

## The Consequence of Not Greasing

July, 2015 Revised

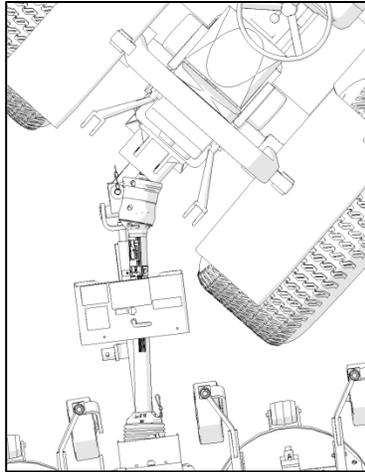
### Applies to:

#### All Models – all serial numbers

Proper routine maintenance is a key to low ownership cost, but it is often viewed as an expense or even unnecessary. For this reason, Progressive Turf Equipment has introduced many features to help reduce the time required for routine maintenance. However, the consequence of not performing the necessary routine maintenance is often very costly and well in excess of the cost of the preventative maintenance activity itself.

### INPUT PTO SHAFT SLIP JOINT

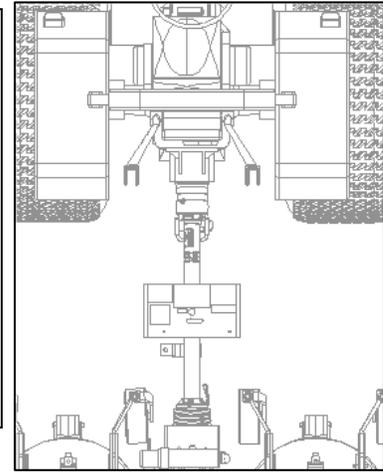
An often overlooked grease point is the sliding spline of the input PTO shaft. A dry slip joint might be able to collapse and expand by hand, but when that same shaft is under load, the splines will seize and the shaft becomes rigid. No longer can the shaft accommodate the length changes required for turning.



When turning or starting to climb a hill, the input shaft must be able to collapse to accommodate the shorter distance between the tractor and mower.

Upon straightening, the input PTO shaft must extend to the initial set-up length.

**If the input shaft slip joint binds or seizes due to a lack of lubrication, the operator most likely won't realize it at first as the slip joint may still slide due to the forces applied.**



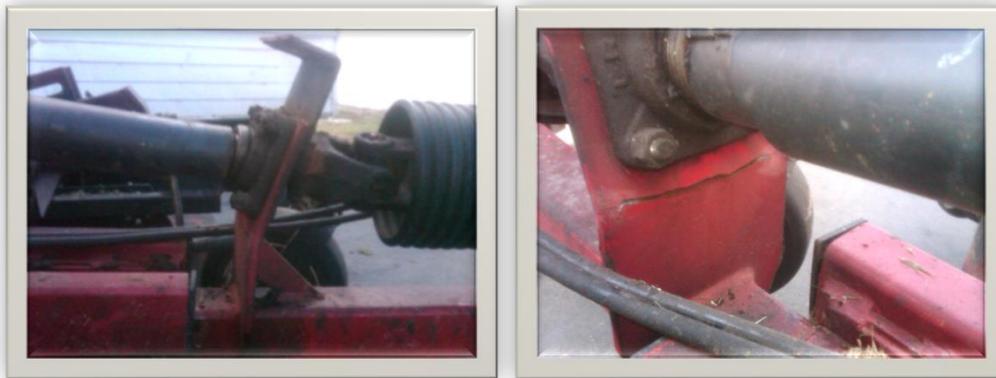
The trouble often becomes visible when the operator steers straight.

Normally when straightening the tractor from a turn, the input PTO shaft will easily expand to the required length without undue load placed on either the tractor PTO stub drive or the mower. If the input shaft slip joint seizes or binds, the tractor's PTO drive must pull on the input shaft with tremendous force as it attempts to expand the shaft at the slip joint to achieve the required length. This places a potentially damaging end load on the tractor's PTO drive which it is not designed to handle. The likelihood of a catastrophic failure of the tractor's PTO drive increases the longer the mower is used in this condition – eventually something has to give. Continued use will accelerate wear, leading to a failure.

To help minimize damage to the tractor's PTO drive, Progressive has designed the hanger bearing bracket on all Progressive mowers to act like a 'fusible link', so that the bracket will yield or bend first. Look for horizontal cracks in the paint as an indication that the hanger bearing bracket is yielding. The yielding of the hanger bearing bracket removes some of the loading from the tractors PTO drive minimizing the risk of an expensive PTO drive repair, but it is also an indication of problems within the PTO shaft that must be corrected.

Repeated operation with a seized or binding input shaft slip joint will eventually lead to failure of the hanger bearing bracket as shown below. While this is not a guarantee of protection, this Progressive feature may save the owner from a more expensive PTO drive repair!

NOTE: You cannot tell if the slip joint is good or bad by simply collapsing and extending the shaft by hand. It can take up to 600lbs of force to move the slip joint when the shaft is under load. The PTO shaft must be pulled apart and inspected for galled or worn splines. It is not recommended to replace just one half of the shaft if the slip joint splines are worn.



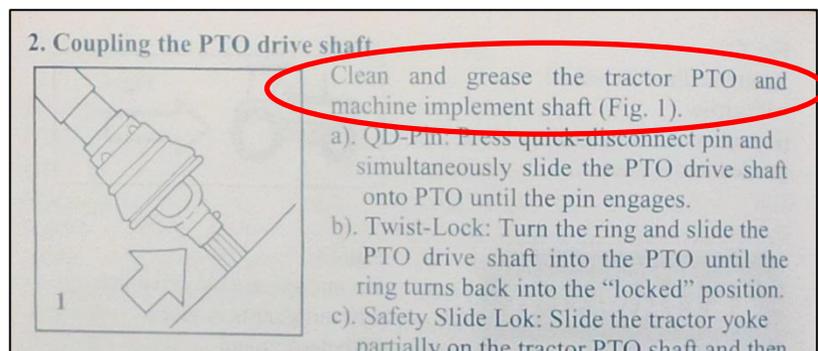
Note: Hose guard removed for visual purposes only. Always have guards and shields properly installed when operating

If a failure of this type occurs, Progressive recommends to either replace the bracket with a new part or straighten the bracket and weld the crack. Progressive does not recommend reinforcing the bracket. If the failure is beyond repair, the hanger bearing bracket must be replaced. Always check the hanger bearing for serviceability and replace the input PTO as a complete shaft. Check alignment of the shafts and fully grease the mower before returning it to service.

### PTO DRIVE STUB

Another routine maintenance point often overlooked is the PTO drive stub and the connecting yoke / locking collar. These are highly machined components that need to be periodically inspected and properly lubricated.

Often new tractors will be shipped from the manufacturer with the PTO drive stub either painted or protected with an anti-rust treatment. In either case the, PTO drive stub must be cleaned and a multi-purpose grease applied to all surfaces. See the notation in the PTO shaft manual (example shown at right) that is shipped with all PTO shafts.



## PTO DRIVE STUB CONTINUED

At regular intervals (see Operator's Manual) the PTO shaft must be disconnected from the tractor and the PTO drive stub and yoke cleaned, inspected for wear and lubricated, before reinstallation. A good time to do this is whenever the sliding joint of the PTO shaft is lubricated. Failure to do this may result in the female splines of the yoke wearing as shown in the right hand picture below. As the replacement of the yoke is much less costly than a repair of the tractor's PTO drive stub, by design the PTO shaft yoke is purposely softer than the hardened tractor's PTO drive stub and will therefore become the sacrificial part if wear should occur.



For these same reasons, it is also a good idea to periodically remove, clean and grease all PTO shaft connections to each gear box when performing scheduled service on the PTO shaft.

## PTO SHAFT REMOVAL

If a PTO shaft is difficult to disconnect from the tractor, DO NOT use excessive force to remove as damage to the tractor's PTO drive could result. The problem may be due to worn splines that have allowed the shaft to rotate so that the remaining splines will prevent the shaft removal. In this case, with the tractor and mower in a safe service condition, rotate the PTO shaft slightly in the normal direction of rotation WITHOUT allowing the tractor's PTO Drive stub to rotate. This will align the non-driving spline surfaces, allowing the PTO shaft to be removed when the auto-locking collar is released.

Occasionally, the auto-locking collar may not slide back into the release position. In this case, remove the retaining clip located at the end of the auto-locking collar and slide the collar forward exposing the locking mechanism.

## How to prevent failure such as these?

Following the routine greasing schedule with the recommended grease is always the least expensive option. Maintained as recommended, a Progressive mower will reward you with both low ownership cost and a long productive service life.



*Good mowing!*