Agriculture • Horticulture • Forestry • Environment • Amenity

LANDWARDS

Late Summer 2004

- Aquaculture
- Machinery Awards

Engineered Forest Recreation

IAgrE JOURNAL Volume 59 No.4 www.iagre.org

Royal Highland Gold Medals for Technical Innovation

To mark the 21st anniversary of NatWest's sponsorship of the New Implement Awards run by the Royal Highland and Agricultural Society of Scotland, three previous silver medal winners that have had most impact on the farming industry were presented with a special 21st Anniversary Award. The finalists were selected, by a panel of previous Royal Highland & Agricultural Society of Scotland judges, from machinery and equipment in three categories – **arable, livestock,** and **miscellaneous –** which have won a medal in the New Implement Awards, some time over the last 21 years.

ARABLE: **Reekie CleanFlow System (1994)**
Launched in 1990, system was one of the single greatest advances in potato harvester design. Prior to that time, axial flow rollers were used in static crop cleaning systems, not in harvesters. With stone and clod separation practised by most UK growers, there was prospect of using part of system in a harvester. Reekie developed the axial roller and pintle belt system to facilitate separation of clods and small stones from harvested potatoes. The CleanFlow system was largely responsible for assuring the company of rapid sales growth to more than 30% of the home harvester market in competition with six other manufacturers. Export sales were also bouyant, especially to countries where harvesting conditions were difficult. Even yet, when it is wet during harvest time, Dutch growers refer to this as "Reekie weather"! The system continues in use in an advanced form in the latest harvesters.

LIVESTOCK: **Adam Leggat's Highland Ground Drive Snack Feeder (2002)**
Probably the biggest revolution in sheep feeding in the last twelve years. Easy feeding of cobs, rolls, pellets or whole grain. Removes the need for troughs and the inherent problems of bullying, foot root contamination and foetal losses due to boxing at the troughs. Human safety is very much a priority, preventing possible knocking and trampling by over zealous sheep and cattle at feed time. Time saving during feeding, especially at hectic periods.

MISCELLANEOUS: **Grays Tubeliner (1992)**
Brainchild of North-East farmer David Anderson. Launched at Smithfield in 1986, the product soon established in the UK's mixed farming areas for silage bales and ammonia injected straw bales. Exported to Canada in the 1980s. Not prevalent now in UK due to changes in farming techniques and machinery developments. In Canada still the most popular system for bale wrapping. Manufactured under licence by three Canadian companies. Other markets Australia, New Zealand and Japan.

From left to right: John Baxter, sales director; Roy Scott, inventor and designer of the Cleanflow 2000; Ian Norcross, managing director with the NatWest 21st Anniversary Award citation for the Arable category; Jeff Sanderson, former joint owner; and Ian McIlravey, financial director.

Grays Tubeliner takes the NatWest 21st Anniversary Award for the Miscellaneous category

Adam Leggat's Highland Ground Drive Snack Feeder (2002) takes the NatWest 21st Anniversary Award for the Livestock category

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LANDWARDS

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ENGINEERED FOREST RECREATION

Paul Mudway

Background

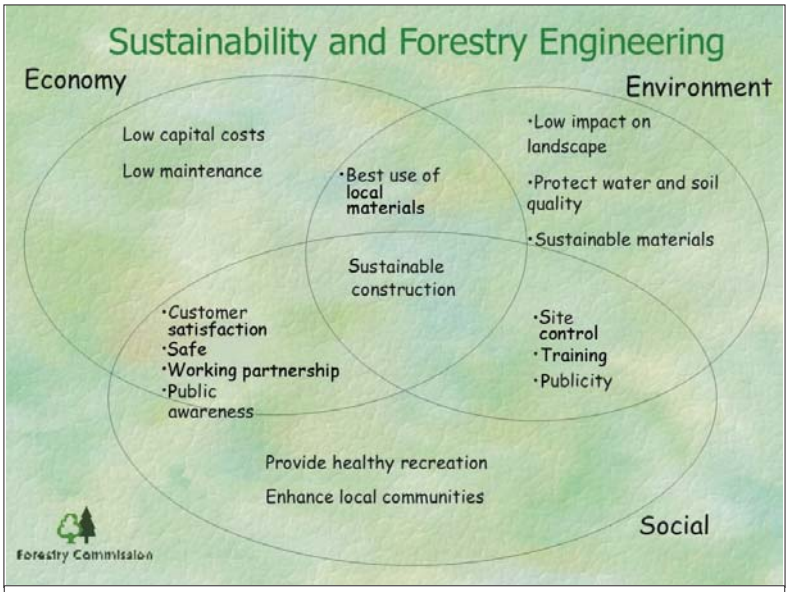
During recent years the downturn in timber prices has forced ongoing reassessment of Forestry Commission priorities. Substantially reduced income from timber sales has meant that to meet financial targets significant diversification has had to be built into business plans to make up shortfalls.

Public recreation and amenity has always played an important part in the management of the forests of Britain. Arguably, however there is an ongoing change in the way the forest estate is used for recreational purposes and an associated change in land use.

Twenty years ago the majority of recreational use of forest engineered (FE) land tended to be by regular walkers and horse - riders. with the provision of infrastructure being limited to informal car parking. In addition, honeypot sites, generally at viewpoints such as Symonds Yat Rock in the Wye Valley, continued to attract the majority of tourism based or weekend visitors. In circumstances such as this the engineering requirement would have been limited to providing fairly low specification car parking facilities and ensuring the viewpoint site was safe for public access.

The surge in popularity of mountain biking in the early '90s and the success of commercial forest based ventures such as 'Centreparcs' has signalled a sequence of events that has resulted in a change to the way people use forests for recreation. This has a resultant direct implication for the 'forest engineer'.

Primarily, as a result of those two influences and Government support for healthy, leisure based activity, recreational emphasis has evolved from relatively sedentary enjoyment. It now includes a more pro-active involved approach, where the visitor is able to enjoy an exciting, invigorating forest experience.



Sustainability; the principle of which should be at the heart of any new forestry development

The engineering challenge

With the change in recreational use of forests has come a change in user group and resultant expectation. In attracting a section of the public more used to urban facilities, a challenge has been raised for Forestry Commission engineers. This has been the challenge to strike a balance between urban expectation - in terms of health and safety provision and multi - user functionality - whilst retaining a rural aesthetic which does not impinge on the forest environment or detract from other core commitments.

In addition, the 'Greening Government' commitment has driven a need for the development of specifications which embrace the principle of sustainability, where the design and implementation of any new project should demonstrate that the three major factors are mutually supportive. There will always be potential for conflict where increased visitor numbers and consequent built infrastructure are introduced into the countryside. The balance between social need, economy and protection of the environment requires rigorous planning and consultation if is to be achieved successfully.

Funding and partnerships

Critical, in the ability to provide improved infrastructure, has

BIO NOTE

This paper was presented at the IAgrE Annual Conference entitled 'Land Use and the Environment – delivering Solutions' and held at the Royal Agricultural College, Cirencester on 13 May 2004. Paul Mudway joined the Forestry Commission in 1977 as Civil Engineering Surveyor in Forest of Dean, at a time of extensive investment in recreation projects. He remained in South West England until transferring to Wales in 1986, eventually becoming responsible for all forest road, bridge and recreation construction and maintenance in North Wales area. He left Wales to become Area Civil Engineer for lowland England in 2000 and is currently managing provision of civil engineering services to ten of the twelve Forest Districts in England. Contact: Forest Civil Engineering, Posternhill Lodge, Marlborough, Wilts SM8 4ND. Tel: +44 (0) 1672 512315 E-mail: paulmudway@forestry.gsi.gov.uk

Fixed facilities; The Radio Mast bridge at Coed Gwyn fynnyd, North Wales

Stress laminated arch bridge; Uplands 'Capital Modernisation Fund' (CMF) site, near Northwich, Cheshire

Adoption of BT 'Access for All' specifications for high quality surfacing and vertical alignment has significantly improved access to forests and the countryside, in general, for wheelchair and limited mobility users

Mountain bikers; cycle trails and family cycle trails are now a common feature in many forests

been increased facility for the establishment of partnership based projects and an understanding of how external funding can be accessed for the right scheme. Prime examples are the creation of new 'community forests' on derelict land on the peri - urban fringes of London and Manchester. This is where, with support from Local Authorities, the Forestry Commission have delivered 'forests for the people', with local communities having been integral in the consultation process which determined the land use design at each location. The 'Capital Modernisation Fund' continues to support the Community Forest Initiative with new projects now underway in conjunction with the North West Development Agency on further brownfield sites in the Liverpool/Manchester area.

Similarly, both the Bedgebury and Dalby Visitor Centre projects have progressed as a direct result of successful joined up government whereby the Forestry Commission have been able to access Heritage Lottery and Sport For All funding respectively as a direct result of close associations and support from other external parties.

Design of recreation facilities

In designing and specifying for a particular use the requirements of an individual user group must be fully understood if the engineering solution is to meet the need.

In essence there are two types of engineered visitor facility:

- access routes designed for a particular user group which can be enhanced by incorporating complimentary structures as focal points or places of interest e.g. cycle trail, all ability trails, footpaths and bridal ways with design features such as bridges and viewpoints ; and
- fixed facilities either adjacent to a visitor centre or as features to enhance routes which access the wider forest environment e.g.'play' facilities, aerial walkways and water features such as lakes and wetlands

Access route requirements and specification

Traditionally precluded from access to forests and the countryside by topography, adoption of BT 'Access for All' specifications for high quality surfacing and vertical alignment has significantly improved this situation. The Forestry Commission are currently involved in a joint Heritage Lottery Fund (HLF) bid with the Calvert Trust to provide 5 km of 'All Ability Trails' and structures at Wistlandpound Reservoir in the Exmoor Forest.

Routes need to be minimally engineered but with an acceptable surface for all. A gradient is required to generate speed however, steep gradients

can contribute to erosion problems, with stormwater run off stripping 'fines' from the running surface. A sustainable engineering solution has been achieved by constructing formation, with crossfall away from the hillside.

For family cycle trails, surfaces are usually of a high quality having a maximum gradient of 10% and a reduction in this on bends. They are generally constructed close to car parks and are of sufficient standard to allow safe use by all ages of family members. The design specification is very similar to that of a water bound forest road with the introduction of a blinding layer to improve the running.

Ramblers and walkers are often unconcerned about facilities as long as footpaths or rights of way remain unrestricted and accessible. Desire for solitary appreciation of the forest can bring conflict with other users.

Horses can severely damage poorly constructed waterbound surfaces and require increased specification bridges in terms of width and strength. Comfortable riding requires a firm, durable surface which is not constructed from sharp or angular stone.Fundamental in good forest engineering is design which integrates with or complements the landscape. In the case of access routes, the use of materials is critical. The overriding aim is to achieve a high quality running surface without resorting to bitumen bound products which can be alien both environmentally and aesthetically in the countryside.

In the same way, the perception of the general public would seem to be is that woodland or countryside structures should all be timber built. However, by using what would normally be considered materials alien to the forest in a sensitive yet designed way, the relationship between structure and surroundings can make a dramatic, architectural statement. Although timber should perhaps be the default structural preference in the forest, the use of steel offers increased design potential to the engineer and should not be dismissed without considered discussion of the options.

Fixed facilities

As with multi-user access routes the increasingly urban demographic group, recreating in Britain's forests, are demanding in their expectations of visitor centre facilities. In most cases a family of visitors is out for the day and needs a sufficiently engrossing experience from the forest to occupy that time.

The Forestry Commission of England is currently involved in the construction of two new visitor centre complexes at Bedgebury in South East England and Dalby in the North Yorkshire Moors. The centrepiece of both sites will be state of the art building designs which will integrate with and also complement the landscape.

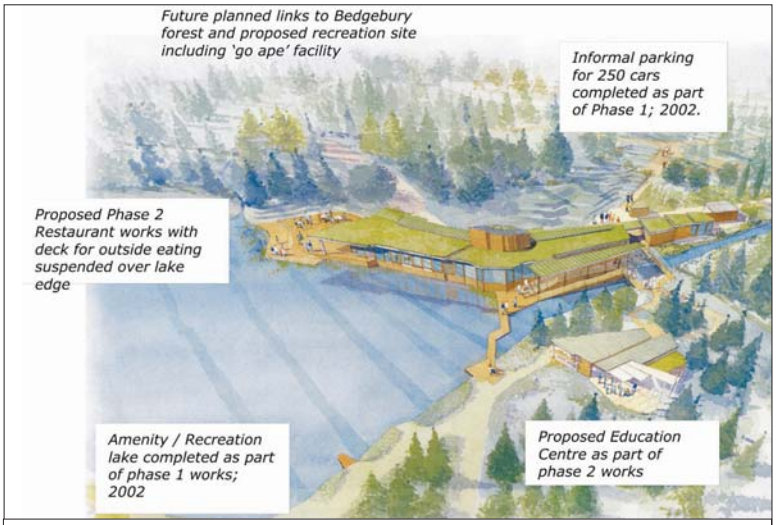
Family cyclists enjoy the quiet tracks of the forests which are well away from busy roads and speeding traffic

Ramblers and regular walkers all enjoy the enhanced access to the forest; a key element of engineered forests

A steel and timber viewpoint at Galloway Forest Park

Horse riders; damage poorly constructed surfaces and require extra design considerations when introducing access routes or fixed facilities

Artists impression of the proposed visitor centre at Dalby Forest



An artist's impression of Bedgebury Forest visitor centre

In both cases, landscape and topography have influenced the existing user demographic and the consequent recreation priority. At Dalby, there is a major emphasis on cycling with intentions for the proposed visitor centre and car parking to be linked to cycle trail routes of varying difficulty.

Meanwhile, the infrastructure proposed for the Bedgebury scheme is specifically designed to bring the visitor closer to the conifer collection and into the landscape by creating a lake which will become fundamental to the architecture of the building. The long term aim will be to link the Pinetum to the forest through a network of 'all ability trails' and eventually to include proactive recreation, such as 'Go Ape'.

The links to the wider forest will enable the development of a genuinely holistic approach to visitor facilities. Successful 'engineered recreation' is dependent on the understanding of what it is which makes the forest attractive and complimenting that appeal with minimal environmental disruption and appropriate cost. At Bedgebury the proximity of the visitor centre to the waters edge will be an important and appealing link to the landscape. The 'Treetop Trail' and 'Go Ape' sites at Moors Valley and Thetford respectively have adopted the same principle; appreciating that by taking the visitor up into the canopy it can give a whole new perspective on the forest and, in addition, introduce a genuine sense of adventure.

Whilst providing genuine enhancement of the experience gained from the forest, it must be understood that these structures demand the highest standards of design and construction, as the implications of failure are considerable. The Construction, Design and Management (CONDAM) Regulations confirmed that the responsibility of the Engineer to the built structure must be 'whole life' and involve truly sustainable processes in terms of rigorous future inspection and maintenance regimes.

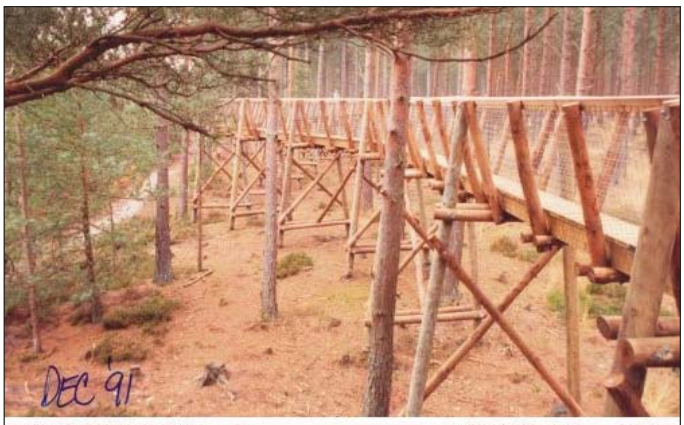
Sequential photographs of lake construction at Bedgebury Forest

Summary

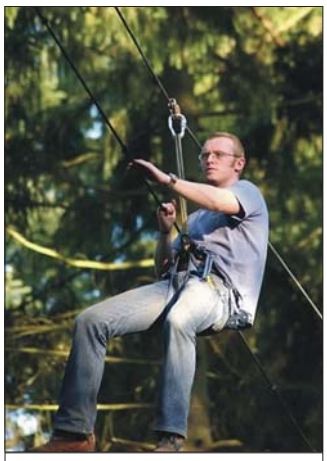
The Forestry Commission has devolved responsibility from Government to manage the forests of Britain in the best interests of the public at large.

With sustainability of natural resources, public health and 'Greening Government' forming key elements of Government Policy, the Forestry Commission and the wider rural community have a vital role to play in delivery. The forests of Britain increasingly facilitate low cost, healthy leisure for all ages across a broad demographic. Although not as yet fully substantiated by income and weighted differently in each country, the intrinsic value to the British population from forest recreation is arguably equally as important as from management of the timber crop.

The likelihood is that this trend will continue. As a result of the need to diversify, foresters and forest engineers, with the support of external organisations, have engaged in the process of developing the forest as a true multi-activity environment where an ever increasing proportion of the Apopulation can derive benefit.



The 'Treetop Walk' at Moors Valley, Ringwood Forest



'Go Ape', Thetford Forest; an example of a 'fixed facility' that adds recreational interest, particularly for family visitors to the forest

Professional, sustainable engineering in the right locations can undoubtedly be the link which brings added value to the forest and indirectly enables generation of increased income and raised profile of forestry as an activity in difficult times.

LAND MANAGEMENT

New website offers insight into flood risk management project

Details of a groundbreaking transnational project dealing with flood risk management in estuaries are now available on-line following the launch of a new web site. FRaME: 'Flood Risk management in Estuaries: Sustainable New Land Use in Flood Control Areas' is an international project aimed at developing innovative solutions for flood risk management in estuaries to reduce the risk of flooding in North Sea estuaries, and to share best practice for the benefit of other estuaries in Europe.

The project combines a range of transnational activities with demonstration projects that are located in the UK, Belgium and the Netherlands. FRaME is funded by five partner organisations. The FRaME project brings together partners from the UK, Belgium and the Netherlands. The partners will work together and learn from each other by exchanging knowledge and experiences throughout the life of the project ensuring that best practice is both developed and shared to benefit all estuaries in Europe.

The focus of the FRaME project is changing land uses in estuaries to create sustainable management systems which bring environmental, social and economic benefits. The sites are Alkborough on the Humber Estuary in the UK, Zuiderklip in the Netherlands and Kruibeke, Bazel and Rupelmonde (KBR) in Belgium, which will focus on flood control, Goeree in the Netherlands and Ijzer in Belgium, which will focus on new land uses. Sustainable new land uses being looked into by the FRaME project include nature reserves and recreational areas.

Flood Control Areas (FCAs) are being created at three of the sites. These are areas of land which can be managed so they can store sea or river water when water levels are high, and allow the water to be released in a controlled way once water levels have dropped. FCAs reduce the risk of flooding around estuaries but require changes in land use and management.

The FRaME project will run for three years. It is jointly financed by the European Union Community Initiative Programme Interreg IIIB North Sea Region.

MORE INFORMATION

Project Manager, Frank Van Holst. Tel: +31 70 3371 219. Website: www.frame-project.org

Details of the five project partners and five demonstration sites involved in the project are available on the new web site, along with information about the project partners and working groups, activities and research studies, and regularly updated progress reports.

WELSH WOODLANDS

Wood hailed as material for the future – naturally

A new initiative to promote wood as the environmentally friendly raw material for the future was has been launched by Environment, Planning and Countryside Minister Carwyn Jones.

The initiative, called Naturally Wood, is co-ordinated by the Forest Industries Development Council and brings together all parts of the forestry sector for the first time, with users of both imported and domestically produced timber joining forces with Forestry Commission Wales in an industry-wide effort to turn the spotlight on the benefits of wood.

Mr Jones told an audience of Assembly Members, environmental organisations and a cross-section of the industry that he was pleased to launch the initiative, as the Welsh Assembly Government had made a binding commitment to sustainable development. "Government cannot deliver sustainable development on its own – we need to work with partners in the private sector. Therefore, I am very pleased that the forest industries have taken it on themselves to launch the Naturally Wood initiative and develop a sustainability strategy for the sector," said Mr Jones.

The launch, at the Assembly's home in Cardiff Bay, set out how both the UK's domestic growing and processing businesses and the importers and traders will work together to promote wood as a sustainable raw material. Mr Jones said the Assembly was working with industry and environmental and social organisations to support a sustainable forestry sector in Wales which applied the highest standards of management – promoting environmental, economic and social benefits.

One of the key objectives in the Assembly's strategy for trees and woodlands, 'Woodlands for Wales', is to promote Wales as a location for world-class forest industries. "It is a challenge for any sector to balance the economics of running a business with protection of the environment and wildlife, and then also to address the interests of employees and users of the forests; the three pillars of sustainable development," said Mr Jones. The forestry sector achieved just such a balance with agreement to a UK Woodland Assurance Standard for forest certification in 1999, and Mr Jones applauded the industry for setting itself a target of realising 80% of its wood production from certified forests. "However, let us be clear about one thing. All the environmental benefits of using wood rely on supplies coming from sustainably managed sources.

We have a strong story to tell here in Wales, but more woods need to be brought into sustainable management. "Our new grant scheme to be launched by Forestry Commission Wales in 2005 – Better Woodlands for Wales – will make a significant contribution and will also help prepare Welsh woodlands for certification if owners choose to go down that route." Mr Jones cited two examples of how the Assembly was already promoting wood which "demonstrate the potential for win-win solutions to current problems". "In Wales, we have broken new ground in the use of wood in construction. The outstanding example of the timber frame re-build of the Aberystwyth halls of residence for the University of Wales set a new standard for building a multi-storey structure using wood.

"The Assembly recently launched a £7 million grant scheme to kick-start a sustainable energy industry in Wales based on wood fuel. This grant may also benefit woodland management. A significant amount of woodland is currently under-managed. The sale of wood fuel may offer a new source of income to woodland owners and managers, promoting sustainable woodland management."

George McRobbie, chair of the Naturally Wood implementation group, said, "The Welsh Assembly Government has sustainable development written into its constitution, and it is important that our sector works with Assembly Members so that we can contribute positively to this objective. "Wood can provide many of the answers to the challenges facing us in the future, and Naturally Wood brings together all parts of the industry in a concerted effort to place wood at the centre of government strategies for sustainable development."

MORE INFORMATION

Website: www.fidc.org.uk/sustainable-forestry

TRADITIONAL SKILLS

New boost for hazel coppice

Fresh life could be breathed into one of Britain's traditional woodland types with the publication of new advice on the ancient art of hazel coppicing.

Hazel woodlands are rich in wildlife and a valuable part of the landscape, however, many surviving patches are neglected and would benefit from restoration work. The new Forestry Commission publication Restoration of Neglected Hazel Coppice describes practical measures for the management of hazel, and presents the results of a detailed case study on growth and yield.

"Many hazel coppices are long-established ancient semi-natural woodlands, but the species mixture and structure of these woods has been strongly influenced by their past management," explained author Ralph Harmer of Forest Research. "Traditionally hazel coppice played an important role in the rural economy by providing small diameter material for a wide range of products. However, the area of woodland actively managed by coppicing has been in decline for many years and the issue of what to do with large areas of neglected hazel coppice remains a problem for many owners."

MORE INFORMATION

Restoration of Neglected Hazel Coppice is available from the Forestry Commission website at www.forestry.gov.uk/publications or free from Forestry Commission Publications, PO Box 25, Wetherby, West Yorkshire, LS23 7EW. Tel: +44 (0)8701 214180.

CONSERVATION

Soil neglect is costing the earth

Neglect and a lack of understanding of soils is threatening to permanently damage one of our most important natural resources according to a report published by the Environment Agency.

The State of Soils Report, which looks at the health of soils in England and Wales has found that our disregard and a lack of understanding of soil is causing damage which may have serious consequences for future generations. This damage is resulting in problems such as soil erosion and contamination, homes being damaged by 'muddy floods' and water being polluted with silt and fertilizer with resulting impact on wildlife and fisheries.

Soil is crucial to all life on earth yet few consider the vital role it plays in our everyday lives – it provides us with food, is important to the air we breathe, gives us a place to live, the material to build a home, it cleans our water and protects us from flooding.

The average person uses 11 tonnes of raw materials (excluding water) every year and 330 million tonnes of minerals and coals are extracted from the land in the UK every year. Demand for raw material, new homes, intensive farming and a lack of understanding of the effect our actions have, is all taking its toll.

The following observations are made in the report.

- The area of soil usable for cultivation available per person has declined by more than a fifth since 1975 (0.32 hectares to 0.25 hectares) – this is down to both soil loss and population growth. The typical western diet requires more that twice as much usable soil – (0.6 hectares)
- Eroded silt from surrounding land can smother riverbed gravels, harming aquatic plants, invertebrates and the eggs of fish. Trout spawning beds in 29 out of 51 river reaches surveyed in Southern England contained more than 15 per cent of fine sediment, a point at which half the egg and larvae are likely to die. Salmon are also affected in this way.
- The equivalent of up to a 1 cm thick layer of soil can be lost each year from some areas. This is unsustainable in areas with only 15 cm of soil.
- In England and Wales erosion moves some 2.2 million tonnes of arable topsoil every year. Topsoil is the most fertile part of the soil profile as it contains the most nutrients. This is where seeds germinate.
- Nitrous oxide from soils contributes four per cent of UK greenhouse emissions. Levels are increased when inorganic nitrogen fertilisers and manure are added to soil. Nitrates from these fertilisers also have a detrimental effect on the water we use.

Barbara Young, Chief Executive of the Environment Agency said: "For too long now we have been building, working, farming and consuming without understanding its impact on the land and as a result we are now seeing growing signs of soil related problems. If we continue to neglect it, sooner or later the consequences will be evident and once soils are badly damaged they are almost impossible to restore to a healthy state."

"We need to understand more about soil. More specifically, we need to know more about what it does and how it does it and how we can protect it. This isn't just about encouraging more sustainable farming techniques, this is about understanding what effect our actions are having on the ground underfoot."

The report has highlighted a number of key areas that need to be addressed if we are to save our soils. They include the need to:

- improve our knowledge of soil – without understanding more about what soil does and how it works, it is difficult to know how to protect it;
- manage soil, water and air as one – adverse effects in one area will have a direct effect on the other two;
- promote more sustainable agricultural practices – intensive agriculture can be damaging to soils and water;
- tackle land contamination which is a risk to groundwater quality and a deterrent to redevelopment; and to
- use sustainable drainage to control flooding.

The Environment Agency and the Department for Environment, Food and Rural Affairs will be publishing their respective soil strategies on how best to protect our soils. The Environment Agency is currently conducting a comprehensive survey into the level of contaminants in soil, the results of which will be published in the Autumn.

CONTACTS

'The State of Soils in England and Wales' can be viewed at: www.environment-agency.gov.uk/stateofsoils

TREE WINDTHROW

Winds of change for forest gales

A unique model to assess the risk of wind damage in forests has been hailed a flagship example of successful knowledge transfer. Promoting Knowledge Transfer aims to help facilitate networking and sharing of best practice between staff in public sector research establishments engaged in knowledge transfer activities.

ForestGALES, a computer programme developed by Forest Research, helps foresters and land managers calculate the wind damage risk throughout the life of conifer woodlands. Showcased at the Public Sector Research Establishment conference the new version of the ForestGALES software is designed to integrate more efficiently with other modelling tools and geographic information systems (GIS).

"Since its launch in 2000, ForestGALES has been widely adopted by the UK forest industry as a valuable planning tool," said Professor Barry Gardiner of Forest Research's Northern Research Station at Roslin. "we are now collaborating with research institutes throughout the world to adapt ForestGALES for other countries and species. We are delighted it has been chosen as a champion project showing how practical knowledge can be transferred through pioneering use of technology."

MORE INFORMATION

Website: www.forestry.gov.uk/forestgales

Action plan for hazardous waste

The Hazardous Waste Forum, set up by Government a year ago, has published an advisory document that sets out the key issues and actions that should be carried out to ensure the continued environmentally sound management of hazardous waste.

The Forum includes representatives from central and local government, regulators and key industry stakeholders. It has met six times since January 2003, and established three working groups to consider specific issues: firstly, future treatment and disposal capacity needs, secondly waste minimisation and arisings of hazardous waste and finally a group to pull together the action plan.

The Forum's recommendations centre around four main themes.

There should be clarity and firm and fair enforcement of regulatory and legislative requirements, particularly with respect to the Landfill Directive.

- There should be greater awareness raising amongst business and industry to promote waste minimisation and environmentally sound management of hazardous wastes.
- There needs to be clear information on the likely capacity requirements for treatment and disposal of hazardous waste, and that a task force should be set up to review progress on the provision of this capacity.
- For the longer term, work should be put in hand to build on Waste Strategy 2000:
  - to develop policy instruments to encourage waste minimisation and environmentally sound management;
  - to develop better data on hazardous wastes arising;
  - to develop targets for hazardous waste reduction; and
  - to address issues concerned with household hazardous waste.

One of the key issues explored by the Forum has been the ability of the country to deal with arisings of hazardous waste, following the changes required by the Landfill Directive on the way hazardous waste is managed. In particular, the ending of 'co-disposal' from mid July 2004 will lead to a reduction in the number of landfill sites able to take hazardous waste.

Commenting on the document, Environment Minister Elliot Morley said:

"I welcome this Action Plan from the Hazardous Waste Forum. It clearly sets out the issues confronting us. Action is underway to implement the legislation and address the issues raised. I am pleased that the waste management industry agreed to chair the task force to consider the specific issues relating to the provision of treatment and landfill capacity. There are clearly still some uncertainties with respect to future capacity, and Government will play its part to put in place the necessary legislative requirements, and to provide the clarity needed by the waste industry."

The Action Plan now needs to be followed up and implemented and I look forward to further updates as the work of the Forum continues."

Professor David Wilson, member of the Forum representing the Chartered Institute for Wastes Management and chair of the strategic framework sub group said, "The stakeholders have done a good job in coming together to agree on the actions, however this is only the beginning, we now have to continue to work together for the long term."

MORE INFORMATION

Copies of the Action Plan can be obtained through the Hazardous Waste Forum website: http://www.defra.gov.uk/environment/waste/hazforum/index.htm Tel: +44 (0)8459 335577.

CAREER DEVELOPMENT

Interacting with engineering

A new interactive CD-ROM launched by the Engineering and Technology Board (etb) today aims to encourage more young people to consider a career in engineering. Aimed primarily at school careers advisers and teachers, the free CD-ROM highlights the wide range of exciting careers in the sector and provides practical information on routes into the profession.

The CD-ROM is called *engineers@work* and covers:

- the varied routes into engineering careers and the salaries, prospects and working environments on offer;
- examples of the creative and challenging roles for engineers worldwide; and
- case studies and sources of further information.

Alan Clark, Chief Executive of the etb said, "We hope this CD-ROM will show the importance of engineering in our society and highlight the exciting reality of an engineering career. Research commissioned by the etb last summer suggested that many teachers are unclear about what engineering actually involves. It is a diverse, well-paid sector at the cutting edge of design and innovation which offers a huge range of challenging and creative work, as this CD-ROM illustrates."

Fiona Sykes, chair of the steering group which has overseen the production of the CD-ROM, and Senior Careers Adviser at the University of Edinburgh said: "This CD-ROM provides a fresh look at a great sector. Using a mix of real life testimony and practical information about the breadth of engineering careers, it is a great resource for teachers, careers advisors and their students alike."

Barry McGregor, the subject leader for engineering colleges at the Specialist Schools Trust said: "Science, Technology and Maths are intrinsic to engineering but often the links between these subjects and an engineering career are not clear to teachers, pupils or their parents. This CD-ROM makes explicit the links between the subjects taught in the classroom and their practical application in the world of work."

MORE INFORMATION

Copies of engineers@work can be ordered from www.scenta.co.uk/engineersatwork

A VOLUMETRIC DENSITY ESTIMATION IN UNDERWATER SONAR: ACOUSTIC ABUNDANCE ESTIMATION IN FISH FARMS

Ingmar Posner, Penny Probert-Smith and Jeffrey Lines

Abstract

There exists a clear need, in fish farms, to quickly and reliably estimate stock levels in pens. Unfortunately, acoustic abundance estimation techniques developed for oceans and lakes do not perform well in such a densely populated environment. Echo integration has been employed successfully on pelagic stock for years and is now a *de facto* standard of acoustic abundance estimation. Based on the linearity principle, this approach assumes a direct proportionality between the energy returned in an echo from an aggregation of scatterers and the number of scatterers producing the echo. This assumption breaks down as scatterer density increases. The use of uncorrected echo integration is thus ruled out in fish farms. While ongoing efforts concentrate on finding correction algorithms, this paper argues that an alternative approach inspired by medical signal processing has so far been neglected. This article:

- gives a brief overview of the

Fig. 1 The acousto-optical sensor developed for this project; stereo-camera pair with the Tritech sector-scan sonar in the middle

BIO NOTE

This paper was presented as a Postgraduate Research Paper at a meeting organised by the IAgrE South East Midlands Branch on 9th February 2004 at Cranfield University, Silsoe.

Ingmar Posner is currently pursuing a D.Phil degree as a member of the Sensor Lab of the Robotics Research Group at Oxford University. E-mail: ingmar.posner@bbsrc.ac.uk

Dr Penelope Probert-Smith currently leads a research group in ultrasound measurements and image processing at Oxford University. Recent applications include seabed classification and an investigation into the lipid content of farmed salmon.

Dr Jeff Lines originally joined Silsoe Research Institute for PhD research on modelling ride vibration of un-suspended vehicles. More recently and following a sabbatical in Norway, he developed an interest in fish farming which has resulted in a series of research projects and developments in sensors and systems for aquaculture.

development of echo integration;
- outlines the problems associated with the conventional echo integration approach; and
- further aims to make a case for the exploration of alternative density estimation methods derived from medical image and signal processing techniques.

Introduction

The successful management of a fish farm depends to a great extent on monitoring stock developments. Fluctuations in pen population can be an important indicator for problems such as disease, the existence of predators in a pen or the escaping of animals due to damaged nets. Traditionally, the magnitude of fish populations has been estimated directly from recoveries of previously marked members of the pen population. This method is not accurate and requires substantial effort and expenditure.

For several decades the use of acoustic equipment has been investigated as a promising alternative. Today, the most commonly employed acoustic abundance estimation technique is echo integration. Introduced by Dragesund and Olsen (1965), this method depends on the linearity principle and assumes that the expected energy in a received echo, otherwise known as the expected target strength (TS), is directly proportional to the expected energy received from a single target of similar acoustic profile to the insonified targets. This assumption was verified by a series of experiments carried out by Foote (1983) on caged free-swimming fish aggregations. Echo integration has since been adopted as a *de facto* standard for surveying pelagic fish stocks.

A strong dependence of echo integration on expected TS has given rise to a considerable amount of work towards accurate TS measurement techniques. As the cross-sectional area intercepting the sound beam changes with fish aspect, the TS varies accordingly. This effect was investigated using individual tethered dead or moribund fish targets which were rotated in the sound beam of a transducer (Midttun & Hoff, 1962; Nakken & Olsen, 1977). However, the data obtained from such *ex situ* experiments were soon challenged on the grounds that the unnatural state of the fish as well as the artificial environment could influence the obtained measurements.

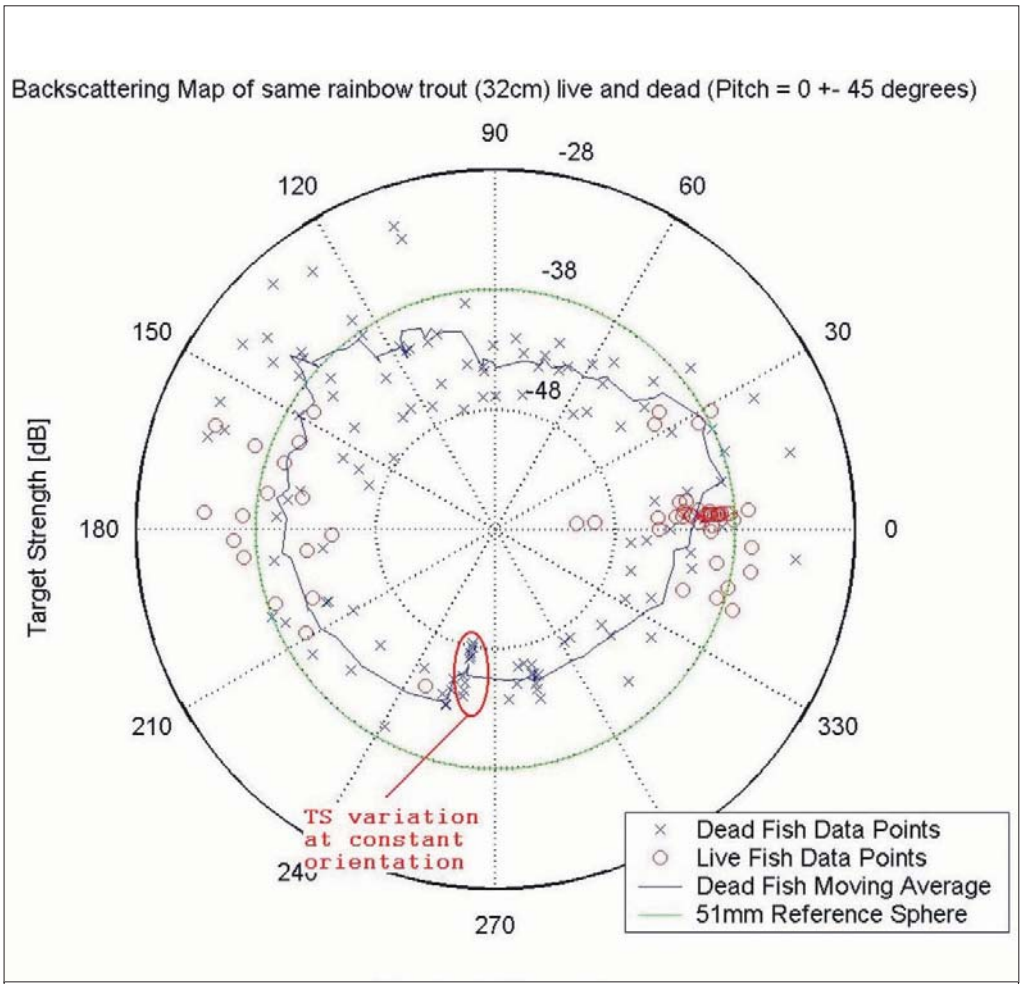


Fig. 2 The scatter-map of a 32 cm rainbow trout (dead and alive); broadside aspect at 0° and 180°.

Results from active live animals were deemed to be more useful when applied to fish in the sea (MacLennan, 1990). Consequently, techniques were developed involving the insonification of a known quantity of fish in a cage. The fish orientation was measured using photography (Edwards & Armstrong, 1983 and 1984). The authors for this project further developed this technique by creating an acousto-optic sensor (Fig. 1), consisting of a commercial sector-scan sonar and a stereo-camera pair. This arrangement enables a fast and efficient semi-automatic approach to measuring the TS of both freely swimming and dead fish against orientation in the sound beam. Typical results are shown in Fig. 2. Apart from the apparent TS variation with aspect, results obtained in this way indicate an instantaneous (ping-to-ping) TS variation of up to 30 dB. The expected target strength is thus commonly treated as a stochastic parameter requiring a considerable number of measurements in order to reduce the standard error. A statistical analysis of the results shown in Fig. 2 yields a possible estimation accuracy using echo integration of within 14% with the given equipment and under ideal conditions.

Echo integration in fish farms: when linearity breaks down

However, these ideal conditions are highly unrealistic when considering a densely populated fish farm environment. Effects commonly associated with high density aggregations have not been accounted for. Experiments on aggregations of caged fish (Röttingen, 1976) showed that the integral of the received echo is proportional to the scatterer density, only up to a certain limit.. When this limit is exceeded, however, consistent underestimates of fish density are obtained, as the received echo energy increases more slowly or

not at all compared with the actual fish density. The assumption of linearity is thus violated and the pure echo integration approach breaks down. This saturation of received echo energy is considered due to two dominating nonlinear effects associated with dense scatterer aggregations: higher-order scattering and shadowing. High order scattering refers to the effect of sound energy being scattered and re-scattered by objects within a school, whereas shadowing refers to the removal of sound energy from the incident sound beam by absorption and scattering by individual targets in a school. Experiments in commercial sea pens showed an error in the echo integration derived abundance estimates between 50 and 222% (Burczynski *et al.*, 1990). Considerable effort has since been mounted to enable successful correction of abundance estimates for these effects (Foote, 1990; MacLennan *et al.*, 1990; Foote *et al.*, 1992; Furusawa *et al.*, 1992; Appenzeller & Legget, 1992; Andreeva & Belousov, 1996; Foote, 1999; Zhao & Ona, 2003). As yet none of the proposed algorithms were found to enable the successful application of echo integration in a fish farm environment, as far as the authors are aware.

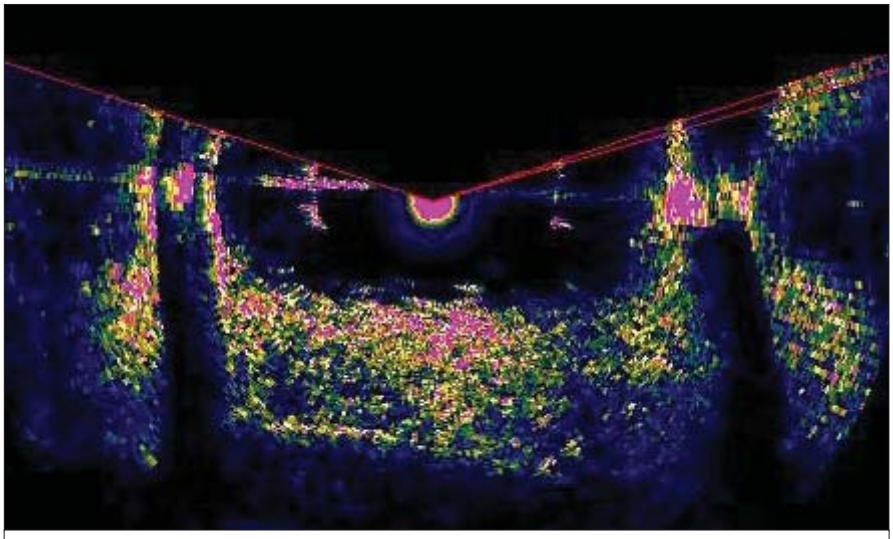


Fig. 3 A typical sector-scan sonar image of a fish farm pen (Courtesy: Institute of Aquaculture, Stirling)

Alternative approach: investigating mean scatterer spacing

As intensive work is ongoing in various research groups to overcome the limitations of echo integration when dealing with dense fish aggregations, possible alternative approaches resulting from recent developments in other fields are easily overlooked. Echo integration appears to discard a whole range of information contained within the returned radio frequency (RF) data, for example, no use is made of spatial information contained within the frequency spectrum of the echo. This unused information reveals potential for an alternative approach which is thought to be less susceptible to variations in returned energy: the estimation of the mean 'nearest neighbour' distance in an area of uniform density of an aggregation. An important pointer to this effect comes from the medical vision and signal processing community. Image processing techniques based on texture (speckle) analysis have been used for some time in medical imaging for mean scatterer spacing estimation (Simon *et al.*, 1997). Techniques have been developed applicable to both B-scan images and RF data. The problem addressed in the medical community appears not to be too far removed from the aquaculture application. The determination of the mean scatterer spacing in an area of uniform texture could provide an alternative way of estimating density (see Fig. 3, for example). The subject of the further work of this project is the identification, exploitation and further development of speckle based signal processing techniques for volumetric density estimation in underwater acoustics.

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Lloyd Ltd and Barony College – partners in customised apprenticeship

Owing to changes at manufacturer level and more demanding customers to deal with, most agricultural dealers are concerned about the future. To compound the problem, if a member of staff retires or leaves the dealership, it has become an impossible job to find a replacement with the skills to provide the customers with the service they expect.

Lloyd Limited has a long-standing reputation for supplying quality Agricultural, Construction, Industrial, Horticultural and other equipment throughout the North of England and Scottish Borders. With eight depots in the North of England and Southern Scotland, they have decided to be proactive and develop a customised apprenticeship in an attempt to encourage more able school leavers to enter into an apprenticeship in agricultural machinery.

Neil Elsender, Group Parts and Service Manager, felt that unless something could be done to replace service engineers who were due to retire over the next few years, taking their skills and knowledge with them, there would be a serious affect on the levels of support offered to their customers. He said: "There is a chronic shortage of people with the skills we require. The only way forward is "to grow our own" if we are to sustain the levels of customer care which allow us to continue to develop in a sector that has become reliant on developing technology".

Developing a customised apprenticeship scheme to encourage more school leavers into agricultural machinery dealerships

Neil carried out a review of the training providers the group normally dealt with and chose Barony College as being the ideal partner for a project of this magnitude. Based near Dumfries in SW Scotland, Barony College has an extremely strong engineering base with 35 years experience in apprentice training. The College has continued to invest in facilities and equipment when other training providers have abandoned engineering because of the high costs involved.

A course was developed at Barony College that integrated the National Certificate currently available in Scotland, within the Modern Apprentice framework at level 3. The Barony course covers all the enhancements and specialist aspects Lloyds need to provide the customised training within the Franchises held by the group.

A specific apprenticeship brochure was developed as well as a dedicated section in Lloyds sales fliers and advertising on the service vans. This resulted in a healthy number of applicants for the apprenticeships across all Lloyds depots and nine were selected to start in September 2002

Lloyds vision was to ensure that the apprentices were fully employed from the onset, and that the correct environment for learning would be created by appointing mentors to support the apprentices at the depots.

Drew Easton, section head for Engineering and Agriculture at Barony College, said:

"It has been refreshing to work with Lloyd Limited. They have a real interest in the apprentices and have created a career path that allows individuals to develop progressively according to their ability and ambition. This approach is beneficial to all parties and will produce the technicians of the future that Lloyds require. Lloyds are to be commended for the commitment they have made to this project".

Since the apprentices come from both Scotland and England, one of the biggest challenges for the project has been funding. This has been resolved through the efforts of Scottish Enterprise (Dumfries and Galloway) who recognised the determination of Lloyds and Barony College to make things work.

The first phase of the programme has now been completed, with specialist training provided by CNH at Basildon and Honda at the Honda institute, Slough. The majority of the apprentices' time will now be spent in the workplace with short technical blocks at Barony College.

Neil Elsender feels that the first phase has been a great success with apprentices in their second year proving to be an asset to the company.

"The Service Managers and Dealer Principles from the Lloyds depots have been talking enthusiastically about how the youngsters have progressed, and the need to keep recruiting. We must be doing something right!"

CONTACT

Mandy Moore, Marketing Officer, Barony college, Parkgate, Dumfries, DG1 3EQ. Tel: +44 (0)1387 860251. Fax: +44 (0)1387 860395. E-mail: mmoore@barony.ac.uk

EDUCATIONAL EXCELLENCE

Harper Adams ahead of Cambridge University

Harper Adams University College has pipped a host of universities across the UK in recently published league tables. The Shropshire University College has performed well in the University League tables, which appear in the current copy of The Times Good University Guide 2005.

But it is the quality of teaching at Harper which has brought the greatest accolade. The University College was placed second in the complete Universities' listing and was only pipped by York for the top spot. Cambridge University is placed third while Oxford University languishes in eighth place. Harper Adams scored 23 points out of a possible 24, and beat more than 100 British universities.

In all the different tables recorded, Harper Adams has performed consistently well and above the new Universities. For student/staff ratio, library and computing facilities and the percentage of students successfully completing their courses, the Newport-based University College is outscoring all of the new universities and most of the older institutions.

Harper's agriculture courses were highly rated too, ranking third in the table for agriculture and forestry, while the percentage of students completing their degree and the percentage of permanent staff also earned the college a high spot in the ranking.

"We are very pleased indeed with the outcome of these league tables," said Professor Wynne Jones. "The dedication of the staff here, the quality of the teaching facilities and the excellence of the teaching provided is mirrored in these results. We continue to invest in order to improve and develop our teaching and learning facilities but at the end of the day it is the quality of our support and care to individual students which is our greatest asset."

SAFETY ADVICE

Safe arboriculture and tree surgery

Three-way karabiners are still the best form of rope-to-harness connector for tree surgery and arboriculture but improvements are needed, say researchers at the Health and Safety Laboratory. If adopted by practitioners, trainers and manufacturers, the findings published in '*Karabiner Safety in the Arboriculture Industry*' will help prevent accidents and enable climbers to work with more confidence. The main findings are as follows.

In treework, three-way karabiners are still the best form of connector between harness and rope equipment.

Karabiners need to be carefully maintained and lubricated, and replaced more often.

Improvements are needed to the way karabiners are used, in particular, the attachment of ropes and prussik loops.

Manufacturers need to improve the design to ensure secure closing of the karabiner and to allow more effective maintenance.

The research was triggered by a serious accident at a college in August 2001. A climber became detached from his rope system when the karabiner opened. Health and Safety Executive (HSE) has also had reports of karabiners not closing properly, for example through wear or because of tree debris. Some karabiners do not close reliably even when new. HSE has taken-up this problem with the manufacturers.

Climbers should make sure they carefully check equipment, using the suggested checklist.

Safety checks: advice for climbers

Check the karabiner locking action before climbing.

Check the gate has closed fully after each opening.

Follow manufacturers' instructions for use and maintenance.

Use recommended techniques for attaching ropes to the karabiner (HSE Guidance leaflet AFAG 401).

Avoid circumstances where rope, strops, tree, etc., may exert force on the gate mechanism.

Remove karabiners from service if they fail to close properly every time.

Make sure karabiners are thoroughly examined every six months, as required by LOLER.

MORE INFORMATION

The Lifting Operations and Lifting Equipment Regulations (LOLER) 1998 apply to tree work, and HSE's guidance to the arboricultural industry is given in Agricultural Information Sheet 30 'LOLER: How the Regulations apply to arboriculture.'

Copies of the HSE Leaflet, 'Tree-climbing operations' (AFAG 401) are available from HSE Books, PO Box 1999, Sudbury, Suffolk, CO10 2WA. Tel: +44 (0)1787 881165. Fax: +44 (0)1787 313995. Website: www.hse.gov.uk/pubns/afag401.pdf Priced publications are also available from good booksellers.

Bimonthly LATE SUMMER 2004

MEMBERSHIP MATTERS

THE NEWSLETTER OF THE INSTITUTION OF AGRICULTURAL ENGINEERS

News about SocEnv

The process has started!

Members of IAgrE are now eligible to apply should they wish to become Chartered Environmentalists (CEnv).

Those members who registered interest with us will already have received a communication from the Secretariat outlining how to apply for CEnv via the time-limited Grandparent Procedure. Indeed, we are already receiving completed applications.

It is not too late to apply via this route and full details are available on our website in the protected members area. (To access this area, you will need your IAgrE Membership Number.) There you will find details of how to apply, a copy of the application form and details of the charges applicable.

This is an important moment for IAgrE and its members and is another step forward in the promotion of IAgrE as the professional society for scientists, technologists, engineers and managers working in the land based sector.

If you have any queries, please contact the Secretariat.

SocEnv appoints first Chief Executive Officer

The Society for the Environment has followed quickly on from the grant of its Petition for a Royal Charter with the appointment of its first Chief Executive Officer, Dr Tim Bines. He will lead SocEnv through the establishment of the register of Chartered Environmentalists (CEnv) which will be the pre-eminent qualification and recognition of excellence for environmental professionals.

Dr Bines studied for his doctorate at Newcastle University and, after 17 years with the Nature Conservancy Council, has been a senior advocate for English Nature in the South East of England for 19 years, more recently as General Manager of English Nature's Maritime Team.

SocEnv was established in 2000, and aspires to be the leading and co-ordinating umbrella body in environmental matters and a pre-eminent champion of a sustainable environment. Its full membership comprises ten leading environmental institutions and learned societies (known as 'Constituent Bodies'), each of which may apply to be licensed to grant the new qualification of CEnv to their appropriately qualified individual members. Between them, the Constituent Bodies have individual memberships comprising over 100,000 practitioners.

Will Pope, Chairman of the Society, said: "I am very pleased to welcome Tim Bines to SocEnv, his appointment is an exciting step in the development of the Society. Our new qualification of CEnv is an important milestone for the environmental profession and Tim will play a key role in establishing the register and also moving forward the development and general services of the Society.

"SocEnv continues to attract great support from key players and organisations in the environment sector and will expand our reputation as a champion of sustainable environmental management. SocEnv fosters a culture of inclusivity and ethical behaviour for the common good. The identities of its Constituent Bodies are maintained, while their primacy as centres of excellence within their fields is recognised and enhanced. New Constituent Bodies with specific technical expertise continue to apply to join SocEnv as full members, the latest formally indicating its desire to qualify members as 'CEnv' being the Institute of Chemical Engineers (IChemE)".

LETTERS

Letters to the Editor

7 July 2004

Valediction

On the eve of my retirement from the engineering department of Harper Adams University College, I would like, through *Landwards*, to publicly thank all of those people and organisations that have helped me over the past 20 years to produce what I think are some of the most valued engineers now working in the various industries Harper Adams courses are aimed at.

It would be wrong to name individuals as there lies the danger of missing out many individuals and companies that have, over the years, supplied 'reality' for our students to complement the theory provided here at Harper Adams. The projects and technical visits, the visiting specialists and sandwich employers have all helped to produce graduates who have a real feel for the practical application and limitations of their studies.

I wish to thank those who have helped by providing cash and kind. From our new £3 million library and design centre, and the range of vehicles costing more than £100,000 each at one end of the scale, to the free Bright Zinc Plating for samples in an exercise with school children at the other, all depend on the generosity of individuals and organisations.

May I also thank the companies that make tractors, fighting vehicles, construction equipment and commercial vehicles; the research centres and test houses; the component suppliers and service providers; and those local companies with no direct involvement in engineering, which have opened their doors to my requests for help and guidance. Without their help, my life would have been less interesting and our students less valued by the industry.

It means that when I drive down the motorway I can be proud when I see the machines helping to build the nation, to feed it, and even in a small part to defend it through the graduates I have helped mould into the first class engineers they are.

Finally, thank you to all of those companies that seek out the graduates and employ them in such valuable jobs, and good job-hunting to all my former students, but remember: there are more wildebeest than lions.

Geoffrey Wakeham MIAgrE
Principal Engineering Lecturer
Harper Adams University College
E-mail: **gfdwakeham@harper-adams.ac.uk**

We wish you every success in all your new ventures! Editor

13 July 2004

Silsoe Research Institute (SRI)

The problem for the Biology and Biotechnology Science Research Council (BBSRC) in interpreting the 130 responses regarding SRI has to begin with the fact that SRI *was* THE National Institute of Agricultural Engineering (NIAE).

It was not a Science based Research Institute but an Agricultural Engineering based one.

What has been 'achieved' is that the profession of Agricultural Engineering and the industry (of which we are a part) have had our National Institute confiscated and placed in a science-focused laboratory by the actions of BBSRC Council which now wishes to sell it to a plc, selected by the BBSRC.

So far, our industry and profession seem to be incapable of persuading BBSRC of the significance of an NIAE – or BBSRC are unable to understand the problem!!

Frankly, I do not see, in any correspondence from BBSRC, any fundamental understanding of what BBSRC are doing to the former NIAE nor do I see any vision or focus upon the need for the UK industry and the profession to exist, for the betterment of food production worldwide. The link, which NIAE had with the profession and the industry was all the more important because of its link with British farmers, amongst the most efficient in the world. Our nation has a place in education and training (of the developing world's agricultural engineers) which is second to none but one that needs sustenance and understanding from government and its excellent science and technology bodies.

Kindly find a means of understanding what is being done to Agricultural Engineering and try to appreciate that transferring SRI (NIAE) into a plc, and not a university-industry-professional tripartite relationship, will be the final nail in the coffin of the valuable Agricultural Engineering profession which is certainly required and respected abroad but is being ignored and insulted at every turn at home.

G.A.B. Edwards FIAgrE
Chairman, Managing Director and co-founder of Trantor Vehicles Ltd, a company formed following the findings of an SRC-funded research grant in 1971-1972.
E-mail: **TRANTOR@btinternet.com**

16 June 2004

Reference sources

Arising from a visit of Mr Edwards to the Budni test centre, it is clear that the Director of the Budni Centre, Mr S.C. Jain is very pro British and very pleased to be using British equipment daily. His organisation is a testing centre but it is also a training place for engineers in the large Indian tractor industry.

The Library at Budni is well equipped but for reasons not immediately clear to me the journals and magazines from Britain are not, in my opinion, *in sufficient evidence*. In order to rebuild the trust and confidence between Britain and India, I wonder if you would find it possible to send some of our recent publications to India in order for a British presence to be more clearly in evidence.

I feel sure that the institute would be able to buy some magazines but also feel that their budget would restrict them and any support you can give them would be appreciated.

Graham Edwards FIAgrE
Trantor Vehicles Ltd
E-mail: **TRANTOR@btinternet.com**

The CFMTTI (Central Farm Machinery Training and Testing Institute), is at Tractornagar, Budni 466445, M.P.,India.

Perhaps there is a member looking for a good home for a back run or the Journal which could be augmented for missing issues by the Secretariat and offered to the Library at Budni as added benefit for their subscription . If so, contact IAgrE.

29 June 2004

Humble pie

The organisers of the Potato Competition (p 10, Membership Matters, Early Summer, 2004) should be eating humble pie for suggesting that Goya had an interest in 'aardappelen' - he probably preferred Spanish onions!!

Poor Vincent should be giving Solanum Ltd an earful - if they have one!!

Allan Langley MIAgrE
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Willowdene Farm Training Centre
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LONG SERVICE CERTIFICATES

Name	*Grade*	*Date of Anniversary*
50 years		
Daniel Stevenson **Boyce**	CEng FIAgrE	31 Aug 2004
Robert Vine **Falkingham**	MIAgrE	31 Aug 2004
John Arthur **Howard**	IEng MIAgrE	31 Aug 2004
James **Wallace**	AIAgrE	31 Aug 2004
Alan Edward **Whitehouse**	CEng FIAgrE	31 Aug 2004
35 years		
Michael Joseph **Percy**	MIAgrE	24 Jul 2004
Keith Dalton **Seiler**	CEng MIAgrE	24 Jul 2004
Paul H **Walker**	EngTech MIAgrE	24 Jul 2004
Robert Paul **Cherry**	EngTech MIAgrE	24 Jul 2004
Hugh Malcolm **Cutler**	MIAgrE	24 Jul 2004
Brian Michael **Keeble**	CEng MIAgrE	24 Jul 2004
Peter Beverley **Leeds-Harrison**	MIAgrE	24 Jul 2004
Jonathan Henry **Roberts**	MIAgrE	24 Jul 2004
25 years		
James Stuart **Martin**	CEng MIAgrE	2 Jul 2004

MEMBERSHIPS

Membership Changes

Admissions

Fellow
Baroness Young (Environment Agency)
T Rollinson (Edinburgh)

Associate Member
M I Phillips (North Yorkshire)

Deaths

G Fear (South Africa)
W T B Marchant (Buckinghamshire)
H F von Kaufmann (Kenya)

Transfers

Fellow
M J Cooper (West Midlands)

Member
P D Austin (Hampshire)
J Bellali (Vietnam)
M I H Bennett (Somerset)
C M Bentley (Wiltshire)
S E Cooper (Shropshire)
Q L Dawson (Bedfordshire)
M Dresser (Bedfordshire)
R G Elrick (Aberdeen)
R Evans (Cambridge)
G N Foster (Cumbria)
D A Hay (Surrey)
A I J Heather (West Midlands)
I J Muir (Kent)
P O'Kane (Co Antrim)
D J Perry (Bedfordshire)
K R Scrivens (Gloucestershire)
L E D Smith (Kent)
S J Twomlow (Zimbabwe)
A A Valentine (Suffolk)
D A T Wynne (Devon)

Engineering Council

Registrations

EngTech
D J Massey (Hertfordshire)
P O'Kane (Co Antrim)

Transfers

CEng
C L Cook (Essex)

Letter to the President

Thank you for your letter, enclosed with my certificate of 50 years membership of the IAgrE. As you may imagine, great changes have occurred during this period and I seem to have been
mixed up with a lot of them.

After six years service with both the 1st and (later) the 6th Airborne Divisions, in North Africa, Italy, Arnhem, Norway and Palestine, having left the army and without any capital to farm on my own, I took a job as salesman/demonstrator with a dealer who had just taken on the Rotary Hoes franchise, the main item at the time being the Howard Gem Rotavator. I thoroughly enjoyed the work, but at the end of my first year I was called in and told that I was earning too much money. (I was paid £5 per week and commission and had just topped £600 for the year, which was apparently more than they paid their Branch Managers.

So I left and, after a spell on a farm in Dorset, set up as a mainly rotavating and muckspreading contractor. Those were the days before the advent of the Howard Rotaspreader and although I tried several makes of spreader, I found that two out of the four I used were almost always broken down. In fact on a number of occasions after digging out a half load of battery hen manure firom a broken down spreader, my wife made me take my clothes off and put them in the stream before I was allowed in the house. I also remember going to a rather smart cocktail party and being asked by an attractive young lady what I did. When I told her that I was a muck spreading contractor, she said: "My dear, what fun". I didn't know how to answer that!

In 1953, having got to know the Company quite well, I was offered the job by Rotary Hoes Ltd, later the Howard Rotavator Company, to be their first fulltime overseas representative. This started my career with what in my view was the most enterprising and exciting company in the industry.

There was an underlying philosophy in the company that we always looked for new ways of doing things and I remember pointing out that every machine in our pricelist had been the first of its type when it was introduced. Copying other manufacturers was considered sacrilege. As Edward Griffith, the co-founder with A. C. Howard of the company, used to say: "If I'm doing it the same way as my father or grandfather, I'm probably wrong. We should have found a better way of doing it by now."

I remember during my year as President of the AEA, talking to students at the National College of Agricultural Engineering (NCAE) at Silsoe and telling them that when I started in the business there were no drum or flail mowers, no plastic bags, only hessian ones designed to hold up to two-hundredweight (100 kg) of wheat which were lifted by hand, no electronic aids and very few mounted implements. Also there were very few combine harvesters and I had to admit that I was almost certainly the only person in the room who had never driven a combine, although I was a dab hand on a binder. I stressed that much of the equipment and techniques that they were learning about now would probably be obsolete in another forty or fifty years so there was loads of opportunity for them.

In my first seven years with Howards, I visited 71 countries and was abroad up to 8 months of the year and up to four months at a stretch, which was pretty tough on my wife and family. And altogether I went to just under a hundred countries. (Howards clocked up 153 countries to which we had exported our machines). In my early days, accommodation in several countries was often basic; hotels at two shillings a night with six others sharing the room and what looked like twenty-six having had the sheets before you. But I treasure to this day the experiences and friendships with so many people I met all over the world.

Later in my career, I was lucky to lead the first AEA mission to China in 1977 and head the British team at the 1978 International Farm Machinery Exhibition in Beijing. I was for some years a member of the FAO Panel of Experts on Farm Machinery, whose purpose was to bring together the Users (developing countries), the Suppliers (manufacturers from different countries) and the Financiers of Aid to those countries whose ignorance of each other and their roles was initially unbelievable. I also served for a number of years on the Shows Committee of the RHS , taking over from Bill Akester of Ransomes, which I thoroughly enjoyed.

As an octogenarian, I am still involved in the industry with my somewhat 'different' Moore Mower, which I only designed because there was nothing on the market which suited my needs, and I still hope to think up something else new and useful before I finish! But I always bless my luck that I served in what I felt was the finest unit in the British Army in wartime and the most exciting and interesting company in British Industry in peacetime.

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POTATO HARVESTERS

Reekie developments keep Dominant 3000 ahead

The Reekie Dominant 3000 potato harvester with three key areas addressed: agitation system is now easily adjustable while working; the control system has been upgraded and major improvements have been made to the Clean Flow system

The established Reekie Dominant 3000 potato harvester uses the interchangeable cleaning modules that were pioneered in the late 1990's by Reekie. The harvester benefits from a number of changes for 2004, which are in-line with Reekie's product development programme to improve ease of operation and further reduce existing low levels of crop damage.

Three key areas have been addressed. The first relates to the main web agitation system. It is now easier to adjust while working, making it simpler for the operator to vary the agitation to suit prevailing conditions. Secondly, the CAN-BUS control system has been comprehensively upgraded to make operation of the electro-hydraulic controls simpler. Two live screens can be viewed, the first operating the commonly used controls, the second controlling the lesser used and variable options. This greatly simplifies on the move adjustments and provides operator friendly functions.

The final key change is to the area of the Clean Flow system. The working principle is unaltered, but major improvements have been made to the gearbox and the changing of rollers is now less time consuming. The new 'open end' Clean Flow module also has the option of fitting a fixed end bearing support. The pintle belt, which is fitted to the new roller table, continues to offer all the advantages that were available with the original Clean Flow unit.

This will be of particular interest to growers working in varied soil types, the revised system enabling a change of rollers to be made quickly and easily.

Other minor modifications have been incorporated into the Dominant 3000 for 2004; these focusing on overall build quality and operational improvements.

CONTACT

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TRACTORS

UK tractor manufacturer's Indian exports

Trantor Vehicles Ltd, a small innovative tractor designer and manufacturer in Lancashire, has signed a Memorandum of Understanding with HMT Limited, one of the leading tractor manufacturers in India - thanks to UK Trade & Investment. Under the agreement, HMT will manufacture Trantor Vehicles' tractors in its 340 ha Pinjore-Haryana factory complex in India and sell them through its 400 dealers across the subcontinent. The partnership is expected to capture 10% of the Indian tractor market.

Mike O'Brien, Minister for International Trade and Investment, said, "Trantor Vehicles is a success story that I came across on my recent visit to India. Companies both here and in the subcontinent are striving to build upon the longstanding commercial relationship. It is important to seize opportunities for successful partnerships with Indian companies."

The Company's products - Trantors - are the world's first transport oriented tractors featuring a range of two and four-wheel drive with fully suspended axles in 45 - 98 kW. In addition to the driver, there is capacity to carry six passengers.

Graham Edwards, chairman of Trantor Vehicles said, "For over 30 years, we have been researching farming activities across the world in order to develop tractors that will enhance farmers' efficiency and reduce costs. Trantors are the solution because they travel faster (maximum speed of over 70 km/h), use less fuel and are more comfortable than conventional tractors. This multi-purpose design means that Trantors are suitable for use in day to day transport, not only in the fields.

"India is the largest tractor market in the world after China, with a market size around 20 times that of the UK. It is also the market where tractors are used as a means of transport more than anywhere else", added Mr Edwards.

In June 2003, an UK Trade & Investment export promoter led an Indian delegation to visit Trantor Vehicles' operations in Wigan, Lancashire. Through commercial staff at the UK Trade & Investment team in India, contacts were made that eventually led to HMT initiating discussions with the company.

"Our success has demonstrated the value of UK Trade & Investment and explained how the Government can help businesses like us. It is largely due to the knowledge and professionalism of staff at UK Trade & Investment that we are put in touch with our potential partner. This is an 'arranged marriage' between HMT and us by UK Trade & Investment", added Mr Edwards.

Trantor Vehicles was a winner of the Small Firm Merit Award for Research and Technology (SMART) from the Department of Trade and Industry in 2001 and 2002.

CONTACT

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TRACTORS

Platform models join MF 5400 fleet

Virtually no horsepower range has been left untouched by Massey Ferguson's relentless new product launch schedule. Scarcely does a major European show pass without news of a new Massey Ferguson tractor range or new features.

The MF 5455 tractor from Massey Ferguson's high performance Platform range; useful for situations and conditions where a cab is not required

Agritechnica saw the world premier of the award winning 90 to 138 kW (ISO) MF 7400 and MF 6400 tractor ranges plus the launch of the 56 to 90 kW (ISO) MF 5400 cabbed tractor range.

This was rapidly followed by an award at the EIMA Show for the new 48 to 74 kW MF 3400 Vineyard, Special and Fruit Tractor range.

The 161 kW (ISO) MF 6499 and 139 kW (ISO) MF 6497 tractors, premiered at AGRIBEX in Brussels, were the first MF machines to be launched in 2004. The pace hasn't slackened as Massey Ferguson announces the launch of the MF 5400 Platform tractor range.

All MF 5400 Series four-cylinder tractors from 56 kW to 75 kW (ISO) are now available with a Platform operator environment in place of a cab. Noise levels on these new models do not exceed 86 dB(A) at the driver's ear which means they can be used in the EU as well as other markets.

Massey Ferguson is further extending its tractor choice with the option of these high performance Platform tractors for use in situations and conditions where a cab is not required. However, owners do not have to make a compromise because the Platform models come with the same features as other MF 5400s, maintaining excellent productivity and comfort.

All models feature:

- two or four-wheel drive;
- clear, open platform with noise levels down to 86 dB(A) and same right hand controls as cab models;
- two post folding, Rollover Protection Structure (ROPS);
- new Perkins 1100 Series four cylinder engines with improved power and torque characteristics and lower fuel consumption;
- 16/16 Speedshift transmission with left hand mechanical shuttle or Powershuttle;
- electronic linkage control with lift capacities of 5000 kg or 6000 kg; and
- comprehensive pto options including 540, 1000 rev/min and economy.

With the same modern Massey Ferguson styling as the cab models, the new Platform tractors also use many of the same features. Operator safety on the platform is provided by a two-post ROPS and there is clear, unimpeded access from a flat floor. The Platform provides excellent visibility to the front wheels.

All controls are laid out logically on the right side console. Here the single gear lever, spool valve levers and hydraulic controls fall to hand easily. The new dashboard maintains the MF family appearance with clearly laid out dials and warning lights. A digital dashboard is an alternative option.

All Platform models are equipped with Perkins 1104C-44 four cylinder engines which are turbocharged on the 68 kW and 56 kW models.

The new engines deliver more power and higher torque for the same power rating - particularly at low speeds - across the working range. This means operators can select a higher gear and reduce engine speed. Overall noise in pure decibel terms is reduced and a change of 'tone' makes the sound easier on the ears.

With 16 forward and 16 reverse gears on offer from the 'Speedshift' gearbox, operators will always find the right speed to match the application. A 'Creep' gearbox, offering speeds down to 0.6 km/h and a 0.2 km/h 'Super Creep' are options.

Gears and ranges are selected using a single lever with a button on, allowing gears and ranges to be changed at the same time. The handy Speedshift button on the lever allows each to be changed up and down

Massey Ferguson MF 5400 Series Platform models' specifications

Specification	*MF5425*	*MF5435*	*MF5445*	*MF5455*
Engine type	Perkins 1104C-44(NA)	Perkins 1104C-44(NA)	Perkins 1104C-44T	Perkins 1104C-44T
Power (ISO), kW	56	62	68	75
Displacement, l	4.4	4.4	4.4	4.4
Max torque at 1400 rpm, Nm	297	297	380	415

without the use of the clutch.

The mechanical reverse shuttle left hand lever is standard, with the option of a clutchless Powershuttle with fingertip control, also on the left. Both systems simplify headland turns and manoeuvring, allowing operators to change direction with the left hand, while operating loader controls with the right.

MF's industry leading electronic linkage control (ELC) provides simple, intuitive operation of the three point hitch with a novel 'mouse' unit and panel fitted to the right hand side console.

A standard lift of 5 t provides the MF 5400 Series Platforms tractors with one the best hitch capacities in its class, allowing the nimble tractors to handle a wide range of mounted equipment. Optional 75 mm rams increase lift capacity to 6 t.

Hydraulic power is from a high flow, open centre system (57 l/min) for powerful and fast operation of external equipment. Two mechanical spool valves SA/DA are standard, with three or four optional.

The versatile MF 5400 Platform tractors come with 540/1000 rpm pto speeds, with speed selection at the rear as standard. Options include operator platform speed selection 6 and 21 spline shafts and economy pto.

All MF 5400 Platform models follow the same family appearance that Massey Ferguson has established among all of its new models. The Platform tractors come with a steeply sloping bonnet as standard and central exhaust, although this can be optionally side mounted. Further options include rear view mirrors and additional work lights along with a large auxiliary fuel tank.

A swinging drawbar with height adjustable ladder hitch is standard but there is also the option of quick adjust automatic clevis, drawbar and pintle pin.

Throughout the range Massey Ferguson offers an operator the ability to specify a machine to their precise needs. All are outstanding in their class and among the top performers in their operation

CONTACT

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BALERS

Claas introduce new baler

The new Quadrant 2100, supplied with a 2.1 m wide pick-up as standard and either the RotoFeed or Rotocut chopping system, has been designed to meet the demand for mid-sized square bales. It produces bales measuring 80 cm wide x 70 cm high. All main baler functions are controlled using the new Claas Communicator control terminal which allow it to be switched between different Claas machines.

For next season Claas will have a new addition to its Quadrant high density baler range - the Quadrant 2100.

The new 2100 has been designed to meet the demand for mid-sized square bales, smaller than the Quadrant 2200, which produces a bale measuring 80 cm wide x 70 cm high.

In many respects the 2100 is similar than the larger 2200 and incorporates many of the well proven features from that model, to bring an entirely new level of performance to the 80 cm baler market.

To cope with large combine or rake swaths, as standard the 2100 comes with a 2.1 m pickup from where material is fed to the chamber through the Claas Power Feeding System (PFS) and either the RotoFeed or RotoCut chopping system.

Introduced last year, PFS uses an actively driven full width auger to accelerate the crop and feed it deep into the intake rotor. Alternatively, to achieve a shorter cut in silage, the RotoCut chopping unit can also be specified. On the 2100RC, up to 16 knives can be fitted and the cylinder housing's hinged design, allows it to swing down for easy access for knife maintenance or for clearing blockages. This gives the operator theoretical chop lengths of 45 mm or 90 mm.

To achieve consistent bale density, the 2100 has a three phase packer system, with the ram operating at 52 strokes/min. As on the larger Quadrant, all the packing elements are shaft driven, featuring a straight line drive to reduce wear and ensure maximum efficiency.

In line with its reduced chamber width, the 2100 has four knotters, which are kept clean using an electrical fan system, and there is the capacity to store 24 balls of twine on the baler.

The 2100 uses the new Claas Communicator control terminal for all its main functions, settings and data recording.

For greater functionality and convenience, the new Communicator works on a common platform basis, which in the future will enable it to operate a number of different machines in the customers fleet, reducing changeover time and cost.

The unit itself incorporates a wider display screen so that more information can be clearly seen without having to scroll through various sub menus.

CONTACT

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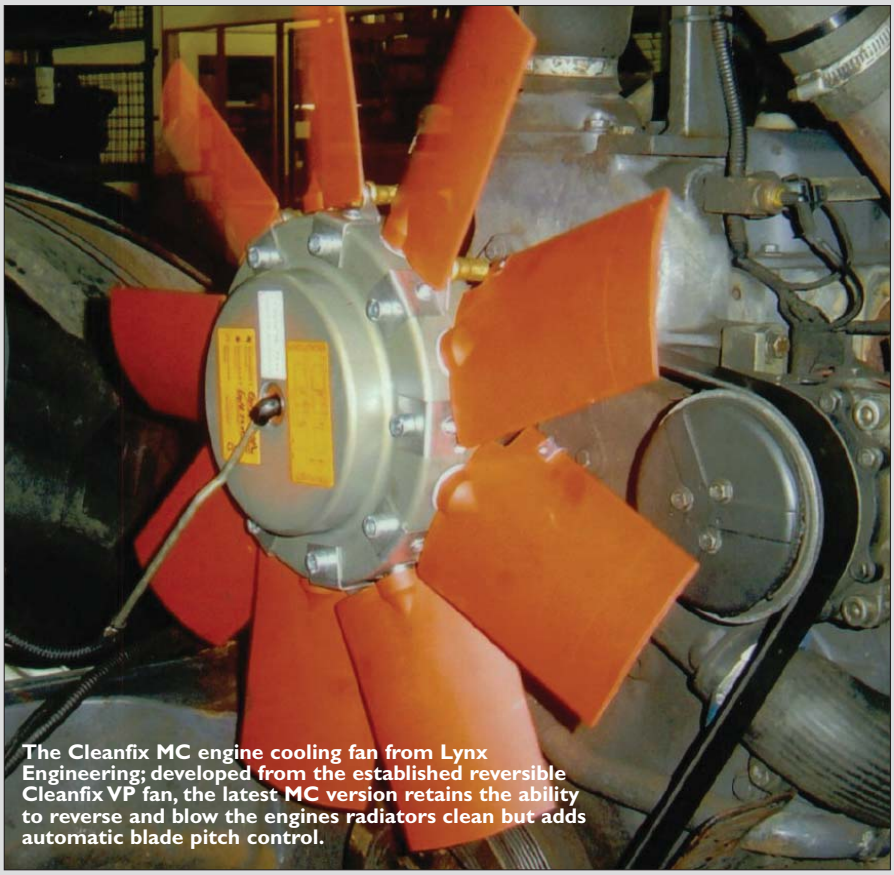
COOLING EQUIPMENT

New Cleanfix MC fan launched by Lynx

The Cleanfix MC engine cooling fan, is an automatic variable pitch fan that cuts fuel and power consumption and is an important introduction for Lynx. Developed from the established reversible Cleanfix VP fan, the latest MC version retains the ability to reverse and blow the engines radiators clean but adds automatic blade pitch control. This new development enables the fan to vary its airflow in relation to engine speed, engine temperature and cleanliness of the radiator.



The Cleanfix MC engine cooling fan from Lynx Engineering; developed from the established reversible Cleanfix VP fan, the latest MC version retains the ability to reverse and blow the engines radiators clean but adds automatic blade pitch control.

"The original Cleanfix VP fan was primarily noted for its ability to reverse its blades so it would blow air back through engine mounted radiators to clean them" says Lynx MD Nick Ewbank. "The latest MC version retains this important ability and one that is of particular relevance to us as the system fits in well with front mounted kit. The new Cleanfix MC fan goes a step further, the variable pitch blades enables the fan to operate at a finer pitch, with lower power and fuel consumption, when compared to a standard viscous coupled fan. This ability will help the fan pay for itself within a couple of thousand hours."

Apart from potentially reducing power and fuel consumption, the fan can rapidly accommodate a sudden rise in engine temperature. This can occur when engine loads increase or when air flow through the radiator is restricted. Although a viscous coupled fan hub clutch can effectively lock to ensure the fan turns at full speed, air throughput is determined by the fans speed. With the Cleanfix MC, the pitch will coarsen to dramatically increase airflow, even at idling speeds. The fan can also increase air flow to bring a hard worked power unit's temperature down more rapidly, so reducing heat soak when the engine is stopped. This can help protect the engine oil from overheating.

It was for clearing blockages that the Cleanfix VP fan was first developed, the latest MC version still offering this proven ability. In use, the fan is typically reversed via a switch in the cab. This enables debris that has collected both on the surface of the radiators and external grill to be blown off, restoring airflow through the cooling vanes without the need to stop the engine. In applications, such as operating a front mower to cut grass in flower beds, periodic cleaning will help reduce the build up of sticky pollen on the radiators and so prevent debris getting stuck to the cooling fins.

Suitable for use most makes and models of tractorand other equipment, including combine harvesters, the Cleanfix MC comprises a controlling hub and blades that are cut to exactly match the diameter of the existing standard fan. A typical installation will cost around £995.

CONTACT

Lynx Engineering is a rapidly growing specialist agricultural company working with farmers throughout the UK. It offers front linkages to fit all tractors front pto facilities. It also offer's an extensive range of presses for use in front or rear of tractors and in conjunction with other implements.
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World's largest stock of Marshall and British Leyland tractor spares

Last month, John Charnley & Sons, in Lancashire, took ownership of Marshall Tractors Ltd's stock and ongoing trade of Leyland and Marshall tractor spares. They now claim to be the world's largest stock in tractor spares for both the Marshall and British Leyland makes of tractor.

Customers contacting Marshalls by telephone are now seamlessly transferred to the spares department of John Charnley & Sons in Lancashire.

Manufacturing rights for the once Bathgate manufactured tractors of British Leyland's Medium and Light Division, at the time known as the Marshall range of tractors, was purchased by John Charley & Sons, from Marshall Daimler Ltd in 1993. The deal included all associated designs, drawings, patterns, tooling, manufacturing jigs and test rigs for the complete range of two and four wheel drive tractors. A lot of these items had originally been in use at the Bathgate plant.

John Charley & Sons, is a family business with over 50 years involvement in repairing, building and selling tractors, which have been known over that period as Nuffield, BMC, British Leyland and Marshall. More recently, of course, the Company has sold its own tractors under the JWD banner.

"Over the past twenty years, our Company has purchased major dealer stocks of Leyland tractor parts and engine spares for virtually all BMC, Leyland and some Perkins engines, from around the globe" said a spokesperson for the Company. "We are pleased to say that we have achieved our goal and now have the world's largest and most comprehensive stock of spares, including engines and workshop manuals, for Leyland and Marshall Tractors and all their predecessors."

Just over twelve months ago, John Charley & Sons took over what was originally Farmfast Supplies then latterly Buccaneer Spares stock of Nuffield, Leyland and Marshall spares, along with the servicing of that Company's customer base.

Over 99% of spares are shipped on a same day despatch service and are supplied extensively throughout the UK and Europe. From seals and bearings to rear axles and gearboxes, John Charley & Sons have sent spares as far afield as Australia, New Zealand, India, Bangladesh, USA, West Indies as well as throughout Europe, Scandinavia and the Baltic states.

Their manufacturing capacity for numerous fabricated parts is a boon to the Company, enabling volume spares for urgent export and other orders to be efficiently manufactured when required.

With its extensive maintenance and repair resources, unrivalled knowledge, skills and expertise the Company is well placed to provide tractor owners of all ages with a complete back-up service.

A full dynamometer test facility and other advanced equipment including hydraulic pump, valve chest and fuel system analysers, complement the expertise of the Company's mechanics and engineers.

JWD tractors Ltd was born in 1994, at the Company's premises in Brindle, Lancashire, following some serious design modifications and improvements to the Marshall tractor range. These changes made the tractor even more reliable and simplified service operations. Simultaneous enhancements to the tractor's overall aesthetic appearance were also made and it was given a new, vermillion red livery.

'70 kW JWD 494, 71 kW Marshall 954, a rare 63 kW Leyland 485 and an even rarer 93 kW Marshall 125, only twelve of which were ever made'; John Charnley & Sons in Lancashire now carry the world's largest stock of spares for these and many other tractors

MORE INFORMATION

Website: www.charnleys.com
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BIOMASS ENERGY

Seedlings of change for Scottish Coal

Scottish Coal, has announced plans to launch Scotland's first willow tree energy crop nursery near Vogrie Estate Country Park, Gorebridge in Midlothian, creating new jobs in the area.

Scottish Coal sees the growing of fuel-of-the-future crops potentially creating several thousand jobs in Scotland over the next ten years, provided industry, central government and local authorities can work together to realise this aim.

Due to open this summer on a 15 ha site near to Vogrie Country Park, the Chesters Wood Energy Plantation will be home to up to 0.5 million willow seedlings, which will be brought on for transplanting to willow coppice plantations across Scotland.

The trees yield a biomass energy crop every three to four years, which is chipped or baled then processed as a biofuel, used on its own or mixed with coal as a combi-fuel for electricity or heat generation. Scottish Coal has identified a clear commercial exit for growers of willow energy crop, with power generators having already expressed satisfaction following trials with combi-fuel.

Dacre Purchase, Development Director, commented, "Willow is an essential part of Scotland's effort to develop a thriving market for renewable fuels, which will create thousands of jobs and benefit the environment. "UK electricity generators are crying out for biofuels to meet their commitments under Renewables Obligation rules. Scotland's private and public sectors need to work together to deliver energy crops on a serious scale or overseas growers will grasp the opportunity from Scotland.

"The Forestry Commission's Woodland Grant Scheme is a reasonable start, but Scotland compares unfavourably with crop producers in England and Wales who are given £1,600 per hectare, compared with just £600 per hectare here in Scotland. We hope this anomaly can be overcome as the nursery is established."

Energy crops are greenhouse-gas-neutral, absorbing carbon dioxide during their growth cycle and releasing carbon dioxide when converted to energy. Willow trees each produce around three harvests, making them a sustainable energy source and being visually attractive, they contribute to Scotland's biodiversity.

Dacre Purchase added, "We believe it's vital for Scotland to have a mix of strategic energy sources for the future. We cannot afford to create an over-reliance on gas, for which Scotland will shortly be at the mercy of overseas suppliers. Scotland still has several years worth of coal reserves, but we're conscious that this is a finite resource, which will decline as renewables such as willow and wind power become more established."

Willow coppice plantation and harvesting is part of Scottish Coal's diversification, which as well as renewable energy includes windfarm development, biodiversity and recycling. As the UK's second biggest coal producer, the company already has the bulk handling skills and transport network in place to take energy crops from field to feedstock for power generation.

CAREER DEVELOPMENT

Interacting with engineering

A new interactive CD-ROM launched by the Engineering and Technology Board (etb) today aims to encourage more young people to consider a career in engineering. Aimed primarily at school careers advisers and teachers, the free CD-ROM highlights the wide range of exciting careers in the sector and provides practical information on routes into the profession.

The CD-ROM is called *engineers@work* and covers:

- the varied routes into engineering careers and the salaries, prospects and working environments on offer;
- examples of the creative and challenging roles for engineers worldwide; and
- case studies and sources of further information.

Alan Clark, Chief Executive of the etb said, "We hope this CD-ROM will show the importance of engineering in our society and highlight the exciting reality of an engineering career. Research commissioned by the etb last summer suggested that many teachers are unclear about what engineering actually involves. It is a diverse, well-paid sector at the cutting edge of design and innovation which offers a huge range of challenging and creative work, as this CD-ROM illustrates."

Fiona Sykes, chair of the steering group which has overseen the production of the CD-ROM, and Senior Careers Adviser at the University of Edinburgh said: "This CD-ROM provides a fresh look at a great sector. Using a mix of real life testimony and practical information about the breadth of engineering careers, it is a great resource for teachers, careers advisors and their students alike."

Barry McGregor, the subject leader for engineering colleges at the Specialist Schools Trust said: "Science, Technology and Maths are intrinsic to engineering but often the links between these subjects and an engineering career are not clear to teachers, pupils or their parents. This CD-ROM makes explicit the links between the subjects taught in the classroom and their practical application in the world of work."

MORE INFORMATION

Copies of engineers@work can be ordered from www.scenta.co.uk/engineersatwork

HIGHLAND SHOW SILVER MEDALS FOR NEW IMPLEMENTS

Four silver medals have been awarded by The Royal Highland and Agricultural Society of Scotland (RHASS) through its New Implement Awards. These awards went to manufacturers in Co. Tyrone, Perthshire, Lincolnshire and Lanarkshire.

Sponsored by NatWest, the awards recognise innovation and design in agricultural and related machinery and equipment and were on show in a special awards section adjacent to the stand of the sponsors, NatWest, at the164th annual Royal Highland Show, Ingliston, Edinburgh (24th - 27th June).

The show offers something for everything; a real flavour of farm and country life. Prize livestock, trade stands, forestry, countryside area, crafts, lifestyle village, fine food halls, forestry and shopping are just a few of the many features of the show.

The 2004 award winning products include a:

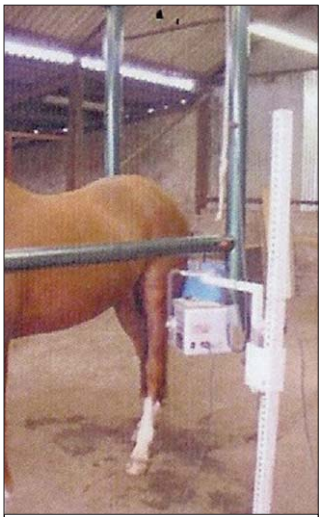
- grass cutting topper from Wylie Engineering of Co. Tyrone;
- physical restraint system for horses from Lawrie & Son (RFC) Ltd of Errol, Perth;
- stone and clod separator from Grimme (UK) Ltd of Boston, Lincs; and
- ATV anti-theft device from Messrs J. Lawson of Newhouse, Motherwell.

Chairman of the judges, RHASS Director and Chief Steward of Trade Stands, John Stewart, Remote Farm, Pathhead, commented: "The scope of this year's awards illustrates the range of opportunities available to inventors and manufacturers serving the farming and wider rural industry.

"We are also pleased to report that this is the 21st year of NatWest's sponsorship. Their support over the years has allowed us to reward many examples of innovation and imagination which have benefited our industry."

To mark the 21st anniversary, a number of products in three sections – livestock, arable

Silver Award – Wylie Engineering with their Grasstopper



Silver Award – Lawrie & Son (RFC) Limited with their Equi-safe

and miscellaneous – have been selected as the best examples of medal winners. The readers of The Scottish Farmer magazine voted to select the best individual products.

Judges for the 2004 silver medals included the following RHASS directors:

- Robin Waddell, Herdmanston, Pencaitland;
- Niall Mustard, Cloves, Alves, Elgin;
- Robert Maitland, West Balhalgardy, Inverurie;
- John Wight, Midlock, Crawford, Biggar;
- William Crawford, Hatton Mains, Kirknewton; and
- John Gordon, Wellheads, Huntly.

The silver medal winners are as follows.

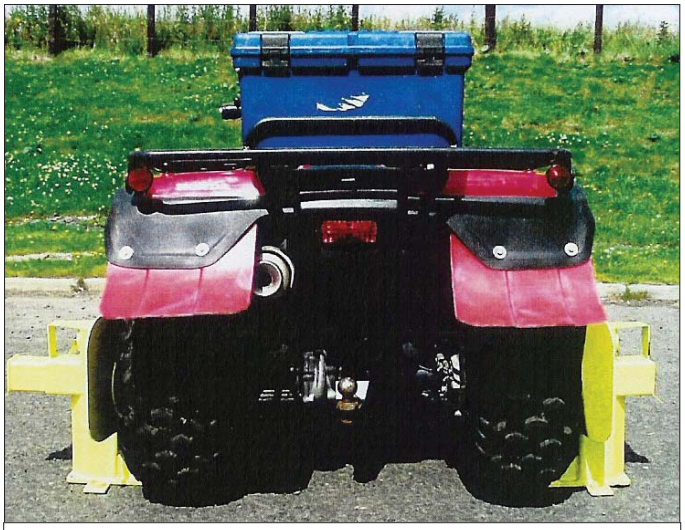
Silver Award – Grimme (UK) Ltd with their Combi-Web and Clod Separator

2.7 m Manx Grasstopper

A high performance grass-cutting topper, from **Wylie Engineering**, with three high-speed 'manx' rotors resulting in nine cutting blades compared to four flails in a conventional machine. The complete topper is mounted on a hydraulic ram/spring float system allowing it to follow the contours of the land. The construction utilises an additional gearbox and drive shaft.

Equi-Safe

The result of collaboration between several specialist equine practitioners from the UK and Australia to manufacture a physical restraint system for horses with the emphasis on safety of the horse and veterinarian/handler. Equi-Safe, from **Lawrie & Son (RFC) Ltd**, provides good, safe access to perform hind-limb radiography and nerve blocks. Its construction appears 'open' to the horse ensuring that untrained youngsters will walk in freely.



Silver Award – Messrs J. Lawson win with their All-Terrain vehicle (ATV) anti-theft device

Combi-Web and Clod Separator

After a two-year introductory programme, **Grimme (UK) Ltd**'s new model has a number of advantages over its predecessor, namely:

- faster work rate;
- reduced maintenance; and
- utilisation of modern design, technology and components without detriment to build quality.

Options to allow the machine to work in widely varying conditions and be adapted for other uses have also been introduced.

Quadclamp

A new, inexpensive and innovative ATV anti-theft device - easy to use and an effective deterrent . The standard model is designed to fit any width of 4 or 6 wheel ATV with deep well rear wheels from 40 cm to 65 cm diameter. This device, from **Messrs J. Lawson**, is also available for different shaped wheel wells, e.g. golf carts. It is of heavy duty construction, weighing approx. 20 kg each side and easy to install on concrete or high grade tar base.

Innovation Awards

The nine previous award winners marking the 21st anniversary of NatWest's sponsorship (see Inside Front Cover of this issue of *Landwards* for the Gold Awards) were:

Arable
Reekie Manufacturing – Cleanflow 2000 Potato Harvester (1994)
John Deere – 550 Round Baler (1984)
Vaderstad – Rollex Roller (1988).

Livestock
Adam Leggat – Highland Ground Drive Snack Feeder (2002)
Richard Keenan & Co – Easifeeder (1984)
David Ritchie Implement – Unistock Cattle Headgate (1993).

Miscellaneous
Grays of Fetterangus – Tubeliner Bale Wrapper (1992)
Claas UK – Rollatex Net Wrapping Attachment (1985)
Charles J Marshall – Tanker Auto Loader (1995).
Next year, the Royal Highland Show will be held from Thursday 23rd June to Sunday 26th June 2005.

CONTACTS

Grasstopper – Wylie Engineering, 97 Moy Road, Dungannon, Co. Tyrone.
Equi-safe – Lawrie & Son (RFC) Ltd, Balchalum, Rait, Errol.
Combi-Web and Clod Separator – Grimme (UK) Ltd., Station Road, Swineshead, Boston.
Quadclamp – Messrs J. Lawson, Linrigg, Newhouse, Motherwell.

ROYAL SHOW

NEW EQUIPMENT AWARDS

In association with Farmers Guardian

Overall Award and General Category Award

The Overall Award winner and winner of the General Category Award is Bomford Turner, for the Buzzard hedge and verge trimmer. The machine offers 6.5 m and 7.25 m reach options, 1.2 m and 1.5 m cutting heads and a choice of six flail types. The weight of the base machine in oil-filled working condition is a modest 1680 kg. A new intelligent control system (ICS) is fitted as standard to give the operator fully proportional control of the first and second arm movement, head float and telescopic arm. It is a robust, versatile and well engineered machine.

Arable Category Award

The winner of the Arable Category is Restrain Company Limited for the Restrain System of producing and dispensing ethylene in potato stores for the control of sprouting. The use of ethylene, a naturally occurring gas, for this purpose has been known since 1934 but it has come into particular prominence in recent times, as an alternative to existing chemical treatments. The System comprises a generator, sensor and fuel supply. The fuel is based on ethanol found in spirits such as vodka which is passed over a heated catalyst to form ethylene. The system is robust and reliable, is portable at 15 kg and only requires a 13 A socket for operation.

Livestock Category Award

The winner of the Livestock Category is Shearwell Data Limited for the ADL130 FDX/HDX reader for animal tagging. It is a dual technology reader with a range of more than 1.3 m and has full ability to read both frequencies (duplex and half duplex) at equal strength. It has a unique synchronisation feature to allow use of multiple readers in close proximity which is a vital facility in busy market or abbattoir situations. The SDL 130 represents a useful step forward in animal recognition technology.

Special Category Award

The winner of the Special Category is G.E. Baker (UK) Ltd for the Steko telescopic compact loader. This is a compact pivot steer loader capable of lifting up to 1700 kg to a height of 3.5 m. It has a telescopic front axle for stability and safety, the overall width of the loader being 1.1 m up to 1.76 m. It is a multi-functional machine with a wide number of buckets, tines, grabs, brushes and a rear digger available. It is especially useful in dairy, pig, glasshouse and similarly restricted working situations.

CONTACTS

For more information about the New Equipment Awards 2004, contact Emma Dineley.
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Website: www.rase.org.uk

RASE Machinery Awards 2004

The **Gold Medal Award** together with the **Silver Medal and Grower Award** are presented on the inside back cover

SILVER MEDAL

Accord TS Tine Seeder - Kverneland Group UK Ltd

Kverneland win a Silver Medal with their Accord TS Tine Seeder

The TS Tine Seeder is a cost efficient comparatively light tine drill which users found effective and trouble-free over a wide range of soil textures and moistures and on both traditional plough-based tilths and minimal cultivation.

The reason several users gave for buying the drill was that they wanted a drill that would work under adverse conditions when necessary. They had not been disappointed. The drill uses the well proved Accord central seed metering and air distribution system; tines on a three-stagger toolbar giving excellent clearance for working through trash, placement of the seed behind the tine point and a following adjustable two row light spring tine harrow. The seeder tines are protected by an auto-reset leaf spring arrangement similar to that seen on Kverneland ploughs. Depth control is by two flotation tyres and the two sections of the drill are connected by a pressure accumulator for close ground following. Working width is 4 m to 5 m and weight 1630 to 1850 kg.

Users reported drilling a comfortable 24 ha a day, stands produced were at least as good as any other drill tried and the ability to perform under difficult conditions was impressive. Tractor power requirement was modest, allowing the drill with a light tractor to operate where heavier machines had problems.

The markers and the tramline mechanism were excellent. They found the drill well engineered and robust and any minor failings that occurred were quickly corrected by Kverneland.

CONTACT

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Website: www.kverneland.co.uk

SILVER MEDAL

Keenan Klassik Bale Handler - Richard Keenan (UK) Ltd

The Keenan Klassik Bale Handler is a robust, simple, reliable and efficient mixer and feeder which in the experience of users handled every kind of material offered but most importantly whole bales of hay, straw, haylage and silage.

Chopping and mixing time is short at five minutes or less, mixing is thorough and complete, and the product is light, fluffy, long fibred and very palatable to the animals. Power requirement is low and said to be about 20% less than previous models.

Users found that for the 140 model, for which Keenan suggest 63 kW in the tractor, the 'stockman's tractor' at 45 kW was often adequate. Typical figures for a 4000 kg load were twenty minutes to fill and mix, and a further ten minutes to feed out and return.

The machine is strongly built and totally reliable, with the main bearings external for easy access and the paddles bolted for quick replacement if that should be necessary.

Keenan offer free nutritional advice with the Klassik which users found excellent for optimising feed quality and reducing costs. A typical comment: "The cattle are doing better, they are healthier and easier to feed".

CONTACT

Richard Keenan UK Ltd, 6th Street National Agricultural Centre, Stoneleigh Park, Kenilworth, Warwickshire, CV8 2RL.
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Website: www.keenansystem.com

SILVER MEDAL

Shelton System 25™ - Shelton Sportsturf Drainage Solutions

The Shelton System 25™ is a trenching machine with a coupled backfilling attachment designed for work on sports fields. The main function is the installation of secondary drainage systems over existing piped drainage. It is capable of cutting trenches 25 mm to 95 mm wide to a maximum depth of 400 mm. It is 3-point linkage mounted. The digging wheel is pto driven, while the spoil conveyor and the backfilling attachment are hydraulically operated. Construction of the machine is largely stainless steel. System 25™ may also be used to install land drains and underground services. The Awards judges did not investigate this function and the Award was made on the basis of its excellence as a secondary drainer.

Users included contractors and golf club maintenance staff. In every case design and construction of the machine was agreed to be excellent. The use of stainless steel for the hopper aided smooth flow of the infill material. Tungsten carbide wearing parts gave long life and reliability, and wearing parts replaceable in sections rather than complete were an economy.

The quality of the work was described as 'fantastic' by users, with minimum disturbance to greens and no interference with the use of the course.

Work rate, with a team of three men and two tractors, was of the order of 1500 - 2000 m per day, depending on depth of work and soil factors. The high overall work rate was attributed to the extreme reliability of the machine and no time lost due to breakdowns.

The drainer was being used on golf courses and other sports pitches. Users made the point that sports contracting is an image conscious industry and the Shelton and the job it does are 'polished' in every sense.

CONTACT

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E-mail: sheltons@baumber-house.fsnet.co.uk Website: www.sheltonsdrainage.com

SILVER MEDAL

Carrier - Väderstad Ltd

The Carrier is essentially an extendable tool carrier which can carry a selection of soil working tools to produce a shallow, uniform, well mixed and consolidated seedbed at high work-rates and low energy input. The front section carries two rows of comparatively small 430 mm diameter discs, each on a rubber suspension, conical in section and only slightly angled to the direction of travel. The relative positions of the disc rows can be adjusted. They provide complete ground coverage at shallow depth without risk of smearing or compaction. There is an optional front straw harrow which the majority of British users buy. The rear section carries a set of press rings which may be of pressed steel construction or cast: the weights are the same in either case. There is a further option, favoured on light land in Denmark, of a rubber ring press. The Carrier is available in 8 widths, 3 m to 12.25m. Optimum forward speed is about 14 km/h, and users found tractors of around 101 – 112 kW with the 5 m model gave a work output of around 4 –5 ha/h.

Users were for the most part replacing traditional cultivation with the plough and power harrows, and heavy discing, with the Carrier. The increase in work rate and reduction in power requirement was dramatic. One or at most two passes with the Carrier produced satisfactory stale seedbeds or seedbeds for immediate drilling. Disc wear was low, support from Väderstad was excellent, and some aspects of the design - notably the rubber disc suspension and the press wheels - were particularly appreciated. The disc option for the front section was in effect standard. Just one customer we interviewed had additionally bought the Crossboard and Agrilla-Xtra (heavy tine) option for particularly heavy conditions.

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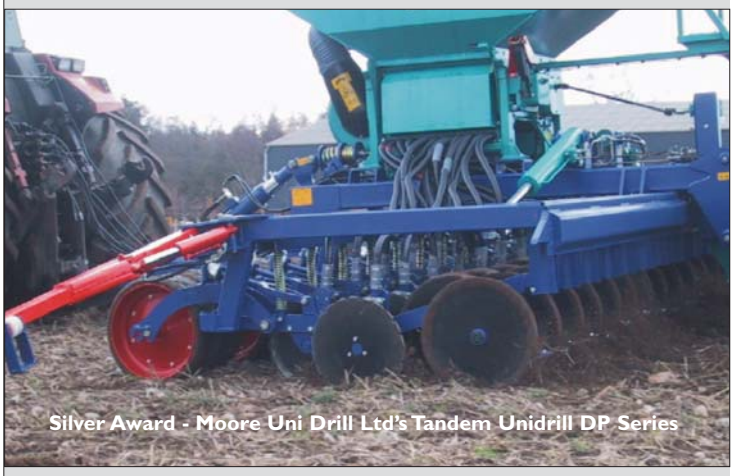
Website: www.vaderstad.com

SILVER MEDAL

Tandem Unidrill DP Series - Moore Uni Drill Ltd

The Tandem Unidrill has been developed from the long established and well proved Unidrill principle. Widely spaced front and rear press wheels have the coulter suspended between them to give precision control of depth of planting. The front press wheel, a zero pressure rubber tyre, consolidates the seedbed in front of the coulter, and additionally prevents the coulter from 'diving' in patches of light or soft ground. Opening for the coulter is by a slightly angled disc. Depth of sowing is easily and positively adjusted by aluminium spacers and accuracy of depth placement is maintained regardless of varying soil conditions. Each pair of coulters is individually sprung to follow ground contours. Seed metering is by individual peg rollers with pneumatic delivery. The coulters are tungsten tipped. The drill folds to 3 m for road movement. Seed hopper capacity is 1600 litres (4 m width).



Silver Award - Moore Uni Drill Ltd's Tandem Unidrill DP Series

The main reason users gave for buying the Unidrill was that they needed a drill for all purposes. That included drilling over ploughed land, minimum tillage or direct drilling, heavy or light land, and if necessary wet conditions. Users planted cereals, maize, evening primrose, borage and rape with the Unidrill. They reported precise depth of sowing and 'in-the-row' spacing and excellent covering by the following cast press wheels. Soil displacement is minimal and tractor requirement agreed with the Moore suggestion of 97 kW for the 4 m drill. The recent development of 'filling in' the spokes of the press wheels works well. Daily work output was around 20 ha and exceptionally 32 - 36 ha. Support in the field and on the telephone from Moore was outstanding. This drill fitted exactly the present day needs for economy and versatility as farmers move towards less input into cultivations.

CONTACT

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SILVER MEDAL

Claas Lexion with Terra Trac - Claas UK Ltd

Bigger combine harvesters with a wider cutter-bar and larger grain tank can offer greater efficiency and real cost savings but often at the cost of the fully laden weight of the machine exceeding that of any other wheeled vehicle on the farm. Claas offer the larger Lexion combine harvesters with Terra Trac, a rubber track system which reduces ground pressure by 66% compared with the same machine fitted with standard 800/65 R32 tyres. The track machine is also narrower at 3.5 m rather than 3.9 m, again with the standard tyres. It gives a more constant stubble height over tramlines and rough terrain and has greatly improved traction on hills. On the combine models where the tracks are available 50% are at present sold with the track system.

Silver Award - Claas' Lexion with Terra Trac

The new 580 and 560 Claas combine harvesters have a suspension system built into the axle. This combined with the tracks gives a completely new level of ride comfort on the road.

All the combine harvesters seen by the Awards judges were Lexion 480's. The reason for investing in tracks was either for traction in hilly areas, or for soil care and a progressive move towards minimum tillage and faster, cheaper crop establishment. Traction performance and stability, whether operating up, down, or across hills was excellent. On rough ground travel was levelled out and control of the header unit was greatly improved.

The 400 mm saving on the width of the combine harvester was an advantage when on the road, especially in the west. Users said that the combines left no marks in the field - "you could not tell where the combine tracks had been" - but 2003 was a particularly dry harvest season and a better test of the reduced ground pressure from the tracks will come in a wet season. Combine harvester drivers said that the tracks were completely acceptable to them. The users consulted had, together, harvested some thousands of hectares without incident and expected the tracks to have a long working life. The additional cost of using tracks was thought by users to be of the order of £3.75 per hectare. Their general view was that all large combines should run on tracks.

CONTACT

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SILVER MEDAL

CargoXbib Tyre - Michelin Tyre plc

The Michelin CargoXbib is a radial construction, low pressure agricultural tyre for trailers, implements and grass care machines. It requires a lower operating pressure than alternative tyres, giving lower ground pressure, lower rolling resistance, less rutting and less compaction. The radial structure has steel bracing in the crown area which ensures good handling and stability on the road, high load capacity and puncture resistance. It is designed for road transport at 50 km/h and up to 65 km/h where that is permitted. The use of the latest developments in rubber compounds and a flat tyre profile give a significant improvement in service life - as much as 16% over the previous standard tyre.

Users confirmed the increased footprint of the tyre, over previously used examples, reduced rutting, made for easier towing, greater trailer stability and better ground clearance. They also mentioned the smoother ride and reduced muddying of the road (an important point in some areas), as a result of the block tread pattern. Some of those consulted were intensive users. One set of tyres had already covered over 20,000 miles. All users were totally satisfied with the CargoXbib and had already placed an order, or would place an order for more.

CONTACT

Michelin Tyre PLC. Website: www.michelin.co.uk

SILVER MEDAL

Power Arm 55 & 60 - McConnel Ltd

The McDonnell Power Arm 55 and 60 are a new series of tractor mounted power arms, designed for heavy duty hedge and verge maintenance throughout the year. The machines have reaches of 5.5 m and 6 m respectively and are suitable for tractors of 52 kW and over. They are mounted using a 'Quick-Fit' three point linkage A-Frame or a 5-point bracket mounting for total rigidity.

The new models can be recognised by a 600 mm McConnel roundel on the rear cover. The roundel, magnetically attached, can be reversed to show a blue direction arrow for highway working. The top section of the cover opens for easy access to the main frame and hydraulic components.

The A-frame has been incorporated into the design of the main frame in this new series, and under frame pick-up points, together with a lower positioned gearbox, provides better ground clearance and closer attachment to the tractor for improved weight distribution.

The reach and dipper arms are fitted to the 'High Reach' rocker pillar to allow close cutting in narrow lanes and similarly restricted sites. There is a 'Midcut Pack' option which moves the flail head 1.5 m forward, so that the operator is looking forward, rather than over his shoulder, at the work.

Control is optional between the simple cable system, the electric switch box, the mono lever and the latest Digital Armrest Proportional Control. The well tried and award winning 'hands free' Automatic Easy Drive Verge Flotation System (EDS) is also available.

Silver Award - McConnel's Power Arm 55 & 60

There are options of 1.2 m and 1.5 m flail heads and a choice of flail design. Also available are a 1.5 m heavy duty Timbercat for timber up to 10 cm diameter, a saw head and a rotary ditch and grip cleaner.

Users were very clear in their comments that the 55 and 60 were excellent and an advance on previous models. The close-in work possible with the new machine, and the standard oil cooler, were particularly mentioned. All users said that they would go back to McConnel if they were looking for another machine, and the only regrets expressed were by users who had not gone for the EDS and Digital Armrest Proportional Control.

CONTACT

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Website: www.mcconnel.com

SILVER MEDAL

CSL Evolution - Crop Systems Ltd

'CSL Evolution' is an innovative crop storage controller dedicated to the precise control of all aspects of the potato storage regime. Crop Systems Limited will install the controller in existing stores but also offer a complete store service from initial design, planning, building, installation of insulation, ventilation, cooling and related systems and commissioning. They will also undertake the conversion and modification of existing buildings for storage purposes and will supply their own modular ambient air mix/refrigeration/humidity unit tailored to the requirements of specific stores. They advise on store management and energy and time efficiency and also offer on line monitoring and remote control of stores if that should be required.

The CSL Evolution control system will operate all fans and ventilation equipment, heating, refrigeration, humidifiers, defrost, ventilation louvres and doors and gas injection. Sensors monitor humidity, temperatures, airflows, CO_2, and ethylene at various points throughout the crop and the building. The key features include:

- dew point curing;
- adiabatic curing;
- active louvre control;
- auto crop setpoint control;
- gas monitoring; and
- CIPC gassing program.

The entire system is managed from a simple interactive touch-screen display panel.

Users reported very precise control of store conditions and excellent crop quality to match the demands of the major buyers. Running costs were low. The control box is robust and sealed against dirt and dust, and found to be easy to understand and manage. The continuously available record, of all store functions, temperatures, humidities, fan running times and gas concentrations, was commercially important. Support from the company, both on line and on-site, was very highly praised.

CONTACT

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SILVER MEDAL AND GROWER AWARD

DART precision seed drill - Stanhay Webb Ltd

The DART drill is unique in so much as it is a precision drill for cereals but it also handles sugar beet, sunflower, maize, peas, beans, soya and a wide range of horticultural seeds of all shapes and sizes to a known total number of 35 species. The accuracy, speed, reliability and versatility of the metering system centres on a twin disc arrangement. A thick disc handles large seeds, with a thin one mounted on it for small or difficult seeds. The thin disc significantly reduces the risk of seeds sticking in the holes. Vacuum is applied uniformly over the whole disc area from a fan delivering a constant pressure of 70 mbar regardless of tractor pto speed An adjustable choke plate regulates seed flow from the hopper to the pick-up area. A finely adjustable singulator allows accurate singulation under working conditions, and both singulation and pick-up of seed on the disc can be checked through a side window in the unit. The seeder units are parallel linkage mounted and allow adjustment of the effective weight of each row in stages. Each unit has telescopic clod deflectors, ceramic coulters, a covering system and a zero pressure concave rear wheel to give good 'seed to soil' contact with a domed anti-crusting finish. The units can be mounted to give row spacing down to 166 mm, with a unit pressure of up to 95 kg. Drill width is normally up to 4 m. One user had modified the drill to 6 m width. The cereal version has a Dickey John Land Manager variable seed rate controller as standard equipment.

Stanhay's DART precision seed drill wins both a Silver Award and the Grower Award

The reasons given by users for choosing the DART were versatility: one drill is required to precision sow cereals, onions, sugar beet, peas, rape and other crops; one drill to precision sow expensive, often organic seeds, and so reduce costs; and a drill which could be linked into field maps and precision farming practice. A major user had searched Europe for such a drill but found the DART to be the only one offering what was required. Precision spacing in the row, depth of planting and contour following was said to be superb. There were economically important results in the proportion of the onion crop being in the marketable size range and improvements in the cereal crop in terms of yield, reduced seed costs, reduced chemical use because of reduced disease incidence, and higher grain weights. Forward speed of drilling was normally 6.5 km/h and, exceptionally, 8.0 km/h and daily outputs of 15 ha and, exceptionally, 20 ha.

CONTACT

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GOLD MEDAL

Rapid A drill - Väderstad Ltd

The Väderstad Rapid A drill is a cultivator drill suitable for crops of seed size ranging from oilseed rape through to beans, once cultivation ranging from traditional ploughing to minimal and zero tillage has taken place. This can be used on the widest range of soil types and if necessary with substantial surface trash present. Several options of rigid and flexible tines are offered by the Parent Company but within the United Kingdom 'System Disc' is standard. This consists of two rows of curved serrated double sprung discs of 400 mm diameter followed by a single crossboard; the disc coulters, press wheels and light following tines, follow this. The drill is offered in this country at 4, 6, and 8 m widths, and Machinery Awards judges consulted users of all three versions. Seed metering and distribution is by a well tried hydraulically driven pneumatic system. Seed rate setting is from a press button control station in the cab and the output of the seed metering unit is controlled by a radar ground speed sensor. There is an optional auger filling system for the seed hopper (capacity 1900 to 3200 l or roughly 1.5 to 2.5 tonnes of wheat). The transport width is 3 m for all models.

Users reported precision depth of planting and 'down-the-row' spacing of seed. The drill was being operated at up to 15 km/h, with around 12 km/h being considered the optimum for quality of work. An 8 m drill had covered 1400 ha without any problems by mid-December of its first drilling season and large outputs of trouble free work were reported by all users. The tractor requirement was found to be around 119 kW for the 4 m, 187 kW for 6 m and 224 kW for 8 m. The drill performed well under all soil and trash conditions but was mainly used for minimum tillage, either after one initial shallow cultivation or without any pre-cultivation. It was said by most users to save at least one cultivation pass over the land. Disc wear varied with soils and conditions but was found to be very close to the norm suggested by Väderstad of 400 ha for each metre width of the drill before replacement was needed. Minor faults and breakages occurred, and Väderstad immediately dealt these with. There is a ready market for used Rapid A drills and the residual value is high.

Väderstad Rapid A drill; Gold Medal Award winner at the RASE machinery awards 2004

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The professional institution of choice for engineers, managers, scientists, technologists, environmentalists and students in the land based sector offers five grades of membership from Associate (including students) to Fellow. Non-corporate grades accommodate non-engineers and companies; you do not need to be an engineer to enjoy IAgrE membership

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- Food Engineering and Technology
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- Amenity and Ecological Engineering
- Pioneering Technology
- Overseas/International Development
- Livestock Engineering

If you have found something of interest in this journal, send for details of membership to:

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IAgrE