

A Stitch in Time...

Roland Taylor provides you with a handy guide to looking after your machinery

While the fundamental principles of machinery, especially mowers have remained the same, there have been considerable changes in engines, drives and cutting systems. One change now evident is that modern equipment requires less maintenance than its predecessors.

While, manufacturers are constantly looking for ways of improving their products, other factors have brought about and influenced changes in design.

Over the last two decades major developments have taken place in engines. These have been driven by noise and emission regulations.

Before this legislation dominated the scene, another big introduction radically altered the reliability and starting of both four and two-stroke petrol engines. In the early 80s the electronic ignition was launched. Prior to this there had always been the uncertainty of whether an engine was going to start and run correctly.

Many readers will remember the days of contact points and how often they became worn or contaminated. These points had to be cleaned and the gap set correctly before a satisfactory spark was achieved. Often this was a time consuming operation.

Electronic ignition, which was a sealed unit, did away with contact points and eliminated one maintenance routine.

With proposed legislation on noise and emissions in the offing, engine manufacturers were faced with having to channel considerable resources into research in order to meet the specified requirements.

This has resulted in compact units without the loss of power. In fact, horsepower ratings increased whilst dimensions were reduced. Improved manufacturing standards mean engines are built to very fine tolerances. There are reductions in oil and fuel consumption and noise levels, while still achieving a power unit's maximum output.

Periods between servicing have also been extended. It is now commonplace to find more than one year's warranty even where a machine is used commercially.

As far as emissions are concerned, one leading engine manufacturer states that the levels emitted from their lawn mower engines, has, since 1995, been 70% lower than similar models produced in 1990.

This all sounds fine, but unless the machine and engine are well looked after, all this goes out of the window. A routine maintenance programme is essential if optimum performance, with minimal affect on the environment, is to be continually achieved.

MAINTENANCE 2004

An engine is the vital component in all machinery. By comparing some of its requirements to that of a human, it is easier to see how things can start to go wrong.

OIL

This circulates the system and has two main functions. Firstly, it provides a protective film between two surfaces, enabling them to move freely. Secondly, oil also acts as a coolant and dissipates any heat build up.

In human terms, most people at some time in their lives experience a stiffening of the joints.

It can be difficult to carry out the simplest of tasks and often considerable strain is placed on other parts of the body. Taking some form of oil (cod liver) is often recommended to keep those joints working freely.

In an engine the lack of that vital oil film between two metal surfaces causes the movement to become less fluid and the friction created is the main culprit.

On a cold day it is a common practice to rub your hands together to generate heat. Likewise if there is no oil between two metal surfaces heat is produced and eventually they become red hot and are fused together, causing considerable damage and a danger.

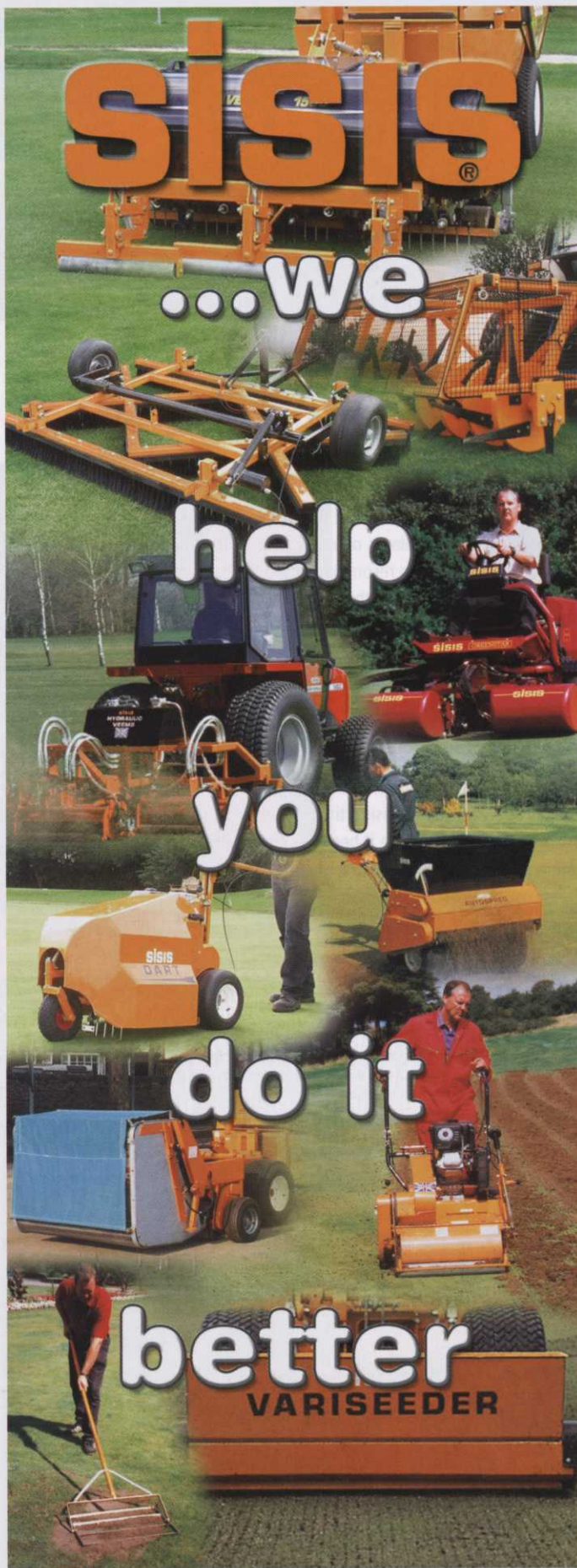
Oil is measured by its viscosity and this is effected by temperature, hence the reason for choosing the right one to suit the time of year. As the oil flows round the engine it becomes contaminated and, to help keep it clean, some power units have a filter in the system. This is not always the case, especially on the smaller engines.

Combustion is a dirty business, with carbon and sulphur as by-products. Condensation and unburned fuel are also present, so oil becomes quickly contaminated and its lubrication properties reduced.

Engine components wear and add minute particles of metal into the system. The volume of the oil over a period of time will be reduced due to burning off. The combinations of these factors results in the oil becoming useless.

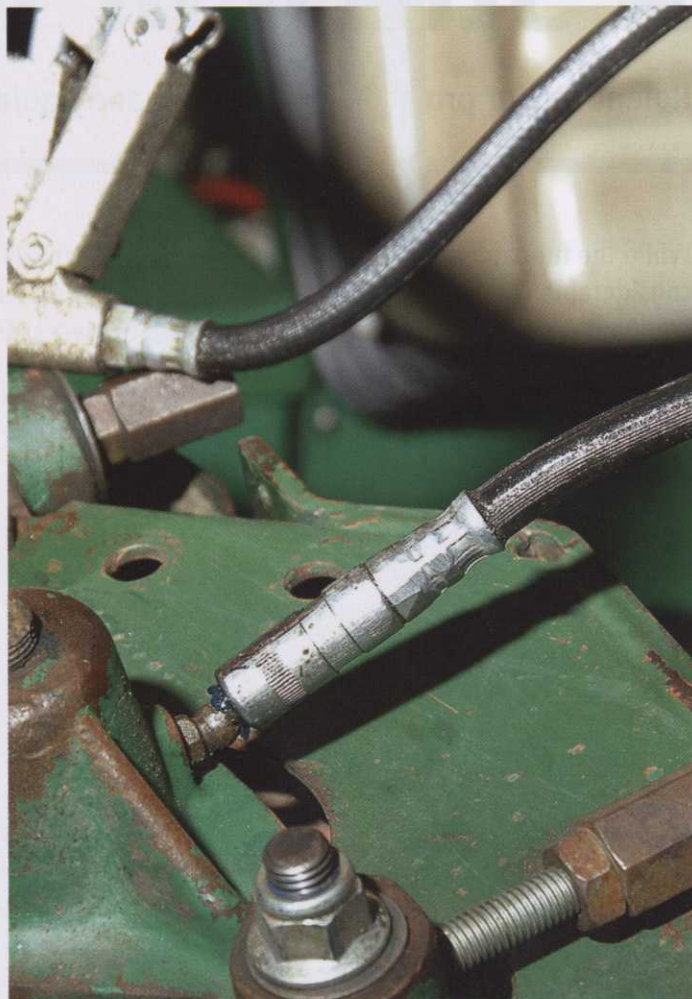


▲ Every time a machine is used ensure the engine oil level is correct



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▲ Use grease gun sparingly

Oil changes should be carried out as laid down in the manufacturer's instruction manual, using only best quality lubricants. It is essential to check the oil level every time the machine is used and top up if necessary.

This procedure does not just apply to engines. Hydrostatic drive systems are just as important. With these the oil's cleanliness and the correct levels are paramount if they are to work correctly.

One should always be on the look out for those tell-tale signs of oil leakage, especially from the joints of hydraulic hoses. Early discovery and rectification of these will avoid the dangerous possibility of being showered with hot oil from a split hose or a loose joint.

There are other areas that require periodic greasing as a form of lubrication. Sealed bearings are common, but some machines still have grease nipples and with these there is always the chance of overdoing it.

The results can be blobs of grease that attracting dirt and sand forming an excellent grinding paste for wearing away components. By over zealous use there is also the possibility of the grease pushing a bearing seal out of its mounting. Regularly and sparingly is the answer.

AIR

Without it we humans would not exist. The same applies to an engine if starved of air, and a number of things start to happen

Combustion needs air in the right proportions to the fuel, for maximum efficiency. Air has to be free from contaminants such as dust, to achieve this it must pass freely through a filtration system. It has another very important role; air acts as a coolant to ensure an engine is kept at the correct temperature.

Everyone has at some time experienced a heavy cold or congestion and knows how debilitating that is. Symptoms can be difficulty in breathing and sweating. With an engine it is not dissimilar.

If the airflow, that is either passing into the engine or over the cooling fins is obstructed in any way, things start going wrong. When the air intake system becomes restricted, the air to fuel ratio is changed and the engine runs rich. The result is that power output becomes erratic, fuel consumption increases and large amounts of emissions are pumped out into the atmosphere.

Air filters become contaminated quickly and need regular cleaning or replacing, especially in the dry climate and dusty conditions we now experience throughout spring and summer.

Where air acts as a coolant the build-up of debris (grass cuttings) and dirt will restrict its flow, thus causing hot spots to occur. Keeping cooling fins clear on engines; radiators and hydrostatic transmissions need to be a daily routine, especially in dry hot weather. Failure to do this may result in a fire.

WATER

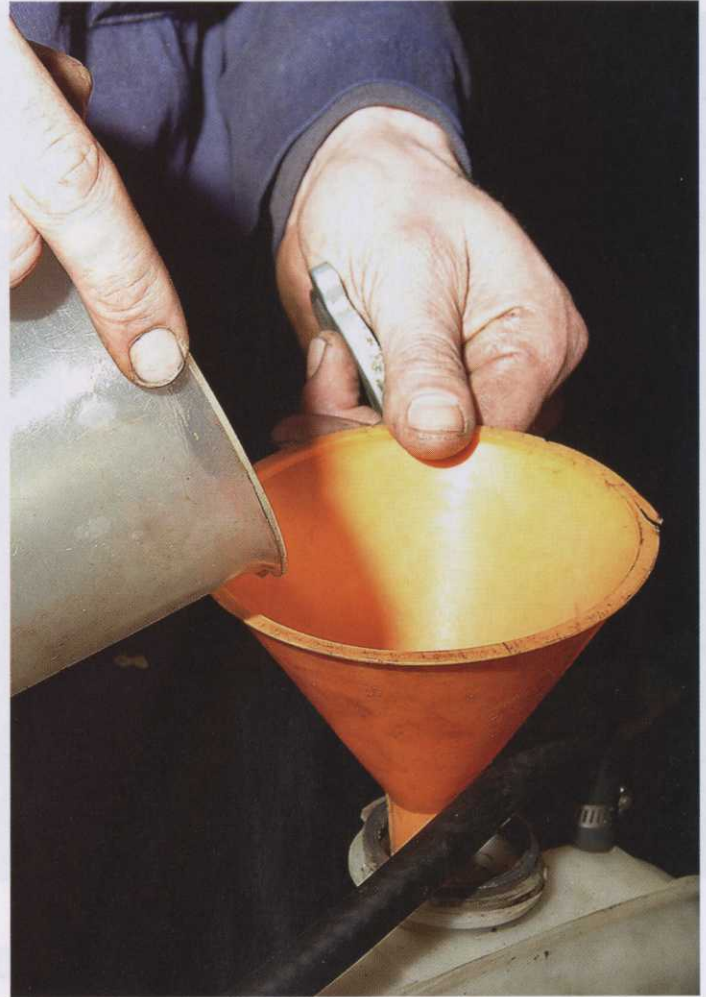
This can become polluted over a period of time and the fluctuations in temperature result in deposits forming. If a water cooling system is used, it should be flushed out at regular intervals. In hot weather the water will evaporate much faster, so check the levels at least daily.

FUEL

Would we drink a contaminated glass of beer? An engine will not respond well if its fuel supply is dirty. The chances are it may not start, if it does then it will run erratically. Where there is dirt, of an abrasive nature present, internal components will be damaged. Fuel should be stored in the correct containers in a cool location.



▲ Replace spark plugs as advised in the engine manufactures manual



▲ In hot weather the water wants checking at least daily

Some readers may not be aware that fuel should only be transported in two -gallon quantities and in the approved cans. There will be serious trouble if larger quantities of fuel are moved around a course and an accident occurs.

Modern fuels have a sale by date and therefore deteriorate if stored in a machine which is not used for a long period of time. Where this is likely to happen there are two choices.

Drain the fuel tank, and then run the engine to remove any left over fuel in the system, or alternatively use a fuel additive. These additives are readily available from outdoor power specialists and will keep the fuel fresh for up to two years.

SPARK PLUGS

As already mentioned, virtually all engines now use electronic ignition, but the one thing that has not basically changed is the spark plug. It is said to have been invented by a Frenchman, Edmond Berger in 1839.

A fellow countryman, Albert Champion, a name now synonymous with spark plugs, went to America to compete in a series of races. He discovered a shortage of parts and started making his own. To cover his racing costs he began manufacturing spark plugs and sold them to friends.

On a second visit to America in 1908, backed by the Buick Motor Company, Albert formed his own company - AC Spark Plugs. Albert Champion died in 1927 and General Motors purchased his company, but his name lives on.

In a lot of instances the spark plugs are components that tend to get overlooked until the day an engine fails to start.



▲ If conditions are dry, hot and dusty the air filter system should frequently be checked and cleaned or replaced

Electrodes wear and the gap increases and the spark shorts out or is weak, placing greater strain and unnecessary wear on the engine. Replace plugs as recommended to ensure the engine's performance is retained.

ALTERNATIVE FUELS

Budgets are always being squeezed, so it makes sense to be continually on the look out for ways of trimming costs.

One possibility is to consider LPG or natural gas. Not only is there a saving in running costs, but environmentally they are of considerable benefit to both the planet and the operators.

At present the government has not taxed this fuel at the same rate as petrol and diesel. The price of 'off road' gas is between 19p and 25p depending on the supplier.

If a club is already using this form of fuel for other activities, such as buggies or heating, some companies take the total amount of gas supplied into account when calculating the final cost per unit of gas. Because of the high usage the unit rate will further reduce machinery running costs.

The storage installation may also be free-of-charge. Some companies will supply a one-ton bulk tank. All that is required of the recipient is a level base built to their specification, plus the cost of connecting the unit's electrical supplies by a qualified electrical engineer.

As far as the machinery is concerned, there are a number of companies who carry out engine conversions and they cost in the region of £750. While this figure does add extra to the purchase price of a machine, the savings over a two year period are considerable.

However it is dressed up, fossil fuels such as petrol and diesel, are gradually coming to an end. In the meantime they are doing considerable damage to the atmosphere for future generations.

Research has shown that LPG is cleaner than other alternatives with the exception of electric power. If looking to save costs or wanting to help protect our environment, then LPG is worth investigating further.

BLADE SYSTEMS

Regardless of whether it is a cylinder, rotary, reciprocating or flail system the one common factor to all is the sharpness of the blades. A blunt blade or badly adjusted cylinder is not only dangerous; it also places considerable stress on the machine's components. More fuel is used; the

job takes longer and the turf can be severely damaged.

Rotary blades tend to be left longer before sharpening, usually because of the vegetation they are cutting and the signs of bluntness are not as obvious as those of a cylinder mower being used on fine turf.

Bearing in mind that a blade tip is travelling in the region of 130-mph, it must be correctly balanced to avoid vibration build up. It could become lethal. From the safety aspect, replace any damaged blades immediately. These criteria also apply to flail mowers.

As far as cylinder mowers are concerned, correctly ground and set reels and bedknives, are imperative to the quality of cut, there are no margins for error. Back lapping is not the answer; it is only short term and therefore should be considered only as a stop gap measure.

The benefits of having modern in-house grinding machinery make it a worthwhile long-term investment. A cylinder problem can be dealt with quickly and efficiently, without the delay of having to wait in a queue. With one of these units in the workshop all the cylinder mowers can be maintained at the highest of levels all-year-round.

CLEANLINESS

Any machinery that is involved with grass, water and soil will get dirty and to what degree this is allowed to develop, is down to each operator and the golf course machinery maintenance programme.

A cleaning-down routine, with a pressure washer, is beneficial for both the equipment and all those people involved in using or repairing it. Accumulations of dust and debris will cause heat build up problems, hide broken welds and missing nuts and bolts.

A clean well-kept machine is much more pleasant to operate and is very likely to fetch a higher trade-in price.

Keeping a course to the high standards now expected by players and members, requires machinery that is reliable and continually operating at optimum performance.

Having a well-planned maintenance programme ensures as little as possible can go wrong. It will never be foolproof and breakdowns will occur, but at least by being on the lookout for unusual signs and taking early preventive action most of these can be either avoided or kept to a minimum.

Like humans, giving machinery some TLC will pay dividends.