

As we move into the next millennium the turf care industry will face ever-greater challenges. In this article, Steve Chicken, the Engineering Director of Textron Turf Care and Specialty Products, reviews where the technology behind the mower may be going



Fantastic voyage



Metals

Various forms of sheet and tubular steel have been the main structural materials for turf care equipment for very many years. Metal has many advantages including ready availability and ease of repair, but suffers from corrosion and is difficult to form into complex curvatures. For the hidden, load-bearing structure of heavy duty mowers it is difficult to foresee metal being replaced in all but the longest

terms, but increased use of cost-effective data recording and analysis will allow designers to optimise metal structure far more closely to the actual operational environment than ever before. The data capture initiative currently being undertaken by Textron Turf Care world-wide will produce an accurate loading pattern for every representative turf care environment from the smoothest competition green to the most aggres-

sive inner-city contract. This data, alongside levels of computer use which until recently was only seen in the aerospace industry, is being used to design structures which are strong enough to give a lifetime's service at minimum weight and cost.

Lightweight aluminium alloys may also feature more strongly in mower structures but material and tooling costs are likely to limit their use to applications requiring very light

Right: Plastic panels, with aesthetically pleasing lines, will be used more extensively as seen on the recently introduced Jacobsen HR-4600 rotary mower.

weight. The great advantage of metal structures is their ability to be recycled, as forthcoming European legislation is likely to specify that a large proportion of future machines be recyclable.

Composites and Plastics

High strength structural composites such as carbon fibre replaced metal in many applications in the aircraft and automotive industries. However, their high cost and problematic repair options make it unlikely that more load bearing structures will be constructed of this material. It is in the area of non-load bearing panels and covers where lower-cost composites such as glass fibre and plastics come into their own, with pleasing aesthetic and operator-friendly shapes becoming available to the designer.

Composites and plastic are still difficult to repair compared to metal and the designer must take care to reinforce or protect those areas, which are likely to get knocked or damaged in normal use.

Previous page and below:
The new Ransomes Highway 2130 will be available in the near future with LPG or CNG as a fuel source.



Operator comfort and safety

Improving the operator's environment has been a major design thrust over the past few years. New designs such as the Jacobsen LF and HR range not only feature highly comfortable seats but have all the controls laid out to ease operation of the machine over extended periods. Joysticks and electrical switches have replaced directly linked hydraulic levers. Cabs are now becoming more common in all turf care applications and heating, air conditioning and radios are available - at a cost! Operator safety is also very much in the forefront of mower design with legislation such as the Provision and Use of Work Equipment Regulations and the Machinery Directive insisting on positive action for machine users and suppliers alike.

Mower noise was recently a heavily publicised issue due to the release of European legislation. This is largely a concern of those manufacturing the smaller machines, but it is undoubtedly a challenge for all producers of turf care equipment for sale in Europe. Vibration is a similar issue with challenging limits being set by European legislation for hand/arm and whole body levels. All recently produced Textron Turf Care equipment has been designed to comfortably exceed these safety rules and more mature designs are being updated to conform. Textron enthusi-

astically supports this safety drive and will wholeheartedly support the various European enforcement agencies in ensuring that only the safest of products are available to the industry.

Propulsion

For many years diesel and, more commonly in America, petrol engines have been the sources of power for turf care equipment. Environmental laws are rapidly influencing the design of these core components and all the main manufacturers are either now or will shortly be supplying engines to clean CARB (California Air Regulation Board) or Euro emissions regulations.

A growingly popular fuel in the municipal environment is LPG (Liquid Petroleum Gas) and CNG (Compressed Natural Gas). The new Ransomes Highway and Parkway range will shortly be available with this fuel source as an option. July's article described in detail the current level of battery-driven turf care equipment, but it is worth repeating the significant and wide-spread environmental improvements an electric mower can bring due to its almost silent operation and total lack of emissions.

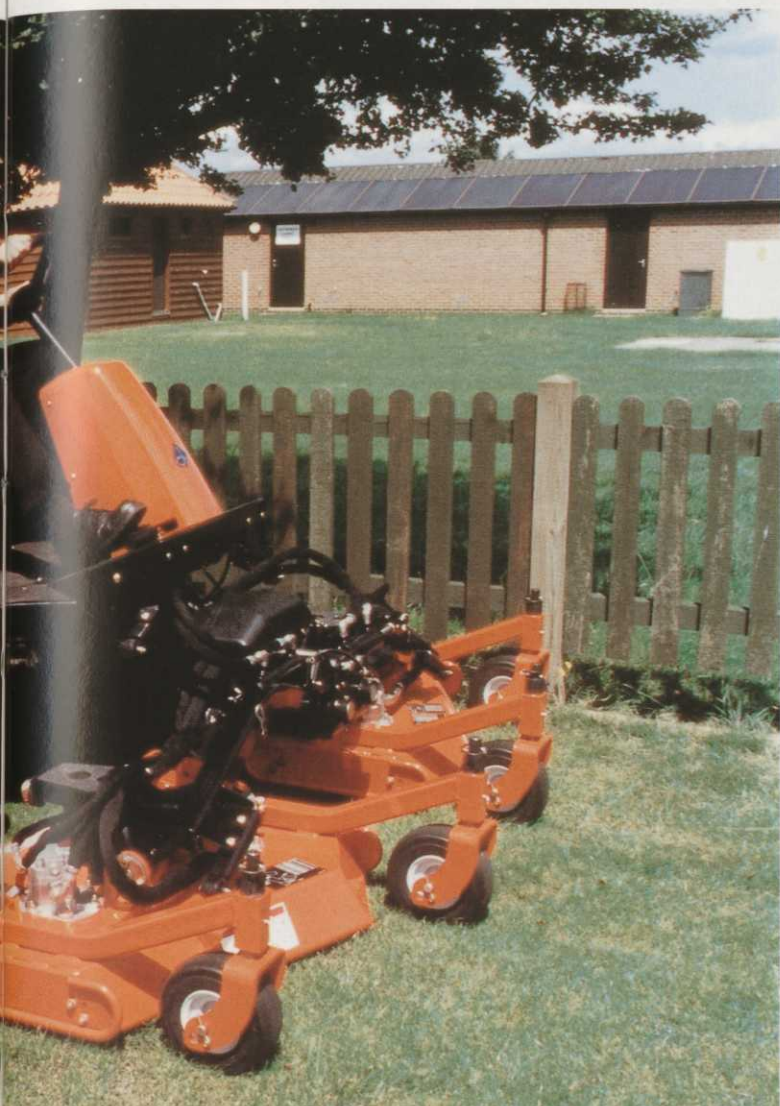
Much work is being done worldwide on alternatives to the conventional lead-acid battery and it is only a matter of time before advanced sources of electric power

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such as fuel cells will become available in the turf care industry. Despite the British weather, solar power is a frequently discussed source of power in the turf care industry. A purely solar powered mower is unlikely, as the power generating capacity of existing solar cells is far too low compared to that required by power-hungry cylinder and traction systems.

Cutting Method

The actual method of cutting the grass has changed little over very many years. Cylinders still give unmatched finish on fine turf and the results of a properly adjusted and maintained cylinder mower and a skilled greenkeeper are wonderful to behold. High quality finish is also available using rolered articulated rotary mowers such as the Ransomes AR250 where, in addition to gaining a high quality finish on semi-roughs, a mulching action is also gained. Mulching or conventional rotary mowers will continue to dominate the rougher cut market with greater emphasis being given over to terrain-following abilities. Flails will continue to be used for extremely rough work wherever municipal rotaries "fear to tread".

Looking further into the future, exotic possibilities such as laser cutting may be developed but, as long as safety and ease of maintenance remain the priority, it is unlikely that

the existing means of cutting the grass will significantly change.

Automation

Probably the most contentious potential future for turf care is robotic mowing. Consumer robot mowers are already available using semi-buried lines or pre-programmed routes to define their area of operation. GPS (Ground Position System) technology is now available in both golf cars and agricultural equipment (especially sprayers) and could form the basis of an "intelligent" mower, which was aware of its position. However, it is extremely unlikely that an unmanned machine, which can merely trundle up and down a fairway, will replace professional greenkeepers with their overall awareness of the course environment they achieve while operating a mower.

It will prove interesting to look back in the year 2010, on this final Learning Experience editorial of this millennium, and see what has, and what has not, come to pass.

One thing will remain constant; the need for experienced Course Managers and greenkeeping teams to keep abreast of the latest developments in this ever fascinating and ever changing industry.

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