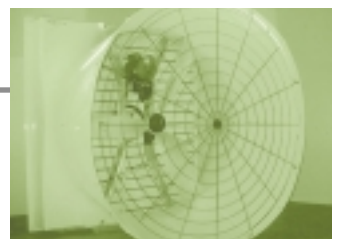

Maintaining Equipment

Waiting for equipment to be fixed, equipment that operates poorly or equipment that is unsafe adds up to significant losses. John Bartok lets you know how to avoid this problem.

By John W. Bartok, Jr.

Top: Follow the manufacturer's recommended service schedule for tractors and motors. Bottom: Equipment used for intermittent service should be cleaned and serviced prior to storage. (Photos courtesy of John Bartok)

Equipment maintenance is an important part of operating a greenhouse or nursery business. The development of new machines and the difficulty in obtaining good labor has led to the use of more equipment in greenhouse operations.

The following episode I observed while on a greenhouse tour illustrates the cost of poor maintenance and the need for a preventive maintenance program. This type of occurrence is common in the horticulture industry, as maintenance is generally not given high priority.

It was 12:45 p.m., and the 7-person crew was just falling into a pace transplanting bedding plant plugs into flats on a belt conveyor. At the rate of 250 flats per hour, this crew would finish filling the 26- x 96-foot greenhouse by the 4:30 quitting time.

Suddenly, the flat filler stopped dead without warning, but the motor was still running. The crew chief started looking for the trouble while everyone else took a break. After retrieving the frayed 36-inch V-belt from under the machine, he headed for the storage room hoping to find a replacement. After a 15-minute search without any success, he decided to send someone to the hardware store. The 30-mile trip and the time to install the new belt would probably take most of the afternoon so he decided to send the crew home. A 1,000-flat production loss such as this can have a significant effect on meeting production schedules.

ASSIGN EQUIPMENT MAINTENANCE TO A RESPONSIBLE PERSON

Someone that is mechanically inclined should be given the responsibility for maintenance. In small operations, it may be the grower along with his many other responsibilities. In larger operations, freeing up one person for part of each day or week may be enough. When your business grows to more than 10 or 15 employees and your equipment list gets longer, it is time to hire a full-time person. Vo-ag or Vo-tech graduates who have majored in mechanics have performed well for some growers.

PROVIDE A PLACE TO WORK AND A GOOD SET OF TOOLS

For small operations where vehicles and equipment are serviced on the premises, a work area in the headhouse or in a garage may be sufficient. For larger operations, a separate building is desirable. The area should be near the growing area, have good access for vehicles and contain both electricity and water. Provisions should be made to heat the work area during cold weather. It is convenient to store tractors, electric carts and other mobile equipment in an adjacent, unheated, machinery storage area. ➧

Shop size. The size of the shop should be large enough to accommodate the equipment that will be serviced. If trucks and tractors will be maintained, an open floor area and door large enough for access is necessary.

Space for floor-mounted equipment, such as a drill press, table saw and welder, is also needed. A good arrangement is to locate a shop facility in one end of a storage building.

Shop layout. The layout of your shop should be flexible to accommodate the equipment that will be serviced. An area should be provided for the day-to-day jobs. Oil, grease, air and water should be convenient to this area for servicing vehicles. A repair bay is convenient if equipment is to be disassembled and overhauled. It should be well-lighted and have space for storing the parts that are removed.

A good selection of power and hand tools helps to speed maintenance and repair.

Perhaps the greatest weakness of most maintenance shops is the lack of an organized arrangement for the hand and power tools. Specific areas should be designated for welding, woodworking, plumbing and electrical work, with equipment associated with these jobs located nearby.

Shop equipment. Portable tools that have the greatest use in a maintenance shop include a 3/8- and 1/2-inch electric drill; a sander; 3/8-inch, battery-powered drill/driver; a saber saw; 7 1/2-inch circular saw; and a compressor. The compressor can be used to power a wide selection of air tools and spray equipment.

Stationary tools that are worth owning include a 6-inch bench grinder, drill press, 10-inch radial arm or table saw and a metal band saw.

Where repairs include metal work such as fabrication or the cutting of steel, both an alternating current welder and an oxyacetylene welder are needed. Courses on proper welding techniques are available through a vocational agriculture or industrial arts program at local high schools.

Consider safety when planning and using the shop. Place a multi-purpose, dry chemical (A:B:C) fire extinguisher near entrance doors and the welding area. Protective clothing, including safety goggles and steel-toe shoes should be worn when working on equipment.

KEEP A GOOD SUPPLY OF SPARE PARTS ON HAND

To keep equipment down time to a minimum, keep on hand a supply of hardware, short-life replacement parts and specialized parts that may not be readily available. Assortments of small hardware items, such as

Locate spare parts where they are handy to retrieve.

pins, stove bolts, cap screws, washers, etc. are packaged in convenient 20- to 30-drawer cabinets that sell for $15-25. Larger bolts, pipe fittings, etc., are available individually or in box lots at most hardware stores and equipment suppliers.

Most of the equipment used in the horticulture industry is well-built, requiring only routine maintenance. When purchasing a new piece of machinery, it is best to review the owner's manual and inspect the machine to identify parts that are likely to fail first. Items such as V-belts, drive chains, sprockets and oil and air filters can be purchased locally if available or ordered from the manufacturer.

Small items are best stored in labeled bins on racks. Plastic bins are available in several sizes to hold loose materials. Larger parts are normally stored on shelves. Good lighting in the storage area will speed identification of the parts.

MAINTENANCE RECORDS PREVENT FAILURES

Keeping good records aids in scheduling maintenance. Many manufacturers supply a form to check off the date and service performed. A better method is to use a computer. You can set up your own program or purchase commercial software. Each week a printout is made of the machines needing servicing.

In setting up the schedule, follow the recommendations in each operator's manual. Enter the various jobs to be performed under the "hours of operation" headings. Then check off the intervals of service after they are performed.

WATCH AND LISTEN

Employees should be encouraged to watch and listen for possible problems as they operate the equipment. Worn belts, loose chains, low tire pressure, frayed hoses and electrical cords, etc. are signs of pending trouble and should receive immediate attention. Indicator lights and dials are placed on machines to make the inspection easier. ➧

Watch and listen for problems and service needs.

KEEP ALL SERVICE MANUALS TOGETHER

A considerable amount of time can be saved if all operator's manuals are kept in one location. A file cabinet in the workshop area gives convenient access. Organize them by type of machine and keep them in individually labeled files.

SERVICE TIPS AND GUIDELINES

The following apply to most gasoline- and diesel-powered vehicles and are general in nature. Individual recommendations on a particular vehicle can be found in the manufacturer's service manual or in one of the general service manuals.

Frequent air cleaner servicing is important to avoid wear of the cylinder and valves. Servicing should be more frequent if the engine is operated in dusty conditions such as field work.

Change oil regularly. Oil loses its lubricating and cleaning qualities as it gets dirty, and its additives wear out. Select oil to meet weather and operating conditions.

Several different oil/gasoline mixes are used for 2-cycle engines. Keep a gas can for each engine, and identify the mix ratio and number of ounces of oil/gallon of gas needed.

Check coolant levels daily. Replace coolant every two years, as it may become acid and full of contaminants. Before winter, measure freeze protection level.

Check fan belts for tightness and wear. A belt that's too tight puts an extra load on bearings. A loose belt allows slippage and may not operate the machine at the correct speed.

Keep battery terminals clean and free of corrosion. Neutralize acid deposits with a baking soda and water solution. After cleaning, coat terminals with grease or silicone spray. Check cables for cracks or wear.

Follow manufacturer's recommendation for servicing ignition systems. Condenser, points, plugs and ignition wires may need to be cleaned or replaced.

Most manufacturers recommend a daily check on oil levels, including engine, transmission, power steering and differential.

To increase tire life, inflation level should be checked frequently. Under-inflation reduces tire life. Over-inflation causes excessive wear in the center of the tire.

Use the operator's manual as a guide for lubricating the vehicle. Most manufacturers provide a lubrication chart that indicates the frequency of lubrication. Typical intervals are 5, 10, 25 and 50 hours.

MATERIALS HANDLING AND PROCESSING EQUIPMENT

Storage. Most of the vehicles and equipment used in the production of plants are not in use year-round. Some of it only sees

use for a few days a year and is then put into storage to make room for other equipment.

Clean the exterior and component parts of soil. These can collect moisture and cause rust to form. A shop vacuum works well for this operation. If the machine is outside, air from a compressor can be used but be sure to wear a dust mask and safety glasses.

Service engines as noted above, and drain the fuel tank or add fuel stabilizer.

Electric Motors. Although electric motors require less maintenance than other types of equipment, some periodic servicing is required. Unless the motor is operated under severe conditions such as dust or outdoors, a once-a-year servicing is adequate. Caution — shut off power to the motor before working on it.

Typical servicing includes: 1) Cleaning dust and dirt from air passages and cooling surfaces. A heavy dust build-up will result in overheating and break-down of the wire insulation; 2) checking bearings for wear, excessive endplay or drag. Misalignment of pulleys or overtightness of V-belts can cause the bearings to wear or the motor to overheat. Alignment can be done with a straight edge placed against the face of the pulleys. To get the proper belt deflection at mid-span, multiply the distance between shafts by one-sixty-fourth of an inch; 3) Checking wiring for worn or frayed spots and replacing if necessary. Clean switch contacts with a contact cleaner or very fine sandpaper. Replace worn brushes and springs in wound-rotor motors.

Hydraulic Equipment. Regular maintenance keeps hydraulic systems operating without breakdowns. It includes keeping the equipment clean, checking for leaks, proper fluid level and proper operation.

Always remove the pressure from the hydraulic system before doing any servicing.

Change the fluid and service filters at the interval recommended by the manufacturer. Clean dirt away from fill pipe before adding oil.

High-pressure fluid leaks are very dangerous. Fluid that gets under the skin must be surgically removed to avoid gangrene.

External leaks from pipes and pumps should be fixed to avoid low fluid level and to prevent pollution of the ground water. They can also let air into the system resulting in spongy action of the cylinders.

Inspect operation of the valves frequently for leaks and poor operation. Springs or seat may have to be replaced. GPN

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