

21 → will be seen more and more widely on golf courses as manufacturers ranges expand. These engines are inevitably of the indirect injection type which means they have a pre-combustion chamber. This 'feature' may be lost on the average greenkeeper, whose main interest is whether they work reliably. What he will notice is that indirect injection engines (usually) need the air in the cylinder to be pre-heated (with a glow-plug) before they will start, whereas the direct injection design, prevalent on tractors, will normally happily start after a few turns of the starter – battery drain is about the same either way. Indirect injection is slightly less economical on fuel although paradoxically it is actually more fuel efficient, it is also significantly quieter with a lower level of particulate emissions – ie. smoke, – telling advantages which come from the better controlled and relatively slower burn of the fuel.

Despite the extra complications of radiator and circulation system and the extra cost, the majority of compact diesel engines have liquid cooling, usually water. The significant advantages of this are in providing a more effective medium for heat transfer, and by providing a sound deadening jacket around the noise generation combustion chamber. If radiators and so on are an abhorrence, or unsuited for other reasons, perhaps an air cooled petrol engine is the better option.

The 'engine management system' on most small engines is a hand/foot throttle and mechanical governor with advance and retard mechanism. Motor racing is pioneering electronic controls which sense more parameters faster, and as well as the setting of the throttle and the engine's revs they can monitor load and power demand to give a faster response and significantly better fuel efficiency. The first (and currently only) manufacturer to use electronic engine control in the turf industry is Huxleys with their Electronic Drive Control (EDC) on the Huxtruk. While not fully integrated into the engine this unit controls engine and hydrostatic transmission according to the power and speed demands of the PTO

# Liquid cooling provides added advantages

and wheels, ensuring these are maintained at the speed set by the operator. Huxley's experience is that the EDC unit responds faster and more positively than the mechanical governor on the engine, and they claim quieter operation, reduced engine loading and lower fuel consumption. The unit was proven in similar hydrostatic drive applications in the construction industry. Turbo-charging is also becoming increasingly acceptable, and while in the first instance it was seen as a way of increasing the power of an engine, by 'blowing' extra air into the cylinder, it does offer a method of improving combustion efficiency and so reducing emissions. Turbo-charging places greater burdens on the oil, however few manufacturers are now specifying specific oils for diesel and turbo-diesel engines. Reducing emissions also includes reducing crankcase emissions – a major source of pollutant, and this means better ring sealing, and lower oil consumption. Lower oil consumption has a down side – there is less 'topping up' to replenish the additives in the oil. At the same time engine manufacturers are trying to extend their service intervals. If there is a lesson to be learned it is that the less often one fills or refills the sump the better quality of oil one ought to buy. One major lubricant manufacturer told Greenkeeper International that they have looked (and continue to look) at oils on the golf course (literally as well as metaphorically). Their conclusion is that bio-degradability has limited value, as much of the damage from oil spillage comes from suffocating the leaf and root of the grass, thus a wetter and water may be the best answer. They

also speculated that equal problems come from the additives and pollutants, often toxic heavy metals, which are in the oil.

Several firms are offering synthetic lubricants, particularly greases or special purpose lubricants such as chain-saw oil. Teflon and other additives are available which can reduce friction and thus wear – claims are many, but few are actively 'sold' by either engine or oil suppliers. A major problem with engine lubrication is that the oil has such a multitude of tasks to perform: to clean, intercept and hold in suspension the products of combustion and wear, transfer heat (from piston etc), protect against corrosion and reduce noise as well as lubricate. Typically there may be nine different additives to augment the base 'oil' in these duties.

Most engine oils are now multi-purpose, in other words, suitable for both petrol and diesel engines, normally aspirated or turbo-charged. It may be possible to save money by going for a cheaper oil if none of your engines requires a high performance oil, but the saving is so small that the wisdom of this must be questionable – and if you upgrade to a new diesel mower or tractor you may be left with a drum of oil which you should not use in it. Most of these refinements (in engine and oil) came by evolution rather than by revolution, and it is only when you consider today's technology against the engine in your ten year old mower that you realise the strides technology has made – nor is there reason to believe that the next decade will not bring further advances. (As a point of interest, my mower is 33 years old!)

## Correct approach to chemical usage: sensitive and sensible

**C**areful chemical selection and weed control programme planning will do much to answer the growing public and legislative pressures related to herbicide use in sensitive areas, according to Mark DeAth of weed control specialists Nomix-Chipman.

Speaking on the options for environmentally-friendly weed control at a specialist water quality seminar in London, Mr DeAth advised local authority and amenity managers to examine their options in detail. With the choice being between residual and non-residual herbicides, there are four primary strategies available to specifiers today, he said.

"The ultimate in environmental acceptability is to use non-residuals only. This will obviously have a higher cost in that at least two applications will be needed each season to give an acceptable level of weed control. However it also poses the least risk of water contamination.

"Another option is to alternate between residuals and non-residuals, using a residual in a single application one season followed by a non-residual which may require several applications the next," he continued. "This will reduce the chemical burden on the environment while maintaining good weed control."

"The third possibility is to combine non-atrazine and simazine residuals with knock-

down herbicides. This eliminates the use of atrazine and simazine but maintains a high level of weed control from a single application at a comparable cost to a triazine-only programme.

"Finally, the most economic option is to use triazine mixtures. Although this will control weeds over an entire season from just one application, it carries the greatest risk to local water supplies. No official restrictions have yet been placed on the use of triazine mixtures, but it is widely accepted that curbs will soon apply."

DeAth went on to outline factors which govern the choice of weed control strategy, including the availability of labour, the need for operator safety and the application equipment to be used.

With herbicide application becoming as important as chemical choice in achieving the best balance, he defined the key application needs. Systems should maximise labour productivity, minimise spray drift and operator contamination, maximise chemical use and minimise chemical disposal problems.

"Whatever strategy is chosen, there are a number of operating guidelines which should be followed to minimise the risk of water contamination," he concluded. "If there is any doubt, seek professional advice from suppliers and ensure that all advisers are BASIS qualified."

## OBITUARY

### Joe Gillett – always proud of his 'calling'

It is with regret that I now inform fellow BIGGA members of the death of Joe Gillett, the much respected head greenkeeper of St Annes Old Links Golf Club from 1953 until 1981.

Joe, as all who knew him will surely recollect, was a great character and a skillful golfer who played with great enthusiasm, especially remembered as a worthy winner of the Ransomes Trophy at Wallasey in 1971.

Joe came from a family of greenkeepers and began his illustrious career in 1931 at the Fairhaven Golf Club. He was always proud of his calling and it gave him great pleasure to see his chosen profession grow from strength to strength.

We are all proud to have known him and on behalf of all his many friends and members in BIGGA, I send our deepest sympathy to his wife, Barbara, and to his family.

GEOFF WHITTLE