



DIGGING IN

No longer just an engine and wheels, today's tractor is a sophisticated piece of power equipment, with versatility and adaptability the keywords in the salesman's patter. HUGH TILLEY examines how the tractor has evolved and its effects on the greenkeeping industry

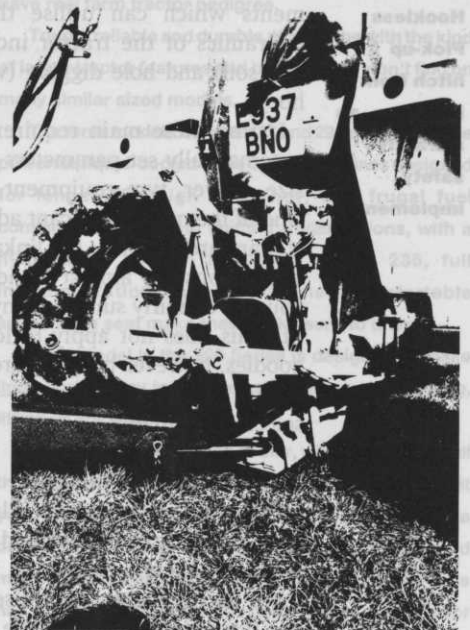
The motive power requirements on the golf course today have changed, with yesterday's agricultural tractor no longer satisfactory. It may still provide engine and wheels, and be suitable for towing basic gang-mowers and trailers, but it lacks the many refinements which enable today's greenkeeper to fully utilise his power equipment.

Today there is a wide range of models available, although the four major manufacturers still hold over three quarters of the market in the 45 hp plus range. Nevertheless, there are many other makes, and one important and overriding criteria in selection must be the ability and credibility of local service support. Options range from East European models, which are normally relatively basic in both specification and price, to (Wes') German machines which are more expensive but can be expected to have virtually double the life expectancy, and a higher specification. In addi-

tion there are several makes of 'compacts,' most of Japanese origin (even if sold by a major multinational), with power in a range up to about 45hp. Then there are several turf maintenance vehicles, (TVM's) such as the Cushman, built specifically for turf work, although generally these are of limited power. Finally, system tractors - whilst never popular in agriculture - would be particularly effective for very mixed work on the golf course, although price may preclude them. These include machines such as the Fendt Tool-carrier, Holder or Aebi, with their principle features being versatility with multiple attachment and power outlet points.

USES:

The starting point of a new tractor selection must therefore be use. The most obvious is mowing, although if mowing were virtually the only use it generally makes sense to buy a self-propelled mower. Most tractors, however, are also used extensively for trailer work and for 'getting around'. Off-green they are effective for aeration, harrowing, spraying and top dressing, using readily available and relatively inexpensive implements - although these functions have been increasingly usurped by TMV's, particularly for greens and fairway work. For heavy work such as cul-





The new
Autoguide
Hookless
Pick-up
hitch from
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attractive
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tivation and loader work the tractor remains the best and most economic answer. Less frequent requirements which can utilise the power take off or hydraulics of the tractor include mixing (concrete and soil) and hole digging (with auger and/or back hoe).

Listing these main requirements will usually and automatically set parameters for the tractor, such as size, power, tyre equipment, hydraulics and so on. One of the most significant advantages of the 'tractor' is standardisation - lift linkage, drawbar and PTO dimensions are almost standard on all makes - so you can be fairly sure that any existing machines will fit. This does not apply to loaders or other add-on goodies, however brackets are normally available for re-fits. The other parameter - or constraint - is in the selection of finance.

PURCHASE OPTIONS

In general the majority of Clubs seem to prefer outright purchase, which should be the cheapest option providing there is money in the bank. Nevertheless, there are frequently subsidised low or zero percentage finance options available, which may be as good as getting 'discount' for cash. Where money has to be borrowed there are several options, the more normal being lease or hire. Finance is very much a specialist field in which terms are extremely flexible and usually tailored to individual requirements. One basic difference between lease (or hire purchase) and contract hire is that in the latter the machine is provided at a set figure which normally includes service and maintenance. This means that there is no danger of unexpected breakdowns upsetting the budget.

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Get to know the true power of your tractor

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POWER RANGE

The most popular power range for the golf course is 45-65 hp. There are variations in efficiency between makes and models and it is also essential to be aware of the various computations of horse power. Most figures are theoretical and to compare like with like one should consider only DIN hp figures. These will usually be slightly lower than BS or SAE hp and if you really wish to know the exact power available some dealers have a dynamometer which will provide an accurate reading of the (PTO) output. If buying second hand it is worth asking for a dynamometer test certificate as a warranty.

Tractors are de-tuned to operate safely below maximum output, ensuring that they cannot be 'flogged' to death. However constantly operating at low speed or power is equally undesirable and leads to other problems such as glazed bores and excessive oil use, thus it makes sense to get somewhere near to matching the power requirement for main tasks. Turbo-charging is a simple means of getting more power from a set capacity, however while it is also very effective in improving fuel efficiency a turbo is an added potential problem normally unwarranted on the golf course.

TRACTION

The primary function of the tractor is traction. On the golf course the usual need for maximum traction is when trailing, though there are other occasions when soil and turf damaging slip can occur. Effective weight transfer was Harry Ferguson's answer to traction, however more recently four-wheel drive has become less expensive and reliable, further improving traction for ALL operations. Four-wheel drive has other significant advantages: larger front tyres reduce ground pressure and the stronger axle allows for safer operation with a front loader. 4WD also

means power or hydrostatic steering.

Tyres are a vital component in traction and the lugged agricultural patterns have been extensively researched and proven to maximise grip. However, they can be detrimental to turf and compromises may be needed. Perhaps the best compromise may be a spare set of wheels – not expensive if off a scrap tractor – so that turf or traction tyres can be fitted to specific need. The other major component in traction is likely to be the drawbar. Most modern tractors offer both ring and clevis hitches, with the former being best for two-wheel trailers as it places more of the trailer weight directly under the rear axle. Never hitch above the axle, and particularly never pull from a chain on the link point, for to do so invites a rearward overturn. Most agricultural tractors are built for draught operations such as ploughing, and have two or three modes for the hydraulic lift linkage with the draught mode controlling the implement depth according to pull. Compact tractors – in contrast – usually have only a position or height control, with depth or draught as an option. Whilst most golf courses seldom need this, anyone trying to plough without it will have great difficulty, so perhaps the most simple alternative is to use

a contractor or buy a power cultivator (a non-draught implement).

HYDRAULICS & P.T.O.

The important figures to consider with hydraulics are flow and lift at the end of the links. The former will indicate how fast and efficient the tractor will be with a loader etc., and with hydraulic operations such as tipping a trailer. It may be possible to add an external pump. Many implements, particularly gang-mowers, have an integral closed system driven from the PTO, thus these place no demands on the tractor hydraulics. Tractors can also be used efficiently to power hydraulic power tools, with hydraulics being very flexible and both simple and effective. The lift measurement will indicate what weight of implement the tractor can lift, though it must be remembered that the tractor may not be stable when lifting this weight; and extra counter-weight may have to be added.

The other important power output is the power take-off, commonly known as the PTO. The most common standard is 540 rpm, however many compacts offer a 750 rpm output. The other 'standard' is 1000 rpm, though this is designed more specifically for higher power outputs – typically around 100 hp. Ground speed related PTO is available from a limited number of makers and this is a useful option with top dressers and fertiliser spreaders, where implement speed and output needs to be regulated according to ground speed. The latest generation of tractors exhibit a far more efficient output from the PTO, with perhaps 90% of the engine's total power being available from it. Most, though not all, tractors have the option to take power from the front of

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Pictured above:
the Huxley HU84
and HU38 Aerators
are two imple-
ments with univer-
sal fitting for
Trucksters and
Tractors

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the engine, this being ideal for operating hydraulic pumps and may also be possible for use with mowers etc. Front lifts and PTO's offer interesting options for doubling tractor use and efficiency.

TRANSMISSION

While the most basic tractors only offer a limited number of gear ratios, top spec. machines have so many gears that the operator can often be confused. Gear ratios are more rational on contemporary machines and recent years have seen the advent of the 'shuttle' – one lever to change quickly and easily from forward to reverse. The most obvious use is for loader work, though there are many other manoeuvre intensive operations where shuttle is an advantage.

Drainage, coring and a number of other operations require especially low speeds and many tractors offer an optional creeper gear. On some this is easily installed without dismantling, whilst on others it becomes a factory built job. Forty km/h (25 mph) available on many



The John Deere Cab – luxury personified

new tractors makes for faster travel – although 20 mph remains the maximum legal limit on the road. Hydrostatic drive is readily available on

many compact ranges though very few standard tractors offer other than conventional gearboxes – perhaps because of the cost of larger units. Thus the clutch remains the greatest liability in transmission, though there are some tractors with clutches of greater capacity and longevity. Brakes are now both reliable and effective, a very limited number also having front wheel brakes, while all new machines are now required to have trailer braking.

The operator's platform has an important bearing on work output, and though cabs have become standard on agricultural tractors they still rate as an 'option' on compacts, TVM's and ATV's. Many operators prefer a roll-bar and open air rather than the somewhat claustrophobic atmosphere of the cab, though today's cab is much more comfortable and affords easier access.

If the major use is as personal transport then access must be a prime consideration and certainly all tractors (and cabs) are not equal. But then the tractor is NOT intended for this use – the ATV is.

There are a whole range of other options, some being easily added – such as loaders – and detached when not needed, though others have to be factory fitted. Downswept exhausts are preferred by many who work close to or under trees, and extra spool valves give more external services. Another interesting option – standard on a limited number of models – is reverse drive, which puts the work in front of the driver. With mowers this also avoids wheeling the grass in front of the cutter and reverse drive also works well with fork-lifts.



Fertiliser

What to use, how to use it

In this 11-page feature, KEITH McKEE explains the not-so-obvious elements of turf nutrition: and we take a look at the developing market and its approach to golf green fertilisation in France

Turf on golf courses is, ironically, unnatural. That is, it is an artificially maintained flora which could not survive untended, unlike the stable ecosystem of, say, a sandy heathland. Throughout a playing year, golf course turf will be trampled, kicked, scratched, torn, swiped with clubs and run over by buggies. IT WILL ALSO BE PLAYED UPON WHEN IT SHOULD BE CLOSED. Throughout all of this bombardment it should be presented like a championship course all year round. To ease such stress and produce playable, resilient turf that will keep members happy, today's greenkeeper runs a balanced maintenance programme of mechanical operations, irrigation and nutrition. Whilst this article covers nutrition only, the other elements of good turf management are just as important.

There is no doubt that to grow properly, plants need nutrients. These nutrients are well known: nitrogen, phosphorus, potassium and a whole variety of trace elements. Like general turf management, all these elements are important, with a deficiency of one upsetting the balance essential for turf growth and survival.

The nature of these nutritional elements is critical too. It is widely recognised that agricultural fertilisers are totally unacceptable for golf course grasses, especially fine turf. Certainly they are not easy to apply. Most important, however, is the priority of agricultural fertilisers to produce yield. For sports turf the priority must be quality. If quality is the key objective for the greenkeeper then he must be careful in drawing-up a nutritional programme that is right for his course.

The only common rule that applies here is that one golf course is not the same as the other. Each is as individual as a fingerprint, indeed the seventeenth green on any given course may not be necessarily the same as the eighteenth. Fertiliser

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