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LANDWARDS

Winter 2006

- Innovation Award
- Mechatronics

AGRICULTURAL RELIEF

IAgrE JOURNAL Volume 61 No.4 www.iagre.org

SLASH BUNDLER

New opportunities: energy from the woods

John Deere's 1490D slash bundler; the bundling process in addition to other functions of the machine are controlled via the Total Machine Control system®

John Deere 1490D slash bundler collects, compacts and wraps the slash into bundles that can then be easily transported.

Residual, slash and other by-products of logging operations represent clean and renewable raw material for energy production. Similar raw material is also produced in connection with cleaning roadsides and powerlines.

John Deere's energy wood harvesting technology enables you to collect this valuable biomass and use it for efficient, productive and environmentally sound energy production – thus gaining a significant competitive edge as a forest entrepreneur.

The 1490D collects the slash and residue left behind after harvesting and feeds it into the bundler, which compresses compact slash logs. The bundling process is continuous, with no restrictions on the length or type of the material bundled. The length and diameter of the bundle can be easily adjusted.

Each bundle contains approximately 1 MWh of energy, depending on the tree species and the moisture content. Amounts of slash per ha vary, between around 150 bundles/ha in Scandinavia whereas tests in the UK in heavily branched species have recorded around 200 bundles/ha. Productivity can be in excess of 40 bundles/h where the worksite has been prepared correctly and, even in areas where no preparation has taken place, productivity can average 20-30 bundles/h.

The compression process is fully automated. The only function the operator needs to perform is to use the boom to lift material onto the feed table. The bundler incorporates two fixed presses and one moving press. During compression, the volume of the material reduces by approximately 80%. The compression strength has been optimised for generating compact bundles without crushing the material.

The moving press pulls the bundle forward and the machine bundles it firmly so that the string is tightened when the press is released. The tying process is automatically adjusted. Parameters, such as length of the log, distance between ties and compression periods, are configured in the TMC/Timbermatic 900. The computer then calculates how many ties are required in order for the bundler to be able to withhold handling and transportation. The volume of one bundle is approximately 0.7 m^3, depending on the material.

Easy transportation and storage for different types of wood and changing conditions

Thanks to the compression and bundling, slash can be transported out of the forest with normal forwarders or log lorries. The slash logs can be delivered directly to a power plant or stored temporarily in the forest. The latest communication technology ensures efficient logistics and fast data transfer.

Bundled biomass is easy to process throughout the year. The compact slash logs are not subject to rotting and they can therefore be stored in the forest or at a power plant in preparation for the peak seasons or energy production. The logs can be dried easily while they are piled up. As opposed to piles of woodchips, a pile of slash logs will not ignite on its own.

John Deere wood energy technology is already used in Finland, Sweden, Spain, Italy, Switzerland and the Czech Republic. In addition, the method has been successfully tested in Austria, France, Germany, the UK and the US among others. The tests show that the bundling method is well suited for different species of trees and various operating conditions.

The basic machine of the 1490D slash bundler features the same properties that have made John Deere the preferred supplier of forestry professionals worldwide. The bundling process, in addition to other functions of the machine, are controlled via the TMC® (Total Machine Control) system. An efficient John Deere engine, with low emission levels and high torque at low rpm, powers the machine. The comfortable, well equipped cab provides the operator with excellent visibility in all directions.

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Front cover: *Slash bundler (courtesy: John Deere)*

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NEW PARTNERSHIPS BOOST IMPACT FROM AGRICULTURAL RELIEF PROGRAMMES

Steve Twomlow

Governments, research institutes, development agencies, donors, etc., all struggle to choose between two kinds of investments: short-term relief interventions (for example after a drought), versus development investments (for example capacity building, markets etc.) that will give bigger pay-offs but if only in the long term.

A broad-based partnership in Zimbabwe has shown that relief and development are not mutually exclusive. Relief investments *can* be structured so as to yield both short and long term impacts. This partnership has:

- generated and quantified substantial impacts in a short period;
- laid the foundation for sustainable development in a poor drought-prone country; and
- provided lessons that will be valuable throughout Africa.

Partners

These are:

- Department for International Development (DFID), UK Protracted Relief Program;
- Department of Agricultural Research and Extension (AREX), Ministry of Agriculture, Government of Zimbabwe;
- Food and Agriculture Organization (FAO) of the United Nations;
- CARE International (CARE);
- World Vision International (World Vision);
- Coordination of Organizations for Voluntary Service (COSV), Italy;
- Catholic Relief Services (CRS), USA; and
- Smallholder farm communities.

Partnership

Partnership brings together a wide range of institutions that share a long-term commitment to the smallholder agricultural sector in Zimbabwe and which have a presence in relief interventions. We recognize that the problems are too large for any one institution to handle. Together, however, they represent a huge pool of experience in diverse fields – research, development initiatives, resource mobilisation, grassroots initiatives and community mobilisation, logistics of procurement and distribution, communications. The aim is to build on these synergies to improve the efficiency and short and long term impacts of agricultural relief programmes, and thus strengthen the resilience of poor farm communities against production shocks caused by drought.

The broad agenda (areas of common interest) was first identified, then detailed work plans developed through intensive consultations. These work plans specified:

- targets;
- activities needed to achieve targets;
- responsibilities of each partner;
- time frame; and
- budgets.

Reporting requirements were agreed upon and processes for monitoring and evaluation were built into the program design. Partners met regularly to provide feedback and consult where necessary. On numerous occasions, specific local know-how or experience of one partner, helped resolve implementation difficulties being faced by another.

Basic questions

Relief and recovery programs are a big part of the development landscape in Africa – and Zimbabwe is no exception. Large-scale relief programmes have been implemented in one or another part of the country during at least 12 of the past 25 years. Following drought (or sometimes floods), governments and donors provide not only food aid but also farm inputs, to resuscitate smallholder agriculture. However, despite the frequency and large size of input relief programs, there has been little effort to evaluate them objectively, to see whether they give value for money.

The partners asked some basic questions.

- Are relief programmes targeting the poorest people and if not, how to ensure that they do?
- What inputs should be distributed – could a different 'package' give higher pay-offs?
- Do beneficiaries have the knowledge to make effective use of relief aid and if not, where should we focus training efforts?
- How to measure the impacts of relief programmes?
- How can programme design be improved?

Off target

Partners worked together to plan and implement a series of surveys, covering nearly 3000 households across 19 districts in Zimbabwe. Some of the results were surprising since targeting was poor. Most Non Government Organisations (NGOs) had specific criteria to select beneficiary households – for example female headed households (Fig.1), households caring for

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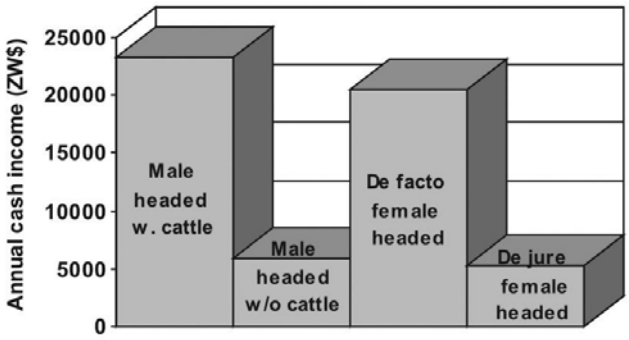

Fig. 1 Cash incomes of male vs female headed households, Zimbabwe (1999, US$1=ZW$38)

orphans or sick people and those without additional sources of income (e.g. remittances). This raises two specific questions: 'Are these the right criteria?'; and 'Can they be implemented under field conditions?'. The answer to both of these questions is most probably not. For example, gender of head of household, or number of orphans or sick family members, were not clear indicators of crop production (hence vulnerability or food insecurity). In any case, many of these criteria were simply not practical to implement, by NGO staff pressed for time. For example, there were no significant differences between relief recipients and non-recipients in terms of household composition, income, or degree of food insecurity.

One solution to both problems would be to use a different criterion – livestock ownership (Fig. 2). The survey found that draught power was the key determinant of farming success. Households with adequate draught animals (2 cattle or 4 donkeys) planted 60% more land, and harvested 70% more grain, than households without draught power. Cattle ownership is a robust indicator of food security; cattle are traditionally a sign of wealth; and ownership is easy to establish. In short, if cattle ownership is used as the yardstick to identify which households should receive relief inputs, this would be a quicker and fairer method than those currently in use and the identification of the poorest households would be more accurate.

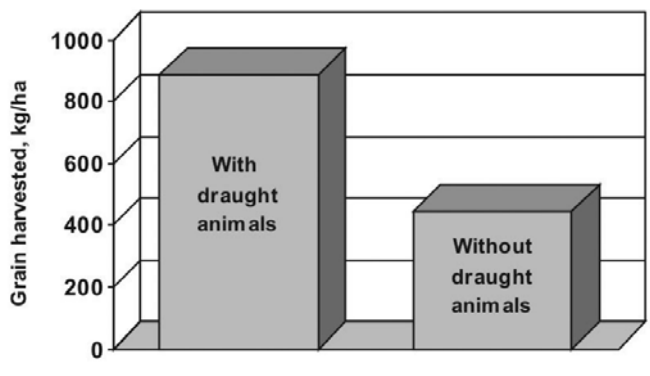

Fig. 2 Grain harvested Zimbabwean households with and without draught animal power (2004)

New seed, new horizons

Farmers are much better at handling seed than we give them credit for. A series of studies by the partners, most recently large-scale surveys in 2005, show that even after severe drought, farmers are either able to save some seed stocks, or acquire them from neighbours or village markets. In fact, a large proportion of relief seed is never planted, for various reasons including:

- poor quality seed;
- distribution of a poorly adapted variety; and
- distributed seed of a crop not normally grown in the area.

Rather than simply distributing whatever seed is available, relief programmes must act as channels for introducing improved varieties. This is where the big impacts, and long-term sustainability, will come. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and other partners have developed and tested a range of high-yielding, early maturing, locally adapted varieties. Relief programmes must select the right variety for each environment, ensure seed quality is good, and distribute it in clearly labelled bags. The emphasis should be on quality, not quantity – better to distribute high-quality seed of improved varieties to a few affected communities, rather than poor seed to all.

Seed versus fertiliser

This partnership has helped dispel the myth that fertiliser distribution gives high returns, to both farmers and donors, only in areas with favourable rainfall. In fact, if it's done right, distribution of fertiliser gives more than double the returns from seed distribution, even in dry, drought-prone areas. The solution is micro-dosing: small quantities of fertilizer, applied directly to the plant, at the right time (5 to 6 leaf stage in cereal crops). Programme partners have conducted on-station and on-farm trials in drought-prone areas in Zimbabwe for several years, under this and earlier projects. The results have shown how farmers can get excellent returns from as little as one-fourth of the 'ideal' dose recommended by government extension programs.

Similar results have been obtained in West Africa, where ICRISAT, FAO, International Fertilizer Development Centre (IFDC), Tropical Soil Biology Fertility (TSBF) and other partners in Niger have established an innovative development model. This combines fertiliser micro-dosing with an inventory credit system that creates financial incentives for smallholder farmers to buy and profitably use fertiliser (as well as other inputs) to increase productivity.

With the micro-dosing technology proven on a pilot scale, it is important now to promote it more widely. The partnership in Zimbabwe builds on synergies to ensure maximum coverage. DFID and FAO provide funding; NGO partners and the national AREX work with farm communities to implement the programme; and ICRISAT provides technical backstopping and monitoring. In 2004, over 160,000 farmers (45% women) received 25 kg of nitrogen fertiliser, together with a pamphlet in the local language (Fig. 3), explaining how best to use this small quantity. In parallel, we implemented over 1200 demonstration trials across the country. The trials were planted and managed entirely by farmers – and the results were spectacular. Micro-dosing increased grain yields by 30 - 50% and almost *every* farmer achieved significant gains. The 160,000 households increased their production levels by an estimated 40,000 t. The programme has significantly improved household food security and saved US$7m in food aid requirements. Most importantly, these gains went directly to many of the poorest farmers in the country.

Logistics and linkages

The partnership also funds research to improve the efficiency and impacts of relief programs in Zimbabwe. These studies – conducted jointly by ICRISAT, National Agricultural Research

Services (NARS) and NGO staff – offer new insights on logistics, farmer perceptions, and impact monitoring; and specific recommendations to improve household coverage, cost-effectiveness, and return on donor investments. Building on the study, ICRISAT facilitated an NGO consortium, brokered again by DFID, FAO, and the European Union, that developed a comprehensive set of guidelines covering design, implementation, monitoring, and coordination amongst relief NGOs in the country. The guidelines have been adopted by all major international agencies operating in Zimbabwe.

Consultative Group on International Agricultural Research (CGIAR) goals

Ultimately, this partnership is about meeting the CGIAR's primary goal of alleviating poverty (full details of all CGIAR goals can be found on their website at www.cgiar.org). It focuses on some of the poorest of the poor – smallholder communities in southern Africa, operating in drought-areas with poor soils, and failing, in most years, to meet even household food requirements. By focusing relief investments more efficiently, the partnership directly improves not only food security and health of relief beneficiaries but also improves their productive capacity through the introduction of new technology, and thus improves economic resilience and long-term sustainability.

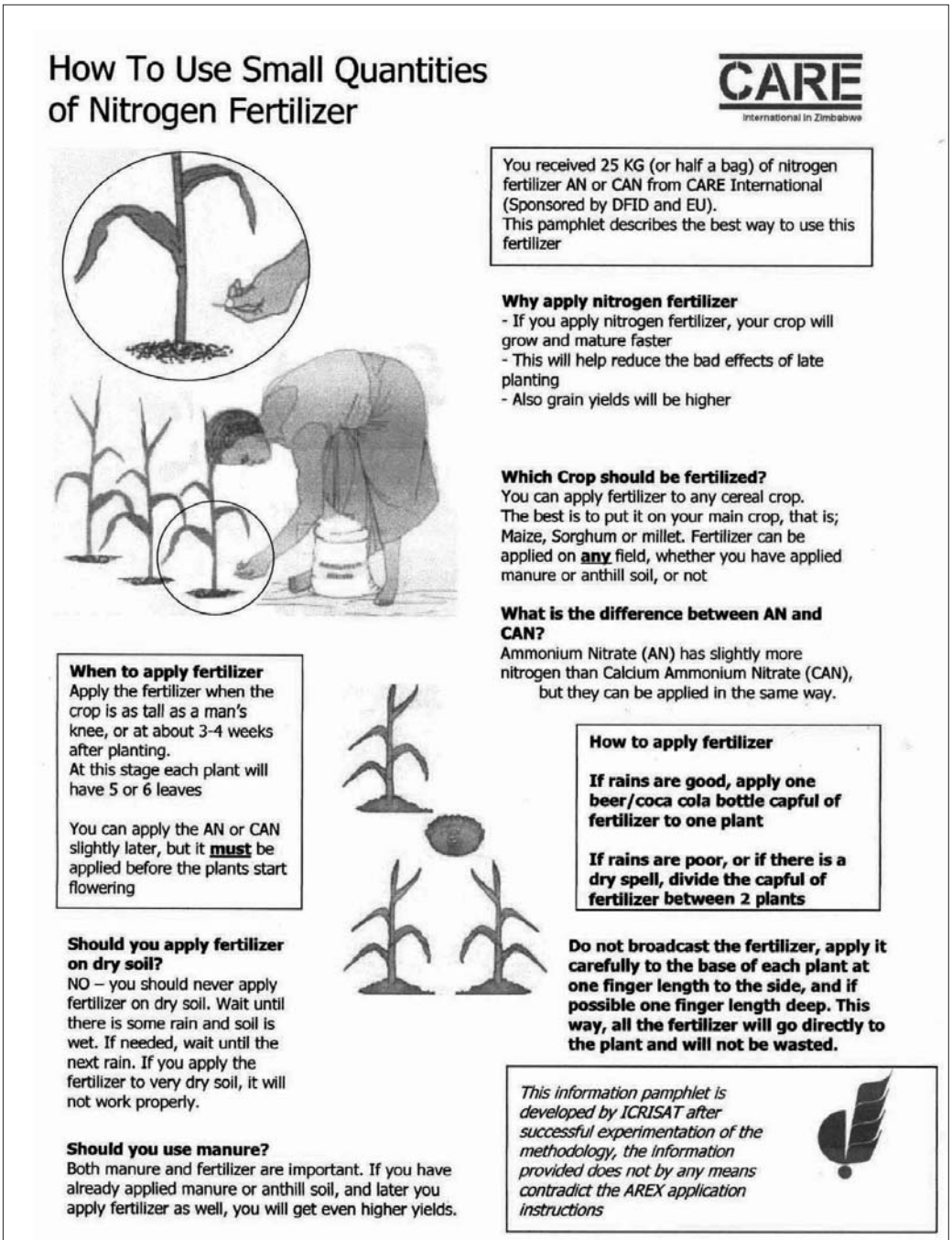

Fig. 3 Pamphlet which accompanies fertiliser bags given out by CARE International (sponsored by DFID and EU) which describes the best way to utilise the fertiliser

More partners, more places

With the impacts clearly visible, more partners in Zimbabwe have 'bought in' and similar initiatives are being developed in other countries. For example, fertiliser companies in Zimbabwe are now working with program partners (ICRISAT, FAO, DFID) to seek technical assistance. Under the envisaged program, fertiliser will be sold in smaller, more affordable packs (rather than the standard 50 kg) and buyers will be given advice on micro-dosing. A similar program has been initiated in South Africa with strong support from both fertiliser companies and grain buyers. The national research and extension services in Mozambique and Malawi have begun experimenting with micro-dosing. NGOs in several SADC (Southern African Development Community) countries are considering using the Zimbabwe guidelines as a model for their relief distribution programs. Together, these efforts are expected to make a major contribution to food security in southern Africa.

Building tomorrow, together

In summary, this partnership looks at different components of relief and recovery programs: improving design, fine-tuning implementation; and even questioning the basic paradigms. As a result, donors and implementing NGOs are redesigning their programs. The partnership is growing, under the umbrella of DFID's Protracted Relief Program. The micro-dosing programme will expand to 250,000 households next season and is being used as an 'entry point' towards an integrated programme of conservation agriculture, which will include land and water management as well.

The first targets have been reached, and partners are broadening their efforts. Eventually, relief programmes will no longer be simply ad hoc or stop gap interventions but instead

a powerful tool for sustainable development, to fight hunger and poverty in southern Africa.

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SUSTAINABLE FUEL

Wood-fuelled future moves a step closer

Wood's comeback as an environmentally friendly fuel for generating heat and power has moved a significant step forward.

Forestry Commission Director-General Tim Rollinson launched three key new sources of information for potential users and suppliers of woodfuel and other 'biomass', during an event at the APF International Forestry Machinery Exhibition at Ragley Estate, Alcester, Warwickshire.

There are three new information guides aimed at making information available to specialist and non-specialist audiences.

- *'Woodfuel – Frequently Asked Questions'*, a Forest Research factsheet with answers in non-technical language to questions about woodfuel. The factsheet is a component of forest research's woodfuel information pack, which contains information on a range of woodfuel subjects.
- *'The Quest for Sustainable Energy – Woodfuel Meets the Challenge'*, a 10-page, layperson's guide to woodfuel published by Forest Research with support from the Commission and the Department for Environment, Food & Rural Affairs (Defra). It sets out facts about the benefits of woodfuel, the different types of woodfuel products, information about drying woodfuel, costs, marketing and sources of woodfuel. It also looks at the future for woodfuel.
- The Biomass Energy Centre (BEC) website, which is a 'one-stop shop' information centre hosted by the Commission's Forest Research agency on behalf of the Commission and Defra. It contains a wealth of technical information about all forms of biomass fuels, including woodfuel. Biomass fuels are fuels based on biological sources, such as plants, sewage and even parts of animal carcasses.

Mr Rollinson also announced that the Commission is committing a further £30,000 to support the centre's provision of technical and scientific advice, information and best practice guidance. He said, "Climate change is the single biggest threat to the sustainability of life on earth, and sustainably produced woodfuel and other biomass fuels can have an important role to play in mitigating climate change, because they cause very low nett emissions of carbon to the atmosphere.

"Woodfuel, when it is produced in managed forests – which we do in Britain – is a sustainable resource that can be supplied forever, unlike fossil fuels, which, once they have been used, cannot be replaced.

"Over the past few years we have spent a great deal of effort on research into the science and technology of woodfuel and other biomass fuels, and on developing the market and increasing their use.

"We have been moving forward on several fronts – evaluating the fuel resources available, developing the supply side, developing the market side, bringing the two together, and making information available.

"Among the key needs for developing the market are sources of reliable, technically sound information for all interested parties. I'm therefore delighted to launch these three new sources of information, which I'm confident will be invaluable to anyone interested in using or supplying wood fuel and other forms of biomass fuel."

MORE INFORMATION

The 'Woodfuel – Frequently Asked Questions' factsheet is available as part of the Woodfuel Information Pack. The pack costs £10. People who have already bought a Woodfuel Information Pack should automatically receive a complimentary new factsheet to add to their packs – they do not need to order one. Contact Sally Simpson at Forest Research. Tel: +44 (0)1420 22255. E-mail: sally.simpson@forestry.gsi.gov.uk Web: www.forestresearch.gov.uk/fr/infd-66sjac

The 'Woodfuel Meets the Challenge' leaflet is available from the forestry commission's regional conservancy offices. For conservancies' contact details, visit www.forestry.gov.uk/contacts or telephone 0845 forests (0845 367 3787).

COMPARISON OF LINEAR ACTUATORS WITH PNEUMATICS AND HYDRAULICS

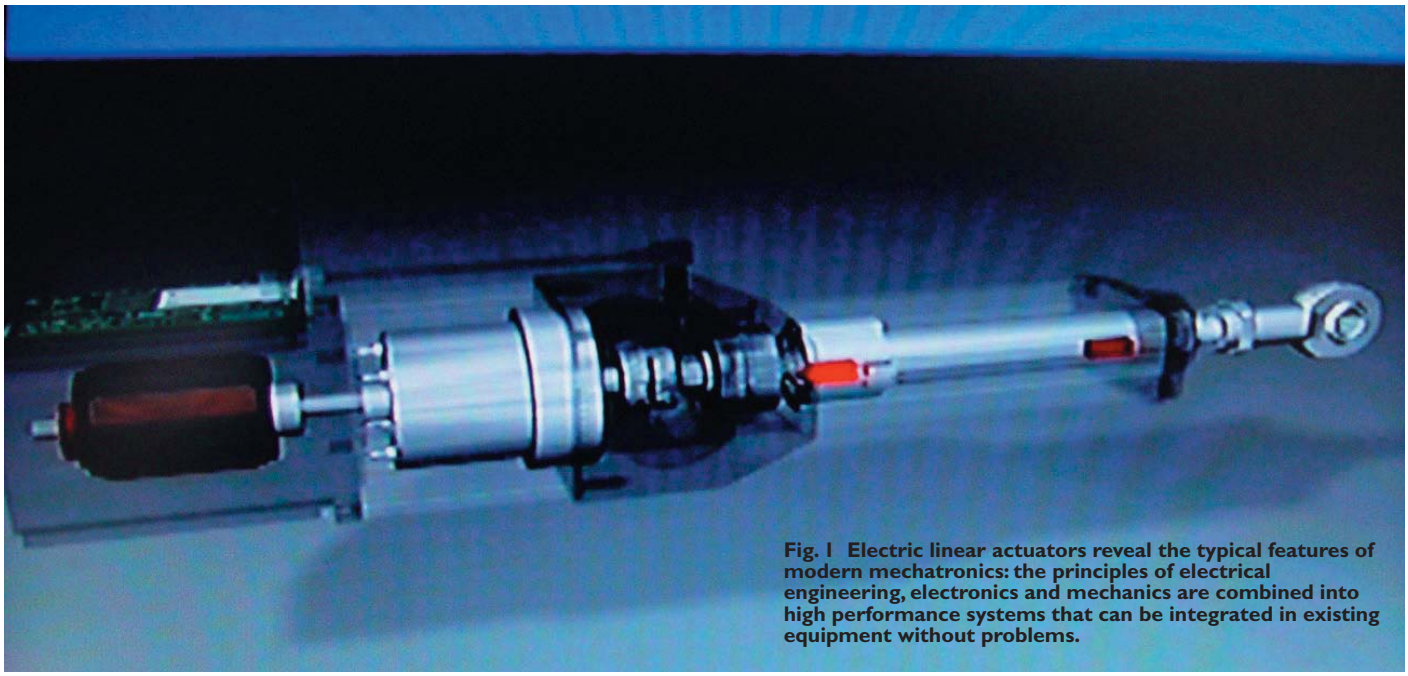

Fig. 1 Electric linear actuators reveal the typical features of modern mechatronics: the principles of electrical engineering, electronics and mechanics are combined into high performance systems that can be integrated in existing equipment without problems.

When deciding whether to use hydraulic or electro-mechanical actuators in a particular application, the sole deciding factor is: which best meets the technical and economic demands of the application. Although the features of each application need to be examined individually, the table provided with this article makes clear the several variables that will influence the basic decision and need to be considered when designing a linear motion system (Table 1). A system for a fully electric powered forklift truck is taken as an example.

Over the last few years the development of electric linear actuators has led to their increasing use in linear motion systems that would formerly have used hydraulics. So much so that it is now good practice before designing a new linear motion system to decide which type of linear actuator might be best for the system. As well as the technical aspects and the price of the drive concerned, it is necessary to consider the cost of any necessary ancillary equipment together with the costs arising over the total life cycle including maintenance and repair costs. In addition, because of the current trend to longer warranty periods, it would be wise to consider questions regarding fatigue resistance and availability.

Comparison

Although the cost of an individual hydraulic cylinder is less than that of an electric actuator, a hydraulic system can still be more expensive in total than its electro-mechanical equivalent. This is particularly the case when only one – or a small number of actuators – is needed for a particular application, because the costs for ancillary equipment will make a hydraulic system more expensive than an electric actuator. Ancillary equipment comprises an oil tank, a pump, possibly an accumulator, a filter system, and tubing or hoses for distributing the hydraulic fluid and returning it to the tank. Moreover, to maintain cleanliness in production and to protect the environment, a drip pan to collect leakage will also be needed.

Finally, the fluid itself must be taken into consideration: in certain cases additional costs are incurred if a bio-degradable oil or – because of increased environmental or fire protection requirements – a water-based hydraulic fluid (types A, B or D) is used instead of conventional hydraulic oil. As every fluid has to be checked regularly for its condition (type and quantity of the particles contained in the fluid, water content and lubrication properties) other costs will also arise. Moreover, for applications outdoors or in cold storage areas, a heating system will perhaps be necessary to improve the flow properties of the fluid.

In contrast to this, electric linear actuators require only cables – for power supply and for transmitting signals or connection to a field bus system. However, if many actuators are concentrated in a small space inside a machine or manufacturing/processing equipment, the ancillary equipment costs for hydraulics can be distributed over all the actuators. This means, that as long as the potential disadvantages of using oil are not significant (with respect to cleanliness in production and environmental or fire protection), a hydraulic system can be more suitable than the electro-

Table 1 Comparison of electro-mechanical drives with pneumatic and hydraulic systems

Criteria/Requirements	Hydraulic system	Pneumatic system	Electro-mechanical system
Costs of single drive	Low	Very low	Higher due to system configuration
Indispensable infrastructure	Hydraulic unit, tank for hydraulic medium and filter systems	Air compressor and filter systems	No further infrastructure required
Potential additional infrastructure	Pipe work, hose pipes and accumulator for increased dynamics of system	Pipe work, hose pipes and accumulator for increased dynamics of system	No further infrastructure required
Environment/protection of water	Oil troughs may be necessary	Compressed air containing oil must not be blown off into working areas	No problems
Operation in clean and ultra-clean rooms	Very problematic	Possible with high additional investments	No problems
Operation in hygiene-critical areas	Problematic	Presents problems	No problems
Operation at low temperatures	Medium must be heated	No additional equipment required	No additional equipment required
Operation at high temperatures	Oil cooler required	No additional equipment required	No additional equipment required
Cost of assembly and mounting	High	High	Low
Maintenance intervals (length of operating cycle)	Rather short	Long	Very long
Maintenance required	Regular oil check, oil change, check working cylinders and infrastructure for leakage	Weeping of compressed air, de-oiling of compressed air, check ram cylinders and infrastructure for leakage	Check commutators, bearing inspection but no additional work necessary
Fire protection	Only with water-based media	High	High
Operating costs	High	High	Low
Synchronisation of several cylinders	Very complex	Very complex	Simple
Complexity of control	High, especially with large variations of pressure and temperature	High, due to compressibility of the medium	Low, similar to rotating motors
Dynamics of operation	Low to medium speed	Medium to high speed	Medium to high speed
Accuracy of running over entire stroke	Significant deviations, especially at low speed	Significant deviations, especially at low speed	Low deviation
Force distribution over entire stroke	Substantial increase of force next to the end position	Substantial increase of force next to the end position	Even force distribution

mechanical alternative.

Linear drives are often used as reversing drives and in many of these applications, oscillating movements occur at high frequency. With a hydraulic system this leads to stress on the seals and impairs the oil retention ability of the seal, which in turn can result in leakage of the hydraulic fluid. In the most favourable case, this is unsightly; but in certain situations – predominantly in clean processes – it can lead to considerable production problems due to the oil having an adverse effect on the quality of the manufactured products. Problems of this nature do not arise with electro-mechanical systems. Without any emission occurring, acceleration factors of up to 10 *g* can be achieved in the system and the reversing motion does not lead to any problems.

Advantages of electric linear actuators

The example stated is not meant to imply that electric linear actuators are always more appropriate than their hydraulic equivalents. The intention is to show that electric linear actuators are becoming a genuine alternative in more and more applications from both the technical and economic viewpoints. This is necessary because an appreciation of the advantages of electric linear actuators is still not very widespread. Consequently potential users are surprised that standard actuators are available with load ratings of up to 100 kN along with strokes of up to 1500 mm (Fig. 1). That electro-mechanical systems can have a trim design is also not widely known. As an illustration of these favourable aspects, SKF has demonstrated within the framework of a pilot project that hydraulic actuators in forklift trucks can be replaced by electric ones without any problem (Fig. 2).

A further advantage is revealed for electric actuators, if the drives are to be controlled. Whereas for hydraulic systems the electronic control system must be specially designed for the particular requirements of fluid engineering, electric actuators can draw upon the complete range of electronic control systems available for electric drives – even rotational ones. As a result of large production runs, the market range is wider and unit prices lower so that in most cases cost savings can be made.

Electronic control

Control equipment is of course available that is compatible to all readily available stored program control systems (SPS) and likewise to all available bus systems. SPS programming for all

Fig. 2 The fully electric SKF forklift truck demonstrates the high performance of electric linear actuators as an alternative to hydraulics

electric drives has proved to be particularly simple, as the motion produced by the drives is not affected by a fluid, and the control response remains practically constant for as long as the machine is in operation. It is however quite different with hydraulic drives. For example, when an injection moulding machine is switched on in the morning it first produces a run of defective parts whereas a fully electric operated injection moulding machine produces parts without defects almost from the very first operation.

Damage arising from obstructions

There is one system property that does make hydraulic drives the first choice for applications like construction machinery. If the shovel of a hydraulic excavator comes up against rock, the compressibility of the hydraulic fluid prevents damage to the moving parts of the excavator. However, of course this error tolerance can be engineered into machines in other ways, e.g. by using power sensors, which switch off or reverse the drive as soon as mechanical resistance is detected.

Operating costs

The costs of electricity have recently been increasing and unfortunately will continue to do so. This gives electro-mechanical systems an advantage in terms of operating costs, as it is well known that every form of energy conversion gives rise to loss of performance. For example, electrical current is used in a hydraulic system to generate the fluid pressure required using pumps. This pressure is converted into motion by the working cylinder. For many items of equipment or plant, a high pressure must be kept in reserve, as when a peak load ensues, sufficient pressure would otherwise not be provided sufficiently rapidly. Electric machines on the other hand, can be operated in an extremely cost-effective manner with respect to energy. If only a low output is required, then a small amount of current is tapped. However, as soon as the load increases, the current input is adapted without delay and the system performance increases. Electro-mechanical systems reveal no losses, for example when reserve pressure generated is not needed later. Furthermore, electric power is always only consumed for the duration of the operating cycle. All in all, it can be said that electro-mechanics is increasingly becoming an alternative system to hydraulics – from both the technical and economic viewpoints.

Courtesy of Minett Media

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COASTLINE MANAGEMENT

UK's largest man-made wetland created in Essex

The sea wall at Wallasea Island in Essex has been breached, creating the UK's largest man-made marine wetland to replace similar bird habitats lost to development during the 1990s. The wetlands will also improve flood defences, provide for better fish nurseries, and create opportunities for recreation.

Biodiversity Minister Barry Gardiner said the £7.5 million Wallasea project was one of the most significant wetland creation projects in Europe. At Wallasea, we have balanced the needs of wildlife, flood management, landscape and people to recreate some of the ancient wetlands of East Anglia," he said.

"Saltmarsh is rarer than rainforest, and is important to people, particularly as a flood and storm defence, and to wildlife. Hundreds of thousands of wetland birds rely entirely on the Essex saltmarsh for their food each winter.

"Wallasea Wetlands will be a wonderful feeding and roosting habitat for birds such as oystercatchers, avocets and little terns, which have been gradually displaced from the area during the last fifty years, as well as creating a haven for other rare wildlife.

"The wetlands will also provide additional flood and storm protection. Damaging storm waves lose their energy as they pass over the area, and the new sea defences will provide better protection than the old ones, which were in very poor condition."

Wetlands, including salt marsh and mud flats, are breeding and roosting places for important bird species, as well as habitat for rare plants, insects and fish. They are also breeding and nursery areas for aquatic wildlife, such as bass, mullet, flatfish and herring. They act as buffer zones that absorb wave energy and protect the coast from storm damage and flooding.

Project Manager Mark Dixon said: "Creating this wetland has been a major feat of engineering. More than 600,000 tonnes of non-polluted navigation dredgings that would otherwise have been dumped at sea have been used to create this habitat.

"A project like this is only possible with the support and co-operation of everyone involved. The involvement of Wallasea Farms, Harwich Haven Authority, English Nature, the Environment Agency, the Royal Society for the Protection of Birds and the local community have been absolutely invaluable."

New flood defences along the northern bank of the island have been built inland of the shoreline and the current, weaker sea walls have been breached. A total of 330 metres of existing sea wall were breached today in an operation involving around 25 large hydraulic excavators, bulldozers and dump trucks.

The project has created 115 hectares of wetland, including seven artificial islands, saline lagoons, mudflats, new public footpaths, and 4km of sea wall. It will be used by birds including brent geese, oystercatchers, grey plovers, dunlins, shelducks, curlews, avocets and little terns. It will also provide a nursery habitat for fish such as bass, herring and mullet.

MORE INFORMATION

Defra. Tel: +44 (0)8459 335577; Website: www.defra.gov.uk

BIOFUELS

Biofuel crops pose no threat to UK food production

Britain's farmers have the capacity to seize the new opportunities presented by the rapidly growing biofuels market without any adverse implications for food production, according to the National Farmers Union (NFU).

In an analysis of the land that will be required to meet the Government's target of a 5% inclusion of bioethanol and biodiesel in road transport fuel by 2010, the NFU has calculated around 900,000 hectares of land will be needed.

However, that corresponds almost exactly to the 375,000 ha of land that is currently being used for the production of feed wheat surplus to UK domestic requirements, which has to be exported, plus the 559,000 ha of mandatory set-aside, most of which could be used to produce oilseed rape for biodiesel.

This calculation takes into account the fact only part of the crop is used for biofuel production and around 2.4 million tonnes of so-called 'co-products' – distillers' grains from wheat and rape meal from oilseed – will be available for animal feed.

The NFU paper 'UK biofuels – land required to meet RTFO 2010' goes on to argue that technological advances in the production of biofuels will allow output to be stepped up still further, without compromising food production capacity.

It is calling on the Government to extend the existing Road Traffic Fuel Obligation (RTFO) targets to the EU target of 5.75% by energy, which equates to 7.5 to 8 % by volume.

NFU Vice-President Paul Temple said recent claims from multi-national food processors that growing crops for fuel would lead to food shortages and soaring prices were nothing more than scaremongering.

He said: "It is quite clear from the figures there is more than sufficient spare capacity in British farming to meet the growing demand for biofuels without compromising food production.

"The biofuels market will mean that, overall, there is a tighter balance between supply and demand for grains and oilseeds and food processors and others will no longer enjoy the luxury of being able to buy their raw materials at below the cost of production.

"But that does not imply shortages and huge increases in food prices. The price the farmer receives for his cereals and oilseeds represents only a tiny proportion of what the consumer pays for the finished product, so even a significant lift in farmgate prices should have very little impact at retail level.

"Against that, the biofuels market will mean that Britain's farmers are making a really worthwhile contribution to the reduction in carbon emissions, as well as generating significant numbers of new jobs. "It is a win, win, win opportunity – for the climate, for farmers and for the economy."

The NFU paper quotes research from the East of England Development Agency indicating that around 2.5 farming jobs will be created or sustained for every 1,000 tonnes of biofuel produced. A 100,000 tonne plant could create/sustain some 60 to 80 jobs directly and underpin as many as 550 jobs on the land.

MORE INFORMATION

National Farmers' Union, Agriculture House, Stoneleigh Park, Stoneleigh, Warwickshire, CV8 2TZ. Web: www.nfuonline.com

The Douglas Bomford Trust

Funding for the pursuit of excellence in agricultural engineering

The Trust provided funds towards the travel of Coleg Sir Gar students to attend the World Ploughintg Match in Ireland

Douglas Bomford descended from a long-established Worcestershire farming family that helped pioneer the mechanisation of many basic farming operations. He played a leading role in professional and technical bodies. He was President of the Institution of Agricultural Engineers from 1955 to 1957 and was closely associated with the establishment of the National College of Agricultural Engineering at Silsoe, now Cranfield University.

The Douglas Bomford Trust was founded as a registered charity in 1972 for the purpose of advancing education, training and research in the science and practice of agricultural engineering and mechanisation.

In the process of allocating funds, the Trustees have sought to uphold the principles that Douglas Bomford would have applied to developing individuals, knowledge and innovation to meet the ever changing contribution that engineering can make to agriculture and the rural environment.

The funds available to the Trust have recently been boosted by a donation arising from the closure of the Silsoe Research Institute.

The Trust provides funding to enable competent individuals and organisations to pursue:

- education, training, research and knowledge transfer;
- innovation and the application of science and technology with respect to the design, development, evaluation and construction of machines, systems and techniques;
- travel to acquire or disseminate knowledge;
- the development and maintenance of professional competencies; and
- the development or acquisition of new skills, techniques and capabilities.

Go to **www.dbt.org.uk** for more information on eligibility criteria and application procedures.

GOOD PRACTICE

Sprayers achieve success with voluntary protection targets

The annual report of the Voluntary Initiative (VI) steering group published today highlights the successes from its first five years. Since its launch the VI has seen £45.75m invested by farmers and the crop protection industry in over 40 projects to improve pesticide use and protect the environment.

Latest data collated by the NFU has shown a dramatic upturn in the area covered by Crop Protection Management Plans (CPMPs), as the Entry Level Scheme has been taken up. At least 2.4m ha – double the 2006 VI target – will now be covered by CPMPs.

The report highlights other successes including:

- most of the final five year targets under the VI have been met or exceeded;
- by March 31 2006, more than 76% of the sprayed area in the UK was treated with machines tested under the National Sprayer Testing Scheme;
- membership of the National Register of Sprayer Operators is covers more than 80% of the UK arable area; and
- Environment Agency data shows a continuing reduction of pesticide levels in surface water with a 19% fall in 2004.

VI chairman Professor Barry Dent OBE said: "After five years it is now good to see the VI moving beyond being a tax prevention package to be a guide on good practice that helps protect the environment and farmers' incomes. "We're delighted to have met most of the targets agreed at the beginning of this five year process and to have met or exceeded all of the operational targets by March this year.

"Government has now agreed the VI should continue on a two-year rolling basis allowing us to build on the major schemes we've already set up. The VI will evolve into a dynamic and progressive programme of measures which works to help farmers and government deliver a sustainable countryside."

MORE INFORMATION

For further information on the Voluntary Initiative contact VI Manager and CPA, Patrick Goldsworthy. Tel: +44 (0)1733 367215. Web: www.voluntaryinitiative.org.uk

ASBESTOS WORKER PROTECTION

Asbestos regulations revised

The Control of Asbestos Regulations 2006, will strengthen overall worker protection by reducing exposure limits and introducing mandatory training for work with asbestos. They will also simplify the regulatory regime and implement revisions to the EU Asbestos Worker Protection Directive.

Commenting on the revised regulations, Minister for health and safety, Lord Hunt of Kings Heath said: "These new provisions will prevent around 6,500 occupational deaths from exposures to asbestos over the next 50 years. There is no doubt these regulations are a step forward in the protection of workers and that they will further strengthen controls to reduce future potential deaths from asbestos disease."

The revised regulations will introduce the following changes:

- single control limit of 0.1 fibres per cm^3 of air for work with all types of asbestos;
- specific mandatory training requirements for anyone liable to be exposed to asbestos;
- requirement to analyse the concentration of asbestos in the air with measurements in accordance with the 1997 World Health Organisation recommended method;
- practical guidelines for the determination of "sporadic and low intensity exposure" as required by the EU Directive; and
- replace three existing sets of Asbestos Regulations.

Most work with asbestos will still need to be undertaken by a licensed contractor but any decision on whether particular work is licensable will now be determined by the risk.

More details of what work is licensable, what training is necessary and how to undertake work with asbestos containing materials can be found in the Approved Code of Practice (ACoP) 'Work with materials containing Asbestos'.

MORE INFORMATION

Further guidance on the duty to manage asbestos in premises can be found in the 'The Management of Asbestos in Non-Domestic Premises' AcoP. Copies of 'Work with materials containing Asbestos', ISBN 0717662063, price £13.50 and 'The Management of Asbestos in Non-Domestic Premises', ISBN 0717662098, priced £9.50, are available from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA. Tel: +44 (0)1787 881165. Fax: +44 (0)1787 313995. Priced publications are also available from good booksellers. HSE's InfoLine: 0845 3450055.
Web: www.hse.gov.uk/

DIARY OF EVENTS

JANUARY 2007

Monday 8 January 19.30 h
South East Midlands Branch
Shake, Rattle and Roll? Reducing Exposure to Whole and Part Body Vibration and Noise
Speaker: Paul Brereton, Principal Specialist Inspector (Noise and Vibration) – HSE
Venue: Tumble Inn, Cranfield University at Silsoe.
Paul will look at these subjects particularly in relation to agriculture, forestry and related industries and explain the implications of the recent Control of Vibration at Work Regulations (2005). Paul has worked on control of noise at work since 1989 and occupational exposure to vibration since 1995. He has developed means of assessing and reducing risk, drafted technical guidance for control measures, commissioned research to support development and negotiated legislation, guidance and Standards. He was particularly involved in negotiation of the EC Directive leading to the 2005 Regulation.
Contact: John Stafford – e-mail: **john.stafford@silsoe-solutions.co.uk or** tel: 01525 402229

Monday 15 January 19.30 h
Wrekin Branch
The Use of Composite Materials in Engines
The increasing use of composite materials in the manufacture and sealing of modern diesel engines.
Speaker: Maciej Bedkowski – Senior Engineer – Core Engine Technology, Perkins Engines
Venue: Lecture Theatre, Harper Adams University College, Newport, Shropshire
Contact: Graham Higginson – e-mail: **wrekin@iagre.biz** or tel: 01270 613230.

Tuesday 16 January 20.00 h
Northern Ireland Branch
Natural Gas Distribution in Northern Ireland
Speaker: Lawrence Hanna, Firmus Energy
Venue: Bannville House Hotel, Banbridge
The speaker, Lawrence Hanna, is a graduate engineer with wide experience of industrial and domestic heating installations who is currently Health, Safety and Environmental Manager with Firmus Energy.
Firmus are currently extending distribution to towns in NW Northern Ireland. In his presentation he will provide an overview of the gas distribution systems and cross-country pipeline construction as well as potential uses of natural gas in industrial/agricultural applications.

Tuesday 16 January 19.30 h
West Midlands Branch
A Vintage Tractor Evening
Speaker: Peter Love, Editor – Vintage Tractor Magazine.
Venue: Beoley Village Hall, Near Redditch,
This will be another chance to explore the types and range of vintage tractors by this nationally recognised enthusiast. Peter has a wealth of knowledge in this specialist area and this will be a joint event with the North Worcestershire Vintage Tractor and Engine Club.
Worcestershire.
Contact if you wish to attend:
westmids@iagre.biz or **michaelcsheldon@yahoo.com**

Wednesday 17 January 19.30 h
Yorkshire Branch
John Deere's Latest Tractor Transmissions
Speaker: Alan Cochran, John Deere Ltd
Venue: Buckles Inn, Askham Richard, York
Contact: Gordon Williamson at **gordon.williamson@ntlworld.com**

Wednesday 24 January 19.00 h
Western Branch
Open your Mind – Using High Strength Steels to Save Costs
Speaker: David Want, SSAB Swedish Steel
Venue: The Royal Agricultural College, Cirencester
This presentation will highlight case studies to show how thinner High Strength steel can be fabricated more easily and simply to produce structures with better performance and lighter weight than when using mild steel.

FEBRUARY 2007

Monday 5 February 19.30 h
Wrekin Branch
The Future of UK Ag Engineering – Where are We Going?
Overview of manufacturing and trading activities and what the future holds for UK land-based engineering.
Speaker: from AEA – to be confirmed
Venue: Lecture Theatre, Reaseheath College
Contact: Graham Higginson – e-mail: **wrekin@iagre.biz** or tel: 01270 613230.

Tuesday 6 February 19.00 h
South East Midlands Branch
Branch AGM and Student Posters
Venue: Stumble Inn, Cranfield University at Silsoe.
As usual this will be an evening of short presentations on a variety of topics given by research students. These presentations will be judged by a panel drawn from Branch representatives who will deliver their decision following our AGM. A good evening to learn from the younger generation and to give them your full support. Students will be drawn from a wide range of backgrounds and probably from many corners of the world!
Contact: John Stafford –e-mail: **john.stafford@silsoe-solutions.co.uk or** tel: 01525 402229 or

Tuesday 13 February 20.00 h
Northern Ireland Branch
The Future of Forage Crop Harvesting
Speaker: from Claas Ltd
Venue: to be confirmed
A speaker from Claas will review current and future developments in mowing, forage harvesting – including both grass and biomass, and tractors. The emphasis of the evening will be on equipment for agricultural contractors who will be particularly encouraged to attend.

Tuesday 13 February 19.30 h
West Midlands Branch
Asbestos Removal Contracting – a CPD Presentation
Speaker: Steve Shutler
Venue: Friends Meeting House, Stratford upon Avon
Steve Shutler will discuss the broader aspects of asbestos related to current issues and legislation. This is a specialist area full of pitfall for the unwary and is likely to be of great value to farmers, growers, contractors, local authority staff, etc.
Contact if you wish to attend:
westmids@iagre.biz or **michaelcsheldon@yahoo.com**

Wednesday 14 February 19.30 h
Yorkshire Branch
Biodiesel Production and Use for the Farming Industry
Speaker: Steve Moody, Rix Petroleum
Venue: Buckles Inn, Askham Richard, York
Contact: Gordon Williamson at **gordon.williamson@ntlworld.com**

Thursday 22 February 19.30 h
Scottish Branch
Scottish Night
Fine Scots fare and entertainment from the Land of Burns
Venue: to be confirmed.

Wednesday 28 February 19.30 h
East Midlands Branch
Renewable Fuels – Where are We Now?
Biodiesel and Willow Power… Are we barking up the right tree?
Growing renewable energy crops – the mechanisation angle. The practical difficulties of converting biomass into electricity. Producing biodiesel from oil seeds – large scale oil processing. The argument for setting up on-farm oil processing plants.
Speaker: Fred Walters
Venue: Brooksby Melton College, Brooksby Campus
Contact: John Sartain – e-mail: **JohnCSartain@aol.com** or tel: 01636 814264

Early February
South Western Branch
The Transport of Animals
Recent and current research about animal transport and associated issues.
Venue: Bicton College, East Budleigh, Devon
Exact date, time and venue to be confirmed.
Contact if you wish to attend: Branch Secretary, Mat Payne – tel: 01278 789906 or e-mail: **mpayne@somersetdbs.co.uk** or Branch Chairman, Angus Buchanan – tel: 01803 874082 mob: 07876 564169 or e-mail: **angus.buchanan@vapormatic.com**

MARCH 2007

Monday 5 March 19.30 h
South East Midlands Branch
Engineering Solutions for dealing with Waste on Farms
Speaker: to be advised.
Venue: Stumble Inn, Cranfield University at Silsoe.
Contact: John Stafford –e-mail: **john.stafford@silsoe-solutions.co.uk** or tel: 01525 402229

Monday 12 March 18.30 h
Wrekin Branch
Branch AGM followed by Presentation on Training Operator to Prevent Point Source Pollution (TOPPS) Crop Protection Project
Research activities aimed at training sprayer operators to prevent environmental pesticide pollution.
Speaker: Simon Cooper, Researcher, HAUC
Venue: Temperton Room, Harper Adams University College, Newport, Shropshire
Contact: Graham Higginson – e-mail: **wrekin@iagre.biz** or tel: 01270 613230.

Tuesday 13 March - East Anglia Branch
Branch AGM and Technical Talk
Venue: TBC - Claas, Bury St Edmunds?
Further details to be advised.

Tuesday 13 March 20.00 h
Northern Ireland Branch
Branch AGM and Technical Talk entitled 'Crop Sprayer Developments – meeting Future Husbandry and Environmental Requirements'
Speaker: Professor Paul Miller, Director of the Sprayer Applications Unit, The Arable Group
Venue: Seagoe Hotel, Portadown
Professor Paul Miller is currently President of IAgrE and a recognised authority on sprayer technology as applied in the agricultural industry. His presentation will address developments in application technology as well as the broader issues of effective equipment use, operator competence and environmental impact.

Tuesday 13 March 19.15 h
West Midlands Branch
Branch AGM and Presentation entitled 'Ten Diggers and Four Kilometres of Pipe'
Speaker: Richard Robinson, President Elect of IAgrE, and MD of Autoguide Equipment Ltd
Venue: Friends Meeting House, Stratford upon Avon.
Contact if you wish to attend: **westmids@iagre.biz** or **michaelcsheldon@yahoo.com**

Wednesday 14 March 18.00 h
Western Branch
Branch AGM followed by Technical Presentation entitled 'Engineering Tractors for Higher Speeds'
Speaker: Ray Clay, Retired Chief Engineer of JCB Landpower Ltd
Venue: Wiltshire College - Lackham, Lacock, Chippenham, Wiltshire
This presentation details the development of high speed tractors, focusing on the JCB Fastrac. It will be of interest to students, farmers, engineers and anyone with an interest in tractors or engineering, and is an excellent opportunity to meet a great character, well known and respected in the industry.

Thursday 15 March 2007
IAgrE Young Engineers' Competition and Factory Tour of the New Holland Tractor and Engine Plant
This event is part of the IAgrE's "Raising the Profile of the Industry" campaign and is designed to raise the awareness among young engineers of the width and vibrancy of our industry. Sponsored by Autoguide Equipment.
Venue: CNH, New Holland Plant, Basildon
Contact: IAgrE Secretariat or visit the IAgrE website: **www.iagre.org**

The 2007 IAgrE Young Engineers' Competition on 15 March is just one of IAgrE's activities that form part of the 2007 National Science and Engineering Week (NSEW). Young Engineers' Vehicle Performance Competition

Wednesday 21 March
Scottish Branch
Branch AGM and Conference "*Rural Energy*"
Venue and Speakers to be confirmed

Wednesday 21 March 19.30 h
Yorkshire Branch
Branch AGM and Technical Talk entitled 'Latest Innovations in Flail Technology'
Speaker: Chris Tucker, Bomford Turner
Venue: Buckles Inn, Askham Richard, York
Contact: Gordon Williamson at **gordon.williamson@ntlworld.com**

Thursday 22 March 19.00 h
South Western Branch
Branch AGM and Technical Presentation by Kingcome Aquacare
Venue: Stowey Arms, Exminster, Devon
Kingcome Aquacare are specialists in the management of water bodies and water courses. As well as carrying out the work they also design and manufacture specialist equipment such as weed-cutting boats.
Contact if you wish to attend: Branch Secretary, Mat Payne – tel: 01278 789906 or e-mail: **mpayne@somersetdbs.co.uk** or Branch Chairman, Angus Buchanan – tel: 01803 874082 mob: 07876 564169 or e-mail: **angus.buchanan@vapormatic.com**

Thursday 29 March 19.30 h
East Midlands Branch
Branch AGM and Technical Talk entitled 'Sustainable Development'
Essential for everyone's future.
Speaker: David Roe, IEP-Environmental
Venue: University of Lincoln, Riseholme Park Campus
Contact: David Roe – e-mail: *david@IEP-Enviroment.com* or Paul Skinner – e-mail: *paul@skinner57.wanadoo.co.uk* or tel: 01205 480431

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MEMBERSHIP MATTERS

THE NEWSLETTER OF THE INSTITUTION OF AGRICULTURAL ENGINEERS

Summer technical visit for horticultural specialists

It's not very often that technical visits can offer such a wide range of interest together with the added advantage of being located at two sites in some of Britain's most scenic countryside. Pershore College and Campden and Chorleywood Food Research Association Group (CCFRA) amply satisfied both these factors, while providing an ideal opportunity for members of the Institute of Horticulture (IoH) to join the Horticultural Engineering Technical Group (HETG) together with W. Midlands and S Wales Branch members of the IAgrE for the day on 14 July 2006.

Pershore College

In welcoming us to our morning venue Dr Heather Barrett-Mold, Principal of the Pershore Group of Colleges, emphasized their commitment to training for the land based industries. This covers a wide spectrum of activities for the Colleges, ranging from amenity management to food and drink production: all of which require their own specialized courses and being located close to the Vale of Evesham, there is obvious emphasis on fruit and vegetable production together with protected cropping. Higher costs and more stringent legislation associated with managing waste disposal and water supply is putting increased pressure on many land based enterprises encouraging both waste and water recycling and Pershore has followed a strictly practical approach in developing recycling processes both for its own use and demonstration purposes.

Commercial horticulture, in particular, produces large quantities of green waste which, generally, has gone into landfill or been incinerated. Now, growers are increasingly turning to composting as a means of disposal to produce the useful byproducts of soil improvers or mulches. Windrow composting, as practiced by Pershore, needs an open site the size of which depends upon the amount of material to be handled in what is normally an ongoing process. Their 'green recycling area' is a level-graded, 2000 m^2 plot of land used for processing green waste from all activities throughout the campus; producing at least 400 m^3 of compost annually. The waste material is graded - soft or woody (chipped) – and then windrowed. It is essential to keep the material aerated while in the windrow. This is achieved by frequent use of a PTO driven compost turner (see Fig. 1) equipped with a

The compost turner in action

purpose-designed rotor maximizing aeration. Our guide, Richard Toft, pointed out that windrowing optimizes conditions while avoiding overheating – a problem encountered with bulk systems - in the composting process. It is particularly important that the end product should contain the right balance of beneficial and pathogenic micro-organisms.

Anyone working in horticulture knows that green material is only one of a number of waste products encountered in quantity on a commercial nursery. A whole range of plastics-based materials (sheeting, containers, liners, pots etc.) come up for regular disposal which, as with green waste, until recently were destined for landfill. Pershore is currently evaluating a number of commercial recycling services now available to growers. These range from a return-collection service of used plastic pots provided by the suppliers to collection services handling all types of waste plastic materials which go for recycling.

Increasing cost of water and limitations on its abstraction are forcing growers to develop water conservation systems which minimize their dependence on external supply. As Brian Meredith pointed out, Pershore's commercial nursery (Avonbank Nurseries) is no exception (Fig. 2). The nursery is currently developing its own renewable water supply system by using a combination of rain harvesting and recycling run-off water from irrigation beds and the extensive campus roadways making it significantly less dependent on increasingly expensive supply from the nearby river Avon. The combination of greenhouse roofing surface and adjacent college buildings provide a substantial rain water catchment area. All the harvested rainwater and irrigation run-off will be collected, via a reed bed, into an existing 1000 m^3 capacity reservoir located at the bottom end of the nursery site. Water will then be pumped from here into an upper reservoir, roughly of the same capacity, which also takes reed-bed cleaned river water, when required for top up. The final purification process takes place as the water is pumped on from here through a sand filter/chlorination unit en route to be held in storage tanks ready for distribution through the nursery irrigation system. It is expected that the resulting cleaner irrigation water should improve plant health and growth response which, coupled with a major reduction in water drawn from the river, will significantly reduce production costs.

Brian Meredith explains the importance in nursery-stock production of maintaining optimum conditions for root development and function while operating a water conservation programme

Some of the members of the group admiring the Royal Horticultural Society (RHS) garden at Pershore

A brief visit to the College's Food and Drink department provided a further opportunity of seeing their support for local horticulture. In the face of strong competition and seasonal oversupply local fruit growers are increasingly looking for added-value lines to increase their return on primary produce: one such line is in bottled drinks production. To promote this the Department has a processing/bottling unit producing apple juice drinks and cider for sale to the public under their own brand name. To conclude our morning at Pershore we toured the garden established as a working partnership between the College and the Royal Horticultural Society promoting good and creative horticultural practice both for members and the wider public through courses and lectures Fig. 3).

As a footnote, the Pershore Group of Colleges in their range of training programmes are fully alive to the growing need for land based industry in general and commercial horticulture in particular to achieve a much higher degree of resource sustainability. Recycling in all its forms is one key issue where British industry has considerable leeway to make up when compared with its EU counterparts – landfill is still, for the present at least, our preferred option for waste disposal. Recycling (particularly of green waste), rain harvesting and integrated pest management are three key issues of increasing importance in both commercial and amenity horticulture. Providing first-hand experience of these techniques together with the back-up from their recently opened Resource Centre is certainly preparing horticulture-destined students for meeting the commercial and technical challenges that lie ahead.

Useful Information

Pershore Group of Colleges.
Web: www.pershore.ac.uk

Pershore Campus,
Avonbank, Pershore,
Worcestershire WR10 3JP
Tel: +44 (0)1386 552443
Fax: +44 (0)1386 556528
Email: pershore@pershore.ac.uk

Holme Lacy Campus,
Holme Lacy, Hereford,
Herefordshire HR2 6LL
Tel: +44 (0)1432 870316
Fax: +44 (0)1432 870566
Email: holmelacy@pershore.ac.uk

CCFRA, Chipping Campden,
Gloucestershire GL55 6LD
Tel: +44 (0)1386 842000
Fax: +44 (0)1386 842100
Email: info@campden.co.uk
Web: www.campden.co.uk

Campden & Chorleywood Food Research Association Group

Approximately one mile out of Chipping Campden, the CCFRA's cluster of imposing buildings are hidden away in a fold typical of the Cotswold's undulating landscape and, without their helpful signposting, easily missed! In his introduction our host Bertrand Emond, Head of Membership & Training, outlined the development of CCFRA since its inception in 1919 when it was established to service the local fruit and vegetable industry, located in the Vale of Evesham and other parts of the W. Midlands. At that time the industry was faced with an increasing demand for processed produce in addition to its fresh market and it needed both technical and development support. Over the ensuing period CCFRA has progressively expanded its activity and today it would be no exaggeration in saying its service to the industry is involved in virtually every process from "field to table". Supported by approximately 1700 members (including the Department for the Environment, Food and Rural Affairs and the Horticultural Development Council – Defra and HDC), mainly in or associated with the food and drink manufacturing/processing sector, it is the largest independent organization of its kind, serving the industry worldwide.

In addition to its headquarters administration accommodation, the Chipping Campden site houses an extensive suite of laboratories, state-of-the-art food processing halls supported by product and process development facilities, and a fully equipped training centre. Their contract-supported research programme is extensive covering all aspects of hygiene, nutrition, allergens, preparation and quality: all of which provides the basic material for CCFRA project work aimed at improving product quality, safety, acceptability and shelf-life. Their food ingredient testing service which can now detect extremely low contaminant levels is meeting with a strong demand - particularly in tracing illegal dyes – is just one example. Quite obviously, not all the more specialized laboratory work can be carried out in-house and the research side of the operation at Chipping Campden has strong links with a range of organizations working in related fields. Project work is centered in their extensive food processing facilities where, in addition to food preparation in general, essential aspects of raw materials storage and produce packaging are developed. A key part the CCFRA's service to the food and drink industry is its training facility. An ongoing series of courses and seminars are available for the industry covering food and drink production technology in general, food hygiene, legislation and diet. Recognizing the importance of extending its full service within the EU, CCFRA has recently established Campden & Chorleywood Magyarorszag, in Hungary.

Covering our more specific interest, Richard Stanley, a member of CCFRA's Agricultural Department, reviewed their role in servicing the agriculture and horticulture, food and drink industries interface. He emphasized the point that farmers and growers had an overriding responsibility in maintaining a range of strict standards in their production – much of which is subject to regulatory control. The current CCFRA agricultural project programme includes field studies on pathogen survival in growing crops, managing pesticide risks and implementing organic production standards in a range of crops. A major part of their work involves interpreting and implementing EU regulations with respect to use of pesticides and contaminants in general. Advice on food chain traceability, post-harvest treatment and related consumer sensory evaluation are services offered by CCFRA; all helping primary producers to fully satisfy best practice procedures. These subjects are built into their comprehensive portfolio of training courses.

Having such a wide R&D remit demands extensive specialist facilities; a matter amply confirmed on our tour of the Chipping Campden site. Of particular interest were the well equipped food processing halls. For reasons of hygiene and possible contamination, entry into these areas was limited but visitors are able to view activities from conveniently located galleries sealed off by glass paneling. The CCFRA building complex has no shortage of connecting corridors providing continuous areas of wall space which the management has made full use of for locating display panels containing essential facts on projects, personalities, links and the like; ideal for passing on information to visitors. A number of these panels referred to collaborative work between CCFRA and other organizations. One in particular was with Silsoe Research Institute (*A Relationship between the Airborne Concentration of Particles and Organisms in Chilled Food Factories*, by Dean Burfoot of SRI and Keith Brown of CCFRA): an example of a working link producing important solutions but also a sad reminder that SRI, in spite of its major contribution to agriculture and land based industry in general, has been recently closed down.

One of the food processing halls at the Campden and Chorleywood Food Research Association premises

Our short but highly informative visit left us in no doubt as to Campden's challenging role of servicing the food and drink industry and, if their extensive list of supporting members is anything to go by, they are certainly achieving this objective. Clearly, crucial factors such as full independence of operation, an extensive range of working partners and contacts and comprehensive training facilities must certainly help to ensure ongoing support from their members in the future.

Our members wish to record their thanks to Richard Toft, Brian Meredith and David Feaver, our guides at Pershore, and Bertrand Emond and Richard Stanley at CCFRA. We are particularly indebted to Mike Sheldon who organised the whole day's event on behalf of the IAgrE and IoH.

John A C Weir
Horticultural Engineering Technical Group

A century of high performance engine testing

– an automotive engineer's observations

We were most fortunate in having Richard (Dick) Atkins of Atkins & Associates to give this presentation at a joint meeting of the IAgrE South East Midlands Branch and the IMechE Automotive Division Luton Centre on 24th October 2006. Dick has worked with practically every car manufacturer of any repute and in many different parts of the world. He started his career at Coventry Climax, a name synonymous with all things exciting in cars!

Dick had some amazing video footage made available by the family of the late W.T.F. Hassan, another name closely associated with the motor racing world and the development of high performance engines.

The presentation started with the fundamentals – if you can't measure it, you can't improve it and Dick traced the development of the dynamometer which went back as far as the 1700s. One of the earliest versions had notoriety for catching fire if the boy ladling water on the wooden blocks was not being attentive! As engines became more powerful, something more sophisticated was needed and this is when the now famous William Froude stepped in. He recognised the unreliability of little boys and submerged his dynamometer in water from the outset!

Moving on to the birth of motoring racing at Bexhill on Sea in 1901, we learned about the steam powered 'egg', a car whose styling earned it the nickname. Dick took us through the international development of racing and also acquainted us with the fact that female glamour was not always confined to the sidelines! Figure 1 clearly shows women in the mad rush for cars at the starting line, a tradition, both in terms of the rush and the ladies, that seems to have disappeared.

Fig. 1. Brooklands 1921. Racing was by no means male dominated!

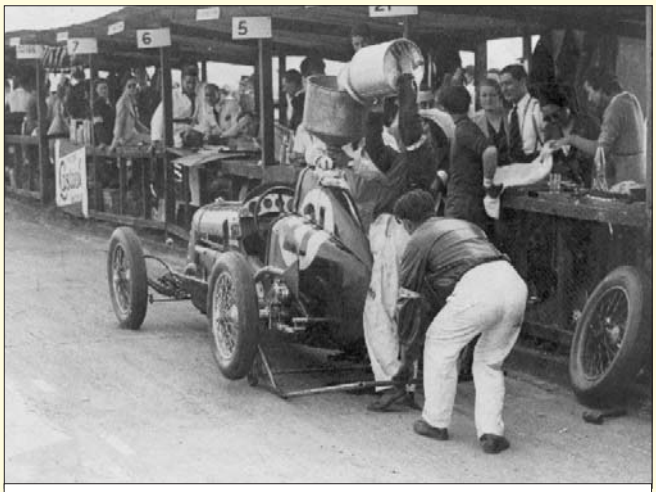

Fig. 2. A pit stop was a somewhat different affair in 1930!

We also saw just how much the pit stop had changed with time. Figure 2 shows what looks like a highly dangerous operation of refuelling next to the bustling crowd, albeit with the earliest version of the lever jack.

The video clips made available through 'Wally' Hassan's family (Wally was Dick's mentor at Coventry Climax) showed unique footage of interviews with the great man and also of racing at Brooklands in the 1930s.

Rear engine raced cars were introduced by John Cooper in the 1950s and the Cooper-Alta was raced by Stirling Moss in 1953 (Fig. 3). It was also the days of Bruce McLaren and Jack Brabham, both closely involved in the Cooper Climax FPF.

We also saw how measuring systems had improved but engine testing was still a dangerous and noisy job. Completion of an open throttle power curve required close contact with moving parts to gather speed, pressure and temperature measurements – not a job for the faint hearted! As engines developed and speeds reached unimaginable levels, a low inertia dynamometer was needed and this was when the Schenk U-series was introduced.

It was a time when traditional thinking had to change. Things as simple as ignition advance to overcome problems with flame propagation were new territory. It was also necessary to deal with oil mist, something that was insignificant at low speeds but became a high power absorber when revolutions exceeded 10,000 per minute! These were also the days when thermocouples were introduced and we saw engines on test bristling with

Fig. 3. Stirling Moss in the Cooper-Alta in 1953

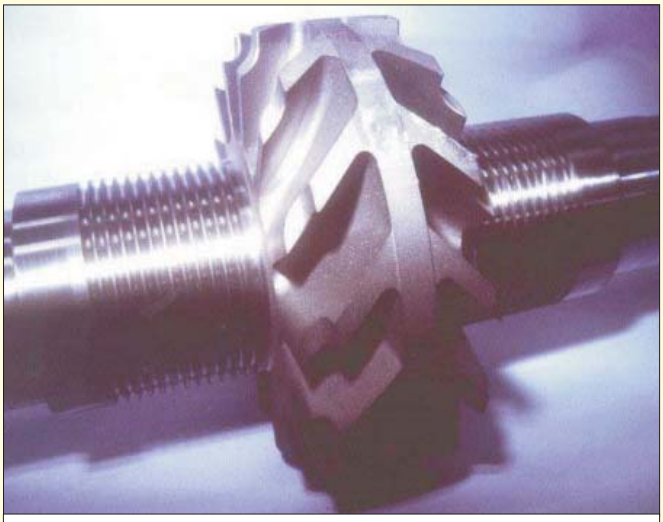

Fig. 4. The rotor of the Froude Consine dynamometer, a modified design of which is capable of absorbing 1875 kW at 24,000 rev/min

wires making maximum use of this new technology. At 20,000 rev/min, tribology also had to rise to new challenges and Dick enthused over the enormous advantage that new technology could bring to measuring techniques. These allowed real time display of measurements at an incredible sampling rate and when a 2% change in performance is a major breakthrough in engine design, instrumentation is critical. To anyone who has had anything to do with engine testing, the name of Froude is synonymous with dynamometers, and it is reassuring to note that the name is still up there with its Consine (Fig. 4), capable of measuring up to 1875 kW at a speed of 24,000 rev/min. What, Dick wondered is the inertial bursting speed of the main shaft? At these high speeds all sorts of previously insignificant factors come into play such as windage and oil migration, but human error is still in there, and is ignored at the designer's peril!

Manufacturers use engine mapping to characterise performance in terms of fuel/air ratio, spark and injection end for optimisation. Mathematical modelling, continuously variable transmissions and engine management are now all part and parcel of the continuing evolutionary process of engine design and performance improvement. Engine management can be used in a number of ways, but probably the most bizarre was demonstrated by Dick in a video clip where we saw, and most importantly heard, a V10 engine being made to play 'When the saints go marching in' as its swan song to the V8 engine replacement for the 2006 racing season. It blew up seconds after the video clip ended!

A thoroughly entertaining, interesting and informative evening and our sincere thanks go to Dick Atkins.

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South East Midlands Branch

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Membership Changes

Admissions

A warm welcome to the following new members

Member

R M Evans (West Sussex)
C K Kutty (Uganda
A R Leake (Leicestershire)

Associate Member

M Bentley (Ayrshire)
S Brayshaw (West Yorkshire)
T Collins (Lincolnshire)
R Guy (Hampshire)
A Hazledine (Nottingham)
A Leisk (Berkshire)
S Reed (Somerset)
D Robertson (Fife)
O Rumsey (Norfolk)
J Smith (Norfolk)
A Terry (Lincolnshire)

Associate

S R Dunn (Lancashire)
D A Maxwell (Middlesex)

Student

Askham Bryan College:
A K Bennett
S R Chandler
S Christoffersen
S J Crossley
M Davies
C Dodsworth
D Goggs
R Grainger
D Jackson
J Jones
W Kealey
J P T Kershaw
M Lambert
J S Lynas
J Marshall
C J Mitchell
A Morrison
B R Prescott
R J Reddish
J M Simpson
J M Standen
L R Stares
R Taylor
J Thorp
M E Waggett
M Wood
J Woolliams

Bicton College:
S Baker
B Barnes
D F Cummings
S J Down
E W Glover
J Haydon
B Jaworski
C Matthews
C Mitchell
J Moulton
J Newby
A Shapland
T Stokes
S C Turner

Harper Adams University College:
F H Adlard
W B R Ainsworth
G S V Apter
L A Bell
M T Biffen
E J Bottomley
S W J Brading
R Burns
P T Butler
W B Cadman
J Child
F Colwill
W R Cruse
A Davies
R Deighton
N I Duncan
T J Elphick
G Fairbairn
J A Fielder
J Fisher
A Helen
A M Herriott
D Job
R Johnson
T A R Johnson
D L M Jones
A J Lawman
C Lawson
H Leeming
W S Lloyd
C Luscombe
C McCorry
J R McElnea
T E J Malpass
J A W Mavin
C J Mayer
A M D Megarry
J R Meredith
P Miney
J E Moss
V L Parkin
C Potter
T Richards
G J Robinson
T E Savery
P Twomey
C A Violet
R T Wainwright-Fisher
E K Whately
B I Williamson
J K Wood

Transfers

Congratulations to members achieving a further phase of their professional development

Associate Member

A J Ellis (Cornwall)
J T Gittins (Shropshire)
T J Lomax (Cumbria)
T W Reeve (Orkney)

Engineering Council

Congratulations to the following members who have qualified as Chartered Engineer, Incorporated Engineer and Engineering Technician, entitling them to use the designatory letters CEng, IEng and Eng Tech, respectively, after their names

Registrations

CEng

T C Lansdell (Suffolk)

IEng

I J Booth (Buckinghamshire)
R T Borland (West Midlands)
P R Thomas (Gwynedd)

EngTech

R W Beer (Devon)
B Hamilton (Peebles)

Long service certificates

Name	*Grade*	*Date of Anniversary*
50 years		
Alan George **Chadborn**	IEng MIAgrE	13 Nov 2006
35 years		
Christopher John **Gaunt**	AIAgrE	28 Oct 2006
25 years		
Jonathan William **Hargreaves**	AIAgrE	4 Oct 2006
Johannes **Koster**	MIAgrE	4 Oct 2006
David Roger **Jenkins**	AMIAgrE	21 Oct 2006
Richard Mildmay **Stayner**	CEng FIAgrE	5 Nov 2006
Robert Henry **Berry**	IEng MIAgrE	12 Nov 2006
Philip John **Wright**	CEng MIAgrE	16 Nov 2006
Brian Francis **Lovell**	IEng MIAgrE	22 Nov 2006
Richard Albert **Warburton**	IEng MIAgrE	22 Nov 2006
Christopher John **Leamon**	AMIAgrE	2 Dec 2006
Peter Michael **Crowe**	AMIAgrE	2 Dec 2006
John Joseph **Healy**	AMIAgrE	2 Dec 2006
James Martin Knight **Ellis**	Eur Ing CEng MIAgrE	2 Dec 2006
Richard Michael Camm **Bennett**	AMIAgrE	2 Dec 2006
Peter Nixon **Burt**	IEng MIAgrE	2 Dec 2006
Peter David **Rowland**	CEng MIAgrE	11 Dec 2006

Wrekin Branch IAgrE kicks off new season of meetings

Chris Howell, Product Development Manager for AGCO (still Massey Ferguson to some of us) provided a first class start to the Wrekin Branch of the Institution of Agricultural Engineers' 2006/07 programme of events. This meeting, on the 2nd October, was held at Harper Adams University College.

He briefly outlined the growth of AGCO from their formation in 1990, when thy sought to realise assets from under performing companies, to the present where they employ some 13,000 staff world wide, sell 13 product brands and have a turnover of $5.5 billion. This is as large as the total UK market in agricultural equipment. Tractor sales make up 66% of their business and 70% comes from outside of the United States. They continue to grow by acquisition and maximise returns by rationalising plants and product ranges while building on brand loyalties in different markets with new and improved products.

Chris Howell has global responsibility for the development of all new products from the French factory situated in Beauvais. He continued by outlining some of the developmental tools used to facilitate rapid response to market needs. These included Virtual Reality Environments, Plug and Play Models, CUE prototypes (for early customer and user evaluation), 3D modelling and stereo lithography as well as full scale mock-ups (what you see is what you get – WYSIWYG).

Virtual reality headgear

The new MT900B Challenger articulated 4WD tractor

Major challenges have to be faced in the future primarily from EU legislation with almost impossible demands with regards to engine omissions (Tier IV) and ill defined requirements for Whole Body Vibration (WBV) reduction. Tier IV will require major increase in under bonnet space to house significantly large catalytic converters, Urea injection equipment and exhaust gas recirculation and cooling systems. At present few if any tractors, even with full suspension systems, will meet HBV requirements or be useable for a full days work without changing drivers. Solving these problems will lead to less efficient tractors at higher prices.

The need to source production from low cost countries will impact on existing European and US plants. With out this shift in production it will not be possible to compete with the increasingly sophisticated designs coming out of China and India.

Future technology based round global positioning systems (GPS) will impact on product sophistication as will new power transmission systems such as electric drives. Biofuels, though not economically viable, will become part of the equation when designing new power and transmission systems due to social and legislative pressures. Whether these fuels and Tier IV are compatible is open to question.

The talk was concluded with a look at four 225+ kW tractors including the Challenger Articulated machine rated at 425+ kW and the Fendt 260 kW high specification unit. The problem with these high powered tractors is getting the power onto the ground because of limitations in current tyre technology. The use of diesel electric drives is under investigation but on going problems with heat dissipation and speed range limitations need to be overcome.

The evening ended with a lively question and answer session. Mr Howell responded to a question on his career path by describing his start as a mechanic in a small Welsh dealership and how he moved to his current position by hard work, a willingness to take opportunities when offered and his knowledge of the product and the customer's needs gained by practical experience. This was a meeting well worth attending.

Geoffrey F D Wakeham
Wrekin Branch

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DEVELOPMENT IMPACT

Guidelines for Ecological Impact Assessment in the UK

These much needed Guidelines, relating to terrestrial, freshwater and coastal environments to mean low water mark, provide a recommended procedure for the ecological component of Environmental Impact Assessment. The Guidelines set new standards for the assessment of the ecological impact of project and plans, so as to improve the consideration of the needs of biodiversity and thereby reduce impacts of any development. They can also be used, for example, to provide environmental information to accompany an application for a consent, to guide a development brief or to inform a management plan.

The guidelines aim to:

- promote a scientifically rigorous and transparent approach to Ecological Impact Assessment (EcIA);
- provide a common framework to EcIA in order to promote better communication and closer cooperation between ecologists involved in EcIA; and
- provide decision makers with relevant information about the ecological impacts associated with a project, positive and negative.

Their purpose is:

- ensuring structured ecological input at all stages of project design and implementation;
- obtaining best possible outcomes for biodiversity resulting from changes in land use and developments;
- improving the effectiveness of current EcIA practice on five key fronts through:
  - identifying and evaluating ecological features;
  - characterising and quantifying impacts and assessing their significance;
  - minimising negative impacts and maximising positive outcomes through the project design process;
  - identifying legal and policy implications and their consequences for decision making; and
  - identifying the role of stakeholders in achieving maximum benefits for biodiversity.

The guidelines are intended for ecologists, developers, planners, local and national planning authorities, environmental managers, statutory organisations, non-governmental organisations (NGOs) or for local groups.

MORE INFORMATION

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Biosystems Engineering

The contents of the latest three months of published research (&, second author; et al., other authors)

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Brian D Witney
Editor

FOREST MANAGEMENT

Getting the best out of brash

Brash is useful stuff. And managing the 'brash' generated by forestry harvesting operations is the subject of a new Practice Note published by the Forestry Commission.

Brash comprises the branches and tops of trees, and small, dead trees that are not suitable for conventional timber processing: in other words, the tree material that isn't usually removed from harvesting sites and sold. It can help to replenish the nutrients in forest soils while it rots down after harvesting; it can provide a habitat for insects and other woodland wildlife; it can provide a safe 'mat' for heavy forestry machinery to operate on at the same time as protecting forest soils from compaction by the machines; and it can be used in the developing wood-fuel industry.

Entitled *'Managing Brash on Conifer Clearfell Sites'*, the Practice Note was written by Andy Moffat, Bill M Jones and Bill Mason of Forest Research. It provides guidance on the range of available options for brash management, and the possible consequences of each option.

"Brash management is … rarely considered in standard forestry texts," the Note reports. "Yet brash is an important component of the forest ecosystem, and its appropriate management can make a substantial difference to the sustainability of the site, the economics of harvesting and restocking, and the subsequent performance of the restock crop.

"In addition, brash management is now not only just of interest to foresters, but also to those involved in environmental protection and wood fuel energy generation."

It sets out the policy and regulatory context for brash management, the properties of brash, and the principles for management during and after harvesting. It points out that some of the principles covered in the Note will be relevant to thinning operations, broadleaf harvesting and continuous-cover sites, although the amounts of brash available are much lower there than that from conifer clearfell sites.

MORE INFORMATION

Forestry Commission Publications, PO Box 25, Wetherby, West Yorkshire, LS23 7EW. Tel: +44 (0)870 121 4180. Fax: +44 (0)870 121 4181. E-mail: forestry@twoten.press.net Quote stock number FCPN013. The Note can be downloaded free from the Forestry Commission's website at www.forestry.gov.uk/publications Free paper copies are available on request.

HORTICULTURE

Recycled paper and compost could help to control plant disease

New research by the University of Warwick should have gardeners and commercial growers competing for both recycled paper and organic waste composts. The University's plant research department, Warwick HRI, is finding that recycled paper based composts are proving to be a major weapon in the fight against a range of plant diseases.

A University of Warwick research team under Professor Ralph Noble has recently shown that the use of composts can reduce the incidence of some important plant diseases by as much as 72%. That research, funded by the UK government's Waste and Resource Action Programme (WRAP), found that the replacement of around 20% of the volume of soil or peat by compost gave major disease control benefits.

Professor Ralph Noble's latest research appears to add another ecological benefit. Early results from trials with conifers using compost made from paper waste shows that it is providing much the same disease suppressing effect as green compost made from plant waste. This provides an obvious additional commercial use for the vast amount of paper waste generated by offices and homes.

Professor Noble said: "During paper recycling production a large proportion of the fibres cannot be recycled. The useable fibres are taken out to make new newsprint, and the small fibres are no longer usable, they're a waste by-product. In Britain, about half a million tonnes of these small, unusable fibres are produced each year. They have a potential use in growing media because they hold a lot of water, just like peat and, being a waste product, they have no other value. Obviously materials that are going to replace peat have to be very cheap or waste by-products. So, paper wastes fit this bill in terms of being cheap and they also hold a lot of water, which is what you need for plant growth".

The suppression of plant diseases was particularly noticeable when the green and recycled paper composts were added to peat. Peat is used by many growers as it provides a clean and uniform material that is suitable for plant growth – but its very cleanliness makes the plants growing in it susceptible to quickly spreading plant diseases. In contrast compost contains a diversity of microbes that can suppress plant diseases. The ecological benefits of this are obvious: less fungicide has to be applied to plants, less peat is required thus preserving peat bogs, and green waste and paper waste that would otherwise be land-filled is recycled.

Professor Ralph Noble says: "This research shows that the use of such compost could provide clear commercial benefits to growers and ecological benefits for us all. There should be no additional costs involved but we must still test the reliability of using composts for a wide range of commercial crops. Those growers who do change from using 100% peat could literally reap significant rewards."

CONTACT

Professor Ralph Noble, Warwick HRI, University of Warwick. Tel: +44 (0)24 765 75053. E-mail: ralph.noble@warwick.ac.uk

Farm Radio – keeping the farming community informed

Farm Radio is an internet radio station aimed at people interested in farming and the countryside. It is proving a great success, clocking up nearly one million hits on its web site in the past year.

The station, launched in Dorset in November 2003, aims to create stronger links between rural communities. Professional farming journalists and volunteers from farming backgrounds, make the programmes which cover up-to-the-minute farming issues. Each month a new edition of Farm Radio is available to listen to online and all previous programmes remain on the site.

Farm Radio is funded by the EU LEADER+ scheme, the South West Foundation and the Sustainable Development Fund. LEADER+ is a European Union programme, managed in England by the Department for the Environment, Food and Rural Affairs (Defra), to help rural communities improve their economic prosperity and quality of life.

The project is the brainchild of Trevor Bailey and John Holman, of Dorset's rural media charity, Trilith, which has existed for 22 years. The idea arose after John and Trevor heard from farming families that the closure of virtually all of Dorset's livestock markets had led to the loss of business and social contact. Trevor said: "We wanted to find a way of helping farming families keep in touch with developments and other people's experiences in agriculture."

The station is now building on its success with a partnership with two Irish community-run radio stations, Raidio Corca Baiscinn, Co. Clare and West Limerick Radio, Newcastle West.

Through the partnership the stations will visit each other to find out more about their work and share ideas on how to reach their rural communities. Each station will also broadcast programmes made by their counterparts, to give people in their community an insight into rural issues in a different country.

MORE INFORMATION

For more information on Farm Radio, contact Trevor Bailey on +44 (0)1747 840750 or John Holman on +44 (0)1747 840727. Farm Radio can be found at: www.farmradio.org.uk

Drive for commuters to stay home

The RAC Foundation is the latest organisation to back Work Wise UK. Supported by Government, business and the unions, the five-year initiative aims to encourage the widespread adoption of smarter working practices, such as flexible working, mobile working, remote working and working from home.

The RAC Foundation is supporting the campaign as it believes any change in working patterns which reduces the need to travel, or staggers the time when travel occurs, will have an effect in reducing congestion on the country's already over-congested roads. It predicts that smarter working could cut commuter traffic by up to 10 per cent within five years. Edmund King, executive director, said: "Even if people only worked from home one day a week, the impact would be significant: just look at what happens during the school holidays.

"Road congestion costs the UK economy some £20 billion per year. If there is a reasonable take-up of smarter working, we predict that £1.9 billion per year will be saved within five years."

Phil Flaxton, chief executive of the IT Forum Foundation, the not-for-profit industry organisation behind Work Wise UK, said: "One of the key benefits of most smarter working practices is less or more flexible travel requirements.

"Reducing congestion and overcrowding on public transport has a double benefit: not only do those people not travelling benefit, the experience for those that have to travel is far more tolerable.

"The UK has one of the longest average working weeks in Europe. Travel is an important element," said Brendan Barber, general secretary of the Trades Union Congress (TUC). "The working week figures do not take into account travel time, which in some areas of the country is very significant. Simply reducing that element, or enabling the staggering of the rush hour, will have a fundamental impact on people's lives both in terms of time and stress."

Phil Flaxton continued: "British workers spend by far the longest time travelling in Europe – as much as 47 working days per year (Samsung research 2004), with commuters in the South East facing an average of eight hours per week – a whole extra working day! Simply by working two days a week from home, workers would save 19 working days per year."

MORE INFORMATION

Further information about Work Wise UK can be found on the website. Web: www.workwiseuk.org

PUBLICATION REVIEWS

RURAL DEVELOPMENT

Traditional farm buildings conversion guidelines

Detailed guidance on how to achieve high quality farm building conversions has been published by English Heritage amid concerns that unsympathetic or insensitive conversions are fast eroding the character of England's countryside. The guidance contains detailed sections on how to deal with key design issues such as day-lighting, subdivision of space, retention of features, treatment of the setting as well as the incorporation of services and insulation. A tool kit is also included to help guide and inform decisions when conversion is being considered.

Simon Thurley, Chief Executive of English Heritage, said "Traditional farmsteads are as central to our vision of the English countryside as trees and hedges. Their use of local materials and their distinctive building styles makes them fundamental to sense of place and diversity in the landscape. But widespread changes in farming practices mean that many of these structures will need to find new uses if they are to survive into the next century.

"Converting them into work places or homes is a good way of ensuring their survival. It is recycling on a grand scale and avoids the expenditure of energy and materials required for new building. If it is done well, the result will always be more in keeping with local character than a new mass-produced building."

In England, a third of listed farm buildings have been converted, with 90% of these converted to residential use. This is largely a reflection of the increasing number of city dwellers moving to the countryside attracted by the high quality environment and way of life, and tight controls on new developments in the countryside.

Stephen Trow, Head of Rural and Environmental Policy at English Heritage said: "The pressure for finding new uses for historic farm buildings is not going to go away and a pragmatic approach is required to manage the process of change effectively.

"We need to identify which buildings are best suited to conservation and which to conversion, taking account of their historic significance and landscape sensitivity. Our policies and guidance will help individuals and local authorities make better, more informed, decisions about the future use of the farm building stock and promote high standards in design and implementation."

David Pickles, Senior English Heritage Architect said: "The conversion of buildings should always be carried out with respect for the original structure and features, and an understanding for their setting. Thoughtfulness, insistence on quality and expert help are needed in large doses to bring good results, but the joy of working or living in a well conserved, characterful historic farm building is immense, and the potential for the property to hold its value is also higher." Some of the recommendations in the guide include:

- respect the open character of many farm building interiors and minimise sub-division of spaces;
- maximise the use of existing openings in their original form where these contribute to the building's character and minimise the formation of new ones;
- retain distinctive features such as ventilation holes or slits, owl holes, date stones;
- retain and repair existing joinery where possible – avoid using 'off the peg' joinery as their standard 'domestic' proportions are almost never suitable for traditional farm buildings;
- keep the long unbroken roof profile that characterises many farm buildings;
- roof structures should not be drastically altered to create extra headroom, nor should rooflights be added without careful consideration – adding a number of rooflights can seriously undermine the original simplicity of form so fundamental to these buildings;
- retain outbuildings such as cart-sheds for ancillary uses such as storage and space for vehicles; and
- external paint colours need to be carefully chosen – garish colours and white should be avoided in preference to colours such as dark grey/red, grey green or colours that match existing stonework.

MORE INFORMATION

'The Conversion of Traditional Farm Buildings: A guide to good practice' is downloadable from the Historic Environment Local Management website or available for free in hard copy from English Heritage Customer Services. Tel: +44 (0)870 333 1181. Web: www.helm.org.uk/ruraldevelopment

Publication of the guidance follows the recent publication of 'Living Buildings in a Living Landscape: Finding a Future for Traditional Farm Buildings', a policy document jointly issued by English Heritage and the Countryside Agency in July which explores how best to secure their future. Copies of this are also available online or as hard copies.

FOREST MANAGEMENT

New guide to forest fencing

Forest managers have traditionally used fences as one option to protect young trees from damage by herbivorous wild animals such as deer and rabbits. However, it is an expensive control measure, particularly in remote areas or where access is difficult. It can also be contentious, drawing opposition from groups such as environmental organisations, ramblers, hill walkers and local communities.

It is therefore vital that the appropriate type of fence is designed, located and erected to high specifications, and then maintained properly to ensure that it fulfils its role cost-effectively and with minimal environmental and landscape impact until it has finished its job and can be removed.

The Forestry Commission has therefore published a new guide that updates its existing advice on forest fencing. It takes into account recent developments such as new fencing materials on the market, temporary and electric fencing, marking fences to reduce deaths of woodland birds from collisions, and the use of machinery

Entitled *'Technical Guide: Forest Fencing'*, it was written by Roger Trout of Forest Research, and Harry Pepper, and replaces Forestry Commission Bulletin 102: Forest Fencing, first published in 1992.

It recommends best-practice principles for managers as a guide to planning, assessment and mitigation of adverse factors, and choosing the fence design appropriate for the target species. It also indicates the key practical steps in construction. It helps in identifying the normal specifications of components required to accommodate typical situations and when taking account of special local circumstances.

It presumes that those involved are already reasonably familiar with the techniques of installing agricultural stock fences, but outlines the factors involved in working with spring-steel line wires, hexagonal mesh and high-tensile netting products, which together create the recommended generic fencing options against rabbits and deer. Sections on choosing the correct specification for the species concerned, and adjustments to specifications in special situations, are provided, together with information on tools, safety aspects and maintenance, including the need to remove fencing when it is no longer required.

MORE INFORMATION

'Technical Guide: Forest Fencing (FCTG002)' priced £7.50, can be ordered from Forestry Commission Publications, PO Box 25, Wetherby, West Yorkshire, LS23 7EW. Tel: +44 (0)870 121 4180. It can also be downloaded free from www.forestry.gov.uk/publications The guide is an A4-sized, 50-page booklet with full colour illustrations.

WOODLAND DESIGN

The wonders of shelter woods explained

Farmers have known for centuries about the benefits of using trees to provide shelter for livestock, crops and buildings. Now forestry scientists have analysed the ways in which shelter woods work to reduce the undesirable effects of wind, and explained the principles in a new Information Note published by the Forestry Commission and entitled '*The Principles of Using Woods for Shelter*'. The authors are Barry Gardiner and Max Hislop from Forest Research, the Commission's scientific research agency, and Harriet Palmer, formerly from the Scottish Agriculture College.

The Note explains how wind behaves when it encounters woods of different heights, lengths, widths and densities, and is illustrated by easily understood drawings. This means that land managers can use the information in it to design woods to meet their shelter needs and maximise the benefits.

Among the findings of the research reported in the Note are:

- porosity (the degree to which wind can pass through the shelter wood) is the most important factor that influences a wood's shelter effect – less porous shelter woods provide greater reduction in wind speed and a small leeward sheltered area which is ideal for lambing, calving and stock feeding;
- shelter woods of differing width but with similar porosity are equally effective;
- height and length affects the total leeward shelter – the taller and longer the shelter wood, the larger the area of shelter; and
- shelter woods with a straight-sided profile are more effective than those with tapered profiles.

MORE INFORMATION

The Principles of Using Woods for Shelter' can be downloaded in PDF format from www.forestry.gov.uk/publications. Free paper copies can be ordered from Forestry Commission Publications, PO Box 25, Wetherby, West Yorkshire, LS23 7EW. Tel: +44 (0)870 121 4180. Fax: +44 (0)870 121 4181. E-mail: forestry@twoten.press.net. Quote stock code FCIN081.

DEVELOPMENTS IN SPORTSTURF

DRAINAGE MACHINERY AND TECHNIQUES

David Shelton

David and Eileen Shelton receiving the EurAgEng Innovation and Development Award 2006 from Professor Aad Jongebreur, EurAgEng President. The presentation of awards at the AgEng06 International Conference took place in Bonn at the Bundeshaus, the former parliament building on the banks of the Rhine.

EurAgEng Innovation & Development Award 2006

The EurAgEng Innovation & Development Award (formerly known as Industry Innovation Award) has become a regular feature since AgEng2000. This Award is given in recognition of innovation underpinned by science, technology and practice.

Six abstracts were submitted (three from EU countries, two from India and one from USA). Three of these abstracts were then worked as complete papers for presentation at the AgEng06 conference. The evaluation Committee, comprising Prof.Ettore Gasparetto (University of Milan, Italy), Prof. Brian Witney, Editor of Biosystems Engineering and Prof. Aad Jongebreur judged the submitted papers.

The **Runners up**:

'Modification in the building method of greenhouses to reduce the labour risks and assembly costs', with first author Angel Carreno Ortega (Unversity of Almeria, Spain) *et al.*

'Development of an autonomous device for mixing and transporting of biomass in a solar dryer based on a systematic design method (VDI 2221)', with first author Nikica Starcevic (University of Hohenheim, Germany) *et al.*

Winner of the EurAgEng I&D Award 2006 is **David Shelton** of Shelton Sportsturf Drainage Solutions, UK, with his paper on: 'Developments in sportsturf drainage machinery and techniques'. Mr Shelton and his wife were presented with a certificate and a prize of 500.

Sportsmen and sportswomen the world over enjoy playing on high quality sportsturf. In areas of excessive rainfall this usually means a well designed drainage system is required to enable play to continue in all but the most extreme conditions.

Almost all soils drain naturally but in the majority of cases the speed of natural drainage is insufficient to meet today's sporting requirements. Hence matches have to be postponed or cancelled, facilities are closed and revenue is lost. The sward suffers, too.

At the construction stage it is usual nowadays to incorporate a land drainage system. This may suffice but in many cases additional drainage requirements come to light within three or four years. On the other hand, there are countless established games areas with little or no drainage. This article concentrates on techniques to improve the drainage of such areas.

Modern drainage systems frequently consist of three components:

- piped drainage spaced 5, 7 or 10 m apart backfilled almost to the surface with free-draining medium (The Primary System);
- a network of 50 mm or 25 mm wide drainage slits, or 25 mm wide drainage bands, closely spaced and running at 90° to the above to carry excess soil water

System 25 working on golf green

speedily to the pipes below (The Secondary System); and

- the incorporation of a free draining sand into the top 75 - 100 mm of the soil or sward.

Optimum results are achieved by carrying out all three steps. On most sites it is possible to design a system to remove 25 mm of precipitation in one hour.

So why are not more established pitches, golf courses and grassed amenity areas drained using these techniques? Upheaval caused by the installation of land drainage systems can be severe. The use of heavy machinery may damage the surface to such an extent it has to be cultivated and resown. The facility may be out of use for weeks or months, sometimes in excess of a year.

Cost is a major factor too. When the facility is closed, revenue is lost. Furthermore, undertaking drainage schemes with general purpose equipment leads to drainage pipes being installed in trenches often 200 - 400 mm wide. Loads of soil have to be carted off and large quantities of permeable fill – usually gravel – have to be brought in to replace this.

The drainage of established golf greens presents a real challenge. Such is the magnitude of the task that most golf clubs finish up totally remaking the greens to the United States Golf Association (USGA) specification. This no longer is necessary, as the Shelton company has devised three systems which can be installed at a fraction of the cost of building new.

For over twenty years the Shelton business has concentrated on the design and manufacture of specialist equipment for draining sports fields. From the outset the Company had two main aims:

- to reduce the upheaval caused by machinery installing the primary and secondary drainage systems; and
- to reduce the cost of installation by developing systems of sportsturf drainage that were both efficient and effective, with the speed of installation of paramount importance.

Today we believe we have by far the biggest sportsturf drainage research and development (R&D) programme of any company or organisation anywhere. This R&D aims to keep the business in the forefront of sportsturf drainage and associated manufacturing techniques.

The designer of the drainage system will calculate the sizes of pipe required for the mains and laterals. Now that lasers are widely used to ensure pipes are laid to an even fall the flag layout (Fig. 1a) is usually used instead of the herringbone layout (Fig. 1b). The flag layout entails fewer junctions and longer working runs hence there are significant cost savings and also with the main drain sited off the main playing area soil disturbance is minimised.

Shelton Supertrenchers are dedicated sportsturf drainage machines. They are mounted on the tractor's three-point linkage. All the models in the range are built mainly of stainless steel for enhanced soil flow in what is basically an enclosed machine. A high-speed wheel, power take off (pto) shaft drive, is fitted with tungsten carbide tipped cutters. The soil arisings are fed on to a hydraulically driven conveyor that carries them into a trailer or dump truck running alongside. They leave an exceptionally clean surface finish on quality turf.

The high speed of the cutting wheel may be likened to a circular saw. The trench it digs is matched to the size of the drainage pipe; a 60 mm diameter pipe requires a 78 mm wide trench, and a 100 mm diameter pipe requires a 120 mm wide trench. Digging precision of this type saves on

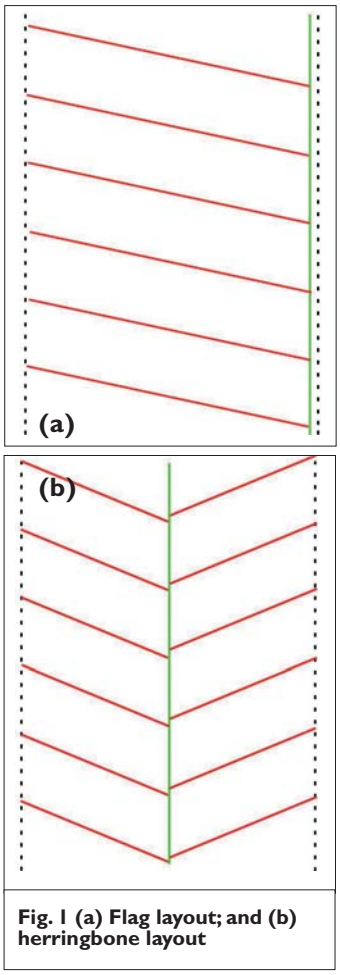

Fig. 1 (a) Flag layout; and (b) herringbone layout

Single leg gravel band drainer working on golf green after hollow coring

"Now we can say with confidence that with Shelton equipment you can drain today and play tomorrow."

Supertrencher laying pipe on a golf fairway; a 4-wheels in line dump trailer removes soil from the conveyor ring

backfill materials and is achieved except where big stones are encountered.

Sportsturf drainage entails working to different criteria than agricultural drainage, a point that cannot be stressed enough!

On grassed sports areas, the aim must be to keep the top 450 – 500 mm well drained. This can be achieved by installing the lateral drainage pipes at an average depth of 500 – 600 mm relatively closely spaced.

In the majority of situations the piped system on its own will not drain the ground sufficiently quickly to allow use of the facility after heavy rain. A secondary system needs to be installed over it to lead excess soil water speedily to the pipes. 50 mm wide slit drainage trenches dug at one to two metre spacings, and usually 250 - 300 mm deep, have been widely used. The same trenching machine that is used to install the pipes can dig them. These trenches are similarly backfilled with small gravel and topped with a free draining sand.

There is a major drawback with these in that they tend to open up in dry weather necessitating topping up once, twice or even three times. On each occasion, there is added cost and a longer recovery period.

Nowadays, there are alternative systems of secondary drainage which we have developed to overcome this major problem. The Shelton Gravel Band Drainer installs bands of gravel, usually 25 mm wide, to a maximum depth of 350 mm. It is a trenchless system in that the soil is not excavated. It requires only one operator – the tractor driver – and band centres of 400 – 600 mm are usually advised. It is low cost but highly effective. It needs to be undertaken when the soil is moist.

Shelton 6-tonne Fastflow gravel and sand hopper placing gravel in trench.

The Shelton System 25™ is a tractor mounted trenching machine with coupled backfilling hopper. It digs a 25 mm wide trench elevating the excavated soil into a trailer. Simultaneously the trench is backfilled by the vibrating hopper making it a one-pass operation which is exceptionally neat.

Better drainage of established golf greens built before the advent of the USGA specification has become a necessity, now that golfers tend to play all year round. However, this is fine delicate turf and even surfaces and neither must be damaged.

To remake a green to USGA specification may cost in excess of £20,000. Few golf clubs have sufficient funds to drain several greens at this rate of expenditure. Furthermore the working site is out of use for a matter of weeks.

The challenge the Company were faced with was to come up with low cost systems that could achieve the same results in speed of drainage as that of USGA greens. Three systems were devised:

- installing 20 – 25 mm wide gravel bands with the Shelton Gravel Band Drainer at 400 mm centres leading to a piped drain just off the green;
- digging 25 mm wide trenches about 300 mm deep with 400 mm spacings using the Shelton System 25™ machine, these micro trenches being backfilled with gravel to within 30 – 40 mm of the surface and then topped with a free-draining sand or a sand based compost; and
- digging 30 mm wide trenches, as with system 2, and installing 25 mm diameter land drainage pipe prior to backfilling.

Cost wise, if gravel bands cost x, then microtrenching costs 2x and installing 25 mm pipes costs 3x. If several average size greens are being drained at the same time then the value of x may be £600 - £1000 per green.

Those who manage sports complexes are concerned about the length of time they may be unable to use the facility arising from drainage activities. This is especially so with golf courses often in use the year round. The accompanying pictures show surface disturbance is minimal. On some prestige venues, the piped drainage runs are turfed with matching turf immediately following installation. On other sites a turf lifter is used to remove a strip of turf, the land drainage pipes are installed, and the turf replaced. We find, in the growing season, that the 25 mm wide gravel bands and micro trenches usually grow over in a matter of a week or two.

The Shelton business has developed sportsturf drainage systems that are in use in many parts of the world. We have developed also a range of dedicated equipment to enable these systems to range of dedicated equipment to enable these systems to be installed speedily and with minimal surface disturbance. We hope by so doing to make sportsturf drainage affordable to the majority.

BIO NOTE

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PEST CONTROL

Keep check on slugs with trapping

If you're not slug trapping this autumn, you're missing out on a valuable slug control tool.

That's the message from HL Hutchinson's Dick Neale. "Crop establishment is the most crucial time to set and check slug traps if you have any history with the pests," he says.

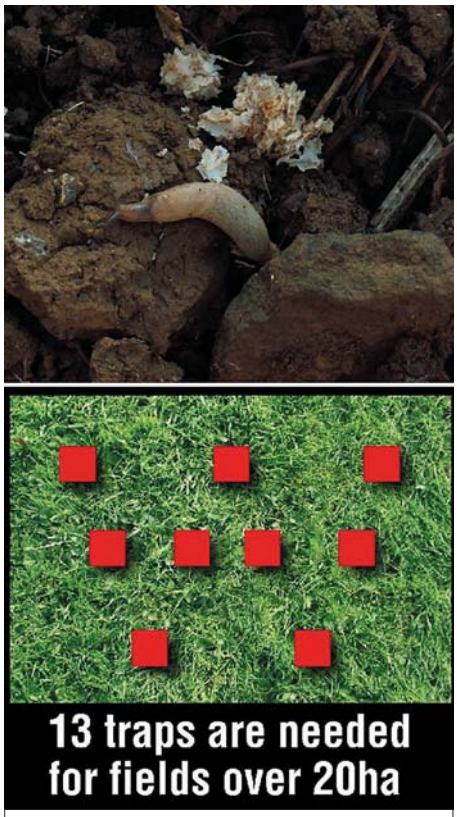
"Slugs do their worst early on, so it's vital to keep an eye on numbers using trapping, and get pellets down where numbers look as though they're getting out of control.

"Distribute the traps at regular intervals. Recent research, by the Home-Grown Cereals Authority (HGCA), suggests laying out the traps in a large 'W' formation across the field, with nine traps per field, or 13 if the field's more than 20 ha in size."

Traps should be between 30 and 40 cm^2 and preferably made from a reflective matting that won't warm in the sun. "If it's warm slugs will retreat so you won't get a true count," explains Mr Neale. "Use a bait of layers' mash – just one or two teaspoons under each trap should be enough.

"Check the traps early in the morning. A catch of four or more slugs indicates a possible risk, and a potential need to apply pellets, particularly when soil and weather conditions might increase slug activity."

The choice of pellet is also very important. "Always think quality, says Dick Neale of HL Hutchinson. "We've recently tested seven types of metaldehyde pellet and found that the higher the quality, the better the spreading and longevity of the pellets."



Slugs on the move (top); indication of trap placement to maximise field coverage (bottom)

Luxan's Delicia Slug-Lentils was one of the products trialled by HL Hutchinson. "We found that the slug lentils [metaldehyde] lasted extremely well in the field and spread very easily, with the 3 kg/ha application a particularly attractive point," says Mr Neale.

Peter Boyne, Technical Manager at Luxan explains: "Better quality pellets are denser, which helps with both spreadability and longevity. They also have a more even distribution of active ingredient.

"Recent research has shown how important the shape of the pellet is. This is why the Delicia Slug Lentils were developed as a round, flat, lentil-shape . It gives the pellets a frisbee style action, getting a far more even distribution than had been achieved previously."

CONTACT

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HEADLAND MANOEUVRES

New Holland TS-A 'Turns Heads'

New Holland demonstrated its 'Headland Turn Sequencing' at the World Ploughing Championships with a TS135A Ultra, enabling customers to see the benefits of this system in practice. HTS enables the operator to manage up to five of the electro-hydraulic remote valves and disengage the pto when the rear linkage is raised, as well as automate gear changes, engine speed and rear linkage movement. Once set, tedious and time-consuming headland turns can be performed quickly and effortlessly.

New Holland's continued presence at the World Ploughing Championship sets the trend for others to follow and the brand will show a full line of tractors complemented by selected models from their harvester range.

New Holland prides itself on offering agricultural machinery for every specialisation and, with the support of CNH Capital, can meet the needs of every customer.

"The Irish market continues to offer great opportunities for New Holland and with the support of our dealers we have continued to grow our market share in new areas such as combines and round balers. With the heritage of the blue brand and the strength of the New Holland name we are showing our commitment for the future," says Ian Roberts, New Holland Country Manager.

CONTACT

John Hewett, New Holland, Tel: +44 (0)1268 292183 E-mail:john.hewett@cnh.com Website: www.newholland.com

COMBINE HARVESTER

BISO Crop Ranger *Plus* header launched

Introducing the Plus model of Biso's Crop Ranger Header, designed to fit John Deere, Case and New Holland combine harvesters

Following extensive testing during harvests of 2005 and 2006, Biso, in conjunction with its UK importer Abrey & Son, is introducing the Plus model of the company's Crop Ranger Header, which is designed to be fitted to Case, New Holland and John Deere combine harvesters.

Incorporating all the proven features of the Crop Ranger Header – features which include integrated hydraulic reel drive, stainless steel auger and moving knife sandwich – the new Plus version has three significant additional features:

- flexible cutter-bar to allow contour following across the width of the header;
- hydraulic adjustment of header angle; and
- side knives permanently installed that can be raised and lowered hydraulically.

Flexible cutter-bar

Harvesting crops with wide headers on land which is not particularly level can result in areas of the crop remaining uncut due to an inability of the bed to accurately follow ground contours.

This is particularly true for cereals that may have become lodged or crops such as peas where it is necessary to have the cutter bed running almost at ground level to ensure the crop is properly harvested.

Operators will appreciate it is difficult, if not impossible, to harvest these crops with a header that is rigid across its whole width and there can be a significant loss of yield as a result – and time wasted in an attempt to overcome these problems.

The Plus can be operated in both flexible and rigid modes. To enable the knife to flex by up to 110 mm the support cylinders are relaxed. Lateral float is still controlled by skids at either end.

Hydraulic header angle

Harvesting lodged or laid crops is also made easier through being able to alter the angle of the header so that the knives can be positioned under the crop.

Equally, during the course of a season or after periods of rain the combine wheels tend to sink further into the ground. This usually means that the header angle needs to be adjusted to ensure optimum harvesting efficiency.

Some combine harvester headers have manual angle adjustment systems but the Plus has two hydraulic cylinders which allow the operator to change header angle from the within the cab.

Side knives raised and lowered hydraulically

As harvest progresses it is often necessary to change to or from crops that require vertical side knives to be used. Having to remove or fit such knives can be a time consuming task which can take valuable harvesting hours out of the day. Some operators will even be tempted not to refit the knives with the result that crop losses may be high.

On the Crop Ranger Plus, side knives are powered hydraulically from the header's hydraulic system and remain on the header as a permanent installation. They can be brought into or out of work simply by pressing a button and the operator can do it with out leaving his seat.

The side knives can also be operated in conjunction with the crop dividers so that if a crop should become wrapped around the dividers, a press of a button raises the side knives so that they can be used to cut away the wrapped material.

CONTACT

Toby Abrey at Abrey & Son Ltd, Pond House, Pamphillions Farm, Debden, Saffron Walden, Essex, CB11 3NT. Mobile: +44 (0)7850 485135.

MOWER

ISEKI SZ330 zero turn mower

Ransomes Jacobsen, a Textron company (NYSE:TXT), has introduced a new zero turn mower, the Iseki SZ330 with a choice of 1.5 or 1.85 m cutting decks.

A 24 kW, three-cylinder, liquid cooled diesel engine with easy access via a tilting, one-piece engine cover, powers the new machine. A removable screen in front of the radiator is also easily accessed for cleaning with an air hose.

A step through operator platform, fully adjustable suspension seat with arm rests, folding roll-over protective structures (ROPS) frame, inertia reel lap belt and foot operated parking brake provide operator comfort and safety.

The 36 l fuel tank, with electric fuel indicator as standard, provides plenty of operational capacity at speeds of up to 17 km/h. All the main operator controls are situated on the right-hand side and include engine ignition, hand throttle, deck lift/lower level, height of cut selector, fuel gauge, warning lights and hour meter.

Iseki SZ330 features a floating rear axle which aids the contour mapping when mowing

The Iseki SZ330 also features a floating rear axle which aids contour mapping and helps provide a comfortable ride, especially when mounting kerbs. The cutting blades rotate at 2600 rpm and are directly driven via an electro-hydraulic pto engagement to the deck drive. With no belts, tensioning mechanism or clutches to adjust, the system requires minimal maintenance. Height of cut ranges from 25 mm to 115 mm.

For blade maintenance and deck cleaning, a jack leg is conveniently stored under the front panel of the operator's platform. This enables the machine to be raised safely to an angle of 45°.

Costing £12,750 with the 1.5 m cutting deck, the SZ330 is competitively priced and is sure to appeal to landscape and professional grounds care contractors.

Ransomes Jacobsen is a subsidiary of Textron Inc, a $10 billion multi-industry company operating in 33 countries with approximately 37,000 employees in continuing operations. The company leverages its global network of aircraft, industrial and finance businesses to provide customers with innovative solutions and services. Textron is known around the world for its powerful brands such as Bell Helicopter, Cessna Aircraft, Jacobsen, Kautex, Lycoming, E-Z-GO and Greenlee, among others.

CONTACT

Website: www.textron.com

BIOFUEL

Pressing ahead with 13 megalitre+ biofuel plant

Law-Denis Engineering is in the final stages of commissioning phase 1 of an oilseed rape biofuel installation in Eastern Europe. The project incorporates 5 x 45 kW oil presses, one micron filtration system, as well as cleaning, destoning and full automation. The plant once commissioned is designed to operate 24 h/day, 365 days/year. Total daily production will be 36,000 l of filtered rapeseed oil.

Law-Denis are the UK & Ireland representatives of the German company Reinartz Maschinenfabrik GmbH & Co. who are European leaders in the design of cold presses for oil seeds such as rapeseed.

Oilseed rape biofuel installation

Reinartz were founded in 1853 and this coincides well with Law-Denis's associate company ETS Denis of Brou, France who also celebrated their 150th birthday in 2005, giving a combined 300 years of oil pressing and materials handling experience and expertise.

Adding to Law-Denis' renowned range of continuous dryers, cleaners, silos, sweep augers and turnkey services they can now offer oilseed based biofuel equipment from 10 l/h to 300 l/h and multiples thereof if greater capacities are required.

CONTACT

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TRACTOR

Deutz Agrotron K120 launched

Following hard on the heels of the launch last year of the Agrotron K 90, 100 and 110 tractors, Same Deutz-Fahr UK is now to introduce the Agrotron K 120.

The Agrotron K 120, which is available in two different specifications - the ProfiLine and standard - is powered by a Deutz 4 l, four-cylinder turbocharged electronically managed engine rated at 90 kW – a Euro II compliant engine which has been designed to combine excellent torque characteristics with low fuel consumption.

As with other models in the K Series, the 120 is equipped with an efficient yet compact cooling system which integrates the radiators for cooling the engine, oil, transmission and turbocharged air, into a neat unit that can be easily opened when cleaning is required.

A user friendly 40 km/h transmission based on the ZF 7100, offers a 24 x 8 box comprising three powershift ratios in four speeds which are then doubled up using an electronically operated splitter for field and road operation. There is also an option for a creeper box which increases the ratios to 36 x 12 and provides speeds as low as 0.25 km/h.

Deutz-Fahr introduce the Agroton K 120 standard and ProfiLine

Automatic powershift

Both the Standard and ProfiLine models benefit from an automatic powershift level adjustment system which provides a smooth transition when range shifting from field to road speeds and between gears three to four (and four to three) but the higher specification ProfiLine also has automatic powershift (APS) with speed matching.

APS enables the operator to adjust the sensitivity of the system in respect of engine loads and speed and, as a result, allows the transmission to alter the point at which the four powershift gear ratios are automatically shifted.

Control for the transmission is by a Bowden gear cable with ProfiLine positioning the gear lever in the right hand arm rest – the PowerCom S multifunction armrest which conveniently combines all important functions of the tractor – powershift ranges, hydraulic linkage, and auxiliary valves.

Its design is such that all control operations can be made without having to take one's hand from the PowerComS – saving time and creating more efficient working.

In the hydraulic department, the Agrotron K 120 is fitted with a 55 l/min pump – 83 l/min ProfiLine - working at 200 bar plus a separate 26 l/min steering pump operating at 12 bar.

There are, as standard three double acting remote valves with colour coded levers to identify the respective valve. ProfiLine models benefit from four electronically controlled auxiliary valves with flow and timing facilities.

Powerful Hydraulics

Hydraulic lift capacity for the rear linkage is rated at 6220 kg and, for the optional front linkage, 2500 kg.

A choice of four pto speed is designed to enable the tractor to be used at different engine speeds yet still produce the required pto speed. For maximum power 540 and 1000 rpm is achieved at 1950 rpm engine speed and where fuel economy is a factor, the same pto speeds can be achieved at an engine speed of just 1550 rpm.

The rear pto also features a drive cut-off system when a three point linkage mounted powered implement is raised out of work. A clever way of preventing damage to universal joints.

For the operator, Deutz has retained all the air conditioned comfort and ergonomic control layout of the cabs used by other Agrotron models.

All levers and switches are colour coded for easy recognition and are logically and clearly arranged – frequently used controls are grouped conveniently on the driver's right hand side.

All engine management information, along with data such as forward speed, pto speed and oil temperatures are displayed on the 'Infocenter' which is positioned in the centre of the dashboard.

CONTACT

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Case IH leads with Axial-Flow

Case IH is reinforcing its position the high capacity rotary combine market by concentrating purely on its own unique rotary technology. Season 2007 marks the 30th anniversary of the introduction of the brand's legendary Axial-Flow system, a system which remains the best solution for enterprises, such as the large scale arable farmers, states Case IH combine specialist Paul Freeman.

"For these businesses, the best financial solution is one that increases income and reduces cost, which is exactly what Axial-Flow achieves. By producing a high quality grain sample at no detriment to capacity, the Axial-Flow combine can generate more value from the harvested crop. Axial-Flow can also drive down the costs associated with harvest thanks to the simple efficiency of its driveline and single rotor. Low fuel consumption and low maintenance costs keep the Axial-Flow cost-effective to support and run."

Case IH is marketing the Axial-Flow on the product's key benefits:

- Simplicity - the efficient single rotor layout requires very few wearing parts to offer superb reliability.
- Versatility - optimisation for many crops types is quick due to easy concave accessibility.
- Grain capacity - Axial-Flow technology allows more crop to be separated.
- Grain quality - wide concave clearances produce a gentle rubbing action and virtually no crackage.
- Customer confidence - built on 30 years of rotary experience, Axial-Flow is trusted by customers around the world.

Axial-Flow 8010 and 7010

The AFX8010 is revised and renamed, becoming the Axial-Flow 8010 and is joined by a smaller sibling, the Axial-Flow 7010, which will be brought to the UK in limited numbers for Season 2007. Positioned between the 2388 X-Clusive and the new Axial-Flow 8010, the Axial-Flow 7010 offers customers greater choice while building on the proven Axial-Flow attributes.

A 9.0 l six-cylinder, turbocharged and intercooled Case IH diesel engine powers the 296 kW Axial-Flow 7010. A 10.3 l variant generates 341 kW for the Axial-Flow 8010. A simple power boost feature on each unit ensures that as the engine speed drops under load, the engine is capable of delivering maximum power output at 1,950 rpm, 150 rpm less than rated speed. This new optimum power boost capability gives the new Axial-Flow 7010 an additional 30 kW while the Axial-Flow 8010 benefits from an additional 38 kW.

Axial-Flow's simple design ensures reliability and quality as well as offering supreme crop versatility. The combines are fitted with a header recognition system that automatically adjusts the combine's systems and controls to operate whichever header is fitted. The new 2050 Series header, available in 6.1 m, 7.3 m and 9.1 m widths, features an adjustable cutter-bar that can be set to the ideal position for the crop being harvested. For short-straw crops the knife is positioned as close as possible to the feeding auger. For long-straw crops however, like oilseed rape, the cutter-bar can be moved up to 50 cm further forward.

The Axial-Flow's new AFS Pro 600 colour touch screen provides the entire combine's critical information in a simply accessible format system, while advanced operator aids such as Cruise-Cut auto-guidance system ensure the Axial-Flow is always performing to capacity.

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