Irrigation
FACTSHEET

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IRRIGATION SYSTEM MAINTENANCE

This factsheet outlines some of the main concerns that should be addressed to maintaining the proper operation of various irrigation systems. It starts with the heart of the irrigation system, the pump, and follows through with the power source, intakes, the delivery system, and the distribution system for sprinkler as well as trickle irrigation systems.

INTRODUCTION

You would not spend $50,000 on a tractor or any other piece of equipment and never change the oil, would you? A properly designed and installed irrigation system should last for many years without having major breakdowns or having to do major overhauls. To be able to achieve this operational capability, some routine maintenance should be performed to keep all the parts of the system working properly.

PUMPS

The heart of the irrigation system is the pump, it supplies the volume and pressure for the distribution system. Before starting the system in the spring, check for the following:

- Check for cracks in the casing due to frost damage.
- Ensure that the impeller rotates freely.
- Ensure proper direction of rotation of pump.
- Adjust packing.
- Check for worn bearings.
- Lubricate pump and check oil levels.
- Ensure pump is secured to platform.
- Ensure shafts are aligned.
- Check condition of belts, chains and couplings.
- Check for cavitation, is pump starved of water?

At the end of the season, winterize the pump and check the following:

- Drain the pump.
- Check for a worn impeller.
- Check the packing and replace if brittle.
- Check lubricants and top up.

Shaft turbine or submersible pumps installed in wells will normally not require any annual maintenance. Shaft turbines may have grease certs that may require lubricants. Should the performance of the system be suspect, it will probably be necessary to engage professionals to pull the pump and do the necessary maintenance or replacement. Annual fall chlorination of wells will help control iron bacteria and prolong the well life.

POWER SOURCES

Electrical

Electrical is the most popular power supply, is probably one of the cheapest and has the lowest maintenance costs. Some items to address include:

- Provide dry mounting and shelter from weather.
- Provide good ventilation around the motors.

- Guard against rodent damage.
- Provide safety shut-off devices for overloading, low voltage or excessive heating.
- Clear all electrical devices of any debris and dust.
- Keep all covers on electrical devices.
- Maintain all electrical connections with proper devices and insulations.
- Do not overload circuits by attaching additional loads.
- Retain spare fuses in case of system failure and prior to fuse replacement investigate cause of failure or let a professional investigate the cause and correct the faults.
- Spray contacts with electrical contact cleaner.
- Tighten electrical wire connecting screws.

Gas or Diesel

Internal combustion engines have the following maintenance requirements:

- Check engine oil levels daily.
- Change oil, oil filters and fuel filters regularly.
- Check coolant water levels daily.
- Check and clean air filter regularly.
- Check belts for deterioration and cracking.
- Check, adjust and/or replace spark plugs, if engines are so equipped, regularly.
- Check that safety switches are working properly including low engine oil pressure, high engine water temperature, high rpm engine governor setting and low irrigation system water pressure.

To winterize the motors the following should be considered:

- Wash and clean the engine and store to protect against weather, rust and corrosion.
- Remove battery and store in a charged mode in a dry, warm location.
- Replace all the lubricants and their respective filters.
- Drain fuel tank to prevent moisture condensation.
- Drain engine coolant and install new coolant capable of preventing freezing during the winter months, run engine with new coolant to ensure the coolant is well circulated.

INTAKES

Investigations show that the majority of troubles with centrifugal pumps result from faulty conditions on the suction side. The following items will reduce the likelihood of pumping problems:

- Ensure the intake screen is properly sized and debris is cleared on a regular basis.
- Screens should be kept in good functional condition, no holes.
- Intakes should be positioned so that they do not rest on the bottom of the water channel or source as mud and debris will be sucked into the system. The intake should not be too close to the water surface as air can be sucked into the system due to vortexing.
- Ensure the foot valve is in working order and replace the foot valve gasket material.
- Replace diaphragm in primer pump if leaking or brittle.
- All joints must be air tight to prevent air leaks into the suction line.
- Ensure there is no air pocket in the suction line and that no portion of the suction line is above the pump intake level.

PIPES AND GASKETS

Permanently installed piping systems should not require any maintenance if the systems are properly installed. A proper installation would ensure that the following provisions have been made:

- The pipeline is allowed to expand or contract due to temperature fluctuations.
- Pipes have been properly anchored with thrust blocks at major pipe directional changes.
- All joints have been properly prepared and welded or glued.
- Permanently installed lines, if not installed below the frost level, must be drained for the winter period.
- Gasketed pipe should be checked to ensure that the gaskets are pliable.
- Pipes with cracks or holes should be replaced or repaired.

- All portable pipe should be gathered and stored in such a way that moisture does not accumulate in them.
- Hydrant valve gaskets should be replaced regularly.
- Threaded joints should be checked and retightened.
- Check for the proper operation of pressure relief valves, snifter valves and air relief valves.
- Mechanical damage to wrapped steel pipe should be repaired with tar and wrapping paper.
- Pipes installed with galvanic zinc blocks should be checked to ensure that sufficient zinc is available for the process of galvanic action.

SPRINKLERS AND NOZZLES

The proper operation of sprinkler heads is critical in the efficient distribution of water at the designed rate. A check list for each sprinkler would include the following:

- Check the nozzles for proper size and replace if worn.
- Replace bent sprinkler head arms.
- Replace worn out springs.
- Replace worn nylon bearings or any other defective part. Total head replacement may be necessary.

WHEELMOVES

A properly functioning wheelmove system will require some maintenance. Key items include the following:

- Securely tighten clamps of connector pipe and replace if hose leaks. Check for cracks due to sunlight or sharp bends.
- Check wheels that all spokes are tight and properly aligned.
- Make sure pipe joints are securely fastened and gaskets are sealing properly.
- Align the wheelmove lateral so that it moves in the proper direction instead of skewing off to the side.
- Ensure that the self-leveling sprinkler joints move freely.
- Check sprinkler heads for wear and proper operation. Replace worn nozzles and repair sprinkler heads.
- Check all drain valves to see if they are properly functioning and are properly sealing under pressure.
- Perform the recommended maintenance on the drive motor by replacing the oil, installing new air, oil and fuel filters, replacing spark plugs and tuning the engine for proper operation. Use clean fuel and check engine oil regularly.
- Check and adjust drive chain/belt tensions.
- Winterize the system by ensuring that the whole system is drained. Remove the engine and store in warm conditions. The wheelmove should be anchored to a fence to prevent movement from winter winds.

PIVOT SYSTEMS

One of the attractive features of pivot irrigation systems is the minimal time input required for the operation of the system. To keep the system functioning properly some routine maintenance should be performed. These include:

- Check that pivot tie downs are secure and in good condition.
- Repair any leaks at the pivot point.
- Lubricate all certs at the pivot and the towers.
- Check oil levels in gear boxes.
- Check tire inflation and tightness of wheel lugs.
- Check joints between towers and replace any faulty couplings.
- Check micro switches at each tower and align positions to ensure proper activation.
- Check for worn sprinkler nozzles and sprinkler heads.
- For part circle installations ensure override stops are secure.
- Excessively deep ruts may have to be filled to prevent the system from bogging down.
- Check end gun for proper operation and ensure part circle setting is appropriately set.
- To winterize the system, drain the lines thoroughly, grease all fittings, drain and/or remove end gun booster pump, check all tower drive motors, drain any water out of gear boxes and replace oil if lubricant is suspect.
- For the winter period, loosen drive chains at towers and ensure they are properly adjusted in the spring time.

TRICKLE IRRIGATION SYSTEMS

There is no doubt that trickle irrigation systems require more intensive maintenance than any other type of irrigation system. The main reason for system failures is probably due to poor filtration or poor water quality. Trickle systems are usually operated at relatively low pressures and relatively small orifices are used to distribute the water. To ensure trouble free operation a more intensive maintenance program would include the following:

- Clean and replace filter cartridges regularly.
- On self-cleaning filters check that the system is triggered at the appropriate pressure differentials or time schedules.
- Replace sand media in sand filters if stratifications have been disrupted.
- Replace all faulty pressure gauges.
- Have a certified technician test backflow devices annually.
- Test all electric solenoid valves for proper operation.
- Replace back up batteries in controller and set proper time.
- At the beginning of the season, shock chlorinate the whole system and then flush all lines.
- Check for the proper operation of all emitters after the chlorination treatment, at least annually and more frequently (weekly) if water quality is poor.
- At the end of the season, drain the pump, filters, backflow prevention devices, mainlines and laterals.
- If chemigation is practiced, ensure proper operation of the injection system.
- Periodically calibrate the injector system.
- Thoroughly flush the injector system after each use.
- Winterize the injectors or injector pumps and thoroughly clean the supply tanks and filters.
- Remove and winterize the soil moisture monitoring devices.

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