Landwards

Agriculture • Horticulture • Forestry • Environment • Amenity

YOUNG ENGINEERS COMPETITION

Reaseheath ramp up their challenge

PROFILE: DAN MASSEY

LTA4 technician now on IAgrE Council

FORESIGHT REPORT

Response by Alex Keen to the Future of Food and Farming

IAgrE Professional Journal www.iagre.org Volume 66, Number 3 Autumn 2011

Biosystems Engineering

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

IAgrE

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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 109, Issue 3, July 2011, Pages 175-185

Use of fluorescence imaging as a hygiene indicator for beef and lamb carcasses in UK slaughterhouses

Dean Burfoot, David Tinker, Robin Thorn and Mary Howell

Campden BRI, Chipping Campden, Gloucestershire, UK
David Tinker & Associates, 17 Chandos Road, Ampthill, Bedford, UK
Food Standards Agency, Aviation House, 125 Kingsway, London, UK

Faeces from cattle and lamb contain products of digestion of chlorophyll that fluoresce. A hand-held fluorescence imager was used to detect faecal contamination on carcasses in beef and lamb slaughterhouses. On beef carcasses, almost all contaminants were found along the legs and the ventral cut line with most being faecal (62%); 36% were hairs, and 2% were other contaminants, such as rail grease. The average number of incidents of contamination per beef carcass was 23. There were significant differences in contamination levels at different slaughterhouses. Carcasses from young cattle showed lower occurrences of contamination than those from older animals. The average number of incidents of contamination on lambs was 25 per carcass. Most of these contaminants were found on the hind legs, breast and sides of the neck. It was concluded that fluorescence imaging could be used as part of an in-plant monitoring system for carcass hygiene

Volume 109, Issue 2, June 2011, Pages 148-157

Ammonia and greenhouse gas emissions from slatted and solid floors in dairy cattle houses: A scale model study

José Pereira, David Fangueiro, Tom H. Misselbrook, David R. Chadwick, João Coutinho and Henrique Trindade

Instituto Politécnico de Viseu, Quinta da Alagoa, Portugal
Instituto Superior de Agronomia, Lisboa, Portugal
Rothamsted Research, North Wyke, Okehampton, Devon, UK
Universidade de Trás-os-Montes e Alto Douro, Vila Real, Portugal

Dairy cattle are usually housed in naturally ventilated houses where removal of excreta is periodically performed. The aim of this controlled study was to compare the effect of two floor designs and three air temperatures (5, 15 and 25°C) on NH_3, N_2O, CH_4 and CO_2 emissions arising from cattle excreta deposition to the floor. Two scale models were built to simulate a level solid floor without urine drainage, and a slatted concrete floor. Emissions of NH3, N2O, CO2 and CH_4 increased significantly with air temperature with both floor type models and emissions of NH_3, N_2O and CO_2 were significantly greater from the solid floor relative to the slatted floor at all temperatures considered. Cumulative greenhouse gas emissions (as CO_2-equivalents) increased significantly with temperature but did not differ between the floor types.

Volume 109, Issue 1, May 2011, Pages 15-21

Environmental impact of catalytic converters and particle filters for agricultural tractors determined by life cycle assessment

G. Larsson and P.-A. Hansson

Swedish University of Agricultural Sciences, Box 7032, SE 750 07 Uppsala, Sweden

Stricter emission standards have resulted in great reductions in emissions from new vehicles. However, the long life time of tractors means that emissions from older vehicles remain substantial. One way to reduce these emissions is to retrofit catalytic converters, but the manufacture and use of catalytic converters consumes resources and slightly reduces engine efficiency. Life cycle assessment (LCA) can be used to determine their full environmental impact. Three after-treatment options were considered: no retrofit; a diesel oxidation catalyst (DOC)/diesel particulate filter (DPF) system; and a selective catalytic reduction (SCR) catalytic converter. Two vehicle usage patterns were considered, one following the legal test cycle (used for all off-road vehicles) and one corresponding to average agricultural tractor usage.

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Landwards
Agriculture • Horticulture • Forestry • Environment • Amenity

VOLUME 66 Number 3 2011

THIS ISSUE

EDITORIAL

LTA needs momentum

Great ideas excite, successful ideas are applauded, an industry is stimulated when solutions are found to a problem or issue that seems to be holding it back.

So it was with the challenges of finding sufficient, well-trained and motivated staff to support the growing complexity of machinery and equipment needed to farm the land efficiently

Thus the LTA scheme, launched almost four years ago, was an inspired and workable answer to challenges that are age-old.

But to work effectively, the scheme had to bring together all the partners involved. Manufacturers, dealers, and most particularly colleges.

In essence, an industry-wide scheme that provides recognisable accreditation provides many benefits. Careers prospects, structured training and customer reassurance amongst them.

But the problem is that most of the parties involved have different agendas and operate to varying dynamics and timescales.

It never was intended that the scheme should only seriously engage three of four major manufacturers - yet that is what has happened.

The colleges are having to fight funding battles on all fronts so the provision of credible training, supported by appropriate equipment and facilities was always going to be an issue.

And what about the customer's confidence in our industry?

The *Farmers Weekly* ran a major feature recently in which a 'doomsday scenario' was suggested whereby expensive and complicated kit could be lying idle for the want of qualified technicians to repair it.

I think that is an over-blown suggestion but if it acts as a wake-up call, then it has served its purpose.

The building blocks for LTA to become THE recognised standard across our industry are in place. The will is there as are the resources (stretched though they might be).

What is needed now is momentum, a shove here, a push there, to get the LTA bandwagon rolling.

One of its problems is identity. Who 'drives' LTA? More importantly, who speaks for it?

These two issues must be top of the agenda for the industry if LTA is to achieve that much needed momentum.

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The views expressed in Landwards editorial are those of the Editor, and do not necessarily reflect those of the Institution

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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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Engineering Council fires up IEng promotional campaign

FOLLOWING a preparatory phase involving research, discussion and careful planning, the Engineering Council's (EngC) promotional campaign for its Incorporated Engineer (IEng) professional qualification is now well underway.

The campaign has been developed together with the Professional Engineering Institutions (PEIs) to raise the profile of IEng, as well as increasing awareness and understanding of its value to individuals, employers, the profession and society as a whole.

I AM PROUD TO BE AN IEngineer

At their request, one of the first priorities has been to involve existing IEngs. As the EngC research has shown how much IEng registrants value their professional qualification and the role it plays in recognising their competence, commitment, and professional standing within the engineering profession, all existing IEng registrants have been sent, through their institution, a special 'logo' designed especially for use with their email signatures. This shows the message *'I am proud to be an IEng'* which, as suggested by the research, reflects the pride felt by those who manage to successfully qualify.

Other creative materials and messages have been developed for use in a variety of channels, all based on the same 'I am' theme, which makes strong, clear links between being a professional engineer and being an IEng.

"The campaign is purely setting out to ensure that the value of registration as an Incorporated Engineer achieves the recognition and standing similar to that which is enjoyed by those with CEng status, " said Jon Prichard, CEO of the Engineering Council "We would also like to dispel some of the myths that seem to surround IEng, many of which were based on misconception and prejudice."

LAND.TECHNIK invites participants to share ideas

International conference takes place 11-12 November, Hannover

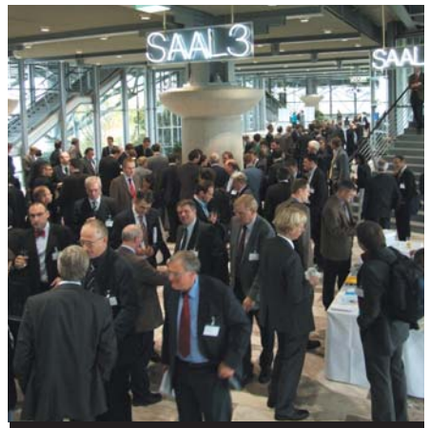
THE 69th International Conference LAND.TECHNIK - AgEng 2011 which will take place in Hannover on November 11 and 12, 2011, once again invites participants to share their ideas about the latest results from the areas of product development and research in agricultural engineering.

This year's theme will be '*Solutions for Intelligent and Sustainable Farming*', and the focus will be the future challenges regarding to the production of food and bio-energy under tight ecological and economical border conditions. It addresses the aims to increase productivity of machines and processes with less input of energy, better availability and extended machine life.

This leading international conference on agricultural engineering, which is staged as a prelude to the Agritechnica trade fair for agricultural machinery, is organized by VDI Wissensforum. The conceptual sponsors are the Max Eyth Society for Agricultural Engineering (VDI-MEG) and the European Society of Agricultural Engineers (EurAgEng).

The program, which includes 75 presentations by speakers from industry and research, will showcase the latest developments in power train, electric drives and mobile hydraulics in tractors and agricultural machinery, electronics, software engineering and data handling. Other focuses will cover harvesting technology and sowing as well as sensors and applications in automation, new developments in precision farming and field robots.

The organisers also expect presentations to be made at the plenary session by Markwart von Pentz, President of the Agriculture & Turf Division at Deere & Company and Professor Heinrich Flegel, Member of the Supervisory Board, Daimler and Chairman of the European Technology Platform 'manufuture'. The conference language will be English.



'Solutions for Intelligent and Sustainable Farming' is the theme at this year's LAND.TECHNIK

Registration and program at *www.vdi.de/landtechnik-ageng* or Tel: +49 (0) 211 62 14-201

EurAgEng information: *www.eurageng.eu*

Good attendance for e-Agri workshop

DAVE TINKER reports from Manchester

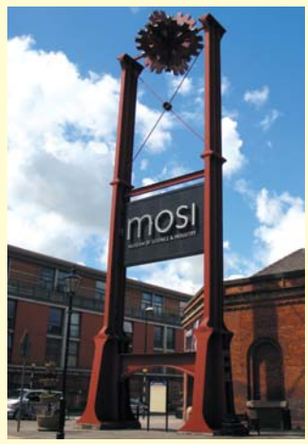
A TWO-day e-Agri workshop in July, '*Preparing the way for Europe*', was attended by 100 delegates at the Museum of Science and Industry in Manchester (pictured).

Following a keynote talk from Sir John Beddington there were talks on EC and UK research and funding initiatives.

The delegates were split equally between industrial / commercial, academic and funder/government. About 90% were from the UK with IAgrE and EurAgEng well represented.

The delegates formed six groups to consider the factors that related to the challenges of water and food provision for the 2030 horizon. When collated the results from the groups will be available to inform future funding opportunities but soil and water was a topic that was close to the top of everyone's list. Keep an eye on *Landwards* for the results and more details.

Manchester University's School of Electrical and Electronic Engineering established the e-Agri ('smart agriculture') research initiative to integrate advanced research in ICT, sensing, electronics, control and power systems to benefit global agriculture and food security.



Awards presented at graduation ceremony

IAgrE and DBT award Cranfield students

ABOVE LEFT: Kate Loten (nee Wright) receives the Douglas Bomford Trust prize from DBT representative Paul Miller. And ABOVE RIGHT: Piotr Osinki is presented with the South East Midlands branch Shepperton Memorial prize by IAgrE Fellow, Tim Chamen

THE high standard of students on Cranfield University's MSc Land Management programme was recognised recently at the university's graduation ceremony.

The Institution accredits the Land Reclamation and Restoration, and Soil Management options of the MSc Land Management course at Cranfield University. Amongst a strong cohort, Kate Loten (nee Wright) won the Douglas Bomford Trust prize for the best student across these two options of the 2009-10 course. Paul Miller, representing The Douglas Bomford Trust presented the award to Katie at the June ceremony.

One of Katie's lecturers' Iain James, commenting on her work about the effect of grass roots on soil gas concentration dynamics said, "Katie has the combination of being intelligent and hard working - making her the ideal student for this project. She was also a good self-manager so led her project with supervision as opposed to hand-holding."

On receiving the award Katie said, "It is so wonderful that a charity like the Douglas Bomford Trust is willing to support and reward young people just starting out in the land-based sector. It was great to know that all my hard work and toil over the year had been worthwhile.

"In terms of the course it was fantastic. It was one of the hardest yet most rewarding experiences I have had so far and I am in no doubt that the skills and knowledge that it has provided me with have been directly responsible for securing my current job The friends I made there, both students and staff, will be links to all aspects of the industry for life and the support of colleagues was unfaltering."

Katie is following a family tradition, as dad Phillip, an IAgrE member, won the Institution's Michael Dwyer award in 2000 as well as an award for his contribution to the landbased sector in 2009. Phillip is the director of Wright Resolutions Limited, a design consultancy specialising in agricultural cultivation and establishment machinery.

> "... It's so wonderful that a charity like the Douglas Bomford Trust is willing to support and reward young people just starting out in the land-based sector"

IAgrE Fellow Tim Chamen, also presented the South East Midlands branch Shepperson Memorial prize to Piotr Osinki, at the ceremony. Piotr who studied the Soil Management option of the course was awarded the prize for the best thesis applying engineering applications to agriculture. Piotr's thesis focussed on '*Guidelines for assessment of slope stability in small earth structures*.'

Through the Institution, the course is recognised as contributing to professional assessment towards CEnv status through the Society for the Environment.

The course takes a holistic approach to land management, bringing together new scientific understanding of environmental processes with relevant engineering and management skills. These skills are then used to develop new integrated land management solutions at relevant scales, including field, city, catchment, national and global.

Additional options on the programme include Ecological Conservation and Natural Resource Management. Further information is available from the website -

www.cranfield.ac.uk/sas/landmanagement

Harper students join IAgrE Council

EAGER to encourage younger people and fellow students to sign up for IAgrE membership, four Harper Adams students have joined Council with a mission to increase membership and encourage more involvement from younger people in the Institution.

Rob Fillingham who is studying for a Master's in Off road Vehicle Design (MEng ORVD), and has just completed his fourth year said, "I feel that by becoming a student representative on Council I can do my part in helping close the gap between the older and younger generations, to make this high tech industry more in touch with the needs and aspirations of its future recruits."

Rob also wants to ensure that the voices of student members are heard by the committee and wants to help improve the methods of electronic communication, such as Facebook, with younger and future members.

Jamie Venables, who is currently in his third year of a BEng Agricultural Engineering degree has been secretary of the student IAgrE branch at Harper and has enjoyed organising visits, talks and making contact with guest industry speakers.

"As a Council member, I would like to voice the opinions of the next generation of the industry and improve the links between industry and students in all areas of engineering," said Jamie.

Third year student, **Alex Skittery** is studying for an MEng in Agricultural Engineering and is currently working his placement as a design engineer for McConnel.

"Since the end of my first year I have been chairman of the Wrekin IAgrE student branch. One of my lecturers encouraged me to put my name forward and while on the Council I would like to try and encourage young people to join up by helping to organise talks and events which will be current and interesting to younger members," said William.

The fourth recruit is **Toby Whatley** who is studying for an HND in off road vehicle design.

Medal of Excellence for Brooksby student

A STUDENT from Brooksby Melton College (BMC) has won a City and Guilds Medals for Excellence award.

James Marks, a Level 3 NVQ in Landbased Service Engineering student, was nominated for the award after his tutor, Phil Spencer, submitted James' portfolio earlier in the year. This is his second Medal for Excellence award, after receiving one for his Level 2 work last year.

The medal was presented to James at City & Guilds award ceremony, The Lion Awards, earlier in the year at the Camden Roundhouse in London. The evening ceremony is a prestigious annual awards show and acts as the grand finale to the annual City & Guilds Medals for Excellence programme.

From a farming background, James has developed skills in maintaining, repairing and diagnosing fault in a wide range of agricultural machinery, becoming a competent technician. James was nominated for the award while working for Cornwall Farm Machinery near Penzance.

James was also put forward for an additional award, The People's Choice, but lost out to another Medals for Excellence winner.

•JOHN O'Conner (GM) Limited, a grounds maintenance business established in 1969, has become the first organisation to be awarded Investors in People accreditation by Lantra Sector Skills Council, the land-based and environmental Investors in People Centre.

First two DBT PhDs completed at Harper Adams

Projects investigated two different ag eng issues

DR Leticia Chico-Santamarta and Dr Ianto Guy have completed two PhDs sponsored by the Douglas Bomford Trust.

The projects investigated two different agricultural engineering issues. The first studied the production, storage and combustion of fuel pellets from oilseed rape straw, and the other the flow of torque in the transmission of four-wheel drive tractor using novel torque sensors.

Dr Chico-Santamarta, whose project was also sponsored by Claas Stiftung and Harper Adams said, "I feel extremely relieved to complete it. Doing a PhD is a very hard process and during the three years that I studied, I don't think there was a day where I didn't think about it.

"I'm very thankful to all three of my sponsors; otherwise the project wouldn't have been possible."

Dr Chico-Santamarta has recently commenced her role as Postdoctoral Researcher in Sustainable Technologies at the University College, continuing her research and also lecturing.

Dr Guy's project studied the effect of the differences in the relative speeds of the front and rear wheels of a four-wheel drive tractor on its tractive efficiency. It was also sponsored by power technology specialists, ABB of Sweden, who developed the torque sensors used in the project.

L-R: Dr Ianto Guy; James Ward; Dr Chico-Santamarta; Professor Dick Godwin; Dr Paula Misiewicz

Dr Guy, who now lectures in the Engineering Department at the University College, said, "While completing my PhD, I discovered some interesting, unexpected behaviour in the way power flows through the transmission.

"The project also demonstrates for the first time the use of ABB's Torductor technology in an off-highway application, this is a significant step in the development of the study of four-wheel-drive transmission behaviour.

"I am extremely grateful to the Douglas Bomford Trust for their support in completing my PhD, and also to Ray Clay, my Douglas Bomford Trust mentor, who has been extremely supportive and helpful throughout the project."

The Douglas Bomford Trust, a charity that enables the advancement of engineering for agriculture and land-based industry, co-funded the two PhDs, which were completed by Dr. Leticia Chico Santamarta and Dr. Ianto Guy.

Dr Paula Misiewiz, now a lecturer at Harper, was also funded by DBT for her PhD at Cranfield Universty, and James Ward is currently a DBT funded PhD student at Harper.

Membership Secretary, Wendy Hickman, retires

WENDY Hickman (pictured right), IAgrE Membership Secretary since 2000, retired at the end of August.

Wendy has seen the Membership Department through many changes-SARTOR and UK Spec regulations with the Engineering Council, the start of registrations with the Society for the Environment and latterly the setting up of the LTA and LTA-MEA schemes. 'It has been a really interesting role and I will miss all the friendly people from IAgrE', said Wendy.

A farewell lunch, with presentations to Wendy, was held after the Membership Committee meeting on 1st September. Wendy and her husband Mick will be heading for Australia in the autumn to visit their son and family.

The IT crowd

CEO VIEW

IT is well known that IT projects run over budget and behind schedule. The new IAgrE website is no exception.

We have had many excuses including an office move and changes to the IAgrE IT system, both of which obviously took higher priority and, in terms of IT implications, proved that the law of unintended consequences is not one that can be ignored.

For those of you not familiar with this law, (if you are not then what a charmed life you must have led!), the law states that there are usually three types of consequences - positive, negative and perverse. It would be fair to say that IAgrE has suffered from all three with the negative and perverse far outweighing the positive.

Added to this, in the interim, we have also outsourced our IT management to Total-IT. The complexities (if not the functionality) of our systems have exceeded the abilities of the in-house team (I include Mike Hurst in this) to manage and so we felt it prudent to take this decision. This has brought its own challenges but at least our support team are only a short walk (or bicycle ride) away being on the Cranfield Technology Park.

And so back to the website.

We took the decision, at the outset, to use a content management format which would enable Branch and Group officials to update their own sections as well as the Secretariat. This means that with suitable permissions, nominated officials may update meetings information, upload images and develop their own on-line communities.

There is a new forum area. This is, we feel, a lot more friendly than what went before and we hope that you will make use of this to bring the disparate IAgrE community closer together.

There will be new log-in arrangements. Your username will now be the first four letters of your surname together with your birth date day and month in dd mm format. Your password will then be your IAgrE membership number.

The launch of the new site is impending. We hope that it is up and running when you receive this copy of *Landwards*. If it is not, please be patient.

Back to the law of unintended consequences. Perhaps politicians should be forced to attend a week long seminar on the subject (on expenses of course) to understand that decisions such as -

- the one to close SRI
- permitting planning for housing on productive land

- fly in the face of what many of us ag-engineers (and thankfully others) see as common sense.

Christopher Whetnall

Landmark agreement

BASIS and the Environment Agency have signed a landmark Memorandum of Understanding, formally recognising more than 30 years in which the two organisations have worked together to raise standards in the pesticide supply and advice sector.

L-R: David Jordan of the Environment Agency with Rob Simpson BASIS md

Signing the agreement which includes a data sharing section, David Jordan, Director of Operations at the Environment Agency said, "We work closely and co-operatively with trade groups and businesses to find more effective ways to protect the environment. This partnership with BASIS supports our work to prevent diffuse pollution and improve the quality of the natural water environment, our rivers, estuaries, coasts and groundwaters."

Advanced Apprenticeship in Landbased Service Engineering

Graduating from the Claas room

THE latest group of students to complete the CLAAS Apprenticeship received their awards in a Graduation Ceremony held recently at the CLAAS UK headquarters at Saxham, Suffolk.

The five graduates, who have all qualified with an Advanced Apprenticeship in Landbased Service Engineering (NVQ Level 3), in addition to qualifying for LTA2 status, received their graduation certificates from Clive Last, Chairman of CLAAS UK.

Due to the disruption of their studies at Writtle College, the group concluded their studies with the considerable support of Barony College in Dumfries.

Subsequently CLAAS students study for their apprenticeship at either Reaseheath College in Cheshire, or on the course provided by Barony College for students in the north of England and Scotland.

The students were the last group from CLAAS to study for the Advanced Apprenticeship in Landbased Service Engineering, as the company has now adopted the new National Diploma in Land Based Technology, which is seen as a practical hands-on alternative to 'A' Levels.

L-R: Tom Gutteridge (Manns, Saxham); Ben Munford (Manns, Saxham); Tom Joyce (Vaughan Agri, Dorchester); Lee Clarke (Manns, Halesworth) and Tom Laird (Marsh, Ulceby Cross).

Having completed this first stage in their agricultural engineering education, the graduate students will have the opportunity to take their training a stage further by aiming for CLAAS Master Mechanic status for specific products, before potentially progressing to the higher Master Technician level.

On achieving these higher levels, this will also accord the technicians the relevant higher LTA3 and LTA4 accreditations.

CLAAS have been one of the manufacturers at forefront of the development of the LTA scheme in the UK. They currently have 390 technicians registered, including 32 at the highest LTA4 level.

• *THE IAgrE Council's next meeting will be held on 27 October at Claas UK's offices in Saxham.*

John Palmer, Training Manager at Claas UK,will give a presentation on three interrelated developments: Telematics; GPS / Guidance Steering systems; and Remote diagnostics.

This will be followed by IAgrE President Peter Leech leading a discussion on 'Where are the technicians of the future going to come from when so much of the equipment of today (and tomorrow) will have increasing levels of technology embedded within IT?'

OBITUARY: John Weeks, HonFIAgrE, CBE, Former Chief Agricultural Inspector

JOHN Cecil Weeks, HonFIAgrE, CBE, Chief Agricultural Inspector from 1968 to 1980 has died at the age of 93.

John was a very active person throughout his life, until he suffered a fall and stroke on 1 December 2010. Sadly, he never recovered and died peacefully at his care home in Chatteris, Cambs, on 20 June 2011, aged 93.

He was the son of a Somerset farmer and before becoming a (very) civil servant, he saw distinguished war service in the Devon Regiment and the Royal Artillery.

After the war, John joined the new Ministry of Agriculture, Fisheries and Food (MAFF) as a Machinery Officer, under a regime originally introduced to ensure food production in wartime. Reorganisation of MAFF included a proposal for a Safety Inspectorate (combined with a Wages Inspectorate), to implement legislation proposed for introduction in the early '50s. One of the critical political decisions at that time concerned the type of structure to carry that forward and John was sent off to USA in 1953 for three months to study their system.

On his return he became heavily involved in setting up the new Farm Safety Inspectorate within the new MAFF Regional structure. In 1965 on promotion to Deputy Chief Inspector. With his agricultural engineering experience he took a prominent role in developing the legislation, testing, and introduction of tractor safety cabs.

John was promoted to Chief Inspector in 1968 and developed a wide and respected Standard-setting role abroad and in the UK, drawing together manufacturers, suppliers, and research interests. But he kept his feet on the ground with national issues and was very much the public face of agricultural health and safety.

Faced with political in-fighting over the future of agriculture under the Health and Safety at Work etc Act being introduced in 1974, John persuaded the Minister that the best future for the Agricultural Inspectorate was in HSE. John was then given the title 'HM Chief Agricultural Inspector and Director of Agricultural Health and Safety'.

John was a great character: charming, fun, firm but fair, and a good mentor, well respected by staff. He remained actively involved and committed to agriculture and safety to the end. He was an Honourary Fellow and Past President of IAgrE. He also served as Chairman of the British Society for Research in Agricultural Engineering Association.

He deservedly received the CBE upon his retirement, in recognition of his contribution to safety in the industry.

Management changes at John Deere

Including Germany role for IAgrE member, Neil Macer

FOLLOWING the establishment of Deere & Company's worldwide Agriculture & Turf Division as a single business unit in May 2009, the company has been restructuring its sales & marketing organisation in Region 2 - which covers Europe, the CIS, North Africa and the Near & Middle East - in order to serve customers and dealers more effectively.

As a result, several new Langar-based appointments have been announced by John Deere Limited, as part of the streamlining of the UK and Ireland business to be more focused on sales and dealer development.

Gordon Day has taken up the new position of branch tactical marketing manager for agriculture and turf, replacing **Chris Meacock** who has moved to Mannheim in Germany as tactical marketing manager, small ag within John Deere's new regional organisation.

IAgrE member Neil Macer

Edward Stephenson has been appointed as agricultural division sales manager for the north of England, Scotland and Ireland, replacing **Antony Scott**, who is the new Region 2 dealer development manager, scale and coverage.

Joedy Ibbotson has been appointed as turf division sales manager for the UK and Ireland, replacing **David Hart**, who has taken on a new key strategic role within Region 2.

Finally, **Chris Wiltshire** has been appointed John Deere Limited's training manager, replacing IAgrE member **Neil Macer**, who has moved to a new product marketing role in Germany.

Newly qualified landbased technicians

Graduates head back to dealers

THIRTY-one newly trained apprentices have returned to their New Holland dealerships as qualified land based technicians after completing a bespoke technician training scheme at Reaseheath College in Cheshire.

The apprentices were presented with certificates at a ceremony at the college by New Holland's After Sales Commercial Manager Rob Alker.

This specialist course is partly funded and run by New Holland and involves five courses specific to New Holland machines and equipment. At the end of the course, every graduate is sufficiently qualified to apply for LTA accreditation (Landbased Technician Accreditation) at grade two.

Chris Coppenhall, one of New Holland's product technical trainers, is involved in the specialist training courses throughout the three year programme:

"During the course, each apprentice does three separate months a year at Reaseheath College. Within this time, in addition to the theory and practical training delivered by the college's lecturers, they'll receive five specialist training courses based on New Holland machines and technology. So they'll go through electronics, hydraulics, transmission, engines and diagnostics.

"All this training is done on our latest machines using specialist test equipment and it is run by New Holland training specialists."

Tim Ball, from Reaseheath College, has the job of liaising with New Holland, the dealerships and the college itself, where the course has been run since 2002. "When this course started, it was one of the very first of its kind to involve a manufacturer. It has been key in effectively standardising and improving the level of training that dealership apprenticeships are getting. Before this course existed, training in this field was variable in quality and very localised.

"This year's graduates, like their predecessors, will be leaving Reaseheath with a respected industry recognised qualification: the Extended National Diploma in Land Based Technology."

Top trainee scoops award

WHEN Matthew Pinder recently completed his National Diploma in Land Based Technology at Plumpton College, he was justifiably pleased with a 'distinction' grade.

Matthew Pinder (right) with John Davies, Service Manager at dealers JSM

However, his achievement was to be boosted further by receiving a 'Top Machinery Student' award from Plumpton College in recognition of his performance over the 2-year diploma course.

Peter Wood, Course Tutor/ Programme Leader at Plumpton said, "Matt's effort has been tremendous. He started the course with no background of any type in the subject and managed to gain distinctions in almost every area of the course work. He has achieved a lot during the course and worked hard for his excellent results".

Matthew had completed his course whilst working part-time as a trainee technician with JSM Limited, the Toro Commercial dealer in the south-east. He now embarks upon his full-time technical career with them.

JSM Service Manager, John Davies, said, "The Matthew we have been used to has proved to be a quick learner and hard worker; this is reflected in his recent achievements. He has always fitted in well in our workshop and we are all pleased to welcome him now as a full-time team member."

Farmers Weekly report says colleges are struggling to invest in new technology

Skills gap opening up in agricultural engineering?

THE *Farmers Weekly* ran a lengthy feature in July asking whether in the future, expensive tractors and machinery might stand idle because there are not enough qualified technicians to service or repair them?

"For students who make it into the industry, it is an exciting and dynamic place to work - but with the shrinking number of colleges offering engineering courses, lack of investment and soaring machinery costs, the outlook for agricultural engineering seems bleak.

"The availability of agricultural courses is dwindling. Already one of the most expensive courses to run, the cost of new technology and and tight budgets mean that many colleges have cut their losses and axed their courses."

Commenting, John Palmer of Claas says the industry needs to work together to find a common solution. He says, "There are too many small colleges with limited student numbers trying to offer a course that they simply cannot fund properly.

"Many can't access modern equipment, and the staff may not have the familiarity and confidence with that equipment to teach the students effectively.

"It's a two sided problem - lecturers need to understand modern technology and students need physical access to it on a regular basis.

"Those students who have only worked on older Massey Ferguson or Ford tractors will be severely limited in what they can do in the workplace. And whilst there will still be swork for them, in terms of pay prospects and career satisfaction, would they rather be changing filters or working at the forefront of the industry?"

> "... for students who do make it into the industry, it is an exciting and dynamic place to work"

He adds, "Even students graduating from Harper Adams, the only college offering higher education in agricultural engineering sometimes fail to meet manufacturers' needs".

In John Palmer's view, there are too many small colleges with small student numbers, trying to offer courses that they simply cannot fund properly.

"It is a emotive point, but I think that colleges need to rationalise further to justify the level of investment needed.

"As manufacturers, we cannot support everyone, we need to limit our resources on a limited number of sites."

Simon Blackmore, Professor of Engineering at Harper Adams says, "There is a definite skills gap in the high technology area and we are doing a lot to close that gap.

"There is no doubt that Britain is some way behind. Farmers in Germany or Denmark are a lot more open to new technology than in GB, so there is more more support and activity.

"However, I am optimistic about the future with plans afoot to set up a National Centre for Precision Farming as well as a field robot event similar to the successful event in Denmark.

"We also need more training for trainers," he added, "to bring lecturers up to the same level."

The *Farmers Weekly* acknowledged the role of the LTA (Land-based Technician Accreditation) scheme created to benchmark professional standards and specialised training.

Commenting, John Palmer said, "With high-value equipment you need high-value staff who can identify problems on site and repair it quickly.

"Using LTA registered technicians will improve farmers' prospects when they have limited weather opportunity."

Available in full on Landwards e-Xtra - *www.iagre.org*

Fruit & vegetable packhouse machinery

by **Richard Langley**, Harper Adams University College

Introduction

THE design and layout of packhouse machinery is very broad and varied, and is really dependent on the product being handled and its intended market.

However, there are many operations that are common to numerous different products, and general brief principles will be discussed, starting with reception to the packhouse, and ending with the packaging.

There are many machines that have been around for some time, and on the other hand, there are newer computer controlled camera sorting mechanisms, and robotic arm packaging devices similar to those seen on some machine assembly lines.

Topics covered

- Box and bag tipping
- Conveyors
- Cleaning
- Washing
- Drying
- Grading
  (*comprising Grading by size; Into-store separator; Fillers; and Electronic grading*)
- Palletising and robotics

Why IAgrE is important to you and your career

IAgrE President, PETER LEECH on the importance of membership to promote your professional image and help build your employment prospects

I CONCLUDED my comments in *Landwards* Summer edition with the words "achievement of higher professional standards is our mission".

What does this mean? Why is IAgrE important in this respect to you and your career?

To be successful in any job of work you firstly need education and qualifications to enable you to apply for a position. Then you need personality and communication skills to succeed in the interview to secure the position.

Once you have the first job then you have to work hard, gain experience and keep learning. All of these attributes (education, experience, and communication skills) contribute to our professional image and status and continue to build through our career.

But how is anyone to know and how can you promote your professional image and status to further your career and the industry you work in.

Clearly the answer to this is to become a member of your industry's professional body which awards membership grades according to those personal attributes of education, experience and acquired skills.

Membership of IAgrE is your way of informing your colleagues, your daily work contacts, your employer (and potential employees) that you are first of all committed to professionalism and secondly have achieved a certain status. Also don't forget that your grade is not fixed, you can move up through the grades with experience and CPD (continuing professional development) over time.

In addition to IAgrE membership there is also the overarching Engineering industry professional body, the Engineering Council or EngC; there are three professional qualifications (or levels of professional status) - Engineering Technician (Eng Tech), Incorporated Engineer (IEng) and Chartered Engineer (CEng).

This is almost like a licence to practise (just like a Doctor, Solicitor, Accountant etc) and states that this person meets all the requirements to be called a professional who can be respected and trusted.

The LTA scheme is also exactly this and provides the same professional status to technicians with the same possibilities to move up through the grades over time, a true measure of professional status to be respected and trusted.

Most of you reading this are members but many more may not be. I hope this helps those who are not yet members to understand what IAgrE is all about and why you need to join, *now*.

I also hope it helps existing members, many of whom will also have the professional qualifications mentioned above, to explain the purpose and benefits of membership and professional qualifications (and status) as we all help to recruit new members.

HARVEST is in full swing in most of the UK as I write this and I believe has been a pleasant surprise to many.

Oil seed rape yields were amongst the highest in recent years and crops were harvested in almost perfect conditions. Due to the spring droughts there were serious concerns about wheat yields but these have not been anywhere near as poor as expected other than on light land. Therefore with commodity prices remaining high, prospects for an overall positive harvest outcome look to be assured.

IN recent months I have been travelling again and have seen agricultural operations in many areas for the first time.

I spent some time on farms and at dealers in the black soil region of Ukraine and south west Russia. When you take a handful of this soil and feel the quality and richness as well as observe the vastness of the fields and farms you start to understand the potential of this region.

The output of these regions can be multiplied many times as better farming practice and more intensive farming methods are applied. Following on from my recent comments about Brazil and being able to meet the challenge of feeding our rapidly increasing population, I feel confident the potential exists to develop in line with global demand.

ON a lighter note I was going to climb on one of the combines we saw operating in a fleet in Ukraine and 'do a round'. I was prevented from doing so as they said that I might not come back for a few hours!

> "Membership is your way of proving you are committed to professionalism"

Young engineers competition

Unfortunatley due to competing Colleges being forced to pull out, this year's national IAgrE Young Engineers competition had to be cancelled. However, following a lot of hard work already put in, Reaseheath College decided to stage their own event. NEIL JEWELL explains

STUDENTS who took part in Reaseheath's Young Engineers Ramp competition this year were Trevor Mill-Irvin and Chris Bracey with a flywheel machine, Matthew Leigh and Joe Lomas with their ButtyBoxBomb, and Slain Preston with the one wheel drive whizz.

Even though Reaseheath was the only college competing this year, competition for the top of the ramp was still as hot as ever

Trevor and Chris had produced a very well engineered Flywheel machine that ran on roller bearing on axles, flywheel and even had a bespoke clutch, with thrust bearing, to transmit the drive from the flywheel to the rear axle. The flyswheel of 2kg was spinning at 15000 rpm and ran silently on 3 o-ring belts driven from a motor. The pulleys had also been made by the team. Once the flywheel was up to speed the clutch was engaged and drive was taken up slowly to avoid wheelspin. The stored momentum in the flywheel was enough to propel the machine up the ramp.

Matthew and Joe, in the tradition of Reaseheath and this competition, took the rules and bent them almost double and came up with an ingenious design that managed to incorporate studded wheels which was still within the rules. The studded wheels utilised the peg board to great effect until gravity became the ultimate winner and the ButtyBoxBomb, so called because it was made inside a Tupperware box, came tumbling all the way to the bottom of the ramp, much to the amusement of the spectators.

Slain with his one wheel whizz, was beset with issues from the start of the build but managed to overcome these to produce a super lightweight machine that certainly made an impression.

Absent from the competition were Colm Moloney and Laurence O'brien both of whom had secured jobs in Belgium. They had designed a machine that extended and retracted and utilised a comb of metal fingers running on the ramp to interlock with the peg board.

Overall a fantastic effort from all the students and thanks to Richard Robinson for sending the competition ramp to us and thanks to Sylvia Harris for 'herding the cats' again.

A Life in Engineering

In this new series, we talk with former winners of IAgrE Awards. This month, JOHN GITTINS, a winner of the Johnson New Holland prize.

AT home on the family dairy farm near Oswestry, John Gittins was always fascinated by things mechanical.

"Like many young boys, I'd spend hours and hours building vehicles or mechanical structures with Meccano."

So it was natural that he should progress to Harper Adams.

He says, "After completing my BEng (Hons) degree which included the design of the dipper arm I continued my studies at Harper Adams with an MSc in Agricultural Engineering.

"This included a major research project on Hand-arm Vibration emission of a trench rammer and the factors affecting its variability.

"After this I took a full time position as a Design and Development Engineer at Turfmech Machinery Ltd in Hixon, Staffordshire. Turfmech are designers and UK manufacturers of turf care products, the products include: trailed vacuums, tractor mounted blowers, sports turf decompaction equipment, large area mowers, pedestrian and ride on sweeper/collectors.

"Just before I joined Turfmech they acquired Allett professional cylinder sports turf mowers and moved the design and manufacturing facilities to Turfmech's base at Hixon.

"Allett customers include many famous football stadiums, National Trust properties, cricket and bowling clubs and the Commonwealth War Graves Commission who are responsible for maintaining all the Commonwealth WWI and WWII war cemeteries around the world.

"In 2009 I became Chief Engineer at Turfmech taking on more responsibility, notable projects in this time were the battery powered electric cylinder mower called ELMOW, a 10m^3 capacity vacuum with dual pivoting axle called the TM10 which is in use at Guards Polo club in Windsor and a special height adjuster for the Allett mower used at Highgrove House.

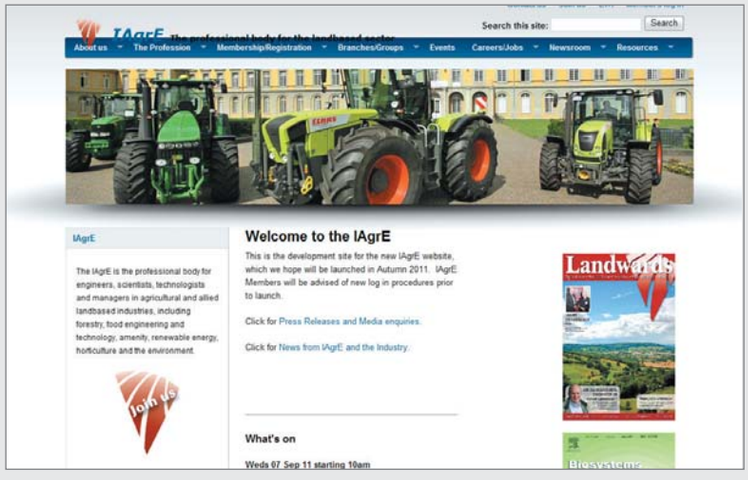
"Just recently I became Engineering Manger taking full responsibility for the management of the engineering function at Turfmech.

"The first responsibility was to work with the management team on a company strategy. As an outcome of this I developed the new product introduction (NPI) process and now manage its implementation.

"The NPI process clearly sets out a Stage-Gate type model which controls both quality of new product introductions and risk.

"In the last few weeks Turfmech has made another acquisition, this time buying the design rights and tooling for Atco and Suffolk Punch domestic cylinder mowers from Bosch. This makes Turfmech the largest cylinder mower manufacture in Britain. The mowers will be designed and built at the manufacturing centre in Hixon.

"Currently I am working on factory planning with a big change planned towards lean manufacturing techniques to meet the high volume production needed for domestic mowers."



Coming soon: new IAgrE website

THE team at IAgrE have been hard at work updating and improving the IAgrE website - which will be unveiled over coming weeks.

The site will feature a modern new look, a new content management system, more information and easier browsing. In addition, there will be a new forum area to bring the disparate IAgrE community closer together.

Members should look out for information on the launch date.

More details in CEO's View page 7

FORESIGHT REPORT

Foresight Report: The Future of Food and Farming

Alex Keen comments on the report and the many issues it raises

THE outcomes of the **Foresight Report: The Future of Food and Farming** (Foresight Report, 2011) are likely to be the main policy guidelines in developing agriculture in the UK and internationally by DEFRA and DIFD and the report indicates that several major international organisations will follow similar guidelines.

The Foresight Report highlights how the global food system is consuming the world's natural resources at an unsustainable rate; failing the very poorest, with almost one billion of the least advantaged and most vulnerable people still suffering from hunger and malnutrition. Despite the considerable progress made in reducing the proportion of people in Asia and Africa living in hunger and poverty, the overall number affected by chronic hunger has scarcely changed for the past 20 years.

The evidence presented in the Foresight Report highlights the vulnerability of the global food system to climate change and other global threats and emphasises the need to build in greater resilience to future food price shocks. In doing so the report makes a strong case for governments, the private sector and civil society to continue to prioritise global food security, sustainable agricultural production and fisheries, reform of trade and subsidy, waste reduction and sustainable consumption.

The analysis of the Foresight Project has demonstrated the need for policy-makers to take a much broader perspective than hitherto when making the choices before them - they need to consider the global food system from production to plate. Policy options should not be closed off.

Throughout, the Project's Final Report has argued the importance of, within reason, excluding as few as possible different policy options on *a priori* grounds. Instead, it is important to develop a strong evidence base upon which to make informed decisions.

All the reports and support evidence are available in Foresight Report (2011).

The IAgrE press release on the publication of the Foresight report referred to "*persistently under investment in the education, research and infrastructure needed to sustain this (Agricultural Engineering) expertise base. This report signals the urgent need to reverse this trend.*"

If this is the view of IAgrE then how is this going to be achieved and, in detail, what has to be done and what resources are required?

THE media coverage on *The Today Programme* and in the newspapers indicates the raising in political priorities and awareness of the need for sustainable food supply for all globally, but although there was a great deal of reporting of the problems there doesn't yet appear to be a great deal of clarity on how solutions will develop and be implemented and what level of resources are required.

In its leader column, *The Independent* newspaper (2011) reported that Professor Sir John Beddington, the Government's chief scientific adviser has argued that "we have 20 years to deliver something of the order of 40 per cent more food, 30 per cent more available fresh water and of the order of 50 per cent more energy".

An *Independent* newspaper leading article (2011) emphasised that a billion people in the world's poorest countries go to bed hungry each night and a further billion suffer from malnutrition, but that the report's forecast is that the situation will get bleaker still.

Urbanisation, climate change, environmental degradation, population growth and changing lifestyles will create a 'perfect storm' that could drive global food prices up by 50 per cent in real terms by the middle of the century. Hundreds of millions more people will be driven into hunger if that happens. If the global population continues to increase on its present trajectory and the 1.3bn Chinese shift to a meat-heavy, Western diet, the demand for crops will increase, driving up prices. If the status quo continues, expensive food is assured. A similar view was put forward by McKie (2011) in the *Observer* newspaper.

Kushwaha (2007) states that "by virtue of engineering applications the agri-food industry continues to become more technologically sophisticated", and that "agricultural engineers have the education and interest that make them uniquely capable of developing engineering solutions for agricultural and biological systems. This is the profession that applies physical science and technology to problems in food and fibre production systems."

Kushwaha continues, "The system is a biological one in which plant growth is basic. All human life depends on the success of this biological system".

A logical extension of this is that the role of agricultural engineering and agricultural engineers will be of immense importance in the development of the working solutions to the problems identified in the Foresight report.

Although the Foresight report identifies the general scale of the problems linked to future food production and farming, it does not identify the scale of the resources required to combat the problems or the numbers of professionals required in the different disciplines. It doesn't identify the role and necessity of agricultural engineering - there is one reference to agricultural engineering in the thirty-three page summary report (on page 18).

IT is proposed that the future role of agricultural engineering is an important task for the IAgrE to be involved in and that elements of this task include:

- A review of the main conclusions and outcomes of the Foresight Report and how they affect agricultural engineering and its development.
- Identify the skills and subject areas that now form the subject of agricultural engineering? Has it changed significantly in recent years? Is it identifiably different in Europe, Asia, Africa and the Americas?
- Identify the size of the agricultural engineering sector in industry, government and research and the numbers of professional engineers required to support this activity.
- Review the current educational provision for professional agricultural engineers and identify the scope and needs in this activity over the period covered by the Foresight report. What is the UK (and international) University provision at

undergraduate and postgraduate level to support the professional development of agricultural engineers and the interests of Agricultural Engineering? Are the requirements for design and manufacture and the development of operator and field practice significantly different, and are both being adequately provided for? Are the generation of new solutions and practice involving environmental physics and biological science catered for? Day (2010) has emphasised and demonstrated the importance of keeping biology, engineering and physics together. Is this taking place in our universities? Are there opportunities for other universities and research institutions?

- Are there adequate levels of research and subject development taking place in UK institutions to support the national and international needs and interests of the UK in Agricultural Engineering and the professional development of Agricultural Engineering. How important is research in underpinning the IAgrE and University teaching?
- How active should the IAgrE be in the development of graduate and postgraduate Agricultural Engineering in the UK?
- Review and identify the resources and support activities that are provided by the institution and those that could be provided in this electronically sophisticated knowledge era. What services should the IAgrE provide for its members to support research and scholarly activity?

  - **Access to published information**. There is some support for access to *Biosystems Engineering*, but with the loss of Wrest Park library how do members get access to journals such *Soil and Tillage*, *Journal of Terramechanics*, etc. Should the IAgrE provide a gateway to electronic access of these, access to search engines such as Science Direct, and access to libraries such as the ASABE Technical Library? How many members would be willing to pay extra subscription for this service?

  - **Special interest groups in the IAgrE**. What is the role and demand? How active are they? Is there a demand for specialist conferences and workshops in areas, for example, such as precision farming, renewable energy, power and machinery, soil mechanics, etc?

- **International cooperation with other institutions of Agricultural Engineering**. What is the scope and opportunity for cooperation, exchange and travel with overseas organisations linked with Agricultural Engineering?
- Estimate funding that will be required and review the turnover in food and its support industries available to support this activity. What is the financial input required from government? To what extent should the IAgrE facilitate and support network groups and application for project and research funding particularly for groups and individuals not affiliated to universities and research organisations. Should agricultural engineering be getting a larger share of the research funding available from the EU and if so how is this going to be achieved?
- Review ways in which to communicate and lobby this 'message'. To what extent does agricultural engineering need to effectively develop its access to UK and European government and political policy-makers? If we do not identify the importance of our own role and actively promote it within governmental policy making and resource provision no one else will.

> "... the role of agricultural engineering and agricultural engineers will be of immense importance in the development of the working solutions to the problems indentified in the Foresight Report"

BECAUSE the Foresight report has not looked to agricultural engineering for support evidence there are some important aspects that it has missed.

As Kushwaha (2007) indicates, it is largely through the application and implementation of engineering that farmers are able to apply technologically sophisticated solutions. In the developed West newer examples of this include precision farming use of GPS data, tractor auto-steer, agri-canbus, field mapping and the use of sensors. The speed of implementation and success of a lot of this technology has been due to major tractor and machinery manufacturers developing relatively easy use of the technology on their machines for a customer that is increasingly willing and comfortable with the technology.

In the less developed world the spread and development of mechanisation and its professional use will be a major driver of change and good practice and therefore the major tractor and machinery manufacturers will have important roles to play. An example of this is the effect of the use of chemicals on the world supply of food and citizens health in rice production and the current increasing use of pesticides and inorganic fertiliser applied onto water (paddy). This is often in unsophisticated hand operations (Asmat Ullah, 2009) and the water will recycle in use many times before reaching the oceans providing the opportunity for chemical contamination build up through leaching.

The development of agronomy that relies less on chemical input may be very dependent on the precision farming and other machinery made available by tractor and machinery manufacturers. The implementation practice used in the West in the safe use of chemicals in agriculture, eg through the TOPPS (2011) programme, is also an area not formally addressed in the Foresight report which seems to focus more on biotechnology solutions. There is already considerable knowledge, technology and good practice available with which to 'engineer' working solutions.

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An industrial evaporative cooling unit

Evaporative cooling

the answer of tomorrow and always will be?

Dr Chris Bishop
READER IN POSTHARVEST TECHNOLOGY, WRITTLE COLLEGE

EVAPORATIVE cooling operates on the simple principle of a fan drawing warm air through a wet pad.

The warm air is cooled by evaporating water which changes sensible heat in the air to latent heat in the vapourised moisture thus causing a temperature drop so the air is now at a lower temperature and higher relative humidity but the same enthalpy, as the initial air.

Instead of a fan the natural breezes can be used but this means a more irregular airflow and hence cooling.

In harvested fresh produce the rate of moisture (and hence weight) loss varies with the product but with any product it is proportional to the vapour pressure deficit.

The vapour pressure deficit is a function of the relative humidity and the temperature. The higher the relative humidity and the lower the temperature the lower the weight loss from the product.

So if air passes through a damp piece of cloth or pad the air afterwards is at a lower temperature and a higher relative humidity. This piece of information alone should be enough to encourage the use of evaporative cooling to reduce weight loss in perishable products particularly in warm climates and even more in warm dry climates.

Unfortunately this is not the case as it often does not work despite the fact that the laws of thermodynamics are consistent - why?

When all the provisos are stripped away the issue is that the low level of investment required relative to standard refrigeration is equated to a low level of management and in reality nothing is further from the truth.

For instance if air of 28°C 40% relative humidity (RH) passes through a wetted medium there is the theoretical potential to change the conditions to 16.5°C and 100% RH, but in reality it should certainly be possible to reach conditions of 17.5°C and 90% RH. A reduction of over ten degrees and a change in the rate of moisture loss through lower vapour pressure deficit of about a factor of five, but this very rarely happens in practice.

Fig.1:
A damaged panel for a forced evaporative cooler

To achieve good evaporative cooling the following two factors must be followed;

1. **An even thickness of wetted pad . If the pad thickness varies so will the airflow through it and there may not be enough water to be taken up by the air in the thinner areas. Gaps in the pad must be avoided at all costs as these will allow warm air to pass with no evaporation and so defeat the objective completely.** ***Fig 1***

2. **The pad must be totally wet from top to bottom and it needs to be appreciated that water will develop certain flow patterns as it trickles down the pad. Work done by the author in arid areas of Mexico with conditions of 30°C+ and**

. . . this should be enough to encourage the use of evaporative cooling to reduce weight loss in perishable products particularly in warm climates and even more in dry climates

relative humidities of 10-20% showed that on an evaporative cooler that pumped water onto the pad at least three times the expected evaporative rate of water removal should be used and even then the maximum fall on the pad should be less than 1.5m or there were dry patches as the water formed rivulets. ***Fig 2***

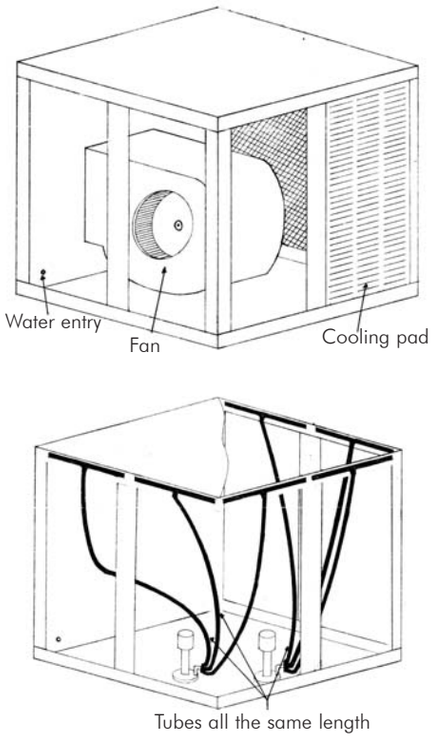


Fig.2:
Cutaway to show layout of a typical forced ventilation evaporative cooler where the water is pumped from the sump in even length pipes to give even water distribution. Water level in the sump controlled by a stop cock

FORCED COOLERS

COMMERCIAL evaporative coolers are available in sizes varying in capacity from 1 to 95m^3/s.

An alternative to the packaged evaporative cooler can be assembled with a pad and fan system. Pads made of 50mm thick compressed 'wood wool' or other suitable material are installed, usually in the long wall of the building, and exhaust fans are positioned in the opposite wall. Incoming air is cooled as it passes through the wet pads and then, after passing through the building, is exhausted by fans,

For effective operation, the air velocity through the pad area should be limited to about 0.8m/s. This is accomplished with 1 to 1.5m^2 of pad area per/m^3/s of air flow. The cooled air leaves the pad at a relative humidity of 85 to 90%,

Water is spread evenly over the pads from a manifold supplied from a sump with a float-controlled water level. Recirculation of water through the pads should be at the rate of approximately 160ml/s for each m^3/s air flow. The actual water consumption, which is the evaporation of water into the passing air, varies with the changing conditions of temperature and humidity. However, as a guide, it is approximately 20% of the water recirculation rate.

PASSIVE COOLER

EVAPORATIVE coolers, which rely on wind pressure to force air through the wet pads (passive cooler), are less effective since the air flow is likely to be either too low or too high most of the time.

While naturally ventilated evaporative coolers will require larger pad areas, the fact that no fan or power to drive a fan is required recommends these designs for small scale applications in rural areas. They can usually be constructed with local materials and be operated and maintained by the farmer at low cost.

A basic system can be produced by having all walls made of vertical poles supporting two 'fences' of chicken wire 50mm apart with an infill of charcoal. These walls must go from floor to the ridge.

The roof should be of thatch and overhanging the walls. The door must be tight fitting and solid. The building/hut should be on level ground.

Along the top of the walls should be placed a rain gutter, with 3mm holes drilled in the bottom at 0.3-0.6m spaces.

A tank of water (ideally connected to the mains with a stop-cock) should be supported just above the gutter and water should be allowed to trickle out into the gutter and then flow down the charcoal walls. Any breeze will blow through the wet permeable walls and the air be cooled by evaporation.

If no mains water is available the tank should be filled to give sufficient water for approximately 1 litre of water per square metre of charcoal wall per hour. This is a very approximate figure and will depend on how arid the conditions of the evaporative cooler and the quantity of wind.

Fig.3:
A 10,000t store in California with the cooler units on the roof and pressure flaps on the side

It is always best to keep the walls damp but the worst problems arise when the charcoal settles and there are gaps in the walls with no charcoal - these must be filled with more charcoal. There can also be problems if the door is left open or if weeds are allowed to grow up at the base as some water will flow all the way down

Passive evaporative coolers have been used successfully as holding or short term storage in a number of countries and can work well providing that it is realised that there is the need for inspection and maintenance from time to time.

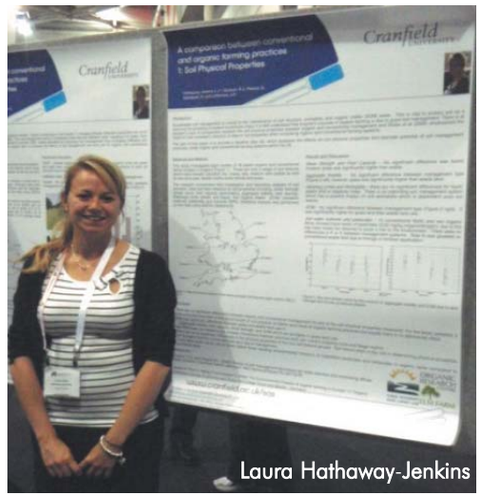
CONCLUSION

With a passive or a forced cooler the management needs to be frequently checking the even thickness and integrity of the pads, as well as the air tightness of the building and the water distribution.

Fig.4:
A passive cooler with charcoal walls. Note how the charcoal has settled to give a gap above and the fact that weeds have grown up to partially obstruct airflow

World Congress on Soil Science

The Douglas Bomford Trust provided financial assistance to LAURA HATHAWAY-JENKINS which in August last year allowed her to attend the World Congress on Soil Science and present two papers on her findings



Laura Hathaway-Jenkins

LAURA Hathaway-Jenkins, IAgrE member, is a soil scientist and has recently completed an EngD on the effects of organic farming practices on soil physical properties, infiltration and workability at Cranfield University.

Her interest in soil health and science began when she was studying her first degree in geography at Royal Holloway, University of London. Here, she undertook her final dissertation comparing different land management effects on soil properties. After completing her degree, Laura visited Cranfield University at Silsoe and enrolled upon the first year of the programme MSc Soil Management.

"This course was different to other masters I had looked at," Laura said. "It involved practical engineering designs for both agricultural and reclaimed land with a large focus on understanding soil science which lies behind these designs. The course also included trips to research institutes (IGER) and to farms to perform detailed soil action plans."

After completing the Masters, Laura began to think about finding a job, however after discussions with Prof. Dick Godwin and Dr. Marc Dresser, they helped to develop an EngD programme which would follow on with her current area of interest in soil health, infiltration and organic farming.

She began her EngD in January 2007 and it was very fast paced having to complete the first year of the part-time MBA alongside establishing research field sites and collecting data. It was a very intense year - Cranfield University worked alongside the University of Sussex, Leeds, Manchester, Cambridge, The Organic Research Centre, HDRA and the Macaulay Institute on a Rural Economy and Land Use (RELU) programme investigating the mutli-disciplinary effects of scale in organic agriculture.

This programme was very challenging working with so many different partners all with different ideals about what they needed in order to complete their part of the research and trying to understand the different terminology used by different disciplines. It introduced Laura to a new style of research, one which provides a holistic approach to problem solving but that is highly complex to manage.

Laura was the main person who worked upon soil collection, analysis and reporting for the RELU project and she visited thirty two different farms in the UK, amounting to 64 fields (both grassland and arable) collecting soil for physical property analysis and infiltration data which would allow modelling of runoff. Laura has since published the findings from the soil component of this research in *Soil Use and Management*.

The main finding was that there was little direct benefit on individual soil properties from organic farming practices but equally there was no detrimental effect. There was evidence to show that infiltration rates were greater on organically managed grassland compared to conventional grassland which could potentially reduce runoff by up to 28 %. This was the first half of her EngD.

During the second half Laura established more detailed plot-scale trials into different cultivation systems on both organic and conventionally managed farms. These trials aimed to reduce the effects of different cultivation systems and compared the same soil texture and cultivation system on organic and conventionally managed land.

There were three site locations: East Grinstead, Huntingdon and Aberdeen. In Aberdeen the research was in conjunction with SAC who provided technical assistance and day to day management of the site. At the Aberdeen site, research data was collected on soil physical properties and infiltration rates (by Cranfield University) and data on Greenhouse Gas emissions (by SAC) during the different stages of cultivation and crop growth.

The main finding was that organically managed land (both arable and grassland) improved infiltration rates in comparison to conventionally managed land. This can be related to improved soil structure and less degradation in grassland fields and improved maximum water holding capacity in arable fields. This has implications for significantly reducing potential runoff and hence reducing flood severity risk from a 1 in 10 year to typically a 1 in 1.25 to 1 in 5 year event.

> "... I was able to meet people who were doing similar research and who were able to offer very interesting points of view on my work"

THE 19th World Congress on Soil Science was very well attended with almost 2,000 delegates.

There was a vast programme over the six days of the conference; but generally comprising of a plenary session, two poster sessions during the coffee breaks and three in-depth subject related sessions per day (with six sessions running parallel). The World Congress followed the final year of Laura's four year EngD at Cranfield University and was a great opportunity for her to mix with peers and leaders in the field of soil science. It also allowed her work to gain exposure to other international researchers.

During the conference, she presented two papers titled '*A comparison between conventional and organic farming practices 1: Soil Physical Properties and 2: Soil Hydraulic Properties*.'

"Overall, this conference was a great experience for me," said Laura. "It allowed me to explore the international research forum, network with other professionals, researchers and scientists and enjoy the experience of a well-organised event for sharing knowledge within my research area. It also improved my presenting and social skills.

"This will provide a good base for my career, as I was able to meet people who were doing similar research and who were able to offer very interesting points of view on my work. I would like to thank the Douglas Bomford Trust for providing financial assistance to enable me to attend this conference."

So what does the future hold for Laura now that she has completed her EngD?

"I'm very interest in developing a career in environmental consultancy looking at large-scale land use management and contaminated land in both rural and urban areas," she said. "I really enjoy actively learning and being able to apply knowledge which I have gained specifically about soils in different situations. So hopefully, I will find something with environmental aspects which will allow me to continue learning within the environmental industry sector."

The Douglas Bomford Student Award Scheme

A chance for undergraduates to receive some financial support to get that bit extra out of their studies

THE Douglas Bomford Trust offers studentship awards to undergraduates that are studying to obtain a qualification relevant to the agricultural engineering profession.

The purpose of the awards is to provide the student with additional opportunities that will enhance their studies by, for example, enabling them to purchase specialised books, computing equipment or software that would not generally be available on their course or to undertake associated activities that will contribute to their technical education.

Students applying for an award need to make a case detailing the potential value of an award to them. Most awards are then made following an interview at which the student presents his/her case to an assessment panel that includes representatives from The Board of Trustees.

This provides students with an opportunity to learn something of interviewing techniques and presentational skills at first hand and many of those that have been through this process recognise the value of this experience and the feedback they receive from the selection process.

Successful candidates are selected on a competitive basis and those receiving an award now have to provide a brief written report for The Trust detailing how they spent the funds awarded and the benefits that they gained from it.

Paul Miller, Secretary to The Trust reports, "The feedback we have had from successful students in the scheme is the last two years has been really encouraging. We are looking to make small changes to the way in which the scheme is run for next year (2012/13) but The Trust is committed to giving as much support as possible to those wishing to establish a career in agricultural engineering."

How to apply

Details of how to submit an application are on The Douglas Bomford Trust web site at: **www.dbt.org.uk** and the next closing date for applications is 31st October 2011.

The Douglas Bomford Trust also provides financial support to student groups wishing to travel to an event relevant to their studies and to individual students who are experiencing particular hardship. Again details of these awards are on the Trust's web site.

History of the Trust

Douglas Bomford descended from a long-established Worcestershire farming family, and from a branch of that family which helped pioneer the mechanisation of many basic farming operations.

He played a leading role in professional and technical bodies and was President of the Institution of Agricultural Engineers from 1955 to 1957. He was closely associated with the establishment of the National College of Agricultural Engineering at Silsoe, now Cranfield University, and continued the family tradition into the twentieth century with leadership in further pioneering work in engineering and mechanisation, and also in encouraging education in agricultural engineering.

Douglas Bomford retired in 1967 when his own company Bomford Bros Ltd merged with Bomford and Evershed Ltd.

www.dbt.org.uk

After his death in 1969 his widow, the late Mrs Betty Bomford, made generous provision for continuing her husband's interests and ideals through the establishment of The Douglas Bomford Trust. It was was founded as a registered charity in 1972 for the purpose of advancing education, training and research in the science and practice of agricultural engineering and mechanisation.

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

The funds available to the Trust have recently been boosted by a substantial donation arising from the closure of the Silsoe Research Institute. This has allowed the Trust to fund more research projects over the most recent period but this unlikely to be sustained at the same level over the longer term.

Working with soil

The IPSS has launched a new professional competency scheme

DEFRA Deputy Chief Scientific Advisor, Dr Miles Parker, helped launch *Working with Soil* recently.

Devised by the Institute of Professional Soil Scientists (IPSS), this new professional competency scheme identifies minimum qualifications, skills and knowledge for practising soils scientists carrying out a range of key tasks. IPSS aims to establish the scheme as the *de facto* standard for identifying competent contractors in the field of soil science.

Miles stated that, "Defra welcomes initiatives, such as the IPSS *Working with Soil*s Competency Statements, that aim to improve the quality of professional soils advice".

IPSS Chair, Dr Bruce Lascelles said, "Soil is the very foundation of life; destroy it and we won't survive. Yet the numbers of young scientists choosing to study soil science is dwindling to the extent that it can no longer be studied at degree level in the UK. We must make it a more attractive career option.

"Our *Working with Soil* professional competency scheme is designed to place value in achieving the qualifications and skills required to advise professionally on the management of soil for a variety of outcomes. As the scheme develops and becomes embedded in research and consultancy practice it will, we hope, help define a number of career paths in professional soil science.

"We expect our houses and offices to be designed by qualified architects and engineers. We go to qualified lawyers for legal advice. The same principles of professionalism should apply to those from whom we seek advice on the management of soil as a complex natural resource. IPSS calls on Government and industry to adopt *Working with Soil* and to only commission work on the use and management of soil from appropriately qualified and experienced soil scientists.

"The Institute plans to expand the scheme and to develop a tailored training programme for those wishing to achieve the various standards," Dr Lascelles continued. "This is a new venture for us and we are very keen to hear back from users of the scheme. We are pretty sure the scheme will evolve over time but we are also absolutely certain that it is needed.

"We need urgently to attract more young scientists into a career in soil science. It must be a more rewarding and worthwhile choice for our graduates and postgraduates and we need to identify clear career paths for those wishing to become professional soil scientists.

"Success in achieving a sustainable professional community and greater societal and industry recognition of the value of soil science will help deliver a well managed and sustainable soil resource to support current and future generations. That, ultimately, is what *Working with Soil* is all about."

Professional Competency in Soil Science

Introduction to the IPSS *Working with Soil* scheme

Professional soil science conducted under contract will very often involve one or more of the following generic activities.

- **The investigation of soils in the field and their consistent description according to a recognised scheme,**
- **The interpretation of soil profiles, properties and conditions, soil maps and/or other soil, earth science, climatic or topographic data and information to guide the current or future use and/or management of land for a range of interests.**
- **The identification of the soil resources at a site prior to their excavation, storage and eventual reinstatement**

The work may be at a site-specific, local, regional or national scale and may range across local land practice to national and international policy development and regulation.

The document introduces a scheme, *Working with Soil*, that sets out minimum qualifications, skills and knowledge which the Institute of Professional Soil Scientists considers necessary for scientists and engineers working on the above identified aspects of soil science. Eight documents form the first release and identify minimum competencies for the foundation skills of field soil investigation and a number of commonly conducted tasks.

Who will the scheme benefit and how?

In producing these documents, the Institute aims to set and improve standards in professional soil science and to assist clients in identifying and engaging scientists and engineers with the appropriate combination of qualifications, knowledge and skills to carry out soil-related work to a satisfactory standard.

The IPSS believe soil is a vital natural resource that delivers many ecosystem services and much economic value. It is important that those advising on its health and its use and management meet professional standards. Society imposes standards on doctors, engineers, lawyers and other professionals and we should expect no less from those practising professional soil science. Their intention is to expand the scheme by adding more task-based documents as needed.

The IPSS' hope is that the scheme will prove of value to those contracting out soil science work and that it will become an industry standard widely adopted in all the appropriate activity sectors. Its adoption by Government and industry will benefit scientists and engineers with the required qualifications, expertise and skills through preferred access to more work. Ultimately they hope that society will benefit from better and more sustainably managed soil resources.

The documents are freely available as downloads via the Institute's website. The Institute sets no limitations as to their use and has no objection to their inclusion as annexes in tender or contract documents, but accepts no liability, direct or indirect, for the consequences of their use.

Download the *Working With Soils* documents

Visit **www.soilscientist.org/workingwithsoil**


Beans direct sown into wheat residue

Conservation Agriculture in the UK

A visit to a no-till farm in Lincolnshire

by **Brian G Sims**

ON 8 March 2011 IAgrE and the Tropical Agriculture Association (TAA) joined forces to host a wide ranging seminar on Conservation Cropping at Cranfield University (*www.iagre.org/conservecrop.shtml*).

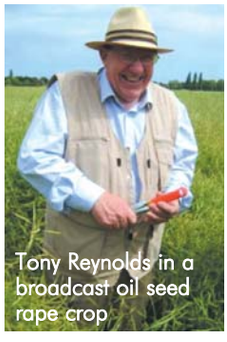
At the seminar it appeared that there was a disquieting lack of appreciation of the benefits of conservation agriculture (CA) in the UK environment. At the same time there was a very useful attempt to identify some of the potential areas of difficulty for would-be UK farmer adopters.

There were (at least) three main areas of concern: These included the high levels of crop residue and potentially high weed populations in temperate-zone agriculture. Both of which, some delegates erroneously, argued 'require' ploughing to solve.

Another issue was the tendency of soils with a high clay content to smear, and so reduce seed germination with direct drilling. This actually could be more of a reason to abandon ploughing and so eliminate the danger of forming plough pans which require energy-expensive tillage to remove.

Finally there was the vexed question of grass weed control in cereal crops. The chief villain is black grass (*Alopecurus myosuroides*) and it seems that the one herbicide capable of controlling it - Atlantis - may not retain its efficacy for very much longer. There is an ongoing debate about this, correct application (nozzle selection, forward speed, boom height) and applying the herbicide to plants no bigger than the three-leaf stage are likely to play a major role in ensuring good control. Poor quality spraying of mature black grass will, of course, result in unsatisfactory control.

It was also suggested that reduced tillage may hold the key as it can cut fuel costs and increase operating speeds. However this half measures approach still destroys soil structure and fauna; and spreads weeds like black grass.


Tony Reynolds in a broadcast oil seed rape crop

Against this backdrop it was a pleasure to accompany the TAA farm visit to Tony Reynolds' farm (Thurlby Grange, Thurlby, Bourne, Lincolnshire) on 4 June. Tony had been at the Cranfield meeting and has been a 100% no-till farmer since 2006 after a 3-year period of trial and assessment.

Thurlby Grange farm is 243ha and is predominantly devoted to annual crops (first and second wheat, oil seed rape and spring crops like peas, beans, linseed, oats and canary grass - *Phalaris canariensis*). All crop residues are retained and the soil is never tilled. In fact it would now be difficult to wreak mechanical damage on the soils as all tillage equipment was auctioned off in 2006 (to the bemusement of neighbours who suspected financial or mental ruin).

Crucially the arable crops are complemented with two livestock production enterprises: store cattle for fattening and a 16 000 bird poultry unit for egg production which also produces 10 tonnes/week of high P and K manure, all of which is returned to the farm's soils. The beef enterprise means that cereal crops are undersown with grass when pasture is required; the poultry enterprise has helped the farm to reduce its overall inorganic fertiliser use by 80%. The target for N fertilisation reduction is 50% which will be achieved principally as a result of the increase soil fertility provided by residue mulch.

Equipment

The equipment needed to run the farm comprises a no-till drill (an Argentinian Bertini 22000 - *www.bertini.com.ar/imod22.htm*), a Claas Lexion 460 combine with Shelbourne Reynolds stripper header, a 24 metre Knight trailed sprayer, a fertiliser spreader and tractors for general farm work.

An important addition to the stripper header is the pneumatic Autocast seed and slug pellet distributor which broadcasts oil seed rape seed at the time of stripping to then be covered by the chaff and straw emerging from the rear of the combine. This really is no-till as the rape seed is 'sown' at harvest and is left alone, except for phytosanitary spray applications and fertilisation, until harvest the following year.

Benefits

The benefits to the farm must, of course, start with the economics.

Tony calculates that his soils needed 5 years to regain their structure and fertility after ploughing was stopped. So, for example, wheat yields dropped from 8.75 t/ha under conventional tillage, to a low of 7.5 t/ha at year 3 before recovering to 8.5 t/ha in year 5 and reaching 10 t/ha in year 6.

Crop establishment costs have fallen from £245/ha to £36/ha with no-till, and annual fuel use over the whole farm has dropped from 96 litres/ha to 43 l/ha. So there is no doubt about the profitability of the switch. But what about the environmental benefits?

Soil is no longer lost to wind erosion. The soils on the farm range from highly erodible organic fen soils to silt and clay loams and, with plough-based tillage, wind erosion is a serious problem.


Bertini 4m no-till seed drill

The farm now benefits from wind blown deposits from the neighbouring farms and so, in the long term is actually accumulating soil! Soil structure is markedly improved due to the addition of organic matter via the crop residues and to the biological tillage provided by the vastly increased earthworm population. The soils are now stable, well structured and healthy and, although the farm has only received 11mm of rain since February, the soils are moist and there is no sign of moisture stress in the crops.

The black grass problem has been all but eliminated (I didn't see a single plant during the visit). Tony explained that 80% of black grass seeds buried in the soil lose their viability each year, so that if the soil is not moved and no new seeds are brought to the surface layers to germinate, the herbicide only has to eliminate 20% of the initial population in year 2. Thereafter the weed seed bank declines rapidly to practically zero. Although he still applies Atlantis, he maintains that this is a precautionary measure and dose rates are kept as low as possible.

the future of tractor design

GEOFFREY WAKEHAM considers as the fundamental purpose of the tractor has not altered over time, what innovations may we see in future production?

SOME forty plus years ago I was invited to speak to an IAgrE Branch meeting in a distant northern town on the future of the agricultural tractor.

This was to be from the point of view of a major manufacturer of agricultural machinery. It was not till question time that I realised how many real experts on the core topic lived and worked within easy reach of Leeds.

I was only looking a few years ahead and seem to remember that I was not expecting many major changes, a decent cab maybe; I was strongly against hydrostatic transmissions. Automatic guidance systems were likely to have been a consideration. There was a lot of talk of high speed transport tractors and I remember producing a sketch of a possible layout. The demise of the UK tractor industry was unthinkable.

So what has happened since the late 1960s to the basic design of the agricultural tractor and what of the future?

The greatest surprise might be how little difference there is between a mass market American designed machine of 1970 and one being designed and built for the mass market in India in 2011.

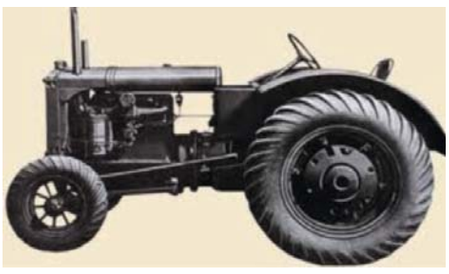
Top of the range tractors for use in the UK have become more powerful and considerably more sophisticated but the basic layout is largely unchanged.

Is this because in one hundred years the fundamental purpose of the tractor has not altered? The tractor is a mobile cross country power unit that serves no other fundamental agricultural purpose. It does not manipulate the top soil or the sub soil (except as a detrimental side effect of its use), plant seeds, harvest crops or act as a major transport device.

It provides power through the PTO and to a limited extent to hydraulic circuits but also, crucially to its layout, by acting as a mobile winch. With the increase in self propelled harvesters, sprayers and specialist handling machines the sophisticated high horse power 'western' tractor is now primarily a traction machine but with reduced versatility and fewer machines to power.

Due to limited seasonal use, the continuing complaint of the high capital cost of many agricultural machines including high

1931



1971

2011

> “. . Top of the range tractors for use in the UK have become more powerful and considerably more sophisticated but the basic layout is largely unchanged”

powered tractors has reignited the debate of providing an engine, transmission and running gear unit with clip on specialist agricultural equipment to carry out most of the high horsepower jobs around the farm. This failed to work satisfactorily in the past and is unlikely to succeed in the future.

So what of the future?

Automatic / robotic tractors will become commonplace where space permits and these will contain control systems to maintain high levels of efficiency of the tractor while the equipment it is powering will contain the intelligence regarding function and position.

The tractor will need to be able to listen to rather than control the process. The technology is already in use in other industries.

Is there any good reason to alter the **basic layout** when most of the tractive power is transmitted through the rear wheels if we are to retain an acceptable turning circle?

Because of the layout there is little logic in changing from a **mechanical transmission** system. Hydraulic or electric transmissions with their flexible layout are not needed and their significantly lower efficiencies would increase the cost of running a typical 140hp tractor by some £2600 per year at current fuel prices. Changes to EU legislation could significantly increase this figure.

The increase in speed both on and off road has lead to **improved suspension systems** but the practice on non agricultural vehicles of minimising unsprung weight to improve grip and ride are not obvious. It is almost the opposite when considering ride comfort, with great effort having gone into seat suspension and more recently cab suspension.

Should we look at removing ballast and unnecessary mass from the wheels and axles and independently suspending all wheels? This will provide better ride, improved off road mobility and possibly increased tractive efficiency. **Transport speed must be increased** as farm sizes and journey distances increase.

Improved track systems driven by military needs will see an increase in the use of such systems on high power tractors but continuing improvements in tyre/wheel design will ensure their continued dominance on medium horsepower machines and extend their suitability for higher power use.

The horse manure crisis of the 1890s and the predicted collapse of the Royal Navy due to shortages of oaks in the late 1700s are behind us but the impending disaster of using up the last drop of oil is fast approaching. This presents a real problem to predicting the future power source for the tractor. Is the date twenty years away as has been predicted for the last twenty years or is it closer to 54 years and rising year on year as estimated by the oil companies?

What ever the reality, the only real option is to use **liquid organic or mineral based diesel fuel**. Hydrogen, even at 700bar (10,000 lbs/sq in), requires seven times the volume of fuel as for diesel and extremely sophisticated fuel storage and handling systems. No nipping out with a can of hydrogen to get the tractor home.

Hydrogen fuel cells weigh thirty times the equivalent diesel powered system while Lithium ion batteries weigh 50 times as much as diesel per MJ of stored energy. Pressures on available arable land, by increasing food demand, will limit the areas available for growing fuel crops. Algae grown on a feed stock of sewage may be the answer

As an aside it might be worth considering **the impact of legislative demands** to limit pollutants on future centres of engine manufacture. Will the greatest demand and supply for engines be in the emerging markets where higher emission levels can be tolerated? Will European engine manufacturers become submerged in their struggle to meet unreasonable demands, with limited impact on the environment, without compromising the performance of their product?

Power take-off and traction linkages that transfer either engine power or traction forces to the working part of the tractor implement combination have changed little over the years. The hydraulic power available has increased but it is still only a limited proportion of the available power. The three point linkage has been beefed up, admittedly with far more complex controls and the PTO can now run at 1000rpm as well as 540 so increasing capacity.

There are moves towards providing significant electrical power for running attached implements with greater flexibility and simpler controls than hydraulics. This will become the preferred system to transfer engine power to attached equipment and could render the mechanical Hook’s jointed PTO obsolete. The mechanical components of the three point linkage have always been very simple in principle.

All those years ago I was convinced a single box section arm system should be developed. We have single arm robots in their thousands in use round the world and hedge cutters, excavators etc show the technology to provide such a linkage is in place. To make such a change would necessitate a clearly demonstrable advantage but also a full range of compatible implements. I think I may have to wait some time to see such a significant change in tractor/implement design.

Ballast is fitted to match the tractor mass and wheel loadings to the task in hand. It is there to provide traction and stability. From my experience few drivers understand optimum ballasting and many never change ballast between jobs.

Tractors require wheel load monitors with intelligent interpretation of required ballast mass and location. If ballast is to be changed and correctly located then engineers need to see this as an area that must be considered early in the design process.

Since writing this, I have discovered that students at Harper Adams University College have spent eight months looking twenty years into the future of the agricultural tractor and I hope a précis of their findings could be published in a future issue of *Landwards*.

PROFILE: Professional Technician

DAN MASSEY is an LTA 4 lead service technician with dealers JE Buckle Engineers based in Stevenage. Dan is also one of the first John Deere Master Technicians in the country. He recently became a member of the IAgrE Council.

Name
Dan Massey

Dealership
J.E Buckle Ltd

Position
John Deere Master, LTA4 service technician

Job and brief description of responsibilities:
To service and repair all kinds of agricultural and horticultural machinery in the workshop or onsite

Other responsibilities
Member of IAgrE Council

Q&A

What qualifications have you achieved to get to the position you are in?

I have achieved city and guilds level 2 and 3 in service engineering and a John Deere diploma as well as many other certificates at college - i.e. health and safety etc.

After college I won a City and Guilds Gold Medal of Excellence in Service Engineering. I have also obtained my air conditioning certificates and in 2009 I became one of the youngest people to gain my LTA 4 qualification.

Why did you choose to go into the role?

I choose this role due to my love of farming and manly tractors and machinery.

I was the same as any little boy who loved to look at and ride on tractors. My earliest memory was sitting with dad for hours on his 1500 MB tractor. When I was older nothing really changed, and when I was 16 I got offered an apprenticeship at Buckles and never looked back.

What skills do you need in your job?

First of all you need great people skills because you have to talk and advise customers, sometimes in pressure situations.

You have to be patient and work long hours. Also something which I think you need now is computer skills. I spend just as much time on my laptop as I do with my spanners.

How does an LTA accreditation help your career?

It gives me great confidence in my job because it gives everyone a level which you can work towards and also something which the customers can appriciate.

If I meet a new customer and he sees LTA4 on the side of my van, he knows that he has someone fixing his machinery who will do it right and to the highest standard.

What have been your main career achievements?

I would say winning the city and guilds medal of excellence in 2002.

It's great to be awarded for 3 years of hard work at college and the fact that I won, beating everyone else in the country, is a tremendous achievement. The best one however, has got to be being awarded LTA4. I had achieved 2 and then 3, but to get to 4 involved lots of hard work, showing my skills and being tested to a very high standard.

> "It's a great feeling to repair a machine and get the customer up and running again"

How do you see your role/career progressing?

Well I keep on working hard to keep on top with the technologies and new products, but I would like to become a service manager and run my own workshop.

Or perhaps moving into the training side to help bring on the next service technicians hopefully with a manufacturer such as John Deere

Are you intending to study further?

Yes I am. I always want to learn more and the LTA is great. So if more qualifications come up I would work towards that.

What do you like most about your job?

I think working on the best and most advanced machinery out there at the moment and also helping and interacting with customers gives me the most satisfaction.

It's a great feeling to repair a machine and get the customer up and running again. I have made some great relationships with some of my customers and they trust me and my work.

What do you think is the most interesting new technology developments since you began work?

I would say precision farming technology, such as John Deere's Greenstar. When I started this was in its infancy but now it's one of the first things on a farmer's shopping list. Its technology is very advanced.

The other development, which for me is the most interesting, is diagnostics or fault finding. I use my service advisor more than any tool in my toolbox. It speeds up the job and can help me to find a fault fast. And with the next step in engines it will keep evolving.

What piece of advice would you give someone wanting to become a landbased technician?

My advice would be, it is a great job and you will enjoy it.

But be prepared to work long hours and sometimes be covered in mud, dust and oil. However, when you are out in the field watching that combine moving again after you've fixed it, it's a great feeling.

Also listen to everybody and never be scared to ask questions of people you work with or your customers. This is how you build trust and great relationships.

College was great and I met some great friends who are still in the job today. James, Nick Tom and Rob would all agree with me, that we would rather be out in the countryside working than in an office watching the world go by.

I was also very lucky to have worked with somebody at Buckles who wanted to show me how things worked and was prepared to take the time with me. So thank you George for everything.

Has membership of IAgrE helped you at all?

Yes, it has introduced me to the industry and showed me there's more to it than what I see everyday.

Also it has introduced me to some interesting people and ideas. I also feel I have support behind me if I ever need anything such as information or contacts.

Saudi expertise at London global agribusiness conference

CropWorld to debate how world agriculture can meet food demands

EXPERTISE in irrigation and arid agriculture developed over the past 35 years in Saudi Arabia will be on the agenda at CropWorld, the global agricultural conference to be held in London later this year.

Farming in extremely dry conditions and the economic utilisation of underground water resources which have been perfected in Saudi Arabia, will form part of a key note address to be given by John Lawton, General Manager at Riyadh based Agricultural Technology Ltd.

Mr Lawton will be one of a number of international experts speaking at CropWorld Global 2011 who will be addressing the problems caused by a growing world population and mounting pressure on its natural resources.

The conference, which is the only global event to embrace all aspects of crop production, will be debating how world agriculture can meet the challenges of increasing food production by more than 50% over the next 19 years.

"Saudi Arabia has extensive knowledge of farming in an arid climate and the expertise we have developed here can be used in similar areas of the Middle East and North Africa", said Mr Lawton. "The desert areas of the region are much larger than the rain fed areas of Africa and using underground water resources we can substantially increase food production and largely eliminate the risk of crop failure due to unpredictable rain fall", he added.

CROPWORLD GLOBAL 2011 | 31 OCTOBER – 2 NOVEMBER 2011 EXCEL LONDON

The conference, which will be addressed by the UK's Minister of State for Agriculture and Food, Rt Hon Jim Paice MP, as well as a range of speakers drawn from countries including Australia, India, The United States and Brazil, will run for three days from the 31st October to the 2nd November 2011 in London.

"We see this as a unique opportunity to bring together a group of international experts at the highest level to discuss, debate and inform those attending - and a wider global audience - how agriculture is going to meet the increased demands which will be placed on it," said Clare King CropWorld Event Director.

"We are delighted that John Lawton is speaking at the conference, his unrivalled expertise and experience will make a huge contribution to our discussions," she added.

CropWord Global 2011 is being organised by UBM in association with the British Crop Production Council (BCPC).

Further details are available from Clare King, Event Director, UBM Conferences. Tel; +44 (0)20 7560 4364, email *clare.king@ubm.com* or visit the website at *www.cropworld-global.com*

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Issue 66 Number 3 Autumn 2011

MEMBERSHIP MATTERS

BRANCH REPORTS

FORESTRY ENGINEERING GROUP

Olympic Park Visit

ON 29th July 2011 the Forestry Engineering Group of the Institution of Agricultural Engineers were invited to have a look at the construction progress on the Olympic Park.

The invitation was from Peter Bonfield who is Managing Director of the Building Research Establishment and as a 'part time job' has been responsible for the procurement of all materials for the construction at the Olympics on behalf of the Olympic Delivery Authority. Peter has not only held a major responsibility for ensuring the buildings were finished a year before the games, they are billed as the 'sustainable' games so all materials had to be procured, manufactured and processed with the minimum emission of CO^2.

We entered as a group through the south gate where 10,000 workers entered each day at the peak of activity. The logistics of organising this workforce safely were unprecedented. Pete told us they decided that people and materials had to be separated. They brought the materials in the north entrance at the rate of a vehicle every 12 seconds. If concrete was delivered by road the traffic density would increase to a vehicle every 6 seconds as between 1.5m and 2m tonnes were required.


The Velodrome

Pete saw this as an opportunity. He arranged that every contractor would buy their concrete from one source controlled by ODA. The concrete supply was tendered and London Concrete won the bid. The mix design used additives to help reduce the CO^2 emissions from 250kg/t to 160kg/t. All aggregates and cement were delivered by sea and mixed on shore and delivered to site on an especially constructed railway.

This one piece of organisation typified Pete's input and contribution to the success of completion a year before the games. He kept repeating "this is Great Britain, and we are ready a year early and below budget."


The Olympic Stadium

Pete was in charge of timber engineering research at BRE when he joined IAgrE and FEG. Even with his high profile and busy schedule he retains an interest in FEG because of the way we do things. He tells us we run great conferences, make decisions and act upon them, which he identifies with.

Pete is from east London and claims to have cycled about on the same piece of land the velodrome is built on. I think we see where some of his commitment comes from. He also told us that part of the track used in the 1948 games has been incorporated into the new track.

We toured the site for about 1.5 hours and got a real flavour for what we can still do in the UK if we get the right people and the motivation. There were no fatal accidents and only one serious injury during the entire construction.

The Brazilians, who host the games in 2016 have invited the ODA team out to Brazil to get them in gear as they are rightly impressed with the results in London. We saw every venue and the 2,800 houses on site for some of the 17,000 athletes. They will form part of the all important legacy.

The last word was on sustainability and Pete is very proud of his timber background. He managed to achieve full chain of custody for every piece of timber used on site. This was no mean task as the world is split between two governing bodies and neither insist on cradle to grave sustainable chain.


The Acquatics Centre

However, on being quizzed about some aspects of sustainability, he admitted that the games are 'socio and economically sustainable' first and CO^2 sustainable as far as practicably possible. They chose realistic targets and achieved spectacular results.

Dr Geoff Freedman

EAST MIDLANDS BRANCH

New Digester plant, Severn Trent Water visit

10th May 2011

FOLLOWING their interest in Renewable Energy, Branch members spent a fascinating evening hosted by John Jackson, Severn Trent's Energy Crop Manager looking at the latest Anaerobic Digester now running commercially at the company's Stoke Bardolph site, south-east of Nottingham.

Developed on their massive sewage treatment works site this new venture produces methane gas from maize being digested to power 2 x V 20 engines each driving a generator producing 1MW of electrical output.

5 silos affording about 37,000 tonnes of storage for the short chop maize (around 6mm) are the start of the process, all material being transferred daily by loader shovel to either of two intake moving floor containers. John refers to the whole system as comparable to a cow's ruminant system so these intakes are the mouth of the beast.

Auto controlled loading of the maize to the 4 digesters, each 550 m^3, continues and temperature is maintained at 42°C. 30% of the gas comes from these primary digesters and 2 secondary fermenter units further digest the material.

Members found the mix of heavy industrial gear challenging particularly when considered with sophisticated controls all linked and managed within control rooms, generally by one operator. Life is made easier through the use of HMIs (Human machine interfaces) - touch screens mainly. No I didn't know what an HMI was till I got there either!

Auto intake to one of the four digesters is described

At the time of the visit the two engines were running and nicely showing 1MW each and the final raw product was discharging through a press seen an almost odourless friable product. Plans are on going for how this product may be marketed as a soils improver / fertiliser.

An information screen at Stoke Bardolph's reception confirms the current situation of output and plant status backing up STW's commitment to pass on information to all visitors.

Everyone left with a vastly improved knowledge of the digestion process and the many and varied systems used in the control system. A great evening rubbing shoulders across engineering disciplines, with all gaining knowledge via enthusiastic presentations and leadership as well.

Bill Basford

EAST MIDLANDS BRANCH

Visit to Allerton Trust, Loddington

6th June 2011

AS a final meeting for the year members and their guests met at the Game and Wildlife's Conservation Trusts' Allerton Trust site at Loddington in the heart of Leicestershire on a fine evening.

Hosted by Alistair Leake the groups' engineering interests were held back whilst Alistair professionally covered the Trust's work in all conservation matters over the commercial 330ha estate.

This was done in a highly informative and entertaining way describing modern farming methods and conservation practices highlighting the many improvements in bird numbers. Improved headland management methods, wild flower species and how these suit various birds were all described. Winter feeding routines have helped maintain numbers and spectacular photographs of many species attracted to and manipulating the feeders under winter pressure for food impressed all the group, these ran from mice to a turkey, masses of small birds, even to deer. Further photos highlighted the many foods taken, even how a Heron will take a rabbit.

Natural predation was discussed at length and the place of selective predator control through the gamekeeper's knowledge and actions resulting in improving other development of other species. Breeding numbers at Loddington of Wren, Dunnock, Robin, Blackbird and Song Thrushes have all doubled, trebled or greater over the past 10 years.

After the highly informative indoor session the group enjoyed a walk around sites on the estate taking in various interests. The Recycling co-operative venture with local farmers was seen where Alistair enthusiastically described the many challenges in recycling of various plastics and chemical container shape, the mix of films/paper and labels, foil seals etc.

Loddington is one of three sites involved in the 3 year Sustainable Arable LINK Project, managed by ADAS. Philip Wright of Wright Solutions and an E M Branch member described the project looking at soil erosion from tramlines and the various approaches in the project to control it, e.g. First year, optimising tyre selection and inflation pressures and then in further years the development of both special spiked rotating harrow tines or concave plastic rollers offering a low density but supportive and drained soil profile in the tramline after use, including light tines to allow any rainfall run off to move sideways into the non wheeled area.

Interestingly such equipment can operate on the sprayer at commercial operating speeds. Early results show that Best practice with tyres and inflation pressures give encouraging reductions in both rainfall as run off and therefore soils sedimentation.

Field drainage interception and sedimentation areas from other studies were described which further complement the Trusts' knowledge of soil movement and pollution limitation techniques comparing these to village outfalls and included chemical content for instance. Results suggested that phosphorous levels leaving septic tanks had a major influence in the local waters, probably challenging perceptions that farming activities represent the major contributor.

Alistair Leake outlines the challenges of agrochemical containers from a recycling perspective

The evening showed that many commonly held beliefs relating wildlife and farming were possibly not as clear cut as many thought, even turned on their heads, which lead to a highly rewarding visit. So the branch rounded off its year firmly back on the soil, at the heart of modern farming comparing and contrasting the vital stewardship of our land and environment so necessary to sustain out modern production requirements

Bill Basford

SOUTH EAST MIDLANDS BRANCH

Visit to Rothamsted Research, Harpenden, Herts

May 2011

A group of 12 members visited RES 17 May 2011.

Dr Chris Watts introduced us to some of the current work carried out at Rothamsted which is the largest agricultural research centre in the United Kingdom and almost certainly the oldest agricultural research station in the world. Over its 160 year history, Rothamsted Research has built an international reputation as a centre of excellence for science in support of sustainable land management and its environmental impact. Its scientific research ranges from studies of genetics, biochemistry, cell biology and soil processes to investigations at the ecosystem and landscape scale.

The program, which could only give a very brief taster of the many activities currently conducted at this site, included a number of short presentations by Rothamsted scientists followed by a tour of some of the classical and other field experiments.

One of the highlights of the afternoon was the presentation by Dr. Juliet Osborne who described the role of insects both as pests and in the pollination of crops and how her group were using novel radar based techniques to investigate the spatio-temporal dynamics of insects in farmland and associated habitats, the cues that influence migratory and foraging behaviour, and the functional and trophic links between different components of farmland biodiversity. We were shown examples of the tracked movement of aphids across the channel from France and the foraging habits on individual bees equipped with radar transponders.

The visitors moved out to the National Willow Collection. Here Dr Ian Shield described how short rotation coppice willow is already being grown as an energy crop in parts of the UK but crop breeding has the potential to greatly improve yields, making it economically viable for a much wider range of growers. Rothamsted's research on bio energy is aimed at helping to bring about these improvements.

The Collection is a repository for willow germplasm, set up in the 1920s as a way of conserving varieties which were being lost when rural crafts such as basket and hurdle-making declined. Today it is maintained on the Rothamsted farm and contains around 1,300 accessions.

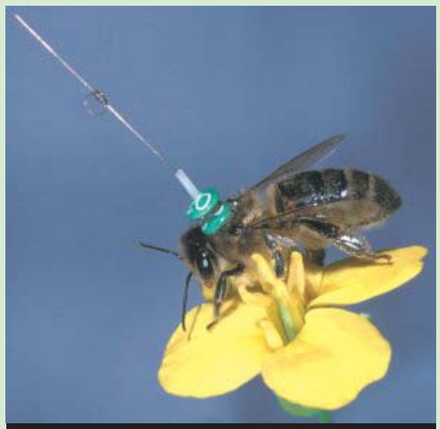
Ian then went on to describe how research on perennial grasses at Rothamsted began in 1992 and has identified two grass species with good potential for biomass production in the UK: Miscanthus and switchgrass, neither of which has any serious pest or disease problems identified yet. Using these grass experiments, research is looking into how long a grass stand can maintain productivity and what changes occur in the soil beneath these crops.

Rothamsted holds a unique and varied portfolio of long term datasets with international significance. The Lawes 'Classical' Experiments started in 1843 and are the longest continually running field experiments in the world. They continue to provide relevant information on the long-term impacts of arable farming on soil fertility and the environment.

Dr. Jonathan Storkey described the Park Grass experiment, one of the most important in the world in the area of bio-diversity and bio-ecology. This experiment started in 1856, on a field that had been in pasture for at least a century. Various combinations of inorganic fertilisers (P, K, Mg, Na, nitrate-N, ammonium-N and Si) have been tested since the start; organic manures (farmyard manure and fishmeal) have been tested since 1905. Subsequently, the effects of regular liming are tested with the division of most plots into four sub-plots, three of which are limed to maintain pHs of 5, 6 and 7. The fourth sub-plot receives no lime and the pH of these ranges from 3.5 to 5.7 depending on the fertiliser treatment. The plots are cut each year for hay, usually in June, and a second cut is taken in the autumn.

Jonathan then showed us how dramatically different swards have evolved as a result of the different pHs and nutrient statuses of the soils. There are 50 - 60 species on the unfertilised plots but only 2 or 3 species on some of the fertilised plots. Since 1990, nitrogen fertiliser has been withheld from half of all sub-plots formerly receiving 96 kg N ha-1 as either ammonium sulphate or sodium nitrate to study processes controlling soil acidification, heavy-metal mobilisation and botanical changes.

The group then moved onto the most famous and oldest of the Rothamsted



A bee equipped with a radar transponder used to track its foraging habits

Classical experiments, the Broadbalk wheat experiment. The first experimental crop of winter wheat was sown here in autumn of 1843 and every year since then, wheat has been sown and harvested on all or part of the field. Inorganic fertilisers supplying the elements N, P, K, Na and Mg in various combinations were compared with organic manures (FYM and rape cake, later replaced by castor bean meal) and a control treatment that received no fertiliser or manure inputs.

Dr. Andy MacDonald described how the management, cropping and treatments on the classical experiments are reviewed critically and modifications introduced to ensure that, as far as possible, the experiments remained relevant without losing their long-term integrity. Andy gave a number of examples of how the Broadbalk experiment continues to reveal new insights and important findings of relevance to today's agriculture and its interactions with our ever-changing environment.

The tour finished at the newly re-housed sample archive which holds some 200,000 samples of crops and soils taken from these experiments over the past 160 years. Together with the accompanying meteorological records, associated documentation this archive is a unique historical record of experiments that have been measured continuously for over 160 years.

These samples and records are regularly accessed by scientists worldwide for research on impacts of environmental change over past decades.

Dr. Chris Watts

Presentation of IAgrE Award

PICTURED here is Nigel Penlington receiving his 'Contribution to the Landbased Sector' award at an East Midlands Branch Meeting from Branch Chairman Paul Skinner, as he was unable to attend the May Conference.

This Award is made to IAgrE members who have made sustained contributions to the land based sector throughout their career.

L to R: David McMullan (Firmus Energy Engineer), Gary Connolly (IAgrE Branch chairman) and Danny Barr (BGE Engineer)

NORTHERN IRELAND BRANCH

Natural Gas Network

MEMBERS of the Northern Ireland Branch of IAgrE recently enjoyed hearing Firmus Energy engineers Danny Barr and David McMullan describe the planning and engineering challenges involved with the ongoing expansion of the natural gas distribution network in Northern Ireland.

Firmus is a subsidiary of BGE who already operate the natural gas network in the Republic of Ireland with 650,000 customers. Further details of their activities and network can be viewed on *www.firmusenergy.co.uk*

The building of the South - North main pipeline in 2006 from Co Meath to Co Antrim was a significant achievement for Firmus in establishing a network to serve the main urban areas along the route. Most recently a loop has been added to supply both the Armagh and Craigavon City areas and work is now well under way to extend the network to both domestic and business premises in all available areas.

The system also links with the North - West gas pipeline which runs from Carrickfergus in East Antrim to Coolkeeragh Power station in the North West. This means that the separate pipelines from Scotland which come ashore in Co Antrim and Co Meath are joined via a growing network which will also link with gas fields off the South and West Irish coasts.

Building the main pipeline

The South - North pipeline is a high grade 450mm steel pipe running 156km from Gormanstown to Ballyclare.

The project involved a huge amount of pre-planning and consultation with land owners, public authorities and environmental interests before work could begin. The route was planned to avoid areas of special scientific and historic interest and when work began to

continues over

Directional drill rig at work on site

OBITUARY

Charles Voss

26/09/1911 - 23/07/2011

IT is with sadness that I have to report the death of my father, Charles Voss. He was two months short of his 100th birthday.

Born in Budapest (where his father was working) of Latvian parents, he followed in his father's footsteps by joining Massey-Harris in 1929 in the Budapest office.

Charles spent six months in Lille in the winter of 1931-1932 serving an apprenticeship. It was the only technical training he ever had.

In 1932 he moved to Manchester as a Clerk in the Parts and Sales Departments. In 1933 he started evening classes at the Manchester Technical College, preparing for the London University B.Com degree, obtaining his B.Com degree in 1937. It was while he was working in Manchester that he met his future wife.

Charles was then given the opportunity to go out on the road as Massey-Harris Representative for South-West England. It was over the next eight years that he learned on the job about farming and the servicing and operation of farm machinery. It was at this time that his two children were born.

In 1947 he moved to Marquette-lez-Lille as assistant export sales manager. After four years (in 1951) he moved to London where a new Export Office had been set up. Some 15 months later Charles moved to Kilmarnock to set up a new Export Service Department. After the merger with Harry Ferguson in 1953 he moved to Coventry as General Service Manager, Export.

In January 1948 Charles undertook his first overseas tour of West Africa. Many other tours were undertaken between 1947 and 1963. These included North America, Middle East, Mexico, Latin America, the Caribbean and Russia.

In 1955 he joined the Leamington and County Golf Club, where he was Captain in 1959 and President 1977-1978. Latterly, he was an Honorary Life Member of the Club.

In September 1967 he was seconded to FAO (Food and Agriculture Organisation) in Rome. The secondment was initially for one year, but he stayed for six years until reaching retirement age in September 1973. My parents always said that this was the best six years of their lives.

On returning home to Leamington Spa, he became active in the Institution of Agricultural Engineers, joining the committee and then becoming Chairman of the West Midlands Branch in the 1970s.

Bob Voss
Honorary Treasurer
West Midlands Branch

clear the 30m wide working strip it was continuously supervised by archaeologists. This scrutiny did reveal the remains of a medieval village and other ancient features such as enclosures.

Some rerouting was necessary and the finds were fully documented for both the National Museum in Dublin and the Ulster Museum in Belfast.

The high grade epoxy coated 450 mm steel pipeline sections had to be ordered 6 months in advance of the work. The pipe sections were butt welded by teams of specialist coded welders. The quality of all the finished joints was checked by X-ray before the pipeline was lowered into the trench to be covered to a finished depth of 1.2m.

Full reinstatement of the land surface and original fencing was carried out as soon as possible to avoid disruption to the land owners.

The completed pipeline was swab cleaned by passing through a travelling cylindrical plug device known a 'pig'. A similar device with sensors around its circumference (known as an 'intelligent pig') was passed through to measure and record the details of the internal profile. This device will be retained to carry out future condition surveys.

Polyethylene pipe T joint

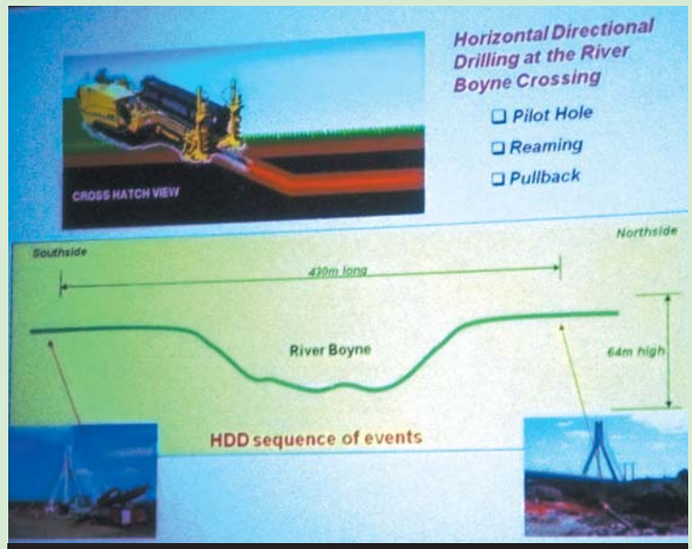
Before use, the pipeline was water filled for high pressure testing following by pneumatic testing. A foam 'pig" pushed out the water and the pipeline was dried with desiccant air followed by the introduction of inert nitrogen gas which is displaced when the pipe is filled with natural gas.

New technique for a Boyne crossing

Whilst the open trench works well in open countryside other methods are necessary if obstacles such as railways, busy roads, canals or large rivers get in the way.

One example was adjacent to the M1 motorway Boyne Bridge near Drogheda where the conservation habitats on the river banks ruled out the use of conventional excavation and structures. The answer was to use large scale horizontal directional drilling to duct the pipeline 64m down and 430m along under the river.

For other crossings, such as the 270 m span across the Craigavon Bridge on the River Foyle, the suspended thick walled steel distribution pipe is exposed and was subject to a strict pressure testing regime before it carried natural gas.



Boyne crossing profile

The Distribution network takes the gas off with pressure reduced to 4 Bar via a series of Above Ground Installations (AGIs) spaced at approximately 20 km intervals. These also allow sectoral isolation of the pipeline for routine inspection, maintenance and pipeline integrity checks. The instrumentation at the AGIs is electronically linked to the main control room for overall management and safety monitoring purposes.

The network extensions also require a substantial advance amount of planning, consultation and surveying. Because the work takes place in urban areas special care is required to identify and map existing underground services in advance.

Pipe installation methods

Trench excavation, which causes the most public disruption and environmental waste, is still needed at times but increasingly other methods are now being used.

The main one is Trenchless Directional Drilling which involves opening a launch pit and receive pit. The drill can be entered and sections added as the work progresses over lengths of 100m or more. It is steered by the operator at the control panel and progress is monitored and guided by hand held instrumentation above ground along the chosen route. It is the ideal way of getting under rivers and roadways. The bore is then reamed sufficiently to enable the pipe work to be drawn through.

The pipe carries gas at 4 Bar which is further reduced to 21 mbar at the consumer distribution points. The polyethylene pipes are joined by butt fusion plastic welding and 'T' joints on the side distribution branches are quickly connected using inbuilt coring and electro-fusion techniques.

Firmus operate a continuous strict monitoring system to ensure integrity of supply and the safety of customers. Customers can shut off their own supply quickly if they suspect a problem on their side of the meter. Firmus react quickly where customers report having no gas supply or a smell of gas and will be on site in less than I hour. Their 24 hour emergency number is 0800 002001

Aerial view of Boyne crossing site after work complete

Those attending the meeting were impressed by the level of engineering expertise and professionalism employed to design, install and operate the gas supply network and an interesting technical discussion followed.

Topics discussed included the practicalities of the installation works and dealing with accidental damage caused by others to the under ground pipes. Mr Barr also drew on his experiences when previously working with British Gas to illustrate some answers to 'what if' questions.

It seems that natural gas has a bright future here and the operation of the system is in safe hands.

Terence Chambers

NORTHERN IRELAND BRANCH

Satellites guiding field work

MR Jim Wilson, Technical Director of Soil Essentials was the guest speaker at the February 2011 Northern Ireland branch meeting of IAgrE which was held at AFBI Hillsborough.

Soil Essentials was set up in 2001 by 3 arable farmers in the Angus area of the East of Scotland on the basis of their own practical experiences of using precision farming technology. The technology is based around the Global Positioning System (GPS) which uses satellites in space as reference points for locations on earth. It now has many applications including the Sat Nav systems so routinely used by vehicle drivers everywhere and in the navigation of aircraft and ships.

Precision farming

Precision farming techniques also use GPS to map and guide the movements of agricultural machinery during cultivation, planting, application of fertilisers / crop protection products and harvesting.

Yield sensors on the combine measure the amount of grain as it is harvested and this information is transferred to electronic field maps which become the basis of future crop husbandry decisions. Additional information such as soil fertility, pH and compaction status can also be recorded separately and added to the map.

Decisions about mid season crop treatment (such as nitrogen top dressing) can be made after measuring crop canopy density using mobile equipment. In turn, the amount applied by the spreader to various parts of the field can be varied on the move automatically.

Choice of systems

Mr Wilson summarised how the various GPS systems have developed from the availability of the US satellites which are now recognised across the world for their wider commercial guidance value. Further satellite systems are now being added including those from Europe (Galileo), Russia (Glonass) and China (Compass). This prompts the next generation of receivers with more channels to utilise the wider choice of networks.

He also described the relative merits of the commercial positioning systems which are currently available for use in agriculture. Some are more accurate for static position finding and others are better suited to parallel matching rows / drills in the field.

There are different performance characteristics such as drift week to week or loss of signal in hilly areas. Up to now accuracy to within 30 to 45cm point to point has been common, but 12 to 20 cm is now regular and some systems are impressively repeatable to within 2.5 cm.

The GPS signal from up to 5 satellites is used in the tractor receiver as well as those received via an in-field base station for best results. Because the incoming signal is radio based it is aerial sensitive and subject to blind spots at some places. Future receivers are soon likely to use data transmission via internet connection with the signal coming via the nearest cell phone tower.

Self steering

One of the practical outcomes from the increasing accuracy is that GPS guided automatic steering on tractors and other self propelled machines is now well accepted in large scale arable operations in the UK and elsewhere.

This means that the tractor can steer straight rows and avoid overlap without the driver touching the wheel. It is especially useful for setting up seeding runs without bout markers and accurate beds for stone separation. Because the planting runs are recorded on the data field maps the sprayer, fertiliser spreader and harvester can be guided in the crop throughout the growing season without the need for tramlines.

In the case of large trailed items, such as wide cultivators which can drift behind the tractor, the guidance instrumentation can be based on the implement to ensure that it follows the correct bouts. The increased accuracy supports important input savings in fuel, labour, seed, sprays and fertilisers.

The technology could soon make it feasible, if not yet legal here, for one driver to control two tractors working in the same field. Many newer tractors are now available in auto steer ready specification which reduces the cost of installation.

Soil Essentials

Soil Essentials are agents for supply of a wide range of equipment from the major manufacturers in this sector such as mapping and guidance instruments, base stations, variable rate controls, self steering units and desktop software for mapping of field records.

They also supply practical field map and data management consultancy for clients in the UK, Europe, Eastern Europe, Australia and New Zealand. They arrange or carry out field activities such as quad mounted automatic soil probe sampling for laboratory analysis and subsequent mapping. There is a steady upward trend in the use of this technology.

Further information about Soil Essentials' products and services can be viewed on *www.soilessentials.com*

The meeting concluded with a question and answer session ranging through associated topics which included:-

- Automatic steering being more accurate than a driver
- Controlled traffic opportunities to minimise soil compaction
- The role of machinery manufacturers in adopting GPS control systems
- Ground speed and wheel slip monitoring during field cultivation work
- Guidance for crop dusting aircraft in Australia and New Zealand.

Branch Chairman, Gary Connolly, thanked Mr Wilson for his most interesting and enjoyable presentation.

Terence Chambers

Behind the scenes at AFB: L-R Laurence Know photographs Gary Connolly (Branch Chairman), Jim Wilson (Soil Essentials) and David Morris (branch member)

These final two branch reports, from the beginning of this year, came in after the production deadline for the previous issue, hence their late publication

Membership changes

Admissions

A warm welcome to the following new members:

Member

Birch R (Trinidad)
Leach S (Hampshire)
Turrion-Gomez J L (Edinburgh)

Associate Member

Birch R (Trinidad)
Leach S (Hampshire)
Turrion-Gomez J L (Edinburgh)

Associate

Joseph R (Wrexham)
Rudge R H R (Herefordshire)
Vaintraub I (London)
Wilkinson J (Buckinghamshire)
Williams J (Hertfordshire)

Student

Coleg Sir Gar

Bridgehouse R T J
Bryant J G N
Coffin A
Evans H
Evans R
George D R
Green J M
Griffiths S
Harries D M W
Jenkins G J
Jenkins O
Murdoch K E
Roberts D
Thomas G J O
Webster B
Williams D G M

Cranfield University

Aldhumayri M
Niziolomski J C

Loughborough University

Shakoor A

Easton College

Coleman C P

Harper Adams University College

Fillingham R

Institute of Technology, Tralee

Harrington D A

Birmingham University

Nathore N K

Re-admissions

Member

Baskerville P H (Suffolk)

Associate

Gold T J (Buckinghamshire)
Williams J A (Herts)

Deaths

Edmunds J R (Berkshire)
Everitt M F (Suffolk)
Weeks J C
(Hertfordshire)

Transfers

Honorary Fellow

Robinson R E (Wiltshire)

Associate Member

Dain-Owens A P (USA)
Yardley S W (Cheshire)

Engineering Council

Congratulations to the following members who have qualified as Chartered Engineers and Engineering Technicians, entitling them to use the designatory letters CEng and EngTech and after their names.

Registrations

CEng

Wardle G P (Derbyshire)

EngTech

Almey S (Lincs)
Bowers S (Peterborough)
Delahay P (Shropshire)
Johnson R A (Staffordshire)
McCullough N (Northern Ireland)
Sharratt B (Hampshire)
Watts R (Bedfordshire)
Webb C J (Hampshire)
Williams G W (Shropshire)

Re-registrations

EngTech

Wilner M J (Shropshire)

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

Long service certificates

Name	*Grade*	*Date of anniversay*
50 years		
Alan **Lavers**	MIAgrE	26 Sep 2011
Gordon **Spoor**	CEng, MIAgrE	26 Sep 2011
35 years		
Martyn Gordon Hamilton **Reid**	AMIAgrE	13 Jul 2011
David Bernard **Tinker**	CEng FIAgrE	15 Jul 2011
Charles Ralph **Powell**	MIAgrE	16 Jul 2011
Nicholas John **Shiles**	MIAgrE	17 Jul 2011
David Arthur Thurnam **Wynne**	MIAgrE	17 Jul 2011
Michael William **Inman**	EngTech, MIAgrE	26 Jul 2011
David Francis **Powell**	IEng, MIAgrE	24 Aug 2011
Edward Arthur **Rogers**	IEng, MIAgrE	24 Aug 2011
Ranjith Tissa **Weerasinghe**	IEng, FIAgrE	8 Sep 2011
25 years		
John Penrose **Mills**	CEng, MIAgrE	16 Jul 2011
Robert **Everett**	MIAgrE	23 Jul 2011
David Kenneth **Hemstock**	IEng, MIAgrE	24 Jul 2011
James Martin **Brook**	IEng, MIAgrE	24 Jul 2011
Keith **Jenkins**	IEng, MIAgrE	24 Jul 2011

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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)
Middleton House,
2 Main Road,
Middleton Cheney,
Banbury,
Oxon, OX17 2TN

Alvan Blanch Development Co Ltd
Chelworth
Malmesbury
Wiltshire
SN16 9SG

Autoguide Equipment Ltd
Stockley Road
Heddington
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
Suffolk
IP31 2AR

SSAB Swedish Steel Ltd
De Salis Court
De Salis Drive
Hampton Lovett
Droitwich
Worcestershire
WR9 0QE

White Horse Contractors Ltd
Lodge Hill
Abingdon
Oxfordshire
OX14 2JD

EVENTS

IAgrE Branch Meetings and Events

East Midlands Branch
Tues 04 October 2011 starting at 19:00
NATIONAL FLUID POWER CENTRE
Speaker: Mr John Savage
Venue: National Fluid Power Centre, Carlton Road, Workshop, Notts S81 7HP
Tha National Fluid Power centre is a world leader for training in hydraulics, pneumatics, electrical/electronic & associated control. The hydraulic and pneumatics training courses are designed for everyone from non-technical staff through to personnel that are involved in the maintenance, management and design of fluid power systems. Hydraulic courses cover mobile and industrial applications. The centre is engaged in the design of advanced apprenticeship schemes. This presentation will interest all at whatever stage of career or interest.
For more information on National Fluid Power visit their website: www.nfpc.co.uk
For further information please contact Paul Skinner (details below) Alternatively, contact the Branch Secretary: Sandy Donald (Tel: 07977 521231 Email: sandy.donald@blankney.com).
Tel: 01205 353754 or 07941 604177
Email: paulskinner57@btinternet.com

West Midlands Branch
Fri 07 October 2011 staring at 10.00am
VISIT TO REASEHEATH COLLEGE AND ANSON ENGINE MUSEUM
Venue: Reaseheath College, Nantwich, Cheshire CW5 6DF
Morning: Reaseheath College is a leading provider of engineering training in the UK. It is a preferred training provider for many companies, including JCB, Case IH, Claas UK, etc. The College is also recruiting many students into IAgrE. This is an ideal opportunity to see what is going on in agricultural engineering training. Visit commences at 10am until 12 noon.
Afternoon: Anson Engine Museum, Poynton, Cheshire, SK12 1TD
See the best collection of small to large stationary engines in the UK at Anson Engine Museum, from early Otto Engine to modern Rolls Royce engine. Lunch will be provided at the Museum - cost tba
For further information, and to book your place for this visit, contact the Branch Secretary: Michael Sheldon.
Tel: 01926 498900 Email: michaelcsheldon@yahoo.com

South East Midlands Branch
Mon 10 October 2011 starting at 19:30
CAP REFORM POST-2013 AND WHY YOU SHOULDN'T YAWN
Speaker: David Tinker (DTA Ltd/EurAgEng) and Joe Morris (CU/Morris Resource Economics)
Venue: Maulden Church Hall, Maulden, Beds MK45 2AU
Dave Tinker has had several years meeting with European ag. engineers and, with Joe Morris, he looked at the proposals for the reformed CAP post-2013 and the implications for the European agricultural machinery industry. Although the reforms to the CAP are still being discussed there is a general form that looks likely to happen. What is likely to be in the reform? How are farmers likely to react? What developments are likely in farm machinery design? How does engineering and politics mix?
For further details contact the Branch Secretary: John Stafford
Tel: 01525 402229 Email: john.stafford@silsoe-solutions.co.uk

Wrekin Branch
Mon 10 October 2011
LAND SYSTEMS - WEAPONS AND VEHICLES
Speaker: Tim Stacey
Venue: BAE Systems Training Centre, Telford - tbc
For further information please contact the (acting) Branch Secretary: Jim Loynes.
Tel: 07836 602750 Email: jloynes@harper-adams.ac.uk

Yorkshire Branch
Thurs 13 Oct 11 19:30
SIROMER TRACTORS
Venue: The Fox & Hounds, 39 Top Lane, Copmanthorpe, York YO23 3UH. Flat pack, low cost and EU type-approved. For further details please contact the Branch Secretary: Mark Andrews.
Tel: 0191 569 2380 Email: andrews_mark_a@cat.com

Western Branch
19 October 2011 - date tbc
VISIT TO GRAIN HANDLING EQUIPMENT MANUFACTURER - TBC
Details to be advised.
For further information please contact the Branch Secretary: Rupert Caplat
Tel: 01235 522828 Email: rupert.caplat@lindehydraulics.co.uk

Northern Ireland Branch
19 October 2011 starting at 16:00
DEVELOPING CONCRETE TECHNOLOGY
Speaker: Wilbert Moore, MD, Moore Concrete Ltd
Venue: Moore Concrete, Caherty House, 41 Woodside Road, Broughshane
This meeting will take the form of a site visit, followed by a meal and then a presentation (at 20:00) by Mr Wilbert Moore on "The company; its history; its products; and plans for the future".
For further details please contact the Northern Ireland Branch Secretary: Ian Duff
Tel: 028 8673 6977 Email: duffi@iagre.biz

Yorkshire Branch
Sat 5 Nov 11 09:00
DISHFORTH PLOUGHING MATCH
Located between Busby Stoop, towards Northallerton. For further details please contact the Branch Secretary: Mark Andrews
Tel: 0191 569 2380 Email: andrews_mark_a@cat.com

South East Midlands Branch
Mon 7 November 11 starting at 19:00
OFF-ROAD SPECIALIST VEHICLES
Speaker: Bill Davis, Business Development Director, Creation UK
Venue: Cranfield University, Cranfield, MK43 0AL
This is a joint meeting with IMechE. Creation is one of the UK's leading independent vehicle design, development, engineering services and program management specialists. The talk will focus particularly on the dynamics of specialist off-road vehicles.
For further information contact the Branch Secretary: John Stafford
Tel: 01525 402229 Email: john.stafford@silsoe-solutions.co.uk

West Midlands Branch
Tues 08 November 2011 starting at 19:30
THE DEVELOPMENT OF THE TRACTOR
Speaker: Richard Trevarthen
Venue: Stoneleigh Village Hall, Nr Kenilworth
For further information and to book your place for this visit, contact the Branch Secretary,: Michael Sheldon.
Tel: 01926 498900 Email: michaelcsheldon@yahoo.com

Yorkshire Branch
Thurs 10 Nov 11 19:30
AGRICULTURAL MACHINERY DESIGN
Venue: The Fox & Hounds, 39 Top Lane, Copmanthorpe, York YO23 3UH. For further details please contact the Branch Secretary: Mark

Andrews.
Tel: 0191 569 2380 Email: andrews_mark_a@cat.com

East Anglia Branch/Norwich Engineering Soc
Monday 14 Nov 2011 19:30hrs
21ST CENTURY AGRICULTURAL ENGINEERING
Speaker: Gerald Anderson
Venue: Holiday Inn, Ipswich Road, Norwich
Gerald Anderson will speak on the application of auto-steering, GPS and laser guidance to tractors and harvesters. The event is organised by the Norwich Engineering Society so check out their website at www.engineeringsociety.co.uk for the latest details before attending. Web: www.engineeringsociety.co.uk

Wrekin Branch
Mon 14 Nov 11
TESTING VEHICLES
Venue: Harper Adams University College.
For further information please contact the (acting) Branch Secretary: Jim Loynes. Tel: 07836 602750
Email: jloynes@harper-adams.ac.uk

Ireland Branch
Tues 23 November 2011 starting at 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

Wrekin Branch
Mon 28 November 2011
YOUNG ENGINEERS COMPETITION AND BRANCH STUDENT AWARDS
Venue: Harper Adams University College. For For further information please contact the (acting) Branch Secretary: Jim Loynes.
Tel: 07836 602750 Email: jloynes@harper-adams.ac.uk

West Midlands Branch
Tues 06 December 2011 starting at 19:30
BUCHER HYDRAULICS'S PRODUCTS
Speaker: Simon Fantom, Bucher Hydraulics
Venue: Friends Meeting House, Maidenhead Road, Stratford upon Avon CV37 6XT
A presentation on the company and use of its wide range of products in agriculture and related industries.
For further information and to book your place for this visit, contact the Branch Secretary: Michael Sheldon.
Tel: 01926 498900 Email: michaelcsheldon@yahoo.com

Northern Ireland
Weds 07 December 2011
KUBOTA TRACTORS - AMENITY AND BEYOND
Speaker: David Blackwood, Sales and Marketing Manager, Kubota UK Ltd.
Venue: CAFRE, Greenmount
For further details please contact the Northern Ireland Branch Secretary: Ian Duff
Tel: 028 8673 6977 Email: duffi@iagre.biz

Yorkshire Branch
Thurs 8 Dec 11 19:30
KRONE IMPLEMENTS
Speaker: James Douggleby, Area Sales Manager
Venue: Meet at The Fox & Hounds, 39 Top Lane, Copmanthorpe, York YO23 3UH
James will discuss the latest technology and developments at Krone Implements. For further details please contact the Branch Secretary: Mark Andrews
Tel: 0191 569 2380 Email: andrews_mark_a@cat.com

South East Midlands Branch
Mon 12 December 2011 starting at 19:30
REVIEW OF AGRITECHNICA
Speaker: Martin Rickatson, JMR Agriculture
Venue: Maulden Church Hall, Maulden, Beds MK45 2AU
A report on items of interest and new releases found at Agritechnica 2011 by Martin who will provide an overview of different products and services.
For further information contact Branch Secretary: John Stafford.
Tel: 01525 402229 Email: john.stafford@silsoe-solutions.co.uk

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/userlogin

Other Events:

Mon 31 October 2011 to Weds 02 November 2011
Crop World
CROPWORLD GLOBAL 2011
Venue: ExCel London
Oxfam's Growing a Better Future report suggests climate change, the scale of farming land in developing countries, speculators who drive up prices and competition for land to grow bio-fuels are impacting food prices and putting pressure on food supplies.
At CropWorld Global hear Phil Bloomer discuss Oxfam's findings in detail with experts. For more information please visit the CropWorld website. Web: www.cropworld-global.com/page.cfm/ID=1

Weds 02 November 2011 to Thurs 03 November 2011
Institute of Ecology and Environmental Management (IEEM)
IEEM 2011 ANNUAL CONFERENCE - REBUILDING BIODIVERSITY
Venue: The Liner Hotel, Lord Nelson Street, Liverpool L3 5QB
This conference aims to inform delegates of the strategic and practical approaches to conserving and rebuilding biodiversity in the UK. The Conference will paint the 'European picture'; examine current biodiversity conservation tools available; consider the evidence base for priority actions; and feature practical case studies in the terrestrial and aquatic sectors. It will appeal to ecologists and environmental managers working in the public or private sector.
To view the full conference programme, full details and to book your place visit the IEEM website by visiting the address below.
Web: www.ieem.net/ieemautumnconference2011.asp

Fri 11 November 2011 to Sat 12 November 2011
VDI Max Eyth Society for Ag Eng and EurAgEng
69TH LAND TECHNIK-AGENG 2011 - SOLUTIONS FOR INTELLIGENT AND SUSTAINABLE FARMING
Venue: Hanover, Germany
A leading international conference on Agricultural Engineering staged as a prelude to AGRITECHNICA. The programme, which includes 75 presentations by speakers from industry and research, will showcase developments in tractors and agricultural machinery; electronics; software engineeringn and data handling.
Tel: +49(0)211 62 143 59 Fax: +49(0)211 62 141 29
Email: koenig_b@vdi.do Web: www.vdi.de/landtechnik-ageng

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