

Peter Oakford goes through the reasons why a machinery care programme can pay handsome dividends

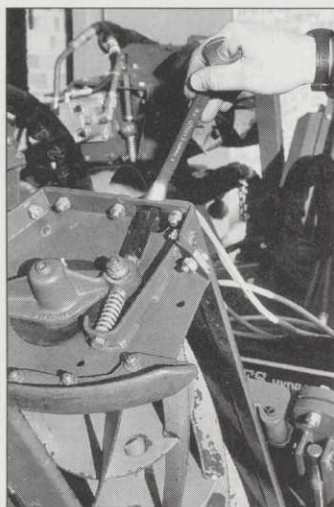
# MACHINERY

With machinery, especially grass cutting equipment, being used less frequently over the next few months, now is the ideal time to address the question of maintenance and overhauls. By being aware of the what can cause problems, steps can be taken both now and throughout next year's cutting season to limit the possibility of any down time. This feature aims to highlight the kind of things that can create problems. By being aware of these, action can be taken to stop them occurring in the future.

A comprehensive look at the maintenance schedules for the vast number of machines found on golf courses is not practical, so in the case of a specific machine the manufacturer's handbook should be consulted.

## Heat

When two surfaces are rubbed together, heat is generated from the friction that is created. In the



Adjusting a cutting cylinder down onto the bottom blade on one side of the cutting unit of a hydraulic trailed gang mower

case of metal, if this process is carried out long enough, fusion will take place. This is what happens when an engine seizes-up.

The problem is how to reduce

the friction and dissipate the heat. Apart from the actual design of the components, the answer is use of oil, grease, water and air.

## Oil and grease

By creating a film of oil or grease between the two surfaces the heat level is reduced. If this lubrication protection breaks down, either through shortage or deterioration, then problems start to occur. Likewise contamination with an abrasive material will result in the metal surfaces either being damaged or worn away. From this, the important areas to watch can be identified.

All oil reservoirs, such as sumps, need to be inspected regularly to ensure that they are maintained at the correct level.

Temperature fluctuations reduce the lubrication qualities and the oil becomes dirty.

Watering down of the lubricant can occur due to internal engine condensation.

To counteract all these requires a maintenance programme that includes constant monitoring, i.e. checking the level on the dipstick, and regular oil changes.

## Oil filters

If these are fitted they will need replacing periodically.

The recommended intervals between oil and filter changes will be found in the machine's handbook.

Cleanliness is important always, so steps need to be taken to ensure dirt does not enter the machine through the fillers or dirty funnels.

In the case of grease there are other aspects to take into consideration.

This mostly enters the lubricating area through a nipple, and is often enclosed in a chamber where it performs its function. Unless it leaks-out, the volume of grease is constant for a considerable time, so pumping in a fresh supply under pressure can push seals or bearings out. Any excess also tends to find its way out through the nipple or between the bearings, where it attracts dirt, sand and other abrasive substances. A lack of this vital compound causes excessive wear of shafts, and dried out bearings finally collapse. Check all grease points are functioning correctly,

then use a grease gun with controlled enthusiasm.

## Water

Another way of controlling the temperature is the use of water. On amenity equipment this is mainly found on diesel powered units, although there are some petrol engines that use the system. In the environment where such equipment is used, dust and dried grass are common problems.

For a water-cooling system to work effectively air must pass freely through the radiator. If the flow becomes obstructed, then the water temperature rises and the engine starts overheating. Pre-cleaning screens are standard on most models. These need to be inspected and cleaned regularly, especially in dry conditions. The use of high pressure water or air to clear debris between radiator cooling fins is not recommended.

The system must be flushed and the manual will detail how often this is carried out and the procedure used.

## Air

This performs two functions as far as an engine is concerned.

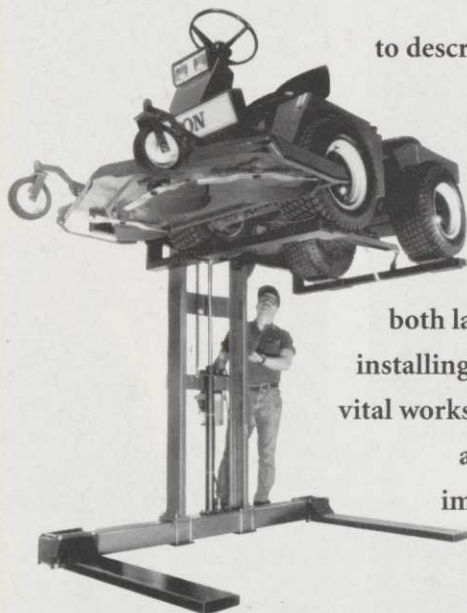
Firstly, like water it acts as a cooling agent. Most small engines are kept at the correct running temperature by cold air being drawn in by the flywheel across a series of fins sited around the cylinder block. The same system applies to hydraulic pumps and motors. If the channels between the fins become blocked and the passage of air restricted then the unit will run hot. It is important to remove any debris from between the fins, cowlings and guards, so that the correct running temperature is maintained.

The second use of air is in the combustion process, which cannot take place without an adequate clean supply. All engines have some form of air filtration. This is usually a foam or paper element – or in rare cases an oil bath. Whatever system is used it must be kept clean. The manual will outline the intervals at which air filter maintenance should be carried out, but in very dusty conditions they need checking much more often. If an element is heavily contaminated, worn, or damaged then fit a new one.

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# MAINTENANCE

## Fuel

Where equipment is not going to be used for a relatively long period then the fuel system needs to be drained. Not only does fuel go stale, deposits also form in the carburettor and pipes and when the time comes to use the machine, a full cleaning down of the fuel system will be required.

It is vital that clean fuel is used. Failure to ensure this can result in wear of internal components, poor starting or loss of power.

## Spark plugs

An engine's performance hinges on this vital item. Modern electronics will ensure a perfect spark every time, so transmitting this to the combustion chamber relies entirely on the condition of the spark plug. Because of its position, it is a good indicator of what is happening inside the engine. Problems can develop and more often than not these are attributed to carbon deposits. These then

become a path for electrical leakage. Insulation deteriorates and the spark is weakened, or in acute cases is non-existent. These situations can be avoided if the cause is identified.

The following outlines the type of conditions that lead to a carbon build-up:

1. A badly adjusted carburettor results in incorrect fuel mixture. In this case the setting would be too rich.
2. Over-use of the choke, or one that does not fully disengage.
3. Blocked or dirty air filters stop air reaching the engine. As a result the ratio of air-to-fuel mixture is altered.
4. Bad insulation within in the ignition system.
5. Wrong spark plug fitted.
6. Incorrect plug gap.
7. Engine timing is out.
8. A compression loss occurs due to damaged or worn gaskets, valve seats, or piston rings.
9. Extended running at low revs.

10. Fuel leakage during transportation. Some machines are not fitted with fuel taps. Neat petrol by-passes the carburettor and enters the combustion chamber where it evaporates leaving a sticky carbon deposit.

Any combination or one of these points can create a carbon problem that once established can only be rectified by de-coking the engine.

Fitting the right spark plug is important. If the reach is too short then carbon builds up in the recess created. In the case where it is too long there is the chance that the tip will hit the top of the piston or valves.

## Transmission systems

### Gearboxes and hydraulic units

Fluid levels need to be checked regularly. Where filters are fitted, these will require replacing according to handbook. It is essential that the correct grades of lubricant are used. If there are

any tell-tale signs of leakage on the storage area floor an investigation is needed immediately.

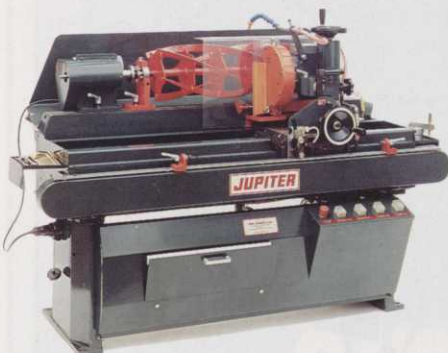
On units with cooling fins it is important to keep the channels free of dirt and dried grass. If a fan is fitted, check the drive to ensure it is operating correctly.

All hydraulic components are manufactured to a high degree of precision, so it is not advisable to carry out any repair that could introduce a minute foreign body into the system. Any work carried out on these units needs to be under clinical conditions. It could be a very expensive exercise, unless you can provide the right facilities plus technical expertise. If a problem occurs in these, a transmission system experts should be called in.

Having looked at the different areas that contribute to a machine's smooth and efficient performance, we now turn to other components that require attention. → Page 21

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73



# MACHINERY MAINTENANCE

## Drives: Belts

Modern belt drives usually have an automatic tension system – where these are not fitted the belt will require checking regularly and adjusting accordingly. New belts tend to stretch so should be adjusted to the correct tension once they have bedded in. A slack belt is not only an inefficient source of power transference it also generates a great deal of heat and in some instances catches fire.

## Chains

Like belts there is generally some form of adjustment, for taking up any stretch. Where a cutting cylinder is chain-driven the adjuster will need to be slackened before setting the unit. Once the blades-to-bedknife are correct then the chain can be re-tensioned. A chain can vary throughout its length, so before locking everything up, check there is no point where it over-tightens when the driver is turned. If this does occur then it

will need re-adjusting.

From the safety aspect, all belt and chain guards should be securely in place and any damaged ones replaced.

## Cutting systems

These come in four basic forms: cylinder, rotary, reciprocating and flail.

## Cylinder Mowers

As this system is similar to the action of a pair of scissors it is vital that the cutting surfaces match. Whilst back-lapping a cylinder helps to maintain this, grinding achieves the ultimate. Once the cutting system has been ground, then regular checking and adjustment are standard practice. A majority of readers will be knowledgeable and competent in performing this operation. A badly set cylinder, apart from producing a poor finish is more vulnerable to damage from small foreign bodies such as grit,



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stone or twigs, which can easily become jammed between the two surfaces.

## General

Most machines on the market have sealed units such as transmission systems and drives. Oil on the floor of the storage area is an indicator that an investigation is needed. Where hydraulic hoses are fitted, regularly inspect for signs of chaffing or leakages from

couplings and fittings.

Check all safety guards are not damaged and are secure, and make sure nuts and bolts are tight.

Throttle, clutch and brake cables will benefit from regular lubrication. Inspect the outer cover signs of any damage to which may impair the action of the inner cable.

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