Agriculture • Horticulture • Forestry • Environment • Amenity

LANDWARDS

Autumn 2004

- Waste Management
- Hose Technology

Diversification

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New Holland innovation in grape harvesting

The grape harvester featured on the front cover was singled out by the judges at Italy's EIMA 2003 for its adjustable harvesting system and newly-introduced crop cleaning system, having previously won a Gold Medal at France's SITEVI 2003 exhibition for the wine, fruit and vegetable sectors.

Unloading an impeccably clean harvest

The harvester's new harvesting head has been designed so that the user can easily and rapidly set the shakers, in particular the number to be used and their vertical spacing. Selected shakers can be quickly disengaged or repositioned and regulated with ease, allowing operators to accurately adapt the shakers to their vines and position them correctly at the fruit-bearing level. Importantly, the system ensures the best possible harvesting performance in any crop conditions.

Efficient picking by horizontal shaking rods into redesigned baskets which improve the sealing between the vines

The new cleaning system features New Holland's patented destemmer-separator, giving the VL range its best ever cleaning performance. While the harvester's cleaning fans eliminate leaves before the grapes are transferred to the hoppers, the destemmer-separator on the top of each hopper removes any remaining stems and any other foreign body that may be in the harvest. With crop quality an important factor at every stage of wine production, the new system ensures that extremely clean grapes are delivered to the winery.

A comfortable new cab is designed to provide maximum comfort. Highly visible instrumentation and ideally located controls provide the latest in operator convenience.

A new system has also been introduced to quickly have the base unit available for usage other than harvesting. This patented system allows detachment of the harvesting head in less than 15 minutes by one operator without using any tools. An extendible front equipment arm is optionally available This fully adjustable interface is operated from within the cab where its controls are integrated into the multifunction lever.

Fast detachment of the harvesting unit

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LANDWARDS

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Feature Articles

Front cover: *Grape harvesting (Courtesy: New Holland Co Ltd)*

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DIVERSIFICATION IN AGRICULTURAL ENGINEERING

David Shelton

Two examples of diversification are presented in this article, namely: a farmer/horticulturist diversifying into agricultural engineering; and a 100 year old smithy diversifying or evolving into the leisure industry.

David Shelton studied horticulture at the School of Agriculture, Sutton Bonington, and was fortunate to be taught by an outstanding team of relatively young staff. In due course, many of them moved on to some of the most senior posts in the industry. Undoubtedly, this experience has had a big influence on what was to follow in his career.

Product innovation

In 1980, we were farming in West Kent, on a good loam overlying Weald clay. To keep livestock out of doors much of the year needed well drained land but the cost of installing piped drainage overall was prohibitive, even although grants were still available. We had to devise an alternative way and the proposed solution was slit trenching.

Shelton Gravel Band Drainer - a trenchless system for installing secondary drainage on sports fields, golf fairways and golf greens

On this gently undulating land, ditches move large amounts of excess soil water. The drawbacks of ditches are the amount of space that they take up and, where cattle graze, the requirement to fence them off for safety. So the question then was 'How narrow can we make a ditch?' In the end, it was decided that 50 mm would be sufficient and we ran these across the land at nine metre intervals. The cost worked out at £25 per hectare and the drainage was so effective that the Royal Agricultural Society of England (RASE) awarded our STS Trencher a Silver Medal.

BIO NOTE

This article is based on a talk originally given by David Shelton to the East Midlands Branch of the Institution of Agricultural Engineers. David Shelton's admission into membership of IAgrE was via the 'eminence' route. He is Managing Partner of Shelton Sportsturf Drainage Solutions, Managing Director of E. Skinns Ltd and Chairman of Sheltons Drainage Solutions S.A.

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Engineering then took over from farming!

Market niche

This circular saw type machine, mounted on the three-point linkage of a tractor, cut an amazingly clean trench which interested those involved in sports field construction and maintenance. In 1983, at a time when there was a down turn in agricultural production, Shelton Trenching Systems launched the Supertrencher - an enclosed trenching machine fitted with a conveyor to carry the arisings into a trailer or dump truck running alongside. At a stroke, it revolutionised sports turf drainage.

Simultaneously, the business developed backfilling hoppers for gravel and sand, trailers with low pressure grassland tyres and gravel carts.

The ancillary equipment was miniaturisation compared to what had previously been utilised on farms but the opportunity was taken to adapt this to suit fine turf. Drainage of established turf is far removed from what is needed in agriculture. In spite of over twenty years of publicity, a handful still cling to agricultural techniques and herringbone layouts on sports turf, not realising the cost savings and effectiveness of the latest techniques.

Shelton Supertrencher, and Shelton 4-wheels-in-line High Lift Trailer draining a sports field with superb clean surface finish

Business development

A manufacturer needs to test new designs of machinery on a wide range of soil types and in the hands of different operators before going into production. This is an expensive and time-consuming exercise. For this reason, we established contracting and hire divisions which operate throughout Great Britain.

The business changed its name in 1997 to Shelton Sportsturf Drainage Solutions to reflect its main activity. The steadily increasing range of equipment is now marketed in 17 countries world-wide. Much of it is manufactured in stainless steel because it exhibits the following features:

- ease of flow of materials;
- greater strength than the equivalent thickness of mild steel;
- non rusting; and
- greatly improved general appearance.

Production is undertaken by several engineering businesses under contract. The three RASE Silver Medals awarded to the company reflect the technological advancements and high quality production. Substantial expenditure on research and development (R & D) is also aimed at keeping the business in the forefront of sports turf drainage techniques.

We can now say without hesitation that on established sports turf, including golf greens, Shelton sports turf drainage equipment and techniques pioneered by us, enable one to drain today and play tomorrow.

Shelton System 25 draining an established golf green; trenches are 25 mm wide and are simultaneously being backfilled with Lytag

Manufacturing expansion

The second facet of diversification in agricultural engineering brings me to my example of a 100 year old smithy diversifying or evolving into the leisure industry.

E. Skinns Ltd was started by Edmund Skinns just a hundred years ago in the village of Woodhall Spa, in the County of Lindsey (Lincolnshire). There was no early retirement in those days with Mr Skinns working until he was 82. It was a thriving business in a rural area. Blacksmithing and steam engine repairs, together with the manufacture of harrows, were the main activities.

In 1932, Ernest Skinns joined his father. They bought the first welding plant in a rural area between Lincoln and Boston and began specialising in welding repairs to mowers, binders and balers. In the winter months, they were making harrows and laying hedges.

David Skinns is known to many and is active in IAgrE affairs. In 1959, he joined the

business, going to Rycotewood College on a full-time course followed by three years of block release. New blood in the Company led to the development of a wide range of equipment:

- fertiliser spreaders;
- flicker type spreaders for potatoes;
- spring tine cultivators; and
- chisel ploughs.

Sales were mainly to local farmers of whom there were many in the district.

Farms grew rapidly in size in the 1980s and this work tailed away to be replaced by fixed equipment work:

- meal hoppers;
- feed equipment; and
- prefabricated mill seed-cleaning.

This prefabricated mill seed-cleaning machine died almost overnight.

In 1992, E. Skinns Ltd. started manufacturing machinery for Shelton, initially the Shelton twin leg Gravel Band Drainer, then the single leg version of this. Expertise in design, in hydraulics, together with in depth technical knowledge led to involvement in the development of new models of the Shelton Supertrencher and of Shelton System 25. Skinns built prototypes and eventually production models.

Four years ago, David Skinns intimated he was putting the business up for sale. It was an important contributor to the success of Shelton Sportsturf Drainage Solutions so D.B. & E. Shelton purchased it, retaining the management and the workforce of four.

Since then, the working area has been extended by 70% and laser profiling has speeded up production. There has been further involvement in R & D.

Job opportunity

Shortly, with the retirement of the third generation of Skinns, a new helmsman will have to be appointed. We live in competitive times but the up and coming generation of new managers are quite capable of maintaining and improving upon the high standards achieved by their forebears. We are now actively seeking a qualified agricultural engineer to manage and expand the Company as it enters its second century, anybody interested should contact David Shelton for details.

VERMICULTURE

Munch through organic waste with new worm harvester

The humble worm is set to play an increasing role in creating a greener world thanks to a collaboration involving materials handling specialist Allibert Buckhorn and scientists from the Worm Research Centre in North Yorkshire.

Vermiculture – the farming of worms – is, quite literally, a growing business and one that has the potential to make a major contribution to a greener and more environmentally friendly way of disposing of millions of tonnes of waste. Scientists have been working for two years to come up with a modern and effective worm breeding system, working with partners including Allibert Buckhorn.

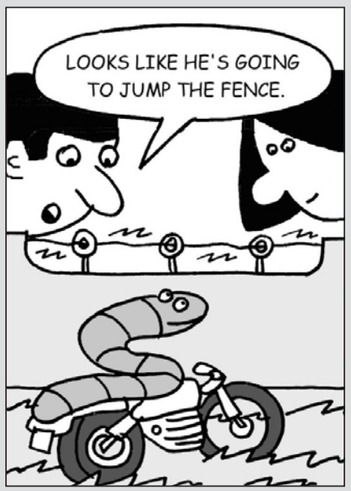
A system of 'Worm Towers' has been created, in which breeding worms are stacked in specially designed Allibert Buckhorn plastic containers, which are easily accessible and easily moved around on wheels. Combined with a newly patented worm harvester, the towers remove the need for back breaking lifting and carrying.

Worms were traditionally bred in old boxes that were given freely, but profit margins were constantly being eroded due to the high costs of managing these systems and poor productivity levels.

"Research has clearly demonstrated that worms kept in ideal conditions – dark, damp and warm – breed much more successfully," said Steve Ross-Smith who is the centre's director, "They have a tendency to wriggle their way to freedom, so most breeding systems and indoor units have had to keep the lights on to stop valuable stock escaping!"

In order to solve this issue, a "Worm Warden" system was designed – a miniature electric fence is used to make sure the worms can be kept in darkness without being able to wriggle free.

Vermiculture has two main markets –



supplying bait for fishing and worms for Vermi composting in which worms are used to break down waste, which is much more environmentally friendly than dumping to landfill. Worms are capable of transforming organic waste into valuable compost in just eight to twelve weeks.

The breeding of worms is a growth industry and an activity into which an increasing number of traditional farms have been diversifying. Although worm farming has been around for many years, very little serious work has been done to investigate how it can be turned into a viable farming proposition and industrial process - but this is changing.

The Worm Research Centre in Yorkshire, founded nearly four years ago, is now in the final stages of work that will give breeders total control of their business and offer low cost and high profit breeding facilities.

Early indications are that the worm really is turning, and the system developed by the Worm Research Centre, with the help and expertise of Allibert Buckhorn, points the way to the future.

MORE INFORMATION

Simon Mendes, Allibert Buckhorn. Tel: 01905 823500.

RAISIN WASTEWATER TREATMENT USING MEMBRANE FILTRATION SYSTEM

When the National Raisin Company in California was looking for a way to minimise its wastewater costs, a new membrane filtration system from ITT Industries' Sanitaire PCI Membrane unit proved to be the solution they were seeking.

The National Raisin Company of Fowler, California, had good news and bad news. The good news was that sales and production of its Champion Raisin products were rapidly increasing. The bad news was that their wastewater costs were increasing just as fast.

Fortunately, thanks to the new membrane filtration system, National Raisin has not only been able to cut their wastewater costs but they have also opened up a potentially lucrative source of additional income. While this particular solution is currently used only in raisin processing, producers of any dried fruit – prunes, dried apricots, etc. – would likely find similar benefits.

Raisins at National Raisin Company enter the washing system by conveyer, at a rate of 200 tonnes per day.

Disposal problems

Processing about 50,000 tonnes of raisins per year (200 tonnes per day), National Raisin is the second largest processor and distributor of raisins in the United States of America. The company generates between 270,000 and 360,000 litres of wastewater per day, primarily from the raisin washing process.

Raisins have a fine coating of dust blown onto them from the sandy soil in the Central Valley of California and this needs to be washed off before packaging. If this dust was the only problem, simple settling tanks or filters could eliminate it and the wash water could be reused for irrigation and other purposes, or disposed of at the local wastewater plant at very minimal cost. However, the real problem with the wash water is that, when it washes away the dust on the raisins, some of the sugar in the raisins also dissolves into the water.

The wash water with sugar in it creates a high biological oxygen demand (BOD). Land application (irrigation) of water with BOD requires a special permit that can be time-consuming and expensive to obtain.

In addition, more paperwork and ongoing regulatory review are necessary to maintain permits and regulations for land application in California are getting tighter all the time. This regulation is considered necessary to maintain general groundwater quality. Offensive odours can also be produced when wash water, laden with sugar, is disposed of via land application.

New solution sought

For all of these reasons, the Bedrosian family, owners of National Raisin Company, wanted to find an alternative to land applications.

The family is from the Fowler area near the raisin processing plant and is involved in local civic activities. They take pride in their community and the company has always been committed to protecting the local environment. "This is a small town," says Ernie Bedrosian, president and the eldest of three brothers who own the company. "There are only four or five thousand people and we know just about everybody. There are cheaper ways to dispose of the raisin wash water, but we wanted to do the right thing for the community."

As time-consuming and environmentally unfriendly as land application can be, sending the water to the local municipal wastewater plant, is not an attractive alternative. It costs more to process water with high BOD, so municipal wastewater plants charge their customers more - about US$50,000 per month more in National Raisin's case.

Not surprisingly, the packer decided it would be more economical to remove the sugar - the source of the BOD - from the wash water. This would reduce municipal wastewater

The membrane filtration plant, installed at National Raisin Company, incorporates 80 Model B1 filtration modules and is designed so that it can easily be expanded 50 percent to 120 modules to meet increased demand in the future.

charges and eliminate the environmental concerns that came with land application.

So, the decision to remove sugar from the wash water before disposal was easy. Making it even more so was the fact that, if the grape sugar concentration in the wash water was high enough, it could be sold to local distilleries to make grape alcohol. This alcohol, in turn, is used to make fortified wines like sherry and port, and to make brandy.

One local distillery said it would be interested in purchasing the water if it were a minimum of 8% sugar. This meant that the sugar content had to be doubled or quadrupled from 2% to 4% - normal in the raisin wash water - to ensure a minimum of 8% in the concentrated washwater.

Reverse osmosis process

The more difficult decision would be to decide how best to concentrate the raisin washwater, since there were several options.

The most logical choices for concentrating the sugar water were evaporation or reverse osmosis (RO). Even state-of-the-art, high efficiency evaporators, operating under vacuum, requires a lot of energy to boil away enough wash water to concentrate the sugar to the desired level. Reverse osmosis, on the other hand, only requires energy enough to generate pressure that forces water through a membrane that retains and concentrates the sugar. Thus, RO seemed the most likely approach.

Plant Engineer John Minazzoli says they considered spiral RO elements, which are relatively inexpensive and require the least floor space. However, dust and other grape solids, such as bits of stems and skins, were found to block the small channels in these spiral elements. Conventional pre-filters used upstream from the spiral elements also became blocked. At this point, Mr Minazzoli raised the question with Dr Jatal Mannapperuma from the California Institute of Food and Agricultural Research (CIFAR). Dr Mannapperuma consults with growers all over California and operates a mobile trailer that houses several membrane options for experimentation.

First, they tried using tubular ceramic membrane ultrafiltration (UF) as the pre-filtration prior to the spiral RO. The filtrate from the ceramic UF unit provided an acceptable feed for the spiral RO but, unfortunately, the dust flowing through the ceramic membrane eroded the membrane surface, reducing its life.

At this point Dr. Mannapperuma recommended evaluating polymeric tubular RO membranes and Peter Allan, sales engineer for Sanitaire's PCI Membrane unit, was brought in. The tubular channels in the RO membranes do not require pre-filtration and the polymer membrane surface is more resistant to abrasion than inert materials such as ceramics. In other words, National Raisin could accomplish their goal of sugar concentration in one step instead of two.

The initial trial in the CIFAR trailer proved that the tubular RO concentrated the sugar up to the 8% to 10% levels required by the distillery and additional scale up trials were then arranged directly with Mr Allan to determine the size of the final system. The larger scale trials were also successful and a full-scale system was installed.

Once the concentrated sugar water or 'retentate' has been removed, the remaining water or 'permeate' is actually lower in dissolved solids than the well water that feeds the plant. Therefore, it can be reused in the raisin washing process or sent to irrigate nearby vineyards without any concerns about odour or soil contamination.

"PCI Membrane was very good to work with," says Mr Minazzoli. "Peter Allan and the people at their main plant (located in Cincinnati, Ohio) were very knowledgeable and helpful. Even after the system was installed they were there to assist us whenever we needed them."

PCI Membrane Systems, Inc. (PCI), a unit of ITT Sanitaire, is a world leader in the application of membrane filtration systems.

In addition to the Fyne Process water treatment system, the company specialises in filtration systems based on tubular membranes for liquids containing suspended, colloidal or viscous materials. It also supplies spiral-wound or hollow fibre membranes for clean solutions and ceramic membranes for high chemical compatibility and thermal resistance.

With its own membrane manufacturing facility and in-house research and development group, PCI is able to engineer filtration materials and systems that exactly match the customer's application requirements. Installation, commissioning, training and technical support services are also available.

National Raisin is continuing their program of optimising RO use for maximum return on their investment.

Demand for grape sugar water tends to fluctuate, dropping to zero occasionally, but the savings on the sewerage bill alone amounts to around US$300000 per year. This is enough to keep the system return-on-investment within the original plan of 3 years. Any additional income that comes from selling the concentrated sugar water to distilleries will just speed things up.

In the meantime, the Bedrosian family knows that they've done the right thing for the environment and for their own local community.

[Courtesy: Minett Media]

SEDIMENT CONTROL

Intelligent woodlands to tackle soil erosion and protect lakes

Scientists have joined forces with land managers to try and combat one of the most serious threats facing Bassenthwaite Lake, a site of extensive conservation value in the Lake District.

Sediments eroded from slopes and riverbanks due to pressures like overgrazing and excessive trampling, are being washed into the lake causing it to 'silt up' at an excessive rate, choking fish spawning beds and damaging rich wildlife habitats.

Researchers from Forest Research and Lancaster University teamed up with the Bassenthwaite Partnership to develop a framework for targeting woodland creation to help solve the sediment problem both at Bassentwaite and in other areas where there is a similar issue. "Planting and establishing new woods can be an effective way of reducing soil erosion and sedimentation," explained hydrologist Tom Nisbet of Forest Research. "As well as providing physical shelter from wind, woods help to protect soils by reducing water run-off, increasing entry of rainwater into the soil, and improving the soil's strength and stability. At Bassenthwaite the new framework has allowed us to identify the main sediment sources in the catchment and to work out where woodland creation might be the best solution."

Forestry Commission Northwest England Conservator, Keith Jones, added: "The intelligence gained via research will enable us to work with partners to target new woodlands where they will make the most difference. "The work also assists us in identifying where alternative solutions will need to be developed, such as reduced grazing intensity."

The results of the study have been published as a new guide, *Using Woodland for Sediment Control*, available from the Forestry Commission's Northwest England office. Although the findings may not be directly transferable outside of Bassenthwaite, the Forestry Commission hopes the guide provides a useful framework for addressing sediment problems in other catchments. The Bassenthwaite Lake Partnership will now work together to encourage woodland planting and other solutions where they can best reduce sediment losses.

MORE INFORMATION

Web: www.forestry.gov.uk/northwest-england

FRESH-AIR MANAGEMENT

Odour and dust control comes of age for food businesses

A UK business has launched a new odour control solution that is seen is a significant milestone in the control of odours and dust in food processing environments.

Probe Industries has developed a product that destroys odour-making compounds as they arise rather than traditional solutions that simply masked smells. The result is an odourless product that will remove smells from the environment leaving the smell of fresh air. This is seen as good news not only for those working in the food processing environments but it also avoids potentially costly complaints from neighbouring businesses or residential areas.

And there is also a similarly innovative solution for dust control. Here the company has developed a product that neutralises electric charges in dust particles and so reducing the dust effectively with a lower level of spraying. There are therefore benefits for production, environmental and hygiene operations.

Probe's odour and dust control system is based not just on chemical innovation but also an atomiser that has been designed to slice liquid into 280 billion droplets per litre which avoids the blockages and maintenance associated with previous nozzle-based systems. The liquids used in the atomiser are all food grade material and therefore completely safe in a food-processing environment.

These solutions have been developed and tested in some of the harshest environments, such as sewage treatment works, landfill sites and quarries, and have revolutionised odour and dust control in these industries. Now the technology is being used for those in food processing to control odours and dust as they arise from their production or waste processes. Probe Industries' Managing Director, Philip Rutherford, believes the solution will provide considerable peace of mind for those in food processing, "As well as malodours and dust affecting the production process there are rising expectations from the public and employees with regard to the environment they work or live in. The risk to reputation and even legal claims can be a significant headache for businesses."

MORE INFORMATION

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PEST CONTROL

InSecta funded to lead European birth control for insects

InSecta, the biotechnology company that develops and provides highly effective, ecologically friendly pest-control solutions for the agricultural and health-care markets, is to lead a three-year programme to enhance the utility of Sterile Insect Technique (SIT) for Mediterranean citrus crops backed by €2.5 million in EU funding.

The European Commission has pledged to support the project under its new Framework 6 research-funding programme. The implementation of alternative crop-protection systems based on improvements in controlling Medfly in the Mediterranean basin is part of the EC's commitment to develop safer, high-quality food.

SIT – often referred to as birth control for insects – reduces pest populations through large-scale production and release of sterile male insects. The sterile males then mate with females in the wild, preventing the production of offspring and causing the pest population to crash, making them easier to control.

Medfly is a major pest affecting several key crops in Europe, notably citrus fruits. Use of SIT in California, South Africa, Australia, Central America and Chile has shown the technique to be cost-effective, environmentally sound and a sustainable alternative to chemical insecticides.

Since it replaces chemical insecticides, SIT reduces chemical residue levels in food. By effective control of the pest, it reduces the impact on the food chain. By encouraging biodiversity the technique supports tourism and alternative land use, and other biological control programmes. SIT enhances export opportunities and revenues through the control of quarantine pests. Of all the biological methods available, SIT has the greatest potential to improve the quality of citrus production in Europe*.

In Europe, the main control method remains chemical insecticide spraying, however, this is likely to change. Feasibility studies in Sicily, the Algarve region and Cyprus, and small-scale SIT trials in Madeira, Valencia, Crete and Israel, have shown SIT can be used effectively by European fruit producers.

To date, technical and practical obstacles have hindered the widespread use of SIT in Europe. Factors such as commercial culture, geography and citrus industry structure are different in Europe from those in other regions including the United States. Nevertheless, the latest funding means that the specific adaptations and improvements required for SIT use to grow in Europe are more likely to be adopted sooner and more widely.

InSecta's partners in the project are CLAM (Spain), Imperial College, London (UK), the Israel Cohen Institute (Israel), IVIA (Spain), Madeira-Med (Portugal) and the Slovak Academy of Sciences (Slovakia). The money will enable this consortium of SIT experts to develop technical and scientific tools and measures to produce:

- improved egg heat treatment and shipping;
- technologies/devices, opening the door to decentralised production based on shipment technology;
- better ground release technologies, devices and infrastructures, allowing the development of field release technologies suitable for local conditions; and
- dissemination tools, such as conversion tables, and information to reduce cultural barriers, enabling local organisations to adopt SIT.

Andrew Gardiner, Managing Director of InSecta, said: "The EU funding is the culmination of months of hard work and preparation by InSecta and a rigorous examination by EU technicians. This project is one step on the road to our to our objective of applying medfly SIT to 25 per cent of European citrus production by 2010."

(Source: EU Standing Committee on Plant Health, 2001)*

CONTACT

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SUSTAINABLE DEVELOPMENT

Indicators in your pocket 2004

A free pocket-sized booklet, presenting a selection of around 50 of the UK Government's indicators of sustainable development is published today. Indicators in the booklet have been selected from the UK Government's 15 headline indicators and an updated core set of 132 indicators of sustainable development, quality of life counts, which have been published on the Government's sustainable development website.

The aim of this booklet is to provide an easily accessible set of indicators covering a number of key sustainable development themes. It includes a variety of economic, social and environmental issues of everyday concern including health, housing, jobs crime, education and our environment. It is hoped this handy-sized publication will be a useful reference to experts but also to others less familiar with the concept of sustainable development or indicators.

The selected indicators should not be regarded as a top 50. Their selection was simply to try to meet the modest aims of providing some easy reference material and to help raise awareness and understanding. The booklet is also intended to provide background material for 'Taking it on: consultation to develop a new UK sustainable development strategy'.

The consultation seeks views on what should be in a new strategy for sustainable development for the UK, and what the Government and others need to do make it happen. It includes questions on how progress towards sustainable development should be monitored in the future.

Sustainable development indicators in your pocket 2004 includes all 15 of the UK Government's headline indicators covering economic growth; investment; employment; education; poverty; health; crime; housing quality; climate change; air and water quality; traffic; land use; wildlife; and waste. Amongst the wider indicators included are the following issues.

- Environmental impacts of households – between 1990 and 2001 household numbers increased by 9%, while household waste increased by 26% and household water decreased by 8%.
- Freight transport by mode – in 2001, 64% of freight was by road, whilst the proportion moved by rail has fallen to 8%.
- Depletion of fossil fuels – estimated oil and gas reserves have both dropped by about one quarter since 1998.
- Native species at risk – in 2003, 16% of mammals and birds and 16% of reptiles, amphibians and freshwater fish were regarded as 'threatened'.
- Impacts of the industrial sector – since 1970, output from the industrial sector has risen by almost 50%, while its energy use, water use, CO_2, SO_2 and NO_x emissions have all fallen.
- People finding access difficult – of those disabled people who said they had difficulties accessing goods and services, 27% had difficulties getting to places, 19% had difficulties getting around once there and 15% had difficulties getting into places.

Although this is a new compendium of the indicators, many of them are based on others already used across Government, and so have been reported elsewhere. Most of the data behind the indicators are from published National Statistics sources from across Government. In some other cases the data are from non-governmental organisations.

CONTACT

The booklet is available free of charge (Product Code PB9541). Further copies can be obtained from Defra publications, Admail 6000, London, SW1A 2XX. Tel: +44 (0)8459 556000. Fax: +44 (0)20 8957 5012. E-mail: defra@iforcegroup.com Website: www.sustainable-development.gov.uk A large print version is also available on request.

WOODLAND PLANS

Toolbox points the way ahead

Land managers and foresters have a new guide at their disposal to help them involve people in woodland planning.

An online resource 'Involving People In Forestry: A Toolbox for Public Involvement in Forestry and Woodland Planning' has been designed, to help Forestry Commission managers choose from a range of possible methods that can be used to include people in planning decisions.

The toolbox has been published by the Forestry Commission, and contains a range of downloadable toolsheets and other resources.

Author Max Hislop of Forest Research, the Commission's research agency, said the toolbox had been created to help users make effective decisions and strategies for involving people in forestry. "There's no right way to get people involved," he added. "Every forest and woodland is unique and capable of delivering a range of benefits to people to greater or lesser extent."

"The goal should be to make decisions that will deliver the range of benefits needed by people, which are consistent with sustainable forest management. This guide will enable users to identify for themselves whom to involve, which tools to use, when to use the tools and what resources will be needed."

MORE INFORMATION

Find the toolbox online. Website: www.forestry.gov.uk/toolbox

ENERGY

Waste meat becomes a bio-fuel

A national food by-product processing company, has helped Sainsbury's to become the first UK supermarket chain to achieve nationwide compliance with tough new EU environmental legislation, that was introduced following the 2001 outbreak of Foot and Mouth Disease.

PDM won the prestigious deal with Worktwice Environmental, to provide the service for Sainsbury's Supermarkets following a detailed tendering exercise. A spokesman for PDM said, "Not only could we show Sainsbury's Supermarkets and Worktwice Environmental that we complied with all the legislation and provided a cost-effective solution, we also demonstrated that our scheme is secure and sustainable, and is in line with their Corporate Social Responsibility guidelines.

PDM is collecting the waste meat from Sainsbury's stores and processing it to produce liquid and solid bio-fuels which are then used in power stations to generate renewable energy. Sainsbury's are helping the UK reduce greenhouse gas emissions through sustainable processing of their waste meat," he said.

The latest rules, which prevent retailers disposing of their discarded meat products in landfill operations, became law last July, but it is understood that some other retailers have yet to adopt the new waste disposal procedures with raw waste meat still going to landfill sites.

The PDM spokesman said that the new service for multiple retailers was based on the waste meat collection service that the company has provided for independent High Street butchers for many years."

CRYOBIOLOGY

Putting the freeze on extinction

Thousands of rare plants could be saved from extinction thanks to a pioneering international study involving University of Derby scientists.

The University's Biology team is working alongside other institutions to understand the benefits of cryopreservation – freezing plants to almost -200°C.

Paul Lynch, Professor in Plant Biotechnology at the University of Derby, said: "This research forms part of a global conservation strategy for crops and plants and could help protect rare and endangered species. Such a development is crucial to the world's food security and could be more cost effective than other conservation methods."

Cryopreservation involves immersing specially prepared plant specimens in liquid nitrogen (–196°C), enabling the germplasm to be kept intact indefinitely before being thawed,, carefully cultured and then returned to the field.

In all, nine research centres are involved in the multi-million Euro European Union funded-project CRYMCEPT. It is the most comprehensive study ever undertaken of cryopreservation and will focus on the tolerance, sensitivity and acclimatisation of plant species across the globe.

Within its laboratories, in partnership with The Nottingham Trent Professor Lynch's team is exploring how the method could be used to help preserve olive and allium (garlic). They will focus on how cryopreservation affects the 'skeleton' and associated enzymes of a cell when frozen.

Other institutions involved in CRYMCEPT are investigating aspects of the cryopreservation process such as the role of sugars, antioxidants, heat shock proteins and dehydration, using other plants such as potato, apple and coffee. The only other UK university involved is the University of Abertay, Dundee.

Professor Lynch, based in the Biological Sciences Research Group, of the School of Education, Health and Sciences noted that, last year, problems were encountered with Europe's allium collections causing a shortage in the garlic harvest. Such a situation demonstrates the valuable role successful cryopreservation could play. "A wet spring and very hot dry summer reduced the diversity of garlic available to these collections. The use of cryopreservation could have reduced the significance of this issue. Cryopreserved seed could have helped replace the lost crops. It indicates the importance of adopting a back-up approach to conventional conservation methods such as field collection."

SMALL BUSINESS MANAGMENT

Are your business assets suitably insured?

Nearly four in five (79%) of the UK's small and medium sized businesses (SMEs) have no business continuity plan in place and face severe business interruption at their own cost should disaster strike. With this in mind, an online search facility, is urging the UK's 3.5million SMEs to speak to their local insurance broker to ensure they have all their business assets insured and are prepared for every eventuality.

Recent figures from the Association of British Insurers show that fire and theft accounted for more than two thirds (65%) of all general business claims in the second quarter of 2003, both of which can result in new work premises and equipment being needed.

Additionally, natural disasters and terrorist attacks are becoming more common place and – if businesses aren't adequately insured – when coupled with the increasing risk of fire, theft, flooding, vandalism and the resulting collapse of information technology (IT) systems, the costs can be highly detrimental.

Business interruption insurance protects a company from the loss of turnover or trading profits from damage to a company's property that prevents the normal operation of the business. A local insurance broker can assess your business' individual needs and offer expert, impartial advice on both valuations and premiums from across the market as a whole, finding you a competitive and, where necessary, a tailored policy.

Derek Gibbens, spokesperson for insurancexpert.co.uk comments: "Apart from the standard risk that any business should be aware of, many small and medium sized businesses require specialist insurance needs above and beyond the standard policies available on the market and would benefit from having these needs serviced by their local insurance broker. Not only do brokers understand your individual business needs more, but they are on hand to offer continuing service and advice throughout the policy, and most importantly in the event of a claim, saving your business time and money."

"Shopping around for the best insurance policy available has never been more important, especially in today's turbulent world, and a broker can scour the market for you to find the best deal. They have expert knowledge of the thousands of policies available and can negotiate on your behalf to find one that has specialist cover to suit all your business needs."

New online search facility, www.insurancexpert.co.uk offers a local insurance broker search facility specifically for small businesses, The free online search facility is easy to use, offering details of specialist insurance brokers for small businesses based on selected postcodes or towns. The site also offers a specialist knowledge centre containing educational tips on how to get the best insurance deals, particularly for small businesses, what to do when things go wrong, and how a broker can facilitate this for you. It highlights the benefits of dealing with a local or specialist broker and provides tips on buying insurance and making a claim.

CONTACT

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MACHINE DEVELOPMENT

British firm punches its way to New Zealand

A British company that has invented and designed a machine for planting fence posts safely, reaps the rewards after licensing out its machine to equipment manufacturers in New Zealand. Meade Machines Ltd based in Tisbury, Wiltshire has given Postpuncher NZ exclusive rights to manufacture and sell a machine that will improve the safety of workers installing fences. The deal was sealed with the help of UK Trade & Investment, the government organisation that provides support services for UK companies trading overseas.

The company's managing director, Ed Ross said: "I visited New Zealand in June to support Postpuncher NZ at Fieldays 2004, the third largest agricultural show in the world. Half a dozen of our machines were sold at the show. Achieving this at such an initial stage of partnership is very encouraging.

"The UK Trade and Investment team at the British Consulate-General in Auckland has been very helpful in terms of organising the trade mission and promoting our product in the New Zealand media. Following our success in New Zealand, we have signed another agreement with El-Gra Engineering Pty Ltd which will soon see our products marketed across Australia. We expect our turnover to increase by 30% over the next three years as a result of increased sales in New Zealand and Australia," added Mr Ross.

The Postpuncher, is a post-driver designed to be mounted to the front of the parent machine, increasing safety by allowing the operator to easily see the banksmen guiding the vehicle on the ground. The unique tube design of the Postpuncher prevents post damage and operator fatigue and also helps to prevent accidents in the event of hydraulic failure.

Since its launch in 2001, more than 160 Postpuncher machines have been sold in the UK. In order to expand business overseas Kevin Meade, co-founder and director of Meade Machines Ltd, participated in a trade mission to New Zealand in September 2003.

Meade Machines Ltd also exports the Postpuncher to Sweden, Italy and Germany and is currently hoping to introduce the product to France and Spain.

ENVIRONMENTAL POLLUTION

Public access to information about industrial pollution in your neighbourhood

The European Commission and the European Environment Agency (EEA) launched the European Pollutant Emission Register (EPER), the first Europe-wide register of industrial emissions into air and water. For the first time, detailed information on pollution from around 10,000 large industrial facilities in the EU and Norway is publicly accessible on the internet.

EPER enables European citizens to exercise their 'right to know', allowing them, for example, to see how much pollution large industries in their neighbourhoods generate and to compare this with the situation in other parts of Europe. Companies can measure themselves against their competitors, and for their part, scientists, insurance companies, local authorities and policy makers now have a solid database to help them choose the most effective solutions for reducing industrial pollution.

Environment Commissioner Margot Wallström said: "People have the right to know how polluted their environment really is, because it directly affects their health and their quality of life. To require that they are informed is one of the Commission's most important duties. The new register provides people with such information, allowing them to compare the environmental footprints of different industries in different towns and regions. With this knowledge, \they can put pressure on politicians and the industry – the information empowers them and is key to their involvement in environmental protection."

Prof. Jacqueline McGlade, Executive Director of the EEA, added: "EPER is a milestone in the provision of information to the European public about their immediate environment. The European Environment Agency plans to build on this by creating an extensive internet portal to regional and selected localised environmental information covering the complete area of the Agency's 31 member countries by 2008."

> "People have the right to know how polluted their environment really is, because it directly affects their health and their quality of life.

What is EPER?

EPER 2004, the European Pollutant Emission Register, is the first Europe-wide register of emissions into air and water from large and medium-sized industrial installations, including large pig and poultry farms. It covers 50 different pollutants and comprises data from all Member States as well as Norway, which has volunteered to participate. Hungary, too, is to be included on a voluntary basis.

The EPER reporting website, which includes all reported data, is hosted by the EEA in Copenhagen. In close co-operation with the Commission, the EEA has managed the process of collecting the data for EPER from Member States, Norway and Hungary and has been heavily involved in the design and development of the website.

EPER is accessible to everybody at and makes it possible to search for the following data:
emissions from a specific industrial site by name, postal code, address or simply its location (map search);
industries in specific countries or by a specific activity;
emissions by name of pollutants; and
combinations of all of these.

Anyone can create their own overviews on pollution by activity, per country or in the EU as a whole! EPER also gives valuable information on every reported pollutant and its general impacts on human health and the environment. For example, EPER shows that 3,029 large pig and poultry farms are responsible for 78% of ammonia emissions into the air. Ammonia is a pungent-smelling gas that is noticeable in the air in quite low concentrations. High local concentrations of ammonia are toxic to health and may harm vegetation. Mercury, which is classified as a priority hazardous substance under the EU Water Framework Directive, is emitted to water by the chemicals industry (53%), the metal industry (17%) and the pulp and paper industry (7%). With regard to mercury emitted to air, energy-generating industries are the biggest polluters, followed by the metal industry and the chemical industry.

Who will gain from EPER?

Everybody will gain from EPER data.

- Citizens can see for themselves which emissions industries in their neighbourhoods produce and compare them with the emissions from other industries in other towns – even in other European countries. This enables them to ask questions about the amount of emissions, the risks they pose, potential reduction measures, etc.
- Companies can look at what their competitors across Europe are doing, increase their efforts to improve their environmental performance and show the public what is being done.
- Scientists, insurance companies, local authorities and policy makers have gained a good information base on emissions. For instance it is now possible to compare the emissions of an individual sector with the emissions of other industrial sectors.

This will help everybody choose the most cost-effective solutions for reducing pollution.

Where does EPER come from?

The Commission has promoted providing environmental information to citizens and involving them in environmental protection for a long time. In 1990, it granted the public access to data held by local authorities with the Directive on public access to environmental information.

The idea of creating emission inventories came up at the 1992 Earth Summit in Rio de Janeiro and received the support of the Organisation for Economic Co-operation and Development (OECD). In the EU, it became a requirement with the 1996 Directive concerning Integrated Pollution Prevention and Control (IPPC Directive), which states: "An inventory of the principal emissions and sources responsible shall be published every three years by the Commission on the basis of the data supplied by the Member States."

By 2000 all the necessary details were worked out and outlined in the Commission Decision to establish EPER (2000/479/EC).

Next steps

This summer the Commission will publish a report reviewing and evaluating the timeliness and quality of the data reported by the Member States. It is already evident that the EPER data are not complete for some pollutants and countries, especially in sectors such as pig and poultry farms, landfills, metal surface treatment and industrial discharges into municipal sewer systems.

The Commission will continue to improve, develop and upgrade EPER. The immediate next steps include the translation of the EPER website into every official language of the EU and, in co-operation with the Joint Research Centre and the EEA, the inclusion of satellite images of the areas surrounding the industrial facilities in colour. At the moment, these pictures are still black and white for some countries.

The EU also intends to ratify the UN-ECE Protocol on Pollutant Release and Transfer Registers (PRTRs) under the Aarhus Convention. As a result, EPER will eventually be upgraded to a fully comprehensive European PRTR, which means that the public will get more information – for example on what industries do with waste. The Commission plans to put forward a proposal for a Regulation concerning the establishment of the European PRTR this summer. Under the Commission Decision on EPER, Member States have to update the data every three years, so the next reporting exercise will take place in 2006. Then, all the new Member States will be obliged to participate.

MORE INFORMATION

The EPER reporting website and the Commission Decision 2000/479/EC establishing it can be found at www.eper.cec.eu.int
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URBAN VENTILATION

Wind tunnel tests could lead to healthier towns and cities

It's hardly an appealing thought but the overpowering fragrance of mothballs in a large wind tunnel could provide the key to improving air quality in our towns and cities. The tests will improve our understanding of how pollution and heat behave at street level so that more effective ventilation methods can be developed. The research will be carried out by scientists at the University of Reading in collaboration with EnFlo, based at the University of Surrey, with funding from the Engineering and Physical Sciences Research Council (EPSRC).

In towns and cities, pollution and heat released below building height (e.g. from cars and buildings) can be trapped at street level until ventilated to the air above. This can cause pollution 'hotspots' which affect sufferers from respiratory diseases such as asthma; it can also contribute to an uncomfortably warm urban climate. The new research will focus on the ventilation process. This process depends on street layout, wind speed and other factors, and understanding it is vital to taking effective action to improve urban climate and air quality.

The project will centre on wind tunnel tests that simulate airflow in urban areas. Cube and bar shapes representing a variety of urban settings will be placed in a wind tunnel and covered in naphthalene (an aromatic hydrocarbon used in mothballs), which is carried by airflow in a similar way to heat and pollution. By measuring the net loss of naphthalene after air has flowed over it, the rate of ventilation for the airflow and urban layout under examination can be calculated.

Interpretation of the results, which will require expertise in fluid dynamics, turbulence, heat transfer and meteorology, will enable the impact of different factors on ventilation to be assessed. An innovative feature of the research will involve the use of sensors to detect naphthalene concentrations. Deploying the sensors successfully will require trial and error, but will ultimately enable the extent and duration of 'hotspots' to be determined.

The project team has already found that ventilation depends on street width, building height and the precise location of the pollution or heat source. Dr Janet Barlow, who is leading the team at the University of Reading's Department of Meteorology, says: "Better understanding of heat and pollution ventilation rates will help inform the decision-making of architects and town planners. This should help to promote more sustainable, more comfortable and healthier urban environments".

CONTACT

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ORGANIC FARMING

The organic farming plan for England – two years on

The '*Organic Action plan to develop organic food and farming in England - Two Years On*' picks up on the work of the original Plan launched on 29 July 2002. It looks at the considerable amount of progress made and makes further recommendations for priority actions.

Launching the Action Plan – Two Years On, at RN & SA Balsdon's Sorley Farm, Kingsbridge, Devon, Organic Farming Minister Ben Bradshaw said: "At the beginning of this year 696,000 hectares, 4% of UK farmland, was under organic production, up from 30,000 hectares in 1993. The market is projected to grow by 9% a year to 2007. The original Action Plan was an excellent example of the whole Food supply chain working together to develop a long term sustainable action plan for the sector."

"The Two Years On report shows that much has been achieved – for instance there has been a big rise in the amount of organic produce provided by UK farms from only 30% when the Plan was written, to 44% today. This is a great achievement for all in the industry and for the retailers. But of course there is still much more that can and must be done to meet the demand of consumers for British grown organic products and I commend this plan to all those involved in the production, preparation, distribution and sale of organic food."

Commenting on one of the main initiatives in the Two Years On report – linking the expansion of organic production with the Defra Strategy for Sustainable Food and Farming Sir Don Curry said: "I am delighted with progress made since the release of the Organic Action Plan two years ago. In the Policy Commission report we recognised the environmental contribution organic farming can provide and the organic strand within the Entry Level Stewardship scheme is confirmation of that recognition."

The Organic Action Plan reinforces other areas of the Sustainable Farming and Food Strategy, including the public procurement initiative. Sir Don Curry said: "Small and medium sized businesses have an opportunity to access new markets through the Government's public procurement initiative. I applaud the progress that has been made in persuading purchasers with public procurement responsibilities in schools and hospitals to source organic food. There is still a long way to go but progress to date is very encouraging."

> "The Two Years On report shows that much has been achieved – for instance there has been a big rise in the amount of organic produce provided by UK farms from only 30% when the Plan was written, to 44% today."

The main areas of progress since 2002 are as follows.

- Market for Organic Food – the aim is to increase UK sourcing for indigenous crops to 70% by 2010. UK sourcing rose to 44% in 2002/3, having started at 30% when the report was written, which is on course for achieving the target. The Action Plan Group and multiple retailers have worked together to achieve this.
- Support for OrganicFarming – the Organic Farming Scheme, introduced in June 2003, provides new maintenance payments for organic farmers and much higher payments for top fruit growers (apples, pears, plums etc.). It is intended to introduce ongoing payments for organic farming under the Environmental Stewardship Scheme at £60 per hectare, this is twice the rate paid to non-organic farmers.
- Public procurement of Organic Food – Defra have worked closely with a number of bodies through the Food Procurement Implementation Group to promote organic produce in public procurement. The range of organic food is becoming more widely available in Defra restaurants.
- Setting and Control of UK Standards – The Advisory Committee on Organic Standards has been set up to advise on approval of certification bodies in the UK. The new Compendium of UK Organic Standards has now been published as the baseline standards in the UK and is closely based on the EC organic farming regulation 2092/91.

Six priorities have been identified for further action by the Action Plan Group.

1. **The Sustainable Food and Farming Strategy** – to work with Defra, to ensure that organic production is making a full contribution to Defra's Sustainable Food and Farming Strategy and vice versa.
2. **Public procurement of food** – to make recommendations to ensure that the sustainable food procurement initiative delivers increased purchasing of organic food.
3. **UK sourcing** – to take forward progress made by retailers and extend the work to the food service and manufacturing sectors, including identifying obstacles.
4. **Local supply networks** – to advise on how to capitalise on the strengths of local organic supply and to identify how obstacles to further development can be overcome.
5. **Government's health agenda** – to advise on how organic produce can contribute to the agenda.
6. **Issues of social exclusion** – to examine and advise on how to tackle the issue of the inability of some people to purchase organic food either because of lack of supply in particular areas or because of price.

CONTACT

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WATER QUALITY

The *Water4All* project – cleaner groundwater for future generations

Part of a European-funded project is underway in the River Slea catchment in Lincolnshire to investigate how land use planning can be used to improve water quality. By treating the causes rather than the symptoms, the overall result of the *Water4All* project will be cleaner drinking water for future generations without the need for expensive and unsustainable 'end of pipe' treatment to remove nutrients and chemicals, and for a more ecological friendly river.

The River Slea catchment in Lincolnshire has been selected as a case study area for the *Water4All* programme because of the relatively high nitrate levels in ground and surface waters, the available monitoring data, and its suitability for investigating land use issues that arise in much of lowland UK.

Currently nitrate concentrations in the public water supply boreholes and in the surface water system are high and rising. The 50 mg/l limit set by the European Drinking Water Directive is exceeded in some places resulting in the need for water treatment prior to supply. The enrichment of surface waters with nutrients also contributes to excessive weed growth and eutrophication. In order to comply with the limit on nitrate some land use or land management change may have to take place in the future.

To establish what changes may be needed, a computer model will be used to replicate what is currently happening in the catchment that leads to high nitrate levels. The model can then have different scenarios built in to determine what impact land use change may have on nitrate levels. So, for example, it could simulate various proportions of the catchment being forest or extensive grassland to predict what such a change would have on long-term nitrate levels.

The UK project is very much theory and scenario based and enhances other pilot projects being undertaken by partners in Germany, The Netherlands and Denmark. These countries have real experience of land use and management changes bringing benefits for both drinking water and local ecosystems. The major part of the UK project is being carried out through a contract with the University of East Anglia's School of Environmental Sciences under the management of the Environment Agency. It is also envisaged that the project will contribute to the development of methods for drawing up River Basin Management Plans (required under the Water Framework Directive) and in the achievement of water quality goals.

An important part of the project is to seek advice and opinions from local farmers, the water company, local authorities, local associations and environmental groups to guide the investigations so that the findings are of maximum relevance to them.

MORE INFORMATION

Web: www.Water4All.com

EDUCATION

Students enjoy a taste of university life at Harper Adams

More than 250 students enjoyed a foretaste of university life at Harper Adams University College. Around 270 students, from as far away as Cornwall, Scotland, Kent and Northern Ireland, attended the popular Higher Education Choices (HEC) event at the Shropshire university college recently.

They had the chance to take part in lectures and seminars, as well as visiting a careers fair including representatives from Liverpool, Bangor, Reading, and Harper Adams Universities. Reaseheath, Myerscough, Writtle, Warwickshire and Bishop Burton Colleges were also in attendance. Advice was available on a wide range of higher education courses for rural and land-based careers.

The Conference was opened by Neil Cameron, Chairman of the National Federation of Young Farmers' Clubs. Mr Cameron reminded students of the work of the YFC and the excellent opportunities for travel and self-development. As he had attended the HEC event as a 17-year-old, he said he was well aware of the value of the conference in preparing students for the world of higher education and its exciting opportunities. "You face a changing world and it is therefore becoming increasingly important that you are prepared and educated to meet the challenges and opportunities that are ahead of you."

As well as enjoying a taste of academic life, the students also got the chance to sample student nightlife, enjoying a party in the students union, and overnight accommodation in the student halls of residence.

Organiser, Sally Bishop, said: "This year's conference has been one of our most successful yet."

Students take part in an animal-based practical in the labs at Harper Adams University College with Dr Margaret Parry.

Bimonthly AUTUMN 2004

MEMBERSHIP MATTERS

THE NEWSLETTER OF THE INSTITUTION OF AGRICULTURAL ENGINEERS

MORE MEMBERS PLEASE

I know - another new President and another plea for new members – but this is a vital issue for the future of IAgrE.

IAgrE needs new members to widen the range of expertise, experience, knowledge and opinion within our local, national and international communities. It is always useful to have fresh ideas and a new supply of enthusiasts.

Of course engineering is at the core of our interests and having a route to Registration with the Engineering Council (UK) and the European equivalent (FEANI) is a key benefit of IAgrE membership for those who are suitably qualified. But engineers do not operate in isolation. They work with and, importantly, connect a wide range of other interests and disciplines in developing and delivering solutions across the board. None more so than those working in the land based industries.

IAgrE provides a unique forum for these wide ranging interests where all can benefit from an interchange of views and interests. Internet links and e-mail communications extend the potential membership well beyond national boundaries.

Our connection with the Society for the Environment and its constituent bodies along with providing access to Chartered Environmentalist status widens the appeal of IAgrE membership still further. Please increase awareness of this important accreditation for all those actively engaged in engineering a better environment.

Our most effective recruiting force is undoubtedly you – the members. We have simplified the admission process for membership at the Associate level as the point of entry to IAgrE. All that has to be done is fill out the bare minimum of information on the membership post card, post it and the Secretariat will do the rest. If you don't have a supply of cards, please request some from the Secretariat. There is also a new IAgrE brochure available from HQ. This explains the advantages of membership for engineers, scientists and technologists in Agriculture, Horticulture, Forestry, Environment and Amenity

So my message to you is please consider all your colleagues and associates anew to see if they would benefit from IAgrE membership as we move forward to engage the whole of the land based sector and all ranges of expertise from technician to researcher. Just encourage them to join and fill out a postcard and we will all be the richer for it. And remember, each new member you recruit will give you a 10% discount on your next year's subscription.

Peter Redman
President

LETTER TO THE PRESIDENT

Fifty years on

The President has suggested that I put on paper some 'memorable experiences' of 50 years in IAgrE. So many! What to leave out?

The most memorable thing has been the tremendous advance in the design of farm machinery, due not least to the work at Silsoe and in earlier days at the National Institute for Research in Dairying (NIRD), Reading. When I left the engine room branch of the Royal Navy and joined the Ministry of Agriculture, Fisheries and Food (MAFF) in the late 1940s, we were running nine threshing sets in Middlesex out of a depot barely a mile from the HMV record factory. By the 1950s, when I entered the ranks of IAgrE, I was in Nottinghamshire and we had one set on the road but a brace of Massey 21 combine harvesters with their gas-guzzling petrol engines.

It was in Nottinghamshire that I acquired my taste for tracklayers and I loved my fleet of 'Cats'. I think their highly engineered construction matched what I had been used to as a Royal Navy engineer. We also had some Fowler-Marshalls, with their single cylinder, two-stroke diesel with cartridge starting. How far can you get from the current, sophisticated tractor?

In 1962, after a few years with Ford-Ransome dealers, I joined the National Farmers' Union (NFU) as Machinery Officer and Secretary of the Machinery Committee. Thus began a rewarding 20 years association with the National Institute of Agricultural Engineering (NIAE). Being responsible in NFU for safety, health and welfare, the formation of the Ergonomics Division at Wrest Park was very satisfying. This sprung from a series of meetings called initially by my opposite number in the NUAAW and myself, culminating in a meeting at

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LETTER TO THE PRESIDENT (CONTINUED)

>> NIAE when the Agricultural and Medical Research Council gave their blessing to the formation of the new department. It went on under Richard Stayner to make a lasting contribution to the well-being of agricultural workers.

In the sphere of education, I had a long and memorable association with Rycotewood College, as a member of the Engineering Advisory Committee and, later, as a Governor. 'Curly' Turner, the Principal, was an old friend and the only member of any of the numerous committees which afflicted me who customarily turned up armed with a supply of home-made wine – a fearsome and mind-blowing brew. Meetings went well!

When the Finniston Committee was looking into the future regulations of the engineering profession, I was chairman of the Engineering Technician Registration Board and, as such, gave evidence to 'Finniston'. It was a source of enormous satisfaction that we defeated Finniston's efforts to exclude Technicians from the proposed new regulatory body, to become the Engineering Council. I think that history has proved us right.

I could go on but perhaps the outstanding memory of 50 years has been of people, not machines. To mention names I suppose is invidious but Dave Manby, Wilf Klinner and Harry Nation at NIAE, Brian May at Silsoe College, Dean Swift at AEA and his son Jonathan at BAGMA demand mention. I have no doubt that the close liaison between NFU, AEA, BAGMA, NIAE and Silsoe College did nothing but good for the industry and our profession.

There is so much more! Perhaps I should write a book but it would be an incredible bore. Much more exciting (a bit too exciting at times) would be one on my Naval career. I still hanker after my engine-room, with its three 1,500 hp 'blown' V-12s crammed into a small space. Three very fast ladies and very, very loud to boot, resplendent in their grey-green enamel. It was hot, noisy, with no standing headroom and my four assistants and I crouched and crawled (literally) about our work but it was a magic place. Furthermore, in case you wonder what connection this has with agricultural engineering, the grounding in sound basic engineering and good leadership skills remained with me and served me well throughout my Agricultural Engineering career.

Colin Victor Brutey FIAgrE

[Editor's note: MAFF, now the Department for the Environment, Food, and Rural Affairs (Defra); NIAE, now Silsoe Research Institute (SRI); NUAAW, National Union of Agricultural and Allied Workers; AEA, Agricultural Engineers Association; BAGMA, British Agricultural and Garden Machinery Association; engine power much more impressive in imperial units]

Membership Changes

Admissions

A warm welcome to the following new members

Fellow
H Claas (Germany)
A White (Leicestershire)

Member
P M Spencer (Leicestershire)

Associate
T Ball (Cheshire)
P W Danks (Oxfordshire)
D P Lambert (East Sussex)
M A Oldham (West Sussex)
T Underhill (Shropshire)
J P Welsh (Bedfordshire)

Student
Walford and North Shropshire College:
K G Morris
L Morris
L A C Powell
G R Smallman
E J Williamson

Readmission

R H Trevarthen (Leicestershire)

Transfer

Congratulations to members achieving a further phase of their professional development

Associate Member
E J de Naurois (East Yorkshire)

Deaths

With great sadness, we record the deaths of the following members

B J Freeman (Essex)
W Haywood (Worcester)

Academic Members

Askham Bryan College
Askham Bryan
York
YO23 3FR

Barony College
Parkgate
Dumfries
DG1 3NE

Cranfield University at Silsoe
Bedford
MK45 4DT

Duchy College
Rosewarne
Camborne
Cornwall
TR14 0AB

Greenmount College
Co Antrim
Northern Ireland
BT41 4PU

Harper Adams University College
Newport
Shropshire
TF10 8NB

Institute of Technology, Tralee
Clash
Tralee
Co Kerry
Ireland

Myerscough College
Myerscough Hall
Bilsborrow
Preston
Lancashire
PR7 0RY

Oatridge Agricultural College
Ecclesmachan
Broxburn
West Lothian
EH52 6NH

Pencoed College
Pencoed
Bridgend
CF35 5LG

Reaseheath College
Reaseheath
Nantwich
Cheshire
CW5 6DF

Royal Agricultural College
Cirencester
Gloucester
GL7 6JS

Scottish Agricultural College
SAC Ayr Campus
Auchincruive Estate
Ayr
KA6 5HW

Sparsholt College
Sparsholt
Winchester
Hampshire
SO21 2NF

Wiltshire College - Lackham
Lacock
Chippenham
Wiltshire
SN15 2NY

Commercial Members

Autoguide Equipment Ltd
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Calne
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John Deere Ltd
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FEC Services
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for land-based and related
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NEWS OF MEMBERS

After spending 16 years overseeing environmental management issues of uranium mining in and around Kakadu National Park as the Principal Environmental Scientist in the Federal Government's Office of the Supervising Scientist, **Peter Waggitt** has taken a 3 year posting to Vienna, Austria. He is a Waste Safety Specialist with the International Atomic Energy Agency dealing with environmental issues in relation to uranium mining wastes and residues, naturally occurring radioactive materials (NORM) and contaminated site clean up – all of these in Africa, Asia and the former Soviet Union.

Robert Merrall is now Marketing and Communications Manager (Director Designate) at Oakes Bros who are a large multi-branch New Holland dealer for central southern England. He is based at their East Ilsley branch near Newbury.

Geoffrey Meikle has moved to South Africa to take a position as Senior Lecturer in Agricultural Engineering at the University of Fort Hare.

Kathy Stearne has recently been awarded the degree of Doctor of Philosophy after five years part time study at Imperial College, London. The title of her thesis is: *'Water Meadows- conflict compromise and change'*. [See article on this study in *Landwards* Autumn 2002, **57**(5), 2-6]

Water meadows in the eighteenth century were exploited intensively. Inputs to water meadows were very high in terms of labour and water. The sheep corn system that operated meant that this could be justified by the high value of the various products gained; lamb, wool, hay, dung and dairy products. So if market prices dropped for one product the other products still justified the work involved. This system operated for over 250 years, from about 1600 to 1850. However, times changed. During the nineteenth century, we began to import many of the products of water meadows from abroad, lowering prices. The sheep corn system didn't disappear overnight, but there was a gradual change over the nineteenth century.

Water meadows were still in use up to the 1960s, with a very different management cycle. Dairy cows grazed on water meadows from March through to November. The latter part of the twentieth century saw the decline of intensive management and the dereliction of water meadows. Why are water meadows important today? Water meadows are part of our heritage, ecologically and archaeologically. They were a way of life in the southern river valleys of England between 1600 and the 1950s. Over the years, local people have adapted them to their needs and they are still being adapted today.

There are challenges, with many conflicting issues on water meadows. Modem management aims should be a *balanced conservation* of these areas. The objectives and management should reflect a balanced integrated approach based on a sound assessment of a particular site.

Kathy graduated from Reading University with a BSc in Soil Science. After working abroad in the USA and Israel, she took a further course in Soil and Water Engineering at the National College of Agricultural Engineering, Silsoe, Bedford, taking up the post of a field engineering advisor with ADAS now Defra in 1980.

Kathy is also a partner in Green Mark International, an independent consultancy offering horticultural and field engineering advisory services for glasshouse and environmental projects. They are at present helping the Countryside Restoration Trust and English Heritage put forward a management plan for Turnastone Farm Herefordshire. Turnastone Farm is one of the first documented water meadow systems dating back to 1600.

Tony Chestney

Write to Tony with your news! His address is: 32 Beverley Crescent, Bedford MK40 4BY

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WASTE MANAGEMENT

Farmers urged to prepare for waste changes

New guidance and advice for farmers on forthcoming waste legislation has been published by the Environment Agency as a survey reveals that 1 in 3 farmers are unaware of forthcoming regulations relating to the disposal of farm waste.

Barbara Young, Chief Executive of the Environment Agency said: "Many farmers are skilled and innovative at finding uses for old materials and wastes, but farmers can cut costs further by reducing, reusing and recycling waste. Farmers should start thinking now about how to reduce waste and change disposal practices if they are to avoid unnecessary expense once the rules come into force.

"According to Defra figures, without waste reduction and disposal changes, the new regulations are expected to cost farmers between £164 and £403 per annum, but this can be avoided by some simple changes to practice. Our newly published advice will help farmers to identify opportunities to reduce waste and save money. In addition, we are working with industry leaders to identify alternative disposal routes for farm wastes, Barbara Young said, "but all farm businesses need to be prepared."

The survey of 800 farmers in England and Wales showed that 71% of farmers knew only 'a little' or 'not much' about the implications of the new regulations. Only 20% felt that they knew 'a lot' about their implications.

While larger farms are more familiar with the new regulations, small farmers were less likely to aware of the regulatory changes that will effect their practices.

Estimates suggest that there are 300,000 tonnes of non-natural wastes produced on UK farms each year, including waste packaging, silage plastics, metals, tyres, oils and animal health products. In addition, as much as 600,000 tonnes of scrap metal, tyres and asbestos roof sheeting are currently being stored on farms with no plans for disposal.

The new controls will mean that the uncontrolled burning and burying of waste, as well as the use of farm tips, will no longer be allowed. Surveys reveal that 90% of farmers are disposing of wastes using these practices, which won't be possible once the controls are implemented.

Agricultural Waste – Opportunities to Save Money, the newly published advice from the Environment Agency and the national agricultural waste stakeholders forum, outlines wastes reviews, gives tips on avoiding, reducing and reusing waste and sources of further advice and support. It is available on the Environment Agency website.

By carrying out a simple six-step review for each aspect of farm enterprise, farmers can identify opportunities to minimise the waste produced on the farm.

1. Carry out a review of what you use on your farm. You could also include energy and water. Evaluate the quantity and the full costs of these resources e.g. how much you pay to buy and transport them and how much you have to pay in the future to dispose of the waste. Focus on the most significant issues to see how they can be reduced.
2. See if the wastes can be avoided in the outset. Consider the use of alternative materials or alternative techniques. If you don't produce waste you will not have to pay to dispose of it.
3. Where waste cannot be avoided, consider how it may be reduced. Again, the less waste you have the cheaper the cost of disposal.
4. Some waste material may be re-used, for example refillable containers or cardboard boxes.
5. Most agricultural wastes can be recycled for a secondary purpose. In agriculture there are great opportunities for beneficial recycling of wastes to land (with a licence exemption from the Environment Agency once the regulations come into effect).
6. Compile a list of potential improvements and take action to make the savings work.

MORE INFORMATION

For a copy of the pamphlet 'Agricultural Waste – Opportunities to Save Money', tel: +44 (0)8708 506 506. Web: www.netregs.gov.uk or www.defra.gov.uk/environment/waste/agforum or www.environment-agency.gov.uk

WATER MANAGEMENT

Environment Agency takes up responsibility for reservoir safety

The Environment Agency will take responsibility for reservoir safety across England and Wales, from October 2004. The role of Enforcement Authority under the Reservoirs Act 1975 is being transferred from Local Authorities as a result of the Water Act 2003.

Reservoirs are essential features of our landscape and operating and managing them safely to limit flood risk is of paramount importance. Safety legislation for reservoirs in the UK was first introduced in 1930 following several disasters that resulted in loss of life and is today provided by the Reservoirs Act 1975.

Currently the enforcement of the Act in England and Wales is the responsibility of 140 Local Authorities. The role has attracted a varying response often co-ordinated by different departments, which has led to inconsistent application. This inconsistency has driven the need for regulation to be provided by a single body which was recognised by an industry review of the Reservoirs Act 1975.

The Water Act 2003 also requires Flood Plans to be produced for specified reservoirs. This requirement is due to commence later in April 2005 and will be preceded by a comprehensive consultation led by the Department for the Environment, Food and Rural Affairs (Defra) and the Welsh Assembly Government (WAG).

Ian Hope, Technical Manager of reservoir safety at the Environment Agency, said, "This is an important new role for the Environment Agency which will provide us with considerable opportunities for improving efficiency and for applying a more systematic approach across the country than has previously been possible.

"Over the coming months, we will be working hard to ensure that the transfer of the responsibility from local authorities to ourselves is carried out as smoothly as possible."

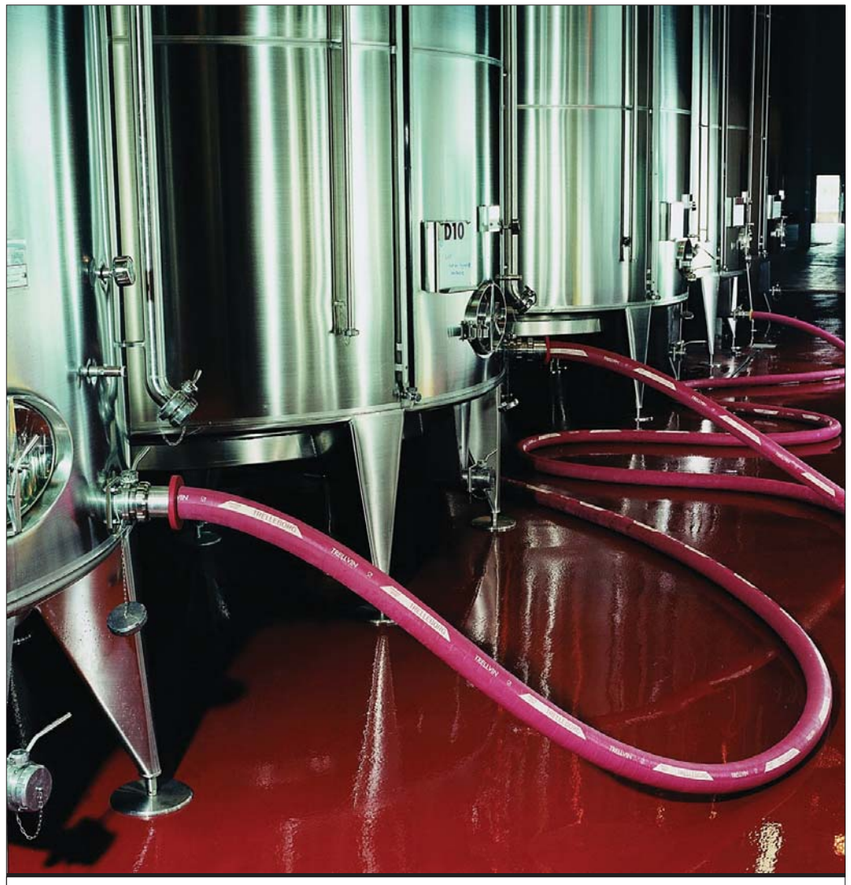
FINE WINES NEED QUALITY HOSES!

Trelleborg provides hoses for all aspects of the wine industry; for each stage hoses with varying characteristics are required but all hoses feature high capacity and operational capability as standard

Introduction

Throughout the world, interest in wines and demands on quality are increasing. Everywhere, investments are being made in the most modern wine production equipment conceivable. This opens up interesting possibilities for Trelleborg Industrial Hoses which produces high quality industrial hose not only for the wine industry but also for many other areas of application in the diaries and beverage industries.

"The market for industrial hoses is spread among a number of applications and select segments where size, complexity and our competitiveness create the conditions for future growth and profitability. We are striving for a systematic approach in selected segments and often sell complete solutions, including connectors, flanges and so forth." This is how



Hoses that transport wines must meet stringent hygiene requirements, so all Trelleborg's hoses are equipped with the white, smooth inner lining that prevents impurities and bacteria from gaining hold and guarantees cleaning with perfect results.

Peter Nilsson, President of the Trelleborg Engineered Systems business area, summarises the development philosophy at Trelleborg Industrial Hoses which is headquartered in Clermont-Ferrand, France.

Christian Caleca, president for the business unit in Clermont-Ferrand, agrees entirely with Peter Nilsson's description. "We are constantly searching for new niches in which we can create new business opportunities with our products and knowledge," he says.

An example is the drive in the wine industry that began a few years ago. This was based on materials suited to the food industry and a thorough knowledge of the industry's special requirements for industrial hoses for facilities such as dairies and breweries, which are naturally closely related to wine production.

Over several decades, interest in wines has been increasing throughout the world. New consumption patterns have been established in pace with increasing travel, through which we have come into contact with and adopted eating and drinking habits from other cultures.

Improved quality

In the 'beer and vodka belt' (the Nordic countries, Germany, the Benelux countries, the British Isles and Switzerland), the per-capita consumption of wine has risen, while it has fallen in the traditional wine countries (including France, Spain and Italy).

In 2002, global wine consumption reached 3.5 l per person. What is pleasing, and for Trelleborg decisive, is the fact that the increased interest in wine over the past decade has led to a marked improvement in quality.

Smaller harvests, better wine

Quality conscious producers are harvesting less and less. This is achieved in various ways - denser planting, restrictive irrigation, strict pruning and, above all, 'green harvesting'. This entails thinning as much as half of the bunches of grapes just as they are beginning to ripen, giving the remainder a greater share of the aromatic substances and nutrients absorbed by the roots of the vine from the underlying layers of soil.

Better grapes require more careful fermentation and enormous investments have been made in new wine cellar technology. Here, one will often find stainless steel vats and advanced computerised control systems for each stage from harvesting to the finished, bottled wine.

However, each link in the production chain is important and even in the most technically advanced wine cellars, hoses of various kinds are needed for different parts of the process - rinsing and cleaning, transfer of wine from one vat to another and much else besides. With higher demands on the quality of both the grapes and the fermentation vats, the demands on hoses and all other equipment also increase. For Trelleborg Industrial Hoses, the rise in quality in the wine industry has revealed new opportunities. Business unit manager Christian Caleca explains: "It is definitely the case that the wine industry's demand for high quality hoses and connectors has increased. We have observed this clearly here in France and also in Spain, while the trend is not yet as strong in Italy."

In France, several of the most prominent châteaux in Bordeaux have invested in hoses from Trelleborg, including one of the top five, Château Margaux. In other areas renowned for their quality many, large, well known producers who are extremely particular about quality and hygiene have also chosen hoses from Trelleborg.

State-of-the-art facility

Situated in the Rhône Valley is the Cellier des Dauphins which is responsible for 25% of the total wine production of the Valley, producing 60 million bottles of wine annually. The Company is an association of 10 cooperatives with a total of 3600 members. The members cultivate their own vineyards

and deliver their grapes to the cooperative which carries out the fermentation process and then delivers the wine to Cellier des Dauphins' central facility for final preparation: clarification; filtering; blending; storage in vats; and bottling.

The facility is situated in Tulette and was brought into service in March 2000. Oenologist Alain Bayonne explains: "We decided to construct the new facility in 1999. It would utilise all available cutting edge wine production technology. A few years before, we had read articles in an industry magazine about experiences of hoses manufactured by Trelleborg. These dealt with applications in dairies and breweries but we have similar requirements regarding capacity and hygiene, so we decided to test the hoses in our own facilities. We were highly satisfied with the results, so when the new facility was being fitted, we naturally used hoses from Trelleborg."

Cellier des Dauphins uses the various hoses and connectors recommended for the various stages of the process. Alain Bayonne continues: "Different stages require different characteristics in the hoses used. However, most important is that they have a high capacity and operational reliability. For hoses that transport wines, it is also important that they meet stringent hygiene requirements. "The most important stage in Tulette is the blending of the wines. We produce wines from many different appellations in the Rhône Valley - Tavel Rosé, Gigondas, Châteauneuf du Pape, Crozes Hermitage, St Joseph, Cornas, Côte Rôtie and, above all, Côtes du Rhône.

As the name suggests, an appellation (Appellation d'Origine Controlée) is a controlled classification of origin, which is a legal guarantee of the wine's geographic provenance and that it meets certain production requirements."

> "However, the wine industry offers attractive potential. We are working with local entrepreneurs who have good contacts with the end users. Together, we are trying to create the best imaginable total solutions."
>
> Christian Caleca

Cellier des Dauphins' Côtes du Rhône is the largest Appellation d'Origine Controlée wine brand in France. Alain Bayonne explains: "It is important that the contents of each bottle bearing this label for a particular year taste the same. Our many customers must be able to depend on obtaining what they have a right to expect. Since the grapes come from various vineyards with different soils and microclimates, we must be able to even out differences and blend a wine that always has the same bouquet, taste and other characteristics.

Naturally, this process requires the possibility of transporting wine between different vats. The hoses Trelleborg has developed specially for the wine industry and the recommended connectors meet these requirements well."

Adapted solutions

So far, the wine industry remains a small part of operations at Trelleborg Industrial Hoses.

"However," says Christian Caleca, "the wine industry offers attractive potential. We are working with local entrepreneurs who have good contacts with the end users. Together, we are trying to create the best imaginable total solutions. "In two thirds of cases, we are able to use materials already available in our range, but in the remainder of cases we make the necessary adjustments.

"This is challenging and educational. Since we work with so many different customer segments, we also have a large number of products and experiences to begin with when developing the right solution for each situation together with our research and development department."

Wine hoses for all purposes

Four types of hoses form the foundation of Trelleborg's range of wine hoses. All are equipped with the white, smooth inner hose that prevents impurities and bacteria from gaining hold and guarantees cleaning with perfect results. All hoses meet European and US Food and Drugs Administration (FDA) requirements.

Trellvin is a hose suited to the transfer of wine from one vat to another or to tanker trucks for onward transportation. It has an odour and taste-free inner hose, regains its original shape if pinched and tolerates high pressure and steam cleaning at temperatures up to 130°C.

Citerdial is the most flexible hose in the range with favourable resistance to external impact, being reinforced with strong metal spirals. It is suitable for transporting wine but also for the extraction of grape waste after fermentation and pressing. Citerdial is available in dimensions of up to 150 mm.

Alikler LV is an easily handled, lightweight hose for transporting wine longer distances *e.g.* between two cellars. It can be rolled flat thus requiring less space.

Alikler is a wine transport hose that is particularly well suited to stationary equipment. It can cope with high pressure and extreme temperatures. The outer sleeve resists the effects of time and weather. Alikler is available in various dimensions.

Hoses also for dairies and breweries

All hoses from Trelleborg Industrial Hoses and the recommended connectors have been designed to guarantee the highest level of quality and optimal security during long-term use. The hoses specially developed for the food industry also correspond to stringent requirements and international regulations on hygiene. Many of these hoses are used in dairies, breweries and wine production facilities. This applies primarily to hoses used mainly for cleaning *e.g.* ***Klenet, Biovast*** and ***Bergalav*** - three hoses that can cope with different water temperatures; Bergalav is a special hose for steam cleaning.

Of the hoses used in the wine industry, ***Citerdial, Alikler*** and ***Alikler LV*** are also used extensively in the dairy industry, while ***Trellvin*** is a special hose specifically for the wine industry.

Alikler D is a hose widely used in dairies and breweries. It differs from standard ***Alikler*** in that it has no steel spiral, which means that it quickly regains its original shape even if someone should happen to drive over it with a forklift. For handling of alcohol in greater concentrations, the special hose ***Alkodial*** is used.

[Courtesy: Minett Media]

CULTIVATORS

New models join high-speed tillage range

Rustons Engineering announces several important developments to the Agrisem Disc-O-Mulch range of heavy-duty minimum tillage disc cultivators in time for this year's post-harvest period, including a five-year warranty on key components.

Two new ranges, known as the 'Vario' and the 'Compact', are now available as alternatives to the 'Super' models that Reco has been distributing since last year. A new tillage train - the 'Cultifield' - has also joined the equipment line-up. This consists of a trailed main frame incorporating a Compact Disc-O-Mulch at the front, followed by a Cultiplow pan buster and a roller, giving high-speed 'one pass' cultivation.

The soil working discs on all Disc-O-Mulch machines are arranged in two banks with intermediate clod shattering boards and are individually mounted on coil tines and fully sealed hubs with massive bearings. The heavy-duty disc hubs and tines used on the Super series are now covered by a five-year warranty.

The patented support system allows the discs to move backwards, sideways and vertically when they meet a solid object in the ground and also enables the centre axis of the hub to be positioned directly in line with the tine mounting which eliminates sideways thrust. Large lateral stresses occur when the hub and disc are offset from the central axis. The Disc-O-Mulch support system also allows the discs to be angled for optimum penetration of the surface and mixing of trash with soil and creates disc vibration for better breakdown of clods.

On the Vario machine each gang of discs can be offset at different angles so the soil working performance can be suited to the soil type. The Compact machine has 30 cm less distance between the front and rear discs - ideal for smaller tractors with limited lifting capacity.

The new Agrisem Cultifield was shown by Reco at Cereals 2004

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SPREADERS

New high capacity fertiliser spreaders unveiled

Rustons Engineering showed a new range of Sulky high capacity trailed fertiliser spreaders with nominal hopper sizes of 4000 and 5600 l at Cereals 2004; with hopper covers in position, maximum capacity is 6600 l.

The machines incorporate Suiky's patented DPX stepless spreading system, which is adjustable from 12 to 36 m simply by altering the drop point on the spreader disc, so there are no discs to change or vane angles to alter. They also have the Sulky Tribord system which enables accurate border spreading to be carried out from the tractor seat at the push of a button.

Fertiliser is delivered to the spreading disc by a 650 mm wide conveyor belt which ensures a consistent feed rate irrespective of the amount remaining in the hopper. A positive drive from the land wheels gives an application rate proportional to the forward speed. Application rates from 60 kg to 1000 kg per hectare can be achieved on 24 m tramlines.

The new Sulky high capacity trailed fertiliser spreader was shown by RECO at Cereals 2004

An under-frame clearance of over a metre allows late top-dressing, and a sprung drawbar reduces compaction and gives greater stability. Hydraulic brakes, sieves, full road lighting and hydraulically controlled double shutters are all included as standard equipment and the wheelbase is adjustable from 1.55 to 2 m. Options include hydraulic hopper emptying. As with all Sulky machines, the spreading mechanism gearboxes have a three year warranty.

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ROBOTICS AWARD

ABB Golden Robot 2004 Award

Cow milking application

A Dutch farmer's pioneering work on robot-based cow milking operations has earned him the ABB-sponsored Golden Robot Award for 2004.

The development, by Henk Hofman, is an outstanding example of a completely new application that is an inspiration to others in expanding the use of industrial robots. Mr Hofman has successfully applied the use of a general purpose robot to the application and in so doing has met all the challenges of a 'normal' robot application, such as robustness of system, uptime and simplicity, in addition to having to deal with unpredictable animals.

Development of robot-based cow milking application earns Dutch farmer the ABB sponsored Golden Robot Award 2004

The application requires close contact between robot and animal, with the robot control system having to closely co-ordinate teat cup position and orientation in relation to the cow. Such an application is invaluable in expanding the use of robots in new areas, while assisting in developing new robot operating concepts in traditional industries,

Key factors that have contributed to the success of the Hofman system are an intuitive user interface, ease of programming supported by widespread use of sensors, and high total system uptime.

Mr Hofman holds a number of patents relating to the robot based automation of cow milking. Close to 100 robot systems for cow milking are already in operation at farms in a large number of countries.

Since its inception in 1984, the ABB sponsored Golden Robot Award has been presented to the winner at the annual International Symposium on Robotics. It is given to deserving individuals throughout the world, who have contributed to the development of industrial robot technology as testified by university, institute or robot user and demonstrated by documented achievements.

ABB (www.abb.com) is a leader in power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries and employs about 113,000 people. They provide products, systems, software and services for the automation and optimisation of discrete, process and batch manufacturing operations plus related business aspects.

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BALERS

Vicon introduces high capacity pick-up

Vicon have introduced a high capacity 2.3 m pick-up for variable chamber balers

Vicon has introduced a 2.3 m pick-up option for its RV 1601 and RV 1901 variable chamber round balers, to improve swath handling ability when working in larger swaths, produced by bigger and bigger combine harvesters.

"Against the standard 2.1 m pick-up, the 2.3 m option gives contractors and farmers more intake capacity when working in wider, heavier straw swaths," explains Tim Baker, Vicon's technical manager. In addition, the pick-up reel now features five tine bars instead of the usual four, offering increased strength and durability across the increased working width.

The firm says that despite the increased pick-up dimensions, the transport width remains unchanged, as a result of using detachable pick-up guide wheels. The 2.3 m pickup option adds £1090 to the price of the RV Optifeed balers.

CONTACT

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CULTIVATORS

New features for Triple-Press cultivator

Knight Farm Machinery has made some design changes to its Triple-Press cultivator and added extra features for the 2004 season.

The soaring cost of steel - amounting to over 20 per cent so far this year - prompted a close look at the frame, with a view to rationalising steel content and enabling the Company to hold its current prices. The result is a new frame that doesn't have to lift so high when it is being folded and is also lower in the transport position.

The Dutch tines on the latest Triple-Press are one-piece, twin-point all-welded units instead of the bolted assemblies previously fitted. The 2004 machine also has road lights and a toolbox that can carry spare Speed-Loc points.

The Triple-Press cultivators are now available in widths from three to seven metres and with up to four rows of soil working tools. A front roller, which can be adjusted to give precise depth control, cuts trash in front of the tools and two sets of rings at the rear of the machine produce a weather-proof finished surface.

Knight Farm Machinery's re-designed Triple-Press cultivator for 2004

MORE INFORMATION

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FENCING

Spaldings distribute the Tensulator

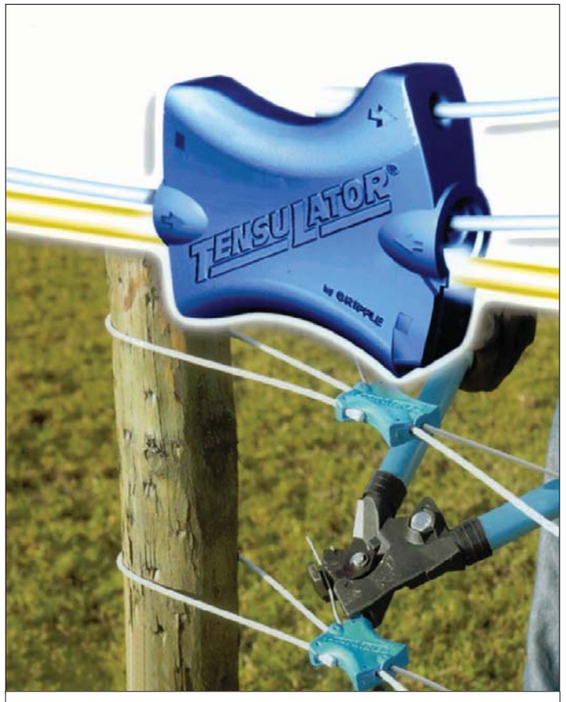
The Electric Fence Tensulator is a 4-in-one device that joins, tensions, anchors and insulates electric fencing. It is faster, easier and more cost effective to fit to electric fences than traditional methods.

It replaces the need for fitting separate end post insulators and inline wire strainers. Tensulator also eliminates the need for awkward bending and twisting of wire. Once fitted it maximises the life of the wire by retaining its tension, insulates the wires from each other and acts as an anchoring device to the end post.

The Tensulator system comprises a glass filled nylon Gripple with stainless steel springs together with ceramic rollers provided with a monofilament length for anchoring.

It is four times faster with a Tensulator system installation typically four times faster than traditional methods. It is also easy to use, as there is no bending, or twisting of awkward wires and, therefore, no hand injuries either. It is ideal for all strains of fence and can be tensioned and re-tensioned.

All components are non-corrosive for insulation and result in a longer life for the product.



A 4-in-one device that joins, tensions, anchors and insulates electric fencing: faster; easier; and more cost-effective to fit.

MORE INFORMATION

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SPRAYERS

Rau's trailed sprayer: increased sophistication and accuracy

Rau has extended its sprayer portfolio with the introduction of the Explorer series - three ranges of trailed machines that offer growers and contractors an increased choice and varied levels of sophistication to suit all needs and budgets.

Replacing the Spridotrain models, the Explorer series contains a total of 44 models, depicted in three ranges: Explorer Farmer, Explorer Classic and Explorer Pro. Depending on the model, tank capacity ranges from 2400 to 3600 l, with the choice of steel booms from 18 - 24 m or aluminium booms from 28 - 33 m.

"Combined with the Ibis self-propelled and the D2 and Expert tractor mounted models, the introduction of the Explorer series creates one of the most extensive line-ups of sprayer available in the UK," says Cliff Buck, Rau sprayer specialist with the Kverneland Group.

In creating the Explorer series, Rau has endeavoured to give growers an extensive choice. This enables machine specification to be as operator friendly and as technically advanced, as growers require.

For example, growers can choose to equip their Explorer with a host of features including Twinflex axle suspension, auto-steering axle, Hydroflex drawbar suspension and Autoset, the latter is an automatic filling system that can be activated from the cab.

"We want to be able to offer customers the choice of every possible innovation, in a package that provides high performance and extremely accurate spraying," says Mr Buck.

Rau's extended portfolio now includes the 'Explorer' series; a range of trailed sprayers

One of the Explorer's most innovative features is the in-cab control box. Designated Flowmate on Explorer Farmer and Classic models and Flowmaster for Pro models, it combines all sprayer functions - dose controller, hydraulic boom functions and spray sections - in one neat control box, developed in-house by Kverneland's Mechatronics centre.

The Flowmate offers individual control of up to nine boom sections, shows target application rate and actual application rate, provides information on area covered, litres remaining in the tank and the ability to control border spraying nozzles. The Flowmaster version includes a larger screen with greater detail on sprayer functions, plus the ability to control the steering axle.

Automatic priming and rinsing is also a feature of the in-cab control system. "We know the diameter and length of individual hoses, so it's easy to calculate how much flow is needed to fill the spray lines ready for work," he adds. "And it's the same when washing out."

Two types of in-tank agitation are used throughout the range. These include a low pressure return-to-tank agitation and a high pressure system. Both can be controlled from the comfort of the Flowmate and Flowmaster control panels.

"High capacity sprayers with big tanks are prone to suffering from air ingestion when agitating, particularly when tank volumes become low," warns Mr Buck. "This also makes it difficult to empty the tank while spraying, leaving quite a lot of volume in the tank that needs to be disposed of."

"By offering two agitation systems, we can fine tune sprayer operation to suit what's in the tank. For example when handling products such as powders that need vigorous mixing and when spraying out exact quantities, to empty the tank," he says.

Rau has overcome air ingestion at the pump by plumbing its return-to-tank agitation line directly into the pump inlet - this is activated when the return to tank agitation is switched off. "It is a system that virtually empties the tank, all bar a few litres," says Mr Buck. "This minimises tank washings and waste, and we believe that no other sprayer offers this level of effectiveness when emptying the tank through the boom."

HSS steel boom construction follows a welded triangular design to create a compromise between inherent strength and lightweight construction. In the HSA aluminium boom, the firm has chosen to adopt aircraft manufacturing technology and assemble the boom with bolt together clamps and glue - this allows individual pieces to be replaced on-farm in the event of damage, eliminating the need for costly specialist welding techniques.

Both boom types conceal spray lines and hydraulic hoses within U-shaped channel sections. At pivot points, all lines are sleeved for additional protection, and hydraulic folding geometry has been engineered so that rams are fully closed when the boom is open, eliminating the risk of ram bending should the boom hit an in-field obstruction.

Part of the Kverneland Group's UK portfolio, Rau sprayers are distributed through the Vicon dealer network. Prices start from £28555 for the 18 m Explorer Farmer, with Classic and Pro versions priced from £31575 and £35815, respectively.

MORE INFORMATION

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TRACTORS

New Lynx Frontline system suits John Deere 7020 range

Due to certain requirements by John Deere for its new 7020 range of tractors, Lynx Engineering's new 5.0 t Frontline linkage system incorporates a push bar to brace the tractor and transfer load when using the linkage lift capacity to its full potential. When such lifting power is not required, a 2.8 tonne version is available without the need for additional bracing.

These latest 2.8 and 5.0 t front linkage and pto systems from Lynx fits with both standard and ILS front axle systems and feature a new cast base frame offering rigidity and strength. The frame neatly integrates with the tractor enabling the link arms, fitted with Waltescheid III hook ends, to fold up and in for transport.

All of the linkages are fitted with the proven Lynx multi-valve system as standard, enabling its operator to work the lift rams in locked transport, float, single or double acting modes.

A single or dual gas accumulator suspension system, on 3.5 or 5.0 t models respectively, provides cushioning for heavy implements in transit. This is proven to help improve tractor stability at transport speeds, increase operator comfort and reduce shock loads passing through the tractor.

The new Frontline's specially designed pto operates, where specified, at 1000 rpm and is engaged via Lynx Engineering's Pro-link pto control system.

Lynx Engineering's new 5 t Frontline linkage system attached to a 7720 John Deere tractor from its new 7020 tractor range

This combination enables the high power pto clutch engagement rate to be modulated to suit the driven attachment.

The 7020 series 2.8 t and 5.0 t Frontline linkages are priced at £2190 and £2960 respectively with the pto a further £3690. This can be retro-fitted separately if necessary.

MORE INFORMATION

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PRECISION DRILLS

Sulky launches new precision drill

Sulky has completed a fundamental re-design of its SPI precision pneumatic grain drill distributed in the UK by Rustons Engineering, improving its performance and introducing a number of new options. The drill is available in six sizes from three to six metres.

The new model has adjustable regulator rollers behind the 'row by row' metering units which helps to reduce bunching or misses and an independent adjustable coulter bar frame that matches the coulter units to the rear roller on a power harrow, avoiding unnecessary overhang. Coulter positioning has been made more consistent by including an anti-bounce feature in the support design.

There is also a wider choice of coulter combinations - two or three rows of Suffolk coulters or two rows of Unidiscs can now be fitted - and pressure can be adjusted up to 30 kg per disc. A new hopper design brings the weight nearer to the tractor and makes bulk loading easier.

Like the previous SPI models, seed is metered first by a peg wheel and then by a Reguline roller before being delivered pneumatically to the coulter which provides very precise seed placement.

Two types of electronic control are now available for the new machines:

- the Ultron MS system; and
- the Vision SPB system.

The Ultron MS system provides a simple rate setting procedure and allows application rates to be adjusted in 10 per cent increments on the move. It also includes tramline control and various information displays and warnings.

In addition to the features on the MS, the Vision SPB control system records information, stores settings and also provides on-screen information for the operator. The Vision box is GPS-compatible and can be used on Sulky fertiliser spreaders.

The drills can also be fitted with an award-winning pneumatic seed transport monitoring device that alerts the operator to problems such as coulter blockage or failure of seed delivery.

New options on the Sulky SPI Reguline precision pneumatic grain drills were shown by RECO at Cereals 2004

MORE INFORMATION

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GRAIN STORAGE

Spaldings launch new grain moisture meter

Spaldings have recently introduced a new grain moisture meter to further complement their range of grain handling and storage equipment.

The self contained fully portable unit is supplied in a shockproof transport case, making it safe for use in the field or for moving between grain stores, etc.

The grain moisture meter has a digital display (accurate to one decimal place), built in measuring beaker and a combined grinder and compressor. The grinding components are manufactured in tempered galvanised steel to give years of trouble free service. The unit has a built in automatic temperature compensator to give accurate results every time.

The new grain moisture meter from Spaldings adds to their expanding range of grain handling and storage equipment

MORE INFORMATION

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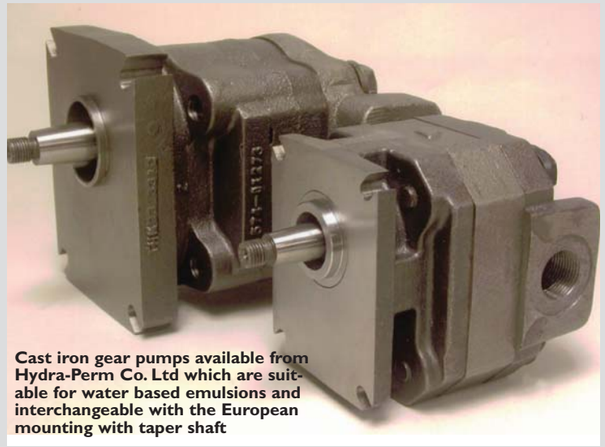
HYDRAULICS

Hydraulic products for mobile applications

The Mobile Division of Hydra-Perm Co. Ltd, can supply a range of hydraulic products for mobile equipment as well as many other general industrial applications. They are the sole agent in the UK for the range of Permco gear pumps, motors and flow dividers etc, which are directly compatible with many other leading brands of equipment.

The products are particularly suited for equipment destined for the construction, offshore, agriculture, mining, forestry and waste reclamation industries, where they are designed to meet the most demanding of project specifications.



Cast iron gear pumps available from Hydra-Perm Co. Ltd which are suitable for water based emulsions and interchangeable with the European mounting with taper shaft

Displacements range from 6 ml up to 199 ml with a variety of shaft and mounting options available.

The roller bearing pumps and motors have passed NCB tests, are directly interchangeable with Parker/Commercial Intertech products and can be supplied in a range of gear widths for speeds of 2400 rpm (maximum 2000 rpm for motors) and pressures up to 21 MPa. Permco are also still manufacturing the equivalent to the 15H, 25X and 37X series. A sleeve bushed series, suitable for higher speed and pressure ratings (up to 31 MPa), includes the latest 1:8 taper shaft with European DIN mounting flange.

CONTACT

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CULTIVATORS

New disc type stubble cultivator is key to success

The Kverneland DSA surface cultivator has been developed as a high speed, shallow depth implement for stubble cultivation or reworking ploughed land. The range includes fixed 3 m and 4 m models, plus hydraulic folding 4 m, 5 m and 6 m versions which achieves a transport width of 2.5 m.

Using two rows of adjustable, serrated discs, the DSA includes a non-stop leg reset mechanism that uses individual springs for each disc assembly. It is a system that ensures ground contours are followed, allowing the DSA to cope with a wide range of soils and working conditions.

Its operational aggressiveness can be fine-tuned by adjusting the working angle of each row of discs. Mechanical adjustment is fitted as standard, though hydraulic operation can be specified.

Notched 510 mm discs are fitted as standard, with 560 mm available as an option. Thorough mixing is achieved, says the firm, by a 250 mm disc-to-disc spacing along each row, with the following row offset between the front discs to ensure comprehensive movement of the soil across the machine's entire working width.

A choice of three packer rollers are available for the rear of the DSA cultivator - the roller serves as a means of adjusting the depth of work by setting the roller's working height by repositioning pins. Rear roller choice includes 450 mm cage-type or spiral rollers, or a 560 mm diameter cracker packer.

Launched at Cereals 2004, prices start at £8975 for the 3 m model and from £15605 for the 4 m hydraulic folding version.

The unique mechanism employed on the DSA surface cultivator allows it to cope with a wide range of soils and working conditions

CONTACT

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ENVIRONMENTAL MONITORING

‘Squirrel’ selected by leading environmental monitoring consultancy

Large environmental monitoring consultancy choose Squirrel SQ1000 data loggers to monitor air emissions by mobile monitoring units

One of Europe’s largest environmental monitoring consultancies has chosen Grant Squirrel SQ1000 data loggers to support their many projects.

Whether monitoring the emissions of an industrial manufacturing process or a power station, businesses are required to supply reports to certify conformance to environmental and health and safety requirements. To do this a mobile environmental monitoring unit is sent to a specified location, for example adjacent to a power station, where data loggers log and record a variety of parameters such as temperature and air emissions. At the end of the day the data is downloaded and analysed. A report is then presented to the site owner in order that they may take remedial action if required. By constantly measuring and checking sites in this manner, the impact on the environment incurred by any changes in process or structure, such as a new extraction flue, can be instantly detected and resolved if necessary. The Grant Squirrel SQ1000 was chosen for its accuracy, ease of use and repeatability and, being battery powered, could operate in mobile trailer units.

Environmental monitoring is extremely important to all types of industry, particularly as the lack of monitoring in the past now threatens a heavy burden on the future. This has led to great advances in the technology surrounding environmental monitoring which is totally supported by the development of data logging systems by Grant Instruments. The Grant Squirrel SQ1000 is small, fast, accurate and reliable and has the following features:

- easy to set up;
- measures temperature, humidity, pressure and voltage of 4 to 20 mA;
- user selectable recording ranges;
- ability to record 2 million readings of secure data with date and time;
- low power consumption for long term monitoring;
- remote set up and download using GSM, PSTN or satellite modem; and
- ethernet option for inclusion in a network.

CONTACT

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TRACTORS

Same and Lamborghini ranges deliver high level specification and productivity

Spanning the 101 kW to 128 kW band, the new Iron and R6 ranges are the most advanced tractors yet introduced to carry the SAME and Lamborghini brand names and liveries.

Each represented by four tractors of identical horsepower, the Iron and R6 ranges both bear the same model designations, namely: 130 S; 140 S; 150 S; and 165 S.

SAME Iron 150 S (top) and Lamborghini R6 165 S tractors at work

All models are powered by new six cylinder, liquid-cooled Deutz TIER II turbocharged engines with intercooler. To ensure that exhaust emissions remain well within the required limit, the engines have a new injection system which generates pressures greater than 15950psi at the injectors for optimum fuel atomisation. This, coupled with an advanced combustion chamber design, helps ensure a very clean burn and low levels of fuel consumption.

A major feature of the engine is its flexibility and performance at slower speeds. Rated engine power output is produced at just 1800 rpm, while at 1000 rpm, the torque rise is significantly higher than the torque at rated speed, ensuring that the tractor has no difficulty moving off, even in very tough conditions.

The high power output available from each engine is achieved at low levels of fuel usage, made possible by the electronic engine management system that continuously compares actual power delivery and fuel consumption data with optimum values stored in the system’s memory.

The new SAME Iron and Lamborghini R6 ranges both feature an innovative cooling system. The engine radiator, transmission oil cooler, fuel cooler, inter-cooler and cab air conditioning condenser are all mounted vertically and parallel to each other at the front of the engine. This layout maximises the surface area exposed to cooling air while helping keep overall dimensions to a minimum. A clever hinging system allows each cooling element to be pivoted upwards or forwards for fast, convenient cleaning and maintenance.

All eight tractors have a four-speed Powershift transmission with six synchronised ranges, creep gears and change-on-the-move hydraulic shuttle, producing a total of 40 forward and 40 reverse gears across a speed range from 0.45 km/h to 50 km/h. Electro-hydraulically controlled, the system allows the operator to adjust travel speeds quickly and accurately to suit working conditions either by pressing buttons on the gear lever or by moving a lever on the multi-function armrest.

Electronic engagement of four-wheel drive and the front and rear axle differential locks is automatically controlled depending on the tractor’s speed and steering angle.

Load-sensing hydraulics are fitted to both the SAME Iron and Lamborghini R6 ranges. The system is supplied by a 120 l/min variable displacement piston pump, this design being chosen as the optimum solution for powering implements requiring large quantities of oil. The pump responds instantly to a drop in hydraulic pressure by pumping more oil, quickly restoring pressure to the optimum level.

Operators have full electronic control over the Category III rear linkage which is equipped with hook ends, lateral stabilisers and left and right hand adjustable lift arms. Maximum lift capacity on all tractor models is 9200kg with external oil requirements supplied by four double acting remote valves with individual flow control. Hydraulic trailer braking is standard as is a combined drawbar and hydraulically actuated pick-up hitch.

Optional equipment includes front linkage with or without front pto and pneumatic trailer braking, the latter being included with the air assisted cab suspension kit available as on extra-cost option on all of the new models.

Electro-hydraulic engagement of the independent rear pto is via a multi-disc, oil-immersed clutch pack transmitting either 540 or 1000 rpm speeds in selectable ‘normal’ or ‘economy’ modes. The hydrostatic steering system is supplied by an independent 42 l/min pump while the steering angle of 52 degrees ensures agile manoeuvring in the field or in tight corners in and around farm buildings. To stop the tractor effectively and safely time after time, all models feature large diameter in-board

TRACTORS (CONTINUED)

oil-immersed brakes.

Modern, streamlined, functional styling ensures that the new SAME Iron and Lamborghini R6 tractor ranges will turn heads wherever they are seen at work. All models have galvanised cab-access steps and bonnets combined with exceptionally well-appointed cabs with a large tinted glass area giving 320 degrees of visibility. An opening glass roof panel provides a clear upward view of a front loader and attachments.

All instruments and the colour coded controls are grouped to provide maximum convenience and ease of use, with the throttle, powershift joystick, hydraulic lift controls and engine electronic memory functions being positioned in the multi-function armrest and panel to the driver's right hand. Same Deutz-Fahr's Infocenter III dash panel provides a constant read out of all important tractor operating data together with maintenance reminders and error messages.

The suspended, flat floor luxury cab includes two entrance doors, a hinged rear window with wash/wipe and cable entry port, two internal and two external telescopic rear view mirrors, air conditioning and an air sprung driver's seat. Lighting consists of 10 front and four rear work lights, a flashing beacon, interior courtesy light and independent lighting for the in-cab controls.

Demonstrations of all models are available now through the SDF dealer network or by telephoning Same Deutz-Fahr UK Ltd on +44 (0)1788 891892 or e-mailing info@sdf.co.uk

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CROP SPRAYERS

New self-propelled models from Knight

Just over a year after launching its first self-propelled sprayer, built completely in-house, Knight Farm Machinery has brought out two new models, including a 165 kW machine for customers with large-scale operations.

The original model, which had a 118 kW engine and 3000 l main tank, has been revised, with the original engine being replaced with a new 135 kW power unit incorporating the latest electronic emission control systems. This model is now being offered with 3000 or 3500 l tanks. Knight expects the 165 kW machine to be usually built with a 3500 l tank.

Knight is now offering two models of self-propelled sprayer with booms up to 34 m wide and a choice of 3000 or 3500 litre tanks

The sprayers are offered with the company's 4-Series heavy duty 24 m boom as standard, with other options including tri-fold booms up to 36 m wide. All round active air suspension, selectable two or four-wheel steering and adjustable track width are also common to both models. Main tanks are glass fibre and incorporate modular clean water rinse tanks in a design that keeps the vehicies' centre of gravity as low as possible. Cabs are high specification units with large panoramic windscreens, air-conditioning and a user-friendly multifunction joystick.

Sprayer specification includes LASER sprayline agitation and Knight's APS system which reduces chemical residues in the pipework and valves and simplifies operation and servicing. Filters and other service items are grouped conveniently together.

Another common feature on both models is the fully integrated intelligent computer based fluid control system, which is particularly easy to use, safe and convenient. An external control panel, a panel in the cab and the operator's joystick interact so that drivers can control all functions, from all positions, with full logic. The sprayers also have a new design of chassis and de-mount system that allows them to be taken on and off quickly and maintains the strength of the vehicle platform.

CONTACT

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MOWERS

Inturf develop hydraulic gang for wide area mowing

Inturf, one of the market leaders in the production, distribution and installation of turf and turf systems for sports stadia, has developed a unique hydraulic trailed gang mower with 15 cutting cylinders for mowing turf fields at their nursery site in Lincolnshire.

Designed and developed in-house by mechanic/fitter Peter Pearson, this mowing leviathan utilises two Ransomes TG4650 7 cylinder gangs mounted side by side with a further cylinder mounted onto a specially fabricated frame to alleviate any uncut gap between the two sets of gangs.

The drive from the tractor pto is an ingenious use of off-the-shelf splitter gearboxes and pto shafts that transfer power to the two TG4650s. The resultant machine has a massive working width of 9.6 metres and is towed behind an 64 kW New Holland tractor with large flotation tyres to minimise ground compaction.

For ease of transport, the drive shafts can be uncoupled and stowed in a special carrying cradle. The two TG4650 gangs can be uncoupled from the frame and the single reel then lifts into the transport position. The frame ends fold hydraulically to within the width of the tractor tyres and the two units can be hitched in tandem and towed to a new destination.

Peter Pearson commented, "With huge acreages in development we need to cut as quickly and efficiently as possible. Now with a 9.6 m cut and the speed at which the New Holland can tow the unit we have improved productivity substantially. In fact we're getting about 7 ha/h.

"I had a feeling that we could get a 15 unit machine to work and within a few weeks I had the basis of a working unit. We've used a bit of ingenuity and also some sound engineering to produce the machine. We've applied to patent the design and have even painted it in Ransomes green."

Inturf have won the contract to relay the pitch at Everton's Goodison Park stadium during the summer and Head Groundsman Bob Lennon, on a recent visit to the Newark nursery said, "I came down to check on the progress of our pitch and was fortunate to see the new machine. The engineering is quite incredible. What Peter Pearson has achieved would do credit to any major turf equipment manufacturer. The biggest accolade that I can pay is to say that it looks like a factory manufactured item. The hydraulics, the attention to detail and the finish are superb. To see it in action is a sight indeed; it makes light work of huge fields."

The unique hydraulic trailed gang mower developed by Inturf with 15 cutting cylinders for mowing turf fields

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Sustainability in Engineering Design

Innovation, science and technology in **A**griculture and the **R**ural **E**nvironment

Sustainable engineering design aims to meet customer's expectations, comply with legislative demands, work within a finite environment and still provide economic returns. Financial sustainability is necessary.

This conference looks to explore these topic areas and propose ways of achieving a sustainable future.

IAgrE Annual Conference

March 9th 2005

Venue:

Harper Adams University College
Shropshire

Outline Programme *

Morning Papers

- Opening address
- Sustainable Business
- Sustainable Design

Lunch and Awards Ceremony

Afternoon Papers

- End of Life Policy
- Sustainable Engines
- Sustainable Materials
- Design Processes and Systems
- Design for Local Manufacture

Parallel Specialist Papers (pm)

- Building Materials
- Waste Management
- Soil Sustainability in a Decoupled Environment
- Horticultural Buildings
- Reed Bed Technology
- Food Chain Waste Limitation
- Energy Crops

* Subject to change

The professional body for engineers, scientists, technologists and managers in agricultural and allied industries including food, forestry and biological systems

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IAgrE

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