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Irrigation Pump

START UP MAINTENANCE

OPERATIONAL

A WEEK TO several days prior to actual start up, an operator should remove the spark plugs and add a 50-50 mixture of diesel fuel and 10 weight oil to each engine cylinder and replace the spark plugs. At this time he should also open the seal on the suction of the pump and inject this same mixture between the eye of the impeller and the wear ring and then reseal the suction. When ready for the actual start up, the batteries should be charged and connected, taking care to clean all connecting terminals.

The tape on all engine openings should be removed, and the air cleaner refilled and replaced on the engine.

All electrical connections should be checked for tightness and corrosion and cleaned if necessary.

The spark plugs should be removed and the engine turned over slowly, without starting, to expel the oil in the cylinders. At this time the operator should insure that the pump is turning freely and is free of foreign objects. The spark plugs can then be replaced.

The suction and discharge piping and connections should be checked to be sure they are clear of foreign objects and, using new gaskets and pipe dope, can be reconnected.

The packing gland should be removed and new packing should be installed in the stuffing box as far forward as can be reached. The gland can then be installed, just

tight enough to prevent the entrance of air while priming. If the stuffing box is equipped with a grease fitting, a new charge of grease should be applied.

The primer and priming valve should then be reinstalled and the pump primed.

After checking engine oil and coolant levels, the engine should now be started and slowly brought up to warm-up temperature. At this time the operator should check all of his safety switches to insure they are working. The over-temperature switch can be checked by removing a fan belt, water pump belt, or covering the radiator. During these tests the operator should watch the engine gauges very closely so that should any of the safety switches fail to work he can shut the engine down and replace or repair the switch. Since the engine oil must be drained anyway, the operator can check the low oil pressure safety switch by removing the drain plug from the engine while it is running slowly.

The engine should then be refilled with the proper oil and restarted.

To check a loss-of-prime safety switch the connection between the pump and switch can be removed allowing the pressure to drop to the switch.

The operator should then check the engine and pump for any leaks

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THE STUFFING BOX area is of primary concern in the operational maintenance on the fluid end of the pumping unit. Most centrifugal pumps used in the irrigation field are of stuffing box construction. By its design, a stuffing box must leak a little of the fluid being pumped in order to cool and to lubricate the area where the packing contacts the shaft or shaft sleeve. If we do not allow proper leakage through the stuffing box the packing will become overheated and dry, resulting in the burning of the packing and the scoring of the shaft sleeve.

Once the packing is burned and hardened and the shaft sleeve scored, no amount of adjustment will maintain proper leakage for any length of time. The shaft or shaft sleeve must then be replaced and a full new set of packing must be installed. Proper leakage varies some among the manufacturers, but generally a leakage of 8 to 10 drops per minute is acceptable.

Although most sprinkler systems today operate at high pressures at the pump, usually in a 60 to 100 PSI range, pump manufacturers have designed most pumps used in this field so that the stuffing box of these pumps are subject to considerably lower pressures than what is felt at the pump discharge, usually only 20 to 30 PSI. This means that when tightening the packing gland of a pump that is producing

TROUBLE SHOOTING

WHEN I THINK of troubleshooting, I think of a story that was told once about a lady who had a domestic pump that had stopped working. The lady called a repairman. The man studied the pump for a couple of seconds and then hit it once with a hammer. The pump immediately started working. Several days later upon receiving a bill for \$28.17, the lady called the repair shop and demanded an itemized statement.

She received the statement and it read: Repair of pump: Hitting with

hammer—.17, Knowing where to hit —\$28.00.

Troubleshooting a centrifugal irrigation pump is much the same as that repair job. Fixing the trouble is usually easy, knowing where to look for the trouble is the big thing. To know where to look for the trouble, a person must understand the function of a centrifugal pump.

The function of a centrifugal pump is to take the water that is delivered to the eye of the impeller and pump this water to another destination. It is **not** the function of

a centrifugal pump to pull water from any source. It only pumps water that is delivered to it. Ninety-five percent of all troubles when a centrifugal pump will not perform can be found on the suction side of the pump unit; the failure to deliver water to the pump, or the failure to deliver enough water to the pump.

Let's take a case where a centrifugal is operating under a suction lift condition. The operator has a vacuum type primer on this unit and after operating the priming device for some time is unable to raise the water into the eye of the pump. This trouble is usually caused by air leaking into the pump or suction

START UP MAINTENANCE

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caused by drying gaskets and should at this time be able to check and adjust the packing gland on the pump. If the driver is an electric motor, the grease should again be changed, the unit turned by hand to insure that it is free, the motor openings checked for foreign objects or rodents and the area around the air intakes cleaned of weeds or trash.

The switch box should be checked to insure it is clean and free of rodents. The fuses should be replaced after checking to insure that they are not blown.

All electrical connections should be checked to make sure they are tight. A loose electrical connection can cause low voltage and excessive heat causing overload protector tripping and blown fuses. The extremes of temperature during the winter can sometimes cause electrical connections to expand and contract at different rates resulting in a connection that was tight in the fall to be loose in the spring. This is particularly true when aluminum wire is used.

On an electric motor driven unit,

the pump end start-up maintenance would be the same as with an engine driven unit; again all safety shutdown switches used on the unit should be checked to insure that they are working properly.

Presented in this manner, pump and engine maintenance seems like a great deal of work, and I have had operators tell me that they do not perform this type of maintenance and yet they get satisfactory life out of their unit. I submit that these people do not know what satisfactory life really is.

Several years ago a farmer in eastern Colorado who used a lot of pumping units, all engine driven, was using one of the major brands of engines, and was happy enough with the service they gave him that he kept trading his engines in to the dealer for the same brand when they did wear out. This man was getting 8,000 to 10,000 hours of operation out of each engine and he considered this satisfactory.

The dealer, upon rebuilding several of the engines he had taken in trade from the farmer, found that the engines were not worn out in general, but had excessive wear at several points in the engine, indicating lack of proper maintenance.

He requested the farmer to perform proper maintenance on one new engine as recommended to test his theory that most of the failures were due to improper maintenance. The farmer agreed to rigidly perform proper maintenance on this one new engine. As a result the last I heard the engine in question has passed 20,000 hours and was going strong. Now the farmer no longer considers 8,000 to 10,000 hours as satisfactory life and is an advocate of proper maintenance. □

Nu-Ag West Becomes New Div. Of Foamspray Chemicals

Nu-Ag West, a new division of Foamspray Chemicals, Inc., has been established in Lubbock, Tex.

W. G. "Skip" Purdy III, Foamspray's vice president and general manager, said the new division would specialize in marketing of growth aids — OD-4 and Microtil — for the west Texas area. Previously, he said, the distribution center for these growth aids had been from Dallas but that increased usage had dictated establishment of a nearby center.



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