

A SELECT REST

A 1965 Ford 4000 with Select-O-Speed transmission provides a test for these enthusiasts who are restoring the machine for the Hamilton Pastoral Museum in Australia.

WORD & PICTURES Mike Allfrey



The Ford 4000 operating a New Holland Hayliner 68 baler at a hay demonstration before any work to find the two missing reverse speeds. The tractor is as donated.

The farms in the Western District of Victoria, a south-eastern state in Australia tended to keep unused machinery in outdoor storage. And more recently, a group of tractor and machinery enthusiasts have collected a large range of machines for preservation at the Hamilton Pastoral Museum. The museum also caters for all items of historical interest from the local farming industry.

Setting the scene

A 1965 Ford 4000 tractor has been donated to the museum by the Hives family. The tractor features the Ford Select-O-Speed transmission coupled with a single speed PTO shaft controlled by a pull-out control handle mounted on the lower dash panel. The tractor was complete, except for two missing reverse speeds. There was also a concern related to the starter motor inhibitor switch. The tractor's tyres, like most in this country, had been filled with water for extra ballast.

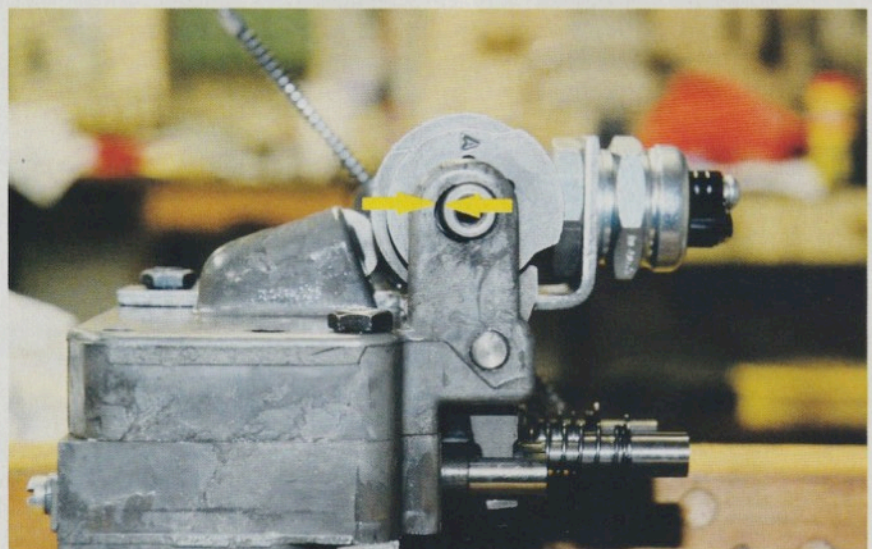
This caused the rear tyre carcasses to suffer cracks between the tyre lugs.

My involvement with this tractor came at the request of a colleague who was service engineer for Hay Tools at Ford New Holland, Noel Payne, here in Australia. Having been service engineer

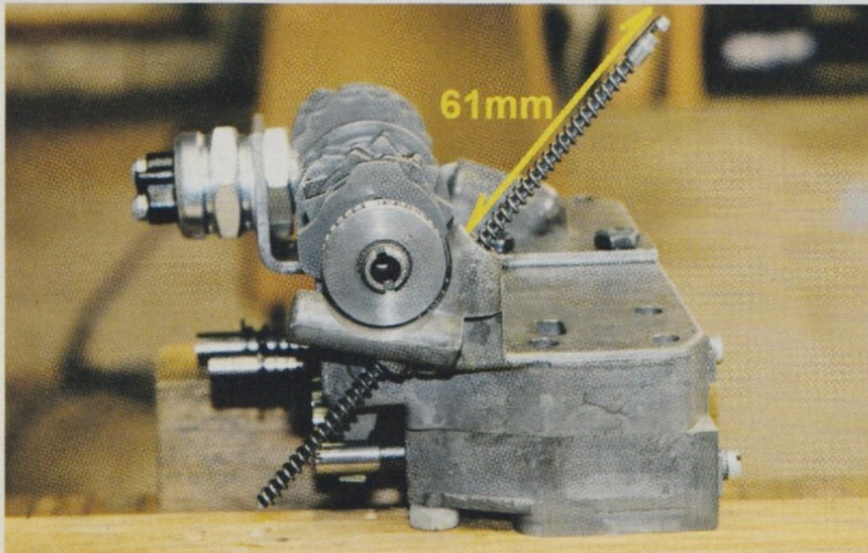
for Ford Tractors, I was soon roped in to help find the two reverse speeds. We soon became deeply involved with the Ford repair manuals of the period, and I took on restoring the transmission section of the manual. Thus, began a search for extra information about Select-O-Speed that took me to the US, Britain, other states in Australia and even South Africa. Initially, not much was forthcoming and there was virtually no information about how the transmission was developed.

Noel and I got together for a diagnostic session at the museum and found the starter motor circuit had been "hot-wired" to bypass the non-functioning inhibitor switch. We also just beat the Covid-19 pandemic lockdown, which soon became even more severe and, with me living on the eastern side of Melbourne, some 340km from the tractor matters were becoming difficult.

Wear found at left-hand end of Select-O-Speed control valve camshaft. This was left 'as is', mainly because there is no dimension provided for the centre of the bore.



ORATION



The set-up dimension for the lower segment of Select-O-Speed control cable.

Initial action

My involvement with Ford tractors was mostly with the Series 10 and the TW range, progressing to the 8030 range with the electronically controlled power shift transmission. I had some brief exposure to Select-O-Speed, but none of the Ford people who joined Ford New Holland could convey much expertise. Basically, we were all starting from scratch on the museum's project.

It was soon realised that the photocopy of the repair manual's transmission section was too confusing for the museum staff - and to a certain extent, us. It was converted to a PDF document, so the information could be viewed on a laptop screen and easily enlarged for detailed observation.

It soon became clear that those directly involved found great difficulty sorting out the differing PTO options. Plus, most illustrations were of the Ford 5000 transmission, which although essentially the same, differs from the Ford 4000 by having the control valve for the transmission, right down at the bottom of its casing instead of the top. To date, not one illustration of a Ford 4000 transmission in cross-section has yet been found! Maybe someone can help with this quest?

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A curious statement in the repair manual was that, in the instance of a Ford 5000 transmission control valve being adjusted, then it would have to be installed in a 4000 transmission for adjusting and testing. Oh, for the luxury of having several Select-O-Speed tractors at a workshop's disposal! Fortunately, the museum has the Ford 4000.

Important note

The Ford Select-O-Speed transmission is not automatic, it is a shift-on-the-go type of transmission. If used under the instructions in the owner's manual, and properly serviced at regular intervals, it is a transmission that will provide long working life and be of great benefit in saving time and costs while at work. Such a tractor as our Ford 4000 is well worth preserving. Also, the transmission requires the correct specification (Ford/New Holland M-2C41) hydraulic oil, not automatic transmission fluid that



Severe rust at base of mudguard, both were affected in the same way.



Inside view of sheet metal repair. The repairs were carried out by a panel shop in Ballarat.

undoubtedly absorbs moisture and can then completely ruin the multi-plate clutch discs.

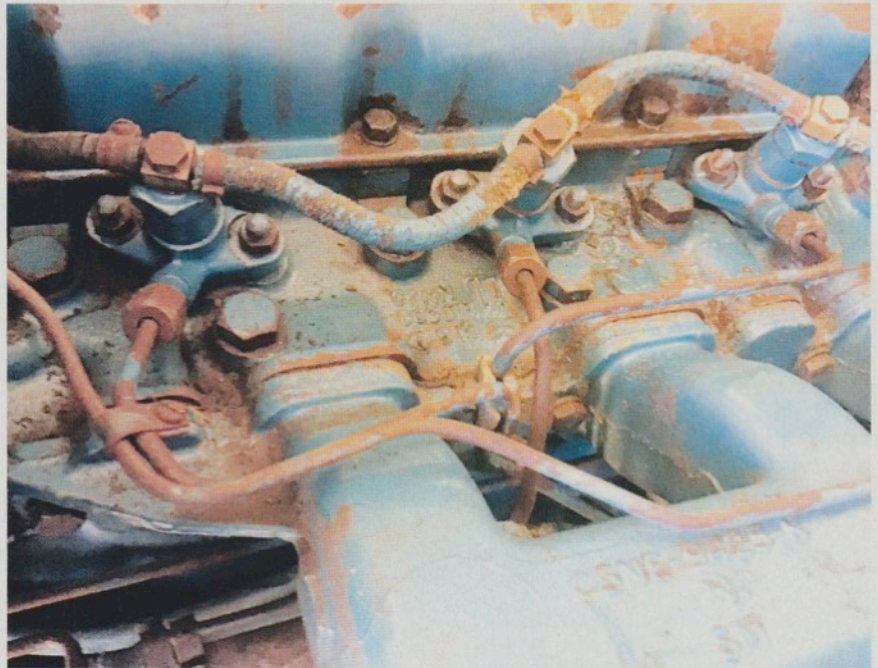
Investigation

When the bypass wiring of the starter motor switch of the Ford 4000 was spotted, I became concerned. The Select-O-Speed indicator dial also had various 'Park' positions inscribed in Biro on its readout face. That was of major concern. A driver not familiar with this tractor was at great risk and could even have been killed should the engine have started with the transmission in gear. The inhibitor switch is in the electrical system for one purpose, to enable engine starting with the transmission only in the 'Park' position.

The control lever assembly was stiff, and the valve cams' detents could not be felt as the lever was forced through its arc. Meanwhile, the transmission's hydraulic pressure was the centre of attention. The oil was ancient, as was the oil filter, and the pump's suction screen was virtually non-existent. A filter was obtained from New Holland and a new gauze strainer was fitted by a local engineering shop. A fill of fresh, correct specification oil brought up reasonable pressures, and we found the best procedure for pressure adjustment was to remove the control valve assembly. Before we could start on the valves, the transmission top cover was removed, using the correct procedure. As soon as there was a general understanding of this, it was a simple task.

Seized solid

With the transmission control assembly removed, along with its operating cable conduit, and the PTO control removed (revealing a stripped thread at its conduit connection), these components were taken to my workshop in Melbourne for cleaning and examination. This revealed a control cable, like a Lucas windscreen wiper drive of the period. On stripping the unit, the control cable was found practically seized solid inside the conduit. When the control lever was rotated, the cable bunched up in the conduit - hence, very likely, all the Biro markings for the 'Park' position. As the cable is moved from 'Park' position, the control progresses through two reverse speeds to a 'Neutral'



The injectors prior to removal and reconditioning. Damage from a leaking battery is evident.

position and then through speeds one to ten. The conduit was removed from the control housing with some difficulty, there was a solid mass of hardened grease, general sand dust and a host of spider webs, probably accumulated since 1965. The control cable comprises two pieces with a sliding joiner that, when the assembly is in place on the tractor, stays inside the conduit. It is this joint that requires complete freedom of movement as the control lever is operated throughout the entire speed range. For this reason, the conduit must not be bent, otherwise cable binding will be a major concern.

Bunching

The portion of the cable entering the transmission housing is the short piece. It was found that the cable was so stiff to move, that it was 'bunching' so much inside the conduit that the indicator dial bore no true relationship with the position of the cam wheel. The cam for 'Park' has a fine point where it actuates the inhibitor switch, this is necessary to ensure that the switch is only activated when the control valve is in the safe to start position. The actual cam position can be verified with a multi-meter, set for continuity of circuit testing. With a resistance-free continuity, the Select-O-Speed control indicator pointers must align with the 'P' on the

dial. This is a simple test.

With the cable not being able to move freely, and because of the 'bunching' situation, the two reverse speeds (and the 'Park') positions could not be determined accurately from the tractor seat.

The manual requires that the control cable be lubricated with a good quality graphite grease. After cleaning all the parts, including the removal of the various 'Park' markings in Biro, it was decided to use Hershell Wheel Bearing Grease mixed with a healthy dose of Performance Plus Graphite Powder. Both products are available in small size containers and the mixed lubricant can be kept in a suitable container for future use.

Remote working

The transmission control assembly was adjusted so that the lower cable joint protruded $\frac{1}{4}$ in from the lower end of the conduit, with the control lever set at the 10th speed position. The large clamp nut (29mm across flats) was not fully tightened at this stage, because the indicator quadrant could require fine adjustment during installation on the tractor. New housing cage nuts and stainless-steel machine screws were obtained for fitment to the tractor. The repaired unit was returned to the museum in Hamilton, right at the time of our

Covid-19 lockdown, which meant that my input was totally via email. This proved to be rather difficult, mostly due to varying terminology for components and the importance of their relationship with the Ford 4000. Eventually, both reverse speeds were found and the correct 'Park' position set.

For some reason, a window opening was cut into the transmission cover, so that the installation of the PTO control cable could be seen. A steel cover has been attached to cover this.

The planetary gear set bands were adjusted using the recommended procedure. To carry out this task, the drive to the rear axle was disengaged and we were advised that two of the bands could be adjusted until the engine revs had been pulled down by a small amount, and then backed off by exactly the required amount. This procedure does not require the use of a torque wrench, but the drive must always be disengaged, no matter which adjustment procedure is adopted. Failure to disconnect the drive could result in death.

More restoration

The mudguards were badly corroded where they bolt onto the rear axle. A local sheet metal worker has kindly assisted with welding new metal into the guards. The hydraulic three-point linkage has been removed for sandblasting before repainting. The seat required replacing, and its removal caused some drama. At the rear of the mounting, the nut had rusted firmly onto the stud, and that stud unscrewed itself from the hydraulic top cover. A peg was discovered at the inner end of the stud. This caused some concern about the peg's fine adjustment. It took a bit of persuading to convince that the stud should have the seized nut removed and then be threaded into the housing right to its shank with a drop of Loctite 262 to keep it securely in place.

The engine has, since the museum's custodianship, been difficult to start from cold. This could be a worry, due to free use of Aerostart and maybe, bent connecting rods. The thermostat has been replaced and the injectors have been thoroughly serviced. We are hopeful of a good result.



The peg stud that unscrewed out of the hydraulic top cover. It was beneficial that the three-point linkage had been removed and the peg stud could be threaded back in place after the nut had been removed.

Work is progressing on the rest of the restoration. The paint on the underside of the bonnet has been cleaned and cut back for colour matching, and the tractor is being repainted in the correct shade of blue. The wheels have been sandblasted and repainted. New decals for the bonnet sides have been provided by a local sign manufacturer. We have decided to apply a decal explaining cold start procedure and Select-O-Speed operating hints for those who may operate the Ford 4000 but are not familiar with the systems.

The Ford 4000 in undercoat awaiting blue topcoat.

ACKNOWLEDGEMENTS

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