

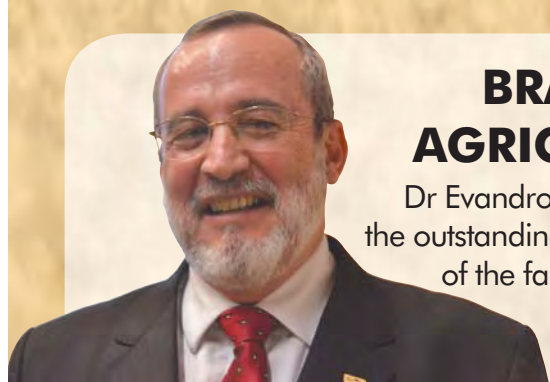
Landwards

Agriculture • Horticulture • Forestry • Environment • Amenity



IAGRE AWARDS

Trio of Awards presented
at LAMMA



BRAZILIAN AGRICULTURE

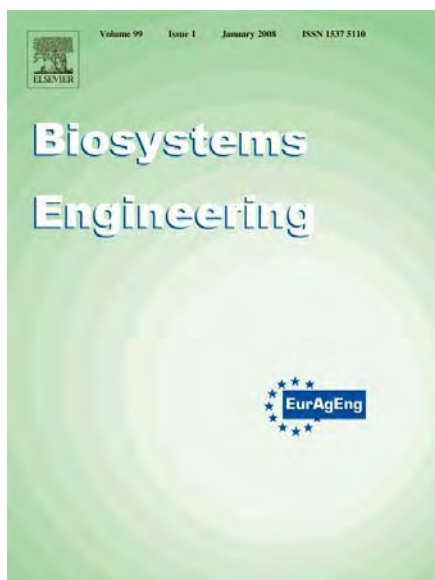
Dr Evandro Mantovani on
the outstanding performance
of the farming sector in
Brazil over the
past 40 years

CULTIVATION TRIALS

Brian Keeble reports on trials in cereal
field conditions

Biosystems Engineering

Biosystems Engineering, owned by IAgRE, and the Official Scientific Journal of EurAgEng, is published monthly with occasional special issues.



Reduced subscriptions are available to members of IAgRE.

To view the full article list of the current edition, visit

www.sciencedirect.com/science/journal/15375110

For further details of the depth and breadth of articles accepted for publication in Biosystems Engineering, visit

www.elsevier.com/wps/find/journalbibliographicinfo.cws_home/622795/description#bibliographicinfo

For details of the preferential rates for members for subscriptions to both the paper and electronic versions of Biosystems Engineering, visit the IAgRE website at

<http://www.iagre.org/bioeng.shtml>



The Managing Editor of *Biosystems Engineering*, **Dr Steve Parkin**, has kindly summarised some of the papers published in the last three issues which he thinks may be of interest to IAgRE members

Biosystems Engineering

Volume 107, Issue 3, November 2010, Pages 221-231

Tramline establishment in controlled traffic farming based on operational machinery cost

D.D. Bochtis, C.G. Sørensen, P. Busato, I.A. Hameed, E. Rodias, O. Green and G. Papadakis

Aarhus University, Department of Biosystems Engineering, DK-8830, Tjele, Denmark
University of Turin, DEIAFA Department, Via Leonardo da Vinci 44, Turin, Italy

Agricultural University of Athens, 11855 Athens, Greece

A targeted approach for the estimation of the operational machinery costs on an annual basis in controlled traffic farming (CTF) systems is developed. The approach combines four sub-models based on existing algorithmic approaches, to evaluate the consequences in terms of machinery performance of different driving directions when establishing tramlines in a CTF system. A case study is presented regarding two fields for a reduced tillage machinery system. Based on the results, it was shown that in the CTF the rule that the driving direction parallel to the longest field edge is the optimal one does not apply. Specifically, in the case of the second field, there is a cost decrease of 9% in terms of annual operational cost when the direction of the tramlines is changed from parallel to the longest edge of the field to parallel to the shortest one.

Volume 107, Issue 4, December 2010, Pages 328-340

Airflow and concentration characterisation and ammonia mass transfer modelling in wind tunnel studies

Chayan Kumer Saha, Guoqiang Zhang and Ji-Qin Ni

Aarhus University, Department of Biosystems Engineering, 8830 Tjele, Denmark

Ammonia mass transfer was modelled by investigating the airflow characteristics above ammonia release surfaces in a wind tunnel and evaluating the effect of wind tunnel dimensions on ammonia emission and the mass transfer process. A laboratory experiment was conducted using a 0.35 x 0.35 m² cross section wind tunnel at 0.1-0.4 m s⁻¹ mean wind velocities and 11%-30% reference turbulence intensities. A 0.1-m thick ammonia concentration boundary layer and 0.03-0.1 m thick wind velocity boundary layers were observed at the tested velocities and turbulence intensities. Increases in wind velocity did not significantly affect ammonia concentration profiles, but they reduced tunnel outlet ammonia concentrations and increased emissions. An inverse-relationship between turbulence intensities and wind velocity was also observed. The highest turbulence intensities were located close to the ammonia release surface where wind velocities were the lowest. An ammonia mass transfer coefficient model was developed as a function of wind velocity and turbulence intensity. Comparisons with two similar studies revealed that characteristics of wind velocity and ammonia emission were significantly affected by wind tunnel geometric dimensions.

Volume 108, Issue 1, January 2011, Pages 46-56

Performance of geotextile-gravel bed all-weather surfaces for cattle

H. von Wachenfelt

Swedish University of Agricultural Sciences, P.O. Box 86, SE 230 53 Alnarp, Sweden

A cost-effective way of producing all-weather surfaces for cattle is to use a combined geotextile-gravel pad construction, which allows pavement depth to be reduced. This study sought to determine the pavement construction that would offer the least runoff, best drainage effect and highest quality runoff and drainage effluent after exposure to heavy precipitation under different manure loads in high animal density areas. The study also examined whether any pavement construction gave acceptable sealing to the underlying soil surface. Runoff, drainage effluent and leachate flow were measured and sampled in buckets as they exited their respective pipes for both regimes. The pad surface layer reduced runoff flow rate and stabilised drain flow throughout the experiments, confirming pad stability. The drainage effluent produced was acceptable for wetland treatment. The results show that geotextile and gravel pad constructions not only have a supporting and draining function, but also a filtering, aerating and sealing effect.



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EDITORIAL

THIS ISSUE

12 CULTIVATION TRIALS IN CEREAL FIELD CONDITIONS

Brian Keeble, CEng, MIAgrE, updates his article first published in *Landwards* in 2007 with additional results for crop growth, yield and profitability, weed problems, carbon dioxide production, soil health and soil organic content discussed.

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Alexander Skittery, a second year student at Harper Adams, studying a masters degree in agricultural engineering tells *Landwards* about his gap year working on New Zealand Farms

18 DIESEL ENGINES: THE FINAL FRONTIER

A preview of the Landwards Conference for all scientists, engineers, and managers with a responsibility or an interest in off-road diesel engined vehicles.

20 BRAZIL: THE NEW FARMING POWERHOUSE

In the latest in a series of lectures organised by IAgrE, Dr Evandro Chartuni Mantovani, outlined the growth of the Brazilian agricultural sector over the past 40 years.

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Firing the imagination

THIS issue marks the start of the third year of my involvement with *Landwards* (another example of how life flashes by), and I have to say what a fascinating and rewarding period it has been.

The sheer scope of the Institution's representative brief is bewildering - and in many ways it must be a nightmare for those at HQ and branch level to ensure all sectional interests within IAgrE are adequately catered for.

What has pleased me particularly is how the editorial input from the Branches has grown and grown - which in itself illustrates vividly the abundance of subject matter of interest to members.

And maybe that is one advantage of such a wide brief.

Engineers by definition are a curious bunch. By that I mean that their curiosity constantly drives them to expand their knowledge base. There are no limits to their imagination, nor inspiration.

The eminent botanist, Sir Eric Ashby probably summed it up best.

"The engineer is the key figure in the material progress of the world. It is his engineering that makes a reality of the potential value of science by translating scientific knowledge into tools, resources, energy and labour to bring them into the service of man."

"To make contributions of this kind the engineer requires the imagination to visualise the needs of society and to appreciate what is possible as well as the technological and

broad social age understanding to bring his vision to reality."

A long quote perhaps, but a perfect summation of the role of the engineer. And that is the beauty of a professional organisation such as IAgrE.

Its members are exposed to a profusion of information through journals, talks and meetings that can only stimulate the mind. No matter that it may not be in their current field of interest or involvement.

Ashby was spot-on talking about translating science into tools and resources. And spot-on about visualising the needs of society.

If ever that maxim was proven beyond doubt, it is in the actions taken to stimulate the agricultural sector in Brazil, so vividly outlined by Dr Mantovani at the recent IAgrE lecture (*reported in this issue*).

And if IAgrE provides a conduit for this transfer of knowledge, it is more than fulfilling its role.

It's a theme that IAgrE Christopher Whetnall expands on in his *Viewpoint* this issue (p7) - and I am sure that there are members working on projects well beyond acknowledged IAgrE boundaries. In which case we'd love to hear about it.



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IAgrE is a founder
member of

EurAgEng, a
licensed body of the
**Engineering
Council** and a
founder constituent
of the **Society for
the Environment**



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Dramatic rise in new registrants

THE Engineering Council's Annual Registration Statistics for 2010 show that the growing awareness and appreciation of the benefits of professional registration, amongst the engineering profession and its key employers, resulted in a dramatic increase in the number of new registrants during 2010.



Compared to 2009, there was an increase of 26% in the number of new Chartered Engineers (CEngs), a 64% increase in Incorporated Engineers (IEngs), and a 12% increase in Engineering Technician (EngTech) registrations. This represents the second year of growth for both IEEng and CEEng and the sixth consecutive year that the number of new EngTechs has risen.

Jon Prichard, Chief Executive Officer of the Engineering Council said, "Ensuring that the UK employs sufficient highly skilled and professionally qualified engineers to meet the needs of society is vital to our future wellbeing. Registration provides the benchmark through which the public can have confidence and trust that those holding the titles work to the highest standards and have had their competences independently and thoroughly assessed. Without this, UK qualified engineers would not be able to maintain the high esteem that they currently hold within the global engineering profession."

"The UK has an ageing population, and with the number of registrants aged over 60 still representing 37.4% of those on the register, the inevitable loss of skills and knowledge over the coming years remains of concern. Therefore, working to ensure an increase in new registrants, and retaining those who are professionally qualified for the full duration of their working life, is of key strategic importance to the engineering profession."

'Agricultural revolution' needed to fight food shortages

Response to Foresight's report on global food & farming futures

THERE needs to be a world-wide agricultural revolution, with farmers growing more food at less cost to the environment, Environment Secretary Caroline Spelman and International Development Secretary Andrew Mitchell said recently.

Responding to Foresight's report on global food and farming futures, Mrs Spelman and Mr Mitchell said that there was a role for governments, the private sector and consumers to play throughout the entire food system in achieving future food security.

Caroline Spelman said, "We need a global, integrated approach to food security, one that looks beyond the food system to the inseparable goals of reducing poverty, tackling climate change and reducing biodiversity loss - and the UK Government is determined to show the international leadership needed to make that happen."

"We can unlock an agricultural revolution in the developing world, which would benefit the poorest the most, simply by improving access to knowledge and technology, creating better access to markets and investing in infrastructure."

"To fuel this revolution, we

must open up global markets, boost global trade and make reforms that help the poorest. Trade restrictions must be avoided, especially at times of scarcity. And we must manage price volatility by building trust and cooperation - and in particular by creating greater transparency around the true levels of food stocks."

Andrew Mitchell said, "Addressing rural poverty in developing countries while producing enough food to provide for a growing global population needs a sustained focus on agriculture. As well as boosting economic growth, investment in agriculture means the poorest countries are able to feed their populations and are more resilient to shocks caused by changing global food prices."

"This report makes very clear the implications of a population increase to nine billion people by 2050 - two billion more hungry mouths to feed, less land available to feed them from, higher rates of malnutrition, and increasing food price volatility that will hit the world's poor hardest."

"As the report shows, the right technology and research findings already exist to help to increase yields, reduce waste throughout the production



process, and tackle the diseases or difficult conditions that can limit livestock and crop production. What we must do now is ensure that those who would benefit most from these solutions are better informed of their existence and have the chance to put them to practical use."

The Foresight report estimates that a third of the world's food is currently being wasted, and that halving food waste by 2050 would have the same effect as increasing food production today by 25 per cent. As part of its response, the UK Government will work with the private sector and other countries to learn and share good practice.

Lantra to re-organise and appoint new Chair

PETER Martin, Chief Executive of LANTRA, has outlined proposed changes to the structure of the industry's Sector Skills Council.

In a message to industry partners he says that over the past few months, Lantra Trustees have been considering how the Sector Skills Council and Lantra Awards should respond to the new political and economic environment.

He says, "It is now becoming clear that there will be a significant reduction in core

funding to Lantra. It is proposed that Lantra and Lantra Awards will come together into a single management structure during 2011."

He added that the detail of how the two businesses would come together was currently being planned out, "But I would assure all of our Industry and Advisory Groups that it is very much 'business as usual' during this transition period."

Meanwhile Lantra has announced that Valerie Owen OBE has been appointed as

their new Chair.

Valerie is a multi-disciplinary business professional who has held a number of senior positions in industry and commerce. As the Managing Director of Le Vaillant Owen Consultancy, she specialises in community regeneration and sustainable development.

Valerie said, "Lantra has important work to do in the coming years."



Simon Blackmore joins Harper Adams

PROFESSOR Simon Blackmore has joined Harper Adams University College as **Head of Engineering**.

A Fellow of the Institution of Agricultural Engineers (IAgrE), he returns to Britain following a recent spell at the University of Thessaly in Greece and as a visiting professor at King Saud University in Saudi Arabia.

He took up his new position

on 1 March.

Simon Blackmore is closely involved in the development of robotic machines for the agricultural sector through his company, Unibots Ltd.

The company provides progression from robotic prototypes developed in universities into commercial use in the farming environment.

He has worked on projects

such as the development of an autonomous tractor able to carry out a number of tasks by itself, and a robotic Christmas tree weeder.

He was also Project Manager for the Future Farm, and in the past worked as visiting professor at Tokyo University, China Agricultural University and the Bristol Robotics Laboratory.



New annual Safety Award launched

IAgrE present trio of awards at LAMMA

THIS year the Institution of Agricultural Engineers presented three awards at LAMMA 2011.

LAMMA was the platform for the Institution to launch its new annual Safety Award. Promoting the importance of safety issues, the award has been established to encourage and recognise innovation in safe design or operation of equipment or processes by students studying agricultural engineering or subjects related to the application of engineering & technology to the land based sector.

T J Slack from the Institute of Technology, Tralee, Ireland is the first student to receive this award and it was presented to him by Alan Plom, IAgrE council member and head of the Health and Safety Executive's Agriculture Safety Section.

TJ's project was the design of a universal bale handler for large square or round bales.

"The judging panel were

impressed by TJ's project approach to increasing safety when handling heavy bales. He used a sound, quantified risk assessment based approach to the project, undertaking local market research, investigating accident history and taking into account comments made from users of conventional handlers" said Alan.

Another student from the Institute of Technology, Tralee, Patrick McNerney, received the Johnson New Holland Trophy award. This award encourages and recognises innovation by students of agricultural engineering or subjects related to the application of engineering to the landbased sector.

Patrick's project designed a hydraulic mixer attachment for a mini digger, capable of emptying content at high or low positions with a mixer frame that fits securely onto the quick hitch of the digger. Inexpensive to run with little maintenance, the IAgrE awards panel praised

the idea as original and innovative and one that would be relatively simple to put into production.

Patrick said, "My father and I really enjoyed LAMMA. It was good to walk around the show viewing the new machine attachment designs and to receive recognition for something I designed and built was brilliant. I also think it was a really good idea to have the IAgrE awards presented at the show.

"It would be great to be able to take my prototype to the manufacturing stage and amazingly, while waiting for a bus to LAMMA, I got talking to a guy who is doing some work for SIMSE (British built agricultural attachments). He showed great interest in the mixer and has asked me to send him pictures and product details"

The winner of IAgrE's prestigious Ivel Award for a product or innovation with the most positive impact on the environ-

ment went to AGCO's MF 9280 DELTA hybrid combine harvester. The IAgrE judges commented they felt that this year's entries were stronger than in previous years, possibly suggesting that many agricultural machinery and equipment manufacturers were seriously interested in developing products which are more environmentally friendly.

The judges also concluded that the clean exhaust emissions and reduced fuel consumption were major considerations in their decision making and these benefits resulted from not only engine technology but also the design of the threshing and separation area which keeps the crop flowing well throughout the machine.

The award was presented to AGCO's sales support specialist – harvesting – Alan Haines, by Sarah Barnett of the University of Lincoln.



Sarah Barnett of the University of Lincoln presented IAgrE's Ivel Award for environmental impact to AGCO's Alan Haines



The Johnson New Holland Trophy Award presented to Patrick McNerney of the Institute of Technology, Tralee by Robert Alker



The new IAgrE Safety Award was presented by HSE's Alan Plom to student TJ Slack from the Institute of Technology, Tralee

VI seeks new leader

THE Voluntary Initiative (VI) is seeking a new chairman to replace

Professor Barry Dent who is retiring after successfully chairing the VI from its start ten years ago.

Professor Dent said, "Over the past decade the VI has become a firmly established part of UK agriculture and has achieved much. However with the UK starting to implement the Sustainable Use Directive fresh challenges lie ahead and it is time for a new person to lead the VI into the next era. I have thoroughly enjoyed my time as chair and see it as a great opportunity and challenge for my successor."

The post was advertised in the *Sunday Times* on the 27th February and further details can be found at the website www.voluntaryinitiative.org.uk

Staff changes at NFU

THE NFU has announced a number of new key appointments at its Stoneleigh Park head office.

Current Head of Food and Farming **Kevin Pearce** has been promoted to Director of Regions and is replaced by **Philip Hudson**, who took up his new position on February 1 2011. Philip has worked at the NFU for 21 years and had spells as a West Midlands Regional Policy Adviser, Oil Seeds Adviser and Senior Dairy Adviser before becoming Chief Horticultural Adviser in 2003.

Terry Abbott has been appointed as the new Director of Membership and Business Services. The former Head of Business Services has extended his responsibilities to cover both the business services and membership departments.

Meanwhile, **Tom Hind**, Head of Economics and International Affairs, will become the NFU's new Director of Corporate Affairs with the departure of **Terry Jones**, who is leaving the organisation after nine years to join The Food and Drink Federation as their Director of Communications.



DBT Student Awards presented

At Harper Adams Development Trust Scholarship ceremony

THE Douglas Bomford Trust is keen to encourage students of agricultural engineering to achieve appropriate qualifications and to go on to successful careers in the industry in a role that best suits their talents and motivation.

One of the ways in which The Trust pursues this objective is with its Student Award Scheme which gives annual scholarships of between £500 and £1000 to students who are Student Members of IAGrE. This year four awards were made to students at Harper Adams University College as follows:

- **James Chapman** - MEng Agricultural Engineering
- **James Hollis** - BEng/BEng Hons Agricultural Engineering
- **William (Alexander) Skittery** - MEng Agricultural Engineering
- **Jacob Smith** - BEng/BEng Hons Agricultural Engineering

For the 2010/2011 awards, applications were assessed by a panel comprising of Douglas Bomford Trustees, independent advisors and staff from the Engineering Department at Harper Adams and all the applicants were interviewed by



the panel. The successful students were presented with their awards at a presentation event organised by The Development Trust at Harper Adams on Wednesday 16th February 2011.

A previous implementation of The Douglas Bomford Student Award Scheme provided awards to successful students that were then paid in annual instalment throughout their course. In 2007/08, awards were made to:

- **James Daniel** - MEng Agricultural Engineering
- **John Plummer** - MEng Agricultural Engineering

Both of these students were also presented with the component of their award relating to the 2010/2011 session at the

presentation event. The photograph shows all six students with Paul Miller, Secretary of The Douglas Bomford Trust following the presentations.

"All of the students were very positive about the scheme," said Paul Miller following the presentation event. "They recognised the role that such awards can play in enhancing their CVs, they thought that the experience gained in preparing the application and attending the interview was valuable and, of course, the extra facilities and activities that the funding grant had enabled were also really appreciated."

Read an account of a DBT student's gap year in New Zealand on page 17

First MSc in Professional Engineering

PROFESSIONAL engineers are now able to gain an MSc which counts towards Chartered Engineer (CEng) status without having to give up their jobs, due to a new Kingston University Masters degree programme.

Dean Carran, who originally graduated from Kingston in 2006 with a BEng degree in aerospace engineering, became the first graduate of the MSc Professional Engineering programme when he picked up his certificate at a graduation ceremony held at the Rose Theatre in Kingston on Tuesday 25 January. The work-based MSc is part of the Engineering Gateways initiative launched in 2006 by the Engineering Council in collaboration with

four universities, including Kingston.

After achieving his degree at Kingston, Dean set up his own engineering consultancy business and was initially, he said, just focused on getting it off the ground. "As my business grew and developed, though, I realised that there was a definite benefit in being recognised as a Chartered Engineer within the aerospace industry," he explained. "I couldn't afford the time to go back to university full or even part-time to gain the academic qualifications that would lead to Chartered status though, so



Dean Carran, Deborah Seddon from the Engineering Council and Dr Peter Mason, Dean of the Faculty of Engineering, Kingston University

the work-based Masters degree at Kingston seemed ideal as it let me build my Masters modules around my day-to-day work. It's been a real benefit to both me personally and my company."

The breadth and depth of disciplines

ONE of the joys of this job (well usually anyway) is sitting through the various conferences/talks/workshops that IAgRE puts on for its members and others.

For example, we recently ran the Smart Sensors event at the East of England and then a week later, the workshop on Conservation Cropping here at Cranfield.

What struck me at both these events was the breadth and depth of disciplines that make up the IAgRE membership. Of course, this reflects the depth and breadth of what constitutes an agricultural engineer.

The first observation I would have is that many of us, if not all, work from a broad base of interests and expertise but with the ability to develop, interpret and apply the higher levels of knowledge required for any particular task, role or mission. We are as adaptable as the solutions required by the very special and stimulating arenas that we are privileged to work in.

So a scientific knowledge of soil and water and their interaction as well as the ability to apply engineering solutions to the science was and is required. These engineering aspects would probably include, as well as the traditional metal bashing skills, an in-depth knowledge of the hydraulics, electrics and electronics, gps systems, internal com-

bustion engines that all go in to modern ag-machinery - not to mention a knowledge of the crops themselves. I could go on . . . and I will.

But we are more than that - at the Smart Sensors event, (reported on elsewhere in this issue of *Landwards*, we had two long-standing IAgRE members demonstrating just these "masterful" attributes, both of them presenting on livestock related sensors; one, Jim Brook on voluntary milking systems (robot milking to you and me) and the other Hugh Crabtree, on pig production management. So add to the heady mix of soil and water, crop production, storage and processing, the husbandry requirements of livestock and you begin to get a real picture of what it is we do (or are capable of doing).

If we look at the registrants to the Conservation Cropping workshop then we have agronomists with a Silsoe ag-engineering top up practicing as international consultants with knowledge of temperate and tropical agriculture, small scale border strip and large scale automated irrigation schemes, highly mechanised schemes and those involving beasts such as oxen, donkeys or camels for animal traction.

And that is probably only the half of it. The forestry engineers and their propensity to

CEO VIEW



build roads and beautiful bridges in almost inaccessible areas, indeed, that many never see; the horticultural engineers with their controlled environments and soil-less growing media; the amenity engineers creating safe environments for those overpaid sportsmen so that when they fall over (or more likely throw themselves down) they are safe as can be; those working in the environmental sector trying hard - often with much success - to celebrate and preserve our bio-diversity. And still I will have missed some of you. My apologies for that.

By now you will realise that I am bursting with pride about our profession. But isn't it sad that we are not better recognised for what we are and what we do. There are various high level meetings going on at the moment all talking about the 'perfect storm' of food shortages, scarce water, insufficient energy resources and greenhouse gas emissions with commentators saying how science will come to the rescue. What, almost without exception, these commentators fail to mention is that it will be engineers who will bring the science into practice.

Christopher Whetnall



Attention all aspiring professionals!



Professional Registration through IAgRE

Being a member of IAgRE is just part of being a professional. Adding a professional qualification to your name is a further important statement which sets you apart from others.

In addition to administering the Landbased Technician Accreditation scheme (LTA) on behalf of our sector, IAgRE has licences from the Engineering Council and the Society for the Environment to award the following professional qualifications to those who are suitably experienced and/or qualified:

**Chartered Environmentalist
Engineering Technician
Incorporated Engineer
Chartered Engineer**

**CEnv
EngTech
IEng
CEng**

One or more of these professional qualifications after your name:

- Establishes proven knowledge, experience and commitment to professional standards, and enhances employability.
- Demonstrates that you have been judged as being competent by your peers
- Establishes that your professional credentials are on a par with other Chartered professionals such as Chartered Scientists and Chartered Accountants
- Provides you with international recognition

To find out more about obtaining professional qualifications through IAgRE, email us at membership@iagre.org, visit our website or call our Membership department on 01234 750876



www.iagre.org



RASE relaunch machinery award

THE Royal Agricultural Society of England has relaunched



its Machinery Equipment Award to find farmers' most valued piece of on-farm kit.

Historically, the Society's Machinery Award Scheme involved manufacturers nominating their machines which were then judged on farm by a team of farmers and engineers.

The new-look award will see farmers and contractors nominating their kit in one or more of the six categories and rating their entry against certain criteria. The most nominated pieces of machinery or equipment in each category will then be automatically selected as a finalist with an on farm follow-up visit by the panel of judges.

The highest rated machine by both farmers and the judges will be crowned the winner of the RASE 2011 Machinery Equipment Award, which will be announced at the Grassland & Muck event on 18-19 May at Stoneleigh Park

For further details visit www.rase.org.uk.

First step towards a rewarding career

IAGrE support Apprenticeships

A LANDBASED engineering apprenticeship is the entry route to a worthwhile career in agricultural engineering, said the Institution of Agricultural Engineers during the UK's Apprentice Week in February.

"It's definitely a career that can offer school leavers the first step towards a defined career path", said Chris Whetnall, Chief Executive of IAGrE.

IAGrE has recognised and approved a number of manufacturer's apprenticeship schemes for dealer technicians. These are run in conjunction with manufacturers' training courses and form part of the industry's Landbased Technician Accreditation Scheme (LTA). The LTA scheme provides a clear career path within the sector. Membership of the Institution forms part of the scheme, as does registration with the Engineering Council as an Engineering Technician.

"One of the major benefits of IAGrE membership enjoyed by students and apprentices, is that it shows they have attained certain minimum standards of education and training.

Membership of IAGrE (MIAGrE) is an internationally recognised professional qualification," added Chris.

Registration as an Engineering Technician (Eng Tech) can be a stepping stone to many other areas of land-based engineering. It is not unusual for technicians to move onto employment with manufacturers after a period of dealer experience. Some of the larger dealerships are large businesses in their own right and there will be promotion opportunities.

Indeed, the quality of training delivered in the landbased sector is such that the sector's technicians are widely sought after in all fields of engineering. Both NVQ and National Diploma based apprenticeship schemes, approved by IAGrE, are being offered by John Deere Ltd, Claas UK, CNH



Ltd, JCB and AGCO through a variety of landbased colleges and training organisations.

"Government research has highlighted that employers also benefit. Hard working apprentices lead to a more satisfied, productive and more motivated workforce. But there is more to be done to promote the land-based sector as a whole as an attractive career option," concluded Chris.



Precision Farming Club

THE AEA Precision Farming Club has been established to champion the sector and provide an opportunity for those involved in Precision Farming to promote its products and services.

Precision Farming is defined as the management of farming practices that use the latest technology in computers, processors, satellite positioning systems, remote sensing devices, imagery, camera and communication of all types to design products and services to provide better information, improve control and reduce inputs and costs.

AIMS OF THE AEA PRECISION FARMING CLUB

- To provide a forum for members to discuss collaboration and promotion.
- To provide members with access to AEA Farm and Outdoor Power Equipment members and the opportunity to showcase their products, services and ideas.
- To provide the basis for promoting the sector to Government (UK and EU), farmers and any other potential users.
- To assist in getting sensors and ICT onto the EU FP8 funding agenda and other funding opportunities.

FIRST MEETING

WEDNESDAY 13TH APRIL at 10.30am at AEA, Peterborough to clarify aims, modus operandi, costs and priorities.

If you are interested in participating contact:

Roger Lane-Nott
Agricultural Engineers Association
Samuelson House
62 Forder Way
Peterborough
PE7 8JB

Tel: 01733 207601
Email: ab@aea.uk

Back CFE or risk 'compulsory approach'

Says Minister for Agriculture, Jim Paice in open letter

COMPULSORY options including set aside could be a real threat unless all farmers and land managers back the Campaign for the Farmed Environment (CFE) to ensure its success.

In an open letter to the industry, Minister for Agriculture, Jim Paice praised the work of the Campaign in using targeted land management to deliver valuable environmental benefits. But he warned that if more farmers don't support CFE he will "consider a compulsory approach".

Mr Paice said, "The Government is putting food production back up the agenda, but we have made it clear that this must be done alongside protecting and enhancing the environment and farmers must show they can do both. We want the Campaign to be a success and don't believe that we should regulate and impose more

red tape if the farming community can achieve the same results through its own actions.

"The CFE is the farming industry's chance to demonstrate that this voluntary approach can work better than regulation and that they are best placed to decide on, and tackle, their local environmental priorities, without intervention. But if the farming community cannot step up and achieve these results voluntarily the Government will have to consider a compulsory approach to deliver these same benefits."

NFU President Peter Kendall said, "It is clear that the Campaign continues to be the industry's best opportunity to show that we can produce more while impacting less on the environment, and without the need for Government regulation.

"I applaud those farmers and advisers who are ensur-



Jim Paice,
Minister for Agriculture

ing that the Campaign has already had real impact. Our actions demonstrate what the CFE can deliver and ensure that the industry is in a far stronger place to shape its own future, even the shape of future CAP.

"I urge those who are about to renew their Environmental Stewardship agreements or considering entering, to choose key target options, those that deliver most for wildlife and resource protection. The success of our industry's campaign lies in our hands."

Agricultural Buildings show

THE organisers of The Agricultural Buildings Show, to be held at Stoneleigh Park (NAC), Warwickshire on Tuesday 29th March, say it will provide practical help on planning, design and construction of all kinds of installations from the simplest barn to a new grain store or milking parlour.



They go on to say that this unique showcase draws together all aspects of the agricultural building industry under one roof, providing essential information on everything from initial planning advice through to selecting materials and finding the best contractor.

"A new farm building is probably the most important investment a farm is likely to make in a generation," says organiser, Andrew Newbold from Fusion Events. "At the Agricultural Buildings Show visitors are able to meet experts to discuss all aspects of the build – all in one place."

The event is organised in association with Rural & Industrial Design and Building Association (RIDBA), which will be introducing new advice on the impending CE Marking of steel frames for farm buildings.

For further details visit www.farm-smart.co.uk/abs.

MP endorses college drive to improve productivity in engineering

SKILLS Minister John Hayes endorsed the efforts being made to improve skills and drive productivity across the engineering industry when he visited Reaseheath College in Nantwich, Cheshire in January.

The Minister of State for Further Education, Skills and Lifelong Learning toured the college's Engineering Skills Academy and agricultural engineering workshops before discussing training needs with industry representatives, apprentices, students and college tutors. The value of colleges and the industry working together to provide relevant education and skills training were discussed, with the minister particularly endorsing the value of managerial level courses and apprenticeships.

After touring the facilities, John Hayes said, "Our economic future depends on effective partnership between employers, colleges and government to deliver the advanced skills we

need to drive growth. This can only succeed if employers are in the driving seat, shaping the training they need to meet the shifting challenges they face.

"The engineering department at Reaseheath exemplifies that employer-led approach and I congratulate the engineering industry and the college for its vision and commitment in coming together in the pursuit of excellence.

"What I have seen here today is a specialist college which is an exemplar of what we need to support British industry. Reaseheath offers courses which meet business needs and inspires learners. Together these build the skills necessary to make Britain prosper."

Reaseheath Head of



MP John Hayes chats to agricultural engineering apprentices from New Holland and Case IH. **Melvin Johnson** looks on

Engineering Melvin Johnson said, "This was a very positive visit. The Minister was extremely knowledgeable about engineering and rural issues. He obviously enjoyed looking at our cutting edge technology and machinery and discussing career paths with our students.

"He was very interested in our approach to collaborative, employer-focussed training and particularly how our part-time degree level courses have been specifically developed to meet commercial need."

• *THE CLAAS Group has announced that Harper Adams student Miles Metcalfe won the 2010 Scholarship for Agricultural Engineering.*

Miles, 20, from Northallerton in North Yorkshire, is currently studying MEng (Hons) Agricultural Engineering at the University College based in Shropshire.

As the winner of the coveted CLAAS Scholarship, Miles will have his fees for the second and fourth years of his studies covered, and in year three he will complete a one-year sandwich placement with CLAAS, both in England and Germany.

Young people deserve better engineering education

Education for Engineering (E4E) say subject is 'almost invisible'

ENGINEERING is 'almost invisible to young people' because of inadequate careers education and guidance, the UK's engineering profession has warned.

Education for Engineering (E4E), a group made up of 39 UK engineering bodies (including IAgRE), has issued a policy statement providing recommendations to Government on how the careers system in England can be improved to ensure young people are fully informed about the breadth of engineering career opportunities available to them.

E4E has welcomed the proposal by John Hayes MP, Minister of State for Further Education, Skills and Lifelong Learning, for the formation of an all-age (13yrs+) independent careers service (November 2010).

However, the Government's Education Bill removes the duty on schools to provide general careers education for young people. E4E believes this

could reduce the number of students being aware of the opportunities engineering provides as a potential career.

E4E's policy statement makes five recommendations to Government for improving the way careers education, advice and guidance is delivered and provided in schools and colleges.

- **A statutory entitlement for young people in England to receive lessons in careers education as part of Personal, Social and Health Education**
- **The need to demonstrate competence in the teaching of careers education as part of the professional standards for qualified teacher status**
- **The use of real-life science and engineering examples in lessons with careers awareness embedded in the curriculum**
- **Improved access to local and national labour market information for schools and col-**

leges and closer links with local employers

- **Specialist science, engineering and technology advisors in careers advisory agencies - echoing the recommendations of the careers profession taskforce**

Along with these recommendations, the engineering profession is committed to working together in coordinated activities to support the national careers information, advice and guidance services.

Dick Olver FEng, Chairman of BAE Systems and Chair of E4E said, "Young people often do not make the connection between the mobile phones they use or the computer game consoles they play on a daily basis and the engineers who created them."

"We need to better inform our children and young adults about the value of engineering and the exciting career opportunities an engineering background can afford. Better

careers education in schools and an improved professional independent careers service, that advises young people of the many routes into engineering will improve this situation.

"We must make sure that young people are fully informed about the exciting opportunities afforded by a career in engineering so that we will be able to meet the growing needs of our industries as we continue to re-balance the economy."

For further information visit www.educationforengineering.org.uk



• VDI Wissensforum, the organisers of the international conference 'Transmissions in vehicles' which takes place on June 7th and 8th 2011 in Friedrichshafen, Germany, say it will throw light on efficiency improvement

The event is being run in parallel to the VDI technical conference 'Transmissions in mobile machines' and the VDI conference 'Transmissions in commercial vehicles'.

VDI say in the course of discussions about electric cars and about reductions in fuel consumption and emissions in conventional drives, transmission-based solutions will also be considered from new angles. A crucial role is played here by efficiency improvement. This topic will be central to the conference.

The program includes innovative concepts for hybrid and electric drives, lightweight materials and manufacturing processes, simulation and development methods as well as noise & vibration optimisation. www.transmission-congress.eu

June 3rd & 4th, Forest of Ae

Forestry Harvesting Demo 2011

A CONSORTIUM consisting of Komatsu Forest, John Deere, Ponsse, Tigercat and W.Clark (Parkgate) Ltd. has arranged Forestry Harvesting Demo 2011 in an attempt to offer industry professionals the opportunity to compare a selection of harvesting machines from competing manufacturers, working under production conditions, on the same site, over a two day period.

The organisers stress that it is not a Show, it's a Joint Demo, so although the general public will not be turned away, the event is primarily intended for industry professionals and anyone else who has a real connection with timber harvesting.

Jim Christie, the Organising Committee Chairman said, "With essen-

tial equipment costing in excess of £250,000 in an industry where profit margins are extremely fragile, it is essential that prudent capital purchase choices are made. This is particularly true in the timber harvesting industry. Buying the wrong harvesting equipment is not only a waste of a harvesting business's capital but it will also result in reduced potential profit.

"For these reasons identifying the right harvester or forwarder is probably the most critical decision that a Harvesting Contractor has to make in his day-to-day working life. A realistic demonstration of a machine's capabilities compared to that of its competitors is an essential part of this process.



"This, however, raises the problem for the Machine Manufacturer's agents of how to demonstrate their products in a real production environment for a meaningful period of time at an affordable cost. Unless he can arrange for prospective buyers to see an existing customer's machine, he will have to spend time and money demonstrating new machines to each prospective buyer."

For further information on the event visit the website at www.forestrydemo.co.uk.

Inspirational events

IAgrE President, PETER LEECH reflects on some memorable lectures he has been fortunate to attend recently and looks forward to the Conference

HAPPY New Year, as I write this the sun is shining, the days are becoming longer and everything is starting to grow out there.

Thank goodness all that snow and cold is behind us once again and we can look forward to watching nature work its magic and remind ourselves why we are all involved in this industry.

Understanding how our industry works with nature and the natural world to research and develop sustainable farming practices through the application of science and technology was brought home very starkly to many of us recently. We were able to participate in a fascinating lecture on the Development of Brazilian Tropical Agriculture given by Dr Evandro Mantovani a charismatic Italian/Brazilian who has been heavily involved with this development for the past 35 years.

The progress they have made by researching the land and climate, developing crop varieties, cultivation techniques and cropping regimes is quite remarkable. In that 35 year period Brazil has more than doubled its productive agricultural land area by converting Savannah (not rain forest) and at the same time tripled yield per hectare farmed. In doing so they have become one of the world's largest producers and exporters of many crops such as soya beans and at the same time become the world's largest producer and consumer of Ethanol (from Sugar Cane) as an alternative fuel.

Listening to such incredible progress gives us all hope that we will be able to find ways to feed the world as population grows at an accelerating pace from 6.8 Billion today to a predicted 9.3 Billion by 2050. Read more on this lecture in the report in this issue.

I WAS also inspired by a lecture of a different kind when the East Midland Engineering Professionals annual Prestige

Lecture invited Richard Noble - Project Director of the Bloodhound SSC team to address a packed audience in Nottingham late last year.

Having broken the land speed record (763MPH) and the sound barrier with Thrust SSC in 1997, they now plan to break the 1000 mph barrier with completely new technology. More than that, they are using the project to inspire young people into engineering education by generating excitement and motivation around this project. I find their mission statement very succinct in summing up both of their goals.

"To confront and overcome the impossible using science, technology, engineering and mathematics."

"To motivate the next generation to deal with 21st century challenges."

You can find more information on their website www.bloodhoundssc.com/.

ALSO reported in this edition you will find a report on the East Midlands branch visit to dealers RBM Agricultural Ltd, the purpose to see LTA at work and to meet, understand and build relationships with the Technician members we now have joining IAgrE through the LTA scheme.

This was the first of what I hope will be many such meetings and I encourage other branches to learn from this excellent example and organise similar events.

Thank you to Evandro Mantovani, Richard Noble and RBM Agricultural for providing inspiration for the future.

THE turn of the year, 1st January 2011, also marked another significant

event, the start of Stage 3B (iT4) Off Road Exhaust Emissions regulations for all new engines above 175KW in the EU.

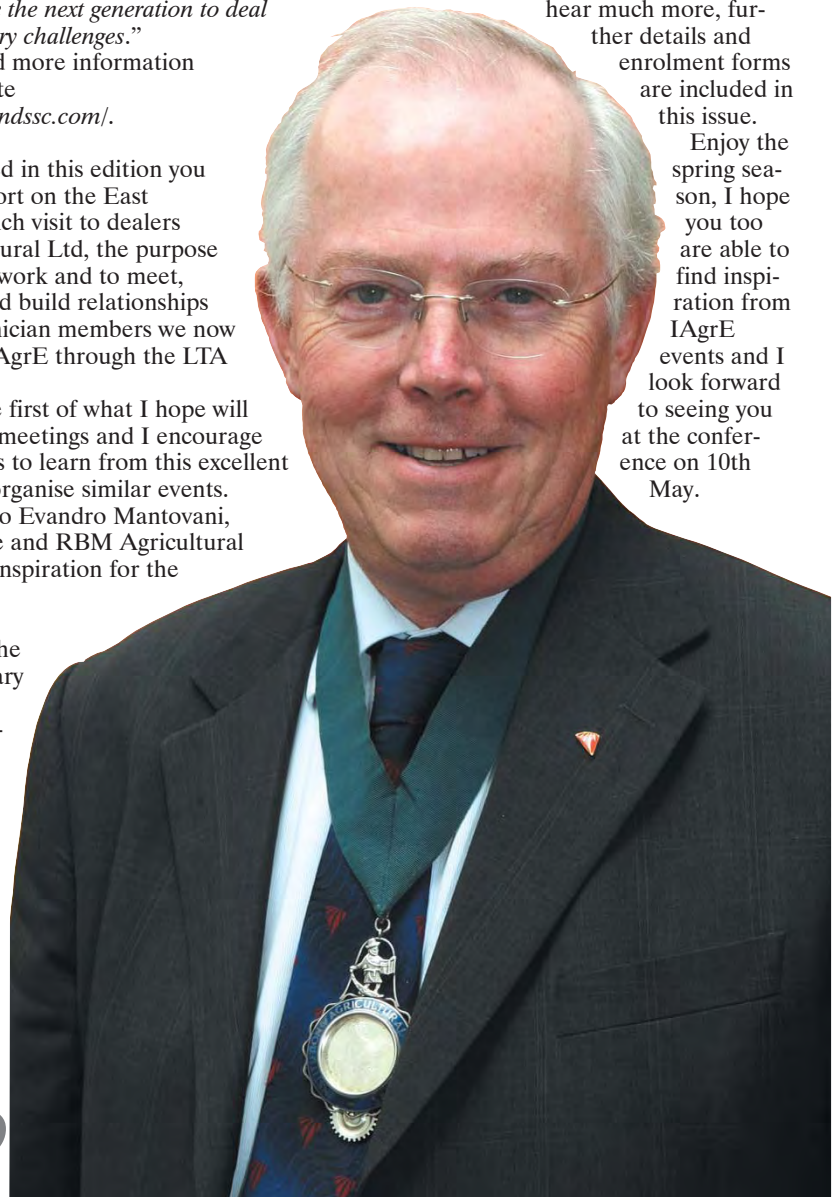
The first impact is that off road diesel fuel supplies have now changed to Ultra Low Sulphur (ULS). You will also have seen lots of advertising in the farming press from manufacturers of engines, tractors and equipment offering 175Kw and above machines promoting their solutions and technology, as there is more than one way of complying with these regulations.

If this is a subject that affects your business or daily work or is of interest to you professionally, please come along to The IAgrE conference on 10th May 'Diesel

Engines- The Final Frontier' to

hear much more, further details and enrolment forms are included in this issue.

Enjoy the spring season, I hope you too are able to find inspiration from IAgrE events and I look forward to seeing you at the conference on 10th May.



“Listening to such incredible progress gives us all hope that we’ll be able to find ways to feed the world”

cultivation trials in cereal field conditions

As written June 2006 and revised December 2010

Brian Keeble, CEng MIAgrE

INTRODUCTION

THERE have been many “Muddy Floods” in ‘90’s and ‘00’s, defined here as flash floods that affect only a relatively small area, full of soil and lasting only a few hours.

Many studies have demonstrated that these usually come from farmers’ fields and that the farming of those fields has changed in recent years. Study of fields where muddy floods started shows that the water flowing off the field has done so down the tramlines, at least for a part of the journey off the field. Study of the history of these fields shows that many of them were classed as too steep, too shallow of soil or else too ‘poor’ to be arable and so were grassland. Often the now large field was, in the past, also divided by hedges and/or ditches.



Fig 1
A tramline Feb ‘06

The runoff potential from tramlines is evidently high and these form waterways for cereal crops and frequently show signs of runoff (**Fig 1**). In 1994 measurement of runoff from tramlines was started on the Writtle farm and discovered to be an average of 82%

and sometimes 98% of the rainfall on silt loam overlying clay (*Luke Ashmore, 1995*).

Discussion with colleagues, farmers and others has led to the consideration of overall field strategy rather than just the tramlines. The necessity of tramlines (or their GPS equivalent) for accurate applications means that they should be treated as a necessary evil and, indeed, packed tightly to support wheels during the growing year to minimise tractor problems. Far from sub-

soiling the tramlines, farmers should be encouraged to maintain them as roads for crop working and for harvest. This would enable the farmer to treat the major part of the field as a no go area, so ensuring the minimum of compaction.

It was a short move from the above study to consideration of the benefit that is brought by either ploughing or minimum tillage. With the tractor power and drill coulter construction materials now available, drills are able to cultivate just enough soil for establishment without an overall tillage process – always provided that rotations and chemicals can then control pests.

What effect would such treatment have on runoff, yields, timeliness or profits?

UPDATES

The trials as discussed in the ‘*Landwards Summer 2007*’ edition can now be updated and additional results for crop growth, yield and profitability, weed problems, carbon dioxide production, soil health and soil organic content discussed.

The first article concentrated on the effects of cultivation on rain water run-off. Runoff from tramlines at 82% to 98% was discussed and found to be an acceptable problem providing that the main field area had minimal runoff. The tillage trial was outlined and methods of measuring run-off were discussed, with the results to 2006 described. Three plots were set up between four tramlines in an otherwise normally farmed field. Plot one was not cultivated for the four years, plot two was minimally cultivated and plot three was traditionally cultivated with a plough based system. Problems met with were mentioned; not least the lack of a suitable direct drill and the poor use of the extra timeliness of the former two cultivation methods, as the same sowing date for the plots was used each year.

Runoff over the growing seasons of 2003

to 2006 was discussed, and the tables in this article are updated to 2007.

TILLAGE TRIAL DESIGN

The aim of the trial was to demonstrate to college students that tillage is not necessary for combinable crops and is as profitable as when using cultivation equipment. To do this, the areas between four tramlines of ‘Gravelpits’, a college farm field were selected for special cultivation practice.

1. Plot one received no cultivation, (Direct Drilled or DD). Typical treatment – Direct drill, roll;
2. Plot two was minimally tilled with heavy discs plus required cultivation, (Min till). Typical treatment – Heavy disc, roll, combination harrow, drill, roll;
3. Plot three was ploughed and otherwise normally tilled, (Plough or Normal). Typical treatment – Plough, roll, power harrow, drill, roll.

The soil is a calcareous pedosol in the Hanslope series. A textural analysis classes this soil as a clay loam, (nearly a loam), with 33% sand, 41% silt and 26% clay.

The trial area has an average slope of less than 2.5% (1:40 or 1.4°).

Instruction to the farm staff was to treat the plots the same with the exception of the cultivation and as far as possible that is what they did. Treatment was varied by the farm staff according to the conditions, e.g. rolling was omitted in the autumn of 2004 due to the late wet conditions.

Runoff measurement took place during the growing seasons of 2003/4, 4/5 5/6 and 2006/7. The 5th year of the trial was curtailed by a farm manager mistake.

LIMITATIONS

- Timing of drilling was held to one date – necessarily after cultivation of all plots. This would not be the case with normal

direct drilling as seeding could be earlier and also possible in wetter conditions.

- Cultivation of three plots in Gravelpits field was necessarily tied up with the normal farm work to keep costs down.
- Plot one (DD) tended to be trafficked more than liked, as it was closest to the gateway to the field.
- Straw was baled off for use on the college farm so disadvantaging the untilled plot in terms of attraction of soil wildlife and shelter from the elements.
- Seed drilling was completed with a heavy duty disc and pneumatic tyre press wheel drill (Väderstad, Fig 2) which struggled to achieve a constant depth or a good cover for the seed in the untilled clay soil, though it worked well on the tilled plots. In 2006 a purpose built direct drill (Claydon Fig 3) was used and did a more consistent job.
- There was some weed problem with the untilled soil which only a re-designed rotation would have reduced, though extra spraying held the levels for the trial.



Fig 2
The Väderstad drill at work



Fig 3
The Claydon, used for 2006/7

MEASUREMENT OF RUNOFF

The runoff measurement sub-plots were established each year after all cultivation and drilling was complete, so that each runoff measurement sub-plot is a representation of that field plot. The comparison of the effects of cultivation method on runoff resulted in differences being measured.

The quantity and timing of rainfall affected the runoff measured. Direct drill cultivation led to better water retention than either Minimum tillage cultivation or plough cultivation. In all years, direct drilled soils retained either the most water or the same as the other cultivation methods.

In a 'Normal' year, minimum tillage retained more water than ploughed soil. In a year when there were heavy rains interspersed with longer dry spells, the minimum tillage could retain as much as the

untilled soil. In a dry year not only was there less runoff but the ploughed soil retained as much as the minimally tilled soil.

RUNOFF

For each of the four years, plots within the cultivation treatment areas were laid out after all groundwork for the crop was complete (Figures 4 and 5). Each plot therefore represented the cultivation type in that field condition. The sub-plots were 10m long and one metre wide aligned with the slope of approximately 2½% and edged with 100mm boards to prevent ingress or egress of water.

The plot position was changed each year to maintain accurate representation of the field condition. Note the precautionary bunds to prevent running water from the field from floating the tank!



Fig 4
Direct drilled
catchment Nov 2005

Fig 5
Normal cultivation
plot Nov 2005

Note the difference in establishment

Measurement of water collected was made after each rain event rather than on a daily basis, at which time the rainfall gauge on site was also read. An attempt to record rainfall intensity failed due to instrumentation problems.

Runoff from the commercially farmed field plots in Gravelpits was measured over a period of four months in 2003/4, three months in 2005, six months in 2005/6 and 3 months in 2006/7 (Table 1).

Total runoff	mm	mm Runoff			Runoff % of rainfall		
Date / season	Rain	DD	Min till	Normal	DD	Min till	Normal
Nov 2003 – March 2004	247	4.8	9.1	11.1	2.0	3.7	4.5
Mar 2005 – May 2005	73	1.9	1.9	4.4	2.6	2.6	6.0
Nov 2005 – May 2006	239	4.3	4.6	4.5	1.8	1.9	1.9
Sept 2006 – Jan 2007	244	4.0	3.7	4.4	1.63	1.53	1.82
Total as m ³ /ha (%)	804	15	19	24.5	1.88	2.40	3.05

Water running off the plots was recorded as litres per square metre and converted to percentage of rainfall and to volume of runoff per hectare. This is presented below in Figure 6.

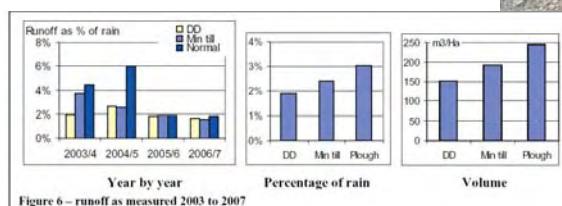


Figure 6 – runoff as measured 2003 to 2007

The total of rainfall over the measured cropping periods was 804mm, or 8,036 m³ per ha. The results were measured in very different rain seasons and mostly incomplete, so the total does not present the full picture. Several more years of study are needed to be predictive regarding runoff and for these figures to become statistically dependable.

2003/4 was a normal season for rainfall, 2004/5, a dry season though with two heavy rain events and 2005/6 an extremely dry season followed by a wet May (81mm, 40mm above normal). In the 2006/7 season the total of rain was low for the period recorded then very wet from January such as to keep the ground very wet and the water table close to the surface. This proved a problem to the system used for measurement, which was stopped in early January. The lighter rain early in the season led to less runoff than the much more important later, unmeasured part of the season. The annual figures for runoff as a percentage of rainfall are to be seen in figure 7 and a reference graph in figure 8.

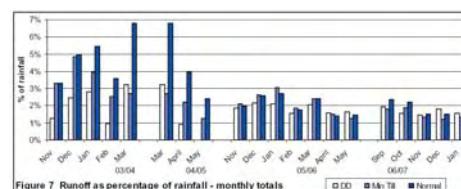


Figure 7 Runoff as percentage of rainfall - monthly totals

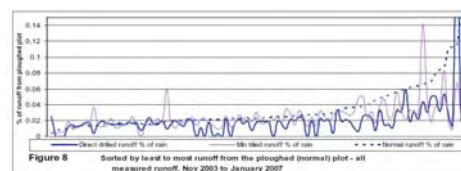


Figure 8 Sorted by date to reveal runoff from the ploughed (normal) plot - all measured runoff, Nov 2003 to January 2007

An example of the field observations is as follows for the 2004/5 season.

Immediately after drilling in November 2004 the plots appeared to be quite rough.

Due to very wet weather conditions it had not been possible to roll the field after drilling. Numerous small clods covered the ploughed plot, while clods after minimal tillage showed a greater variation in size. The direct drilled plot showed signs of surface compaction and smearing of the seed slots. A surface cap was beginning to form in some areas on the ploughed plot in late November 2004 (see figures 9 and 10).

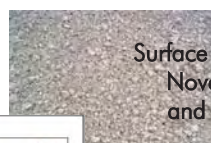


Fig 9 & Fig 10
Surface of ploughed plot in mid-November 2004 after drilling and at the end of November,



showing surface cap beginning to form (Paul Rogers project report)

continues over

Infiltration measurement using the double ring test was difficult to measure being very fast on the ploughed land, less so on the minimally tilled land and slowest on the untilled land.

They all settled at a similar rate after 3 hours, once the upper profiles were saturated. The tests were taken in very dry conditions in November, 2004 (**Figure 11**).

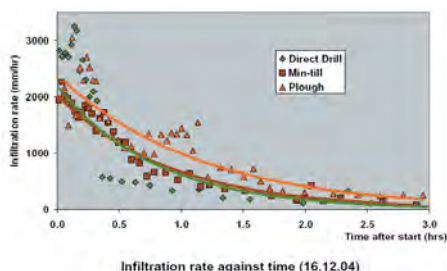


Fig 11 Infiltration

CROP INFORMATION

The rotation of wheat, wheat, barley, oilseed rape was normal for the field rather than one selected for zero tillage (and to be followed by wheat but the trial was stopped).

Crop establishment was poor on the direct drilled plot when using the Väderstad drill, with many long gaps where coulters had blocked or ridden out in the hard soil. There were also many sections of the rows where only a few plants per metre emerged, though whether this was due to poor placement; poor germination or low emergence could not be discerned. (**Figures 12, 13 and 14**)



Fig 12 Barley, April 2005

It was interesting to note that with the rape sown in 2006, slug damage was worse on the ploughed plot compared to the other two.

Two pellet applications were made as the standard treatment for the field but the second application was probably not necessary for the direct drilled plot and maybe not for the minimum tilled one either.



Fig 13 Wheat, Feb 2006

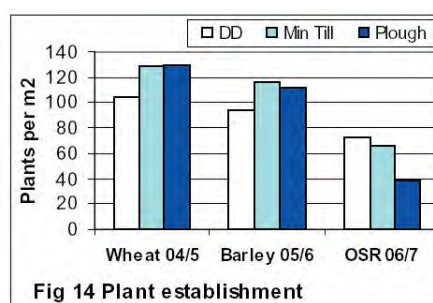


Fig 14 Plant establishment

According to crop data recorded during the growing year, the direct drilled plot did least well in terms of establishment in the first three years though this changed dramatically in the last year with the introduction of the Claydon direct drill for the rape when the soil conditions were dry so the ground with least disturbance retained the most moisture, the ploughed plot giving the poorest results.

It was also interesting to note that the rape plants in the direct drilled plot were slower to grow in the autumn, leaving them open to more pigeon damage compared to the other two cultivation treatments. (The pigeons appeared to dislike landing among the taller plants.) Once the weather warmed up, all plots were the same by appearance (**Figure 15**), though at harvest the farm manager did comment that the direct drilled plot appeared to be "Quite a bit shorter" as well as "Having more thistles".

Weeds were controlled by application of normal spray chemicals, with in addition one dose of Atlantis against blackgrass on the direct drilled and minimally tilled plots in 2004/5 which was additional to the normally required sprays. This is not separately priced as it would be normal to vary the rotation for each cultivation type to account for such weed problems. Grass weed in the direct drilled plot was very evident in places at establishment but disappeared shortly afterwards.

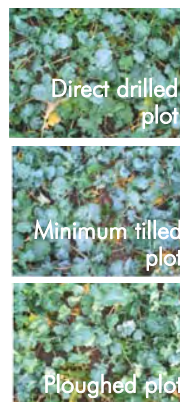


Fig 15 Plant cover at 7 January 2007

YIELDS, COSTS AND PROFIT

	TABLE 2 – Crop yields			Table 3 – Yield as percentage of ploughed plot yield		
	2004/5 wheat	2005/6 barley	2006/7 OSR	2004/5 wheat	2005/6 barley	2006/7 OSR
		tonnes/ha		%	%	%
Ploughed	6.2	7.98	3.33	100	100	100
Minimum tillage	5.5	8.24	4.09	89	103	123
Direct drilled	4.9	7.12	3.67	79	89	110

The yields as shown in **tables 2 & 3** reflect the early poor start for the crops in the direct drilled plot when drilled with the wrong drill and the difference when using a specifically designed drill. It should also be noted that the timing of the drilling was poor due to having to await the cultivations for the other plots.

The establishment costs were as recorded in the college farm diary, i.e. very standard to any farm system of a similar farm size. The price of time spent on the field is not accounted for specifically, so not showing the modern cultivation methods at their best. Some operations were carried out by contractor, e.g. the Claydon drilling.

Table 3 Costs, income and returns				
	DD	Min till	Plough	
2004/5 Wheat @ £55/t				
Cultivation	£31	£65	£117	
Yield @ £55/T	£270	£303	£341	
Profit/ha	£239	£237	£224	
2005/6 Barley @ £70/t				
Cultivation	£42	£98	£117	
Yield @ £70/T	£498	£577	£559	
Profit/ha	£457	£479	£442	
2006/7 OSR @ £180/t				
Cultivation	£42	£74	£163	
Yield @	£660	£736	£600	
Profit/ha	£618	£663	£437	

Only differing costs are counted, with the exception of the application of Atlantis which was not accounted as said above. Crop yield was not measured in the first year.

- **2004/5** saw the least yield give the best returns as the price of wheat was so poor at £55/tonne, with the ploughed plot (producing the greatest yield) having the poorest return. (At £60/tonne, the minimum tilled would be just best and at £75, the ploughed just best.) This is with the use of an inappropriate (Väderstad) direct drill.
- **2005/6**, with the price at £70/tonne for the barley, the minimum tilled plot was most profitable and next best, the direct drilled plot. (The minimum tilled plot yielded the best profit at any price and the ploughed would be just better than the direct drilled at £90/tonne.) Again, an inappropriate (Väderstad) direct drill was used.

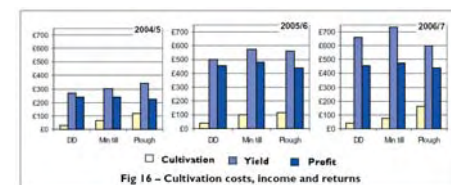


Fig 16 – Cultivation costs, income and returns

- **2006/7** saw the oilseed rape, at £180/tonne yield the greatest profit from the minimum tilled plot, followed by the direct drilled, the ploughed plot yielded least in both quantity and profit. (This ratio doesn't change over the sensible price range that might be expected for OSR.) This was the first year that a specifically designed direct drill (Claydon) was used.

ENVIRONMENTAL ISSUES

Carbon dioxide created during cultivation

The carbon dioxide generated by the trial cultivation methods (**Table 4 and Figure 17**) were calculated using approximations of 250g/kWh brake specific fuel consumption (measured from a MF8280) and 2.7kg CO₂ per litre of fuel, (various sources differ from 2.6 to 3.1kg/l).

It should be noted that these figures assume that each operation is carried out at near maximum loading for the tractors, which makes the figures smaller than if a

... Compaction in terms of soil bulk density indicates quite clearly that the soil is denser with the lesser tillage treatments

	kg CO ₂ per hectare			Ratio to plough	
	DD	Min till	Plough	DD	Min till
2003/4	54	172	228	24%	76%
2004/5	33	145	206	16%	70%
2005/6	54	188	206	26%	91%
2006/7	54	128	270	20%	48%
Average	49	159	226	21.5%	69.7%
Range	11	43	64	±4%	±21%

large tractor is used at less than full power. The figures are also based on engines that are well maintained and operating efficiently.

Over the period of the trial, crop establishment by direct drilling produced an average 49kgCO₂/ha (22%) and by minimum tillage 159kgCO₂/ha (70%) of the CO₂ produced by conventional tillage establishment at 226 kgCO₂/ha (100%).

It is interesting to note the range of production over the years, especially the minimum tillage production, as the farm manager saw fit to vary the tillage operation.

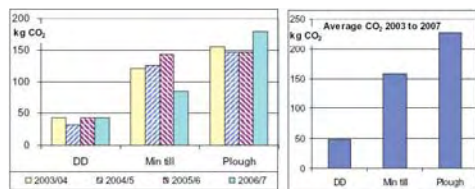


Fig 17 – Kilograms of CO₂ released by tractors performing cultivation per trial and averaged

An approximation based on these figures translates into a saving of 610,333 tonnes of CO₂ nationwide if all farmers direct drill the 3.435 million hectares under wheat, barley, 'other cereals' and oil seed rape instead of ploughing and minimum tillage would save 235,350 tonnes of CO₂. (Area figures from DEFRA, Harvest: Final Estimates of Cereal Production, United Kingdom 2006.) These are shown in Table 5.

Total area of combinable crops 3,435,000ha 2006	DD	Min Till	Plough
Average production	49	159	226
Total UK CO ₂ produced (tonnes)	167,460	542,443	777,792
Potential saving over UK (tonnes)	610,333	235,349	

Soil organic matter

Table 6 Soil organic carbon

	DD	Min till	Plough
Dichromate C	1.59	1.51	1.36
Implied o/m *	2.74	2.6	2.34
Loss on ignition	5.86	6.15	5.79

The correlation between the two methods was low (R = 0.35).

* = organic carbon x 1.79 (Rowell, 1994)

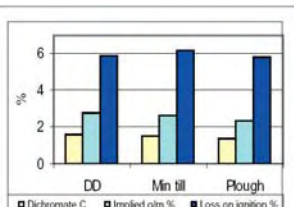


Fig 18 – Comparison of loss on ignition values with dichromate method for determining soil organic carbon.

There is plentiful evidence that soil organic content is the main criterion of strong aggregation of soil. Cultivation tends to disrupt the organic cycle, so leading to loss of organic content and the degradation of structure with consequent loss of soil workability, surface stability and increased runoff.

Measurements of the soil organic matter content and of earthworm numbers are the main criteria of soil health measurement used. Soil organic content and earthworm numbers were highest in the untilled plot and lowest in the ploughed plot.

Loss on Ignition was used as being most readily measured, though a dichromate test was run as a control. The results for this are compiled in Table 7 and Figure 18.

The loss on ignition method of measuring organic content gives a result that is approximately 232% of the implied organic level, according to the dichromate method, which indicates that the level is near the middle of the range for arable topsoil (at generally 1 to 3 %), though well below the theoretically better levels of pasture at 5 to 8% organic matter. The measured loss on ignition for each year and averaged is shown in figure 19.

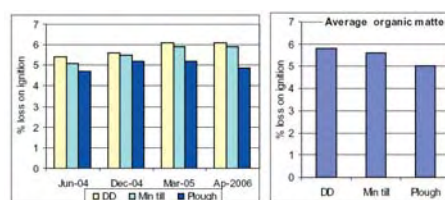


Figure 19 – Organic matter by loss on ignition (5 – 100mm soil layer)

Earthworm numbers

Earthworm counts were taken in 2004/5 and 2005/6. (The oilseed rape height did not allow for taking spades full of soil from the plots at the pertinent time.) These indicate a higher number in the untilled plot compared to the other two, closely followed by the minimum tilled plot. Results are shown in Table 7 and Figure 20, which follow.

The population of earthworms was measured by digging into the top 150mm of soil and counting the number of worms on a spade full of soil. The method, though crude, was consistent for all plots from which the same number of samples was taken.

It can be seen that there is a trend of more worms in the less disturbed soil, and therefore that there are likely to be

Table 7 - Number of worms 0 - 20cm depth in March 2005

	Direct Drill	Minimal Tillage	Plough
March 2005	40 ^a	36 ^a	16 ^b
April 2006	46	37	35
Average	43	36.5	25.5

Means with different letters differ significantly (p<0.05) according to a one way ANOVA test

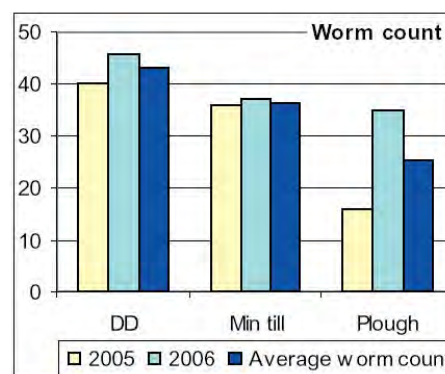


Figure 20 – Worm count

more naturally produced water flow channels developed in the direct drilled soil, followed by the minimum tillage soil, where, it is presumed, there was only moderate disruption to the worms during cultivation.

Compaction

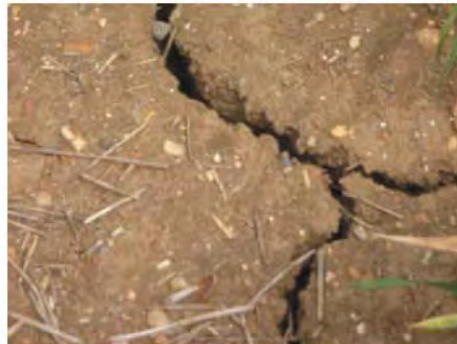
Measurement of soil density was taken during 2004/5 and at later stages (though not recorded as these were student exercises). Compaction in terms of soil bulk density indicates quite clearly that the soil is denser with the lesser tillage treatments, though the water infiltration tests do indicate that there are channels for water flow to be found in the more dense soil. From the latter, the inference is that there is good structure in the un-tilled soil. It was observed that all plots were similarly dense by late spring in all years, all cultivation effects having disappeared.

Soil cracks (figures 21 to 24 - overleaf) were noted during the summers, these being of consistent size and depth over all treatments (measured by plumbing with a straw!). Width of crack was typically up to 30mm and depth more than 400mm (i.e. below plough depth) in the wider cracks. The widest cracks were noted in the wheelings'.

There were as many cracks, equally large, in the ploughed soil as seen elsewhere. The ploughed topsoil did appear to be less well structured than in the plots, though below the cultivation depth the structure did become less massive.



Surface cracking in . . .
Fig 21



. . . the direct drilled plot and . . .
Fig 22



. . . the minimum tillage plot
Fig 23

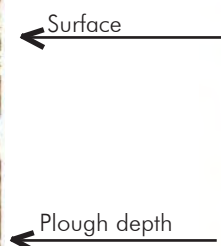


Figure 24 – Soil cracks in soil pits in the ploughed plot June 2006

It is my impression that there is not a restrictive plough pan as there does not appear to be root deprivation below plough depth. This has not been closely measured.

CONCLUSIONS

Four crop years into a projected five year trial demonstrated that “No till” farming is viable and competes effectively with “Minimum tillage” and “Plough based” cultivation systems in the production of crops. This is particularly true when crop prices are low.

The environmental effect of farming on the countryside is least with non till (direct drilling) in terms of less CO₂ emission, less and cleaner water running off the field and also in sequestration of organic carbon and soil structural integrity. More worms are to be found in non ploughed fields.

1. The untilled area proved productive but uniform crop establishment, speedy germination and consistent emergence is critical. The use of a specifically designed drill is essential. (It may be the case that the tine/disc opener question is more soil dependant than usually thought, also.)
2. Runoff water was least from the no till plot, with the minimally tilled soil a close contender. For the four years of the trial,

rain and runoff was measured over parts of the growing seasons to a total of 804mm of rainfall (or 8036m³/ha). Runoff has been most from the ploughed soil at 3.05% of rainfall (245m³/ha), followed by the minimum tilled soil at 2.40% (193m³/ha) and least from the untilled soil at 1.88% (151m³/ha). This does vary with differing seasonal weather conditions but at all times the untilled soil has the least runoff.

3. The weed problem is one that only a re-designed rotation will fix on a low cost low input system. (The fact that spray resistant forms of weed are now prevalent in East Anglia combinable crops indicate that whatever cultivation system is used, better rotations must be used.)
4. Slugs appear to be more prevalent – in this trial – in ploughed soil than in either direct drilled or minimally tilled soil – presumably due to the extra shelter of clods in the ploughed soil and possibly affected by the baling-off of all straw.
5. It is considered that it takes five years to achieve maximum benefit from no-till farming, for the soil to re-adjust to the new conditions. During that time in-soil flora and fauna build up in number and variety to eventually take over from the plough. This was not proven in this four

year trial.

6. As all of the straw is baled off from the trial field, it would be interesting to discover if additional organic manure applications (farm yard manure or green waste compost) would improve the direct drilled soil more quickly and further.
7. Cracking observed each year in this clay loam soil alleviates compaction both at surface level and at plough depth. No pan was observed, even though the farm manager had initially planned to sub-soil after the harvest in 2005. It is considered important to restrict field traffic to tramlines insofar as possible to improve profitability by reduction in soil damage. In non-cracking soils it is strongly recommended that soil pits are used to discover any soil pan.
8. The objective to prove that the no-till system is viable on a clay loam soil, that there is a lower environmental impact from the method and that conventional tillage is unnecessary is held to be demonstrated.
9. It is felt that with further trials optimising the benefits of direct drilling, then the use of minimum tillage and plough based cultivation systems could be reduced or not used at all.

It is considered important to restrict field traffic to tramlines insofar as possible to improve profitability by reduction in soil damage

Cultivation work with a John Deere 7820 and set of discs - the hills got a lot steeper than this!

DBT

DBT in NZ

ALEXANDER SKITTERY, a second year student at Harper Adams University, studying a masters degree in agricultural engineering, tells *Landwards* about his gap year working on New Zealand farms

LAST year I was awarded a Douglas Bomford Trust Scholarship to help finance my studies at Harper. During the panel interview I talked about my gap year to New Zealand and they asked me to write about my experience.

I initially set out with two friends and chose New Zealand due to its sizeable agricultural industry. Our start point was an organisation called FHINZ (Farm Helpers in New Zealand) who produce a booklet detailing over 350 farms that offer free food and accommodation in exchange for a few hours work a day. An ideal way to experience NZ farm life and see the country we thought.

Our journey took us to the most southerly point of NZ, Bluff and to the most northerly point, Cape Reinga with our hire car covering over 10,000km in six weeks. During our journey we stayed at 10 farms, ranging from arable and dairy to rare breads and Kiwi fruit.

The farmers and their families were very welcoming and hospitable. There were great opportunities to get to grips with some real farm work from sheep mustering, involving driving quad bikes over 1000 acres of mountain, herding up 1500 sheep, to milking a herd of 750 Holstein-Friesian

cows on a newly installed Herringbone milking parlour in Otago.

After 6 weeks my two friends returned to the UK and I was left to fend for myself. A family contact led to a month's work on an asparagus farm in Morinsville.

My main jobs included weed spraying using an International B-414 tractor and stacking boxes of asparagus but there was also plenty of time to play golf and attend family barbecues. From there I moved on to an agricultural contracting company in Waipukurau, Hawkes.

By the beginning of summer I was in charge of a John Deere tractor raking up hay, then progressed to big bale silage with a New Holland square baler. When the harvest season began one of my favourite jobs was baling up the straw after the Claas Dominator combine.

Following harvest I was assigned another John Deere and a set of discs and this is where it became interesting. Much of the land we were farming was very steep, something I am not used to coming from a relatively flat farm in Herefordshire.

I would be sent off to disc paddocks that I would struggle walking up let alone driving up the slopes. Apparently the trick is to drive sideways across the slope following its

contours! This did seem to work and kept me out of trouble for most of the time.

During my time in New Zealand the dairy industry was experiencing a huge boom, with many traditional sheep farms being converted to dairy, as farmers saw opportunities to make money from the large increases in milk solid prices. I did a lot of work putting down more intensive rotation leys of grass for these conversions.

People have asked me how life and farming differs in New Zealand to the UK. In my opinion farming is very similar, the same tractors and equipment are used and farmers seem to have the same outlook as they do here, always seeking ways of diversifying to increase the farm income.

New Zealand shares many things with life in the UK but the amount of people that live there - only about 4.4 million to the UK's 61million - made for a very relaxed way of life. I don't think I locked my car once and someone did say to me that life in New Zealand is like the UK was 30 years ago.

My advice for anyone planning to go on a trip to New Zealand would be, go with an open mind, be willing to try different things and don't be too organised. I did all three of these things and had the time of my life.



My favourite job, baling up the barley straw. Note the Claas Dominator combine in the background



TUESDAY 10 MAY 2011

The Vincent Building, Cranfield University



Diesel Engines: The Final Frontier

A CONFERENCE FOR ALL SCIENTISTS, ENGINEERS
AND MANAGERS WITH A RESPONSIBILITY OR AN
INTEREST IN OFF-ROAD DIESEL ENGINED VEHICLES

WITH the introduction of Interim Stage Tier 4 and Final Tier 4 emissions legislation for diesel engines used in off-road applications, responsibility for implementation falls on engine manufacturers, fuel and oil suppliers, equipment manufacturers, servicing dealers and end-users.

The conference will be of considerable interest to all those

involved in the installation of diesel engines into machinery and equipment used off-road; transmission integration; filtration and fuel supply and storage.

Issues covered fully will consider future trends in diesel engine design, fuel specifications, transmission matching cooling systems as well as sales and after-market issues.

INTRODUCTION BY CONFERENCE CONVENOR: Richard Robinson

Having been suggested as the Convenor for this Conference, (that will teach me to miss Executive meetings) our President and I decided to make it appeal to engine installers - and my company is one of them.

It is quite difficult to find out enough of all the technologies available, like many manufacturers, we try to deal with a limited number of suppliers so that we can get the best help when we need it, and take advantage of the best prices.

We have been fortunate in having assembled a panel of excellent speakers from a wide range of suppliers, and it is particularly significant to discover the massive effect of political decisions on our industry. In particular, the effect of changes to fuel composition on the serviceability of our increasingly complex drive trains.

We have tried to cover a wide spectrum of subjects so that at the end of the day delegates will be able to say. *"That was a really useful Conference"*. We also want our speakers to make positive contacts, with the real prospect of future business.

We are sending invitations to as many potential delegates as possible, but if you know of any potential visitors, please let them know - we are Agricultural Engineers, and we are the only people who can feed the world!



SPEAKER LINE UP:

CONFERENCE CHAIRMAN

Michael Hawkins (current President of EUROMOT)

Michael Hawkins is a chartered engineer and fellow of the Institution of Mechanical Engineers. He is an honours graduate engineer and holds a Master of Science degree in Aeronautics. He started his professional career in the diesel engine industry in 1972 in Perkins Engines where he progressed through research and development to the level of Chief Engineer. In 1996 he moved to Case New Holland where he took charge of engine product development and board membership of the European Engine Alliance between New Holland, Cummins and Iveco to design, develop and produce a range of 3, 4 and 6 cylinder engines for the truck and off-highway markets.



INTEGRATING TRANSMISSIONS

Roger Weyman: Business Development Manager, Torotrak plc

Roger has over 30 years experience in agricultural engineering, specialising in the design and development of agricultural tractors as well as transmission design. He has spent 16 years with Massey Ferguson and its parent company AGCO, and held positions of Chief Engineer – New Product, and Engineering Director. From 2003 to 2006, he ran his own engineering consultancy before joining Torotrak in 2008. An IAgRE member, he has an honours degree in Engineering, an MBA from Warwick University in the UK and is a Chartered Engineer. He also is a qualified helicopter pilot.



FUEL AND LUBRICANTS: THE IMPACT FOR TIER 4

Carl Stow: Senior Scientist, Shell Lubricants

Carl is current chairman of the Industry Liaison Committee of ATIEL, which represent Europe's leading engine oil manufacturers. He recently worked in close collaboration with Professor Gordon Murray to develop a new concept oil from Shell which achieved significant fuel efficiencies.



EFFECTIVE FILTRATION SYSTEMS

Emmanuel Moreau, New Technologies Manager, Donaldson Company

Donaldson Company Inc is a leading worldwide provider of filtration system serving customers in the industrial and engine markets.

ENGINE DOWNSIZING WITH NO LOSS OF PERFORMANCE

Craig Grant, Mobile Hydraulics Manager, Bosch Rexroth

Craig is an IAgRE member and sits on the FEG Group. He is Key Account manager - mobile hydraulics for Bosch Rexroth, having previously worked at Parker Hannifin, Norson Power and Anderson Strathclyde.



THE EGR or SCR ROUTE?

Discussing the technology options available to manufacturers are:

John A. Radke: Manager, Worldwide Customer Support, John Deere Power Systems, and T.B.A : FPT

HYDRAULIC FAN DRIVES

Mark O'Driscoll, Applications Engineer, Sauer-Danfoss

At Sauer-Danfoss, the Global Emissions Team has been taking a vehicle-by-vehicle approach to assess and analyse the technologies which may be employed to address the changes in flow and power output, heat rejection, and installation space. by performing lab tests, conducting dynamic simulations and validating and documenting how best to produce more efficient, productive machines.

PLEASE NOTE:

THE speaker line-up for the 2011 Conference was still being finalised as this issue of *Landwards* went to press - and may be subject to change.

For more information, or online booking go to www.iagre.org or contact the Secretariat at 01234 750876

Tackling the Tier 4 challenge

Environmental legislation is having a major impact on diesel engine design.

The regulatory agencies are concerned with four main categories of emissions:

- Carbon monoxide
- Oxides of Nitrogen
- Hydrocarbons
- Particulates

Given the different relative effects on the environment of concentrated emissions from road vehicles (traffic) and that posed by off-road (or "non-road" vehicles (dispersed), different time scales have been placed on the introduction of emission regulations.

January 1st 2011 saw the introduction of Tier 4 (Interim)/Stage IIIB for off-road diesel engines >174 HP. Thus, all new diesel engine tractors, combines, sprayers and self-propelled equipment used in forestry and farming will be covered by this regulation.

This will require (in relation to Tier III) a 90% reduction in particulates, 50% reduction in oxides of nitrogen (NOx).

The main technology choices available to manufacturers are:

Exhaust Gas Recirculation (EGR)

Selective catalytic reduction (SCR)

EGR: involves taking a portion of the exhaust gas and using it as part of the fresh intake air in order to provide inert mass in the cylinder. This reduces peak flame temperatures thereby reduce NOx emissions.

SCR: is a means of converting nitrogen oxides, also referred to as NOx with the aid of a catalyst into diatomic nitrogen, N₂, and water, H₂O. A gaseous reductant, typically anhydrous ammonia, aqueous ammonia or urea, is added to a stream of exhaust gas and is absorbed onto a catalyst.



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Brazil : the new farming powerhouse



IN the latest in a series of lectures organised by IAGrE, **Dr Evandro Chartuni Mantovani**, outlined the growth of the Brazilian agricultural sector over the past 40 years.

CHRIS BIDDLE reports

BEFORE the creation of a new farming research corporation in 1973, Brazilian agriculture was a poor performer, Dr Mantovani told delegates at the latest in the series of IAGrE lectures held on 27 January at Harper Adams University College.

"Before the 1970's, Brazil suffered from low agricultural productivity, a food supply crisis, expensive food, inflation, poverty and no specific knowledge about tropical agriculture.

"We were in a farming void, there was no research, no education, confused Government policies and no marketing effort.

"And for a country as vast and rich in agricultural resources, that was something that had to be addressed".

In 1973, the Brazilian government created EMBRAPA, a new agricultural research corporation whose role was to provide research, development, innovation and feasible solutions for the sustainable development of agriculture to the benefit of the Brazilian society.

"Its principal task was to move from agriculture applied to the tropics, to tropical agriculture." said Dr Mantovani, "A

subtle but hugely significant change".

EMBRAPA (short for Empresa Brasileira de Pesquisa Agropecuária), is now one of the world's leading tropical-research institutions. It does everything from breeding new seeds and cattle, to running a nanotechnology laboratory creating biodegradable ultra-strong fabrics and wound dressings.

Today, EMBRAPA holds 68 bilateral agreements for technical cooperation with 37 countries and 64 institutions, as well as multilateral agreements with 20 international organisations.

It has high tech research laboratories in the United States and France, and recently, also set up a laboratory in Wageningen in

“ EMBRAPA's principal task was to move from agriculture applied to the tropics, to tropical agriculture ”

the Netherlands.

Its main achievement, however, has been to turn the Cerrado, a huge tract of land that is the size of Spain, Portugal, France, Italy, Germany, and England combined, into one of the most productive farming areas in the world.

When EMBRAPA started, the Cerrado was an arid brush savanna stretching over 120 million hectares across central Brazil from the western plains to the northeastern coast.

With soils characterised by high acidity and aluminum levels that are toxic to most crops, Brazilian farmers had long referred to the area as Campos Cerrados – “closed land,” with little promise for sustaining production.

Dr Norman Borlaug, an American plant scientist often called the father of the Green Revolution, told the *New York Times* that, “nobody thought these soils were ever going to be productive.”

They seemed too acidic and too poor in nutrients. EMBRAPA changed all that.

“ The Cerrado development is one of the great achievements of agricultural science in the 20th century. It has transformed a wasteland into one of the most productive agricultural areas in the world ”

It poured industrial quantities of lime (pulverised limestone or chalk) onto the soil to reduce levels of acidity. In the late 1990s, 14m-16m tonnes of lime were being spread on Brazilian fields each year, rising to 25m tonnes in 2003 and 2004.

This amounts to roughly five tonnes of lime a hectare, sometimes more.

With improved soil chemistry and the support of flexible research institutions, plant scientists in Brazil developed high-yielding crop varieties for the Cerrado that are more tolerant of aluminum toxicity and acquire soil micronutrients more effectively.

Today the Cerrado accounts for 70% of Brazil's farm output and has become the new Midwest.

With its worldwide reach, EMBRAPA scoured the world for viable farming solutions. It went to Africa and brought back a grass called brachiaria. Patient crossbreeding created a variety, called braquiariinha in Brazil, which produced 20-25 tonnes of grass feed per hectare, many times what the native Cerrado grass produces and three times the yield in Africa.

That meant parts of the Cerrado could be turned into pasture, making possible the enormous expansion of Brazil's beef herd.

Thirty years ago it took Brazil four years to raise a bull for slaughter. Now the average time is 18-20 months.

EMBRAPA also turned soyabeans into a tropical crop. Soyabeans are native to north-east Asia (Japan, the Korean peninsula and north-east China).

They are a temperate-climate crop, sensitive to temperature changes and requiring four distinct seasons. All other big soyabean producers (notably America and Argentina) have temperate climates. Brazil itself still grows soya in its temperate southern states.

But by old-fashioned crossbreeding, EMBRAPA worked out how to make it also grow in a tropical climate, on the rolling plains of Mato Grosso state and in Goiás on the baking Cerrado.

The Cerrado region now provides 54 percent of all soybeans harvested in Brazil, 28 percent of the country's corn, and 59 percent of its coffee.

Cerrado agriculture has also diversified to include rice, cotton, cassava, and sugar. For all crops, average yields in the Cerrado are higher than in other areas, with har-

vests reaching 4.8 tons per hectare of soybeans and 11 tons per hectare of corn. In addition, the Cerrado supports 55 percent of Brazil's beef industry.

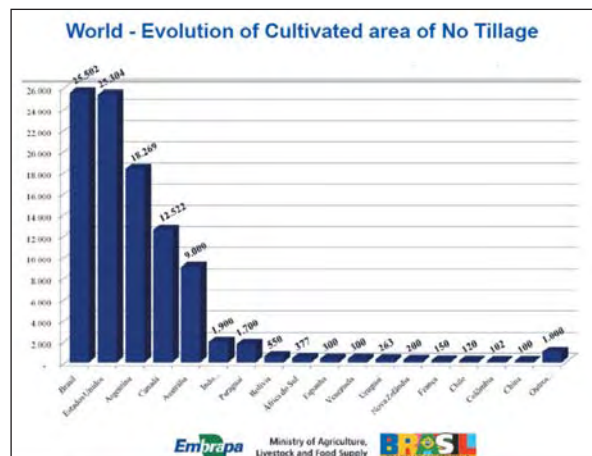
EMBRAPA's latest trick is something called forest, agriculture and livestock integration: the fields are used alternately for crops and livestock but threads of trees are also planted in between the fields, where cattle can forage.

This, it turns out, is the best means yet devised for rescuing degraded pasture lands. Having spent years increasing production and acreage, EMBRAPA is now turning to ways of increasing the intensity of land use and of rotating crops and livestock so as to feed more people without cutting down the forest.

NO TILL REVOLUTION

EMBRAPA has pioneered and encouraged new operational farm techniques. Brazilian farmers pioneered “no-till” agriculture, in which the soil is not ploughed nor the crop harvested at ground level.

Rather, it is cut high on the stalk and the remains of the plant are left to rot into a mat of organic material. Next year's crop is then planted directly into the mat, retaining more nutrients in the soil. In 1990 Brazilian farmers used no-till farming for 2.6% of their grains; today it is over 50%.



Brazil leads the world in No Till farming



In recent years, agronomists have also refined no-till or direct planting technologies, reducing environmental degradation and maintaining higher levels of soil organic matter.

The increased production of a variety of crops and livestock has made food more available and more affordable in Brazil. In the past 25 years, food prices have steadily dropped by an average of 5 percent annually. At the same time, the standard of living for many rural communities has been enhanced, with life-quality indicators rising 47 percent from 1970 through the 1990s.

“Eventually, the Cerrado technology, or one similar to it, will move into the llanos in Colombia and Venezuela and hopefully, into central and southern Africa where similar soil problems are found,” said Dr. Borlaug speaking at the World Food Prize in 2008.

“This will bring tens of millions of additional acres, previously marginal for agriculture, into high-yield agriculture. Hundreds of millions of people will benefit from this work.

“The Cerrado development is one of the great achievements of agricultural science in the 20th century. It has transformed a wasteland into one of the most productive agricultural areas in the world.”

THE increase in Brazil's farm production has been stunning. Between 1996 and 2006 the total value of the country's crops rose from 23 billion reais (\$23 billion) to 108 billion reais, or by 365%. Brazil increased its beef exports tenfold in a decade, overtaking Australia as the world's largest exporter.

Brazilian Agribusiness Ranking

Source: US Dept of Agriculture

PRODUCTS	Production	Exports
Coffee	1st	1st
Sugar	1st	1st
Orange Juice	1st	1st
Beef	2nd	1st
Tobacco	2nd	1st
Ethanol	2nd	1st
Soyabean	2nd	2nd
Chicken	3rd	1st
Maize	4th	2nd
Pork	4th	4th



It has the world's largest cattle herd after India's. It is also the world's largest exporter of poultry, sugar cane and ethanol.

Since 1990 its soyabean output has risen from barely 15m tonnes to over 60m. Brazil accounts for about a third of world soyabean exports, second only to America.

In 1994 Brazil's soyabean exports were one-seventh of America's, now they are six-sevenths. Moreover, Brazil supplies a quarter of the world's soyabean trade

on just 6% of the country's arable land.

No less astonishingly, Brazil has done all this with little government subsidy. According to the Organisation for Economic Co-operation and

Development (OECD), state support accounted for 5.7% of total farm income in Brazil during 2005-07.

That compares with 12% in America, 26% for the OECD average and 29% in the European Union.

And Brazil has done it without deforesting the Amazon (though that has happened for other reasons). The great expansion of farmland has taken place 1,000km from the jungle.

Brazil has more spare farmland than any other country. The UN Food and Agriculture Organisation (FAO) puts the total potential arable land at over 400m hectares; only 50m is being used.

Brazilian official figures put the available land somewhat lower, at 300m hectares. Either way, it is a vast amount. On the FAO's figures, Brazil has as much spare farmland as the next two countries together (Russia and America).

Brazil is also often accused of levelling the rainforest to create its farms, but hardly any of this new land lies in the Amazon basin, almost all is Cerrado

THE agricultural machinery sector has also received a massive boost over the past 25 years said Dr Mantovani.

In 1990 production of tractors and machinery stood at just over 33,000 units, by 2008 it had risen to 85,000 units with all the major manufacturers including AGCO, John Deere, CNH and Caterpillar having plants in the country.

The agricultural revolution, said Dr Mantovani had resulted in a profound and important impact on the Brazilian economy.

Today, agriculture accounts for 37% of jobs in Brazil, agribusiness accounts for nearly half of all exports and 28% of the GDP.

More importantly, agriculture was largely responsible for a positive balance of payments in 2009 of more than US\$60 billion.

Since the 1970s, Brazil has become a model for maximising food production, but not through some magic fix. EMBRAPAS approach was systematic and based around research and science - and the world is now asking whether such an approach can be exported to other potential food baskets such as Africa.



“Brazil has created new farmland without levelling rainforests, nor destroying the Amazon basin”

FEEDBACK

Peter Redman writes:

EVANDRO's lecture portrayed a quite spectacular improvement in the performance of Brazilian agriculture over the last 40 years that has resulted in a two fold increase in production whilst providing other significant economic, social and environmental benefits; and the good news is that only a quarter of the available land has been used.

So it might seem that Brazilian agriculture has some of the clues to resolving the global food challenge that we are hearing so much about these days.

These improvements in productivity have been achieved with marked reductions in soil loss and agrochemical use, with shifts from peasant farming to precision farming, better diets for the population as a whole along with a 37% contribution to Brazilian exports.

All of which has added up to a claimed thirteen fold return on each dollar invested by the government. Quite a story!

So how much of this is applicable to the UK?

Clearly the starting points are quite different in terms of latent capacity and land ownership with very strong drivers for change but there are some relevant pointers that may apply elsewhere, even in the UK.

There was a clear strategy for land use, raising the intellectual capacity, researching new knowledge and transferring this into practice with investment to match.

There has been a mixed discipline approach throughout and no fear of reaching into new technologies.

Surely strengthening the relationship between those developing agricultural strategies and practices in the UK with those in Brazil and in agricultural engineering in particular can only be a good thing.

The full Powerpoint presentation of Dr Mantovani's lecture can be viewed on the IAgrE website (www.iagre.org)
Additional reporting courtesy of The Economist and The World Food Prize

Smart sensors in agriculture

Science, technology and agriculture joined together to drive forward the frontiers of farming in the next in the series of Landwards Lectures

A GROWING population, climate change, insufficient water supplies and limited energy resources is driving the farming industry to embrace more and more innovative farming practices. IAgRE's smart sensor seminar explored the use of sensors to aid continuing improvements to the scope and accuracy of precision in agriculture.

Delegates from academia and industry, including students from Harper Adams and Cranfield Universities, came together at the East of England showground to listen to nine experts talking about the use of sensors in current and future generations of automated and robotic equipment.

Roger Lane-Nott, chief executive officer of the AEA and conference convenor said, "Sensors are one of the key fundamentals to smart farming. Equipment may be getting smarter but people need to get smarter too otherwise how is the world is going to feed itself and wean itself off fossil fuels? These are major challenges for the agricultural industry to solve".

Will Mumford of AS Communications opened up the conference talking about guidance for tractors and getting the precision needed. Will has worked in the precision farming sector for over twenty years and his company provides GPS, guidance and precision agriculture solutions to improve the efficiency and profitability of businesses. He described how GPS guided solutions can provide enhanced accuracy throughout the crop cycle. Farmers are able to pinpoint the location of seeding, spraying, irrigation and harvesting directly over each plant. He also explained the need for correction signals as satellites are often pulled off course which introduces errors into the system and miscalculations.

Dr Nick Tillett of Tillett and Hague Technology presented on image analysis for mechanical plant weeding. Nick's company has expertise in precision guidance and provides the technology behind Robocrop in-row and inter-row vision guidance systems.

He explained about the Robocrop design and how it accurately guides inter-row cultivation and band spraying equipment at high speeds. The technology relieves the driver of the need to concentrate on very accurate steering, allowing him to monitor operations for longer periods and at higher speeds than had previously been possible.

Simon Brown from Amazone talked about variable rate systems in practice. How, by using GPS technology, yields can be improved, costs cut and farming practices made more environmentally friendly. A form of IT farming, it uses modern noz-



zle technology with a flow meter control system allowing essential agrochemicals and seed to be placed precisely according to need and growth potential.

He introduced the BoniRob field robot concept developed in partnership with Bosch and the reality that swarms of tiny robots bustling about the fields selectively applying fertiliser or removing weeds is no longer science fiction. While research work carried out to date on field robots focused specifically on row navigation, the BoniRob will also be able to navigate independently, although to begin this will only be relatively small scale for crop experiment plots. Not only will it be able to pinpoint the GPS position of individual plants and find these again, but also map and document the work it carries out making field robot technology simply faster and more effective than humans and any technologies applied so far.

BUT of course sensor technology does not apply uniquely to plants and **Jim Brook of DeLaval** gave an fascinating vision of smart sustainable dairy farming by incorporating sensors in robots used in voluntary milking systems. Although developed by researchers in the UK there is some way to go yet in embracing this technology here as there are estimated to be 17,000 VMS systems worldwide but only 300 operating in this country.

The VMS is a complete, automatic milking solution designed to get the maximum yield in a cow friendly, hygienic and efficient manner. But probably the greatest benefit to the farmer is freedom from rigid milking schedules, allowing them greater flexibility and more time to manage the herd and their business.

Continuing the livestock theme, **Hugh Crabtree of Farmex** gave a lively presentation on ICT based decision support tools for pig production management. In terms of energy use, Hugh says intensive pig pro-

duction is greener than outdoor pig-keeping.

Farmex offers tools such as a DICAM networked process control, Barn Reports, GuardianAction, a web-based M2M system to capture and distribute data. But Hugh stressed these tools are not only required for measuring the pigs and equipment but the people who operate the equipment, because its people that have the most influence on success or failure in pig production.

A network of simple on site sensing devices are connected to a landline/GPRS wireless broadband, to monitor temperature, water flow, feed by run time, electricity, equipment status and operation, weight and other factors such as slurry level, wind and rain. The benefits of monitoring can give reduced finished times, less variation, a 50 per cent reduction in energy use, 70 percent reduction in water usage, improved knowledge and a certified production system. But you do need to be disciplined to analyse all the data. Hugh said that field evidence had shown that new housing with good environmental controls could improve returns dramatically.

Following lunch **Professor Simon Blackmore**, a key figure in the development of precision farming and agricultural robotics, spoke about smart sensors and robotics. He said, "The idea of robotic agriculture is not a new one. Many engineers have developed driverless tractors in the past but they have not been successful as they did not have the ability to embrace the complexity of the real world. The approach now is to develop smarter machines that are intelligent enough to work in an unmodified or semi natural environment."

The approach of treating crop and soil selectively according to their needs by small autonomous machines is the next step said Simon in the development of Precision Farming as it reduces the field scale right down to the individual plant or beyond. A simple definition being doing the right thing in the right place at the right time with the right amount. Once these systems are mounted on an autonomous vehicle they may become commercially viable. Concluding Simon said that the equipment is going to get smarter with improved automatic control of well defined tasks, automated data gathering, better processing of real information. There will also be the possibility of fully autonomous vehicles with sensible behaviour and the chance to design and build a complete new small smart mechanisation system.

continued over

Dr Bruce Grieve, director of Syngenta Sensors University Innovation Centre at the University of Manchester discussed exploiting the electronics revolution to change the rules of the game for sustainable agriculture and food. Dr Grieve, working with the team at Manchester University, is developing strategies to promote the long term well being of the environment, society and the farming economy to meet the needs of the present without compromising the ability of future generations to meet their own needs.

One of the subjects Dr Grieve is working on is early detection of crop diseases. Prevention of yield loss resulting from crop disease is a key factor in delivering food security. Existing infection monitoring programmes, based upon field walking by agronomists or aerial/satellite imaging are invariably too late to effect a remedial treatment. This research theme addresses the development of wide-area networks of pathogen specific sensors which will detect spore growth early enough to secure yields but with the minimum of fungicide input. The main drivers for this research are increasing crop yields to respond to increasing demand for food, while minimising any impact on the environment through the minimum use of pesticides.

Information could well become more valuable than products alone. For example post 911 legislation now demands that every US mobile phone will have an integrated global positioning sensor, smart power management for reduced carbon footprint.

But Dr Grieve emphasised that there has to be a way to work out how farmers can make money, relatively quickly using precision farming techniques.

Dave Tinker, secretary of EurAgEng gave the final presentation on pre-competitive R & D funding. David has been involved in obtaining funding for applied research and has recently been involved with preparing proposals for large consortia in the UK and EU funded applied research projects, with major agricultural engineering components.

WAKEHAM'S WORLD

Customer services

GEOFFREY WAKEHAM stresses how important clear, concise and helpful communication is between suppliers and customers

RECENTLY, friends had told us how difficult it was to book seats on flights to Australia and beyond during the run up to Christmas. It was assumed this was due to a combination of UK citizens escaping winter and an influx of sporting fans to the antipodes. If you have had problems with websites and call centres you will be aware of what can go wrong with the simple process of booking tickets using a credit card.

We ended up with four sets of tickets with various levels of error, a £100 surcharge, two credit cards stopped, four months of insistence by the card company that we were in dispute with them, twelve letters, numerous phone calls and the need to visit our local bank twice. The last letter received was to let us know they were aware that we were in dispute and they would be in contact again within 28 days.

So what has this to do with Agricultural Engineering or even Land Based Engineering?

Why should the average dealer selling sprayers, the importer of tractors or the local manufacturer of one-off courgette harvesters worry about the problems associated with buying air tickets off the web or dysfunctional credit card companies?

The answer is they all have customers and it is only the fortunate few who never manage to be in dispute with customers or who have not lost a customer because of poor communications.

Do you send out computer generated letters via a mailing list or to individuals without cross checking any problems, however slight, with one or more of the recipients?

Making claims of superior service to someone who is waiting for a spare part will hasten their resolve to find another supplier. Inviting customers to come and see your latest product range and failing to have a particular machine on show can ensure an undecided buyer makes their purchase from your competitors.

There must be a way to cross check between recipients of such letters and their relationship with your organisation. When you make promises in these letters, your staff who have to deliver the promises must be aware how critical it is to live up to these promises.

If our card company had checked our computer generated statements against our status then we would still be active customers.

All organisations must have telephone contact with their customers.

Have you ever tried phoning your organisation? Was it a good experience, did you get answered within half a dozen rings, was the person on the other end positive and polite, did you get a satisfactory answer to your query?

If you did that is super, if not what are you going to do about it? Is the value of the loss of a customer less than the cost of putting it right? If you fail to put it right will your reputation dissuade new customers from seeking you out?

So often companies are 'experiencing unprecedented levels of calls' or they have multiple tiers of options with no reference to previously entered data. By the time one gets to a 'sentient being' one is fuming with rage and frustration.

It is interesting that 42% of customers in Yorkshire will seek an alternative supplier if they do not get a

response to a telephone enquiry within a reasonable time. 25% of Yorkshire customers see one hour as a reasonable time.

So how is your Web Site? Is it easy to use or is it a monument to the artistic skills of the designer, all flashing lights and garish colours? Is it up to date?

I went on a site recently that said the Queen Mother is the Lord Warden and resident in Walmer Castle.

Have you ever asked your customers what they expect from the site and made sure this information is easy to locate, clear, to the point and accurate?

As an unscientific survey for this article I tried to locate three specific pieces of farm machinery, their relevant suppliers or manufacturers to check on available equipment and to find my local dealer.

None of the companies I was expecting to locate appeared on the first two pages of a Google search. I could locate Lego models for one product line but not the real thing.

A trade listing provided me with a list of names for another item but this did not show me the specific company I was expecting. I opened a competitor's site instead.

The third product provided no links except with a company in India so I typed in the specific producer's name and still struggled to find their site.



Two of the sites were slow to load due to their excessive use of animated images; we like many rural customers have very slow download speeds. The third was basic and to the point and quickly accessed.

The site for a small UK based manufacturer of relatively High Tec equipment had clear details of its products and a simple system of locating regional dealers. Due to the large regions used, most dealers were too distant to be relevant.

It contained some up to date 'News' but also out of date details of Agricultural Shows. Contact details were good and a detailed location map provided. Remember this was a competitor to my preferred supplier.

The site for a supplier of basic tillage equipment was limited and seriously out of date. I did not check the India manufacturer.

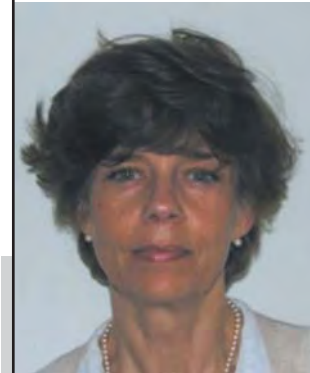
The site for a large multi national organisation (not Lego) was very slow to load, negotiating the site was difficult, it did not recognise I was in the UK, let alone Europe and sent me off on wild goose chases. The format was larger than my screen which was a pain. I never did find the harvesting product I was looking for.

A list of local dealers was provided but many were no more than a name and telephone number. Were they just a man and a van? Much to my surprise the location tool was case sensitive. I never checked their 'News' pages.

I think I will go down the road and have a word with alternative suppliers.

PROFILE: Chartered Professional

Professor JANE RICKSON has over 25 years experience in soil and water management and engineering, specialising in soil degradation processes (focussing on soil erosion), soil conservation and land management.



CURRENTLY Jane Rickson leads the Soil Conservation and Management Group within the National Soil Resources Institute, Department of Environmental Science and Technology at Cranfield University (<http://www.cranfield.ac.uk/sas/nsri/index.html>).

The Group is a multi-disciplinary team, including environmental, civil and agricultural engineers, soil scientists, geomorphologists, ecologists and hydrologists.

Professor Rickson's research and consultancy experience includes the EU LIFE / Syngenta funded SOWAP Project - (<http://www.sowap.org/>), which assesses the environmental, technical, economic and social costs and benefits of conservation tillage, compared to conventional practices. Working with farmers and land managers, field demonstration plots in the UK, Belgium, Hungary and the Czech Republic were set up to measure losses of soil, water, nutrients, pesticides and carbon from different tillage practices. The field scale work was supported by a rainfall simulation programme, which allowed detailed observations of erosion processes.

Jane's other research interests include the application of soil erosion models to evaluate different soil conservation measures such as contour grass buffer strips (as currently advocated by UK agri-environmental schemes). Jane was also involved in the 'Sustainable Agriculture and Soil Conservation (SoCo)' project (<http://soco.jrc.ec.europa.eu/>), which addressed soil degradation processes, practices, policies and control relating to EU agriculture. Recently, Jane has been involved in a number of Defra commissioned projects including Soil strategies to inform Soil Protection Policy (SP1601); The costs of soil degradation (SP1606); and Cost effective monitoring of soil erosion in England and Wales (SP1303).

Since joining Cranfield, Jane has helped establish a world-class soil erosion laboratory,

incorporating several rainfall simulators and runoff plots (<http://www.cranfield.ac.uk/sas/clientservices/facilities/page26018.html>). These facilities aid our understanding of erosion processes, from single aggregate up to micro catchment scale. In the controlled conditions of the laboratory, soil conservation measures can be tested.

Jane's current research in the lab includes assessing the effect of biota (such as earthworms, fungi and bacteria) on soil susceptibility to erosion and runoff generation.

She has published her research interests extensively in books, peer-reviewed journals and articles

Further details can be found at: <http://www.cranfield.ac.uk/sas/aboutus/staff/ricksonj.html>

Q&A Why did you choose to become a Chartered Professional?

I was seeking a formal recognition of my competence as an environmentalist and of my commitment to keep up to date with advancing principles and practices in preventing environmental harm and enhancing environmental quality.

I also wanted to maintain my personal professional competence (e.g. continuing professional development) and improve my network of contacts in my specialist areas.

How do you feel that being professionally registered helps you in your career?

The formal recognition of chartered status demonstrates my professional credentials to potential clients and collaborators both within and outside of the university sector. The network of contacts really helps in seeking research and business opportunities.

Opportunities for CPD enhance my skills set and experience, which can aid career development.

What discipline areas have you worked in and which discipline area are you now working in?

I have been very fortunate to work in a number of trans-disciplinary areas throughout my professional career, including geomorphology, land resource planning and management, agriculture, civil engineering and soil science.

Recently, my specialist area of soil erosion has expanded to consider other forms of soil / land degradation, such as soil compaction and declines in organic carbon and biodiversity.

What makes your work important?

Soil provides us with vital goods and services such as the production of food; storage of rainwater, nutrients and carbon; shelter to a variety of living organisms; and protection of our cultural heritage.

Soil degradation processes such as erosion, compaction and loss of soil carbon threaten the ability of soil to carry out these functions, which are fundamental to human health and well-being.

What have been your main achievements?

I think my main achievement has been to develop and promote Cranfield's capability and expertise in soil science and management, in particular in the subjects of soil degradation and the approaches used to control these processes. This has been delivered nationally and internationally through teaching, research and consultancy.

I consider myself very fortunate to be able to apply my geomorphological scientific background in solving practical problems. I am proud to be a member of a team of dedicated and enthusiastic researchers, teachers and technicians.

How do you see your work developing in the future?

The forthcoming EU Soil

Name

Jane Rickson

Position

Professor of Soil Erosion and Conservation

Current Assignment

Research, consultancy and postgraduate teaching

Academic Career:

- BSc (Hons) in Geography (2i), King's College, University of London.
- Diploma of the Associateship of King's College (A.K.C.), London.
- MSc in Agricultural Engineering (Land Resource Management), Silsoe College (awarded full NERC scholarship).
- PhD 'The use of geotextiles for soil erosion control', Cranfield University.

Areas of Expertise:

- Soil degradation processes (especially erosion).
- Soil conservation.
- Use of vegetation for erosion control and slope protection (soil bioengineering).
- Soil erosion risk assessment.
- Use of geotextiles and soil conditioners for erosion control.
- Experimentation in erosion research, especially use of rainfall simulators.

Framework Directive (as proposed in the Thematic Strategy for Soil Protection) will transform soil policy and implementation throughout Europe, requiring better information on soil resources.

This makes it an exciting and challenging time for soil scientists, especially those of us involved with soil protection.

Any tips for those newly qualifying?

Networking is so important, no matter what stage of your career. Building up relationships early in your career will last throughout your working life.

Make time to read up-to-date journals, articles, web-pages to stay in touch and see how your work fits into the wider picture.

MEMBERSHIP ENQUIRIES

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MEMBERSHIP MATTERS

BRANCH REPORTS

WEST MIDLANDS BRANCH

Visit to Bomford Turner Ltd

24th November 2010

AT the kind invitation of Dr Geoffrey Davies OBE, Managing Director, Alamo Group Europe Limited, some twenty five members and guests of the West Midlands Branch attended the factory visit and assembled in the Board Room of Bomford Turner's Salford Priors factory, where they were warmly welcomed by Geoffrey and his senior staff, and invited to partake of some very excellent refreshments prior to a factory tour, to be followed by presentations in the Conference Room.

The role of the Bomford factory has changed since the Company became part of the Alamo Group and it is now designated Alamo Group Manufacturing Services, acting in effect as a sub-contractor both for Bomford Turner and for other Group companies in the UK. It was nevertheless a surprise to some 'old hands' to be confronted in the Assembly Hall by a McConnell Discaerator 3000, resplendent in its yellow and black powder-coated finish! Products of other Group companies were also much in evidence, one of which, Spearhead, is also based on the Salford Priors site.



McConnell Discaerator 3000 in course of assembly at Salford Priors

The factory layout has been altered to accommodate the needs of its new 'customers' but there have been no significant additions in recent years, despite a substantial and sustained increase in output over the period. All that is about to change, we were informed, and a major extension and refurbishment programme is in the advanced planning stage. The Branch was cordially invited to make a return visit to inspect the new extension and refurbishment when it is completed.

It was also of interest to note that the year 2010 marked the Centenary of the move of Bomford & Evershed Ltd from its original

base in the Atlas Works, Pershore, to the present site at Salford Priors.

Following the factory tour the visitors assembled in the Conference Room, where Geoffrey Davies, now an Institution member and proudly wearing the lapel badge, opened the proceedings by giving an outline of the scale and organisation of Alamo worldwide, of which Alamo Europe Limited is an increasingly important part.

Alamo companies in the UK are Bomford Turner, McConnell, Twose and Spearhead, plus AMS (Alamo Manufacturing Services Ltd), whilst in France the Group owns Rousseau, SMA, Faucheux, Rivard and Forges Gorce, the latter being a manufacturer of wearing parts. Alamo Inc in the USA operates as two divisions - agricultural and industrial, each of which comprises seven substantial manufacturing companies.

In addition, Alamo Europe has extensive contacts worldwide, both in the context of export markets and as sources of supply of parts and assemblies. Contact is established and maintained by frequent visits to Eastern Europe and the Far East, and there is also an Alamo company in Australia.

The highlight of the evening was without doubt Geoffrey's outstanding PowerPoint presentation in which he came down firmly in answer to his question: 'YES, the lure of exotic and emerging markets definitely IS worth the risk!'

Having said that, the central theme of his presentation was to emphasise the great difference between taking a calculated risk and gambling - the vital importance of careful planning, researching the prospective market, understanding the people and local customs to ensure that the right contacts were made and carefully cultivated, and at the same time taking care to avoid inadvertently giving offence.

As well as the positive exhortations, the audience quickly became accustomed to Geoffrey's 'Eleventh Commandment' - listing 'Thou shalt not . . .' actions, such as omitting to shake hands with everybody when in France, and similar social niceties elsewhere, that must be observed if relationships are to be built and nurtured.

A particularly fascinating aspect of Alamo strategy was its decision not simply to identi-



Geoffrey Davies gave the presentation - 'Exotic and Emerging Markets: Is the Lure Worth the Risk?'

fy and exploit a niche market sector that fitted its aspirations and capability viz. vegetation control, but to corner the market in selected territories by buying up the competition and then running their acquisitions as ostensibly separate and independent companies, preserving their individual identities and product ranges, their loyal customer base and their existing dealer network.

The benefit to the companies and to the marketplace of retaining the element of choice and competition, whilst discouraging new entrants to the marketplace and thus ensuring that virtually every machine of the type purchased in the territory is an Alamo product, in Geoffrey's opinion more than offsets the reduced opportunity to standardise and enjoy the benefits of scale in terms of production efficiency and lower overheads. That he has a valid point is surely borne out by the consistent success and profitability of Alamo Europe since the early 1990s.

Proposing a vote of thanks at the conclusion of proceedings, John Fox highlighted the fact that the remarkable success of Alamo Group Europe demonstrated once again that the current decline in the agricultural engineering industry was far from inevitable, and that a well-run British manufacturing company, with a capable and enthusiastic management who listen to, and meet, the needs of their customers can compete and win on the world stage.

The scale and worldwide extent of Alamo's operations had undoubtedly come as a revelation to many in the audience and Geoffrey's excellent presentation had cast much light upon how that had been achieved.

The proposition was carried with acclamation, and all present were agreed that the evening had been of great value and an exceptional event in the Branch calendar.

John Fox

WEST MIDLANDS BRANCH

Off-Road Capability - Turning Craft into Science

Presentation by Jan Prins, Technical Specialist, Off-Road Capability, Land Rover Limited

JAN Prins is Land Rover's Technical specialist with responsibility for delivering the attribute of Off Road Capability in Land Rover vehicles.

The presentation explained how Land Rover balances the demands of the Off Road Capability against the other important attributes of vehicle performance. In order to quantify capability the performance of the vehicles has to be measured and compared with the performance criteria set as part of the performance objectives for the new vehicle programme.

The Off Road Capability is defined for 7 primary surfaces which include Wet Grass, Mud and Ruts, Boulder Crawl and Snow and Ice.

Some aspects of Off Road Capability can be measured directly and may be dependant on the characteristics of the vehicle, be it geometry or specification. Other elements of capability are much more subjective and have to rely on subjective expert jury assessment.

Off Road Capability is split into two elements. The first consideration is the ability of the vehicle to cover a distance between two points. The second consideration is the way in which this

is done. This is referred to as 'Composure'.

The Off Road Capability attribute is further split into sub attributes which include such aspects as Control of speed, noise and driver effort in transitioning the surface in question.

Off Road Capability and sub attribute objectives are defined for new vehicle programmes and hence the performance of the new vehicle can be compared with its predecessor and competitor set.

There are a number of aspects of the vehicle which can be adapted in the process of tuning the Off Road Capability attribute. These include vehicle geometry - such as approach and departure angles and ground clearance.

Additional technologies can also be applied to the vehicle to assist in the deliv-



A Range Rover Sport being tested for sand traction in the Off Road Traction facility at Silsoe College

ery of Off Road Capability. Such applications include Hill Descent Control and Traction Control systems. A number of these technologies have been integrated into the Land Rover 'Terrain Response' System which applies different performance compromises for different Off Road Surfaces.

Evaluating and tuning of Off Road Capability takes place in a number of Real World and laboratory environments.

Laboratory and local test track work is carried out first followed performance evaluation in environments including ice and snow in northern Sweden, desert sand in Dubai and boulder crawl in the USA.

Jan gave us a fascinating talk about his area of specialisation which he clearly has a great deal of knowledge in and enthusiasm for. His talk opened the eyes of many of his audience to the detail and complexity of the delivery of this fundamental attribute for Land Rover.



A Range Rover on an ice lake track, northern Sweden

Stuart Martin

Manual on Small Earth Dams published

IAgrE member Tim Stephens has had his 'Manual on Small Earth Dams' published.

Tim said, "I am an irrigation engineer working mostly in Africa. In the 1990s, Cranfield Press published a handbook on dams written by me which was used by Silsoe College and also sold quite well.

"I have recently been employed by FAO in Rome on a longish contract and they asked me to re-write this book (which I had been planning to do anyway!). They have now published it in the Irrigation and Drainage series through their Land and Water Department and it has been produced

as a completely new book to a high standard of publication.

"The good news is that it is available from FAO Publications (or their representations around the world) free of charge as either a hard copy or as an electronic copy. It is presently being translated to Portuguese for use in Mozambique and elsewhere and a French version will eventually be produced as well. Most likely I will use it this year and next for training and practical work in Zimbabwe and Zambia."

Details of how to obtain a copy are contained in the flyer opposite.

FAO
IRRIGATION
AND
DRAINAGE
PAPER
64


Manual on Small Earth Dams

A guide to siting, design and construction

By Timothy Stephens

This publication aims to fill a void of practical guidelines for the construction of small earth dams. It presents readers with sound, reliable and practical source material to improve dam siting and design capacity in rural areas, to introduce a beneficiary and gender sensitive approach and to enhance safety and competence in construction. A section also provides convenient guidance on costing, drafting tenders and awarding contracts.


The manual is primarily aimed at technicians and others with knowledge of engineering and basic irrigation systems and processes to apply to the concepts, techniques and methods proposed, using simple and straight forward design and construction procedures.



Access the electronic copy at this URL:
<http://www.fao.org/docrep/012/11531e/11531e400.htm>

Or for a direct link to the book:
<http://www.fao.org/docrep/012/11531e/11531e.pdf>

Alternatively, contact Tim directly on:
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timothystephens@yahoo.com



FAO IRRIGATION AND DRAINAGE PAPER

SOUTH EAST MIDLANDS BRANCH

'Reducing Decibels and Making a Noise about Agricultural Engineering'

Presentation by Tony Turner, Chairman of GreenMech Ltd. on 13 December 2010

THIS was an interesting game of two halves as we were treated to an excellent technical lecture as well as a history lesson.

Tony started by recounting his apprenticeship which started aged 15 in 1949 with Bomford Bros Ltd, under no less a mentor than Douglas Bomford. He then talked us through the evolution of his various businesses up to his current role as Chairman of GreenMech Ltd.

Set up in 1993, the company's wood chippers are noted for their innovative design features and Tony outlined some of his more recent experiences marketing them around the world. His company now employs more than 60 people and has an annual turnover of close to £6m with 60% of their trade being international.

Tony's entertaining talk was interwoven with plenty of anecdotes - supplemented by comments from John Fox who accompanied Tony to the meeting. These were based on his personal experiences throughout his (very!) long career as an engineer and his involvement in developing a wide range of machinery over many years. His current company has received no less than 2 Queen's Awards - for exports and innovation. Tony is doubly proud of the latter, reflecting the pure engineer that lies within.

Tony explained how he became frustrated working for 'DR' (as Douglas Bomford was known), who apparently lost interest in ideas as soon as they were produced 'in the metal'. Whilst DR was always inventive and seemed to find a better way of doing things, he encouraged Tony to think outside the box. Perhaps too much so, because Tony quickly came up with ideas which didn't fit with DR's model.

Tony came up with a design for the first hydraulically-powered flail mower to cut roadside verges, but DR was still 'fond of belts' and didn't share Tony's enthusiasm for hydraulic drive.

He also failed to recognise the potential market of the Hydramower and turned down the opportunity to manufacture it in return for a share and royalties.

Cue Tony to leave Bomford's, having obtained funding (from his wife!) and borrowed facilities to develop his new invention himself, together with a tractor and Land Rover to demonstrate it. After his prototype was tested by Dorset County Council and he promised he could supply them with 6 machines (before he really had any manufacturing facilities!) this new approach attracted other County Surveyors, because



Turner Hydromower 23 – First Long Reach Mower

they saw that it would reduce the number of people required to clear verges.

SO, with the promise of an expanding market and confident in his own abilities and ideas, he made the jump and set up his own business, Turner Engineering in 1963.

The rest, as they say, is history. Within months, no more sickle-bar mowers were being bought by County Councils.

Turner's were the first company to design and manufacture a tractor mounted double side arm flail cutter, a principal now used around the world and after producing a range of other successful innovative machines - including the Turner Ranger vehicle (designed by Harry Ferguson Research, and which even appeared as a means of transport inside a huge tanker in a James Bond film), the 'Slurry King', being involved in developing the Dowler Gantry system and a reversible plough which was then developed by Roger Dowdeswell - the potential of this successful company was recognised when it was bought out in 1979 by Elswick (of Hopper bicycle fame).

This was another opportunity for Tony to get on his bike himself, and after he left the Elswick Board he soon saw an opportunity in another market. He formed GreenMech Ltd in 1993 to fill the gap in the emerging wood chipper market. By developing more robust designs with unique features such as disc blades, his machines have been well-received and widely sold in many different countries.

Elswick also bought out Bomford & Evershed in 1987 and merged into Bomford-Turner in 1988. This led to the marketing of Turner World Mowers and perhaps the company name Turner International originally introduced in 1978 imply thoughts of world domination, but in reality what has driven Tony on is his ethos and enthusiasm

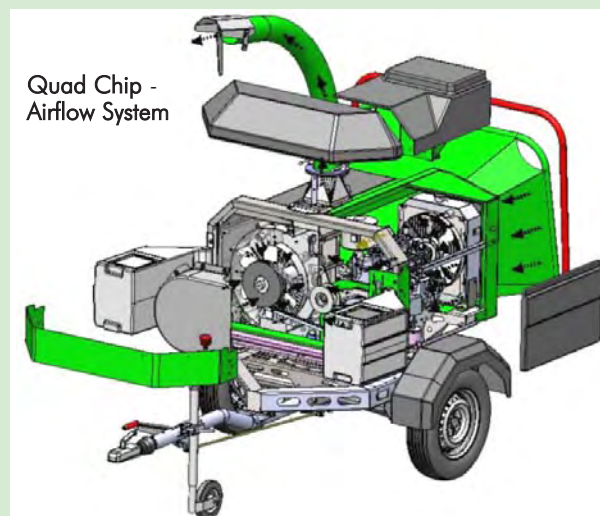
to identify and develop new ideas, clearly rooted in his initiation into engineering under the tutelage of DR.

THIS has also been recognised recently by the Health & Safety Executive (HSE), who invited Tony to speak at the launch of the new 'Buy Quiet' initiative in March 2010.

In the second half of his presentation, Tony described how wood chippers are one of the noisiest machines working in urban environments. They typically create noise in excess of 118 to 121 dB (LWA).

GreenMech exhibited their new concept of Hush-Chip wood chipper at Saltex in 2002 & 2004, but were clearly ahead of the times because nobody in the UK was interested. However, they did sell a few of these machines to Spain, Holland and France, where they have now taken off as their authorities are taking steps to reduce noise created by machines being used in inner city areas and driven by the reduction in landfill and burning of waste.

Noise levels from GreenMech's Quad-Chip machines have been reduced from 120 to 114LWA. This is a tenfold reduction in the emission of acoustic power, making it the quietest chipper in its class on the market today. This has also resulted in a reduc-



tion in noise at the operators position, from ~105dB to ~95dB. This is a huge reduction in the risk of deafness, but this still means that operators are still at risk and exceed the Exposure Limits prescribed by the Noise Regulations.

Tony has a personal objective of achieving 105dB overall but 110 is currently feasible, particularly on larger machines. However, this will require purchasers to recognise the benefits and be prepared (or be forced by regulators!) to pay for additional sound reduction measures - which would increase the cost of machines by 5-10%.

The engineering challenge is to overcome the physical parameters which limit the design. In particular the ideal maximum towing weight of 750kg imposed by driver licensing. The usual solution to reduce noise is to use or enclose machines in sound deadening materials, but this adds weight and retains heat within what is in effect a sealed box containing the engine and working components.

GreenMech's neat solution was to channel the cooling air up the discharge chute, which has the benefit of ejecting the chipped material further, thus allowing the flywheel and engine revs to be reduced - in turn further reducing the noise levels and fuel consumption. The epitome of a good engineering solution!

HSE's Buy Quiet initiative aims to raise awareness of designers, manufacturers, suppliers and purchasers of what can be achieved, across all industries. Tony was involved in the launch of the campaign, reflecting the innovation in his machines and he has been actively promoting this approach internationally.

TONY hinted at one secret of his success when he emphasised how important it is to listen to operators and mechanics.

For example, a throwaway comment by one European customer who suggested that to get access to slopes "you need to be like a mountain goat and have one leg shorter than the other". This led to Tony developing their

successful Safe Trak tilting tracked chippers capable of accessing and working on side slopes, eg railway embankments and motorways and the recipient of the Queens Award for Innovation. These machines now constitute a major part of their business.

Another innovative feature recently developed from discussion with users is the turntable chassis, which allows the inlet to be rotated towards the working position. This enables more efficient operation as well as enhancing safety, by allowing material to be fed into the machine from the safety of footpaths, rather than standing in the road and being exposed to the significant risk of being struck by vehicles.

Although still regularly globe-trotting on sales missions (including as far afield as Australia and New Zealand) and still actively involved in producing and developing his ideas, Tony has recently turned some of his boundless energy to working with a local High School, providing their pupils with opportunities to see how a manufacturing business and its factory operate, and introduce them to the technology and opportunities which exist in production and marketing.

Although he openly admits that he was not every interested in school himself, Tony is grateful for the solid grounding he received in engineering and is keen to pass this on. He has encouraged students to work with the factory to develop their own ideas and designs and get them interested in engineering as a career.

His latest range of wood chippers are developed using the Solid Works CAD system, laser cutting and CNC bending etc and he has demonstrated these highly technical facilities to students and enabled them to turn their own design projects into metal, eg in producing a trophy for the company.

However, although Tony is clearly passionate about this, it is not matched by the education system and this has been a frustrating process. Schools and teachers are driven to meet their targets to get students into universities. They think of working in a local factory as a lower class option than going to university. They also fail to recognise the potential of local manufacturers as a source of employment - let alone a career - for their students.

In typically forthright fashion, Tony described graduates as being 'ten a penny' and the real challenge UK manufacturers face is to get 16-20 year olds into the industry. He is saddened that his company's difficulty in attracting good quality young people is mirrored by tens of thousands of SMEs around the country and he was recently moved to write to Ministers to correct their misplaced assumptions.

However, as students realise that they will build up debts of £20k+ and perhaps have no job prospects at the end of their studies, a new approach is needed. 'Come back Apprenticeships', I think you hear Tony shouting.

So, in one evening, we were neatly taken on a journey from Tony's early days in engineering through the evolution of his various businesses; identifying and exploiting new ideas and niche international markets via development and marketing of his innovative ideas (by basing his business around batch production which allows trial and speedy introduction of new ideas); through to his efforts to promote agricultural engineering as a career.

I get the impression there is plenty of noise left in this Old Dog yet

Alan Plom



GreenMech's Safe Trak system

EAST MIDLANDS BRANCH

Winter visits

Garford's of Deeping St James & The Witham Group, Lincoln

OUR winter programme got off to a brilliant start with two meetings to well established companies offering their own forms of precision in engineering.

Garford's of Deeping St James started from humble beginnings, set well into fens, building single row sugar beet harvesters. Almost from a smithy/local engineer type start they

have grown through providing multi row harvesting equipment well suited to the heavier marginal end of sugar beet growing. Members visiting therefore were surprised to learn of a long developed export market with countries as far afield as Iran and South America.

Interest in the visit had really been hung around the company's steady development in the automated hoeing arena. From beginnings linked to Silsoe Research they have, in this country pioneered the use of video identifying rows and plants, now resulting in world wide sales of highly sophisticated image analysis linked to the

control of inter row hoes working in a variety of crops allowing forward speeds around 12km/h.

However the work has not stopped there. Now the visually guided principle has been developed to afford by image analysis the location of plants within the row allowing successful hoeing between the plants. Looking at the several videos of the hoes in use prompted several engineers visiting to utter 'mindboggling' and 'fantastic'.

So the visit confirmed many visitors careers experience from simple metal bending to amazingly futuristic forays into environmentally conscious mechanisation. Such

continued over

a long way from singling beet in the 60s! So check out their web site at www.garford.com and see the hoes in action.

A link again from humble beginnings was the second meeting to **The Witham Group** in Lincoln.

Local people know them best as Witham Oils having begun from the wonderful title of Witham Oil and Candle Company in 1921. The company is celebrating 90 years in 2011 and Nigel Bottom MD proudly introduced members to that fact throughout the evening.

Beginning with the manufacture of cycle oils and candles, their diversification has continued through the years to meet the continual higher specifications of lubricants within machinery and vehicles. They have acquired other companies including paint businesses in 1993 and 1996. Their business centres now stretch from Lowestoft, Soham and Lincoln but market products throughout the UK, though almost admitting

that they had not sought to be a National company.

Members were amazed to learn that this is a company who doesn't advertise at all with business resulting from word of mouth and a smattering of agricultural shows. Their client base runs from farms to the MOD and back to Sandringham to HM the Queen.

The Lincoln base covers 4.5 acres with a blending facility, laboratory, oils and paint storage which made a challenging walk through on a cold winter's evening. There was considerable interest shown in how the size of such a company could challenge the more commonly known majors in the oils industry.

The considerable detail covered by Nigel describing the engine, hydraulic and agricultural lubricants including products for gears, auto transmissions, greases as well as synthetics for horticultural and amenity use showed that the company was extremely flexible to react to both market and specifi-

cation change.

Members were treated to an update of the many terms used within the industry from American Petroleum Industry (API) specifications to the effects of Additives on Viscosity index and demands made during engine tests when certain parts were glowing red! Specification changes to suit developments in engineering were highlighted and the suitability of latest oils to early engines and equipment discussed. One member was delighted to find he could get a suitable product for his 1954 Triumph Tiger Twin motorcycle.

Witham Oils changed many members' views during that visit, not the least that a local company can and does compete through quality products. Fantastic technical support and a customer facing approach which certainly has secured markets for them. What of the next 90 years?

Bill Basford

EAST MIDLANDS BRANCH

Meeting to RBM, John Deere Dealers, Clarbrough, Retford

LTA - What does it mean to all involved?

MOST IAgrE branch members have a working knowledge of the Landbased Technician Accreditation (LTA) scheme administered by IAgrE as this has been running over some 3-4 years now. The East Midlands Branch felt that there would be benefit in meeting up in a Dealer's workshop to see just how the scheme really works.

Around 20 members met recently with RBM staff from several RBM depots lead by Peter Arrand, Operations Manager for RBM Agricultural Ltd and John Deere staff, both regional and Langar based.

Starting the evening off everyone present was asked to say who they were and what they were involved in. Quite a shock to some but an excellent reminder to demonstrate just what IAgrE is built on and that those present ranged from teenage work experience students, RBM workshop and parts staff, those from a multi-national company and then a full mix from IAgrE members.

Peter Arrand introduced the evening by outlining the origins of RBM, another starter from a humble market trader's stall.



Development of the group by dealer acquisitions to a brand new purpose designed facility at Louth were reviewed leaving a firm impression of a solid well developed dealer network offering a wide range of support over a wide range of products.

Neil Macer, Training Manager, John Deere Ltd UK then took the meeting through a practical and straightforward approach to the LTA scheme. Time was spent clearly illustrating how LTA stages were reached from levels 1 to 4. Emphasis was placed on the value of the LTA scheme to customers, the individuals concerned, the dealer and to John Deere. A detailed structure of training credits within the scheme was outlined and credit numbers appropriate to each level was indicated.

Of further interest was the level and type of training offered from the basics applying to most engineering, e.g. electrical and hydraulics at Levels 1 and 2 to extremely detailed training on specifics associated with Levels 3 and 4. Recent training courses attended by some present within the John Deere comprehensive training programme were reviewed e.g. linked to the forthcoming changes in fuels right through to updates associated with various products and detailed changes necessary in knowledge and support which had resulted.

Good examples were made through questions and answers with some of the RBM staff present as to length of service and LTA levels achieved. Peter Arrand then took the floor again emphasising how the scheme worked within RBM and their commitment to training of staff and costs involved. Detail shown of each of the five RBM depot's staff and LTA levels achieved alongside intake of apprentices was impressive.

1-2 apprentices were employed at



each depot and a good spread of LTA levels at each depot was emphasised. This raised questions of how customers viewed service through LTA grades and that not all employees would always get to the highest level but who offered highly valuable skills in several directions.

CPD was raised through questioning and the relevance of LTA members being within IAgrE and whether Branch meetings might offer value in that direction. RBM's approach in maintaining training records and highlighting each staff member's credits total confirmed the group's approach and commitment to the scheme.

After an excellent buffet courtesy of RBM, members had individual chances to question all staff present and to listen to what the scheme meant to them. This was done alongside several demonstrations of tractors and equipment under test. The skills and interpretive ability of technicians working the John Deere Service Advisor computer program was a highly impressive example of both modern technology at work but also of the obvious training completed and confidence of the individual for instance.

The meeting was a first for the Branch in meeting to note both the practical value of the LTA scheme and also to promote contact between IAgrE members and a modern dealer's staff. IAgrE members from other branches who attended left with ideas to

encourage other Branches to follow this lead which offered a highly valuable and informative evening.

Thanks are due to all the RBM and John Deere staff who participated and offered their experience so freely leaving everyone a superior opportunity for exchange better than any paper description of the LTA scheme.

Bill Basford

SOUTH IRELAND BRANCH

Bi-Annual Farm Machinery Show, Punchestown

THE Southern Ireland branch of the Institution of Agricultural Engineers took a stand at the Bi Annual Farm Machinery Show in Punchestown Exhibition centre (pictured below). The machinery show has graduated to a three day event which began on Thursday the 10th of February and finished on Saturday 12th of February.

The Institute of Technology in Tralee Co. Kerry together with the Salesian Agricultural College in Pallaskenry Co. Limerick decided to work together to bring aspects of education in Agricultural Engineering in the Republic of Ireland to the premier farm machinery indoor exhibition in Ireland. Both Institutions are involved in Agricultural Engineering since the early seventies and have worked closely together over many years to benefit trainees entering the Farm Machinery industry in Ireland.



It was decided that this show case would be an ideal opportunity for the Southern Ireland branch to be launched into the arena of the business of Farm Machinery in Ireland. Staff from both Tralee and Pallaskenry are members and were only too glad to man the stand over the three days.

The combination of advertising college courses to potential future students and their parents together with the steady stream of past students from both institutions that were handed out literature on the Institution of Agricultural Engineers kept us busy over the three days.

Many thanks to the students from Tralee, members of the Young Ag Engineers Society, who put up the stand on Wednesday afternoon.

I am pleased to report that the Institution of Agricultural Engineers was very well received indeed, especially by staff working in the industry. We hope that the work put in over the 3 days will benefit the Institution in the long run.

The picture below shows Alfie Cox IAgRE member and a great friend of both Tralee Institute of Technology and Pallaskenry College chatting to Michael Ryan, Secretary Southern Ireland branch. Alfie was joint owner of Tanco Engineering based in Bagenalstown Co. Carlow from its infancy to his retirement from active duty managing a premier farm machinery manufacturing business. Alfie is as busy as ever in retirement. He is



an adviser to Government Agencies supporting manufacturing in Ireland. Alfie also mentors students and start-up manufacturing companies in Ireland and has first hand knowledge of manufacturing in the far east. Alfie says that Agricultural Engineers never retire. I am of the same opinion.

Michael Ryan

OBITUARY

Seamus Martin Maguire BEng, MSc, EngD, AMIAgrE 1976 -2010

Dr Seamus Martin Maguire, sadly passed away aged 34, on Thursday 4th November 2010 at Belfast City Hospital Cancer Centre.

Seamus was born on 18th September 1976 in Co. Tipperary and lived in Omagh, Essex, Bedfordshire and Northamptonshire.

He obtained a First Class Honours Degree in Agricultural Engineering from Writtle College in 1999. This was then followed by

post-graduate studies at Cranfield University at Silsoe where he completed an MSc by Research degree project in 2000 to automatically vary the spacing of onion seeds to match the soil type and so help to improve the size uniformity of the crop. This was conducted in association with AGCO and Parrish Farms at Chicksands in Bedfordshire. A further study followed and in 2004 Seamus was awarded an Engineering Doctorate for his work on the development of novel methods to sense the weight and moisture content of large rectangular bales as they were discharged from AGCO balers.

Seamus was a member of the IAgRE from his student days at Writtle College, becoming an Associate Member upon graduation and was currently at Stage 1 for CEng Registration. He was awarded the New Holland International prize for the best engineering student of his year at Writtle College and the Gordon Shepperson Trophy by the South East Midlands Branch of the IAgRE in 2000 for his work on variable seed spacing.

On the completion of his Engineering Doctorate Seamus continued his graduate career by completing the Graduate Recruitment Programme at Perkins Engines, Peterborough. This enabled him to further develop his industrial engineering skills developed first as a student at Matbro (NI) and Dowdswell Engineering. Seamus thoroughly enjoyed his role at Perkins working his way to a Six Sigma Black belt and Project Team Leader for 3 cylinder engines.

Seamus had a kind and caring nature, with a natural willingness to help others. His love of tractors, enthusiasm for engines and anything mechanical will live on in his 2 year old daughter Niamh, who can already identify a Massey Ferguson from a John Deere! His hobbies included, travelling, gardening, DIY and walking.

Seamus will be missed by wife Alisa, daughter Niamh, father Seamus and mother Mae and sisters Teresa, Veronica, Sinead, Dymna, Paula and Siobhan and by his many friends and colleagues in our profession and industry.



Membership changes

Admissions

A warm welcome to the following new members:

Member

Davies G (Hereford & Worcester)
MacCulloch F (Scotland)

Student

Askham Bryan

Abbott J
Backhouse J
Beavers J
Buchanan B
Buckle D
Burton T
Claughan L
Gelder C L W
Gill A J
Groves D
Hardwick L R
Jones E I
Lavan P
Preston J
Slater J A
Tattersall J
Wagstaff C

Brooksby Melton College

Bicknell S
Brown D
Bryant L
Fletcher D
Fowler W P
Johnson N
King M
Smith J
Teague P
Watts T

Bicton College

Boon S
Budd N T
Chapple T
Cleave T
Francis B
Fish A
Hilsden T
Lane C
Merritt G
Novell G R
Peterhoses K M
Pritchard B
Rushbrook J
Short R
Stanesby M
Stumbles C
West S J

Harper Adams

Assanakis S
Brown J R
Cliff J
Copland W
Cox M
Dawson A W
Elvins L A
Evans P
Foster C E
Fountain M
Gibson A I
Godfrey D A
Greenwood O
Harford J
Harrison L A
Henderson A
Hollis J
Jeffrey R A
Johnson B
Kramenbrink E
Latta W
Marston C
Mason W R
May C
Melrose M
Menzies M
Miles A
Murphy M
Palmer M S J
Price T
Roberts S G
Round S
Scragg M J
Siddons J C
Silk J
Smyth C
Stainton H
Stephens S L
Stuart P J
Stuehmeyer E
Thorne M
Voutt N
Watson M J R
Watt A C
Whitehead F J
Williams L
Williams O
Woodage H S
Woolley J

Teagasc, Ireland

Murphy M D

*Kings College
London*

Chaudhri A

Deaths

Chilvers R (Cams)
Maguire S (Northants)

Transfers

Fellow

Sadler R W (Suffolk)
Martin J S (Oxfordshire)

Member

Ingram M H A (London)

Associate Member

Baron D (Lancs)
Baird D J (NI)
Clark I W (Fife)
Day J (Lincoln)

Associate

Biffen M T (Aberdeenshire)
Ray T (Coventry)
MacLellan J (Lincolnshire)
Worsley C R (Nottingham)

Long service certificates

Name	Grade	Date of anniversary
60 years		
John Shewring	IEng, FIAgrE	23 Jan 2011
50 years		
Martin Edward Nellist	CEng, FIAgrE	24 Jan 2011
Edward Hervey Elwes	IEng, MIAgrE	28 Mar 2011
35 years		
John Gwyn Bumby	MIAgrE	5 Feb 2011
David John White	CEng, FIAgrE	1 Mar 2011
William Waddilove	IEng, FIAgrE	2 Mar 2011
Brian Frank Fraser-Smith	FIAgrE	6 Mar 2011
Stephen Allen Clark	IEng, MIAgrE	6 Mar 2011
Robert Lockhart	MIAgrE	25 Mar 2011
John Frederick Scott	IEng, MIAgrE	25 Mar 2011
25 years		
Timothy Christopher Lansdell	CEng, MIAgrE	8 Jan 2011
Thomas Overbury	MIAgrE	8 Jan 2011
Stuart William Albert Glover	MIAgrE	10 Jan 2011
Catherine Gail Martin	AIAGrE	31 Jan 2011
Robert Ian Barker	AMIAgrE	10 Feb 2011
George Nicholas Foster	MIAgrE	20 Feb 2011
Karl Vicent Searson	AMIAgrE	20 Feb 2011
Gavin Peter Simons	AMIAgrE	23 Feb 2011
Ashley Hollingshead Knibb	AMIAgrE	26 Feb 2011
Andrew Donald Haslock	AIAGrE	28 Feb 2011
Jeremy Neil Short	CEng, MIAgrE	5 Mar 2011
Christopher James Cronin	MIAgrE	27 Mar 2011

Academic members

Askham Bryan College
Askham Bryan
York
YO23 3FR

Babcock International Group
Mere Way
Ruddington Fields Business
Park
Ruddington
Nottinghamshire
NG11 6JZ

Barony College
Parkgate
Dumfries, DG1 3NE

Bicton College
East Budleigh
Budleigh Salterton
Devon
EX9 7BY

Bishop Burton College
York Road
Bishop Burton
Beverley
HU17 8QG

Brooksby Melton College
Asfordby Road
Melton Mowbray
Leics
LE13 0HJ

Coleg sir Gar
Pibwrlwyd Campus
Pibwrlwyd
Carmarthen
SA31 2NH

Cranfield University
Cranfield
Bedfordshire
MK43 0AL

Easton College
Easton
Norwich
Norfolk
NR9 5DX

Greenmount Campus
CAFRE
22 Greenmount Road
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

Plumpton College
Ditchling Road
Lewes
East Sussex
BN7 3AE

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

Commercial members

Agricultural Engineers
Association (AEA)
Samuelson House,
62 Fodder Way, Hampton
Peterborough,
PE7 8JB

British Agricultural & Garden
Machinery Association
(BAGMA)
Entrance B, Level B
Salamander Quay West,
Park Lane, Harefield
Middlesex,
UB9 6NZ

Alvan Blanch Development
Co Ltd
Chelworth
Malmesbury
Wiltshire
SN16 9SG

Autoguide Equipment Ltd
Stockley Road
Hedington
Calne, Wiltshire
SN11 0PS

Bomford Turner Limited
Salford Priors
Evesham
Worcestershire
WR11 5SW

David Ritchie (Implements) Ltd
Carseview Road
Suttieside
Forfar, Angus,
DD8 3EE

Douglas Bomford Trust
The Bullock Building
University Way
Cranfield
Bedford MK43 0GH

FEC Services
Stoneleigh Park
Kenilworth Warwickshire CV8
2LS

Garford Farm Machinery Ltd
Hards Lane
Frognall
Deeping St James
Peterborough
PE6 8RR

Huntaway Consulting
Ivy Cottage
Torlundy
Fort William
Inverness-shire
PH33 6SW

John Deere Ltd
Harby Road
Langar
Nottinghamshire NG13 9HT

Shelbourne Reynolds
Shepherds Grove Ind. Est.
Stanton
Bury St Edmunds
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SSAB Swedish Steel Ltd
De Salis Court
De Salis Drive
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White Horse Contractors Ltd
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OX14 2JD



We want to hear from members.
Send branch reports or correspondence to:

The Editor, 25A New Street, Salisbury, Wiltshire, SP1 2PH.
Email: chris@nelsonpublishing.co.uk

Or the IAGRE Communications Officer, Marion King on pressroom@iagre.org

EVENTS

IAgrE Branch Meetings and Events

Wrekin Branch

Monday 21 March 2011

BRANCH AGM AND TECHNICAL TALK

Speaker: Peter Leech

Venue: Reaseheath College

For further details contact the Branch Secretary Graham Higginson

Tel: 01270 613230 Email: wrekin@iagre.biz

Northern Ireland Branch

Tuesday 22 March 2011

BRANCH AGM FOLLOWED BY PRESENTATION 'CONSTRUCTING LOW VOLUME ROADS OVER DIFFICULT TERRAIN'

Speaker: Henry Bouchier, Senior Consultant, ESBI Engineering

Venue: Drum Suite, Glenavon Hotel, Cookstown, Co. Tyrone

The technical presentation will deal with the techniques used to construct low use roads over difficult terrain, including peat and marsh ground, yet capable of achieving load capacities of up to 18 tonne per axle. For further details please contact the Branch Secretary: Ian Duff

Tel: 028 8673 6977 Email: duffi@iagre.biz

East Midlands Branch

Wednesday 23 or Thursday 22 March 2011- tbc

BRANCH AGM AND 'THE UNIVERSITY OF LINCOLN'S STRATEGIC DIRECTION & DEVELOPMENTS WITHIN LANDBASED ENGINEERING'

Speaker: Bill Meredith, Head of Agriculture and Landbased Studies, Riseholme College

Venue: Riseholme College, University of Lincoln, Riseholme Park, Lincoln LN2 2LG

An update of the University's strategic direction and developments within landbased engineering, including food processing and packaging. For further information please contact Branch Secretary Paul Skinner.

Tel: 01205 353754 Email: paulskinner57@btinternet.com

South East Midlands Branch

Monday 11 April 2011 starting 19:00

HYDRAULICS ON MOBILE EQUIPMENT

Speaker: Rexroth

Venue: Maulden Church Hall, Maulden, Beds

For further details contact the Branch Secretary John Stafford

Tel: 01525 402229 Email: john.stafford@silsoe-solutions.co.uk

West Midlands Branch

Tuesday 12 April 2011 starting 19:30

MODEC ELECTRIC VEHICLES

Speaker: Colin Smith

Venue: MODEC, Progress Way, Binley Industrial Estate, Coventry CV3 2NT

A visit to look at the design and manufacture of MODEC's specialised product. For further information and to book a place please contact Michael Sheldon

Tel: 01926 498900 Email: michaelcsheldon@yahoo.com

East Midlands Branch

Tuesday 10 May 2011 starting 18:30

SEVERN TRENT FARMS APPROACH TO: RENEWABLE ENERGY, ENERGY AND CARBON

Speaker: John Jackson

Venue: Severn Trent Farms, Stoke Bardolph, Nottingham

Visit to Severn Trent Farms, including a visit to the new digester facility For further information please contact Bill Basford on 01636 813412 or mob 07831 141622 or email: mechbasford@aol.com.

Alternatively, contact the Branch Secretary Paul Skinner.

Tel: 01205 353754 Email: paulskinner57@btinternet.com

South East Midlands Branch

Tuesday 17 May 2011 starting 14.30

FIELD TRIP TO ROTHAMSTED RESEARCH

Speaker: Chris Watts, Rothamsted Research

Venue: Rothamsted Research

For further details contact the Branch Secretary John Stafford

Tel: 01525 402229 Email: john.stafford@silsoe-solutions.co.uk

East Midlands Branch

Monday 06 June 2011 starting 19:00

COUNTRYSIDE MATTERS AND MANAGEMENT. LINK PROJECT ON EROSION FROM TRAM LINES ETC

Speaker: Alastair Leake

Venue: Allerton Project, Loddington House, Main Street, Loddington, Leicester LE7 9XE

Partners welcome. For further information please contact Bill Basford on 01636 813412 or mob 07831 141622 or email: mechbasford@aol.com. Alternatively, contact the Branch Secretary Paul Skinner.

Tel: 01205 353754 Email: paulskinner57@btinternet.com

Ireland Branch

Tues 23 November 2011 starting 19:30

RENEWABLE ENERGIES FOR THE AGRICULTURAL SECTOR

Speaker: Ag Eng Department, University College Dublin

Venue: FTMTA Headquarters, Nass, Co. Kildare

For further information please contact the Branch Secretary:

Michael Ryan

Tel: 00353 61 393100 Email: pallaskenryengineering@eircom.net

Other Events:

Friday 18 March 2011 starting 1400hr

Forest Research

DEVELOPING AN INTERDISCIPLINARY RESEARCH AGENDA ON FORESTS AND WOODLAND

Speaker: Prof David Clark (University of Glasgow)

Venue: Northern Research Station, Roslin EH25 9SY

An outline plan for a new research initiative at the University of Glasgow Dumfries Campus, focused on social, cultural and ecological perspectives. Seminar is FOC. Please advise Jordan Chetcuti if you are planning to attend.

Tel: 0131 445 6977 Email: jordan.chetcuti@forestry.gsi.gov.uk

Web: www.forestry.gov.uk/forestresearch

23 Mar 11 to 24 Mar 11

Cranfield University, School of Applied Sciences

ENVIRONMENTAL ANALYTICAL SCIENCE FOR NON-SPECIALISTS

Venue: Mitchell Hall, Cranfield University, Cranfield, Bedford, MK43 0AL

A 2-day in-depth course with lab demonstrations. It aims to fill the knowledge gap amongst scientists, engineers technicians working in the waste, soil, water environmental sectors who increasing 'intelligent client' for the procurement and review of analytical data. The 2 day course costs £570 (discounts are available for members of professional/trade associations, alumni and group bookings. For further information on course content please contact Keith Richards details (below). To book please contact Academic Operations Unit Tel: 01234 754176 Email: shortcourse@cranfield.ac.uk Tel: 01234 750111 x3302 Email: k.richards@cranfield.ac.uk Web: www.cranfield.ac.uk/sas

Tuesday 29 March 2011

Fusion Events

AGRICULTURAL BUILDINGS SHOW

Venue: National Agricultural Centre, Stoneleigh, Coventry CV8 2LZ
This Show is a unique event which brings together the UK's specialists under one roof. Here visitors can find out about all aspects of the industry from how to repair guttering right up to multi-million pound new installations. This year along with the well-respected seminar programme, new features will focus on providing practical advice and demonstrations on a wide range of related topics.
Contact: Andy Newbold
Tel: 0845 4900 142 Email: info@farm-smart.co.uk
Web: www.farm-smart.co.uk

Thursdat 31 March 2011

TSAE and KMITL

THE 12TH INTERNATIONAL CONFERENCE IN AGRICULTURAL ENGINEERING

Venue: Chon-Chan Resort, Pattaya, Thailand
Organised jointly by King Mongkute's Institute of Technology Ladkrabang (KMITL) and Thai Society of Agricultural Engineering (TSAE). For further information visit either website below
Web: <http://www.kmitl.ac.th/agrirng/tase2011/index.html>
Web: www.tsae.asia

05 April 2011 to 07 April 2011

Universiteit Stellenbosch

FOURTH FOREST ENGINEERING CONFERENCE (FEC) - 'INNOVATION IN FOREST ENGINEERING - ADAPTING TO STRUCTURAL CHANGE'

Venue: Protea Hotel, The Winkler, White River, Mpumalanga, South Africa
Organised by Dept of Forest and Wood Science at Stellenbosch University in conjunction with IUFRO, this event is a forum for forest engineers from around the world to share their knowledge, experience and emerging ideas. Early registration deadline: 31 December 2011. Late registration deadline: 31 January 2011. Abstract submission: 15 August 2010. For further information contact: Hannel Ham
Email: hamh@sun.ac.za

Tuesday 10 May 2011

IAgrE

DIESEL ENGINES - THE FINAL FRONTIER

Venue: The Auditorium, Vincent Bldg, Cranfield University, Cranfield, Bedford, MK45 0AL
A conference to understand current and forthcoming off-road diesel engine emissions legislation, new technologies and the impact of Stage IIIB (Interim tier 4) and Stage IV (Final tier 4) on engine manufacturers, fuel and oil suppliers, equipment manufacturers, service-

ing dealers and end users.

Tel: 01234 750876 Email: conferences@iagre.org

Web: www.iagre.org

Friday 13 May 2011 starting 1400hr

Forest Research

INTERACTIONS BETWEEN DEER BROWSING, WOODLAND MANAGEMENT AND HABITAT QUALITY FOR BIRDS

Speaker: Rob Fuller (BTO Director of Science (Ecological Change))

Venue: Northern Research Station, Roslin EH25 9SY

Seminar is FOC. Please advise Jordan Chetcuti if you are planning to attend.

Tel: 0131 445 6977 Email: jordan.chetcuti@forestry.gsi.gov.uk

Web: www.forestry.gov.uk/forestresearch

Thursday 19 May 2011

IAgrE

YOUNG ENGINEERS COMPETITION

Venue: tba

Given a set of standard wheels, a battery and maximum dimensions, entrants have to create a remote or radio controlled vehicle to produce the best performance on a standard test track.

Tel: 01234 750876

Email: sylvia@iagre.org

Web: www.iagre.org/yecomp.shtml

25 May 2011 to 26 May 2011

British Science Association

2011 SCIENCE COMMUNICATION CONFERENCE

Venue: Kings Place, London

The conference addresses the key issues facing science communicators in the UK and each year brings together people who are involved in public engagement - a diverse group of people. An opportunity to network and share ideas. For further information visit the British Science Association website.

Tel: 020 7019 4938 Fax: 020 7581 6587

Email: amy.lothian@britishscienceassociation.org

Web: www.britishscienceassociation.org

29 September 2011 to 30 September 2011

Soc for Engineering in Agriculture (SEAG)

'ENGINEERING IN AGRICULTURE - DIVERSE CHALLENGES INNOVATIVE SOLUTIONS'

Venue: Hotel Grand Chancellor, Surfers Paradise, Gold Coast, Queensland, Australia

This event is the 2011 CIGR International Symposium of the Australian Society for Engineering in Agriculture. The theme will include: irrigation, water and environmental management; post harvest technologies and processing; Structures, equipment and environment; Power & Machinery; Precision agriculture and livestock management; Plant production and handling; Information management. There will be associated meetings and workshops and a pre-congress tour including a conservation agriculture field on 27 and 28 Sept. Early Bird booking til 29 April 2011 Symposium Secretariat - Engineers Australia

Tel: 02 6270 6563

Email: seagconference@engineersaustralia.org.au

Web: www.seagconference.com.au

If anyone is interested in car sharing to any of these events you can liaise with fellow members by using the discussion forum in the Members Only section of the IAgrE website - www.iagre.org/memaccess.php

Conference 2011



Diesel Engines – The Final Frontier

A CONFERENCE FOR ALL SCIENTISTS, ENGINEERS AND MANAGERS WITH AN INTEREST IN OFF-ROAD DIESEL ENGINED VEHICLES

Current and forthcoming off-road diesel engine emissions legislation, new technologies and the impact of Stage IIIB (Interim tier 4) and Stage IV (Final tier 4) on engine manufacturers, fuel and oil suppliers, equipment manufacturers, servicing dealers and end users will be discussed.

The Conference will be of interest to all those involved with:

- the installation of engines in to whole machines
- transmission integration
- filtration issues (air and fuel)
- fuel supply and storage

The conference, to be chaired by Mike Hawkins formerly of CNH and current President of EUROMOT, will feature noted speakers from across the industry and will cover the impact this legislation will have on:

- Future trends in diesel engine design
- Users (fuel, lubricant and fuel systems, fuel specification (low sulphur for off-road use) and storage issues)
- Installers (design installation and transmission matching issues)
- Manufacturers (sales and after-market issues)

Speakers, organisations and topics will include:

- Future trends in diesel engine design
- SCR to achieve Tier 4 compliance
- John A. Radke (Manager, Worldwide Customer Support – John Deere Power Systems) The EGR Route
- Carl Stow (Senior Scientist - Crankcase Lubricants Industry Liaison Shell Global Solutions) - *Fuels and Lubricants – The Impact for Tier 4 off highway engines*
- Roger Weyman (Director - Business Development Torotrak Plc) The Challenge of integrating transmissions to achieve improved energy efficiency and reduced levels of emissions for Tier 4 compliance.

Plus speakers from: Rexroth Bosch, Sauer-Danfoss and Parker-Racor on topics ranging from “Instrumentation and control of the drive chain” to “Fuel and air filtration challenges for Tier 4 compliance”

LANDWARDS™2011

Conference

May 10th

Venue:

**Cranfield University
Cranfield**

For further information, please contact:

IAgrE Secretariat:

conferences@iagre.org
01234 750876

For online booking, please visit

www.iagre.org

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

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body of the Society for
the Environment*

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