Agriculture • Horticulture • Forestry • Environment • Amenity

LANDWARDS

Winter 2005

- Cost Control
- Agricultural Developments

Zero Turn Revolution

IAgrE JOURNAL Volume 60 No.6 www.iagre.org

DIARY OF EVENTS

JANUARY 2006

Monday 9 January 19.30 h
South East Midlands Branch
Modern Sports Surfaces
Speaker: Alex Vickers, Cranfield University/Turftrax
Venue: Stumble Bar, Cranfield University at Silsoe

Wednesday 11 January 18.30 h
Western Branch
Technical Presentation – MAN
Speaker: Les Bishop, Heavy Truck Product Manager, MAN ERF
Venue: Wiltshire College, Lackham
For further details and to reserve a place please contact the Branch Secretary, Nick Paul, tel: 01225 782347 or e-mail: njp@iagre.biz

Wednesday 18 January 17.50 h
East Midlands Branch
LAMMA Show
Further details to be confirmed

Wednesday 18 January 19.30 h
Wrekin Branch
Black Circle Traction
Speakers: Peter Debenham and Stuart Eagland, Michelin Tyre Company
Venue: Harper Adams University College

Wednesday 25 January 20.00 h
Northern Ireland Branch
Self Loading Forage Wagons – Features and Applications
Speaker: Thomas Reiter, Marketing Manager, Alois Pottinger Ltd
Venue: ARINI, Hillsborough

January
Herts & Essex Branch
Fuel Cell Technology
Venue: CEME, Rainham, Essex
Details to be confirmed
Contact the Branch Secretary, Tom Kindred, tel: 07974 951604 or e-mail: thomas.kindred@cnh.com

January
Scottish Branch
Members Night/Social Evening
Further details to be advised

FEBRUARY 2006

Monday 6 February 19.30 h
Wrekin Branch
Automotive Technologies for Land-based Vehicles
Speaker: TBC
Venue: Harper Adams University College

Tuesday 7 February 19.30 h
West Midlands Branch
Wind Power
Speaker: Antony Johnson, National Grid
Venue: Friends Meeting House, Stratford upon Avon
For further details, e-mail: westmids@iagre.biz

Tuesday 7 February 19.00 h
South East Midlands Branch
Branch AGM & Postgraduate Student Presentations
Venue: Stumble Inn, Cranfield University at Silsoe

Tuesday 7 February 19.30 h
Yorkshire Branch
Turbocharging Technology by Borg Warner Turbo Systems
Venue: Buckles Inn, Askham Richard, Nr York

Thursday 16 February 19.30 h
South Western Branch
Not All Bio Oils are Equal – Standard and More Unusual Applications for Biodegradable Hydraulic Oils
Speaker: Derrick Simpkin, Panolin Biodegradable Lubricants
Venue: The Stowey Arms, Exminster, Devon
For further details and if you would like to attend please contact the Branch Secretary, Matt Payne, e-mail mpayne@somersetdbs.co.uk or tel: 01278 789906 or Branch Chairman, Angus Buchanan, e-mail angus.buchanan@vapormatic.com or tel: 01803 874082/mobile 07876 564169

Tuesday 21 February 19.30 h
Herts & Essex Branch
Field Drainage and Flood Control
Speaker: Professor Dick Godwin
Final details to be confirmed

MARCH 2006

Monday 6 March 19.30 h
South East Midlands Branch
Routes to Professional Registration
Speakers: Dr Dan Mitchell and recently qualified registrant
Venue: Stumble Inn, Cranfield University at Silsoe

Tuesday 7 March 19.30 h
East Anglian Branch
Branch AGM and Technical Talk
Speaker: Professor Paul Miller, Silsoe Spray Applications Unit, The Arable Group
Venue: Diss Golf Club
Further details to be advised

Tuesday 7 March 19.30 h
West Midlands Branch
Branch AGM and Technical Talk
Speaker: Geoff Freedman
Venue: Friends Meeting House, Stratford-upon-Avon
For further details, e-mail: westmids@iagre.biz

Tuesday 7 March 19.30 h
Yorkshire Branch
Branch AGM and Technical Talk
Speaker: Knight Farm Machinery
Venue: Buckles Inn, Askham Richard, Nr York
Further details to be advised

Thursday 9 March 20.00 h
Yorkshire Branch
Joint Meeting with Lancashire Tractor Club
Speakers: to be confirmed
Venue: College Lecture Theatre, Myerscough College

Monday 13 March 18.30 h
Wrekin Branch
Branch AGM and Technical Talk
Speaker: Dan Mitchell
Venue: Reaseheath College

Wednesday 15 March
Landwards 2006
"Land and Change: Engineering the Future"
Venue: Cranfield University at Silsoe, Bedfordshire
The Conference will highlight the issues arising from a more integrated approach to land use and point up where science and technology can contribute to resolving conflicts and, where appropriate, add value.
For further details, please contact the IAgrE Secretariat

Thursday 16 March
Scottish Branch
Branch Annual Conference/AGM
IAgrE Second Spray Master Class
Speakers: to include Professor Paul Miller, IAgrE President-Elect
Further details to be advised

Thursday 17 March
East Midlands Branch
Branch AGM
Venue and time to be confirmed

March
East Midlands Branch
Visit to Brooksby College
Brooksby College Third Year Engineering Students Introduction to Branch activities – two Branch members will outline their experiences and work as agricultural engineers followed by a tour of the College facilities and look at the work being carried out.
Final details to be confirmed

Wednesday 22 March 18.30 h
Western Branch
Branch AGM and Technical Presentation by leading tractor manufacturer on the subject of transmission design
Venue: Royal Agricultural College, Cirencester
For further details and to reserve a place, please contact the Branch Secretary, Nick Paul, tel: 01225 782347 or e-mail: njp@iagre.biz

Thursday 23 March, time TBC
South Western Branch
Branch AGM and Technical Talk entitled "Recent Advances in Crop Protection Technology and Ongoing Research"
Speaker: Professor Paul Miller, Silsoe Spray Applications Unit, The Arable Group
Venue: The Stowey Arms, Exminster, Devon

March
Herts & Essex Branch
Branch AGM and Technical Talk
For further details, contact the Branch Secretary, Tom Kindred, tel: 07974 951604 or e-mail: thomas.kindred@cnh.com

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LANDWARDS

The Professional Journal for Engineers, Scientists, and Technologists *in* Agriculture, Horticulture, Forestry, Environment and Amenity

Editor
Eur Ing Prof Brian D Witney
PhD CEng CEnv FIMechE HonFIAgrE MemASABE FFCS
LAND TECHNOLOGY LTD
33 South Barnton Ave,
Edinburgh, EH4 6AN
Tel/Fax: +44 (0)131 336 3129
E-mail: landwards@landtec.co.uk
Website: http://www.landtec.co.uk

Advertising
All enquiries to IAgrE
Tel: +44 (0)1525 861096
Fax: +44 (0)1525 861660

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IAgrE,
West End Road, Silsoe,
Bedford, MK45 4DU
Tel: +44 (0)1525 861096
Fax: +44(0)1525 861660
E-mail: secretary@iagre.org
Website: http://www.iagre.org

President
Peter L Redman
BSc(Hons) CEnv FIAgrE

Chief Executive & Secretary
Christopher R Whetnall
CEnv IEng FIAgrE MemASABE

CONTENTS

Front cover: *Amenity operations wit the Ferris IS 5000 (Photo: Angus Lindsay, IPU Groundcare)*

ISSN 1363-8300

PUBLICATIONS AND ASSET MANAGEMENT

Fifty bar one

This issue of the IAgrE Journal completes a decade of publishing by Land Technology. In that time, fifty issues bar one have been produced to a high standard of content and design. At the outset, the Journal was rebranded, not without animated discussion and strong minority reservations, as '*Landwards*', a single identifier with broad appeal to represent our members' diverse sectors of interest as '*Engineers, Scientists and Technologists in Agriculture, Horticulture, Forestry, Environment and Amenity*'. Now, with the benefit of hindsight, could we have succeeded in the recent troubled times and downturn in the agricultural industry *as 'The Agricultural Engineer'*? Would such a narrow identity have offered sufficient synergy to welcome and interact with other specialists such as those in Forestry Engineering and much more recently in the Farming and Wildlife Group? Who would have predicted the dominance of amenity, recreation, renewable energy and natural heritage (and all have appeared in recent feature articles) in a ten year cultural shift from food production?

The front cover is essential to attract attention, but the Journal contents need to hold reader interest by covering a range of topics spanning all the sectors of interest at a popular technical level. Author photographs encourage networking and article illustrations encourage interaction with the text! We try to select news items, membership matters and products to provide something of interest for everyone. Contributions from authors and the Secretariat are gratefully received and material is seldom turned away! If you find little of interest in your particular sector, we would welcome a contribution to make good the omission.

Meanwhile, I wish to record my thanks to the people – my wife and members of our family – involved not just in finding, preparing, selecting and editing much of the copy, but also in writing some of the features that have appeared in the 49 issues (and more copy besides that is 'spiked' through lack of space or fading topicality). The front cover images all have to be chosen with care but without charge, some from machinery manufacturer press websites but others garnered in-house to register our independence. We have been fortunate in our Graphics Designer who ensures that the layout closely follows contemporary trends, while upholding the conservative image as the hallmark of a 'Professional Body'. After all the checks, changes and corrections for accuracy and consistency of style, there is the final satisfaction of signing off the proofs. Nevertheless, it eases the suspense in waiting for the final hard copies with the confident assurance that the production team at the Printers remain vigilant even through the final printing processes to provide a high quality product on schedule.

Four for six

The Journal strengthens the common bond for many of the IAgrE members. It is a tangible reminder of the benefits of membership, an information source and awareness of current trends, threats and opportunities relating to our core interests. Although I read every page several times, there is no compulsion for anyone else to read any magazine from cover to cover. Even a quick scan refreshes your link with the Institution. When next you receive *'Landwards'*, check how long you spend browsing the contents: it only requires a quarter of an hour per member, on average, to justify its continued distribution.

Yes, of course, we are aware that the cost of providing and distributing the hard copy could be defrayed by encouraging member access to the Journal posted on the secure website. Each issue is there on offer, but do you really wish to read any magazine online? I don't! Instead, you can always download the portable document format (pdf) file and print it out if you or somebody else has the facilities to do so *and* acknowledges the real charges – broadband connection, printing time and running costs – that substantially exceed the production costs for an individual hard copy (not even considering the extra cost of full colour for your personally downloaded copy)!

However, success does not flow unchecked. Some of the Institution reserves have been eroded in the past few years by withdrawal of capital, carefully monitored and managed, to maintain specific services to members. This is as it should be. Charities, in general, are not in existence to hoard donations but to disburse them wisely. The IAgrE has taken important steps to secure the future with an active response to the current membership drive and further professional qualifications, and headline agreements for the replacement of the office building and acquisition of a research journal. All credit to those with a commitment to making the outlook more buoyant than it has been in recent times past. But if we secure a new building, then does this not relax the exigency for reserves in a 'Building Fund'? And if we add an additional income stream,....do we have to wait for *Godo*? Some risk is necessary to secure the success of any venture. Where do you draw the 'building' line?

I place on record my personal disappointment, not as current Editor but as a Past President, that this membership link through '*Landwards*' is being degraded by a reduction in frequency of publication from six issues

per year to four in 2006 at a time when promotion of our profession could not be more vital. Not only that, the pagination of four issues per year is less than before the increase in frequency of publication was introduced! Perhaps you do not share my disquiet, but if you do, then lobby your Branch representative on Council or voice your opinion by e-mailing the Secretariat. At Land Technology, we believe that we provide a high quality informative product but, in the absence of feedback, do not wish to be seen as complacent in achieving 'total customer satisfaction'. We welcome constructive criticism which could improve the Journal. However, it is not our role or our intention to 'blacken' the pages, so accompany your comments on appropriate copy with a piece for publication, by way of example.

It is counter-productive to cut member benefits at this time.

Harvesting Silsoe's natural resources

Plans have been announced by Cranfield University of its intention to relocate Silsoe's activities to its core site at Cranfield near Bedford. A project team has been appointed by the university Executive to manage the relocation process and to ensure that it is handled to best practice standards. Initially, there will be consultation with all interested parties including students, academics, and support staff, together with partners of the university, in order to exchange information and better understand the impact of the proposed changes. Although there may be some redundancies, the university has committed to minimising these and it is hoped that most staff will move across from Silsoe to Cranfield.

Silsoe has been a strong part of our cultural heritage and has generated international respect through its educational provision and consultancy activities in Agricultural Engineering. However, the university believes that the Cranfield campus offers the best opportunity for synergy between newly enhanced areas, with Natural Resources becoming a new department within the School of Industrial and Manufacturing Science. It will focus on the global need to address technical, environmental, economic and social issues in a holistic fashion. Its aim is to maintain and enhance the world's natural resources and to place them at the heart of economic strategy.

Cranfield University is one of Western Europe's largest academic centres for strategic and applied research, development and design. It is unique in its entirely postgraduate focus. The university is made up of three campuses: Cranfield, Shrivenham (The Defence College of Management and Technology) and Silsoe. The Shrivenham site is effectively 'ring-fenced' as a military location, singling out Silsoe for closer asset management scrutiny. Negotiations are already underway to provide access to the rear of the Silsoe site for residential redevelopment of student housing. Thereafter, the remainder of the site can become, in real estate jargon, 'a prime uncontaminated brownfield site in an idyllic rural setting'. That is why land-based educational facilities are such a sound investment.

BDW

FAREWELL

A slice of history

ALTHOUGH news of the closure of Silsoe Research Institute (SRI) next year has been greeted with general dismay, there was a silver lining for a few when its fleet of tractors fell under the hammer at a machinery auction at the end of October.

The withdrawal of Biotechnology and Biological Sciences Research Council (BBSRC) funding has spelt the end of an era for the research station, formerly the National Institute of Agricultural Engineering, based in the glorious surroundings of Wrest Park in Bedfordshire.

The inclusion of its 15-strong tractor fleet in the weekend sale of vintage and classic tractors at Cheffins sales ground at Sutton, near Ely, underlined the finality of that decision but, at the same time, presented buyers with the chance to buy not only some well-maintained, low-hours tractors, but also a slice of history.

Although more than 330 tractors in total were on offer, the Silsoe consignment produced some record-breaking prices, said auctioneer and director Bill King.

A final view of the County TW1474 at Wrest Park

The 'headline' tractor was a 1981 County TW1474 (pictured) with just 2606 hours on the clock, described as a 'superbly original example' that had been used for Silsoe's research into soil compaction. It was eventually sold to a Northern Irish collector for the grand sum of £46,000.

Other sought-after tractors from the Institute included a 1973 Ford 7000 that had been used for OECD cab testing purposes that fetched £14,000 from a Irish buyer.

A 1970 Ford 5000 with 1228 hours made £8400, while a 1979 Ford 6600 with 1764 hours made £7600.

Other makes represented in the SRI consignment included a 1979 International 1246 that made £9600 and a 1985 Massey Ferguson 675 which reached £7300.

The tractors from Silsoe were only outshone by a 1964 Doe Triple D dual drive that broke all records, with a Midlands collector paying £66,000 for the privilege of taking it home.

"It was a massive day with some exceptional prices throughout the day," said Mr King. "The crowds were huge and the bidding determined.

"The number of Irish enthusiasts attending the sale has always been high and they are now accounting for a high proportion of tractor purchases," he added.

Ferris IS5000 at Stratford golf course

ZERO TURN REVOLUTION

Angus Lindsay

Founded in 1959, the IPU Group now operates three divisions offering a range of services from electronic engine governor and control systems for customers such as the Ministry of Defence and BAE Systems, a starting division whose staff custom build non electrical air and hydraulic starting systems primarily for the oil industry but also one off projects such as the back-up starting system for the 'Snowbird 6', an amphibious vehicle designed to cross the Bering Strait and the groundcare division whose staff specialise in highly productive and innovative zero turn rotary grass cutting machines.

Ground-Care joined the IPU portfolio through the importation of JLO engines, once a common sight on all Flymo's, and grew through the supply of Dori pedestrian mowers from France and Grillo amenity machinery from Italy. In the mid 1990's with the zero turn market very much in its infancy, the decision was taken to import Ferris mowing machines from the United States. This would be the basis for a major revolution in the UK's groundcare market.

Today, there are many zero turn machines to choose from but only Ferris offer a unique patented suspension system of automotive quality, unseen on any other type of commercial grass cutting machine. With its strong simple construction coupled to robust Kawasaki petrol and Caterpillar diesel power plants, the Ferris IS range offers unrivalled productivity and operator comfort. Adjustable suspension helps to reduce operator fatigue and whole body vibration whilst also prolonging the life of the machine by softening the shocks and knocks associated with the rigorous demands of commercial mowing contracts.

Available in cutting widths from 1.2 m up to 1.8 m, all petrol powered machines can be offered with an liquified

BIO NOTE

Angus Lindsay MIAgrE is Northern Account Manager with IPU Groundcare, Churchbridge, Oldbury B69 2AS. Tel: +44(0)121 5110400 Fax: +44(0)121 5110401 E-mail: ipu@ipu.co.uk Website: www.ipu.co.uk

Stander range have integral operator platforms, eliminating the fatigue of pedestrian mowing

"Today, there are many zero turn machines to choose from but only Ferris offer a unique patented suspension system of automotive quality, unseen on any other type of commercial grass cutting machine."

petroleum gas (LPG) dual fuel conversion as well as collection systems. At its introduction in 2002, the Ferris IS5000 won the 'New Product Innovation Award' at Saltex; this was only possible after much development work by the IPU team fine tuning the machine to meet UK and European standards, so much so that many of these improvements have been adopted as options in the US market. The latest product, the Ferris IS4500, again features Caterpillar diesel power, and the latest 'Active Performance Suspension' (APS) which further improves comfort, speed and traction whilst delivering a consistent cut.

In 2002, IPU began importing the Wright range of 'stand on' commercial mowers to complement the Ferris range, designed and built to the same exacting standards by former grounds maintenance professionals.

Ferris IS5000 rear suspension (top); front suspension (bottom)

The innovative Stander range offers the ability to eliminate the fatigue of pedestrian mowing, by allowing the operator to become part of the machine on his or her own integral platform. Again, productivity and comfort are the benchmarks, at nearly half the length of a comparable walk behind machine, operators are at less risk from machine vibration and impact injury, by standing on the machine they are kept out of freshly cut grass and the detritus it contains.

Available in deck sizes from 0.8 m up to 1.5 m, machines can be fitted with mulching kits and flail heads, as well as having an LPG dual fuel option. The Stander's manoeuvrability greatly reduces the amount of back up mowing required by strimmers and smaller pedestrian operated mowers, both renowned for their fluctuating vibration levels and voracious appetite for fuel.

As in agriculture, today's groundcare industry is suffering from a lack of skilled staff and changes in climate are leading to more extremes with warmer wetter conditions forecasted for the future, the grass however, continues to grow.

This all leads to reduced windows of opportunity for local authorities and contractors alike to keep the millions of square metres of grass in Britain's parks, cemeteries, verges, etc., in check. Like any industry, the two most expensive items are the man and the machine; and like agriculture, groundcare is very much weather dependent, so the key is to be as productive as possible with key assets.

With so many elements directly contributing towards maximum machine productivity, it is not surprising that accurate operating costs are hard to calculate. The need to improve daily performance and maintain optimum productivity means knowing the daily, monthly and whole life costs is vital to remain competitive and profitable.

In an effort to assist end users in their choice of machine, IPU has produced a mini CD based 'Productivity calculator', developed from detailed end user experiences of commercial grass cutting and the demands therein. The simple to use CD allows you to change a number of key variables so that the answer accurately reflects the operating environment; it is also available via the IPU website.

In an industry where the once simple task of grass cutting is compounded by ever changing climatic, financial and welfare driven conditions, IPU with Ferris and Wright zero turn mowers offer innovative and productive solutions which go some way to putting an element of fun into an increasingly arduous task.

AWARD

John Deere wins £5,000 Edge Employer Award

Nottingham-based John Deere has been awarded £5,000 after being crowned the East Midlands' best medium sized employer for practical learning.

John Deere was awarded the honour after winning the regional heats of the Edge Employer Award; a joint Jamie Oliver and Simon Woodroffe-backed initiative to recognise the best employers in England offering practical learning opportunities to 14-25 year-olds.

Having already beaten hundreds of organisations, John Deere will now go head-to-head with eight other medium sized organisations for the chance to be recognised as the country's best practical learning employer and receive a staggering £50,000 investment.

Peter Leech, Manager of Customer Support at John Deere, was thrilled with the news, saying: "We are delighted to have won an Edge Employer Award. Practical learning is crucial to the development of our dealer apprentices and we have developed a work based learning programme with Brooksby Melton College. A very important ingredient of this programme is that apprentices work with and continually learn from experienced technicians in the dealer's workplace."

John Deere Limited has been providing comprehensive service technician training across the UK and Ireland dealer network as an integral part of the business since the company started trading in 1966. The dealer network has hired an average of 30 apprentices a year during that time, all of whom have benefited from John Deere training. The Ag Tech agricultural apprentice engineer training programme was the first such scheme to be introduced in the UK, in 1992. Since then, 177 Ag and Turf Tech apprentices have qualified through the scheme, and the programme's total intake to date has been a staggering 361.

Simon Woodroffe, Edge supporter and Founder of Yo! Sushi, says: "Congratulations to John Deere for winning an Edge Employer Award. Most people really discover what they love and what they're good at by actually doing it. It is great that John Deere is committed to giving young people these opportunities."

Jamie Oliver, a supporter of the Edge Employer Awards, says: "The Edge Employer Awards is a brilliant competition and the winning organisations are doing an outstanding job, I hope other organisations will be inspired to follow in their footsteps."

All regional winners will receive their trophy and prize at the Edge Employer Awards ceremony at Old Billingsgate, in London, 1 November, at which the four national winners are to be announced. Jamie Oliver and Simon Woodroffe will both attend the ceremony.

Five facts about the Edge Employer Awards

The first ever Edge Employer Awards will reward £460,000 in cash prizes to employers who provide the very best practical learning for 14-25 year olds.

The Edge Employer Awards have been created by Edge, a new charity dedicated to raising the status of practical learning.

All employers in England, large and small, private and voluntary were able to enter the Edge Employer Awards.

Winning organisations must reinvest their prize winnings (between £2,500 and £200,000) into work-related learning.

Simon Woodroffe and Jamie Oliver are both in full support of Edge and Edge Employer Awards. Simon has succeeded in his career through learning by doing and ensures that it is an integral part of development at Yo! Sushi. Jamie's restaurant Fifteen is all about practical learning and giving young people the chance to shine.

John Deere's Practical Learning Tips

- Practical learning doesn't have to be expensive, start small by transferring your personal knowledge and skills to just one young person.
- Practical learning creates a positive atmosphere that enables staff to feel values. By helping employees to reach their full potential you are far less likely to have issues retaining them
- The reality of business always differs from the plan. By stimulating young people, you will be helping to develop a generation that can think on its feet and is ready to face the challenges of modern business.
- Even the smallest efforts can lead to greater rewards. Young people that learn from experienced employees will also be able to pass those skills on to others throughout the course of their career.

If your tank was ready for September, you're oil-right

With September ushering in new rules for oil storage for non-agricultural users, the Environment Agency has clarified what is required of farmers to store oil safely and how the new regulations of 1 September 2005, apply to them. Farmers (and others such as businesses, schools, hospitals, churches) in England who store more than 200 litres (i.e. standard 40 gallon drum) of oil in tanks and containers, outside and above ground, for non-agricultural purposes will need to meet the new strict requirements.

Although these new Oil Storage Regulations do not apply to agricultural fuel, farmers may find themselves subject to the regulations if they store oil in substantial quantities for heating residential properties or other non-agricultural business activities, such as Bed and Breakfast (B&B), kennels and workshops, carried out on their premises. These regulations are retrospective and will therefore apply to all existing tanks as well as new tanks.

Failure to comply with the new rules is not only bad for the environment but can lead to a fine of up to £5000. If an oil pollution incident is caused, the polluter could be fined up to £20,000 at a magistrate's court.

A recent report from the Oil Care Campaign found that three of the top four causes of oil and fuel pollution incidents were tank failure, pipe failure and overfilling of tanks. The risk from all of these can be reduced by making sure oil storage meets the regulation requirements.

One of the main requirements of the regulations that farmers should look out for is that oil tanks subject to the regulations must have secondary containment – or a 'bund'. The regulations also include detailed requirements for ancillary equipment, location and pipe work.

To comply with the new regulations, there are some simple checks that need to be made, such as:

- store oil in a suitable container which is kept out of harms way;
- use secondary containment big enough to hold 110% of the oil stored in tanks or 25% of oil in drums;
- make sure secondary containment is leak-proof;
- locate all ancillary equipment within the secondary containment when not in use;
- have locks on all taps and valves;
- protect all pipework from damage by impact and corrosion and get underground pipes tested for leaks;
- check valves in pump feed lines or manual pumps; and
- use an automatic overfill prevention devise when the delivery driver can not see the tank vent pipe whilst filling.

Some oil tanks, drums, Intermediate Bulk Containers (IBCs) or mobile bowsers are exempt – such as those containing waste mineral oil.

Oil and fuel used for agricultural purposes is already subject to regulations introduced in 1991. The Silage, Slurry and Agricultural Fuel Oil (SSAFO) regulations cover the storage of oil used for heating and/or power on premises as defined by the Agriculture Act 1947, which includes horticulture, fruit growing, seed growing, market gardens and nursery grounds.

Oil Care Campaign Manager, Richard Martin said: "We are pleased to see that about 70% of farmers have taken some measures to reduce pollution of rivers and groundwater but already this year we have seen over 75 oil and fuel pollution incidents on agricultural premises.

"Farmers need to know how these new regulations for oil storage apply to them, and if they do store oil and fuel for non-agricultural purposes they need to get their tanks in order. We strongly recommend that farmers do regular maintenance checks on their oil storage and ancillary equipment to check for leaks. A few simple checks to your tanks can make the world of difference to protecting the environment and preventing oil loss and clean up costs."

A spokesperson for NFU Mutual said: "Sudden and unforeseen releases of oil or fuel from tanks caused by either accidental or theft damage is a major problem both financially and environmentally. Not only is there the loss of stock to consider, but the clean-up costs associated with such releases can amount to several thousand pounds, as can the resulting fines! It is imperative that businesses follow the guidance provided by the Environment Agency in order to reduce the risk of such incidents."

"Sudden and unforeseen releases of oil or fuel from tanks caused by either accidental or theft damage is a major problem both financially and environmentally"

MORE INFORMATION

Anyone needing clarification on the regulations should see the advice and frequently asked questions on the website at www.environment-agency.gov.uk/osr Tel: +44 (0)8708 506 506. E-mail: oil.regulations@environment-agency.gov.uk

Anyone who sees an oil accident in the UK should call the Environment Agency for free on 0800 80 70 60 to report the incident as soon as possible.

Publication Reviews

STANDARD

BS5837 Trees in relation to construction

Publisher: BSI Business Information
Price: £120*, £60 BSI Subscribing Members
ISBN: 0 580 46418 0

When construction takes place in or around trees, there are specific issues to consider. BSI Business Information has just published a new standard that gives recommendations and guidance for anyone involved in the planning and construction process or concerned with the care and protection of trees.

Who should use this publication?

- Architects
- Builders
- Engineers
- Land managers
- Landscape architects
- Contractors
- Surveyors
- Arboriculturists

The standard follows the stages in the process of construction work from the initial land and tree surveys, through the design and construction stages, to aftercare for trees that have been incorporated into the built environment.

It gives recommendations on how to avoid undue damage to trees during construction work, as well as how to minimise damage to structures and buildings by trees. Information is also given on legislation that protects trees and how this might affect the construction process.

Valuable guidance is given on the application of key principles:

- how to achieve a satisfactory juxtaposition of trees, shrubs, hedges, and structures;
- the planning stages essential to developments where trees are integrated;
- problems of development close to existing trees that are to be retained; and
- planting trees close to existing structures.

The publication is written to assist those concerned with trees in relation to construction, and enable them to form balanced judgements. It does not set out to put arguments for or against development, or the removal or retention of trees.

Also included:
a list of organisations to contact for further advice;
a bibliography listing useful publications for further reference; and
the sources of other relevant publicly available documents.

Where development, including demolition, is to occur, the standard provides guidance on how to decide which trees are appropriate for retention, on the means of protecting these trees during construction work, and on the means of incorporating trees into the developed landscape.

This publication supersedes BS 5837:1980 which is withdrawn.

CONTACT

BSI Customer Services (Ref: 5837-PR). Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001. E-mail: orders@bsi-global.com Website: www.bsi-global.com/bsonline

*P&P £4.17 UK (inclusive of VAT), £5.83 Overseas (+ VAT if applicable). P&P is free to BSI Subscribing Members. Pre-payment is required from non-Members. All prices, content and publishing dates may be subject to change.

BOOK

Could your business be the target of a Data Protection scam?

Data Protection Pocket Guide: Essential Facts at Your Fingertips

Authors: Nicola McKilligan and Naomi Powell
Publisher: BSI Business Information
Price: £30*
ISBN: 0 580 44437 6

Many small and medium-sized businesses have recently fallen foul of notification 'scams'. You might well have received a threatening letter about your business's legal obligations. These prevalent scams usually state that you must 'notify' the Information Commissioner about the way your business processes its data. Typically you may be asked to complete and sign a form that will then be published on a public register.

But, if you are a small or medium-sized business you may well be exempt from the requirement to notify and able to put these scamming letters through the shredder. It is typical for 'scammers' to charge over £100 for their 'service' of simply forwarding a notification form to the Commissioner. However, you will still have to comply with the requirements of the Data Protection Act 1998 and other privacy legislation in respect of any personal information you are processing.

So how can you be sure you are meeting your legal requirements without an expensive cost to your business? BSI Business Information has published a book to help small businesses get to grips with the Data Protection Act: *Data Protection Pocket Guide: Essential Facts at Your Fingertips*. The

Guide is co-authored by Nicola McKilligan and Naomi Powell and was written as a stand-alone guide to Data Protection. It provides the essentials for small businesses without large in-house compliance departments, and offers the guidance needed to understand and comply with the Data Protection Act 1998 and other privacy legislation.

The Information Commissioner's Office (ICO) reviewed the Guide favourably and commented: "This is a very good piece of work. It is comprehensive and reads easily. The clear non-technical style reflects what we are seeking to produce in our own revised guidance".

Anybody who runs their own business in the UK will need to comply with the Data Protection Act 1998. Specific guidance is provided for accountants, solicitors, medical professional, independent financial advisors, credit brokers and others operating in high-risk areas.

The book:

- provides basic practical advice to help make compliance with the law easier;
- cuts through legal terminology and jargon to clarify the requirements of the law;
- reveals the way organisations process their customer, client or contact information;
- explains what to do and provides examples of how to do it; and
- gives specific guidance for accountants, solicitors, medical professional, independent financial advisors, credit brokers and others operating in high-risk areas.

MORE INFORMATION

BSI Customer Services (Ref: BIP 0050). . Tel: +44 (0)20 8996 9001. Fax +44 (0)20 8996 7001. E-mail: orders@bsi-global.com Website: www.bsi-global.com/DPpocketguide

*P&P £4.17 UK (inclusive of VAT), £5.83 Overseas (+ VAT if applicable). P&P is free to BSI Subscribing Members. Pre-payment is required from non-Members. All prices, content and publishing dates may be subject to change.

FUEL TECHNOLOGY

Innovative alternative fuel company secures financing and sets up shop in UK

A pioneering company, which has developed technology that extracts hydrogen from water, has been established as a UK company. UK Trade & Investment's Global Entrepreneurs Programme (GEP) assisted OM Energy Ltd in establishing it as a British company to develop its innovative Electro Hydrogen Generator (EHG) in the UK.

"The successful creation of OM Energy Ltd as a UK company represents UK Trade & Investment's steadfast commitment to help develop global entrepreneurship based on exceptional intellectual property," said Ian Pearson, UK Minister of State for Trade. "I believe the company will benefit greatly from establishing its base in the UK, from which it can grow and penetrate the global marketplace."

GEP has also helped OM Energy successfully secure initial private financing from a small syndicate of private technology and energy investors in the US and overseas. The financing will support the establishment of OM Energy in the UK and be used for the assembly of version four of the OM Energy prototype prior to the commercial phase.

The technology is a hydrogen-from-water generating process that helps solve many of the hydrogen creation and storage problems faced today and in the fast approaching 'hydrogen economy'. It is the hydrogen that could be mixed with petrol to make a more cost effective and environmentally friendly fuel. Water is made from two hydrogen atoms and one oxygen atom, and this process efficiently separates out the hygrogen. The technology, if commercially successful, could in future help fuel cars using tap water and could even help ships power themselves using seawater.

In addition to supporting the company's migration and introduction to financing sources, GEP assisted OM Energy with the evaluation of the technology and the transfer of the core patent to the protective environment of a UK company. GEP will also help build and enhance its management team through a network of 'Dealmakers', who are serial entrepreneurs with technology and global business experience.

"OM Energy's cutting-edge technology promises to contribute significantly to the hydrogen technology development," said Eric Van Der Kleij, the Dealmaker responsible for the OM Energy relationship, and one of the UK's government's leading dealmakers. "We are very pleased that the company decided to develop its technology and establish its business in the UK." Although OM Energy developed their patent and core technology in Russia, the company's management felt they needed a strategically viable location to globally protect and expand their intellectual property and business. GEP advised OM Energy on the benefits of establishing in the UK, and the company has cited GEP's strategic counsel and networking support as the key catalysts to identifying funding sources and migrating to the UK. The company has already filed the worldwide patents for the core EHG technology and is now poised to assemble version four of the EHG prototype in the UK.

MORE INFORMATION

Website: www.entrepreneurs.gov.uk

RECYCLING EDUCATION

New pack enhances waste awareness

Awareness of environmental issues has never been more important. However, finding practical ways of highlighting these issues and those concerning waste management can be difficult. A new education pack produced by leading waste management company SITA UK, aims to help this process for school children at Key Stages two and three of the national curriculum. School children have always been taught the basic three Rs – reading, writing and arithmetic. However, SITA UK's new education pack, is set to promote an equally important set of three Rs – reducing, reusing, and recycling.

Launched for the new school year and written in line with the National Curriculum, the education pack contains a teacher's guide, a poster and activity sheets and, is complimented by an educational website with downloadable activity sheets, animated waste journeys ad an interactive game. The pack and website aim to promote the messages of reducing, reusing and recycling waste to children at Key Stages two and three of the National Curriculum in England, Ireland, Scotland and Wales.

The pack is intended to encourage a sense of responsibility for the natural environment whilst considering the impact that humans have on its resources and on all living creatures. It encourages users to understand the consequences and negative impact on the environment of our 'throw away' society.

The pack has been produced following extensive research and consultation with practising teachers and education experts. Information was drawn from a wide range of sources including government policy, high-profile environmental organisations and waste management companies to identify a key knowledge base and inform the content of the pack.

Kevan Sproul, Human Resources and Marketing Services Director at SITA UK, said: 'We realise that children are bombarded with messages about saving the environment. However, we hope that our new pack will provide a practical and innovative way of presenting the issues around reducing, reusing and recycling our waste. Waste affects everyone in the UK and it is fundamental that organisations like SITA UK do their bit to raise awareness of the issues facing the country as we move towards a more sustainable waste management system. 'The experiences gained by professionals in the education industry have really helped us to develop the pack and website. We hope that both children and adults alike see this new pack and website as a real resource for learning and providing information about our industry.'

MORE INFORMATION

SITA UK, SITA House, Grenfell Road, Maidenhead, Berkshire SL6 1ES. Tel: +44 (0)1628 513100. E-mail: education@sita.co.uk Website: www.sita.co.uk

NOISE POLLUTION

Defra to map some of England's noisiest roads

Some of England's noisiest roads are to be put on the map. Local Environmental Quality Minister, Ben Bradshaw confirmed that new research has been commissioned by the Department for the Environment, Food and Rural Affairs (Defra) to map out noise levels along major roads and over 20 major towns, cities and regions across England.

It marks a key phase in the Government's plan to map noise from roads, railways, aircraft and industrial sites across all of England. The new maps follow the one already produced for London, which recently won a prestigious innovation award for the best new media technology to improve public life.

Ben Bradshaw said the award from New Statesman demonstrated just how beneficial these maps can be for society. "The potential uses are enormous – by creating noise maps we can get a better understanding of the overall situation and target our efforts to tackle unwanted noise where it is really needed.

"Unwanted noise has probably affected us all at one time or another it can cause stress and annoyance, interrupt conversation and disturb sleep. By creating more of these maps we can help Government, local authorities, planners and the public better understand noise levels and work more efficiently to reduce the number of people who are exposed to high levels of noise."

The Noise Mapping England Project is part of the first stage of the development of a National Ambient Noise Strategy. The idea is to identify, in simple terms, where people are affected by noise, how many are affected, and what the source of the noise is. The findings from the mapping project will then be evaluated against economic, social and environmental factors before agreeing the necessary action required and final strategy.

Cities and towns to be noise mapped include: Bristol, Bournemouth, Brighton, Reading, Portsmouth, Southampton, Southend, Leicester, Nottingham, Coventry, Stoke on Trent, Hull, Sheffield, Manchester, Liverpool, Birkenhead, Blackpool, Preston, Tyneside and Teeside, along with the West Midlands and West Yorkshire.

NATIONAL CYCLE NETWORK

Foresters hit the right track for 'green' transport award

The Forestry Commission is just the bicycle's bell in the eyes of the sustainable transport charity, Sustrans. For it has just won an award from Sustrans for its role in helping to develop the National Cycle Network. The award was one of a series made by Sustrans to honour the people and organisations who made exceptional contributions to its first 10 years' work and to the completion of the first 10,000 miles of the National Cycle Network.

The Forestry Commission won an award in the 'People - Supportive Landowners' category for providing 'many crucial links as well as whole networks of local cycling routes' over national forest land. Sustrans chief executive officer John Grimshaw said, "Sustrans would like to thank the Forestry Commission for helping it to reach the first 10,000 miles (16,000 km) of the National Cycle Network.

"Already nearly 50% of the population lives within one mile of these safe, attractive walking and cycling routes. "With the support of partners such as the Forestry Commission, we aim to offer people more choice to travel in ways that benefit their health and the environment by extending the network to even more people."

The Commission's Chairman, Lord David Clark, congratulated Sustrans on its achievement, adding, "We're delighted to receive this award, and we've been delighted to help Sustrans' efforts in this very worthwhile project, and we will continue to do so. Britain's national forests are the people's forests, and the UK Government, the Scottish Executive and the Welsh Assembly Government are keen for us to maximise the benefits that they can provide to Britain's people.

"Cycle trails are one of the many benefits we provide in national forests. By doing so, not only do we provide opportunities for folk to enjoy an environmentally friendly means of transport, but going for a regular bike ride in the fresh air and peace and quiet of a woodland does wonders for our health and well-being.

"Indeed, it is most appropriate that this award has been made to us in the year that we launched our Active Woods campaign to get more people off the couch and into the forest to get fitter and feel better."

The Forestry Commission has more than 2600 km of cycle routes on its 1.04 million hectares of national forest land in England, Scotland and Wales, as well as thousands of kilometres of walking trails, hundreds of kilometres of horse-riding trails, and a number of world-class mountain biking centres.

MORE INFORMATION

Forestry Commission public enquiry line – Tel: 0845 FORESTS (0845 367 3787). Website: www.forestry.gov.uk/cycling and www.forestry.gov.uk/activewoods

PROJECT AWARD

Bradford University student takes a winning step with Strulch

A Bradford University student has won £200 and a place in the Yorkshire and Humber Regional Final of a competition recognising young enterprise, after spending her summer working with Yorkshire-based gardening company Strulch. Shell STEP is the UK's leading creator of tailored work placements for students in small to medium-sized businesses. The annual Shell STEP competition recognises the UK's 'Most Enterprising Student' and is open to all students who undertake a placement.

Psychology and Sociology student Jenny, 21, was up against 14 other students nominated in the first local heat and could now win a place in the national London final after impressing with Strulch. Jenny said: "My assignment was a marketing and market research project aimed at getting garden centre buyers interested in Strulch, a revolutionary type of garden mulch, and inviting them to the national gardening exhibition Glee 2005 at the NEC in Birmingham, where Strulch will be on show.

(L – R): Jackie Whitely from Strulch, winning student Jenny Powell and Professor Chris Taylor, Vice Chancellor of Bradford University.

"I'm thrilled to have won through to the regional final doing something I've enjoyed so much and learning so much from Jackie Whiteley who has really passed on her passion for business."

Jackie Whitely, from Burley-and-Wharfedale works with her husband and inventor of Strulch, Dr Geoff Whitely, a Senior Lecturer at Leeds University. Jackie said: "Jenny has exceeded our expectations and has proven herself to be a highly able and motivated young woman. She quickly understood the product and the garden centre market and has been a great asset in making Strulch Garden Mulch better known."

Jenny received her local heat award at The National Museum for Photography from the Professor Chris Taylor Vice Chancellor of Bradford University.

MORE INFORMATION

Website: www.strulch.co.uk

DRAFT PUBLICATION

Draft for public comment: new British Standard on Sustainability Management

Achieving business success through sustainability management

Sustainable development has come to mean an enduring, balanced approach to economic activity, social progress and environmental responsibility.

A successful approach to managing sustainable development enables organizations to make high-quality decisions that promote continuing and lasting business success.

The long-term success of any organization requires the integration of social, environmental and economic performance into all aspects of operation. A coherent and comprehensive approach is needed to weigh and address the opportunities, pressures and constraints of operating in the modern world and answering society's expectations.

BSI Business Information has just published the draft of a new British Standard – *BS 8900 Guidance for managing sustainable development* – which is designed to help organizations to develop an approach to sustainable development that will continue to evolve and adapt to meet new and continuing challenges and demands. It offers clear practical advice with which to make a meaningful contribution to sustainable development. This new standard guides organizations towards effective management of their impact on society and the environment, along the route to enhanced organizational performance and success.

The British Standard is designed to:

- provide a framework so organizations can take a structured approach to sustainable development by considering the social, environmental and economic impacts of their organization's activities;
- be applicable to all organizations, in terms of size, type etc, including civil societies and trade unions;
- make it easier for organizations to adjust to changing social expectations;
- helps organizations to connect existing technical, social and environmental standards, both formal (e.g. ISO 14000 series of standards) and private standards (e.g. the GRI and the AA1000 standards);
- offer a maturity pathway for the development of the management of sustainable development issues and impacts;
- provide organizations' stakeholders with a useful tool to assess and engage in improving organizational performance; and
- contribute to international level dialogue in the international standard on social responsibility, currently under development.

Comments on draft

Dr. Simon Zadek, CEO of Accountability and Co-Chairman of the Committee responsible for the development of the draft (SDS/1), encourages organizations and individuals to comment on the draft, "BS 8900 will help advance the cause of sustainable development by making it easier to integrate into organizational processes, decision-making and behaviour".

Professor David Jackman of the Ethics Foundation and Co-Chairman of SDS/1 comments that "this standard represents a bold step forward for BSI. Sustainable development is positioned firmly at the cutting edge and is an important area affecting the future of all of us".

MORE INFORMATION

BS 8900 is a Draft for Public Comment and is not a British Standard. Standards documents are circulated as Drafts in order to get comments from as wide an audience as possible. The DPC stage occurs during drafting in national, European and international arenas and is an important part of the standards development process. All comments will be given consideration prior to publication as a British Standard. Comments should be sent before 31 December 2005 to the Secretary of BSI Technical Committee SDS/1 at British Standards House, 389 Chiswick High Road, London W4 4AL.

BSI Customer Services (Ref: D8900-PR) (BSI order ref 05/301189555DC). Tel +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001. E-mail orders@bsi-global.com Price £20*, £10 BSI Subscribing Members. *P&P £4.17 UK (inclusive of VAT), £5.83 Overseas (+ VAT if applicable). P&P is free to BSI Subscribing Members. Pre-payment is required from non-Members. All prices, content and publishing dates may be subject to change.

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Erratum

Macadamia nuts: about growth and cultivation
Dorothy Hollamby

The Editor apologises for clipping the last five words of the concluding sentence with the lower photograph on page 17. The sentence should read: 'Here at last is a product which is not only a natural health food but also *tastes hugely enjoyable as well.*'

Corrigendum

Sustainable timber engineering structures
Geoff Freedman and Abdy Kermani

The authors apologise for the error on page 3, column 4 misrepresenting the location of Whistler which remains firmly in Canadian territory.

EMPLOYER SOFTWARE

Long weekend syndrome costing businesses millions of pounds

British businesses are losing tens of millions of pounds a year due to the huge number of employees sneaking extra days off work either side of the weekend. Ninety per cent of firms said that the most common day for sickness was either Monday or Friday.

Employment law experts have dubbed the trend Long Weekend Syndrome. Employment Law Advisory Services (ELAS) surveyed more than 600 small and medium sized enterprises (SMEs). They found that two thirds (67%) said that Monday was by far the worst day of the week for sickness while 23% cited Friday as the day they were affected most.

"Everyone suffers from the Monday morning blues from time to time," said Pam Rogerson, head of personnel at ELAS. "But some people are taking this to extremes, not necessarily taking a lot of time off sick over the course of a year, but making sure they only ever fall ill around a weekend."

Now, ELAS is helping small firms fight back with a cutting edge piece of software that not only spots those who take a lot of time off sick, but those whose patterns of illness are also a cause for concern. As the software, called Employersafe, has been designed by lawyers, when problems do arise, it can guide employers simply through the best way of tackling the issue.

British businesses currently lose almost £12 billion a year as a result of absenteeism in the workplace – an average of £601 per employee per year – with women more likely to throw a sickie than men. While most of that time is due to genuine illness, the perception of the vast majority of small firms is that too many days off are no more than extended weekends.

Mrs Rogerson added: "While managers might have a good idea which staff suffer from Long Weekend Syndrome, few have the time to go through their records and count exactly when they are off sick. "Employersafe does that for them, spotting patterns such as only ringing in sick on a Monday, or always falling ill after a bank holiday, for example." As well as tackling absenteeism, Employersafe uses clear, on-screen traffic lights to ensure employers always know whether they are in the clear (green), have a minor problem (amber) or an urgent legal crisis (red). For everyday problems, it breaks down complex legal procedures into simple tasks while for more complicated issues, the software suggests the employer calls ELAS' 24-hour helpline for advice.

"With both the software and the helpline, companies can then relax knowing they are complying with the law at all times and get on with what they do best – which is running their business."

MORE INFORMATION

For more information about Employersafe, call ELAS. Tel: +44 (0)161 785 2000.

WOOD PRODUCTS

'Green' technology set to transform Scotland's forest products industry

A new, eco-friendly technology that has the potential to revolutionise Scotland's forest products industry is to be developed thanks to a £181,000 research grant, which has been awarded to a team of engineers at the University of Aberdeen.

Professor Howard Chandler, Professor in Engineering, is leading the research project to devise an environmentally-friendly binder for wood particles and wood chips that would produce huge benefits for the forestry sector and to consumers of wood-bonded products. The research money was awarded through Scottish Enterprise's Proof of Concept Fund, which supports leading-edge technologies in Scotland's academic institutions, and aims to help export innovation from the lab into the global marketplace.

At present, wood products are bonded together using an adhesive, which is mixed with the wood and formed under heat and pressure. However, the prices of the bonding mix have risen sharply and, more alarmingly, one of its components, formaldehyde, is a known carcinogen.

Professor Howard Chandler is developing the new technology with his colleagues Professor Fred Glasser, Professor in Chemistry, and Professor Paul Mitchell, Director of Research and Commercialisation, within the College of Physical Sciences at the University of Aberdeen.

Professor Glasser said: "If the forestry industry is to survive and prosper, a new and non-toxic bonding system has to be rapidly developed. We have been experimenting with an alternative bonding system using technology very similar to that currently in use and only minor changes in processing are envisaged.

"The industry would reap huge benefits from this new system which would offer better fire resistance, a decrease in nasty chemicals, and water resistance. There would also be a marked reduction in 'creep' – which is the term used to describe the sagging of chipboard with the weight of heavy items."

The development of this new technology has recently begun at the University of Aberdeen and will continue over the next two years.

The £33m Proof of Concept fund launched in 1999 now supports 146 ground-breaking projects worth nearly £23.7 million and has created 340 new jobs. It concentrates on early-stage ideas, which have typically reached patent level and could lead to the creation of new businesses, or licensing innovative technologies.

MORE INFORMATION

Further details on the Proof of Concept fund, the projects that are currently supported, and the application process can be found at: http://www.scottishenterprise.com/proofofconceptfund

PLANT RESEARCH

Scientists track down the chemical that signals plants to flower

Scientists at the Max Planck Institute (MPI) in Tübingen, Germany, and the John Innes Centre (JIC) in Norwich, UK, have reported a breakthrough in understanding how plants ensure that flowers are formed at the right season and in the right place on the plant. In an article published in the international journal *Science*, they show that a small molecule, made in the leaves, induces the formation of flowers at the growing tip of the plant. Because flowers produce fruits and seeds, including cereal grains, this discovery could find important applications in crop plants.

"Most of us know that plants make flowers only at certain times of the year, the flowering of cherry trees in spring being one example", said Dr Phil Wigge (project leader at JIC). "Our discovery is very exciting because for the first time we have a lead in the hunt for the molecule that induces plants to make flowers. It also helps explain how plants can use, and combine, different cues from their environment to ensure they flower at the right season".

Plants can use several cues from the environment to control when they flower. For example some plants are stimulated to flower after several months of winter cold, while others are stimulated by the increase in day length that heralds the arrival of spring.

In the 1930s it was found that plants detect day length with their leaves and as flowers typically form at the tip of branches, researchers concluded that a chemical signal (dubbed florigen) must travel from the leaves to the site where flowers are initiated. However, little progress has been made in identifying florigen, leading many scientists to believe that it might be a complex mixture of molecules.

The research teams at MPI and JIC have identified a molecule, called FT, which has all the characteristics of florigen. The FT gene is activated in leaves when plants receive an environmental stimulus that promotes flowering, while the product of the gene, the FT protein, acts at the tips of the plant's growing shoots to switch on the flowering process.

Although FT induced flowering it was not clear, to the researchers, how it affected the genes that control flower formation. The breakthrough came with their discovery that FT protein binds to another protein, FD. FD itself directly acts on genes that turn groups of unspecialised stem cells into flower buds. The FD protein is only produced at the tips of branches and is only active when bound to FT protein. As the FT gene is activated in leaves but the FT protein is active in the tip of branches, the researchers concluded that the FT protein must be moving from leaves to shoot tips, making it the best candidate, so far, for the mysterious florigen molecule. It remains to be seen whether FT protein travels all the way from leaves to shoot tips, or whether a relay mechanism is involved.

"We discovered the FT gene in the late 1990s, but couldn't figure out how it controlled the activity of genes that make flowers. Once we saw that FT needs the FD protein, which is present at the growing point of a plant, it made perfect sense," explains Detlef Weigel, (Director at the Max Planck Institute for Developmental Biology). "Requiring two independent components (FT and FD) to come together to activate flowering is a neat trick. Especially as one determines the right season and the other specifies the right place for flower formation."

The work was carried out in the model plant *Arabidopsis thaliana*, since this represents the most versatile experimental system for plant biology. The lessons learnt, however, have far-reaching consequences for plant biology, as the FT and FD genes are present throughout the plant kingdom, including important crops such as rice and wheat. A better understanding of how flowering is controlled could help in breeding new varieties that can flourish in places where they would normally not flower at the appropriate time. Altering flowering time may also become important as existing crops have to be adapted to cope with the effects of climate change.

The research was funded by grants from the international Human Frontiers Research Organisation, the German Ministry for Education and Research and the Max Planck Society, and by postdoctoral fellowships from the British Wellcome Foundation, the Korea Science and Engineering Foundation and the European Molecular Biology Organisation.

MORE INFORMATION

The Max Planck Society. Website: www.mpg.de
The John Innes Centre. Website: www.jic.ac.uk
The paper 'Integration of spatial and temporal information during floral induction in Arabidopsis' is published by 'Science'. Contact: AAAS Office of Public Programs. Tel: +1-202-326-6440. E-mail: scipak@aaas.org

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MEMBERSHIP MATTERS

THE NEWSLETTER OF THE INSTITUTION OF AGRICULTURAL ENGINEERS

President's progress

"Well, President, you seem to be quite good at handing out awards but what else have you been up to?" This was the challenge put to me at a recent meeting, albeit in a friendly way, that has prompted this item. The first point to make is that anything that I have been doing has been in close collaboration with the team at the Secretariat and with Chris Whetnall often in the lead.

Top of the list perhaps is the progress that has been made with the Chartered Environmentalist (CEnv) qualification. The total of those registered as CEnv through IAgrE now exceeds 160. Congratulations to you all.

As reported elsewhere, we particularly welcome to our ranks a contingent of new members from FWAG (The Farm and Wildlife Advisory Group) who have chosen IAgrE as their route to this new qualification. I do hope that you will soon feel at home in our organisation. We welcome the addition of your expertise and, with your support, plan to establish a Technical Group that relates to environmental land management as a focus for your interests. I certainly look forward to activities coming into our programme that allow all our members to keep abreast of environmental issues.

We have another community that deserves more of our attention and that is those of our members who are the nationals of the 'developing countries', if that is the correct terminology? Many of those who have spent time in the UK as part of their studies or through other affiliations are keen to remain connected to IAgrE and will, I am sure, enrich our Institution as a result. Meeting our full subscription costs with adverse exchange rates is simply not achievable for these members. Executive have agreed therefore that the Secretariat can develop a special package that will keep these members on board and ensure that we stay connected to the 'developing world'.

A team from the Engineering Council (UK) recently examined our processes as part of the 5 yearly assessment for the renewal of our Licence. I am pleased to say that they have submitted a largely favourable report with a positive recommendation although there one or two aspects of house keeping to be put in place. The time required to prepare for such a challenging audit, by the Chief Executive and the Membership Panel in particular, should not be underestimated.

Talking of housekeeping, you may well have heard the news that Cranfield University is planning a consolidation of its sites. This will mean the transfer of current teaching and research activities at Silsoe to the main Cranfield Campus. The time scale for the IAgrE move – now to Cranfield – remains unclear but, nevertheless, assured.

A further exciting development in the offing is the acquisition of the scientific journal *Biosystems Engineering* upon the closure of the Silsoe Research Institute, the current owners. Should they come to pass these two opportunities combined will not only raise the status of IAgrE but could underpin our viability far into the future.

As we enter a new season of Branch meetings that have the usual combination of interest and variety, can I urge you all to mark them out in your diary now and make a special effort to attend as many as possible - your Branch committees deserve your support.

Peter L Redman
President

A Claas performance

The first meeting of the Wrekin Branch of the Institution of Agricultural Engineers got off to a first Claas start on 3rd October at Harper Adams University College (HAUC).

Tom Jewers, Product Manager and Alistair McCallum, Regional Sales Manager introduced an audience of over 120 members and students from across the region to Claas UK Ltd tractor range. A brief history of the family run company led on to their development of the Xerion systems tractor.

Their acquisition of Renault's tractor range in 2003 and subsequent development work particularly on the new Hexashift gearbox has provided the company with a range of robust and versatile tractors. The audience was told of future plans aimed at providing the company and the farmer with an outstanding product that meets the needs of industry around the world. The talk was followed by an active demonstration of the Xerion moveable cab system and the Ares 7 series tractor. The presentation was light-hearted but highly informative and professional.

Further information about subsequent meetings can be obtained from Jim Loynes, Head of Engineering HAUC and Wrekin Branch IAgrE Chairman on +44 (0)1952-815245.

Academic Members

Askham Bryan College
Askham Bryan
York
YO23 3FR

Barony College
Parkgate
Dumfries
DG1 3NE

Bicton College
Budleigh
Budleigh Salterton
Devon
EX9 7BY

Coleg Sir Gar
Pibwrlwyd Campus
Pibwrlwyd
Carmarthen
SA31 2NH

Cranfield University, Silsoe
Bedford
MK45 4DT

Greenmount Campus
CAFRE
22 Greenmount Road
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

Pallaskenry Agricultural College
Co Limerick
Ireland

Pencoed College
Pencoed
Bridgend
CF35 5LG

Plumpton College
Ditchling Road
Lewes
East Sussex
BN73AE

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

Willowdene Training Ltd
Chorley
Bridgnorth
Shropshire
WV16 6PP

Wiltshire College - Lackham
Lacock
Chippenham
Wiltshire
SN15 2NY

Writtle College
Chelmsford
Essex
CM1 3RR

IAgrE welcomes 38 new members from FWAG

Following discussions between senior personnel at IAgrE and The Farming and Wildlife Advisory Group (FWAG), FWAG decided earlier in the year to select IAgrE, together with IEEM, as its preferred suppliers of the Chartered Environmentalist professional qualification. As a result of this decision, IAgrE is pleased to announce that, to date, 38 FWAG staff members have joined IAgrE, 35 of these having also qualified as Chartered Environmentalists through IAgrE.

FWAG exists to provide farmers, landowners and other clients with the best opportunity for environmental gain through cost effective, quality solutions. FWAG Director for England Michael Woodhouse said: "As the UK's leading provider of on-farm conservation advice, we needed to ensure that FWAG staff be seen to be professionals in their own right, and that an independent accreditation such as Chartered Environmentalist was an excellent way of demonstrating such professionalism".

IAgrE President Peter Redman said: "This is great news, not only for IAgrE and FWAG but also for SocEnv. It clearly demonstrates that IAgrE remains in the forefront of registering professionals working in the delivery of science, engineering and technology to the land based sector.

"IAgrE has a long history of welcoming farm advisory staff into membership and indeed, my career with ADAS was my route into IAgrE. There are tremendous opportunities for joint Continuing Professional Development (CPD) activities and you will soon be seeing a comprehensive list of FWAG programmes appearing on our meetings list. It is up to IAgrE to ensure that not only are the FWAG staff made welcome but that they feel they are getting value for money from their membership of IAgrE."

Michael Woodhouse, FWAG Director for England

"As the UK's leading provider of on-farm conservation advice, we needed to ensure that FWAG staff be seen to be professionals in their own right, and that an independent accreditation such as Chartered Environmentalist was an excellent way of demonstrating such professionalism."

FWAG admissions

Member/CEnv
T L Bardill (Derbyshire)
A Boulton (Highland)
T C Brooks (Devon)
L J Charman (Lincolnshire)
F H Chester (Lincolnshire)
D M Cliffe (Somerset)
S A Colquhoun (Devon)
M C Combe (Cornwall)
A K Dodsworth (East Yorkshire)
R M Goldsworthy (Cornwall)
R S Holm (Rutland)
J M Leece (Somerset)
J E Lomas (Worcestershire)
A B Long (Kent)
R A Lyon (Lanarkshire)
P Lyth (North Yorkshire)
P J Mullan (Co Derry)
D M Nichols (Essex)
S G Nisbet (Stirling)
J E Oborn (Somerset)
I Panton (Devon)
M C Phillips (York)
S R Podd (West Sussex)
D G Proudley (Warwickshire)
R T Roberts (Anglesey)
T J Schofield (Suffolk)
R P Slater (Warwickshire)
K Stanley (North Yorkshire)
G M Thomas (Gwynedd)
H D Thomson (Shetland)
G R Wardle (Lincolnshire)
P R Watson (Suffolk)
M J Williams (Hereford)
M P Woodhouse (Warwickshire)
J E Wright (Cumbria)

Member
T W Aidley (Cheshire)

Associate Member
M J Blackburn (Inverness-shire)
S Convery (Co Derry)

Long service certificates

Diamond service for Peter Isle

Born in April 1926, Peter worked for many years for a firm manufacturing and supplying agricultural implements and tractors accessories. He was particularly involved with the manufacturing of spares for tracklaying tractors to export markets. He continued to develop and utilise his expertise relating to all aspects of the design, construction and re-furbishment of tracklayers until very recently, often in a consultancy role. In a letter on file (addressed to the then President – John Weeks) at the time he was awarded his 25 year certificate, Peter noted: "I hope to have the opportunity to qualify for a 50 year certificate - eventually!" Well, congratulations, you've had the 50 year certificate and now – a first for the IAgrE as far as records reveal – a 60 year certificate has been dispatched with your name on it. Peter moved to Crook in County Durham in 1994 where he is now enjoying his retirement.

Name	*Grade*	*Date of Anniversary*
60 years		
Peter Harland **Isle**	IEng MIAgrE	31 May 2005
50 years		
Upatissa **Moonesingha**	Eur Ing CEng MIAgrE	13 Dec 2005
Peter David **Russell**	IEng MIAgrE	13 Dec 2005
John Peter **Low**	MIAgrE	14 Dec 2005
25 years		
John **Owen**	MIAgrE	23 Nov 2005
Richard Gareth **Ellis**	CEng MIAgrE	24 Nov 2005
Graham Edward **Diggins**	IEng MIAgrE	27 Nov 2005
John Richard **Pedley**	IEng FIAgrE	1 Dec 2005
Graham Reid **Tyrie**	FIAgrE	4 Dec 2005
Surendrachand **Issur**	IEng MIAgrE	11 Dec 2005

COMMERCIAL MEMBERS

Autoguide Equipment Ltd
Stockley Road
Heddington
Calne
Wiltshire
SN11 0PS

Douglas Bomford Trust
Springhill House
Salters Lane
Lower Moor
Pershore
Worcestershire
WR10 2PE

Bomford Turner Limited
Salford Priors
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Worcestershire
WR11 5SW

John Deere Ltd
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Nottinghamshire
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Warwickshire
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G C Professional Services
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Law-Denis Engineering Ltd
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Gloucestershire
GL12 8NB

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Forfar
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Shepherds Grove
Industrial Estate
Stanton
Bury St Edmunds
Suffolk
IP31 2AR

White Horse Contractors Ltd
Lodge Hill
Abingdon
Oxfordshire
OX14 2JD

Membership Changes

Admissions

A warm welcome to the following new members

Member

S J Barrett (Devon)
M C Butler Ellis (Bedfordshire)
S G Perryman (Devon)
R J Rickson (Bedfordshire)

Student

Bicton College:
R J Barton
L Bourne
S J Brenton
M P Durman
D Fitzpatrick
O Hallett
M Haynes
A J Hurford
M J Philp
C Quick
M P G Rose
P Sheppard
T K Stone
L T P Taylor
M J Thurlow
A Turner
D I Webber
P Welch
D J White
R Williams

Harper Adams University College:
T C Adams
S P Ainsworth
C L Barclay
S J Bell
T Blakeman
D A Borthwick
J J Bradley
J Briggs
G H Brunt
G Burgess
J P Butterly
J E Cale
G E Campbell
I W Clark
J Connolly
D A R Cottey
D J Cottingham
M S Croal
S Curtis
G Daly
G Davies
T R Davies
P Dodd
P J S Elliott
G J Farmer
R T Fletcher
S Fletcher
R Frascona
A S Fryer
T W Goose
J W Harland
J Harrison
G Herbert
A C G Hunt
O D James
F King
A McCartney
D Mart
O J Martin
M P Moore
R Morgan
B A Morris
D J O'Hare
M Paget
J R F Pantall
A J Phillips
G H Pople
T Ray
H A Roberts
R Sadler
C G Smith
D Smyth
E Taylor
A J Tweed
B D Windle
M H Workman
C R Worsley
T F Worthington
E T Wright
S W Yardley

Transfers

Congratulations to members achieving a further phase of their professional development

Fellow

C English (Hertfordshire)
P N Leech (Lincolnshire)
D R White (Staffordshire)

Member

P A Skinner (Lincolnshire)
D E Spencer (Monmouthshire)
J Wheeler (Northamptonshire)

Deaths

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

D A Chapman (Kent)
S D Minto (North Yorkshire)

Engineering Council

Congratulations to the following members who have qualified as Incorporated Engineer and as Engineering Technician, entitling them to use the designatory letters IEng and EngTech after their name, respectively

Registrations

IEng

W A S Wyllie (France)

EngTech

P M Spencer (Leicestershire)

Society for the Environment

Congratulations to the following members who have met the criteria for Chartered Environmentalist, entitling them to use the designatory letters CEnv after their name.

Registrations

H L Back (Uganda)
P C Baker (Conwy)
T J M Brassington (Bedfordshire)
P N Burt (Cumbria)
M C Butler Ellis (Bedfordshire)
W C T Chamen (Bedfordshire)
R Chilvers (Cambridgeshire)
J M Churchward (Cambridgeshire)
S E Cooper (Shropshire)
R G Elrick (Aberdeenshire)
M R Geary (Hampshire)
A N Haywood Smith (Northumberland)
R E Hughes (Essex)
S R Hunt (Somerset)
K Jenkins (Gwynedd)
H E Johnson (Warwickshire)
A Jones (Ayrshire)
C D Jones (Bedfordshire)
J Koster (Oxfordshire)
A J Landers (USA)
P B Leeds-Harrison (Bedfordshire)
A J H McKenzie (Perthshire)
D K Morris (Co Antrim)
P A L Orbell (Northamptonshire)
N J Penlington (Nottinghamshire)
D W M Pullen (Norfolk)
T P Reynolds (Cambridgeshire)
R J Rickson (Bedfordshire)
A P Robertson (Bedfordshire)
M C Sheldon (Warwickshire)
P A Skinner (Lincolnshire)
J V Stafford (Bedfordshire)
A J Taylor (Shropshire)
D F Topping (East Malaysia)
W Waddilove (West Midlands)
J Wheeler (Northamptonshire)
J A C Whiteley (Devon)
P J Williams (Cardiff)

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REFLECTIONS OF A CAREER IN AGRICULTURAL DEVELOPMENT WORLDWIDE

Ian Constantinesco CEng FIAgrE

Letter to the President

My apologies for this belated response to your invitation in October 2003 to provide a few paragraphs concerning my memorable experiences over 50 years membership of the Institution. As there is so much, it is difficult to decide on what to put in and what to leave out, but I hope the following selection may be of interest.

On being demobbed in 1946 from the Royal Air Force as an Engineering Officer (Signals), I was in the mood to '*change guns for plough shares*'. As a mature married student, I took a BSc degree in Agriculture at Reading University.

Towards the end of 1949, the Colonial Office (later to become the Ministry of Overseas Development) offered me an appointment as an Agriculture Officer in (then) Tanganyika, which I accepted. Under normal circumstances before the War, such appointments required a one-year postgraduate course in Administration at Cambridge University followed by a one-year course in Tropical Agriculture at Trinidad. Due to the shortage of staff in the Service caused by the War, this requirement was waived. However, I was informed that at the end of my first tour of duty (three years) I would be sent on a two-year post-graduate specialist course of my own choice. I chose Agricultural Engineering.

Soil conservation

I arrived in Tanganyika (by boat in those days) in November 1949 and was first posted to the Soil Conservation Service which was being established at Tengeru, near Arusha in the Northern Province. There, I was put through an intensive course in the theory and practice of soil and water conservation, as grooming for tasks which lay ahead. At the same time, a fully equipped mechanised Soil Conservation Service was being developed mainly for use on the large European settlers' farms for the design and construction of terraces.

My wife arrived shortly after with my young son and newly born baby daughter. Arusha was a pleasant township only ten miles away with all necessary services, hotels, shops, garages, etc. For my transport, I was advised to buy a Ford Pilot pick-up (with V8 engine) available at the garage in Arusha. It cost then £600. In its 3 1/2 years of life on rough roads with me, it had two new gearboxes, a new radiator and a bent chassis!

The highlight of this first tour of duty was my subsequent posting as the Agricultural Officer to Mbulu District and my participation in the Mbulu Development Scheme. Mbulu District Administrative Headquarters (in the old German 'Boma') was about 150 miles west of Arusha at an elevation of about 6,000 feet on top of the Great Rift Wall. The total District area was about 6,000 square miles of cool uplands and hotter lowlands. We all arrived safely in the Ford Pilot, complete with household kit and 'soft furnishings', over rough and sometimes hair-raising earth roads early in 1950. We were allocated a small house (with no glass windows and a loo in the garden) pending completion of a new three bedroom bungalow.

The main purpose of the Mbulu Development Scheme was to rehabilitate the eroded and overgrazed uplands by drastically reducing the number of grazing animals (mostly cattle and goats) and by treating eroded cultivated lands with suitable soil conservation measures and other improved cultural practices. All this applied mainly to the small scale African farms, but there were also soil erosion problems on the big settlers' farms in the north of the District. The Mbulu District Team consisted also of Officers in charge of Animal Husbandry, Forestry, Public Works, Police, a Doctor and Field Officers supervising work in their sub-Districts. General Administration of the District and co-ordination of activities was carried out by a District Commissioner assisted by two District Officers (rather like a District Council in the UK).

I had an Experimental Farm at my disposal where I carried out trials and demonstrations of various soil conservation measures applicable to sloping land on small farms, such as diversion channels, bench terraces, earth bunds, permanent vegetative barriers and crop residues or 'trash

BIO NOTE

Ian Constantinesco's anniversary date for his 50 year long service certificate was on 13th October 2003. He now lives in Chippenham, Wiltshire. We are privileged to have an opportunity of sharing this account of this rewarding career in Agricultural Engineering and hope that it will encourage others to meet fresh challenges with equal enthusiasm.

bunds' laid along the contour at specified intervals according to the slope of the land. The trash bunds worked very well in that run-off water filtered slowly through the vegetative residues but eroding soil in suspension was left behind in the line of the trash. This reduced erosion by slowing down the velocity of run-off and at the same time built up an earth bund along the contour. In time, the final result was a 'formed bench terrace'.

All this could be done quickly, cheaply, without the use of machinery or heavy hand work and was the most likely measure to be accepted by the farmers. The same system had already been applied with success in Kigezi District in Uganda. The District Commissioner went there to check it out and came back full of enthusiasm. So 'trash bunds' it was, as official policy on African small farms. For other improved cultural practices, we exhorted farmers to plant at the right time and weed properly. We extended the limited use of ox-drawn cultivation with ploughs imported from South Africa and taught farmers how to plough on the contour. There were no tractors on small African farms in the highlands at the time.

The achievement of the objectives of the Project was easier said than done. The farmers objected to losing some of their stock and they were not keen to do the extra work on their cultivated lands. However, by constant touring ('safari'), personal contact and extension work by all members of the team, remarkable progress was made. I had a staff of 80 African Agricultural Instructors doing extension work among the farmers and I trained a proportion of them how to lay out the contour lines on the cultivated plots. A 10% de-stocking rate was achieved and 75% of all cultivated plots were treated with trash bunds by the time I left.

In the north of the District, there were several large-scale European settlers' farms – or 'ex-enemy properties' (formerly occupied by German settlers before the war) – growing coffee and wheat. These were also in my 'parish' and called for my duty visits while on safari in the area. There were soil erosion problems on the wheat lands. We discussed remedial measures such as terracing and the extent to which they could be assisted by the mechanised Soil Conservation Service based at Tengeru.

All members of the District Team got on well together and with the local, predominantly Walraq, tribe. There were around 15 expatriates on the station. The men, and sometimes wives and children with them, would spend 2 to 3 weeks of every month on safari, generally in the most beautiful and dramatic countryside, and sometimes hair-raisingly near to big game animals such as elephant, rhinoceros and lion! At the end of the month, there would be the monthly reports to write and time for social gatherings. It was a happy and memorable Station and many of us made lifelong friends. The District Commissioner, as Leader of the Development Team, was awarded the OBE for the good work done.

Postgraduate training

At the end of 1952, the time had come for us to depart on Home Leave. The Colonial Office kept to the spirit of its promise to send me on my postponed two-year postgraduate course in Agricultural Engineering in the UK but allowed me only eight months extended leave in which to do it! I was sent to the (then) Essex Farm Institute at Writtle to do the newly established National Diploma in Agricultural Engineering (NDAgrE) course. Although it was a two year course, I was exempted from the first-year study and exams because of my degree from Reading and experience in Tanganyika.

"The farmers objected to losing some of their stock and they were not keen to do the extra work on their cultivated lands. However, by constant touring ('safari'), personal contact and extension work by all members of the team, remarkable progress was made."

Agricultural extension

Early in 1953, I returned to Tanganyika, with family, to take up my new assignment. This time I was posted as the Agricultural Officer for the 20,000 square miles of the five Districts of Sukumaland, and as Agricultural Adviser to the Sukumaland Development Team stationed at Malya in the Lake Province. We were allocated a house near a large dam (of 440 million gallons capacity) which was a pleasant feature of Malya. It abounded with bird-life, strange fish that 'barked' at night, and hippos. Most of the staff houses surrounded the dam and had pleasant gardens which could be irrigated. Mine had the distinction of hot water intended for the bath emerging from the standpipe in the garden! Later on, we moved to one of the larger and better houses on the other side of the dam.

Outside the station the land was rather featureless and flat, except for scattered rocky outcrops. There was a risk of malaria, bilharzia and various unspecified fevers, streptococcal throat infections from dust, and dangerous snakes. However, I do not remember any staff members being seriously ill at Malya. Later, there was a case of cerebral malaria in a baby, which had to be rushed to Mwanza Hospital in the middle of the night but it recovered. Another child drank paraffin out of a bottle in the refrigerator thinking it was water and was ill but this kind of mishap was not specific to Sukumaland.

I have to admit that after Mbulu we were not at first too impressed with the climate and flatness of the cultivation steppe, but we soon got used to it, while the excellent co-operation and friendly atmosphere among the staff at Malya made it a Happy Station. I found that my 'parish' covered five Districts, and a million people. Most of the Africans were Wasukuma and there were no European farmers, but there was the Williamson Diamond Mine complex in the District of Shinyanga. We led a busy and interesting life both at work and at play, whether 'on safari' in our Districts or joining in the social gatherings at Malya. There was a good club, where Scottish dancing was a regular and popular exercise and the usual round of dinner parties.

Malya was in the Kwimba District about 170 miles south of Mwanza, the capital of Lake Province. Maswa and Shinyanga Districts were to the south and Mwanza and Geita Districts were to the north and west. A Deputy Provincial Commissioner (DPC) headed the Malya Team. The key (expatriate) technical advisers were Agricultural, Veterinary, Forestry, Water Development, Sociology and Co-operative Development Officers. There was also a Stores Officer and a Public Works Officer. There was a Senior Field Officer in charge of the Workshops and a second Field Officer as Workshop Foreman. There were also a number of Development Officers out-posted to the Districts.

As far as agricultural administration was concerned, the five Districts of Sukumaland were classified as a Division of Lake Province. On all agricultural matters, I was directly responsible to the Provincial Agricultural Officer (later designated Assistant Director) in Mwanza, and administered by him, although I was also agricultural adviser to the DPC, and a member of the Sukumaland Development Team. In each District, I had one Agricultural Field Officer responsible to me, and he in turn advised his District Commissioner. These Field Officers and their African staff (Instructors) were members of the Department of Agriculture and not of the Development Team. The main physical problem was the vast area to cover, which meant I had to spend at least two to three weeks 'on safari' around the Districts. Conditions were not so suitable for taking a wife and small children on tour as it was in Mbulu. Thus, Malya was not a particularly popular station for wives with young children. There was no school and amenities were limited.

Mechanisation and irrigation

The basic agricultural problems were low crop yields resulting from a subsistence type farm economy and consequently low living standards. This was due mainly to erratic or unreliable rainfall and lack of readily available water for irrigation; the difficulty of achieving timely planting, due to insufficient farm labour or mechanical power; soil erosion and undeveloped infrastructure. Traditionally, farmers grew mainly food crops. Cash crops, particularly cotton, were introduced to raise farm cash incomes, but food crops had to be planted first as food security.

Farmers planted cotton extensively, but with only hand hoes for cultivation (and even with oxen) most of the cotton was planted late, which resulted in low yields. Efforts to increase yields by increasing the area under cultivation simply aggravated the problem. In addition, the lighter, easy-to-work soils, were already fully utilised. Additional land had to be found on the hard cementing sands (Itogoro) or heavy cracking clays (Mbuga), both of which could not be cultivated by hand or animal power when dry. They could be cultivated after sufficient rain had fallen, but late or inadequate rains resulted in low yields.

These problems called for the introduction of mechanisation and irrigation. The topography of the land looked like a paradise for mechanisation but there were many technical and social problems to be overcome. Small scale irrigation was possible by impounding water in small dams and tanks. Prospects for large-scale irrigation were minimal because of international agreement on the abstraction of water from Lake Victoria. Soil erosion by water, and to some extent by wind and the loss of moisture through run-off, were further factors contributing to low yields.

Most of the soil erosion in Sukumaland was caused by water - through rain-splash and uncontrolled run-off and, to some extent, by wind. Although the annual rainfall was rather low (about 30 inches – less in Shinyanga area) the distribution was confined to the 'short' and 'long' rains (about five months) in high intensity storms over short periods. If land, even with a gentle slope, was bare of vegetation (for example by over-grazing or cultivation) the resultant run-off carried away the soil. At the same time, most of the rainfall which should have been absorbed by the soil was lost. The result was low crop yields or complete crop failures.

Tie ridging for erosion control

Farmers knew that ridging across the slope tended to increase yields of staple food crops such as sorghum and millet. However, unless the ridges were made accurately on the contour or with a gentle non-erosive slope (for which they did not have the knowledge or the means) much water ran off laterally, or settled in low spots and broke down the ridges. The volume of water thus released could cascade and cause serious gullying down the field. In any case, the ridges were too small (in height and width) and could be flattened by heavy rain.

A solution had to be found which could be put into practice by the farmers themselves at minimum cost. The ridges had to be made bigger and the lateral movement of water had to be prevented. This was done by constructing ridges five feet apart from crest to crest and about 18 inches high. In addition, lateral movement of water was prevented by constructing ties at intervals of about a yard between the ridges (tie-ridging). Progress had already been made with the introduction of tie-ridging by the early 1940s. In most years, this system was entirely successful. In exceptionally wet years, there could be waterlogging on some soils, but on the whole the benefits far outweighed the disadvantages. There was no other solution except costly and sophisticated terrace systems, which could not be applied on small, scattered and fragmented farms.

Therefore, the official extension policy of the Department of Agriculture was to push tie-ridging throughout Sukumaland. The Sukumaland Development Team provided a welcome boost to the extension work necessary because there were more people around to help. Farmers understood the benefits but were not so happy about the extra work required, not so much for the ties, but for building larger ridges. Equipment to mechanise the process was developed on experiment stations in

Sukumaland (at Ukiriguru and Malya), in northern province (Arusha), and in Uganda (Namulonge) with assistance from the National Institute of Agricultural Engineering (NIAE) in the UK. African farmers had not adopted it by the time I left. The capital cost of the equipment was one problem, but the main problem was getting sufficiently large aggregated plots for economical use of the equipment.

Earth dam developments

Apart from conservation of soil and water in sites on arable land, water was conserved for domestic use, for animals, and for small-scale irrigation by constructing small earth dams throughout the Districts. In the past, some dams had been constructed by hand, sometimes aided by animal power. This work was greatly facilitated and extended with the Development Scheme earth-moving machinery. Wherever possible, water from the dams was used as supplementary irrigation for crops, mainly rice seedlings and vegetables. Channels were also constructed to improve accumulation of water in the rain-fed main-crop rice tanks.

Attempts were made to encourage fish farming, but without much success except in Headquarters at Malya. There, I filled fish tanks from dam water, and grew both fish (Tilapia) and rice together. I also experimented with snail-eating Tilapia in the tanks in an attempt to break the life cycle of Bilharzia. On this point the results were inconclusive. I also resurrected and developed the defunct herringbone irrigation scheme fed with water from the Malya dam. Its120 acres of irrigated rice showed what could be done.

Level invention

As a result of the vast amount of contouring necessary for soil conservation and irrigation layouts, I found that Dumpy levels were too slow and difficult to use by unskilled staff, while road tracers, then used as alternatives, were not accurate enough. I invented and patented a new kind of simple level which was sufficiently accurate and easy to use. Many hundreds of these instruments were made locally and used in the Lake and Northern Provinces. (The UK Patent [No.771279] was published in 1957.)

Contract ploughing scheme

Farm mechanisation was first introduced by the Sukumaland Development Scheme carrying out contract ploughing for local African farmers. These functions were taken over successively by the Cotton Board, the Lake Province Cotton Committee, and finally by the Lint and Seed Marketing Board in July 1955. By this time, a substantial amount of information had been gained concerning the social, economic and technical aspects of mechanisation in a peasant farming community. It must be stressed, however, that tribal land tenure customs involving small scattered holdings, inhibited economic machinery utilisation, and had an important bearing on high costs of operation. Apart from this, unsuitability of machinery for the conditions under which it had to work forced up costs.

It was also found that while the lack of trained and responsible African supervisory staff persisted, concentrated supervision by trained and efficient European staff was essential. Before 1955, ploughing units were based on a static Headquarters, and the tractors moved out to work singly or in twos and threes to plough scattered fields, largely in charge of the drivers themselves. Neither the African overseer, nor the European Field Officer in charge could efficiently supervise widely dispersed units. Furthermore, the wasted travelling time, and the consequent low output of work led to excessively high costs of operation. During 1955 the plan was to reduce costs by tackling three major problems: (1) land tenure, by propaganda for aggregation of small plots; (2) supervision, by ensuring that tractors were never out of sight of the European in charge; and (3) the equipment itself, by detailed examination of the weaknesses with a view to rectification and consultation with manufacturers.

A degree of success was achieved with aggregation, in that no plot under five acres was ploughed, and that most of them ranged from 20 to 80 acres, while aggregated areas were sought and found at relatively short distances apart. Supervision, mobility and coverage of potential ploughing areas was greatly improved by forming a self-contained mobile ploughing unit of high 'striking' force. The unit was made up of the most satisfactory equipment available to the scheme at the time, and consisted of eight Massey-Harris 55D tractors, five Massey-Harris 506 disc ploughs, two International 98 disc ploughs and one Ransome Dragoon disc plough. A further MH605 was added later in the season, and this was followed again by an International 99 heavy disc plough. The unit was equipped with a mobile workshop fitted with both gas and electric welding plant, and a substantial supply of spares, with the intention that everything except major overhauls would be carried out in the field. A caravan was added for the European Field Officer and his family. A Ferguson tractor was used to haul the mobile workshop and supply it with power from the belt pulley. Other equipment in the unit consisted of three low-loading trailers and the Field Officers own Standard Vanguard pick-up, a motorcycle for the African overseer, and tentage for the African drivers, mechanics and overseer. Fuels and oils (in drums) and ancillary equipment were hauled on the low-loading trailers, and the ploughs were generally trailed across country.

It was decided that the very hard soils for which the equipment was unsuitable would be left alone until such time as suitable equipment was available, and the unit would confine its activities to the easier, but still relatively hard, black clay soils that could be broken by the heavy disc ploughs. The medium weight ploughs were used only under the easiest conditions whenever they presented themselves. The unit moved from ploughing area to ploughing area 'en masse', and *all* serviceable tractors and ploughs were put to work in tandem in each field successively so that a high rate of work was maintained. The average overall ploughing rate was approximately two hours per acre, and the average nett ploughing rate about 1.5 hours per acre, varying from one to two hours per acre according to conditions and serviceability.

A differential ploughing price was introduced depending on the acreage ordered by each individual or group of cultivators. In practice, it was found that anything under five acres did not pay, so that after a few attempts all areas under five acres were refused. It was still a tough job to maintain serviceability with this equipment, and in the case of ploughs it rarely exceeded 50%. The final result was, however, encouraging in that the total land ploughed during the season was about 3000

acres compared to less than half that amount under the old system of a static headquarters, while costs were reduced by 25%.

Much experience and information was gained by these mechanisation schemes working in Sukumaland but they had to be subsidised because they were experimental. Thus, the commercial side of these schemes had to be divorced entirely from experimentation, and the latter taken over by a separate organisation charged with solving specific problems for the general benefit of all. With this end in view, the Director of Agriculture requested me to set up a separate Experimental Section in Agricultural Machinery. This was the forerunner of the Tanganyika Agricultural Machinery Testing Unit (TAMTU) which was later moved to Tengeru in the Northern Province. A summary of the important results in Sukumaland is given below.

Machinery trials

From experience gained by the Mechanisation Scheme and specific investigations by the Experimental Section, a number of facts were established:

1) The soil resistance of heavy black clays could be anything from 14 to 20 lb/in^2 and, when it neared the higher figure, the strain was too great for all but the very heaviest implements.
2) Very heavy and well constructed disc ploughs would penetrate some, but not all, the soils in the dry season.

Sheer weight (assuming correct adjustment) was the only factor allowing penetration, and this meant an expensive plough and powerful tractor to pull it – beyond the pocket of the individual farmer, and necessitating high running and maintenance costs. The heavy strains sustained, together with dust and grit, caused rapid wear of moving parts and frequent breakage of parts, especially those made of cast iron.

Clearly the disc plough was not the right implement for these conditions, and the alternatives were investigated. It was noted that certain types of mouldboards would penetrate more successfully than discs, in particular digger and semi-digger bodies fitted with deep suck shares or bar points. On the other hand the design of the mouldboard type of plough for very hard soil would entail a modification and strengthening of the normal frames and beams to take care of extra heavy draught. However, the normal mouldboard plough even with the right kind of body was not the final answer either. The reason for the better penetration was the *point* of the share.

As there was no necessity to invert the soil in semi-arid areas, subsoilers and both rigid and spring-tined heavy duty cultivators fitted with very hard-wearing points proved satisfactory for penetration in all but the very hardest soils. The best arrangement was the toolbar system, lifted hydraulically as this had the added advantage of a minimum of moving parts. Coil spring shanks were, however, usually only 1 inch square and not heavy enough for the job. The difficulty with subsoilers and cultivators was the tendency to clog with lumps of soil or grass when the tines were set close enough to obtain a complete cultivation.

I made up an experimental ripper plough from available equipment at Malya which combined the penetrating power of three subsoiler points, each immediately followed by a small mouldboard and share. The point was set about 1 inch below the share, thus obtaining penetration of the hard top cap of the soil, while the share was then able to enter the relatively softer soil below, lift it, and push it to the side. The final result was a complete cultivation in soil that could not be touched by a heavy disc plough, leaving it in an ideal cloddy condition for the absorption of rain, and prevention of wind erosion. This was a forerunner of chisel ploughs which became available from manufacturers later.

> "Most of the soil erosion in Sukumaland was caused by water - through rain-splash and uncontrolled run-off and, to some extent, by wind. Although the annual rainfall was rather low (about 30 inches – less in Shinyanga area) the distribution was confined to the 'short' and 'long' rains (about five months) in high intensity storms over short periods."

Mechanisation specialisms

From time to time, manufacturers and their salesmen would send equipment to Malya for testing prior to marketing. They were often surprised by the results obtained and returned home sadder and wiser men. Manufacturers returned to their drawing boards and eventually more suitable machinery was produced.

In 1956 we were due for Home Leave. We enjoyed our time in Malya but the time had come for me to gain experience of conditions and problems in other parts of the country. For part of the next tour I was posted back to the northern Province as the Agricultural Officer for Moshi District, with its important coffee growing areas, and maize and wheat growing on small African holdings and large European farms on Mt Kilimanjaro. A major problem in the coffee areas was coffee borer which had to be controlled over some four million trees. There was also a cotton irrigation scheme in the lower areas (Uru Chine). I had a young, newly appointed Agricultural Officer and two Field Officers to assist me. Later came the first lady Agricultural Field Officer to be

appointed by the Colonial Office to work among the Chagga women on the mountain. There were also two lady Social Workers.

I was getting well 'dug in' to the general District work and enjoying it immensely when came an unexpected change of plans. There was an urgent request to the Director of Agriculture for a qualified officer to help the Sisal Research Station near Tanga to solve mechanisation problems facing the industry due to rising costs of hand labour. I was chosen to fill the post and had to be uprooted from Moshi and go to the Sisal Research Station. This was a disappointment to us as a family at the time. We had made good friends with the other government and non government people on the Station, on the European farms, and with the local Chagga tribe. Not least of these was the Paramount Chief of the Chagga tribe (Tom Mirealle II) who took great interest in the well being of his people and development of the District. He tried hard to persuade the Director of Agriculture to leave me in Moshi, but failed. This tour in Moshi became a significant turning point in the direction of my career towards more specialisation in mechanisation.

At the Sisal Research Station, I was asked to try and solve three main problems: how to mechanise the application of fertilisers; how to speed up control of sisal weevil; and how to mechanise weeding in bulbil nurseries.

For fertiliser application it was necessary to get granulated fertiliser deposited sideways to land under and round the base of the sisal plants. Available tractor mounted distributors would only deposit fertiliser vertically downwards between rows of plants where it was not wanted. I solved the problem by modifying existing two-hopper units to spray the fertiliser by pneumatic means through a nozzle at the base of the plants under the leaves. I believe this was the first time that a pneumatic system was used in this way. Full details of the work appeared in my article published in the East African Agricultural and Forestry Journal, Vol. XXIX No.4 in April 1964.

Traditionally, the control of sisal weevil had to be done by laboriously 'peppering' ground limestone out of tins into the planting holes. I invented a new kind of hand-bellows applicator to spray ground limestone (and other heavy materials) at high velocity into the holes. I had started on this idea in Moshi for insect control in cotton and developed it further at the Sisal Research Station. I got it patented in 1958 (UK Patent No.886222).

Using self-propelled tool carriers, such as the David Brown, solved weeding in nurseries but this was only suitable for the research station itself where skilled operators were available.

The next significant event was that I was sent on a study tour under a Fellowship sponsored by the Food and Agriculture Organisation (FAO) of the United Nations (UN) to study the mechanisation of peasant farms in the Far East, including Sri Lanka (Ceylon), Malaysia (Malaya), India, Pakistan and Japan. My Fellowship Report was re-published by the Engineering Branch of FAO for general distribution in 1962 under the title: '*Indigenous and Improved Farm Implements and Machinery for Peasant Farmers in the Tropics*.'

Machinery Testing Unit

On return, I was posted to the Northern Province Agricultural Research Station at Tengeru to assume my territorial duties and to take direct charge of,

"At the Sisal Research Station, I was asked to try and solve three main problems: how to mechanise the application of fertilisers; how to speed up control of sisal weevil; and how to mechanise weeding in bulbil nurseries."

and expand, the testing and research work of the Tangangyika Agricultural Machinery Testing Unit (TAMTU). So we were very pleased to return to the pleasant Station at Tengeru where we had started in 1949!

Work at TAMTU included testing, designing and developing both tractor and animal-drawn equipment - notably ploughs, cultivators, toolbars, seeders, small threshers, small sisal decorticators, and equipment for tie-ridging. I was appointed permanent member for Tanganyika on the Standing Committee on Farm Mechanisation for East Africa, and official correspondent on Farm Mechanisation in Tanganyika to the Colonial Office. I remained in close contact with the NIAE in the UK - particularly with David Manby and John Hawkins, and we co-operated closely on development of toolbars and equipment for tie-ridging. I also maintained close contact with my opposite numbers in Uganda and Kenya.

Irrigation project management

Tanganyika became independent in 1962, but I continued serving on contract with the independent government until late 1963. By this time I had been offered, and accepted, an appointment with the Agricultural Engineering Branch of FAO. My first assignment was as Agricultural Engineer with responsibility for research and development of mechanisation on the large scale Ganges-Kobadak irrigation project (originally) intended to cover 1.3 million acres) in East Pakistan (now Bangladesh).

Due to shortages of staff and interference of the war with India in 1964/65 I had to assume three other jobs as

well: Team Leader of the FAO team on the Ganges-Kobadak project, Senior Agricultural Adviser to the East Pakistan Water and Power Authority (EPWAPDA) and Project Manager of the Hydrological Survey! I also ended up in charge of the FAO Mission Office in Dacca and in administrative charge of all FAO personnel in the country, including technical supervision of the Ganges-Kobadak Team (extension specialist, irrigation engineer, and farm management specialist).

Plough design

Due to the war, my wife had to be evacuated via Singapore to the UK by the British Administration and my daughter had to go there with the Americans via Bangkok. I could not go until I was relieved and thereby missed attending my father's funeral in the UK in December. During this period I managed to accomplish some important research, design and development work on low draught ploughs, to train and establish a counterpart agricultural engineer and farm mechanisation extension team and to teach some 20 technicians in the principles of agricultural engineering.

As a result of experimental work I was able to demonstrate conclusively the superiority of eastern type mouldboards, obtained from Japan, over western standard and improved designs. I then designed and constructed a plough with an eastern type mouldboard from local materials, except for the share, which was imported from Japan. The US Care Organisation financed the construction of about 300 of these ploughs for distribution to farmers. My work on ploughs was published in the local press and in an FAO Report (WS/D4110) which was reprinted in 1969 due to demand, and because the results were considered *"of major importance to agricultural engineers and extension workers in developing countries"*.

Conditions in East Pakistan were very different from Tanganyika. It was hot and very humid except for a short period in the spring. I took my second Peugeot 404 car which I used for safari in Tanganyika. What I really needed was a boat! I did try sometimes to safari on the rough brick roads with my wife, but when we stopped for a rest and a snack, we would be surrounded by 300 or so people - open-mouthed and holding umbrellas for shade - as though we had come from Mars! We had a spell at the head-works of the Irrigation Scheme at Kushtia. To amuse my daughter we found a pony for her to ride. When she appeared near a village, the locals would throw stones and shout because she was not wearing a veil! My wife was almost in purda too if she ventured out of the house compound! Even so, we got on well together when they got to know us better and knew what we were trying to do. Towards the end 1965, I got infected with Amoebic Hepatitis. The European doctor treated me successfully but told me not to come back to East Pakistan! I was then transferred to FAO Headquarters in Rome.

Land and water development operations

At this time, the Operations Branch of the Land and Water Development Division was handling about 75% of the entire FAO Field Programme, which were mostly large-scale multi-disciplinary irrigation and general development projects, or feasibility studies.

Due to the range of disciplines and mother-tongue languages of field staff involved in civil, mechanical, and agricultural engineering, hydrology, agronomy, economics, etc., it was apparent from the field reports that there were deficiencies of integration and co-ordination of disciplines, or of correct language usage for recipient countries (English, French or Spanish). This made it difficult for Project Managers in the field to produce final reports acceptable to FAO and Governments or Financing Agencies.

It was decided therefore to establish in Headquarters an independent multi-disciplinary Reports and Evaluation Unit within the Operations Branch of the Division, to assess, edit and clear all reports before printing. As a result of my experience of multi-disciplinary projects, I was appointed as Technical Editor to establish and lead this unit and be directly responsible to the Chief of Operations.

During 1973 a reorganisation of FAO was taking place. An entirely new Division was formed to deal with the operation of all projects. Technical back-stopping was to be vested in reconstituted specialist Technical Divisions. At the same time, the number of projects had to be severely reduced due to financial stringency. My future in Rome lay in continuing as Technical Editor in the new Technical Divisions. I did this for a while and then decided in 1974 to retire from the FAO and work as a freelance consultant for private agricultural consultant firms based at home in the UK and to continue to review, edit and write reports and publications for the FAO on a contract basis. I acted as Raporteur at the International Technical Conference on waterlogging and salinity at Lahore, Pakistan. Also at the Conference on the use of organic materials as fertilisers at the FAO, Rome. I was commissioned by the FAO to write Soils Bulletin No.30 – Soil Conservation for Developing Countries, published in 1976. Much of my work in Tanganyika on soil conservation was mentioned in that publication. I worked on short term contracts for Sir M. MacDonald & Partners, Huntings Technical Services, and the World Bank on projects in Africa.

Memorable conclusions

The latter assignment was back in Tanganyika, to appraise the Government's proposed Agricultural Development Programme for financing by the World Bank. My input was the Semi-arid Areas. This entailed several weeks of safari among the African farmers, then three weeks in Washington writing reports. When due to fly back to the UK, I asked if I could go by Concord. The answer was yes, provided I found the difference between a normal fare and the Concord fare. (In those days it was only £60!) I readily agreed and added the trip to my memorable experiences!

At age 87 and looking back over these 50 years or so, my (and my family's) happiest and most rewarding period abroad was our 14 years in Tanganyika. Second on the list was our seven years in Rome, though seriously marred by the untimely death of our daughter as a passenger in a car accident in the UK in 1967.

I fondly remember that on arrival in Dar-es-Salaam on the World Bank mission in 1977 I was touched by the remark of my young counterpart who said: "*Bwana, welcome back home. As you are old enough to be my father I will carry your suitcase for you.*" Times had changed. No porters at the airport!

[In the interests of factual reporting, traditional units of measurement have been retained throughout. Editor]

FINANCE

Late payments cost agricultural businesses 16,660 hours every week

Small and medium sized businesses (SME's) operating in the agricultural sector are being forced to spend an incredible 16,660 hours chasing overdue invoices every week to maintain their cash flow – valuable time which could be better spent winning new clients and growing their businesses.

The independent research, commissioned by one of the UK's leading corporate funding specialists GMAC Commercial Finance (GMAC CF), shows that every business in the sector – which includes both farmers and agricultural services companies – spends an average of one hour chasing unpaid invoices each week. This compares to just 20 minutes in the property sector and a national average of nearly three (2.93) hours. The business services sector suffers most with businesses spending more than five (5.17) hours chasing invoices on a weekly basis.

The Department of Trade and Industry (DTI) estimates that there are nearly four million SMEs in the UK, which equates to a startling 11.5 million hours spent chasing unpaid invoices every week nationwide. Late payment reduces cashflow which is vital for financial health and can make or break a business. According to the Government's Small Business Service, SMEs are owed a staggering £17 billion from debtors at any one time, and approximately 10,000 UK businesses fail each year as a direct result of late payment. The UK's late payment culture appears to be entrenched. The Factors and Discounters Association (FDA) estimates that the average number of debtor days (time waiting for payment) reached 60 in 2004, up from 57 the previous year, reinforcing GMAC CF's research findings. In a bid to beat the debtors, improve cash flow and free up valuable time, small business owners are increasingly discovering invoice finance, which can give them immediate access to capital by raising finance against the value of their sales. With the ability to increase available finance in line with sales, invoice finance is flexible and can be more cost-effective than bank loans or overdrafts.

Nick Grainger, area manager for GMAC CF invoice finance said: "These shocking statistics underline the difficulties that SMEs in the agricultural sector face on a daily basis. Many small businesses operate on tight margins and are under constant pressure to maintain cash flow, yet their ability to do so is severely hampered by habitual late payment.

"As a result, small business owners are being forced to devote a huge amount of their time to recovering debts, which ultimately limits their growth and expansion capabilities, and even their chances of survival.

"However, there is an alternative to expensive bank overdrafts," continued Nick. "Invoice finance can generate immediate capital on outstanding invoices, reducing cash flow worries and allowing business owners to concentrate on what really matters – running their businesses."

Average number of hours spent chasing unpaid invoices per business by business sector

Business sector	*Number of SMEs**	*Time chasing unpaid invoices, h/wk*	
		Total	*Average per business*
Agriculture	14,000	16,660	1.19
Construction	51,000	127,500	2.50
Manufacturing	33,000	148,830	4.51
Transport/ communications	18,000	46,440	2.58
Wholesale	26,000	114,140	4.39
Retail	38,000	56,620	1.49
Property	8,000	2,400	0.30
Business services	51,000	263,670	5.17
Hotels/catering	15,000	32,100	2.14

* SMEs, small to medium sized enterprises

PESTICIDE MANAGEMENT

EU funding helps improve the detection of Pesticides in the Environment

The production of more advanced sensors to improve the detection of pesticides in water and other environmental samples has been helped by a grant of almost 1.23 million euro from the EU's 6th Framework Programme (FP6).

With seven partners from four EU member states, the SAFEGUARD project was designed to systematically evaluate specifically tailored enzymes as the basis for the production of sensors that are able to detect significantly lower levels of pesticides than has previously been possible.

"The project permits detection limits of pesticides such as Paraxon for environmental protection applications down to concentrations (of 10 aM) that were until now unobtainable", says Professor Seamus Higson of Cranfield University. "The enzymes will be produced by molecular biology techniques to be selectively responsive and sensitive to the presence of pesticides. They will be the basis for the production of established sensors, able to rapidly and routinely quantify pesticides in water and other environmental samples at concentrations below recommended acceptance levels.

"This work will provide a new tool for environmental protection purposes for use both in the field as well as laboratory based determinations". The sensors will be fabricated by advanced interfacial techniques and will allow software control, data processing, chemometric analysis and routine monitoring capabilities.

"SAFEGUARD is an excellent example of how Framework Funding is being used to help protect and improve the lives of future generations", says Catherine Holt, FP6*UK*'s National Contact Point for Global Change and Ecosystems. "Pesticides are a part of our everyday lives but it is only right that we invest research and development funding into projects like this to continually improve our ability to monitor levels in the environment.

CONTACT

The current Framework Programme (FP6) runs until 2006 and free information is available to organisations wanting access some of the 19 billion euro available. FP6*UK*, The Glasgows Group, Customs House, Custom Way, Preston, PR2 2UW. Tel: +44 (0)870 600 6080. Website: http://fp6uk.ost.gov.uk

LEAN THE NEXT STEP

Geoffrey Wakeham

Most manufacturing companies will be operating, at least in part, lean processes. The reduction of waste within the production process has become standard practice for most progressive organisations. Pressure is now on to integrate the support services into the production stream. The quality control, equipment maintenance and even some purchasing is directly in the hands of the factory staff.

The drive to reduce cost or improve value to the customer imposes the need to reduce costs by 5% year on year or introduce enhanced products without increasing the selling price or reducing the profit margins. As the percentage of product cost directly attributed to the manufacturing process is reduced, these savings/free enhancements become more difficult to achieve but pressure is still mainly directed at these costs. Some organisations may still have a 60-40 split on direct costs to overheads but many are now approaching 30-70. The bureaucracy has become the core of the company and in some cases it seems as if the maintenance of this bureaucracy and its expansion has become the purpose of many employees. They need the products or services to pay their wages rather than the product or services needing their support to maximise the efficiency of the organisation.

A case could be made that all parts of the organisation should reduce costs by 5% per year or provide better support of the 'value added' processes at no increased cost.

There are two parts to achieving cost savings, one is management setting targets and /or installing constraints and the second is what action can be taken to achieve a leaner bureaucracy. Linking the services more closely to the in-house 'customer' and transferring control to that 'customer' will make the driving objective of management the maximisation of the value of the non-productive activities. As with buying, cost of processing, production productivity, etc., an annual reduction in budget can be imposed on the managers of these support activities. Alternatively, the percentage of non productive costs can be frozen in the short term and renegotiated downwards on an annual basis. Whatever the chosen action, it should be monitored and managed with as much diligence as savings of waste materials or reducing direct labour costs without loss of efficiency within the value added areas.

The seven wastes

Lean, at its simplest, within the manufacturing process is to reduce the seven wastes. These wastes are as follows:

overproduction – producing more than the customer requires right now;

transportation – movement of product that does not add value;

motion – movement of people that does not add value;

waiting – Idle time created when material, information, people or equipment is not ready;

over-processing – adding no value to the product;

inventory – more material, parts or products on hand than the customer needs right now; and

d*efects* – work that contains errors, needs rework, mistakes or lacks something necessary.

Lean bureaucracy

At first glance, many of these wastes may not seem to have much relevance to the process carried out within a bureaucracy and therefore of little value. It is suggested, however, that with a little imagination they may be adapted and adjusted to highlight where waste may be being generated, provide ways of quantifying that waste and then devise methods to remove the waste.

It is up to senior managers to seek a lean support organisation for those that add value to the products or services that the customer is willing to pay for.

Some examples are detailed below.

Overproduction

Are all the reports and memos circulated through the organisation required or serve a useful purpose?

Transportation

Is it necessary to transmit outline reports to so many people for editing prior to final publication?

Motion

People do need to interact face to face for best results. Is the office layout and location ideal with respect to the internal customer?

Waiting

Do the internal customers receive information when they need it rather that at the convenience of the support service?

Over-processing

Are internal reports and presentations more style than substance?

Inventory

How much capital is locked up in material and equipment not directly related to production? Is it worth tighter control?

Defects

Errors in records can be as expensive as errors in manufacture. Are the staff and systems providing accurate and up-to-date information?

Savings in the cost of supporting those who add value are as valuable as savings in the cost of materials or processes. Improved support at a reduced cost will increase profits and facilitate improved response to market changes so enhancing customer value and the chance of a long term sustainable business.

If you have a lean manufacturing unit, have physically integrated your direct support services such as quality systems, maintenance procedures and production management then maybe it is time to start looking at investing in a lean bureaucracy. It should be there to support the core of the business rather than the business being there to sustain the bureaucracy.

BIO NOTE

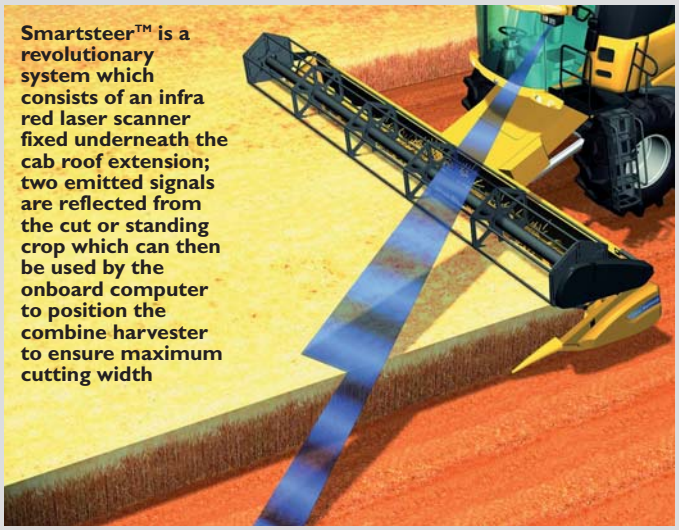
Geoffrey F D Wakeham CEng MIAgrE continues to undertake lecturing duties at Harper Adams University College.

SWATH WIDTH CONTROLLER

Harvest times slashed by laser guided combine harvesters

The new SmartSteer™ laser guidance system from New Holland allows combine harvesters to make hands-free course corrections, reducing operator workload and improving productivity. The system is available on New Holland CR980 and 960, and CX880 and 860 models.

The SmartSteer system consists of an infrared laser scanner fixed underneath the cab roof extension on the left-hand side. Two emitted signals are reflected from either the cut or the standing crop. The time difference between the respective signals indicates the position of the combine relative to the crop edge. This information is used, by the on-board computer, to determine the edge between standing and cut crop and to position the combine to ensure maximum cutting width.



Smartsteer™ is a revolutionary system which consists of an infra red laser scanner fixed underneath the cab roof extension; two emitted signals are reflected from the cut or standing crop which can then be used by the onboard computer to position the combine harvester to ensure maximum cutting width

The scanner is fitted on a turntable which allows it to scan the crop to the left or the right of the combine. The multi-function controller in the cab positions the scanner and allows the operator to shift the combine left or right in steps of 10 cm. The system has a number of safety measures including a cut-off, should the operator leave his seat for any reason, and an immediate override triggered by the movement of the steering wheel.

One farmer who had the opportunity to evaluate this system during the 2004 harvest was John Sawdon from Colchester who grows 728 ha of continuous milling wheat. "We basically have all the cereals ready to combine all at the same time. Consequently, we had the SmartSteer system fitted to our new CX880 last season.

"This gave us an extra 20 - 25 cm swath width which over 728 ha represents a considerable reduction in harvesting time. Not only did this save time but it also freed the operator to spend more time adjusting the threshing side of the operation in order for us to produce a higher quality product."

CONTACT

New Holland. Website: www.newholland.com

STREAMLINE MEASUREMENT

MEA's G-Bug soil monitoring system

The G-Bug is the first truly low cost, continuous, soil moisture monitoring system available. Designed especially for fruit soil moisture monitoring the G-Bug is a small battery powered data logger, connected to four sensors buried at various soil depths. Readings are stored every two hours by the G-Bug data logger. The pocket-sized MEARetriever can download up to 100 G-Bugs. The stored data is transferred to the MEARetriever by wireless connection. To download data, simply tap the G-Bug to wake it up, hold the MEARetriever within 1 m of the G-Bug and the data is transferred.

This enables the grower to collect soil moisture readings in the field in a matter of seconds. The data can be analysed on the spot or taken back to the office for interpretation on a PC. The MEA Retriever display will show current readings and confirm the successful transfer of data. To see changes in soil moisture over time, you can scroll back through all the readings stored in the MEARetriever. This allows in-the-field assessments to be made without the use of a laptop computer.

The G-Bug – a small battery powered data logger connected to sensors and buried at various soil depths monitors soil moisture content

The data stored in the memory of the MEARetriever is then downloaded to a PC using the software program provided. The software displays the data graphically and in table form. Full and refill points can be set for each site and data can be exported easily to other programs.

The G-Bug kit comes complete with batteries, quick connectors and software aimed at ease of use. There are different versions of the G-Bug available including the GT-Bug which has one soil temperature sensor, and the latest T-Bug for use with up to four Theta Probes.

CONTACT

John Stephenson, Streamline Measurement Ltd., 11 Hawthorn Bank, Hadfield, Glossop, SK13 2EY. Tel. +44 (0)1457 864334 Email: sales@streamlinemeasurement.co.uk

Case IH MXU Maxxum X Line tractors

CASE IH has introduced three new tractors to its MXU Maxxum model line-up to widen its appeal to even more customers.

The Case IH Maxxum X Line models deliver a fuel efficient, cost-effective solution for livestock and mixed farming systems.

Other benefits include better access to traditional farm buildings, by virtue of the new tractor's low profile cab, and the fact that only the minimum of operator training is required to get the most from these new models.

Robust, easy-to-maintain tractors that will become durable assets to any business, the Maxxum X Line will appeal to any farming operation that was put off by the high levels of basic equipment on the existing MXU Maxxum tractors.

The three new models are designated the MXU100X, MXU110X and MXU115X. They are rated at 74 kW, 83 kW and 85 kW, respectively.

All three tractors feature engines that have been introduced especially for the this line. The 74 kW and 83 kW models are fitted with four-cylinder engines, while the 85 kW tractor has six cylinders. All have two valves per cylinder and a mechanical fuel injection system.

The new tractors can be ordered with a choice of two proven transmissions - a two-speed Powershift with 24 forward and reverse ratios featuring a left-hand powershuttle and two-speed shift under load; or a four-speed Semi Powershift gearbox with 16 ratios in either direction, a left-hand powershuttle and a four-speed shift under load.

CASE IH's Maxxum X Line models deliver a fuel-efficient, cost-effective solution for livestock and mixed farming systems

The Case IH Maxxum X Line is fitted with a fully mechanical hydraulic linkage which is simple to operate and easy to maintain. Fed by a 63 l/min hydraulic pump, the hydraulic system comes as standard with a 40 l/min steering pump ensuring the tractor offers high work rates when coupled to a Case IH LRX loader. The X line can also be specified with a new hydraulic push back pick up hitch.

A two speed pto is supplied as standard offering a choice of 540 or 1000 rpm with an optional economy 540 rpm speed.

There has been no compromise on cab comfort on the new tractors, which feature a low-profile version of the class-leading Case IH Surround Vision cab. This retains the low noise levels, adjustable steering wheel and the option of a deluxe air suspended seat. The new roof in conjunction with a shorter exhaust pipe reduces the overall height by 150 mm.

The revised cab also features a loader view window as many of the new tractors are expected to be used with Case IH's LRX loader.

Case IH has a proven tradition of delivering solid business solutions to an industry that demands reliability and value for money. The Maxxum X Line is proof that the brand is ready to react to its customers requirements by delivering a flexible, general purpose tractor that combines power with low cost of ownership.

CASE IH is a brand of CNH.

CNH is the power behind the leading agricultural and construction equipment brands of the Case and New Holland families. Supported by more than 11,400 dealers in more than 160 countries, CNH brings together the knowledge and heritage of its brands with the strength and resources of its worldwide commercial, industrial, product support and finance organisations.

CONTACT

More information about Case IH and its products can be found on-line at www.caseih.com

TRACTORS

New John Deere 8030 Series tractors offer more power and performance

Increased power, performance and fuel economy are the hallmarks of the new 8030 Series tractors from John Deere.

New Tier 3 engine technology is designed to produce higher torque at lower engine speeds, leading to better fuel economy and higher productivity in the field. The new design has resulted in 10 to 20 per cent more power, up to five per cent better fuel economy and 40 per cent lower NO_x (nitrogen oxides) exhaust emissions, compared with the Tier 2 engines they replace.

Five wheeled and three tracked tractors make up the new 8030 Series, including the most powerful rigid body tractor on the market, the 246 kW 8530 model, with a maximum rating of 269 kW. The new 9-litre PowerTech Plus six-cylinder, four-valve common rail engines feature a number of innovative components designed to reduce emission levels and overall running costs, while maintaining or improving performance, fuel consumption, durability and torque. These include:

- exclusive variable geometry turbocharger;
- VariCool variable speed cooling fan drive system;
- cooled exhaust gas recirculation

Exclusive variable geometry turbocharger

This has adjustable airflow elements which allow the optimum intake of air depending on engine rpm, generating more torque at lower engine speeds which saves fuel and provides a quicker response to loads

VariCool variable speed cooling fan drive system

The new cooling package has been redesigned and moved forward within a new hood design to improve airflow and aid cooling through the tractor. The larger 767 mm diameter fan incorporates a variator drive that allows stepless variation of the fan rpm according to the tractor's actual cooling requirements, irrespective of engine rpm. This results in more efficient cooling, lower noise levels and a further reduction in fuel consumption.

Cooled exhaust gas recirculation

Using an electronically controlled valve, cooled exhaust gas is recirculated and mixed with the air to reduce the oxygen concentration which in turn lowers combustion temperatures. This allows the engine to meet increased emission standards without compromising performance.

In addition, rated speed has been reduced to 2100 rpm and standard pto speed has been reduced to 2000 rpm, while torque has been increased by up to 40%, with a 37% faster torque rise. Up to 22 extra kW can be achieved over a wide constant power range, with maximum power achieved at 1950 rpm.

Two improved transmissions are available for the new 8030 Series tractors. The Automatic PowerShift (APS) 42 km/h transmission is available on every model, wheeled and tracked, except the 8530; this features 16 forward and 5 reverse speeds, with fully automatic shifting and Field Cruise control. As well as offering improved shift quality, APS features new, customisable transmission settings within the CommandCentre control system, for optimum performance in the field.

The new AutoPower infinitely variable transmission, designed by John Deere specifically for the 8030 Series, offers stepless speeds from 0.05 to 42 km/h, with full electronic engine and transmission management and Field Cruise control. This is available as standard on the 8530 or as an option on the other four wheeled models.

This transmission's automatic utilisation of the total available power keeps the engine running at peak performance, which means more ground can be covered per hour. AutoPowr also

John Deere's 8030 Series: increased power, performance and fuel economy are its hallmarks

features a choice of left-hand or new right-hand reverser, with the latter built into the main CommandArm armrest console controls.

The newly designed hydraulic and drive train system reduces power losses during transport by up to 50% compared with 8020 Series tractors. This means 23 – 30 kW extra engine speed can be converted into usable power, which also helps to save fuel. Other new features include a three point hitch with category 4N lower links on the 8530 model, which is optional on the 8430. Models with category 3 hitches have 20% more lift capacity at 10.8 t, while the category 4N hitch provides extra lift to 11.8 t.

New Agricultural Management Solutions (AMS)

High levels of accuracy, repeatability and ease of use are offered by John Deere's new generation of AMS GreenStar 2 products for precision farming applications. These include the new GreenStar Display (GSD) 2100 and 2600 colour displays, which can be used to show key tractor functions.

Designed with push-button controls and a touch screen on the GSD 2600, these new displays are mounted within easy reach of the operator, along with remote display controls that can be conveniently mounted in several easy to reach locations within the tractor cab, including the CommandArm.

The displays feature a 128 MB memory, USB port and compact flash memory card slot, and both come packaged with all-new guidance and documentation software to operate Parallel Tracking, Field Doc and Harvest Doc. They are also fully ISOBUS compatible, and can be used to monitor and control a wide range of implements including fertiliser spreaders, forage wagons, potato harvesters, ploughs and seed drills.

John Deere's StarFire positioning technology processes differential GPS signals to pinpoint a machine's location in the field, to improve accuracy and productivity. Customers can now choose from three levels of positioning accuracy without changing the receiver hardware, allowing them to be tailored to specific applications:

- a free SF1 signal, offering an accuracy of +/-30 cm, is suitable for Parallel Tracking and is now available for AutoTrac guidance when performing tillage, spraying and lime or slurry spreading operations;
- an SF2 signal is available on payment of a licence fee, offering accuracy of +/-10 cm for harvesting, tillage, seeding, planting and mowing;
- the new RTK signal is accurate to +/-2 cm, with true repeatability in the field – there is no licence fee, and the battery or mains operated base station can be portable or fixed to cover one or more working machines within a 10 km line of sight range.

For both new and existing GreenStar customers, free software upgrades are available, including the new Curved Track mode for the AutoTrac assisted steering system. This allows the operator to follow the natural contours of a field or operate on headlands more easily. Customer service features for the AMS GreenStar product range include the Stellar Support website, which offers round the clock advice, operators' manuals and product tutorials, as well as software.

CONTACT

Gordon Day (tractors) or Mark James (AMS), John Deere Limited. Tel: +44 (0)1949 860491 Fax: (0)1949 860490 Website: www.johndeere.co.uk

ROBOTICS

SCARA has longest reach in class

TM169 – TH1050 is the latest addition to the SCARA robot range from TM Robotics

The latest addition to the highly successful range of SCARA robots from TM Robotics has a reach of 1050 mm which, together with a maximum payload capacity of 20 kg, makes the new TH1050 one of the most versatile machines in its class. The robot is suitable for a variety of manufacturing applications and other key features include high operating speeds with maximum Z axis linear and rotational speeds of 2000 mm/s and 1147°/s, respectively.

The TH1050 is a four axis horizontal multi-joint robot. Like other models in the TH range, it offers an exceptionally large working envelope of 320° and features a compact ductless design. The elimination of the external cable duct found in many less advanced products is a particularly important benefit in applications where space to install the unit is restricted.

For use with the TH1050, TM Robotics supplies the TS2100 control system which supports point-to-point, controlled path (linear and circular), short-cut and arch motion. This is complemented by the hand-held TP1000 teach pendant which provides users with a convenient and intuitive method of programming motion sequences.

Alternatively, programming can be carried out with a standard PC running the TSPC software package which TM Robotics offers as an optional accessory.

An additional benefit of the TS2100 control system for use with the new TH1050 robot is its integrated programmable controller (PLC) functionality. This means that, in addition to controlling the robot, the TS2100 can be used to provide control for other devices. In many applications, this eliminates the need for a separate PLC and allows substantial cost savings to be made.

CONTACT

Nigel Smith, TM Robotics (Europe) Ltd, Unit 15, The Weltech Centre, Ridgeway, Welwyn Garden City, Herts., AL7 2AA. Tel: +44 (0)1707 871535 Fax: +44 (0)1707 393959. E-mail: sales@tmrobotics.co.uk Website: www.tmrobotics.co.uk

GREEN MOWERS

Jacobsen cylinders: a better cut than competitors

Turfgrass disease reduction by factor 7

Preliminary results of a study by none other than the world renowned Cornell University in the USA confirms that performance is what really matters.

Jacobsen walk-behind greens mowers outperformed competitors in quality of cut and turfgrass health according to first year results of a three year independent study conducted at Cornell. The study appeared in the *Cornell University Turfgrass Times* published by Cornell Cooperative Extension and the Turfgrass Science Program.

The study by Dr Frank Rossi shows that Jacobsen walk-behind greens mowers provide up to a 25% improvement in quality of cut. The study also found that Jacobsen models reduce the incidence of anthracnose to as low as 2.8%, while competitive equipment generated up to a 21.7% incidence of the disease.

"This study validates that when it comes to the quality and health of fine turf, the performance of equipment matters," said Ryan Weeks, Director of Product Management at Jacobsen. "Long-term turfgrass research will ultimately help us deliver even better products that reduce the incidence of disease and fungal infestation, providing superior conditions."

Although the first year data is complimentary of the Jacobsen equipment, additional seasons of observations will provide more definitive results and help the industry understand why the differences occur.

Jacobsen walk-behind green mowers outperformed competitors in quality of cut and turfgrass health; providing up to 25% improvement in quality of cut

"Neither manufacturers nor turfgrass scientists have established a standard that defines what healthy turf is and more importantly, what factors under the control of the equipment designers are beneficial or harmful to the plant," said Dr Milt Engelke, Professor and Faculty Fellow at Texas A&M University and Agronomist for Jacobsen. "We try to understand the science of superior conditions, conducting our own comprehensive research internally. It's a great statement to have our own hypothesis validated by an unbiased source but let the study run its course as designed."

The unfunded study was initiated by Dr Rossi, Associate Professor of turfgrass science at Cornell in Ithaca, N.Y. Rossi's findings, the first from the three year study, were published in the Cornell University Turfgrass Times. The study showed that the performance of greens mowers markedly affects the health and susceptibility of bent grass greens to anthracnose. Rossi tested four mowers from two companies including Jacobsen's TC-22 and Greens King 518.

The 2004 study was conducted during an unusually wet year, a situation which makes greens surfaces softer than normal. Organisers feel that these conditions will not affect the data in 2005 or 2006. Rossi notes that even in dry years with more stable green conditions, superintendents are not necessarily able to avoid the stress of close mowing. Their mowing patterns are the result of the golf industry's demand for faster greens.

The study aims to measure the impact of lowering cutting heights and cutting more frequently to meet these industry demands. The study also evaluates the effect of mower type on incidence of anthracnose and putting green performance.

Not surprisingly, results from the 2004 study showed that more frequent mowing results in higher incidence of disease. As for mower type, Rossi's study showed that the Jacobsen floating head mowers had a significantly lower incidence of anthracnose than the other mowers:

- Jacobsen floating heads showed only 2.8%;
- Jacobsen fixed heads: 6.7%;
- Toro floating: 10.6%;
- Toro fixed: 21.7%.

Rossi is continuing the study this year and in 2006, adding one additional manufacturer and modifying it to include only solid rollers on the equipment.

Jacobsen manufactures a full range of vehicles and turf maintenance equipment for golf, turf, professional lawn care, sports field, municipal and industrial applications. The company markets Bob-Cat®, Brouwer®, Bunton®, Cushman®, Jacobsen®, Ryan® and Steiner™ brand products internationally through an extensive distribution network.

CONTACT

www.jacobsen.com

Keenan's weighing systems reduce livestock mortality

Richard Keenan, the market leading diet feeder manufacturer, is now equipping its entire range of mixers with a new weighing system which is deemed to be more accurate and offer a wider range of control options.

Introduced to meet the demand for greater accuracy in the weighing of ration ingredients and the facility to handle the increasing number of rations required by different classes of stock, the DG weighers are robustly built and have been designed to the handle harsh working conditions that exist on livestock farms.

Keenan's range of feed mixers, incorporate a weighing system deemed more accurate. They offer a wider range of control options and, in addition, magnets fitted to their feeders are proving highly successfully in reducing mortality in livestock.

The new weighers feature a display panel with brightly lit, large 4 cm high numbers which can be easily seen from a tractor cab and beyond.

As a standard build, the unit displays the weight of ingredients as they are added to the feeder but increasing levels of sophistication can be opted for.

These include remote control, data transfer of diets mixed and of pre-programmed of diets formulated on the office computer. There is also a facility to program the units so that they unload a set weight or volume of mixed diet.

As with all Keenan machinery, the new weigher system has been intensively tested for the last 12 months and it is only now that they are being fitted to all of the company's diet feeders.

Magnets prevent deaths

However much care taken when making silage or mixing feed, there is a high risk that there will be strands of metal in the feed. Whether this comes from the field where the grass is cut, the machinery which teds or harvests the grass or the loader which takes the silage from the clamp is an unknown factor.

What is known though, is that this metal can be responsible for the death of livestock. The usual signs of metal ingestion reveal themselves as an animal losing condition for no apparent reason - a condition which does not respond to treatment. The result is an animal – possibly a high yielding cow – lost.

Keenan offers a metal detection system which is fitted to the feed-out chute. A number of powerful full width magnets help to prevent any ferrous metal in the feed leaving the machine.

Available for all Keenan diet feeders, the magnets can be ordered with new machines or easily retrofitted to existing feeders.

Keenan reasons for this being that if just one cow's life is saved through the lifetime of the diet feeder, the investment in the magnet system will have paid for itself and Keenan diet feeders last a long time.

CONTACT

Richard Keenan (UK) Ltd, 6th St, National Agricultural Centre, Stoneleigh Park, Kenilworth, Warwickshire, CV8 2RL. Tel: +44 (0)24 7669 0903 E-mail: info@keenansystem.com

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