Tractor service hints - The correct usage of the hydraulic lift and linkage
When using an implement with a new tractor for the first time, the operator soon discovers the best gear to select for the particular job in hand. In other words, the operator's experience enables him to use his tractor in the most economical manner.

For example, correct gear selection means minimum wheel spin, and therefore economy in tyre wear. It also means economical fuel consumption.

These are but two of the more obvious expenses in tractor operation.

In that last statement, "obvious" is the operative word, since most people note the obvious and act accordingly, hence the operator's selection of a particular gear.

**Seldom gets necessary consideration**

Correct usage of the tractor's hydraulic lift and linkage, on the other hand, does not bring to light such obvious advantages. Therefore it seldom gets the consideration that is necessary for efficient operation, which brings us to the object of this article.

To save time and money, it is essential that the operator should be fully conversant with the tractor as a whole, and this includes the lift and linkage.

Firstly, to clarify the adjustments and general operation of the three-point lift and linkage, let us examine the relationship of mounted plough operation to that of trailing ploughs.

The trailing plough is basically similar to its mounted counterpart in construction, in that they both have discs or mouldboards attached to a suitable frame. The trailing plough, however, is suspended
at three points, all of which are adjustable to some degree. They are the land wheel, front furrow wheel, and rear furrow wheel. When in work the land wheel controls the depth and the front furrow wheel keeps the plough level. The rear furrow wheel is usually angled to take the load imposed by side draft. The whole unit is attached to the tractor at one point, the drawbar, which only serves as a link by which the implement is drawn through the ground.

**REPLACE DRAWBAR**

With the mounted plough, however, the linkage lower links replace the drawbar. However, their function does not end here. They also provide a method by which the implement may be lifted clear of the ground.

The fact that the lower link hitch point is much higher on the mounted plough than the point of pull on the trailing implement means that the mounted unit requires some method of stabilisation to prevent the plough tipping forward as it is lowered into the work. This is one of the reasons for the provision of the upper link. The other reason is to provide the third point necessary for lifting the implement.

The fact that the mounted plough is held level transversely by the lower links obviates the use of a front furrow wheel.

The level of the plough is adjusted by means of the levelling box incorporated in the right hand lifting rod, and the fore and aft level is maintained by adjustment of the upper link of the three-point linkage.

The depth of operation of the implement is still controlled by an adjustable depth wheel on the plough, since ground contact is the most accurate method. To sum up this comparison, the list below shows the equivalent parts of the two types of plough and the function that they perform:

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**EASIER METHOD OF ATTACHMENT**

It will be seen, therefore, that for the smaller implement the three-point lift and linkage provides a much more convenient method of attachment; at the same time it will be obvious that a distinct relationship exists between the operation of both types of implements.

Most tractor owners will have made themselves familiar with their tractor and its accessories through the Instruction Booklet issued on the subject. The section devoted to the hydraulic lift and linkage is quite comprehensive. However, enlargement on a few points may prove of value.

When raising the implement the operator is advised to release the control lever smartly at the conclusion of raising, and not to retain the lever in the raised position.

The reason for this instruction is that at the conclusion of the lifting cycle the ram is fully extended, therefore the oil has to have an alternative circuit, since the pump continues to force oil into the valve box.

The only alternative is through the unloading valve, included in the circuit as a safety device. This valve is forced off its seat at the conclusion of the ram stroke, and remains unseated while the lever is held up, and since this is undesirable, the practice should be avoided.

**SPEED OF DESCENT**

The speed of descent of an implement can be controlled by the positioning of the control lever when lowering. In the case of the mouldboard plough with cast shares, it may be desirable to lower at a slower rate if the ground is hard or stony.

The lever in the fully down position allows the implement to fall quickly. At intermediate positions between neutral and the fully down position, the rate of
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flow of oil is controlled to give varying speeds of descent. The slowest descent position is nearer neutral.

Having fixed the appropriate speed for a particular implement, this can be selected automatically by positioning of the thumb screw stop on the control lever quadrant, thereby allowing the control lever to be pushed down only as far as the stop will permit.

**WATCH CHECK CHAINS**

With the exception of one application, check chains should at all times be slack when an implement is in work. They are not intended to take up the side draft on a plough, for example. Any tendency to pull on the check chains means that the plough is incorrectly set. Constant load on the check chains could result in bent lower links or even a fractured check chain bracket mounting pad.

The purpose of the check chains is to prevent the lower links striking the rear tyres. It is also advisable to tighten them if transporting the implement over a considerable distance in the raised position. This prevents the implement swinging at speed making a driving hazard and also placing strain on the check chains.

The one exception to the rule applies when cultivating crop rows. For this work, the chains should be tight enough to prevent the unit swaying and damaging the crop. It should be borne in mind that this work imposes a comparatively light load, and does not involve side draft.

**LIFTING RODS**

The lifting rods connecting the lower links to the hydraulic lift lifting arms comprise, broadly speaking, two parts connected by a pin. Provision is made in the lower half of each lifting rod for the pin to connect the two halves rigidly through a hole in both members as shown in Fig. 1 or the telescopic position where the pin can move vertically in a slot in the lower member.

While the former fixed position should be used for all implements having only one depth control wheel—such as ploughs...
— the telescopic position should be used on all wide implements, particularly those having two depth control wheels. In the case of the plough, it is essential to have these rods fixed, since the plough relies upon the lower links holding it level to maintain level work. However, in the case of a tine cultivator, the two depth wheels on the implement hold the unit level and there is no necessity for the length of the lifting rods to be fixed.

It is most advisable to utilise the telescopic position for a wide implement, since any lateral tipping of the attached unit due to running over an obstruction, for example, results in great strains being placed on the hydraulic lift arms.

Therefore, ensure at all times when using an implement of this type that the pins are placed in the telescopic position.

ATTACHING PROCEDURE

It is claimed that a mounted implement can be attached in a matter of one or two minutes, a claim occasionally disputed by operators who are unaware of the correct attaching procedure and do not observe the elementary points that can be of assistance.

Firstly the linkage itself. Ensure that the levelling box is always adequately greased and also the threaded portions of the upper link. Always endeavour to park the implement on a level piece of ground. If, for example, the operator wishes to leave the depth-control wheel of a plough in the ploughing position, it is worthwhile, placing a block under the depth wheel to keep the plough horizontal and therefore much easier to attach.

The actual attaching procedure, while being prominently illustrated in the Instruction Books of several of the "Crown" implements, will probably be of value to the operator in possession of other types of mounted equipment.

Therefore, we illustrate here the only correct procedure to adopt.

STEPS TO FOLLOW

With the transport chain disconnected and the tractor in a central position in
relation to the implement, reverse the tractor toward the implement, holding the upper link and guiding it between the jaws of the upper link support on the implement. (See Fig. 2).

Before dismounting from the tractor, apply the parking brake, place the gear lever in neutral and operate the hydraulic lift until the left-hand lower link is at the same vertical level as the left-hand hitch pin of the implement.

Upon dismounting, adjust the length of the upper link until the top link pin may be inserted and the linch pin locked in position.

The next step is to adjust the length of the upper link and push the implement away from or draw it toward the tractor until the left-hand lower link that is already in the correct vertical position is brought in line with the left-hand implement hitch pin. The ball point of this lower link may be now attached and the linch pin inserted. (See Fig. 3).

The last step is to attach the right-hand lower link. Any necessity to move the implement away from or to the tractor can be accomplished by use of the adjustable upper link, and any vertical adjustment that may be necessary can be accomplished with the levelling box. (See Fig. 4).

For detaching an implement, the reverse procedure applies.

**KEEP PINS FREE FROM RUST**

One final point in connection with safe and easy implement mounting concerns the various pins and linch pins. Always ensure that the main pins of the implement and the top link pin are free from rust and corrosion, likewise the holes in the upper link support of the implement.

In the event of loss or damage to the securing linch pins, these should be replaced by new ones and not by bolts and nuts or similar means of securement.

The design of these pins is such that the minimum amount of time is wasted in implement attachment and therefore advantage should be taken of this facility.
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