Landwards

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ENGINEERING TEA

Matthew Ingram on the challenges working on an African tea estate

THE MAKING OF AN AGRICULTURAL ENGINEER

Across the ages, agricultural engineers continue to make a difference. Profiles of John Fox, Graham Thompson and Robert Fillingham.

SUSTAINABLE FOOD SECURITY?

Report by Rothamsted Research

IAgrE Professional Journal www.iagre.org Volume 66, Number 4 Winter 2011

Biosystems Engineering

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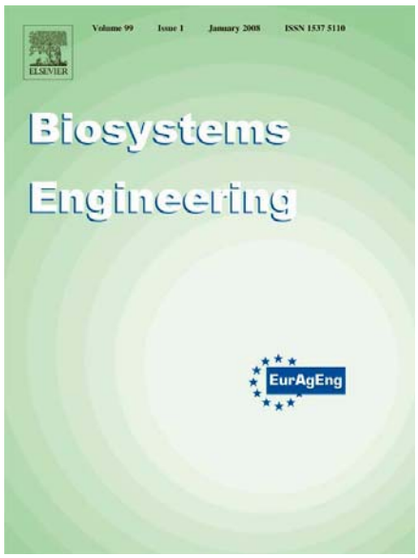

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IAgrE

EurAgEng

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 4, August 2011, Pages 308-325

Discrete element method modelling of a centrifugal fertiliser spreader

C.J. Coetzee, S.G. Lombard
University of Stellenbosch, South Africa

Experimental testing and calibration of new machines and fertiliser can be costly and time consuming. Standard centrifugal fertiliser spreaders are designed to achieve a uniform distribution across the entire field. Fruit trees, however, are planted in rows and it would be advantageous to concentrate the fertiliser closer to the tree trunk and hence the root system. This could reduce the amount of fertiliser needed and will also reduce the negative environmental impact. A discrete element method (DEM) model of a centrifugal fertiliser spreader was developed. A sensitivity study was used to determine the DEM parameters by comparing the results to experimental results. The effects of the disc speed, feed position, feed rate and vane angle on the spread pattern were investigated experimentally and compared to the DEM results. It was shown that the DEM model can be used to make both qualitative and quantitative predictions of the spread pattern under different spreader settings. This indicates that DEM can be a powerful tool in the development of new spreader concepts.

Volume 110, Issue 1, September 2011, Pages 10-19

Vibration levels and frequencies on vehicle and animals during transport

Girma Gebresenbet, Samuel Aradom, Fufa S. Bulitta, Eva Hjerpe
Swedish University of Agricultural Sciences, Uppsala, Sweden

During transport, animals are subjected to various stressors, including vibration, noise and poor handling, and these compromise animal welfare. This study determined vibration levels and resonance frequencies for vehicles and dairy cows. A Volvo FM12 with air suspension, driven at 30, 50, 70 or 90 km h-1 on three road types, was used for transportation. To study the effect of standing orientation on vibration, animals were positioned parallel or perpendicular to the direction of travel. For each run, measurements were made over a 20 s period on five animals. The highest vibration level observed on animals was 2.27 ± 0.33 m s-2 when driving on gravel roads at 70 km h-1. Vibrations in the horizontal and lateral directions were lower on animals positioned perpendicular to the direction of travel than on those facing forward. Both road conditions and standing orientation have a significant effect on vibration levels. The vibration exposure values for the vertical, horizontal and lateral directions exceeded the EU daily exposure action of 0.5 m s-2, but were lower than the daily exposure limit of 1.15 m s-2.

Volume 110, Issue 2, October 2011, Pages 73-82

Prediction of the contact area of agricultural traction tyres on firm soil

E. Diserens, P. Défossez, A. Duboisset, A. Alaoui
INRA-Ephyse, Villenave d'Ornon, France; ART Research Station, Switzerland; University of Bern, Switzerland

Equations were developed to enable reliable calculations to be made of the contact area for a wide range of traction tyres from independent easily accessible variables taken on firm ground. Given that when tyre size increases the specific contact area decreases and tyre stiffness increases, it is worth taking into account tyre intrinsic properties by studying the impact of external constraints such as load and inflation pressure on the contact area. Based on a wide range of measurements (64, from a total of 28 tyres used on 12 grassland and open ground sites), three classes will be proposed for estimation of the contact area on firm agricultural soil. When considering not only tyre size but also load and inflation pressure as explainable variables, an increase in correlation was observed. After taking into account intrinsic properties of the tyre, a new tyre classification was proposed leading to an additional increase in correlation.

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

Landwards
Agriculture • Horticulture • Forestry • Environment • Amenity

VOLUME 66 Number 4 2011

THIS ISSUE

EDITORIAL

Amongst the doom and gloom . . . .

FROM the crisis in the Eurozone to our Government's attempt to bolster the economy and drive up growth, the news on the financial front is pretty depressing these days.

It is worth reminding ourselves that agriculture, and by association, agricultural engineering has hit some rocky and rough times post-War when everyone had to batten down the hatches.

And whilst the impact of present economic restraints will hit every industry sector, there are plenty of reasons to be optimistic for the future.

As ever, it's the people that matter. So I was delighted to find that I could seamlessly connect three people at different stages of their career for a feature in this month's issue, *The Making of an Agricultural Engineer*.

There are fascinating tales of achievement from John Fox, John Deere's Graham Thompson and Harper Adams student, Robert Fillingham, which although separated by half a century, still speak volumes for the skill, tenacity and commitment demonstrated by many, many others throughout the industry.

We worry continuously, it seems, about making our industry visible and attractive enough for skilled people to want to participate in land-based engineering.

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

I think however we are starting to see a real step-change in perception of engineering in general and our industry in particular.

Talking to the Head of Engineering at a college offering land-based engineering courses recently, he told me that he had seen a definite shift in the quality of technicians from dealerships over the past four or five years.

This indicated, he said, that dealers were getting more choosy about the quality of the staff they were taking on.

There are a number of reasons for this, amongst them the creation of the LTA (Landbased Technicians Accreditation) scheme which provides a formal career path for existing staff and new entrants.

And here a New Year wish that the LTA scheme is supported and embraced by more and more suppliers.

So plenty of positive news to end the year - and time for me to wish everyone in the IAgrE community a ***Very Happy Christmas and Peaceful New Year.***

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IAgrE
www.iagre.org

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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***

New rural grants available for green projects

A NEW scheme under the Rural Development Programme for England (RDPE) aims to help farmers, foresters and horticultural businesses in England to increase profits and reduce their impact on the environment.

Farmers, foresters, contractors, woodland owners and horticulturalists across England are eligible to apply for grants to invest in green projects and new machinery so their businesses can grow in an environmentally friendly way. The selection process is competitive and applications will be appraised against one another.

To be eligible for funding, projects must be in nutrient management, energy efficiency, water resource management, animal health and welfare and forestry.

There is £20m available under the Farming and Forestry Improvement Scheme (FFIS) until December 2013. The grants are for capital items and the grant rate available is up to 40% (50% in upland areas) and the maximum grant allowable per project is £25,000. The minimum grant per application is £2,500.

•THE only certainty in the current grain market is that it will remain volatile, visitors to the UK Grain event learned in November.

Alongside the exhibition of grain drying, handling and storage technology and services, the seminars and GrainStorm areas offered visitors a wide range of advice on marketing grain. Much of the talk was about how to help farmers protect themselves from market uncertainty.

IAgrE members win top industry awards

IAgrE members, Dan Massey and Alan Jones, both won prestigious awards at the recent Industry Awards Dinner which took place at the Savill Court Hotel, Windsor, organised by the Agricultural Engineers Association (AEA) and *Service Dealer* magazine.

The Awards recognise sales and service excellence amongst dealers in the land-based equipment market comprising farm machinery, garden machinery, professional turfcare and ATV/Quads.

Dan Massey, EngTech, who featured in the profile section of *Landwards'* last issue, won the Technician of the Year award in the Stars of the Dealership category, sponsored by Briggs & Stratton. Dan is lead service technician with dealers JE Buckle based in Stevenage. He is one of the first John Deere Master Technicians, holds the LTA Level 4 qualification, and recently became a member of the IAgrE Council.

The judging panel said of Dan, "Since he joined J E Buckle Ltd from school, Dan has made impressive progress and today is one of a select band of land-based technicians to hold the highest level of Landbased Technician Accreditation."

Kverneland's Alan Jones was the recipient of the 2011 Lifetime Achievement Award, sponsored by AgriArgo UK.

Alan joined Ransomes, Sims and Jefferies in 1972 after two years at Rycotewood College. He moved to Kverneland in May 1980, initially as parts and service manager, and became product manager for ploughs and cultivators in 1998. This year, he took partial retirement but will continue to advise Kverneland as a Consultant until the end of this year.

Alan is the current Chairman of the Society of Ploughmen, and has written a definitive publication Plough Guide of which over 10,000 copies have been printed and is now available in several languages.

ABOVE: IAgrE President Peter Leech with Technician of the Year winner Dan Massey.
BELOW: Ray Spinks of sponsors AgriArgo UK congratulates Lifetime Achievement recipient, Alan Jones

Forestry Commission bridge awarded

FAR Moor Bridge, Selside, Yorkshire has won a Judges Special Award in the 2011 British Construction Awards under the 'Small Civil Engineering Project – up to £3m category'. Commissioned by Yorkshire Dales National Park Authority, the innovative design is probably the largest example of a stress laminated arch bridge in the world and has been designed specifically for walkers, horse riders and mountain bikers.

The Judges Special Award is for a building or civil engineering project of any size, which the judges consider to be particularly inspirational in one or more aspects.

It was designed by Dr Geoff Freedman, Fellow of the Institution of Agricultural Engineers and former Forestry Commission Engineer, with Houseman and Falshaw as the main contractor. The stress laminated structure uses short lengths of timber to create a bridge with three arches spanning 53 metres across the River Ribble near Selside. It is a part of the Pennine Bridleway National Trail which runs for 200 miles from Derbyshire to Cumbria.

Far Moor Bridge, Selside, Yorkshire

Dr Freedman said, "The remote and rural setting influenced the choice of bridge design, as the use of heavy machinery would have been impossible. A laminated construction allows large spans to be formed from short lengths of timber that can be carried and lifted into position by hand. It also blends in well with the natural surroundings."

The project was also highly commended in the structural category of the 2011 Wood Awards – the UK's premier architecture and furniture competition for building and design in wood.

This honour further endorses the work of members of the Forestry Engineering group, who over recent years the group have won numerous awards from various bodies against tough national and international competition.

FAO launches a Global Soil Partnership

IAgrE can make an important contribution - *says Mark Kibblewhite*

IT is encouraging that there is an increasing appreciation among senior policy-makers of the importance of soil resources.

One important new development is the initiative of the FAO to form a Global Soil Partnership (GSP) for Food Security and Climate Change Adaptation and Mitigation.

The launch meeting was held at the FAO headquarters in Rome in early September and attended by towards 200 delegates from around 70 countries. Although several scientists attended from the UK, disappointingly, there was no UK Government representative.

However, I recently represented IAgrE alongside colleagues from the British Society of Soil Science at a positive meeting with Defra officials, when we briefed them about what had been decided at the launch and the opportunities presented by the creation of the GSP.

There is an urgent need for a global soil initiative to report authoritatively on soil resources and the steps needed for their better management. The United Nations Convention on Combating Desertification (UNCCD) has not delivered substantive progress on soil management, even for those countries with extreme land degradation. Soil has not been a main priority at the FAO recently, with only one soil scientist in its headquarters.

Meanwhile, the central role of soil is highlighted by the United Nations Framework Convention on Climate Change (UNFCC) and by the Convention on Biological Diversity.

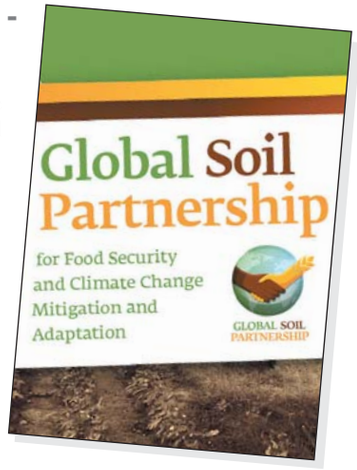
IAgrE and its membership can make an important contribution to the GSP which is distinct from the main thrust of soil scientists. The science ambition is to create a new digital soil information resource with a pixel resolution of 50m^2 covering the whole land area of the planet.

Technology to deliver this extraordinary dataset has already been identified and the GSP is an excellent vehicle for organising the necessary international collaboration. However, to be successful, the GSP must also create momentum for the faster development and wide implementation of better soil management tools, including machinery.

Therefore, IAgrE should be collaborating with its international colleagues to support soil and water engineering in the GSP.

At the Rome meeting it was agreed that Rio+20 offers an important opportunity to bring soil resources to the top of the political agenda. It was stressed that policy makers need to understand the implications of urbanisation and the consequent loss of productive soils, for food security.

> “. . IAgrE should be collaborating with its international colleagues to support soil and water engineering in the GSP”



Escalating demands for food, biofuel and other products must be met while ensuring sustainable land use systems (soil, water and biodiversity management) are resilient to climate change. The intention is for the FAO to sponsor an Inter-Governmental Panel on Soils to report to Rio+20.

The GSP aims to enhance the sharing of knowledge, data, methods, and technologies for soil resources management, making maximum use of collaboration and coordination among key partners, projects and networks. Practical solutions to soil management challenges cannot be found without the effective participation of farmers / land users, especially as soil management requires local and national solutions. IAgrE can help make the connections

A GSP brochure can be found at:
http://www.fao.org/nr/water/docs/GSP_BROCHURE_A4.pdf

Reaseheath tops employment league

GRADUATES from agriculture courses at Reaseheath College in Cheshire are the most successful in finding jobs, a national survey of students has found.

The National Student Satisfaction Survey, which questioned thousands of higher level students countrywide, showed that 95% of Reaseheath’s agricultural graduates found employment or went into further study.

The figures put Reaseheath firmly at the top of the employment league of educational institutions offering degree courses in agriculture and related studies, followed by Writtle College with 91% and the Scottish Agricultural College and the Royal Agricultural College with 85%.

A further breakdown of statistics showed that 50% of Reaseheath’s agriculture graduates went directly into higher level jobs such as management. The survey also showed that an overwhelming majority of the students (83%) were satisfied with their course.

The survey, based on the experiences of final year students from leading colleges and universities, is carried out by the government and provides data for the official comparison site published at *http://unistats.direct.gov.uk*

Responding to the figures, Reaseheath Principal Meredydd David said, “We are delighted with these results, which shows that our graduates are much sort after by industry and have gained the knowledge and skills that make them really competitive in the jobs market.”

The college has recently invested £3.5 million into its dairy and livestock facilities and into a demonstration anaerobic digester on its commercial farm. The investment is part of a total £35 million spend across campus. Reaseheah has also purchased the former Genus MOET herd of high merit dairy cows, now renamed Reaseheath Holsteins.

•A NEW Water Management Tool, developed by LEAF (Linking Environment & Farming) was launched by Jim Paice MP, Minister of State for Agriculture and Food recently.

The online resource offers farmers a complete health-check for water use on their farm, helping to make every drop count. Split into 7 sections it looks at better distribution and monitoring; improved irrigation; more efficient washing systems; protecting water quality; recycling and reuse.

Using the tool, farmers will be able to better understand how to increase their efficiency and, in turn, make significant savings on their water bills.

To find out more visit *www.leafuk.org*

Oxford Farming Conference 2012

THE political and economic line-up at the 2012 Oxford Farming Conference (OFC) will not disappoint according to Cedric Porter, the 2012 Chairman.

"We have Caroline Spelman and her shadow counterpart, Mary Creagh as well as the USDA Chief Economist Dr Joe Glauber kicking off the first morning. We have also secured George Magnus, Senior Economic Advisor to the UBS Investment Bank who will debate whether emerging markets have already emerged."

The Conference programme for the event, which runs between 3-5 January 2012, has been launched via the new OFC website *www.ofc.org.uk*. "For the first time this year we will be taking online bookings and we're urging anyone who would like to come to book as soon as they can," Mr Porter added.

Since 2009 the OFC has conducted one piece of industry research which has previously examined the public perception of farming, where future agricultural R&D needs to be focused and the value and viability of UK farming. "This year Dr Alan Renwick's team at SAC is undertaking the OFC research which will examine who, where and how global power is exerted in agriculture and what impact this power base will have on British farmers and our domestic food chain in the future."

In a session chaired by OFC Director Nick Tapp four speakers will tackle where there is cooperation or confrontation in the UK food chain.

"We will also raise sustainable production in the context of the Foresight Report, our speakers are Professor Bob Watson, Juan Antonio Marhuenda Berenguer, Director of Production, at Primaflor in Spain, Martin Harper from the RSPB and Nigel Lok a South African Dairy farmer," said Cedric Porter.

Dr Dick Godwin, FREng, honoured

BCPC Medals awarded at CropWorld Global

BCPC has awarded its highest accolade, the BCPC Medal to Dr. Richard (Dick) J. Godwin FREng as well as William (Bill) J. Angus, Dr. Peter J.W. Lutman and Dr. John Fisher.

The presentations were made by BCPC Chairman, Dr. Colin Ruscoe on the first day of this year's CropWorld Global conference held at the ExCel Conference and Exhibition Centre, London between 31 October and 2 November 2011. BCPC medals are awarded to people who have made an outstanding contribution to environmentally-sound crop production.

An internationally recognized and multi award winning researcher and educator in the field of agricultural soil mechanics, soil and waste management and precision agriculture, **Dr. Dick J. Godwin** holds Emeritus, Honorary and Visiting Professorships in agricultural engineering from Cranfield University, the Czech University of Life Sciences and Harper Adams University. He is a former Director of Research, Dean of the Faculty of Agricultural Engineering, Food Production and Rural Land Use and Pro Vice Chancellor of Cranfield University.

A key achievement in Dick's career was his development and delivery of Masters' courses in agricultural engineering, precision farming and soil management, and short courses for manufacturers, advisors and farmers. Dick has refereed over 100 journal publications, 130 conference proceedings, and delivered numerous Keynote presentations and patents for soil implements and soil strength sensing systems.

2011 BCPC medallists. L-R: Dr Peter Lutman; Dr Dick Godwin; BCPC Chairman, Dr Colin Ruscoe; Bill Angus and Dr John Fisher

He served as International Director of the American Society of Agricultural Engineers (1992-94) and President of IAgrE (1994-96). He is a Fellow of ASAE, the Royal Academy of Engineering, the IAgrE, the Royal Agricultural Societies (2009) and the Royal Agricultural Society of England. He is Editor of a number of international journal publications, Chairman of the Douglas Bomford Trust, founding Trustee for the Claas Foundation in Germany and a member of the Advisory Committee to the Faculty of Agriculture of the Royal College of Agriculture.

On receiving his award Dick said, "It is a great honour for a soil and water engineer to be recognised by the BCPC for the contribution that I have tried to make to crop production in the UK over the past 4 decades and I would like to thank the Council very much for the Award. Whilst good soil and water management have always been vital to both crop productivity and the environment it has been overlooked in recent years.

"Thankfully, its importance is now being recognised as the demand for improved crop yields and quality, improved water efficiency and reduced energy consumption all impact upon the budgets of the farmer, the consumer and government."

Queen Elizabeth Prize for Engineering

IAgrE in support of newly launched initiative

THE Queen Elizabeth Prize for Engineering is a new global award which celebrates truly outstanding advances in engineering that have created significant benefit to humanity.

The £1 million Prize will be awarded in the name of Her Majesty The Queen to an individual or team of up to three people, of any nationality, directly responsible for advancing the positive application of engineering knowledge.

The Prize will recognise and celebrate the best – and also serve to illuminate the sheer excitement of modern engineering. It will be international and will be awarded biennially, the first being presented in Spring 2013.

IAgrE have announced that they are in support of the Prize with President, Peter Leech saying, "This award is a great way to show engineering in its true light as a cornerstone of society and a key driver for economic well being. The UK's agricultural engineers are instrumental in tackling the world's challenges of hunger and drought and have the right tools for the job.

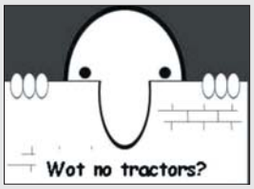
"It is vital that the UK's aspiring professionals are directed towards and inspired by a career in engineering. There are some very demanding and exciting challenges facing humanity that will require engineering solutions. None more so than the expertise of agricultural engineers with their particular knowledge of sustainable food, forestry, fibre and biomass production, along with the management of soil, water and our other finite natural resources.

"Looking forward, agricultural engineers are finding ways to protect and enrich soil and water resources, using less water, energy and land resources to provide better quality food for an increasing population."

The common denominator

CEO VIEW

WHEN I arrived at IAgrE HQ to start the first day in my role as CEO, I noticed a strategically placed copy of *Landwards* on my desk. The Winter issue with a seasonal picture of one of Geoff Freedman's bridges on the front cover. The cover had been annotated with a picture of Chad with the words *"Wot no tractors?"*



Whether this was meant to be a warning message I will never know but I remember it with a wry smile.

The articles in this issue of *Landwards* give the lie to the notion that ag-engineering is only about tractors and associated machinery. And I am pleased that this year, our seasonal cover represents other niche areas of our profession - sheep (no doubt wearing EiD tags) and one of Matt Ingram's hydro-electric power plants.

I have waxed lyrical before in this column about the profession we represent. I can do no more in this issue than to reflect on the careers outlined within. Just look at what our members do (and have done).

In his Editorial, Chris Biddle talks about the skills, tenacity and commitment demonstrated by those in our industry. I would add to that the depth and breadth of knowledge displayed.

- Matt Ingram living the ag-engineers dream - working in a developing country applying a vast set of skills in difficult areas in a climate somewhat more attractive than ours.
- John Fox - responsible inter alia for the development of the Bomford Superflow (congratulations Mrs Fox on coming up with that name) - an implement that I was able to put to good use in some difficult soils in Sudan behind an M-F 174 in spite of being told by others that it would never pull it. Amazing what a bit of ballast will do!
- Graham Thompson - holding a very senior position within one of our most prestigious ag-engineering companies
- Robert Fillingham - a HAUC student with accolades from companies with such diverse interests as fencing and combine harvesters.

There are a couple of messages to be taken from all of this.

Firstly, the common denominator of IAgrE membership. Like John Fox, I too made use of the IAgrE Appointments Service in obtaining jobs which made up the greater part of my career. Secondly, the fact that those with skills and determination will prevail whatever their educational background.

Finally, on behalf of all at IAgrE headquarters I would like to wish all our members a very Happy Christmas and a Peaceful New Year.

Christopher Whetnall

Agriculture is UK's riskiest profession

NEW figures published by the Health and Safety Executive (HSE) once again condemn agriculture as the most dangerous profession in the UK. Accidents on farms account for around a fifth of Britain's workplace deaths yet only 1.5 per cent of the population work in the industry.

Agricultural engineers have a crucial role to play, whether in equipment design, distribution, maintenance, or just spreading good practice to everyone involved in agricultural technology and food production. Reaching the next generation at college with effective messages and practical demonstrations is vital.

Workplace transport and contact with machinery are two of the main causes of fatal and major injuries in farming each year. Other common causes include falls from height and being struck by moving objects and livestock.

But it's not just about machine design. It is also about looking at how equipment is used in practice and developing the right techniques and processes to manage operations. Improvements need to be made in livestock handling and avoiding hazards such as inadequate guards on machinery, steep slopes and overhead power lines.

"Everyone in the industry needs to take this issue seriously," said IAgrE's Chief Executive Chris Whetnall. "We are not talking about more red tape, just solid no-nonsense advice."

IAgrE members include leading experts in agricultural health & safety, tractor and trailer braking systems, animal handling technology and knowledge transfer specialists. The Institution stands ready to assist manufacturers, policy makers, insurers and farmers themselves by facilitating contact with the best sources of practical and research expertise in the sector.

"Significant reductions in on-farm accident rates are achievable if all the landbased organisations make a concerted effort to work together on this," concluded Chris Whetnall.

IAgrE President, Peter Leech unveils the plaque

£400,000 agricultural engineering workshop opened at Easton College

by Michael Pollitt, Agricultural editor, *Eastern Daily Press*

A £400,000 investment to train the agricultural engineers of the future and bridge the skills gap has been launched at Easton College.

As farming gears up to boost food production to feed a rapidly-expanding global population in the next couple of decades, a new generation of skilled engineers and technicians will be needed, said Peter Leech, President of the Institution of Agricultural Engineers.

He officially opened the new workshop at the college, which represented the latest stage in a £33m programme of investment in teaching facilities in the past 20 years.

Mr Leech, who is regional training manager for John Deere covering the whole of Europe, including, Russia, the Middle East and Africa north of the Sahara, praised Easton as "forward-looking" and for investing heavily for the future in buildings, equipment, staff and resources.

He told the audience of about 100 employers representing the agricultural machinery industry at a local and national level that "we should look to this fine example and support it as much as possible.

"In the 40 years that I've been in this industry, I've seen remarkable changes in technology and amazing innovations. Over the next 40 years we will need to accelerate the pace of innovation to help our farmers meet the challenges of doubling food production within the next 40 years.

"As technology becomes more complex and sophisticated the more we need high calibre, well-educated people at all levels to design, manufacture, distribute, sell and support these new technologies or solutions," added Mr Leech.

He said that the industry had developed the LTA (Land-based Technician Accreditation) to recognise four levels of achievement and training. The programme was based on continuing training that technicians receive from manufacturers and recognises higher grades as advanced and master technician.

Easton College's new workshop and, below, Peter Leech talking to students

Mr David Lawrence, Principal of Easton College, who had studied at Kesteven Agricultural College, Lincolnshire, with deputy principal Clive Bound, welcomed fellow student Mr Leech. After college, Peter Leech started his 40-year career with John Deere at Langar, Nottinghamshire, and most recently became regional training delivery manager based at Mannheim, Germany, covering Europe and further afield.

The latest investment in a £300,000 training workshop was part of a strategy to reverse the prolonged decline in agricultural engineering recruitment, which has challenged the industry for the past decade or more.

"In East Anglia, there is now minimal provision and nationally the capability to deliver to industries' needs is very limited and getting worse," said Mr Lawrence.

"At undergraduate level the situation appears even worse. This cannot go on. The only way we as a college can help to solve the current skills crisis is to work in a close partnership with employers.

> "... Over the next 40 years we will need to accelerate the pace of innovation to help our farmers meet the challenges of doubling food production"

"The impact on the much-reduced level of recruitment to the sector has had a serious knock-on impact on education and training provision. We have been making very substantial investments at the college both in terms of physical resources but also in staff."

He said that £300,000 had been spent on a new building plus another £100,000 on equipment.

Mr Lawrence said that a good start had been made with 30 service engineering apprentices, 60 full-time agricultural engineers, 12 foundation degree students and 14 to 16 year old students attending college one day per week from school.

"The industry still offers some outstanding career opportunities for young people," he added.

Two student course representatives, Henry Clewlow, of Long Stratton, who is a studying for a national diploma in land-based engineering, and Caitlin Cartwright, 17, of Walsoken, near Wisbech, who is a first-year level III diploma student, thanked Mr Leech.

Record apprentice intake for Claas

Technician scheme split between Barony & Reaseheath

A RECORD 26 students have joined this year's CLAAS Agricultural Technician Apprenticeship intake, which is split between Reaseheath in Cheshire and Barony College near Dumfries. Also joining the scheme for the first time are students from both northern and southern Ireland.

CLAAS is the only landbased engineering company to offer a manufacturer's apprenticeship within Scotland, which this year sees 18 students joining. The Barony course was launched in 2008, in order to provide CLAAS dealers in Scotland and the north of England with the same opportunity as that which southern dealers have to train and develop the skilled technicians they need for the future, with the course based at Reaseheath.

The students study for a National Diploma in Land Based Technology, which is seen as a practical hands-on alternative to Highers or 'A' Levels. One of the main benefits of the Diploma, in addition to higher technical credibility, is that upon qualification, the successful candidate will receive a Pass, Merit or Distinction grade, which will enable them to better demonstrate and gain recognition for their ability and their potential to progress to higher level qualifications.

Barony's latest Agricultural Technician Apprentice intake

During the four-year apprenticeship programme, students spend three years studying the National Diploma, in which time they have the opportunity to train at CLAAS UK headquarters at Bury St Edmunds, and subsequently the Group headquarters at Harsewinkel in Germany.

Drew Easton, Section Head for Engineering at Barony College said, "Our partnership with CLAAS enables us to provide our students with access to state of the art machinery. CLAAS support to the dealers where the apprentices work is excellent, and the travel opportunities presented are unrivalled within the industry."

The new intake of students is pictured above at their recent induction day, which was also attended by CLAAS After Sales Director Alastair Tulloch, HR Manager Jane Broomhall and Training Manager John Palmer, who said, "Barony college has a proven commitment to Landbased Engineering and commands nationwide respect from every corner of the sector.

"CLAAS UK is very pleased to welcome all the entrants onto the program and to support Barony in delivering it, knowing as we do, that this will provide the foundation for our collective success in the future."

Farmers urged to embrace new technology

THE urgent need for farmers to embrace new technologies to meet increasing demands for food, was the key message delivered by one of the country's leading plant scientists, Professor Sir David Balcombe FRS, a LEAF's recent President Event.

Professor Sir David Balcombe (right), Regius Professor of Botany at the University of Cambridge, gave the key note speech at the event which took place on November 2nd. His talk entitled 'Growing Acceptance for New Technologies', urged farmers to embrace new agronomy and plant genetics in order to meet the food requiremnts of a growing population using sustainable practice. Tackling the needs of a population expected to grow to 9 billion within the next 30 years.

Professor Baulcombe explained, "There is huge potential within the scientific community, to come up with viable scientific solutions for feeding a growing population. Farmers, the food industry and wider society have a responsibility to help realise this potential."

Weathering the Perfect Storm - who do you want in your lifeboat?

Landwards 2012 Conference, Thurs 10th May, Stoneleigh Park, Warwickshire

THE perfect storm of sustainability in global agriculture and food production is upon us, with key challenges in soil and water resource management, population and climate change.

The UK has a fantastic pool of talented and innovative farmers supported by an adaptable and resourceful cast of researchers and engineers.

In order for agriculture to rise to these challenges, there is an increasing need for an integrated agricultural research community, covering all strands of plant breeding, animal science, technology (hardware & software) and soil and water resource management, whilst at the same time balancing the sustainability requirements of society.

To facilitate this integrated approach, the respective communities need dialogue with policy makers, the right political landscape and framework for successful technology transfer and commercial realisation. We really need suitably skilled, experienced and professional individuals with a passion for agriculture across all disciplines in order to rise to the challenge.

The purpose of this conference is:

- **to inform the debate on future agricultural sustainability;**
- **to demonstrate that the agricultural research community is ready, willing and able;**
- **to give a broad view of the depth and breadth of agricultural engineering and its contribution to food sustainability.**

This day is for those seeking to be more actively engaged in the future of the integrated agricultural research community.

If you have an opinion, want to be involved in the debate or want to have your say on the future direction of agricultural research, come along and get involved.

To get involved: *visit www.iagre.org*, email: *landwards2012@iagre.biz*, or call 01234 750876.

Where will the Technicians of tomorrow come from?

The meeting was held at the Claas UK headquarters, Saxham

How are we, as a profession, going to provide the technicians of the future was the topic for debate following IAgrE's October Council meeting

HELD at the Claas UK headquarters at Saxham, members listened to presentations from Steve Nott, Warranty Manager at Claas covering advances in the areas of telematics, GPS/Guidance Steering systems and remote diagnostics and how these hi-tech developments will impact on the traditional role of the agricultural technician.

As technology is becoming increasingly complex there is a need for specialists and yet colleges are not equipped with the latest modern equipment. The modern technician needs core engineering skills, an understanding of up to the minute technology, and an ability to effectively use diagnostic tools and techniques. Not only that but they also require customer facing communication skills. Tomorrow's colleges will need access to modern technology and equipment and have properly trained staff with up to date product knowledge and expertise.

And it's not just the technical side of the landbased sector that needs a strategy. Work also has to be done on the image of agricultural engineering. It is still perceived as a dirty industry and research shows children tend to get most careers advice from their parents and yet a third know little at all about vocational training.

So what can we do?

One of the solutions could be having the majority of colleges providing a general education and perhaps three or four colleges, well supported by the agricultural manufacturers, to handle the more sophisticated subjects such as telematics, GPS/Guidance steering etc.

Some of the points raised during the debate were, do we need a University Training College? What is the scale of the problem of updating lecturers on a regular basis? How do we update colleges and staff regularly? As the industry is too small to have a large number of providers do we come up with a unified structure that involves collaboration between a limited number of colleges supported by manufacturers?

All the suggestions and ideas will be discussed in more detail by the LE-TEC group. This group, made up of representatives from AEA, BAGMA and IAgrE was created to be the single voice for training and education within the Landbased Engineering sector.

ABOVE: John Palmer, Training Development Manager of Claas UK, with Richard Robinson.
BELOW: A service van displaying LTA livery

ABOVE: Peter Redman examines the portable version of a hydraulic power pack designed and built by students of HAUC for use at Saxham.
BELOW: The meeting was well attended

Technology & innovation

IAgrE President, PETER LEECH muses on the vital importance of functionality and communication between differing makes of machinery

I MADE comments in the last edition of *Landwards* concerning membership and why it is so important to us all from a personal career perspective.

This was brought home to me again quite strongly when I attended the 69th International Land.Technik conference in Hanover in mid November. This is possibly the largest single Agricultural Engineering conference in the world with a sell out attendance of 850 engineers, academics and industry partners all developing their knowledge and gaining new perspectives while networking with each other.

This was held in the 2 days preceding AgriTechnica in the stunning Conference Centre at the heart of the Hanover Messe. The conference presented 75 technical papers on a multitude of highly relevant and exciting themes, the most interesting to me from a future development perspective were those concerning vehicle and implement electrification and those concerning electronics and developments in telematics. All these technologies are leading to intelligent machines and intelligent farming.

Visiting the AgriTechnica show highlighted this even more, almost every exhibitor was promoting, electronics, software solutions, precision farming, telematrics and using all this towards intelligent farming solutions and decision support. What also became clear from seeing such an amazing display of equipment and services spread across 27 exhibition halls is that functionality between one make of machine and another make's tractor or another's monitoring/guidance system is critical for all this to succeed.

We all take for granted the 3 point hitch and standard linkage categories as well as standard PTO shaft and hydraulic connections but we need the same simplicity and fully accepted standards across software and electronic connections and protocols to really allow these technologies to succeed. We have strong ISOBUS standards and these are generally adopted but there are many other areas of systems and protocols where compatibility and therefore more widespread adoption of these technologies could be improved.

On this same theme of technology and innovation it is interesting to see the Gold and Silver medals awarded for innovation by DLG at the show. You would expect the major international companies to collect most of those medals, but that is not the case. There are many medals going to medium and small companies who are developing solutions to problems and innovating at the forefront. If you take a look at the total number of medals awarded to different companies over the last 5 years you will see that the second place in this table is taken by a European company who doesn't even make any self propelled machines.

A final point on this subject which may help us all put things into perspective relating to the size of our industry and innovation is to make a comparison with Apple Corporation.

As you know this company, developed and driven by the late Steve Jobs has the reputation of innovating and developing products that no one knew they even needed but once invented very soon could not live without. This is the power of technology and innovation combined with slick marketing and brand and product differentiation. In 2011 Apple had a global turnover of $108 billion, in comparison the total global market for agricultural machinery is estimated at $68 billion!!

AN exciting announcement that gives all of us engineers a new sense of pride is the announcement recently of the Queen Elizabeth Prize for Engineering Excellence.

The Prize will be international, and aims, in time, for the stature of the Nobel Prizes. It will be awarded biennially, the first being presented in Spring 2013. The Prize is the result of a growing realisation within political, business and engineering circles of the need for a pioneering initiative based in the UK to focus attention on engineering worldwide.

With the linkage of food production, global population growth and all the other global challenges, wouldn't it be appropriate and motivational for our industry if the first award of this prestigious prize went to an Agricultural Engineer. As your institution we will be promoting and supporting this heavily and encouraging some appropriate entries.

IT was my great pleasure to visit Easton College at Norwich at the end of November to open their new Ag Eng training workshop.

It is refreshing to visit a college where there is real enthusiasm for Ag Eng to the point that they are investing heavily not only in buildings but in teaching staff and resources. They have invested over £33 million in recent years and are positively looking to the future. You can read more on this in a separate report in this edition.

ONE final comment, it was a great honour to be able to attend the retirement dinner of John Fox back on October 3rd.

John has contributed so much to our industry over his extensive career, both as MD of Bomford, IAgrE President and founder of the Douglas Bomford Trust, it was a fitting tribute and is reported elsewhere in this edition. Enjoy your retirement John!

> "All these technologies are leading to intelligent machines and intelligent farming"

The making of an agricultural engineer

As a career, agricultural engineering does not hit the national headlines. It is still regarded as a niche sector, yet its contribution to the welfare of the world, food production and the environment is inestimable.

Across the ages, it has offered stimulating and exciting opportunities - but above all, it is an industry that focuses on people and develops their talents.

How better to illustrate those opportunities than through the eyes of three 'practitioners' from across the ages?

JOHN FOX

Scratching the surface

From helping to rescue an ailing manufacturer to a lifetime of supporting research and development, John Fox has been at the forefront of the agricultural engineering industry for over 50 years. CHRIS BIDDLE talked to him at his Stratford-upon-Avon home.

FOR someone who has made such a lasting contribution to our industry, John Fox's first few months with his new employer did not bode well

Having gained a National Diploma in Agricultural Engineering during 1954/5, John was sure that this was a career he wanted to follow, but first there was to be a spell with the Army (REME) based in Cyprus.

Whilst serving his time, he began to plan for his return to civilian life and placed his name on a newly created Appointments listing which had been introduced by IAgrE, itself starting to reform after the war.

IAgrE President at the time was Douglas Bomford who had been a driving force behind the diploma course (NDAgrE). He spotted John's name, and as a recent graduate immediately identified him as someone whom he might be keen to employ at the family firm of Bomford and Evershed.

Hitching a lift back to the UK with the RAF for Christmas in 1956, John attended an interview at a deserted factory at Salford Priors on Christmas Eve with the general manager Brian Armitage who then took him to meet Douglas Bomford at his home.

The upshot was that John was offered the role of Technical and Production Manager - to start on 1 September 1957 immediately after he left the Army.

His recollection of those early days at Bomford is still as sharp as ever.

"I remember sitting at my new desk on the first morning, watching a huge lorry draw into the yard with what looked like a mass of scrap metal.

"When I asked what it was, I was told that it was the initial delivery of 100 Sapper ditchers that the company had sub-contracted.

"When I queried such a large commitment, Brian Armitage replied cheerily 'Oh, they'll all be sold by Christmas'."

It wasn't long before John realised all was not well at the company. "The factory facilities were poor, the company was making a substantial loss, it was far too reliant on sub-contractors to manufacture straight-forward products such as dozer blades - and as for those Sapper ditchers!

"They weren't sold by Christmas - and indeed by any Christmas!" he says.

"Those machines were symptomatic of the problems within Bomford at the time. They hadn't been adequately tested, were full of manufacturing errors and it took considerable time and expense to even get them into a saleable condition.

"Looking back, had I known about the company's parlous financial state, my decision to join them might have been different."

But as ever, it is people that make things tick, and John had enormous admiration for Douglas Bomford. "Things might have gone awry, but he was dedicated to the industry, an advocate of education and training - and a splendid man to work with".

And so it was to be the beginning of a more than 50 year association with the Bomford family - and the Bomford legacy as a Trustee and Vice-Chairman of the

John and Pat Fox (seated), flanked by daughters (l to r) Elizabeth, Julia and Rachel.

Douglas Bomford Trust. John stepped down as full-blown Trustee in October, but remains a splendidly titled Emeritus Trustee and is a former President of IAgrE.

WHEREAS Douglas Bomford was an ideas man but often with limited commercial awareness, John Fox was also an innovator but with a keen sense of commercial reality.

During his first year with the company, he set about improving manufacturing capability and reducing the reliance on out-sourced products.

Soon the benefits started to come through in reduced costs, which in 1958 only stemmed company losses.

"It was only much later that I heard that the company auditor had put a pertinent question to the Directors at a Board Meeting 'Gentlemen, are you solvent?'"

There followed a series of management changes as the company faced up to moving forward - or going out of business.

"It was clear that nobody was going to come in for us with our huge liabilities," says John. "We were on our own - but in many ways it was a very exciting time."

John took over from Brian Armitage as General Manager in January 1959, and immediately started rationalising the product line.

But he soon realised that the Bomford range was too narrow, they wanted new products that excited the market.

As so often, a series of seemingly unconnected events came together.

Bomford had spotted a gap in the market for a heavy-duty cultivator that could be used by a typical tractor of the time (60-70hp).

John had been influenced in his deliberations by a paper written by Dr Peter Payne (later to become first Principal of the National College of Agricultural Engineering) on '*The Relationship between Soil and Tine*'.

"We had to produce a cultivator with much greater inter-tine, inter-row and under-frame clearance than anything else on the market, but it had to be light enough to be lifted and pulled by the relatively low-power tractors at the time."

Then browsing through a catalogue from steel supplier Stewarts and Lloyds, John noticed that they were now supplying steel tubes in rectangular hollow sections. "When I saw that in the catalogue it was a definite ***'eureka'*** moment," says John.

Prototypes of the new cultivator were built and tested during 1960, John's wife Pat came up with a name Superflow - and a machine was prepared for its debut at the Smithfield Show that December.

"Against similar cultivators, it looked huge," says John, "and first reaction from farmers was *'my tractor's never going to lift that*'."

However, actions speak louder than words, and John and his colleagues rolled up their sleeves several times a day during the show and lifted the cultivator to demonstrate its lightness.

The Superflow could be said to be Bomford's 'signature' product over the 25 years it was in production when more than 20,000 machines were sold, some in Massey Ferguson colours through a parallel marketing 'deal' (although no formal agreement ever existed).

The success of the Superflow put Bomford back on a better financial footing. The machine was easy to manufacture, easy to transport and furthermore with nine tines per machine, considerable economy of scale in manufacturing was achieved (not to mention the satisfaction of the factory staff who were on piece-work!)

Soon John was able to plan the first extension to the Salford Priors factory for many a long year.

Having broken into the soil-engaging market, Bomford turned its attention to hedges and edges.

Through an adaptation of an earlier Bomford Hedgemaker developed by sister company Bomford Brothers, the company introduced the Bomford Any Angle mower, the first articulated mowing machine designed for highways and the forerunner of the flail verge mower.

At first Bomford imported flail heads from US supplier Mott to fit the Any Angle mower, but before long had developed a machine specifically for European conditions. This was to be the beginning of the core part of the Bomford business which continues to the present time.

It also spawned the growth of a competitive rivalry in and around Salford Priors when Bomford salesman Tony Turner decided that hydraulic power was preferable to belt drive for flail mowers. Douglas Bomford disagreed, so in 1963 Turner set up his own company in opposition.

After a period of ill-health, Douglas Bomford died in 1969, but his legacy was assured in more ways than one. The period from 1960-1980 was a boom time for Bomford and the agricultural machinery industry in general.

The company was even able to buy its own plane to ferry staff and parts across Europe.

And whilst the recession of 1980 caused some retrenchment - although not in R&D expenditure - the company went from strength to strength on a raft of innovative products following the success of the Superflow with such market leading machines as the Highwayman, Bushwacker, Dynadrive and many others.

John receives an Award from Jonathan Bomford at the dinner held in October to mark his retirement as a Trustee of the Douglas Bomford Trust

For these and many other products, in 1976 Bomford and Evershed was awarded the Gold Medal for outstanding contribution to agriculture by the Royal Agricultural Society

For someone outside the Bomford family, John Fox has had a huge influence on the fortunes of the 'family firm' over many decades.

Of course, the company has moved on, first through a buy-out by the Elswick Group, then subsequently by present owner, the Alamo Group.

Following Douglas Bomford's death, John was appointed executor of the estate. After many lengthy discussions with the Bomford and Evershed board and his widow, Betty, it was agreed to set up the Douglas Bomford Trust.

Today the Trust manages funds worth over £3m which are used to recognise and uphold Douglas Bomford's desire to assist in developing individuals' knowledge and innovation, to meet the contribution that engineering can make to agriculture and the rural environment.

Douglas was not to know how vital his Trust was to become in later years in supplementing and supporting research that would have been carried out by the now-defunct agricultural machinery research facility at Silsoe.

Rather aptly for the inventor of an iconic machine such as the Superflow, we are only able to 'scratch the surface' of John Fox's contribution to Bomford in particular, and the agricultural machinery industry in general.

On the edge of the lawn which slopes down to the Avon at his home on the outskirts of Stratford-on-Avon, John points out a shed.

"That's my workshop," he says. "There is plenty of interesting stuff in there!" Although he has 'stepped down' - once an innovator, always an innovator!

GRAHAM THOMPSON

Taking the steps

Landwards editor Chris Biddle talks to GRAHAM THOMPSON who has progressed from technician at a dealership in Hampshire to head of global tractor planning for John Deere in the US.

GRAHAM THOMPSON is adamant. "My career path was only made possible by the support of other leaders who provided me the opportunities, encouragement, and support."

One of those was Terry Duggleby at Lackham College. "I was a full time student on an agricultural engineering course at Lackham College in Wiltshire. Terry put life into the dynamics of agricultural engineering and convinced me there could be no better industry for a future career. He also challenged me in my final report to not set my sights low - and said, in effect, the sky's the limit.

"Thirty years on, I know I made the right choice - there IS no better industry to be involved in, than that of the agricultural machinery industry."

Growing up, Graham always held a fascination with farming and farm machinery. He enrolled at Sparsholt Agricultural College near Winchester where he took an apprenticeship in Agriculture.

Following his apprenticeship Graham chose to enroll full time at Lackham where he gained an HTC (Higher Technical Certificate) in agricultural engineering.

During his college holidays, Graham worked at nearby John Deere dealership, Roger Hunt Ltd.

Leaving Lackham, he joined Roger Hunt full-time as a technician. "I spent three years at the dealership and those were some of the most influential and enjoyable years of my whole career."

Like so many youngsters growing up, Graham always had an affinity to one brand over another - and in his case it was John Deere. Therefore the opportunity to work on Deere products was one he grasped both both hands.

"I know I work for the company now, but even today one of my favourite relaxations is to tinker around with my five John Deere tractors of various vintages.

"Through working at a Deere dealership I got to know the people at Langar, and in 1986 when an opportunity arose, I applied for and accepted the post of Area Service Manager for Deere in the south west of England."

Here again, Graham is quick to credit one of his other 'mentors', Peter Leech, the current IAgrE President. "Peter gave me the opportunity. He also mentored me and provided the support I needed."

Graham had been in that role for three years when an opportunity arose to become Field Service Engineer for the UK, but based in Mannheim in Germany.

"I think then I realised it was going to be a one-way ticket from the UK," he says.

And so it proved, he became Senior Field Service Engineer, a post he held for 9 years, during which time he met his wife Andrea, in Germany and raised a family (two boys now 11 and 18).

In 1998, a new opportunity arose to move to the Deere plant in Waterloo to join the infinitely variable transmission development team. Then in 2003 a move back to Mannheim where he became Divisional Marketing Manager for Waterloo Tractors in Region 2 (Europe, North Africa and Middle East). During this time Graham also studied for his Bsc in Business Management.

It was whilst Graham was working as part of the team developing the John Deere 7R series, that the call came for him to take up his present role as Global Manager Tractor Platform Planning.

Despite Deere's penchant for long-winded and complicated titles, Graham's title is pretty well 'what it says on the tin'.

Field research: Graham Thompson (r) discusses mechanisation with a sub Saharan smallholder

> **"There is no better industry to be involved in than the agricultural machinery industry"**

He heads a product planning team involving Deere's tractor manufacturing plants around the world that work on new products ranging from small tractors for India and China to the planning of the higher horsepower products required for established markets

Essentially it is a portfolio panning role. "Our team plan the prioritised global tractor portfolio based on the input from the customer requirements in the four global regions. This encompasses planning products to meet needs of the key global value chains as well as meeting the advancing global emissions regulations."

At any one time, Graham and his team will be working on a long term portfolio of projects that may or may not come to fruition in anything from two to eight years.

"Everybody in developed markets looks on the ever-growing sophistication and technical features of new and larger tractors, but our focus is also on the new and emerging markets.

"We work on a full portfolio of tractors including those that will possibly be the first tractor that a smallholder in India or Africa will buy. It has to be affordable - and it has to be user-friendly to those who have not experienced mechanisation in the past.

"Those projects are just as important to Deere as the ongo-

. . . continued

ing development of new tractors in the higher horsepower range."

IT is clear talking to Graham that he views his career as a vocation. "The opportunities in our industry are growing. All of us play a significant role in bringing food to the table for a global population of now 7 billion people, and growing," he says.

"The industry constantly grows in esteem - and I am extremely optimistic about the future and prospects for everyone involved, whether they work for manufacturer or dealer."

Now 53, Graham Thompson's story embodies the opportunities that exist within the industry.

"Of course I often reflect on how I moved from being a farm machinery technician in Hampshire to my present role - and whilst there is no glib answer, I would say that to advance you do have to 'take the steps' as they open up to you and you should also not be shy to push open some doors.

"That might mean advancing through the ranks as a technician, becoming better and better at your job - or it might mean accepting new challenges as they come along, as in my case. There is no set formula, no rule book.

"But one thing is for certain, listen to others, heed advice. There is a wealth of experience available from those who have done it, made mistakes along the way and still succeeded."

And perhaps it was all in the stars and Graham's destiny was established right from the start, for he shares his birthday (7 February) with none other than John Deere himself!

ROBERT FILLINGHAM

Exciting future

From school, Robert Fillingham has been developing new ideas and winning prizes, now he is ready to start work for real

Rob Fillingham (right) receives his prize from Helmut Claas

THERE would have been a clue to Robert Fillingham's future career whilst he was at school.

For GCSE, his project was on developing a reversing sensor for tractors, whilst for his 'A' levels, he wrote about a new electronic sensor for ensuring that fencing posts were put in straight.

It was a piece of research that won 18-year Robert, the Gripple Award for Innovation held at Hallam University.

Gripples are used worldwide in the installation of agricultural fencing, which is why Derek Boaler, director of Gripple's innovation and ideas centre, was attracted by Robert's entry for the 2007 Young Engineer for Britain contest.

He said, "I was greatly impressed by Robert's well-researched and innovative approach to finding a practical solution to the problem he had himself identified, which is why he deserved to be awarded the Gripple prize."

Robert grew up on a small farm near Driffield in East Yorkshire, and his father ran an engineering company, so it was natural that he should combine an interest in both.

From school, Robert enrolled at Harper Adams on a 5-year Masters Engineering course.

Now in his last year, Robert has recently been recognised as one of the world's best young agricultural engineers after being revealed as one of only nine international winners of Claas scholarships, presented during a ceremony at the agricultural machinery company's customer service centre in Harsewinkel, Germany.

The '*Helmut Claas Scholarships*' were presented after each student made brief presentations to the Board of Trustees of the Claas Foundation, a panel of judges and many guests.

Board member Dr Hermann Garbers said, "We want to awaken the younger generation's interest in agricultural technology and other agricultural issues and support the global importance of agriculture to the general public."

The prizes were presented by Helmut Claas himself, the board chairman. Robert was awarded the third prize, of 3,000 euros, for his research into the cause of damage to equipment by a mini excavator.

He said, "I submitted a report on '*The failure modes of agricultural and off road machinery*' to the Claas foundation earlier this year.

"I was then asked to attend the award ceremony and visit to their headquarters, where I gave a presentation to trustees about my report and was awarded 3rd prize."

Robert was also awarded the Claas Scholarship for Agricultural Engineering in 2008. He received a bursary to assist his studies and completed various work placements with the company, including a 12 week placement in the UK and 15 month sandwich-placement in Germany.

He added, "I am very grateful to the Claas foundation for presenting me with this prestigious award which will help me to complete my MEng degree this year at Harper Adams, and continue my personal development."

His sandwich placement in Germany with Claas enabled him to learn German - something that came in extremely handy during his recent three day trip to Agritechnica.

The massive show was an ideal opportunity for Robert to approach a wide-range of European manufacturers for possible job opportunities after he graduates next summer.

"I'm taking my time," he says, "because there are a host of opportunities out there for me to further my career."

Until then, Robert is determined to continue his studies at Harper Adams, gain his degree - and enjoy everything that college life has to offer.

He has been closely involved with the Students Union and was the site manager for the HA Summer Ball with overall budget of £40,000 which he says he had no problem in allocating!

So the future for Robert in the agricultural engineering field looks assured. And to illustrate the close-knit and often-seamless nature of the industry, Robert ties straight back to John Fox.

He has recently been awarded a grant from the Douglas Bomford Trust which he intends to use to cover some of the cost of attending external conferences on agricultural engineering in order to further develop his knowledge of technological advances in the industry.

Salcey Walkway

Six years on

Mobile access platform

by **Graeme White**

IN 2005 the Forestry Commission erected a tree-top walkway in Salcey Forest, Northamptonshire.

The project came together relatively quickly and at a low cost, but the net result was a highly regarded structure that managed to pick up the Environment Award at the prestigious BCIA awards in 2006.

The walkway has now been in place for six years and has helped to carry thousands of visitors up into the canopy of the surrounding trees allowing them to experience the forest from a whole new prespective. With this amount of pedestrian traffic it has carried, it has became important to inspect the structure to see how it was bearing up.

So in July of this year a team of engineers and others trained in rope-access work was put together to give the walkway a thorough check-up. To put the scale of the task into perspective, the overall length of the walkway is 225m gradually ascending along its length, so that at its highest point it is 20m above ground level.

The goal of the inspection was to check all of the elements that had caused concern to the designers, while also looking out for any other defects that may have appeared since the walkway was opened. The areas to concentrate on included the bolts holding together the sections of 'aerial-mast' that form the main spans of the walkway. These spans are up to 24m, and as they are quite lightweight, they will give a lot of 'bounce' should someone want to try to get them resonating.

With the amount of vertical movement experienced on these spans we wanted to check that the connections in the aerial mast were not becoming loose.

Another section we were paying close attention to was the steel cleats that connected the main spans to the steel towers.

These connections were a key part of the design allowing the ends of the beams to rotate as the midspan deflected but still holding them in place securely. With the continual movement in these joints it is possible that fatigue cracks could appear in

Rope access

Fatigue in welds

. . . those areas where we expected to find problems turned out to be okay, while other areas where we thought would be fine turned out to have problems

the welds. Given the potential for a sudden failure in these joints it was important that every one was closely inspected.

We had to get close enough to touch and inspect the walkway and this required different methods as it got higher and higher. To begin with it was possible to reach from ground level, but quite quickly after we needed to use ladders. This was effective in reaching up to around 4-5m but beyond this other means are needed to get at the parts we wanted to investigate.


Using ladders for low level access

From this point onwards we used a mobile access platform to get at things from underneath. Also we lifted up deckboards on the walkway and used rope access to reach sections while working from above. With this two-pronged approach we could get at all the key elements of the structures.

Our main findings were that those areas where we expected to find problems turned out to be okay, while other areas where we thought would be fine turned out to have problems.

Despite checking all of the support cleats for signs of fatigue in the welds, no cracks were seen. However, on the same connection many of the bolts holding the main spans onto the towers had become loose. These were all tightened as we came across them, and this should help in reducing the amount of bounce in the spans.


Loose bolts in tower bracing

On the main aerial mast spans we found some loose bolts, but it was only around 10% that required half a turn.

Many more loose bolts were found on the steel towers. On checking just a sample of these, around 50% could take up to 3 turns in some instances. Luckily though it is not as critical for these bolts to be fully tight as it is for those that hold the main spans together. This is because in the tower the bolts are acting in shear, while in the spans they are all in tension.

As part of a maintenance programme we will have to go round all of these bolts and tighten them up.

Elsewhere on the walkway we came across other defects such as the odd rotten timber bearer, bent rods in the aerial masts, and loose handrail posts.

None of these were critical to the overall structure and can easily form part of ongoing maintenance.

When the walkway was built all of the deckboards had a non-slip insert to provide grip. However after the passage of thousands of feet, the inserts are wearing down and becoming as smooth as the surrounding wood. We will have to add extra grip onto the boards by painting on some adhesive and sprinkling chips onto the surface.

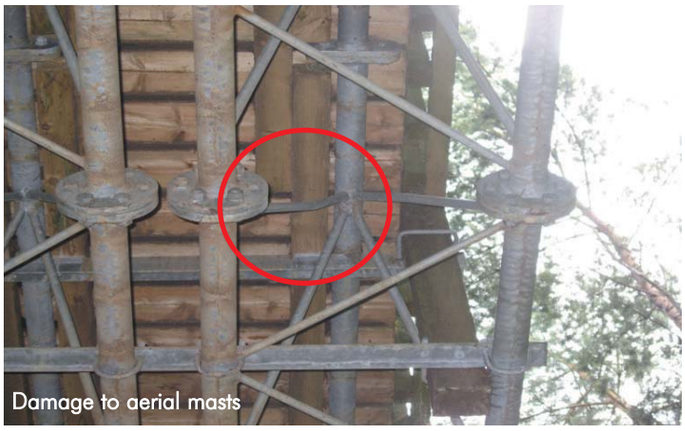
Overall, the main timber and steel elements of the six year old structure are lasting well. The bounce in the spans has caused bolts to loosen, but has not affected the welds. Now knowing this we can concentrate on checking the bolts during routine inspections which are carried out every two years.

Also we now know how the inspection should be done. Rope access is invaluable when working at height with the deckboards taken up. The MEWP also is indispensable in reaching the higher parts and going along the track below. Also it took 6 people around three days to carry out this work.


Salcey Walkway

All this is invaluable knowledge and should help keep the walkway in good shape for the years ahead.


Lifting of plates


Damage to aerial masts


Minor damage to bars and angle sections

Engineering tea in Malawi

A brief account of the diversity of engineering found working within an African tea estate

by Matthew HA Ingram, CEng, MIAgrE

MATTHEW graduated from Harper Adams in 2005 with a Bachelor of Engineering Degree in Agricultural Engineering. This had followed a 2 year top up degree from an HND in Agricultural Engineering at Lackham College, Wiltshire.

Prior to this he had been working within farms & contracting, repairing machinery and doing fabrication work, mostly mobile on site. During this time he completed several practical qualifications such as City & Guilds mechanics & plant operators certifications.

At about the age of 22 he decided that engineering was the right career and enrolled at Lackham, following successful outcomes throughout the two years at Lackham, a degree top up was an obvious choice.

Becoming an IAgrE member upon starting at Lackham, he has progressed to full Member status and was registered on the Engineering Council Interim Register of engineers in late 2005. In September this year he obtained Chartered Engineer Status.

MOVING to Lujeri Tea Estate in Malawi was a complete lifestyle change for my wife and I; as well as a great change in work for me.

When I was working as Engineer and Project Manager for Cornelsen Ltd in the UK, I thought I had a highly varied job where most days were different and each new project brought about the need for new approaches - if only to make us more competitive; however being here brings about a whole new meaning to job diversity!

Fundamentally my job as Engineering Director involves the planning, development and coordination of the estates' mechanical and physical infrastructure as well as overseeing of machinery maintenance and the complete management of the engineering department.

The estates contain a number of very different assets within them, these range from irrigation systems, hydro-electric power stations and the associated HV/LV distribution systems, tea and macadamia nut processing facilities, bridges and graded dirt roads, water delivery systems (domestic / factory water) to domestic housing, office buildings, parts stores, food storage and milling facilities, fertiliser storage and medical clinics. Planning the development of all these and coordinating the maintenance of them brings a number of different engineering disciplines into use on a daily basis.

Fortunately I have always been strong in the electrical area of engineering, as this is not taught to great depth within any of the formal engineering training I have had; my job at Cornelsen brought me up to date with modern automation and highly stringent control and electrical safety techniques; that learning now being invaluable as I bring more process control and automation into our tea factories to give a more consistent product.

However, what has become very apparent from both my previous position and this one is the unique diversity of an agricultural engineering course structure, and how valuable that can be. Within Cornelsen, the obvious bridge it makes between soils & the environment and mechanical engineering principles really paid off as I could normally fully understand the problems our clients faced, (environmental consultants for the most part) with the soil aspects, and then apply the needs to a mechanical plant which was where our expertise lay.

Here in Malawi as I design and erect storage buildings, low level bridges, houses etc the structural, soil mechanics/civils and building design & materials modules come in really useful. The truly 'agricultural' side of my training fitting right in with irrigation schemes and design of trailers and application of field mechanisation; leaving the mechanical and mathematical components of the course well suited to factory machine design, failure analysis, budgeting and future project planning and staff management.

Since being in Malawi, the range of projects has seen me:

- **re-design a major part of the tea process and successfully implement a new system saving up to 65% of the power and much less labour than that used in the former process; upgrade the control of the hydro-electric systems (some dating back to 1929) to a highly sophisticated yet surprisingly simple modern control system, giving us much more consistent power;**
- **completely refurbish a tea factory;**
- **install and calibrate a weighbridge (made in UK to be split down into a container);**
- **subsequently use two short old balance type weighbridges and build one long bridge with digital cells;**
- **oversee irrigation expansion of so far 55Ha; investigation of a new irrigation dam site as well as investigation into a new hydro electric system that now has an approved EIA;**
- **construction of a medical clinic as well as design and construction of septic systems for this;**
- **design and construction of 5 houses;**
- **design and installation of chlorination; systems for our domestic water supplies;**
- **as well as several other projects.**

On a more daily basis, my office location immediately adjacent to the fabrication and machining workshop means I regularly get to advise on machine repairs. The vast array of ways in which parts can fail often shows scope for improvement rather than just re-make repairs. These bring in another interesting part to the job in that I may be sat compiling a project justification on Excel, but five minutes later in a workshop working out why a shaft has failed or a pulley cracked and is there a better way or material we can make the replacement if there is not an on-shelf

option (many parts have to be fabricated or machined from 'blank' material due to the nature of the tea machines - some are tailored to our needs; the manufacturers also have a habit of very frequent upgrades so there is not a standard machine per se).

Later in that same day I may well be stood on a riverbank deciding how best we can repair an irrigation pump platform that was eroded and fell into the river the night before and desperately needed back in use (gabion baskets were promptly made). I may then walk through the vehicle workshop to see what has come in from the vast tractor & vehicle fleet.

If anyone is looking for a job that is full of variety and challenges, then I would highly recommend the African tea industry - another thing worth mentioning is that tea prefers to grow at altitude, and within a temperate climate, so the scenery is often stunning and the weather - well it's not bad as you may guess!

Some tea facts

- Tea is reputed to have first been drunk by Emperor Shen Nung in 2737BC when some leaves from a tree fell into a cup of boiled water and the resulting brew proved stimulating!
- Despite tea being very much thought of as an English drink, it was in fact brought to Europe by Portuguese and Dutch traders in the 17th century.
- All tea comes from the evergreen bush Camellia Sinensis; it is then processed to form 'Oolong, Black, Green or White tea'.
- Black tea is fermented (oxidised) before it is dried, whereas green tea is merely cut then dried. Oolong tea is partially fermented. White tea on the other hand is plucked before the leaf has opened, and then sun dried-this small volume process hence giving it its high prices.
- The black tea process consists of: plucking leaf, transport of leaf, withering leaf (chemical changes within leaf and loss of 30% moisture), maceration and cutting, fermentation (oxidisation), drying (to <3% MC), fibre removal, sorting, storage and packing. Leaf must be at the factory within 2hrs of plucking or degradation impacts quality; it is then processed within 24hrs.
- Black tea should be brewed for 5 minutes before drinking-think of this next time you dip a tea bag for 20 seconds, you are not getting the full flavour you are paying for!
- Malawi was the first country in Africa to grow tea on a commercial scale, one of the original ancestor bushes still lives in the city of Blantyre, sown around 1886. Many bushes in full production on Lujeri estate date back to pre-1939.
- Most tea propagated now is cloned-that is to say it is grown from cuttings grafted onto rootstocks produced from tea seeds; this allows for a consistent product that is not subject to cross-pollination and produces tea closer to the buyers tastes.
- Tea tree oil is nothing to do with tea bushes, neither is Roibus tea!
- Tea contains many anti-oxidants, those in green tea differ to those in black tea.
- Tea packagers and retailers buy tea from all over the world and blend this to produce the tea that they sell as theirs; these blends can be unique to them hence the different tastes and colours from different brands.

FORESTRY

Build, burn or both

Looking to the Future for British Timber

FEG Conference 2011

Report by **Dr Geoff Freedman**

THE Forestry Engineering Group of the Institution of Agricultural Engineers held a very successful symposium at the University of Cumbria's Newton Rigg campus at Penrith on 8th September 2011 on whether to utilise the UK timber resource for products or energy or both.

Currently there is severe competition for forest products from both sectors. On the one hand there is a growing market for green energy from wood as a biofuel to combat global warming and help achieve political targets for CO^2 reduction, while the traditional markets of sawn timber, wood based panels and paper compete without subsidy.

Sir David Read opened with a keynote address based on the excellent report, bearing his name, launched in 2009 entitled '*Combating Climate Change - a role for UK forests*'. It is difficult to summarise his contribution in one line, but he put forward credible science-based arguments to show that trees very effectively and efficiently absorb CO^2 from the air and lock carbon into the wood, where it remains. The obvious conclusion is that this very cost-effective option for reducing global warming must be maximised.

Robert Matthews, of Forest Research, followed with an explanation of some of the science and particularly the value of 'substitution'. This is the term used to describe the CO^2 saving made by using a wood product rather than other materials. These speakers convinced delegates that we must grow more trees and utilise marginal agricultural land. It was noted that conifer species are more effective at absorbing and storing carbon than broadleaf species.

Jason Sinden of UPM Tilhill followed, to put the financial case for forestry and revealed that he had clients with £100m to invest, but could not find land to buy that could get permission for planting. He further revealed that forestry has returned 10% on capital over the last decade, making it the top performing investment class. What is it that stands in the way of profitable investment that creates jobs and helps save the planet? The answer seems to be planning constraints usually involving conservation issues.

As an example, Jason revealed that 40% of Scotland is estimated to comprise golden eagle range. Conventional thinking asserts that these areas cannot be planted. However, Jason suggested that using a scientific approach, golden eagles and forestry can co-exist. A similar case could be made for many other constraints which are currently preventing planting. There is a paradox which needs to be urgently addressed. Perhaps the conservation case requires scientific scrutiny.

Scott McG. Wilson followed with an excellent paper on alternative tree species which would flourish in the UK and possibly be substitutes for Sitka Spruce. We have a limited choice of produce

The Conference speakers

for structural timbers - principally Scots Pine, Larch and Douglas Fir - which are available in commercial volumes. Scott was looking into the future when suggesting what we might plant that would improve volume or durability.

This information, published in conjunction with the Forestry Commission as 'Using alternative conifer species for productive forestry in Scotland', is useful at a time when forestry is becoming a very profitable enterprise as pressure builds on the availability of the declining natural resources of the World.

The first argument for 'Build'- as opposed to 'Burn' was put by **Peter Wilson**, an architect by profession, from the Forest Product Research Institute at Edinburgh Napier University. He showed excellent examples of the use of wood in building and bridges and introduced us to 'Wood Products Innovation Gateway' which is a project to foster innovation in timber products.

This use of timber locks the carbon away from the atmosphere for perhaps another 100 years and can often have the 'substitute' factor to augment the value of the carbon capture. Peter stressed that wood products add monetary value to the raw timber material which burning does not.

Alastair Kerr, Director General of the Wood Panel Industries Federation, continued the plea for the 'Build' argument by asking for a 'level playing field'. His case centred on the massive capital investment by the industry and the jobs created in the UK.

Wood based panel products are an integral part of the construction and furniture industries and if fibre becomes too expensive or in short supply because of competition from the 'Burn' market, they will be imported with a consequent loss of jobs. He is concerned about the Government subsidies to the 'Burn' market which could result in higher fibre costs and other knock on industry effects.

Steve Luker, a private consultant, examined the Government's Renewable Energy Strategy and he highlighted the fact that it does not mention wood as such, only biomass, which comes in many forms, including woody biomass. He showed that the demands of the targets cannot be achieved because there will be a lack of supply of biofuel.

He showed that 20% of the UK's energy comes from wood while 10% comes from wind - and the surprise is that landfill gas is the biggest contributor. He looked at the increase in wood energy that would be required for Government targets to be achieved and concluded that adequate wood supply would not be available and investment in wood-fired boilers and related electricity generating plant could not be justified. His conclusions were that we need to plant more trees and concentrate on heat production.

Bill Watson of Angus Biofuels gave a picture of his substantial business which provides heat to housing, schools, hospitals and other public and commercial buildings from wood fired boilers. The science is very sophisticated and efficiencies depend on good maintenance and regular supply of the correct type of chips.

His argument for 'Burn' relies on Government subsidy (40% for boilers) which is driven by Government policy targets to reduce emissions to levels internationally agreed. The question is how long will the subsidy remain and will 'Burn' continue to be profitable in the future.

Cameron Maxwell, Policy Adviser on renewable energy for Forestry Commission Scotland, pulled the subject together and he too emphasised the shortfall of wood supply to achieve the Government's CO^2 reduction targets.

He highlighted the Scottish Government's more sensible approach, which concentrates on local heat supply, rather than large-scale electricity generation. However the targets are either over-challenging or unrealistic and will require major imports of pellets or chips to supply the capacity that is policy driven. There is clearly a significant threat to existing UK wood supply chains and wood processors. He also concluded that we need to plant more trees.

The final speaker, **John Lyons**, from Coillte in Eire gave a report on his visit to the 4th International Forestry Engineering conference in South Africa. He was the only attendee from the British Isles to an international initiative started in Scotland in 1999 and begs the question - how relevant do we see Forestry Engineering in the UK?

He concluded that many of the papers were indeed not relevant but the contacts, innovation and ideas make such an investment in attending worthwhile. The industry in the UK is small and can benefit from keeping abreast of the big players in forestry around the World. The conclusion of the conference was 'Innovation is the key to adding value to forest products'.

The conclusion from our Symposium was that 'Build' creates most jobs, locks up carbon for long periods and is a more sustainable use of the limited and valuable wood resource in the UK.

The 'Burn' camp knows they rely on Government subsidy, but they can quickly help delivery of some of the Government's policies on emissions. The show of hands at the end of the Symposium was unanimously in favour of a balance between build and burn, which would be profitable to investors / landowners and Government.

Everyone agreed that, although our global contribution will always be limited by our small land area, we should maximise our contribution by PLANTING MORE TREES.

The contrast between the scientific approach taken by the Read Report on forestry's role in combating climate change and the seemingly 'arbitrary' planning/conservation constraints was striking. The value of a sheep on the hill was shown to be £86 against an equivalent forestry benefit of £770 and the consequent carbon sequestration. Each pair of breeding eagles occupies 10,000 hectares. If the whole range could not be planted, this would prevent approximately 100,000 tonnes of CO^2 sequestration per year!

Are so many sheep necessary in Scotland? Also, it is worth noting that eagles are known to be successful hunters in woodland.

Surely the time has come for a science-based approach to conservation - what we need is a sensible balance between the needs of conservation on the one hand and raw material production on the other so as to ensure sustainable economic development.

This report is not necessarily the views of FEG or the conference speakers.

. . . surely the time has come for a science-based approach to conservation

Can engineering and science deliver sustainable food security?

Rothamsted Research thinks it can

by **Dr Darren Hughes,**
Head of Communications and External Affairs, Rothamsted Research

THE Government's Chief Scientific Adviser, Sir John Beddington, has said that the world is heading for a 'Perfect Storm' of events, as food, energy and water demands increase in the order of 30 to 50% in the next 20 years.

He has stated that, "The challenge for global agriculture is to grow more food on not much more land, using less water, fertiliser and pesticides than we have historically done". In other words, it is the challenge for agricultural engineers and scientists to create the tools and technologies to deliver sustainable food security, by increasing crop quality and quantity whilst minimising negative environmental impacts.

Rothamsted Research is rising to this challenge with a new and refocused strategy, which it published in November.

Rothamsted is the longest running agricultural research station in the world, providing cutting-edge science and innovation for over 168 years. It has continuously delivered agricultural innovation, for example its founder, Sir John Bennet Lawes was responsible for the production of the world's first commercial chemical fertilisers, and after forming a unique partnership with Chemist Sir Henry Gilbert they together unearthed the fundamental principles of plant nutrition.

Rothamsted Research is also responsible for the discovery of synthetic pyrethroid insecticides (for example permethrin, cypermethrin and deltamethrin), which revolutionised the insecticide market and today make up around a quarter of pest control agents used worldwide. Indeed some argue that, with its continuous experiments that have been running for nearly 170 years (*Figure 1*), Rothamsted Research is responsible for shaping modern agricultural practice.

The real strength of Rothamsted Research and one of the reasons why it has been around for so long, as Director Maurice Moloney puts it, "is in its ability to move with the times and embrace the evolving scientific challenges through creativity and ingenuity", for example through using innovative engineering and scientific techniques. This has been helped by its unique approach to dealing with engineering and science questions, by utilising its extensive multi-sector collaborative networks and its truly multi-disciplinary workforce, bringing together knowledge from many different fields, for example bringing agronomists, ecologists, molecular biologists, mathematicians and engineers together to think up novel approaches from new perspectives.

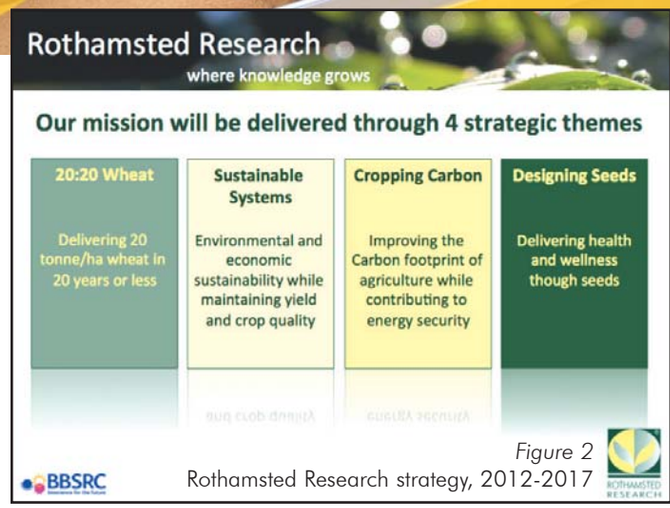
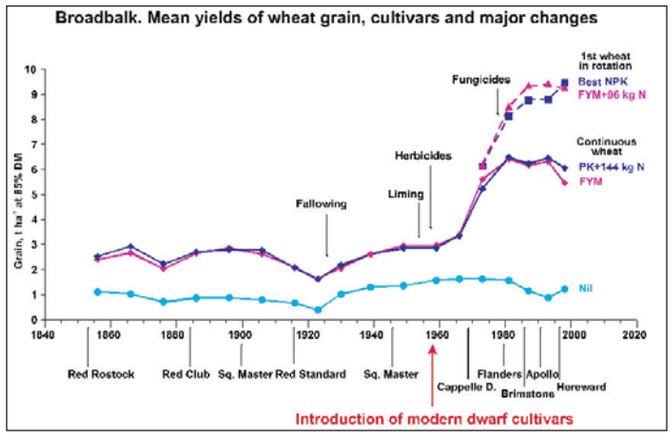


Figure 2
Rothamsted Research strategy, 2012-2017

Figure 1:
The Broad balk Wheat Experiment which has run continuously at Rothamsted Research since 1843



The new strategy at Rothamsted Research is led by a mission to **deliver the knowledge and new practices to increase crop productivity and quality and to develop environmentally sustainable solutions for food and energy production**.

This new strategy focuses on a dynamic and integrated approach to crop science, allowing plants to be studied from within (e.g. molecular level) as well as from their interactions with the environment (air, soil, water etc).

This strategy will be delivered through 4 themes (*Figure 2*):

1. **20:20 wheat**: Increasing wheat productivity to yield 20 tonnes per hectare in 20 years.

Ensuring food security is a major challenge for the future. Wheat provides a fifth of the calories used by man, but since 1980 the rate of increase in wheat yields has declined (*Figure 3*). The average farm yield of wheat in the UK is currently 8.4 tonnes per hectare. Our aim is to provide the knowledge base and tools to increase UK wheat yield potential to 20 tonnes of wheat per hectare within the next 20 years.

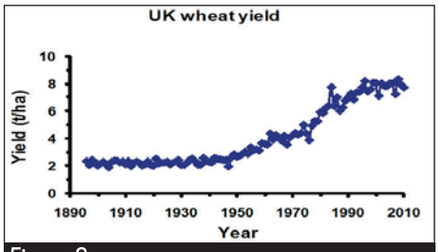


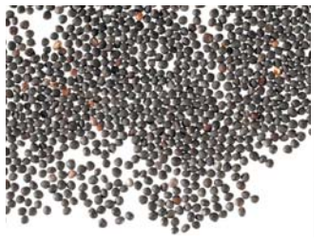
Figure 3:
Current UK wheat yield increases are slowing down. Rothamsted aims to increase UK wheat yield potential to 20 tonnes of wheat per hectare within the next 20 years.

2. **Cropping carbon**: Optimising carbon capture by grasslands and perennial energy crops (such as willows).

   The UK has an ambitious target of 80% reductions in greenhouse gas emissions by 2050. We will aim to provide renewable and sustainable alternatives for fossil fuel-based products and to translate these into robust technologies and practices that can be used by policymakers, agribusinesses and energy companies to help underpin the UK's transition to a low carbon economy and contribution to future energy security and mitigation of climate change (*Figure 4*).

Figure 4:
If both CO^2 capture into biomass and sequestration of carbon in soils are maximised, crops can be an effective way of 'cropping carbon'; providing renewable low carbon products for the future and land based solutions to mitigate climate change and helping deliver a low C economy. Willow (above right) and Miscanthus (above left) plants.

Figure 5:
Building on a strong capability in seed development and composition, Rothamsted will focus on promoting the enrichment of beneficial components of grains and oilseeds to promote health and well-being.



3. **Designing seeds**:
   Harnessing our expertise in seed biology and biochemistry to deliver improved health and nutrition through seeds.

   Seeds are major components in a wide range of foods and animal feeds, so their composition is an important determinant of nutritional value. We will focus on understanding and optimising the nutritional value of the seeds of two crops, wheat and Brassicas, with the aim of enhancing their impact on health and well-being (*Figure 5*).

4. **Delivering sustainable systems**:
   Designing, modelling and assessing sustainable agricultural systems that increase productivity while minimising environmental impact.

   We believe that it is possible to provide secure and increasing amounts of healthy food and make a contribution to the supply of renewable energy without reducing other ecosystem services. We aim to show how such systems can be delivered through research into better ways of managing pest control, biodiversity, grazed grassland and soils with the overall goal of designing and quantifying sustainable systems (*Figure 6*).

Agricultural engineers and scientists have risen to the challenge before, through both mechanisation and the Green Revolution of the 1960s and 70s. The father of the first green revolution, Norman Borlaug, who received the Nobel Peace Prize in 1970 for his contributions to world peace through increasing food supply, said that "Civilization as it is known today could not have evolved, nor can it survive, without an adequate food supply".

Our next challenge is to create a new and Greener Revolution, which will require further great leaps in innovation and one the UK agricultural engineers are more than capable of delivering. The agricultural engineering industry reduced the labour requirement of agriculture, through mechanisation, by a factor of 10 over the same period as the green revolution making food far more affordable.

Rothamsted future strategic direction is dependant on working in collaboration with Engineers to convert cutting-edge science into practical outcomes. The IAgrE is currently preparing a UK manifesto for agricultural engineering so the Council meeting at Rothamsted Research next February offers an ideal opportunity to discuss these issues.

Rothamsted Research is a national institute of bioscience strategically funded by the BBSRC.

Further details about Rothamsted Research, its strategy and its recent research success stories can be found at **www.rothamsted.ac.uk**

Figure 6:
Delivering sustainable systems relies on understanding biogeochemical cycling, spatial ecology and crop protection that are critical for delivering food security

"Our next challenge is to create a new and Greener Revolution, which will require further great leaps in innovation and one the UK agricultural engineers are more than capable of delivering"

will you be able to afford pineapples next Christmas?

GEOFFREY WAKEHAM says as Christmas and the pantomime season is on us, here is a story of feckless people, magic and a need for a happy ending . . .

ONCE upon a time long, long ago there was a land high in the hills, rich with fertile farms, growing cereals, fruit and fat cattle.

The people of this land included brewers and bakers, builders and writers of ballads as well as farmers. They had free time and feasted in their homes and palaces and all was well with their world.

One day an exotic traveller passed through their country and marvelled at their riches. He did however; notice only the lords could keep staff to grow bananas or pineapples, while in his homeland these grew freely. He agreed to supply all the bananas and pineapples they needed and very soon nearly every one stopped eating cherries and apples and the orchards fell into ruin.

The pineapples and bananas were paid for with fat cattle but as the consumption rose it was not possible to find enough cattle and no one was willing to convert the orchards into pastures. To ensure the continuation of supply of exotic fruit our hill people asked their wizards to make magic tablets that promised to supply cattle in the future. The traveller was amazed and stored up these tablets as he believed in the strength of the magic.

For years this worked well. One day the traveller returned with a magic tablet and demanded payment of five hundred cattle as promised. There was no way payment could be made. The total of the tablets he had equated to three quarters of every thing produced each year; not just fat cattle and cereals but every new building, the out put of the bakers and brewers even three quarters of all the new ballads and feasting.

Leaders came from the distant land and took over the farms and shipped much of the annual production back to their homeland. They then persuaded the brewers and bakers and builders to come with them and they feasted in their new homes and magnificent palaces.

The hill people had to work for foreign masters and survive on meagre rations whilst their houses slowly decayed and their palaces fell into disrepair.

IF we are not to follow the fate of the hill people we must stop borrowing money and start earning it again.

There is a clear need to export more and import less. If we are to re-establish our wealth and re-establish our way of life there is a need to produce products and services that are in demand by both the UK market and around the world. It is likely that this will take hard work and requires our industries to become far more innovative.

We need to find ways to improve the way we work and regain our confidence as leaders in technology and inventiveness.

Organisations need to have trust in their staff and construct working environments that encourage innovation and commitment. Targets and reviews do not produce happy staff. Bonuses go to staff that naturally work hard often to meet unimaginative goals. The majority, who don't get the bonus, are disillusioned and may even sabotage the efforts of those that do.

Soulless open plan offices with no readily accessible quiet spaces or relaxed communal meeting areas lead to an increase in sickness both real and constructed. Informal meeting areas lead to cross fertilisation of ideas and a shared desire to succeed. Does your staff have any say as to the décor or layout of their personal workspace, are they pleased to come into work?

Do you hold regular formal meetings with staff? If so, do they achieve anything? Do these meetings report to other groups largely populated by the same staff?

Would a truly involved management,or a simple memo to just those it concerns eliminate most of these time consuming activities. Should you schedule your work first and meetings last; it is claimed that such an approach can triple your daily productivity.

Have you looked at your product range lately? I was amazed that a brochure for a new car that came through the post recently could only find it worthwhile to mention

> “. . . If we are to re-establish our wealth and re-establish our way of life there is a need to produce products and services that are in demand by both the UK market and around the world”

that it had “white acrylic glass interior ledges”.

Are your latest designs no more than last century’s designs fitted with “red acrylic glass control knobs”? Would any one make a journey to their local dealer to look at it? Or does it use technology that provides a clear advantage over your competitors?

There is a need for valuable new products in any business if only to attract customers to your current core products. Selling these technological advances should be done at a premium so limiting sales until teething problems are eliminated. A major warranty problem in a distant market will damage your reputation and could bankrupt the enterprise.

In the end there is a need to produce products that are more valuable to the customer than the purchase cost. Design must be carried out with the cost to value ratio as the first priority. Products need to be designed for easy manufacture within your own control. Manufacturing needs to be looking to eliminate waste whether it is wasted energy, time, movement, scrap, unnecessary stock, paperwork or layers of management.

Task your staff with the elimination of waste and give responsibility as close to the activity as practical. Design and manufacture for less than your competitors and be able to sell your products for more.

When you lay down the design specification do you detail how many must fit into a standard container or does your shipping department have to curse when it is 25mm too wide or 50kg to heavy? If we are to balance our books with our overseas trading partners we must minimise the cost of transport of products that are often bulky and of relatively low value per cubic metre or tonne.

When I started work at least seventy five per cent of our trade was export lead or produced in the region of the world they were designed for. But remember products that displace imports are as valuable to our balance of payments as exports.

IF our hill people could have found a way to grow pineapples at a lower ‘cost’ than their current suppliers then good for them. If they had grown them at a higher quality as well, then they could have shipped them to those from distant lands.

AS it is the pantomime season maybe some of our favourite characters can help by providing examples of how to improve our productivity and general wealth.

Cinderella teamed up with a wealthy partner and installed gas fired heating so easing her work load. Jack took a risk when he changed from being a dairy farmer and went into GM vegetables, however stealing competitors wealth creating assets should be frowned at. Dick Whittington’s tenacity and clever use of his major asset, the cat, turned his fortunes about.

I am sure you can think of ways to improve your organisation’s fortunes. Make Friday ‘ideas day’, when a major advance is agreed let everyone go home.

What ever you do, make work an exciting place, give credit and responsibility whenever you can. Agricultural Engineering is vital to everyone’s future, if you don’t take the world wide opportunities someone else will.

Have a good Christmas and help make it a prosperous New Year for us all.

ETI project to take wave energy to the next level

THE Energy Technologies Institute (ETI) has announced plans to take wave energy to the next level with a project to design and demonstrate a low-cost wave energy converter system.

Marine energy technologies have the potential to play an important role with other offshore renewables in enabling the UK to meet its long-term CO^2 emissions reductions targets given the significant natural energy resources available within UK waters.

Extracting energy from waves using Wave Energy Converters (WECs) is one method of exploiting the energy potential of the waters around the UK.

To do this effectively, these machines need to be able to capture as much energy as possible from the waves whilst withstanding the often very harsh environment associated with deployment at sea.

The long-term viability of wave energy depends on it becoming competitive with other low-carbon energy sources including wind power as quickly as possible through the significant reduction of energy delivery costs.

Dr David Clarke, Chief Executive of the ETI said, “Wave energy offers a potential clean energy source for the UK without needing to import fuel but we need to ensure that it is affordable and competitive with other technologies. There are many competing concepts being developed but none yet demonstrate a clear route to large scale commercial deployment.

For wave energy to realise its potential there will need to be reductions in the costs of building, installing and operating the devices and associated infrastructure, as well as improvements to device technical performance and reliability.”

“This project will identify the areas major improvements could be made and, if as we hope, significant savings can be demonstrated, the intention is that we will invest in the development and demonstration of them.”

The project will be commissioned in two phases, the first providing a fully detailed design concept for a wave energy converter system capable of delivering at least 10MW of power before a second phase where the new innovations are developed and demonstrated at full scale at sea.

It will also assess the potential market opportunities of the technologies in the UK and abroad.

The ETI is looking for teams that have a broad range of skills including device developers and engineering and technology development companies from a range of industries with the experience and expertise to demonstrate a step-change in cost improvements.

It is expected that the project will start in summer 2012 with the first phase lasting around 12 months.

MEMBERSHIP ENQUIRIES
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Issue 66 Number 4 Winter 2011

MEMBERSHIP MATTERS

BRANCH REPORTS

SOUTHERN BRANCH

Late Summer visits

Leckford, the Waitrose Farm

THE late summer visit was to the 4,000 acre Leckford Estate near Stockbridge in Hampshire.

It is part of the John Lewis partnership and its founder John Spedan Lewis bought the farm in 1928. He was an environmentalist and was keen to develop new ways of farming, producing good quality food and working in harmony with the environment. It is a working farm supplying under the Lankford brand milk, free-range chicken and eggs, mushrooms and more to Waitrose branches throughout the country.

There is a large area of cereals and orchards. Also a plant nursery, water garden, and the fast flowing brown trout chalk stream, River Test, on which the estate has 16 fishing beats. It is understood fly-fishing was invented here.

We were taken around the farm by a purpose built tractor drawn passenger trailer and our enthusiastic guide John Malley gave a detailed commentary throughout the morning .We were shown the extensive free range poultry unit with its large number of sheds. The chicken have easy access to the grass paddocks but it seem most prefer to stay inside. The heat and light for the sheds comes from wind turbines and solar panels.

The eggs are produced by Columbian Black Tailed hens and mostly sold in the test valley area. The chicken sold for consumption are slower growing and take two weeks more to mature than most. Therefore they have a good flavour when eaten.

The mushrooms are grown in a computer-controlled environment, which imitates the mushroom growing cycle. Production totals 28 tons annually and is of the cup variety. We were told they double in size every 18 hours. The mushrooms are pre packed and sold at Waitrose stores throughout the country within 24 hours of picking.

We watched a large container truck as it unloaded compost material currently brought in from Belgium.

Southern Branch members in front of the purpose-built tractor-drawn passenger trailer which took them around the Leckford Estate

There is a 600-cow Holstein Friesian herd, which graze on pasture in summer and are housed in winter in sheds with mattresses to lie on. They are milked in a 32 unit Rotary Parlour installed 6 years ago. The majority of the milk is sold in Waitrose stores throughout the country.

A large part of the farm is used for arable crops; the wheat is used in producing Leckford flour and barley sold for malting and oats for cereals. Poppies are grown under strict Home office supervision. And the harvested seed taken to Scotland where it is milled and used in the production of medicinal opiates.

The 80 Hectares of orchards are used for apples and pears, some of which are used for production of apple juice and cider. 85% of the crop is Cox Orange Pippin. The chalky soil is not ideal for apple trees but despite that they grow well and produce fruit that is crisp and of good flavour.

We saw apple picking in progress and were surprised by the almost carpet layer of fallers. These are not picked up and left to rot.

A new venture is a £100,000 investment in 10 acres of vines. Three varieties are grown and the objective is to produce a blend of wine similar to champagne. The first crop of grapes will be harvested this year. It is hoped to produce 50,000 bottles of wine for Waitrose stores.

Whitchurch Silk Mill

IN the afternoon members visited the Historic Grade 2 Georgian Whitchurch Silk Mill, one of only three in the country.

Now a working museum it has been used to produce bespoke silk since 1830.

A Victorian water wheel via line shafting, pulleys and belts drives some of the power looms and other textile machinery. Depending on orders between one and five weavers are employed to produce silk and other textiles mostly for the theatrical costumes including costumes for the TV drama Downton Abbey. Locally the hanging decoration in Winchester Cathedral and Guildhall were produced at the mill.

The General Manager gave the group a very detailed guided tour and such was the interest and questions he was kept busy for over two hours.

Denis Welstead

EAST MIDLANDS BRANCH

Visit to the National Fluid Power Centre

4th October 2011

SOMETIMES on holiday people report on stumbling across one of Britain's Best Kept Secrets.

Without criticism the National Fluid Power Centre could be described as fitting this bill. Based on the northern edge of Worksop it is hardly on a through route but once visited can only be described as a jewel in the nation's training facilities.

It started from very humble beginnings with skills and expertise from the coal industry in small huts in rural Nottinghamshire. A strong link was formed then with their skills locally and in Lincolnshire on pea viner and potato destoner problems.

Now it is a purpose built training facility to include hydraulics, pneumatics and electronics at an introductory or seriously advanced level. All training is conducted surrounded by or actually being involved with components, systems or interactive programs simulating use.

The instruction to the evening included

identifying sponsors and companies on the advisory panel to the centre. All of which represented worldwide major players in the industry with fluid mechanics from Aerospace to Off-shore and from Agriculture to Fishing. Such companies have provided all the hardware and consumables to the centre, all of which are the latest level.

Throughout the centre's work training was the main thrust with contamination to oils being identified as the main limitation to efficient and reliable hydraulic function. Horror stories across a range of uses highlighted preventable failures.

Agriculture could be described in their terms with hydraulics as a mobile use and within their main training hall there were examples of fork trucks, loading shovels and a small digger all modified to allow function and monitoring with all components identifiable and monitored in use. A similar approach is taken with fixed plant, also with pneumatics and electronics.

The centre's web site is *www.nfpc.co.uk* and is well worth a visit and contact with NFPC is to be encouraged by all of our membership engineers whether for awareness, CPD or service training. In fact our Branch Chairman Paul Skinner was actually attending a course there whilst the Branch visited, a trend setter if ever one was needed.

Bill Basford

WESTERN BRANCH

Technical lecture by John Moore of Windcrop - *'Small Wind Systems'*

23rd November 2011

THE Royal Agricultural College, Cirencester played host to 19 IAgrE Western Branch members and guests for a technical lecture by John Moore of Windcrop entitled '*Small Wind Systems*'.

John, Managing Director of Windcrop for 2 years, began his lecture with the definition of a small wind system, i.e. wind power generating systems with a capacity of between 1.5 and 100 kW, but the most common types that he deals with are between 5 and 15 kW.

John identified that it is vital to conduct a wind survey prior to an installation. Typically, weather forecasting results can be used, but the best method is to site a wind meter for a 12 month period in the area of consideration. It is also vital to access generation and consumption cycles to maximise efficiency and to remember that small wind systems utilise a mast of between 15 and 18 metres in height and as such require planning permission.

The power generated by these systems are a '3 phase wild AC' which has to be rectified to DC and then inverted back to grid matched voltage and frequency. The generator works in parallel with the grid supply; monitoring supply and demand with the use of export and import meters. Currently the Feed-In Tariff is 28 p/kWh for 5 to 15 kW systems, i.e. the amount of revenue the National Grid will pay the operator for 'surplus' energy.

John discussed installation methods and presented his company's preferred process: screw piles. At this point IAgrE's Richard Robinson gave a short talk with respect to the history and benefits of screw piles; they are cleaner, greener and quicker than concrete foundations and when considering the whole installation costs (including excavation and disposal), they can be typically between a quarter and half the cost of a concrete foundation.

The typical design life of screw piles around 60 years, but Richard pointed out that the screw piles holding up Brighton Pier are still going strong after some 180 years! Richard also explained the basic principle and mathematics behind the practice:

Capacity (kN) = Empirical Torque Factor (1/m) x Installation Torque (kNm)

John Moore of Wincrop

John finished his presentation by outlining the planning permission and connection legislative procedures that must be complied with and ways in which farmers and landowners can obtain such systems.

Windcrop can supply systems outright for a capital cost, but the most attractive offer for the consumer is where Windcrop supply and maintain a system for 20 years completely free of charge. Here the customer gets free electricity from the system when required, but Windcrop collect the Feed-In for surplus energy.

For further information visit the website at **www.windcrop.co.uk**.

Nick Handy

NORTHERN IRELAND BRANCH

Visit to Moore Concrete

THE Northern Ireland branch of IAgrE recently enjoyed a visit to Moore Concrete at Ballymena, Co Antrim. This was hosted by Moore's Sales Co-ordinator (Keri McGivern), who took the group on a tour of the production facilities.

The Quality Control Department, where all the inputs are sampled to ensure that the concrete can meet all the specified standards for strength and quality, was the first stop before seeing the working modern production facilities for the extensive range of precast concrete products. The batching and mixing is handled by a Danish sourced and serviced plant. The group was fascinated to see the workshop where the moulds are made up for new and bespoke projects.

Later Keri McGivern presented a well illustrated talk about the Company history and the development of its products for the agricultural industry. In 1978 Wilbert Moore (owner and Managing Director) recognised demand in the expanding agriculture sector and started making cattle slats. Since then the demand for quality concrete products has resulted in the development and production of a wide range of precast items for the agriculture, construction and civil engineering sectors.

Keri McGivern (extreme left) welcomes the IAgrE group to Moore Concrete

The company moved to its present production facility in 1984. Further expansion and updating took place in 2008. Precast products for the agriculture, construction and civil engineering sectors are now supplied to customers throughout the UK and Ireland.

There is an obvious strong people based ethos (now rewarded by official 'Investor in People' status) and as MD Mr Wilbert Moore states, "Our aim is to exceed the expectations of our customers by providing quality precast solutions, while at the same time fulfiling our duty of

care to the environment and ensuring that our people are safe, happy and prosperous".

The company actively ensures that all relevant quality production ISO quality standards are met and ISO 1400 environmental status is due soon.

There is a strong emphasis on servicing the needs of livestock farms such as the comprehensive range of suspended livestock flooring systems including gang slats of all types. An example of considering individual customer needs is the special slat to carry and retain straw bedding for young stock whilst still being able to carry machinery for cleaning purposes.

The range of precast support beams, passage covers and cubicle bases facilitate efficient and fast onsite installation. Complete system installations are common and complemented by precast end cubicle walls and in-house drinkers. The latter have rounded corners to avoid animal injury and maximise the number able to drink at one time.

Other precast products include interlocking slurry channel systems, feed trough sections and field drinkers. The drinkers have rounded profiles for added strength. Other specialist products include counter ballast weights for tractors and a precast base on which to mount the latest Lely robot milker.


Moore above ground slurry store

There is an extensive range of prestressed portable wall panels and high strength self standing units for storage of bulk materials. These are now popular for a wide range of applications for both agriculture and other industries.

Moore Concrete above ground slurry stores are now a common sight on farms everywhere. They are based on the proven Danish Lundsby design, have a 50 year design life and are built with curved post-tensioned panels. Installation can be above or below ground. A recent development is their use in the Lundsby system for anaerobic digestion biogas production plants. Moore Biosystems was formed in March 2009 and offers ready to use installations with technical back up for on farm energy production from farm waste and specialist crops.

Although the primary focus of the visit was on products for agriculture, Moore Concrete also uses its expertise and experience to make an extensive range of precast items for both the construction industry and large scale civil engineering projects. Examples include precast arches for railway / road projects, reinforced beams, box culverts and other quality structural items. Details of all the products produced by Moore Concrete can be viewed on their comprehensive website at *www.moore-concrete.com*. They can also be contacted on 028 2565 2566

The excellent presentation was followed by a discussion around specific products, innovation and new application for existing items, trends in livestock farming, working with the civil engineering sector and use of the internet by local manufacturers to extend their markets. The members thanked Keri and all those at Moore Concrete who made such an interesting and enjoyable visit possible.

Keri McGivern (second left) with IAgrE members and guest

Terence Chambers


Moore installation on Ayrshire farm

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

Some advances in mechanization options for Conservation Agriculture systems:

Reflections from the V World Congress of Conservation Agriculture, Brisbane, Australia, September 2011

by **Brian G Sims**

Summary

The 5th World Congress on Conservation Agriculture was held in Brisbane, Australia in September 2011.

During the Congress, and especially during the field day, equipment for CA at several levels of sophistication was discussed and demonstrated. This account reflects on some of the technology on view.

No till planters for two-wheeled tractors are becoming increasingly demanded in Asian and African CA systems. The ACIAR Rogro and strip-tillage machines were on view. CA planters suitable for smaller farms include the Turbo Happy Seeder and chain-driven residue management system planters.

For smaller farms yet there is the novel Yunfan jab planter from China which may be set to challenge the Brazilian domination of the market.

Narrow tine openers for no-till planters have been the norm in Australia. But times are changing with both double and single disc openers increasingly being incorporated in commercial no-till machines.

Controlled traffic farming (CTF) is a natural partner for CA as it eliminates wheeling compaction in the cropped area. Aspects of precision farming are also relevant to CA systems as they can ensure more precise application of inputs and amelioration of problem areas.

Crop mapping with tractor-mounted red and near infrared light reflectance, motorcycle-mounted soil parameter sensors and helicopter-mounted cameras are all playing a part in improving the efficacy and efficiency of CA.

LONG SERVICE CERTIFICATE

Alan Lavers, MIAgrE - 50 years membership

I JOINED the Institution in 1961 whilst working for Allis Chalmers at Essendine, Lincolnshire, where I was attached to the product development department.

This proved a complete contrast to following City and Guilds courses at Lackham in Wiltshire and I quickly learnt the importance of sizing 'sky hooks' and spirit level bubbles. My work with the department involved field testing the first Hillside Gleaner combine to enter the UK and assessing the hand clutch on the ED 40 tractor, designed to improve Rotobaler operation, but best remembered as the forerunner of the ejector seat!

Following Technical Teacher training at Wolverhampton I joined the teaching staff at the East Riding Institute of Agriculture under the tutelage of the late John Turner and worked with both agricultural and engineering students. After completing the National Diploma in Agricultural Engineering at Writtle I joined Shellstar as engineer to the development teams researching new pesticides for the UK market.

I introduced load cell weighing for plot combines and wrestled with sensors for monitoring grain flow along elevators to tell operators when plots had been completed. My interest in spray application lead to being appointed team leader of a multidisciplinary group working on terrestrial and aerial spray application problems on a worldwide basis for Shell International.

This appointment coincided with a period when considerable interest in spray efficiency was gaining momentum and I moved to Shell Research in Kent to establish a dedicated laboratory for spray studies. The lab was equipped with a high speed camera for spray impact studies and a particle size analyser using a laser diffraction technique to measure droplet size. Matching laboratory results to field practice was always demanding but moving from studies with blank formulations to working with live chemicals for improved comparisons generated vast quantities of spray liquid for disposal.

The effect of different pump design on spray liquids was monitored and innovative spray techniques, such as electrostatic spraying and tree injection, were field evaluated as part of the team's work both at home and overseas. The understanding of field spray technology has improved considerably and today's equipment testing has helped, but the spray operator remains the most important factor in safe and efficient pesticide use.

Following the sale of Shells agrochemical business in 1994 I continued working as an independent consultant and completed overseas missions for the Food and Agricultural Organisation (FAO) of the UN, around the world running training courses on safe use of spray equipment with the added distinction of being one of the first UN consultants to work in North Korea.

During my Shell career I completed a degree in Environmental Studies and in 2004 I was awarded a PhD by the University of Newcastle upon Tyne after a period of private study and the support of Sanatogen!

Today we share a barn conversion in Herefordshire with Cluster flies and other wildlife and I continue to spray weeds in grassland on farms adjacent to my home. I am involved with the local Council and remain on the board of the Hereford Technical College where we still offer training in agricultural engineering, blacksmithing and farriery.

All a long way removed from 1965 when I showed students the Ford film strip *'Farming in the year 2000'* and we all agreed that driver-less tractors and robotic milking would never catch on.

NEWS OF INTEREST TO MEMBERS

Franz Grimme wins the EurAgEng Award of Merit

GERMAN entrepreneur and Managing Director of Grimme, Franz Grimme was awarded the EurAgEng Award of Merit at LAND.TECHNIC-AgEng2011.

The Award is the society's most prestigious award which is given to a leading figure in the world of agricultural engineering.

Franz Grimme is the fourth generation managing director of the company renowned for machinery for growing and harvesting potatoes, sugar beet and root vegetables. The prize was awarded to Franz Grmme at a special ceremony, during the conference, by Professor Peter Schulze Lammers, President of the European Society of Agricultural Engineers.

Also recognised during the ceremony were Dr Detlef Ehlert and Engineer Robert Honzek. They both received the Max Eyth Commemorative medal from Professor Stefan Böttinger, the President of Max Eyth Society for Agricultural Engineering (VDI-MEG), Germany, for their contributions to education and design.

LAND.TECHNIC-AgEng2011 broke all records for attendance with over 850 delegates during the two day conference held in Hannover as a prelude to one of the world's largest agricultural machinery fairs, Agritechnica.

Many delegates were from industry and enjoyed presentations on harvesting technology, robotics, automation and machine control, product development, sustainable energy and much more. Key note addresses came from Heinrich Flegel on MANU*FUTURE*'s pathways to future research and development in the EU and Markwart von Pentz, President, Agriculture and Turf Division of John Deere & Company who was thought provoking and entertaining.

Franz Grimme receives the EurAgEng Award of Merit from EurAgEng President, Peter Schulze Lammers

NEWS OF INTEREST TO MEMBERS

Claas Lexion 770TT smashes World Harvesting record

Event overseen by Bill Basford of the East Midlands Branch

DURING an endurance performance test conducted in Lincolnshire on September 1st and 2nd, a CLAAS LEXION 770TT established a new Combine Harvesting World Record for wheat of 675.84 tonnes harvested, by maintaining an average harvesting rate of 85.5 tonnes/hour over an eight hour period.

This new record is some 22.5% higher than the previous record established in 2008 by another brand.

The record was set as part of the endurance performance test during which the 770TT harvested over 1400 tonnes of wheat in 20 working hours, a feat made possible by the APS HYBRID threshing & separation system which allows for continued high output in damp conditions.


Claas Lexion 770TT

The combine was a standard 586hp LEXION 770TT, equipped with TERRA TRAC rubber tracks and a 12 meter VARIO cutterbar and APS HYBRID threshing system. It was driven by CLAAS combine demonstrators Jens Broer and Christian Mecmann, supported by a team of five tractors and trailers driven by staff from CLAAS UK and the local CLAAS dealer Marsh.

The endurance test was conducted on four fields of wheat totalling 183ha at Haugh, near Louth in eastern England. Cropping was split between two varieties, Conqueror and Duxford, which between them averaged 9.7t/ha with a peak yield of 13t/ha, and moisture contents ranged from 16-18%.


World Record breakers: left to right - Jack Brockbank (Guinness World Records), combine operators Jens Broer and Christian Mecmann and Bill Basford (independent machinery consultant)

The endurance test was overseen by ex-ADAS machinery consultant Bill Basford, with the new World Record confirmed by Guinness World Records adjudicator Jack Brockbank. The crop was harvested to a height determined by the farmer, all the straw was chopped and the tonnage recorded over a neighbouring public weighbridge.

The endurance test was being conducted to assess the ability of the APS HYBRID threshing system on the LEXION 770TT to allow farmers to start harvesting earlier and finish later than is possible with rotary type combines.

After 15 minutes spent setting the combine and calibrating the on-board yield monitoring equipment to the weighbridge figure, the endurance test started at 9.45am.

With good harvesting conditions and the 770TT maintaining average throughputs of 85.5 t/hr and peaks in excess of 100t/hr during the day, it soon became apparent that the eight hour World Record would be comfortably beaten, and at 5.45pm the new World Record figure of 674.84 tonnes was confirmed.

During this time, the combine cleared 69.7 ha of crop, but only used 11.21

litres/hectare, or 1.15 litres/tonne, of fuel, which was some 3.75 litres/ha less than was used by the record breaking LEXION 580TT in 2008, and 10.8% less than the previous world record.

Such is the capacity of the 770TT, working at this World Record breaking rate of 85.5 tonnes/hour and at a feed wheat price of £171/tonne (the September 8th average HGCA for November), the LEXION 770TT would have paid for itself in under 34 hours.

After a short break, the LEXION then continued its endurance test, working into the night. With dawn having broken, the combine was finally shut down at 6.30am, by which time it had spend 20 hours harvesting, had threshed 1361 tonnes of wheat and had only stopped for two short servicing and refuelling breaks.

Despite working through the night, overall the 770TT still maintained an average throughput of 70.94 tonnes/hour during the 20 harvesting hours it worked, which in itself was 4 tonnes/hour higher than the LEXION 580's eight hour average in 2008.

The fact that the LEXION 770TT could maintain this high harvesting rate over such a long harvesting period, and through the night , answered the objective of the endurance test and demonstrated the effectiveness of the APS HYBRID threshing system in allowing the combine to work longer hours when other threshing systems would struggle to cope.

In holding this endurance test, and in the process setting a new World Record, CLAAS say they would like to thank landowners and farmers Mike Daniells of J Wharton Farms, Robbie Heath of J Heath Farms and Anthony Turnbull. Also Bill Basford who oversaw the whole event, Micronized Food Products at Driby for the use of their weighbridge and local CLAAS dealer Marsh.

Watch a video of the record being broken here **tinyurl.com/d2nwjbs**

Helmut Claas celebrates the new Combine Harvesting World Record. With him are Mrs Cathrina Claas-Mühlhäuser (left), Mrs Erika Claas and Mr Jack Brockbank from Guinness World Records.

298 engineering scholarships awarded

By the Arkwright Scholarships Trust

THE Arkwright Scholarships Trust has made its 2011 award of sixth form Scholarships for aspiring leaders in engineering and design. 298 Scholarships were awarded to students from across Britain – the largest ever annual number.

Scholars received their awards at two prestigious Ceremonies hosted by The Institution of Engineering and Technology in London and Glasgow on November 4th.

The Scholarships support students through their sixth form studies and encourage the students to study engineering or related areas of design at university. Scholars are selected following a rigorous selection process comprising an assessed application form, a two-hour aptitude paper and a university-based interview.

Arkwright Scholarships consist of an annual financial award to the Scholar and to her/his school, and a range of enrichment activities, such as mentoring and industry visits, that enhance a Scholar's understanding of engineering and the world of work. The Scholarships are highly regarded by university Admissions Tutors and enhance Scholars' university applications.

This year, the Arkwright Scholarships Trust is celebrating its 20th year of Scholarships - the first 5 Scholarships were awarded in 1991. Scholarships are supported by an expanding group of commercial companies, Professional Institutions, Trade Associations, Charitable Trust and individual donors.

ABOVE: Scholars, parents and guests at the London Awards Ceremony
RIGHT: Scholars with their Sponsor at the ceremony

Arkwright's new National Director, Dr Martin Thomas CEng FIET, commented, "These Awards Ceremonies represent the pinnacle of the Arkwright year. It has been fantastic to meet the dynamic new Scholars and to welcome supporters old and new. Arkwright talent is growing in breadth and depth and this has come across very clearly in this year's Awards Ceremonies."

Arlene McConnell, the Institution of Engineering and Technology's Young Woman Engineer of the Year 2011, a systems engineer at SELEX Galileo, Edinburgh said, "Young people, especially girls, need to hear about how important and rewarding a career in engineering can be both to them, and to the UK as a whole. It is important for Engineers to speak at high-profile events such as the Arkwright Scholarships Award Ceremonies to get that exciting message across to young people and their parents."

Membership changes

Admissions

A warm welcome to the following new members:

Member

Terry L A (Bedford)

Associate Member

Jones D A (Cornwall)
Lawlor J (Ireland)
O'Toole O (Ireland)

Associate

Barkley J A (Northern Ireland)
Cullen M P (Cheshire)

Student

Ashcroft Technology Academy

Glen J (London)

Brooksy Melton College

Aldridge J
Blythe S
Bond I
Branston A
Bridges S
Chiswell D
Cotterill D
Cox N
Duffin L
Ellis R
Giannotta D
Goodacre G
Gray N
Harris K
Hensman G
Heath S
James D T
Morrison L
Pearson T
Ross J
Taylor D
Toon J
Venables A
Wyatt D

Cranfield University

Aziz S
Bouffier V
Castillo Garcia M
Dziankowska J
Edmonds O
Ehmann J M
Gaja Jarque M
Gay M
Haggerstone R
James T
Martinez Morlanes M P
Nalwadda C
Przewozny S
Sanchez Barrera A
Stella D
Tait J
Weeks M
Whicheloe R

Easton College

Amess B
Barber D
Barnard J M
Blake B
Breeze R W
Burleigh A
Bush O
Carlston T
Cartwright C R E
Cooper L
Cullum M A
Currie L
Delph B
Everett A
Herbert D
High M
Houghton K J
Leech A
Ley J
Manning S
Mayhew O E
Moore T
Oxborough L
Pratt D
Salmon D J
Saunders H
Simmons L
Smith J A
Venni T W
White J J

Re-admissions

Member

Whiting M (Gloucestershire)
Toothill C J N (Hants)

Associate

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

Deaths

Bowen M E (Wiltshire)
Crolla D A (Yorkshire)
Harvey P E (Norfolk)
Russell J H (Yorkshire)
Ward E G (Nottinghamshire)

Transfers

Member

Bound C T (Norfolk)
Olley W J A (Oxfordshire)

Associate Member

Coker B B (USA)
Fryer A S (Lincolnshire)

Associate

Caple M C J (Bristol)
Hathaway-Jenkins LJ (Oxon)

Engineering Council

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

Registrations

IEng
Bound C L T (Norfolk)

EngTech
Jones D A (Cornwall)
Lawlor J (Ireland)
O'Toole O (Ireland)

CEng
Ingram M H A (London)
Olley W J (Oxfordshire)

Long service certificates

Name	Grade	Date of anniversay
60 years		
Edgar Raymond **Halstead**	MIAgrE	16 Oct 2011
35 years		
William David **Parnell**	IEng, MIAgrE	7 Oct 2011
Andrew Bryan **Howard**	MIAgrE	26 Oct 2011
Simon Robert **Glazebrook**	EngTech, MIAgrE	3 Nov 2011
Peter George **Nelson**	IEng, MIAgrE	4 Nov 2011
Antony **Couling**	IEng, MIAgrE	16 Nov 2011
Fraser **Milne**	MIAgrE	7 Dec 2011
David Andrew **Hay**	MIAgrE	19 Dec 2011
Thomas Julian Morley **Brassington**	CEng, MIAgrE	19 Dec 2011
Alasdair Maclean **Philips**	MIAgrE	19 Dec 2011
Stuart Donald **Christie**	EngTech, MIAgrE	30 Dec 2011
25 years		
Michael Eric **Chamley**	MIAgrE	23 Oct 2011
Robin Andrew **Chase**	IEng MIAgrE	23 Oct 2011
Richard Francis **Flach**	AMIAgrE	2 Nov 2011
Stephen Anthony **Crowther**	MIAgrE	20 Nov 2011
Ben Ndobe Epie **Ewang**	MIAgrE	20 Nov 2011

Academic members

Askham Bryan College
Askham Bryan
York
YO23 3FR

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

Barony College
Parkgate
Dumfries, DG1 3NE

Bicton College
East Budleigh
Budleigh Salterton
Devon
EX9 7BY

Bishop Burton College
York Road
Bishop Burton
Beverley
HU17 8QG

Brooksby Melton College
Asfordby Road
Melton Mowbray
Leics
LE13 0HJ

Coleg sir Gar
Pibwrlwyd Campus
Pibwrlwyd
Carmarthen
SA31 2NH

Cranfield University
Cranfield
Bedfordshire
MK43 0AL

Easton College
Easton
Norwich
Norfolk
NR9 5DX

Greenmount Campus
CAFRE
22 Greenmount Road
Antrim,
Northern Ireland
BT41 4PU

Harper Adams University College
Newport
Shropshire, TF10 8NB

Institute of Technology Tralee
Clash
Tralee
Co Kerry
Ireland

Myerscough College
Myerscough Hall
Bilsborrow
Preston
Lancashire PR7 0RY

Oatridge Agricultural College
Ecclesmachan
Broxburn
West Lothian
EH52 6NH

Pallaskenry Agricultural College
Co Limerick
Ireland

Plumpton College
Ditchling Road
Lewes
East Sussex
BN7 3AE

Reaseheath College
Reaseheath
Nantwich
Cheshire, CW5 6DF

Royal Agricultural College
Cirencester
Gloucester
GL7 6JS

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

Sparsholt College
Sparsholt
Winchester
Hampshire
SO21 2NF

Willowdene Training Ltd
Chorley
Bridgnorth
Shropshire
WV16 6PP

Wiltshire College - Lackham
Lacock
Chippenham
Wiltshire
SN15 2NY

Commercial members

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

British Agricultural & Garden Machinery Association (BAGMA)
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

South East Midlands Branch
Mon 12 December 2011, 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 please contact the Branch Secretary, John Stafford.
Tel: 01525 402229 Email: john.stafford@silsoe-solutions.co.uk

Wrekin Branch
Mon 12 or Thurs 15 Decemver 2011 - tbc
SPRAYERS - TBC
Speaker: tbc
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

South East Midlands Branch
Mon 9 January 2012 19:30
ECONOMICS OF FARMING SYSTEMS
Speaker: Gary Markham, Grant Thornton
Venue: Maulden Church Hall, Maulden, Beds MK45 2AU
Gary Markham will look at the key aspects that differentiate those who are in profit above subsidy and those who are not, primarily on arable farms. He will also express his view on the uptake of new technologies and whether there is a close link between those that embrace new ideas and those that are more profitable. Gary will also touch on the likely implications of the CAP reform in terms of cropping. For further information please contact the Branch Secretary, John Stafford.
Tel: 01525 402229 Email: john.stafford@silsoe-solutions.co.uk

West Midlands Branch
Tues 10 January 2012 19:30
SOLAR PANELS
Speaker: George Hughes, Active Renewables
Venue: Friends Meeting House, Maidenhead Road, Stratford upon Avon CV37 6XT
Mr Hughes will talk about solar panels, their value and various applications in domestic and commercial situations. 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 12 January 2012 19:30
TEAC THE ALTERNATIVE ENERGY COMPANY
Venue: Meet at The Fox & Hounds, 39 Top Lane, Copmanthorpe, York YO23 3UH
Wind turbine selection and solar electric power generating equipment for estates and businesses. For further details please contact the Branch Secretary: Mark Andrews
Tel: 0191 569 2380 Email: andrews_mark_a@cat.com

Wrekin Branch
Mon 16 Jan uary 2012
AGRICULTURAL MACHINERY (TBC)
Speaker: tbc
Venue: Harper Adams University College (tbc) For further information please contact the (acting) Branch Secretary: Jim Loynes.
Tel: 07836 602750 Email: jloynes@harper-adams.ac.uk

Northern Ireland Branch
Weds 18 January 2012 19:30
TRANSPORT SYSTEMS OF TODAY AND TOMORROW
Speaker: Andrew Wilson
Venue: Wright Bus, Ballymena. For further details please contact the Northern Ireland Branch Secretary: Ian Duff
Tel: 028 8673 6977 Email: duffi@iagre.biz

Western Branch
Weds 25 January 2012
VISIT TO ALVAN BLANCH LTD - MANUFACTURERS OF GRAIN DRYING AND HANDLING EQUIPMENT
Venue: Alvan Blanch Ltd, Chelworth, Malmesbury, Wiltshire SN16 9SG. For further information please contact the Branch Secretary Rupert Caplat
Tel:01235 522828 Email: rupert.caplat@lindehydraulics.co.uk

East Midlands Branch
1 or 2 February 2012, 19:00
SIMBA GREAT PLAINS - DEVELOPMENTS AT SLEAFORD FOR THE EUROPEAN MARKET
Speaker: Mr Alan Davies, Engineering Manager
Venue: Simba Great Plans, Woodbridge Road, Sleaford, NG34 7EW
Mr Davies will give an overview of Simba Great Plains. This will be followed by a tour of the Training centre and production facility.
For further information please contact Philip Wright (details below) . Alternatively, contact the Branch Secretary, Sandy Donald (Tel: 07977 521231 or 01526 320228, Email: sandy.donald@blankney.com
Tel: 01205 355689 Email: philip.wright28@btinternet.com

Yorkshire Branch
Thurs 9 February 2012 19:30
RITCHEY LTD
Venue: Meet at The Fox & Hounds, 39 Top Lane, Copmanthorpe, York YO23 3UH
Tags for livestock and links to weigh equipment and other automation. 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 13 February 2012 19:00
STUDENT MEETING AND BRANCH AGM
Speaker: Students
Venue: Maulden Church Hall, Maulden, Beds MK45 2AU
Presentations will be: "Management zone delineation by an on-the-go near-infrared sensor fusion platform (Graham Halcro); "Risk-based application of vis-NIR-DRS in the rapid assessment of a hydrocarbon-contaminated agricultural soil" (Reuben Okparanma); "Combined impedance and visible - near infrared spectroscopy techniques for non-invasive in situ measurement of soil compaction" (Raed Al-Asadi). For further information please contact the Branch Secretary, John Stafford.
Tel: 01525 402229 Email: john.stafford@silsoe-solutions.co.uk

Wrekin Branch
Mon 13 February 2012
CARBON FOOTPRINT FOR THE DAIRY SECTOR
Speaker: Chris Brown, ASDA
Venue: Harper Adams University College (tbc). For further information please contact the (acting) Branch Secretary: Jim Loynes.
Tel: 07836 602750 Email: jloynes@harper-adams.ac.uk

Northern Ireland Branch
Mon 20 February 2012 - tbc
EMISSION REDUCTION TECHNOLOGIES - THE WAY AHEAD - TBC

Speaker: Declan Hayden, AGCO - tbc
Venue: AFBI Hillsborough - tbc. For further details please contact the Northern Ireland Branch Secretary: Ian Duff
Tel: 028 8673 6977 Email: duffi@iagre.biz

West Midlands Branch
Tues 21 February 2012 19:30
CNH TIER 4 ENGINE
Speaker: Nigel Fawdry, CNH
Venue: Murley Agriculture, Nelson Lane, Warwick CV34 5JB
For further information and to book your place for this visit, contact the Branch Secretary, Michael Sheldon.
Tel: 01926 498900 Email: michaelcsheldon@yahoo.com

East Anglia Branch
Mon 27 February 2012
BRANCH AGM
Venue: tbc. For further information contact the Branch Secretary: Clive Bound
Tel: 01603 731207 Email: cbound@easton.ac.uk

East Midlands Branch
Early March 2012 - tbc
LTA - HOW IT HAS RAISED THE PROFILE OF THE SERVICE ENGINEER
Speaker: Claas, RW Marsh and East Midlands Branch Member
Venue: R W Marsh, London Road, Sleaford, Lincolnshire NG34 8NX
For further information please contact the Branch Secretary: Sandy Donald
Tel: 07977 521231 or 01526 320228
Email: sandy.donald@blankney.com

South East Midlands Branch
Mon 5 March 2012 19:30
FUTURE OF LIVESTOCK FARMING: ENGINEERING A REVOLUTION IN BIOLOGICAL MANUFACTURING
Speaker: Tomas Norton, Harper Adams University College
An industrialised approach to livestock farming can transform livestock farming not only in technology and production practices, but also in value creation beyond the farm gate. The presentation will discuss an acceptable and practical approach to the adoption of smart technologies and practices by livestock procedures.
For further information please contact the Branch Secretary, John Stafford.
Tel: 01525 402229 Email: john.stafford@silsoe-solutions.co.uk

Wrekin Branch
Mon 5 or Mon 12 March 2012 (tbc)
WIND POWER AND ALTERNATIVES? & BRANCH AGM
Venue: Harper Adams University College (tbc). For further information please contact the (acting) Branch Secretary: Jim Loynes
Tel: 07836 602750 Email: jloynes@harper-adams.ac.uk

Western Branch
March 2012 - date to be confirmed
CASE GPS AUTOSTEER TECHNOLOGY AND BRANCH AGM
Venue: Lackham College, Chippenham
Details to be advised. For further information please contact the Branch Secretary Rupert Caplat
Tel: 01235 522828 Email: rupert.caplat@lindehydraulics.co.uk

Yorkshire Branch
Thurs 8 March 2012 19:30
TRACTION ENGINE
Venue: Meet at 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

West Midlands Branch
Tues 20 March 2012 19:00
BRANCH AGM + TECHNICAL TALK (TOPIC TBC)
Venue: tbc. For further information and to book your place for this visit, contact the Branch Secretary, Michael Sheldon.
Tel: 01926 498900 Email: michaelcsheldon@yahoo.com

East Midlands Branch
Weds 4 April 2012 17:15
DAVID SHELTON SPORTS FIELD DRAINAGESYSTEMS & BRANCH AGM
Shelton has become leader in the design and manufacture of advanced equipment for draining sports fields and has won national and international awards. Their machines are exported worldwide. They have designed a number of new drainage techniques also which have been used to drain pitches for world cricket, football and rugby competitions. They have hire and contracting departments serving the UK.
There will be a machine demonstration at 17:15 followed by a presentation and light refreshments. The AGM will take place 19:00.
For information about the company please visit their website below.
For further information please contact Paul Skinner (details below).
Alternatively, contact the Branch Secretary: Sandy Donald (07977 521231 o r01526 320228, Email: sandy.donald@blankney.com)
Tel: 01205 480431 or 07941 604177
Email: paulskinner57@btinternet.com

Yorkshire Branch
Thurs 12 April 2012 19:30
BRANCH AGM AND CARLISLE BRAKES
Venue: Meet at The Fox & Hounds, 39 Top Lane, Copmanthorpe, York YO23 3UH
Brake components and their selection for a variety of applications.
For further details please contact the Branch Secretary: Mark Andrews
Tel: 0191 569 2380 Email: andrews_mark_a@cat.com

West Midlands Branch
Tues 17 Apr 12 19:30
WATER AND IRRIGATION - TBC
For further information and to book your place for this visit, contact the Branch Secretary, Michael Sheldon.
Tel: 01926 498900 Email: michaelcsheldon@yahoo.com

Other Events:

Weds 28 March 2012
IAgrE
YOUNG ENGINEERS COMPETITION
Venue: Terex UK Ltd, Central Boulevard, Prologis Park, Coventry, CV6 4BX. Anyone wishing to enter a team or teams, please contact IAgrE Secretariat asap to obtain kit(s). See website for rules of the competition.
Tel: 01234 750876. Email: conferences@iagre.org
Web: www.iagre.org/careers/devcareeryecomp

Thu 10 May 2012
IAgrE
WEATHERING THE PERFECT STORM - WHO DO YOU WANT IN YOUR LIFEBOAT?
Speaker: Various. Venue: RASE Stoneleigh Park, Warwickshire, CV8 2LZ. Further details will be published in due course. Check the IAgrE website for details and on-line registration when available.
Tel: 01234 750876 Email: conferences@iagre.org

Full details of forthcoming events can be found on www.iagre.org/events

Conference 2012

Landwards
Agriculture • Horticulture • Forestry • Environment • Amenity

Weathering the Perfect Storm-

Who do you want in your lifeboat?

A CONFERENCE FOR ALL SCIENTISTS, ENGINEERS AND MANAGERS WITH AN INTEREST IN HOW OUR SECTOR WILL INTRODUCE INNOVATIONS TO COUNTERACT THE EFFECTS OF THE "PERFECT STORM"

Innovation, science and technology in **Ag**riculture and the **R**ural **E**nvironment

A "perfect storm" of food shortages, scarce water and insufficient energy resources threaten to unleash public unrest, cross-border conflicts and mass migration as people flee from the worst-affected regions.

The IAgrE Landwards 2012 conference will allow representatives from various sections of the landbased sector to demonstrate how they will be offering innovations to ameliorate the effects of climate change whilst focussing on the need for the sustainable intensification of agriculture. The landbased engineering sector will then articulate how they will use engineering solutions to bring these innovations from concepts to reality.

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

- Energy resources
- Water resources
- Livestock
- Crop production

The conference, to be chaired by David Llewellyn, Principal of Harper Adams University College, will feature noted speakers from across industry sectors including:

- soils
- water
- plant breeding
- livestock

Each speaker will summarise their sector's contribution towards tackling the problems giving current contemporary examples and will give their views on what the future holds and their sector's possible part in it.

Others from the engineering sector will then outline their views about how these ideas will be put into practice.

***LANDWARDS*™2012**

Conference
May 10th
Venue:
RASE Stoneleigh

For further information, please contact:
IAgrE Secretariat:
conferences@iagre.org
01234 750876

For online booking, please visit
www.iagre.org

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

IAgrE is a licensed body of the Engineering Council and

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a founding constituent body of the Society for the Environment

Convened by IAgrE

In association with Royal Agricultural Society of England; Knowledge Transfer Network Biosciences; Knowledge Transfer Network Environmental Sustainability

AGRICULTURE **FORESTRY** **ENVIRONMENT** **AMENITY** **HORTICULTURE**

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