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Kubota Tractor Kill Switch

For many people who live in rural areas across the country, operating a tractor is almost as common as driving a car. When people use tractors for everyday chores, the machines become a daily part of their lives. However, problems arise when these everyday tools put the operator's safety at risk. If mechanisms like the kill switch on the Kubota Tractor were to fail, it could prove debilitating or even fatal for whoever was using the tractor. The resulting lawsuits could also prove to be very costly to the manufacturer. By developing alternative systems to replace the current faulty ones, the manufacturer could save time as well as money.

PROBLEM

In many instances, tractors are left outside without any protection from the elements. Therefore, it should come as no surprise that manufacturers go out of their way to develop ways in which tractors can resist the wear from rain, snow, and ice. One way to do this is to reduce the amount of electrical equipment that could malfunction on the tractor. On the Kubota B7200HST, Kubota utilized the fact that cutting the supply of fuel to a diesel engine is an effective way to stop the engine. From this, the company engineered a simple mechanism that does just this.

A pull-knob is connected to a cable behind the dashboard which pulls a switch that stops the fuel pump, thus stopping the flow of diesel fuel to the engine, as illustrated in Figures 1&2.

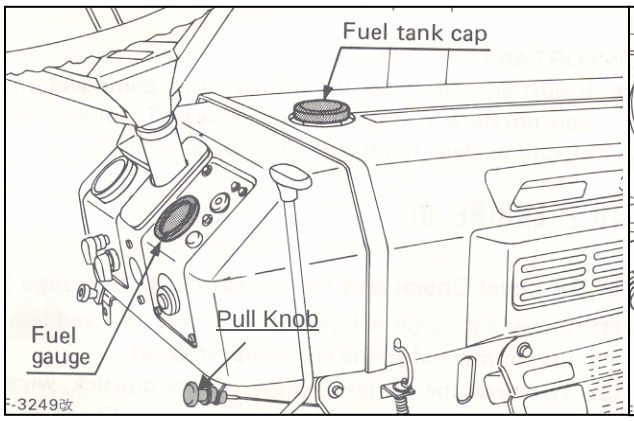

Figure 1

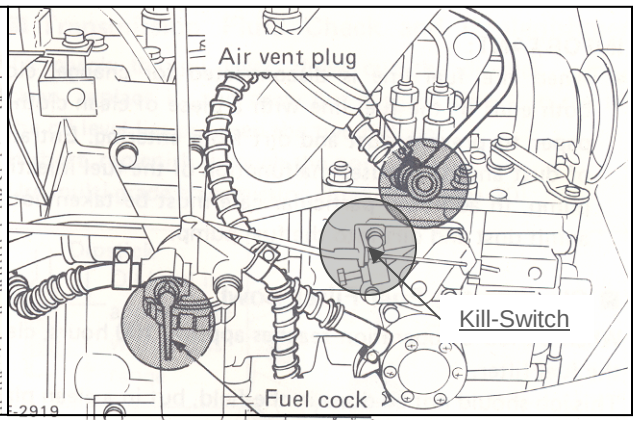

Figure 2

**From the 1993 Kubota Tractor Model B6200HST/B7200HST Operator's Manual*

Many problems come from the simple mechanism that shuts the engine off. The greatest number of problems stem from the lack of durability of the knob and its shaft that can cause this mechanism to fail.

The knob itself is made of plastic and is prone to breaking because of its position relative to the driver. It is located by the driver's right knee and is in the perfect position to get kicked every time the driver gets on or off the tractor. Eventually, the knob can break off leaving the operator with nothing to pull on to stop the engine.

Another factor that contributes to the failure of this device is the deformation of the shaft that slides in and out of the dashboard. When the kill switch is in the "Stop" position, the shaft sticks out approximately four inches from the dashboard. The shaft is made out of a soft steel rod that is about 1/8 inch in diameter which makes it very easy to bend. When the shaft sticks out, it is a prime target for getting kicked or knocked

around because of its position. Over time, the deformation of the shaft can prevent it from being able to slide in and out of the dashboard, thus crippling its ability to flip the kill-switch.

POSSIBLE CONSEQUENSES

When damage to the knob or the shaft causes the kill-switch system to fail, it leaves the operator with two options. The operator can leave the tractor running until it runs out of fuel or open the hood and manually flip the kill switch. The latter of the two options presents a more likely scenario and opens the door for many possible consequences. To manually flip the switch, one must open the hood and reach down next to the engine while it's running. The switch is located between the cool-air intake and the cooling fan for the radiator (see Appendix A). The operator risks loss of a finger or severe laceration of his/her hand in the cooling fan or serious burns from the exhaust pipe. These are very real risks that should never have to be taken.

In emergency situations, it is possible that the tractor must be shut off as quickly as possible. If the tractor were to roll onto its side, it would make it nearly impossible to shut the engine off if the pull-knob were broken. The operator would then be scrambling as quickly as possible to shut the engine off losing sight of any caution when reaching under the hood. Emergency situations such as these increase the likelihood of injury ten fold.

The responsibility for these injuries might be hard to place however it could undoubtedly provoke if a lawsuit between the victim and the manufacturer. Regardless of the outcome, the manufacturer would lose a lot of money in legal fees. Additionally, if the lawsuit went in favor of the victim, the manufacturer could spend some hundreds of

thousands of dollars to pay for medical bills, restitution, and possible income lost due the victim's inability to perform their job because his/her new handicap.

SOLUTION 

The manufacturer could save money in the long run by developing a safer and more durable way to shut the engine off. Temporary fixes can be an inexpensive and effective way to buy the company time while a permanent fix to the problem is in the development and testing stages.The cost of development and production of the new system would undoubtedly cost less than all of the possible lawsuits and bad exposure.

Perhaps the simplest and most cost-effective temporary solution to this problem is to reroute the fuel line between the fuel tank and the engine. By creating an equally effective way to transfer the fuel, the kill switch could be moved to a much safer place under the hood and the knob could be moved to a place on the dashboard where it is less likely to be broken. This solution would save the manufacturer money on the production line because they wouldn't have to produce any new mechanisms. Moreover, the product would be immediately available as there would be no need for the development and testing of a new device.

The most effective long-term solution would be to develop an entirely new switch that meets higher standards for durability than the current system. A flip switch located on the dashboard most of the mechanical parts located under the hood would meet these standards. A flip switch would be more durable since it would not protrude from the dashboard and have a chance of being broken. A simple system of levers underneath the hood could meet the same objective of cutting the flow of fuel to the engine.

Simple mechanisms such as the kill-switch on the Kubota tractor are often overlooked in the development and manufacturing process. When these devices fail, they can result in debilitating or even fatal injuries. The manufacturers need to take it upon themselves to quickly fix the problem with a temporary solution to the problem. This will provide ample time needed to develop and test a permanent solution. By failing to do this, the manufacturer would surely be involved in countless lawsuits costing millions of dollars since they needlessly put their own customers in harms way.

Appendix A

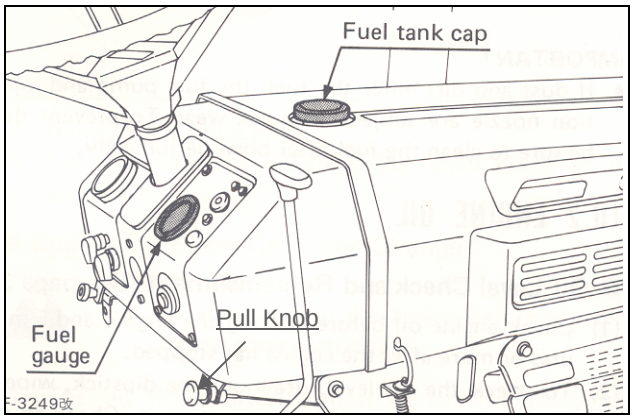

Figure 1

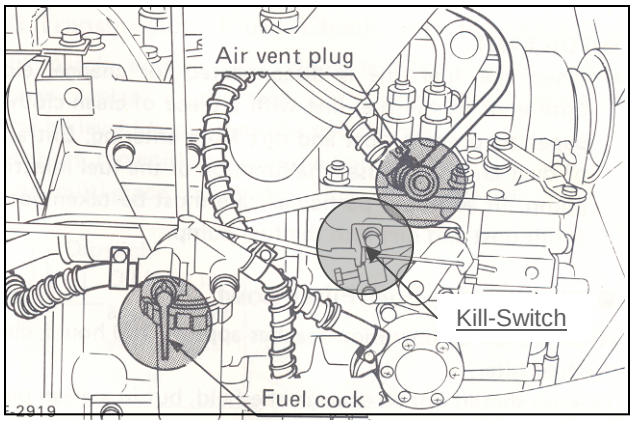

Figure 2

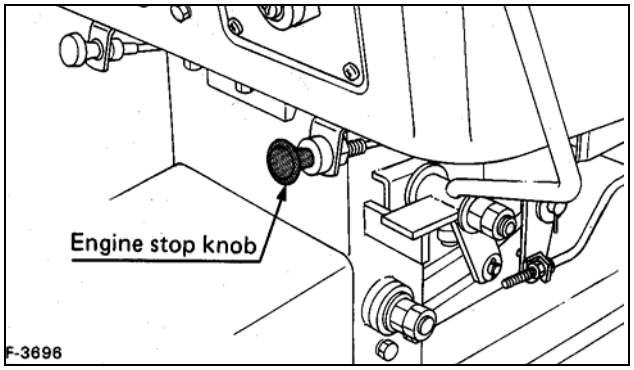

Figure 3

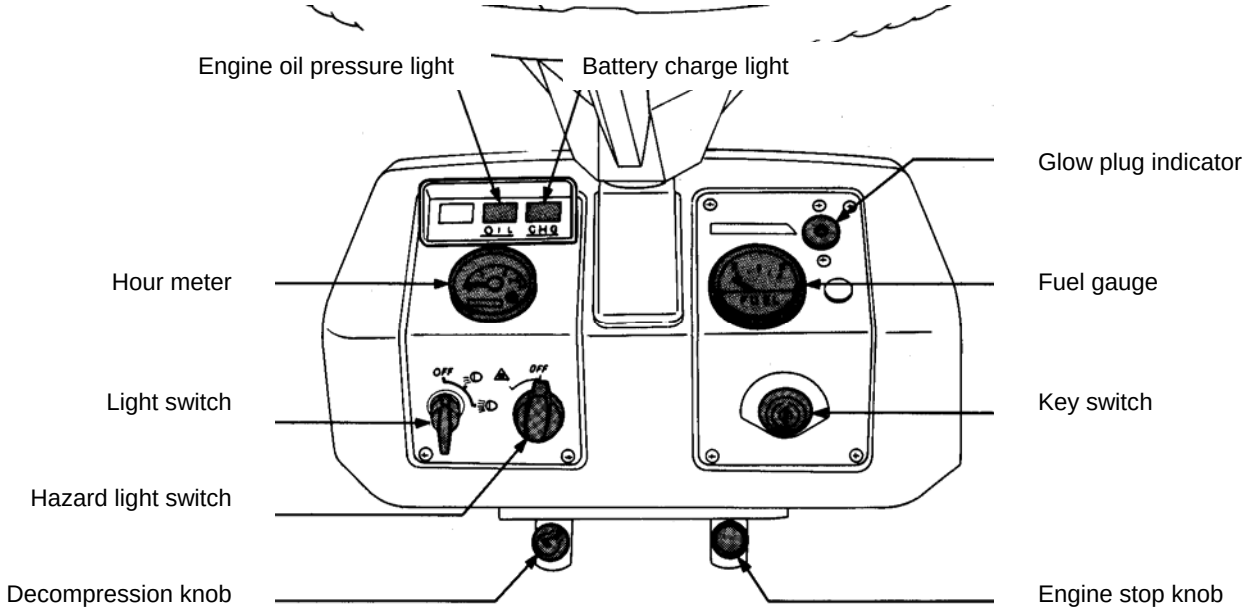

Figure 4