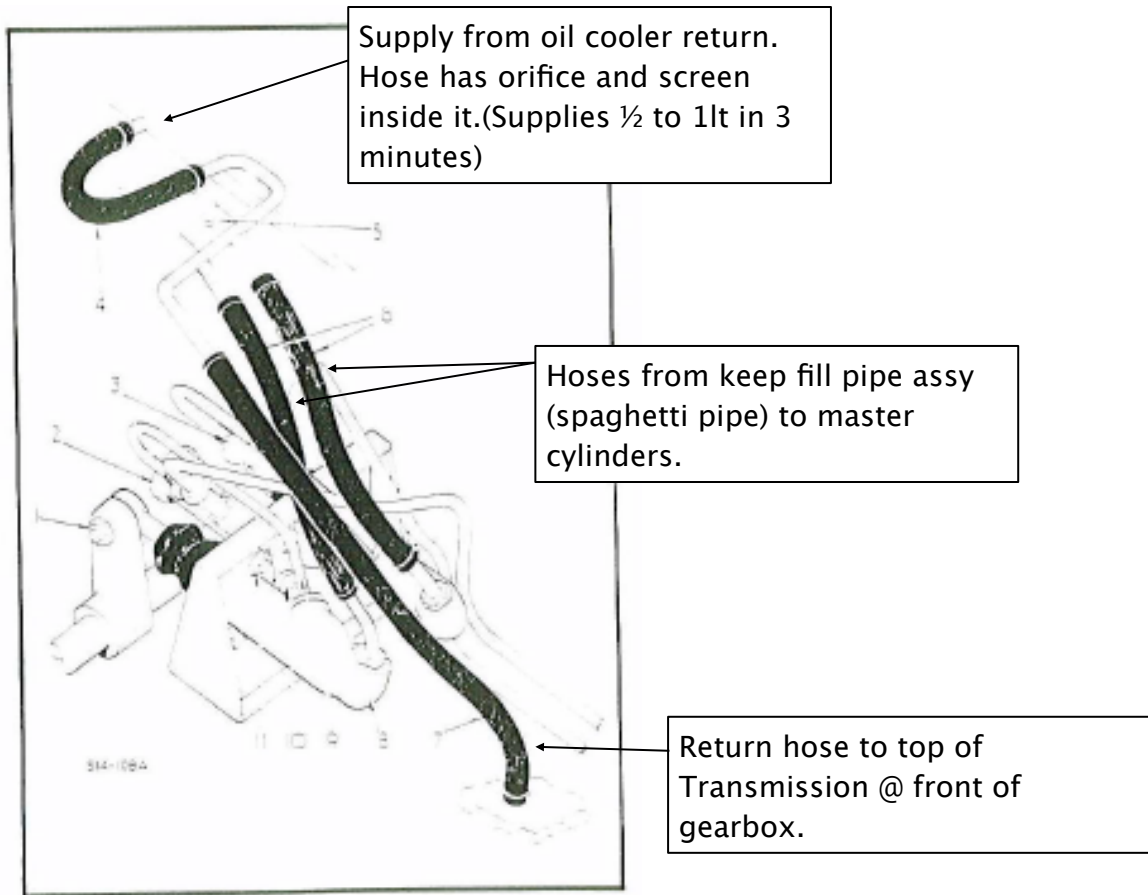
pedals supplies oil to the axle brake pistons. Near the master cylinders and tee'd into the brake lines is a balance valve assy (items 7 – 12) which makes sure brake line pressures are equal when both pedals are depressed to allow balanced braking. It also isolates lines to allow independent braking when only one pedal is pressed.

Because the top up is always there when the engine is running the system is fairly tolerant of small leakages.

- A) Fluid loss due to worn brake seals in the axle. After a lot of use the O ring seals on the piston become worn and flats form on the O ring, so the section of the ring is more D shaped, When the piston is moved by pressurised oil from the pedals being pressed the O ring rolls and seals giving a brake, however when the brakes are at rest (usually when parked up) the ring un-rolls and the flats allow fluid to leak from the brake circuit, next application of pedal gives a soft pedal and loss of braking.

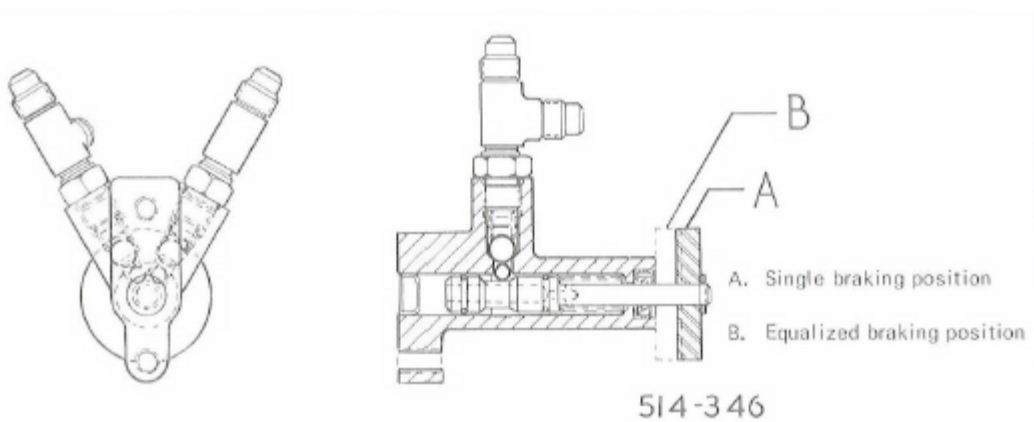
Application of a low pressure test (3 to 5psi) on the system will cause the pistons to move, O rings to roll and system will build to high pressure.

The correct method to carry out a test for worn O rings is to remove the two steel brake pipes where they go onto the axle and make up and fit 2 pipe and hose fittings fitted with clear plastic hose and to tape plastic hoses up side of cab. Then fill hoses to a marked level with warm transmission oil (warm oil allows easier filling of tubes and air removal from filling oil) Leave oil in tubes for 3-4 hours and if seals are bad the oil will either have dropped significantly or disappeared.



Layout of keep fill (Spaghetti) pipe assy fixed to rear top of battery carrier

B) Air ingress due to worn equaliser seals



Equaliser Valve Assembly.

A worn oil seal on the spindle of the equaliser can allow air entry to the brake system, will usually also show signs of seepage/leakage if inspected.

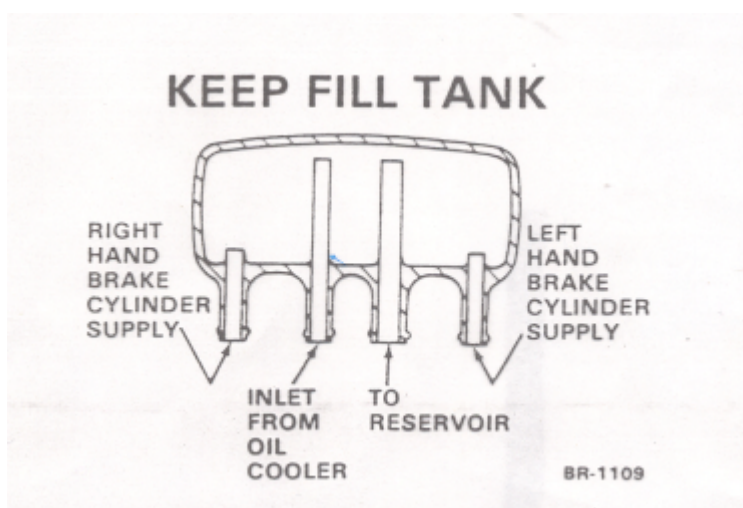
Easily repaired with a new seal kit or if badly worn a replacement valve

It was found in 1978 that under certain circumstances a vacuum of around 4 inches of mercury could occur in the brake system with the tractor parked up

How the air gets in:- On a tractor that is used infrequently and or for short periods, the oil never really gets hot. So when parked up for a period of time a vacuum forms in the brake system, caused by a solid plug of cold viscous oil in the return line from the spaghetti pipe to the gearbox lid. Until 1979 this pipe was only about 3/16 inch bore so the cold oil did not drain out easily. On 84series this pipe was increased to 3/8inch bore with a bigger fitting on the gearbox lid, which prevents the vacuum forming.

Once the vacuum has formed and operator gets onto tractor he gets comfortable, places feet on brake pedals and this usually joggles the equaliser valve spindle which lets in a little air bubble, over time quantity of air in brake increases and results in spongy brakes. Once the engine is running there is no longer a vacuum until next time. If ever gearbox lid is off it is worthwhile modding this return pipe on earlier machines.

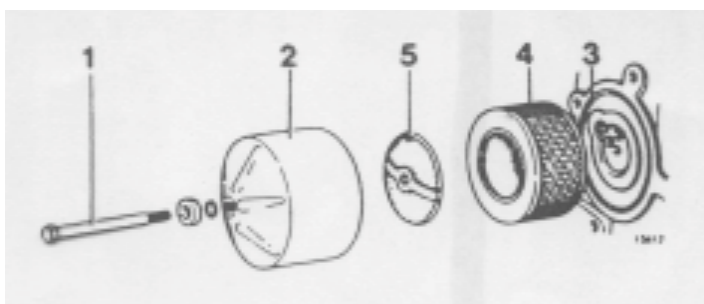
To improve even further some people have replaced the Spaghetti pipe assy with the plastic reservoir from the Later 85series Case IH machines, although it must be stated that space in this area is somewhat at a premium.



c) Air ingress due to cavitation of hydraulic system

This problem may also be accompanied by hydraulic system problems, heavy steering, increased noise and vibration etc.

Problem usually occurs after a recent change of hydraulic suction filter on the Multiple control valve (MCV). When the filter is changed there is a suction screen (5) which must be changed from old element to the new element. It has been known for this to be discarded, causing hydraulic problems.



Another source of air ingress from the filter assy is when the bolt 1 is over tightened, causing the bowl 2 to distort, and whilst it may not leak oil it can allow air to be drawn in by the pump. Once the bowl is damaged like this the only course is a new bowl.

The filter bolt torque is only 12-16lb ft (16-21Nm).

- D) The position of the independent power take off (IPTO) linkages and spool can also affect the supply of oil to the brakes. In the fully off or fully engaged position the oil supply to the brakes will be o/k, but if the linkage is badly adjusted then it may allow leakage from the cooler circuit, starving the brakes, a symptom of this may be a hot transmission and hydraulic system.

From the off position the first movement of the IPTO lever gives initial engagement and in this position oil is dumped from the

cooler circuit. This can be caused by seized linkage, due to lack of lubrication. Also if something is placed at r/hand rear of the seat, snap bag, overcoat etc, it can restrict IPTO lever movement and cause the oil to be dumped, leading to loss of brake top up oil.

## **Brake Bleeding Procedure.**

Go to spaghetti pipe assy and find supply hose from oil cooler return. feel along hose and you should feel a slight bulge, this is where the plastic orifice and screen is fitted remove this hose and temporarily replace with a piece of clear poly tube.

Place two clear hoses on the bleed screws on the hydraulic top cover above rear axle and place free ends in filler plug hole above top link mounting, and open bleed screws.

Run engine @ 1500 rpm for several minutes before starting to bleed brakes, to allow aerated oil in system to be removed. Find the dump hose from the spaghetti pipe assy and fit a hose clamp to temporarily seal off hose and divert full oil flow through brake system, then when you start to bleed brakes check the clear poly hose to see if oil is aerated, it must be fixed before proceeding to bleed the brake system.

You can only bleed brakes when oil is air free.

With brake pedals latched together and bleed screws open, slowly pump the pedals until oil free of air is seen in both the hoses. now unlatch pedals and hold one down whilst slowly pumping the other, (To purge air from the balance valve assy). When lines are free of air stop tractor and tighten bleed screws and remove bleed hoses. Unclamp hose clamp from return hose.

When bleeding is over remove poly tube and replace hose with orifice. **Do not** leave poly hose in place or fit rubber hose without orifice/ screen assy as it will cause brakes to drag and wear out!!!!.

The plastic orifice / screen assy is designed to pass 1/3lt /min of oil. in practice some have been opened up by putting a hot 1/16 inch welding rod through the plastic orifice, or a 1/16inch drill bit (1.5mm).