Landwards

Agriculture • Horticulture • Forestry • Environment • Amenity

IAgrE Professional Journal www.iagre.org Volume 69, Number 1 Spring 2014

Special issue

Winter Flooding

Lessons learned and the engineering response

In this issue...

Agricultural Engineering Innovation Centre opened

Garford Machinery win Ivel award

Graduation for John Deere technicians

Silsoe plaque unveiled

Biosystems Engineering

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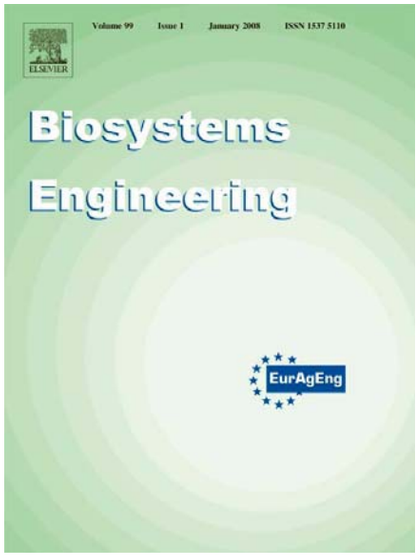

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IAgrE

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

Biosystems Engineering
Volume 116, Issue 3, November 2013, Pages 297-308

Methods for measuring gas emissions from naturally ventilated livestock buildings:Developments over the last decade and perspectives for improvement

N.W.M. Ogink, J. Mosquera, S. Calvet, G. Zhang

Wageningen UR Livestock Research, Wageningen, Netherlands
UniversitatPolitècnica de València, Camino de Vera, Valencia, Spain
University of Aarhus, Tjele, Denmark

The methods reviewed include determination of concentration and air exchange rate separately, tracer gas ratio, passive flux samplers, flux chambers, and combined downwind measurement and dispersion modelling. It is concluded that passive flux samplers, flux chambers and combined measurement and dispersion modelling are useful, but for limited fields of application only and require further development and validation against reference methods. The most robust method to investigate emission rates available at this stage is the tracer gas ratio method, but improvements are required. They include more detailed estimates of CO2release rates (when using CO2as a tracer) and research into optimising dosing performance of tracer gas release systems. The reliability of tracer gas ratio methods applied in buildings with large ventilation openings needs to be improved by a more profound understanding of tracer-pollutant ratios and their spatial variability, and the development of improved sampling methods for concentration ratios. There is a need for a field reference method against which other methods can be evaluated.

Volume 116, Issue 4, December 2013, Pages 487-496

Measurement of kick loads from horses on stable fittings and building elements

Hans von Wachenfelt, Christer Nilsson,Michael Ventorp

Swedish University of Agricultural Sciences, Alnarp, Sweden

Fittings and fixtures in horse stables may cause injuries to horses when trapped and there is a high risk of an accident to animal and handler when releasing a horse. The risk of injuries to horses and handlers must be minimised by correct structural design and appropriate choice of building material. The physical load of unprovoked and provoked horse kicks were measured in order to obtain data for the design of safe horse fittings and fixtures.Impacts recorded in the field tests were rapid, often shorter than 0.03 s and 90% had a maximum value below 1924 N. The greatest impact force and impulse caused by a horse kick were 8722N and 131N s respectively, with no statistical difference between provoked and unprovoked kicks. Considering the data obtained and allowing a certain safety margin, the impact resistance of horse fixtures and fittings in single horse boxes, to be used for horses of up to 700kg mass, should be at least equivalent to 150 Ns exerted by a horse shoe at 45°.

Volume 117, January 2014, Pages 35-42 -
Special Issue: Image Analysis in Agriculture

Automatic detection of tulip breaking virus (TBV) in tulip fields using machine vision

Gerrit Polder,,Gerie W.A.M. van der Heijden, Joop van Doorn,Ton A.H.M.C. Baltissen

Biometris, Wageningen University, Wageningen, Netherlands
Applied Plant Research, Wageningen University, Lisse, Netherlands

Tulip breaking virus (TBV) causes severe economic losses in flower bulbs in the Netherlands. To prevent further spread by aphids, the vector of the disease, infected plants must be removed from the field as soon as possible. Until now screening has been carried out by visual inspection in the field. As the availability of human experts is limited there is an urgent need for a rapid, automated and objective method of screening. Based on laboratory experiments, a vision method for use in open fields has been developed. In the period 2009-2012 field trials were carried out and the techniques were tested and improved. During the final evaluation of our system, in the last experiment (2012), the system approached the scores obtained by the experienced crop experts.

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

Landwards

EDITORIAL:

Mixing old and new . .

CHRIS BIDDLE
Editor
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WELCOME to this first issue of *Landwards* for 2014.

We have taken to the opportunity to give the magazine a bit of a 'spring-clean', with a slightly different cover design and layout to keep *Landwards* looking fresh.

But through it all, the 'meat' of the magazine will always be in the content.

However, unlike Marks & Spencer who seem to move the milk around the store to a different location every other week, we have kept the familiar flow of news, features and membership information to ensure continuity.

One of the joys of editing *Landwards* is the sheer diversity of editorial content, reflecting as it must, the age range, interest levels and varying experience of the readership.

That is illustrated wonderfully by the lovely words and pictures of the unveiling of a plaque at Silsoe to mark the site of the former Silsoe College which sits alongside articles such as thoughts on the Technician of 2025 and IAgrE ceo, Alastair Taylor's Vision of the future role for the Institution.

That is how it should be.

Our future must always be rooted in the experiences of the past.

The impact of the floods over the past few months, in the wake of the wettest winter on record, has given us the opportunity to focus on an issue of real topicality.

As a relatively small professional body, IAgrE needs to keep its head popping above the parapet, so it was both timely and appropriate that we should align ourselves publicly with sixteen other rural, engineering and environmental bodies to urge the Prime Minister to take a long term view of the impact of severe weather events on this country.

We now look forward to the IAgrE Conference in May. The subject matter compiled by our incoming President, Mark Kibblewhite, looks mind-blowing.

Our profession has often been regarded as traditional and somewhat staid.

I've a feeling that is about to change!

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

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THIS ISSUE

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Grimme and Brooksby partner on courses

GRIMME UK and Brooksby Melton College have joined forces to offer two industry developed Level 4 programmes in Land based Engineering and Business Management.

The two organisations have been working in partnership to develop a series of higher level programmes that would provide engineering businesses with their next generation of leaders. The idea behind the partnership is to offer a qualification directly related with the engineering industry, meaning employees are trained with skills that directly benefit business.

There are two Higher National Certificate courses being offered; an HNC in Business Management and an HNC in Engineering. The HNC in Business Management will involve areas such as working with dealerships, customer care, brand loyalty and understanding products and their aftercare services. The HNC in Engineering will include elements such as understanding the principles of sophisticated hydraulic and electronic monitoring and control functions, research project modules, product development and design.

The Higher National Certificate based programmes will consist of spending a number of blocks each year in college that have been carefully tailored to match the needs of the business by avoiding periods of peak business activity. The rest of the time is spent using these new skills in a number of work based projects and through their normal workplace activity.

Both HNCs are open to anyone who is currently employed within the engineering field, currently has a Level 3 qualification and is looking to progress their career.

Garford's Robocrop Spot Sprayer wins IAgrE Ivel Innovation Award

And student award also presented at LAMMA exhibition

Phillip Garford MD of Garford Machinery receiving the Ivel award from IAgrE President Andy Newbold

Dan George of Coleg Sir Gar is pictured receiving his student award from IAgrE CEO Alastair Taylor

MARKET Deeping based farm machinery manufacturer Garford Farm Machinery Ltd has won the Ivel Award for best new product for environmental innovation for its Robocrop Spot Sprayer.

The award was presented at LAMMA and Philip Garford Managing Director commented, "Being a LAMMA exhibitor since almost the start of the show, LAMMA awards are always that bit more special to us at Garfields and we are thrilled to receive the Ivel award."

The Spot Sprayer is the latest in the Garford Robocrop family. It uses the Robocrop imaging system, which in case of the spot sprayer, firstly defines the position of the crop and then looks for clumps of weeds growing between or amongst the row which it then targets with a special jet of weedkiller in order to kill the weed but avoid contact with the crop.

The Robocrop sprayer has been developed in partnership with Tillett Hague Technology, prompted by the impending withdrawal of key herbicides, particularly those used for volunteer potato control in onion and carrot crops.

Student Award

Daniel George of Coleg Sir Gar, was also presented with the IAgrE student award at LAMMA by IAgrE's CEO Alastair Taylor.

This award is designed to encourage and recognise innovation and excellence by students of subjects related to the application of engineering and technology to the land based sector.

Daniel's project was wheel assist (mobile wheel remover for large machinery).

Professor Miller who was part of the judging panel said, "This project addressed what the Awards Panel considered to be an important problem in a way that was practically relevant and that could be exploited commercially. The submitted material demonstrated that the student had very effectively defined and documented the stages in producing a prototype unit and had completed a good analysis of the potential for this design."

> "..Being a LAMMA exhibitor since almost the start of the show, we are thrilled to receive the Ivel award"
>
> Philip Garford, managing director Garford Farm Machiner

We must inspire more young people

To choose engineering as a career says IAgrE

A RECENT report by Engineering UK has highlighted a decline of 12.2% of young people under 19 taking engineering related Advanced Level Apprenticeships - a downward trend which will damage the UK's current and future capacity for growth if left unaddressed, say IAgrE.

"I believe Engineering Institutions need to work together rather than having their own initiatives, pooling resources to engage school students in engineering as a great career opportunity. The current programme is not as strategic as it could be and may not be cost-efficient in its use of very substantial funding," said Alastair Taylor CEO of IAgrE.

"We are awash with reports warning that the UK is lacking in engineers delivering high skills and innovation. It's time to set key priority objectives that have a chance of delivery and dump initiatives that are less promising. There is not enough focus on the impact of all these initiatives and I think there is duplication and possibly even some competition," he added.

"It is a recognised fact that companies are facing difficulties in recruiting staff with the right skills and experiences and this is going to get worse as many older engineers retire. Through Landbased Technician Accreditation schemes the IAgrE has already started to address this challenge and in many respects is ahead of the game - certainly at technician level. We have more work to do at graduate level.

"It is vital that we make engineering attractive and recruit more women into the profession, I think we are missing a strategic opportunity here.

"Not only is engineering central to ensuring economic growth, but it also plays a major role in helping to tackle global challenges, such as climate change, health, food security, biodiversity, water security, population and energy security.

"Agriculture and agricultural engineering are forward-looking sectors. If we are to meet the challenges of climate change and food security we must act now to address these issues," concluded Alastair.

. . . It is vital that we make engineering attractive and recruit more women into the profession

Alastair Taylor, IAgrE CEO

New engineering qualifications announced

Designed by industry-leaders for pupils aged 14-16

On 16 December 2013, Skills Minister Matthew Hancock announced rigorous new vocational courses in engineering for 14- to 16-year-olds as part of the government's long-term plan for the economy. The qualifications have been specifically designed by industry leaders and will help Britain's teenagers compete in the global jobs market.

IAgrE CEO, Alastair Taylor commented, "I am very pleased that these new qualifications have been introduced for pupils aged 14 to 16. I am optimistic that young people following these will be excited by what they learn and will then want to pursue a career in engineering - that has to be good for our economy. I hope that the Engineering for Agriculture sector can mobilise support for these qualifications and that those colleges already involved in providing vocational courses will work with their local schools to introduce young people to our own specialism."

The new engineering courses have been designed by the Royal Academy of Engineering and backed by world-leading businesses such as JCB, Rolls-Royce and Siemens. The demanding qualifications focus on engineering design, and electronics and computer control technologies - vital skills for the industry. All these qualifications reflect the skills and knowledge necessary to meet employers' requirements and the demands of the sector.

Alastair added, "I do have concerns that the large global companies behind these qualifications will have too much influence. We need to make sure that small and medium sized companies also benefit from an influx of youthful ideas and enthusiasm!"

Former staff attend ceremony at site of Silsoe College

Silsoe plaque unveiled

MANY IAgrE members will be aware that Cranfield University decided to close down the Silsoe College site in Silsoe in 2006, transferring the teaching and research to the Cranfield campus and shortly after selling the site for residential development.

Subsequently all College facilities in Silsoe were demolished, with the exception of two trees which stood outside the former Soils Lab and some trees on the side of Barton Road.

A number of former Silsoe College staff, with the cooperation and assistance of Bloor Homes Ltd, one of the developers, felt that the former presence of the College on the site over a 46 year period should not be lost without trace. To remedy this, a plaque has been erected and was unveiled on Friday 6th December 2013 by Professor Frank Inns, in the presence of 11 members of former staff who were working at the National College of Agricultural Engineering in 1963. Frank was the first staff member appointed after the Principal, Professor P.C.J. Payne, in 1962 and served the College until his retirement in 1988.

The National College moved to Silsoe in 1963, after starting in temporary accommodation at Boreham House in Chelmsford and continued its activities there, until finally all the work, staff and facilities were transferred to the Cranfield Campus in 2009.

The National College of Agricultural Engineering became a School of Cranfield in 1975 and subsequently changed its name to Silsoe College in the 1980s.

During the 46 year period in Silsoe, some 6,000 students were trained in agricultural engineering and related disciplines and came from all continents and more than 100 countries. The name of Silsoe is very well known throughout the world through the activities of both the College and Silsoe Research Institute, with many graduates now occupying very prominent positions in their respective countries.

Anyone wishing to view the plaque will find it sited in the region of what was the former Lecture Theatre / Butler Yard area. It is fixed on the garden wall of the first house on the right side of Obelisk Way. Travelling from Silsoe towards Barton, Obelisk Way is the second entrance on the right leading into the Silsoe Grange development.

ABOVE: Professor Frank Inns unveiling Silsoe plaque with Mr Darren Pratt of Bloor Homes Ltd

BELOW:Former NCAE staff at unveiling ceremony. L to R. Jill Godwin (Fisher), Brian Stenning, Brenda May, John Neville, John Kilgour, Pat Kilgour, Vanessa Macnee (Bloor Homes), Leonora Inns (Floy), Frank Inns, Gordon Spoor, Darren Pratt (Bloor Homes), Anne Grant (Tucker), John Dyson, Sandy Grant.

£10,000 of SRUC 'Going Further' bursaries support students' progress

STUDENTS from Dumfries, Perth and Lower Largo in Fife are among a group receiving bursaries totalling £10,000, awarded by Scotland's Rural College.

SRUC's 'Going Further' awards encourage and reward candidates with exceptional potential to advance their studies and achieve higher qualifications than they previously aspired to. The unique way SRUC works offers students a particular opportunity to progress this way and to chose routes of study they might otherwise have not considered.

In all 10 students benefited from the Going Further Bursaries. SRUC now offers its students a wider choice of courses with the opportunity to progress from entry level qualifications through to PhD.

New reduced cost service for the industry

AEA launch 'Training for Business'

The Agricultural Engineers Association (AEA) has launched its new service for the industry - '*AEA Training for Business*'.

AEA Training for Business is the result of a members' initiative and is designed as a service to members at a reduced cost to other providers. The aim is simple - to provide business (non- technical) training opportunities for AEA members and their dealers. The courses are available to non-members at the full price.

The prospectus lays out the Aims and Objectives, the Process, the initial Curriculum subjects, Pricing and other administrative information.

Chief Executive of the AEA, Roger Lane-Nott said, "We are planning to conduct our first training in April and May and will then announce the full programme for 2014/15 in June providing a full training programme from September 2014 for the next year. I anticipate there being around 25 courses available from Customer Service, Negotiating Skills, Introduction to Finance, Health and Safety and a full suite of Windows courses at all levels and many others dictated by demand.

"The price will be lower than many other providers and the AEA sees this as a service and benefit to members rather than a profit making concern."

Evolution, revolution, defining moments, seismic shifts, and black swans

Alastair Taylor

In our lives, I guess we would all be able to identify those moments which turn out to be so called defining moments.

For me, as a child of the sixties, these would be the first man on the moon, the three day week, the fall of the Berlin Wall, 'nine-eleven' and the Twin Towers, and more recently the great success of the London Olympics.

So what have been the defining moments in Agricultural Engineering? I guess when, a few thousand years ago, someone put a wheel on a cart and moving things became so much easier, that must have been a real revolution. 'Turnip' Townsend is celebrated for his Agricultural Revolution through his work with crop rotations in the seventeen hundreds. At the same time, Jethro Tull and his horse drawn seed drill must have been revolutionary.

The industrial revolution truly did speed things up and the rise of mechanisation through that period and into the twentieth century had a massive impact on productivity, labour usage, and when combined with other husbandry techniques, crop yields and quality. I wonder how it must have felt when the first steam engine and threshing set emerged on the scene during the mid-nineteenth century. At the time, all of this must have been truly revolutionary.

Moving into the twentieth century, there is no doubt that Harry Ferguson with his unique hydraulic system and mounted implements brought about a further revolution. There must be hoards of people who still believe that we should work the land with the Grey Fergie (and probably as many who still think we do!). In some developing countries, the modern day version of the Grey Fergie goes on to revolutionise productivity.

Up to this point, I have used the word 'revolution' seven times.

However, I am not really sure that we can be as confident about its use when we look at the past few decades. Yes things have got bigger, more automated, use different materials and techniques, more efficient, and in many respects, more productive, but can we say that all of this is a revolution in agricultural engineering?

To be honest I don't think so. Certainly things have evolved, but other than perhaps the Robotic Milking Machine, I am not sure there has been anything in the last thirty years which I will look back on as a defining moment in Agricultural Engineering. We need a new revolution!

> "I truly believe that the wider community will look to IAgrE and its members for the intellectual capital to move things forwards to new heights"

A few of you will have heard me talk about 'Black Swan Theory'. Developed by Nassim Nicholas Taleb, this is a metaphor which describes "an event that comes as a surprise, has a major effect, and is often inappropriately rationalised after the fact with the benefit of hindsight".

Taleb uses the concept of Black Swan Theory to explain "the disproportionate role of high-profile, hard-to-predict, and rare events that are beyond the realm of normal expectations in history, science, finance, and technology". In other words, things we didn't see coming.

So are we on the verge of a Seismic Shift? Somehow I think we might be.

There appears to be a growing movement to connect different aspects of science and technology in a way they have never been connected before. For all we know, there may be some bio-chemist, or nano-technologist beavering away on some ground breaking research which when connected with engineering, could bring a new revolution in production.

Similarly, there may an engineer, perhaps working in aviation, robotics or aerodynamics who has never thought about how their work could be applied in our discipline. Our job is to connect these people.

We should not fear this future. In fact I believe our time has come.

After all Agricultural Engineering is unique in the way it already connects Biology and Engineering. This is our territory and we should be proud of it. As the CEO of a professional institution, I truly believe that the wider community will look to IAgrE and our members for the intellectual capital to move things forward to new heights.

Our Annual Conference, convened by IAgrE President elect, Mark Kibblewhite does just this. With the title '*Re-imagining Agriculture: Engineering as the strategic enabler*', this brings together some cutting edge speakers from ecology, environmental science, and engineering to explore how new engineering technology could enable a step-change in agricultural productivity by enabling the adoption of entirely new agricultural systems.

Here's hoping that the IAgrE will be at the fore front of the next agricultural revolution. Will we be behind the next Black Swan?

Come to the conference on Wednesday 21 May to find out. I will see you there.

Tractor training for Kent students

The recent purchase of a new MF 7616 tractor by Hadlow College, Tonbridge, Kent, has extended a close working relationship that has existed for almost 50 years between Massey Ferguson and the well-known land-based college, rated as 'outstanding' in its most recent Ofsted inspection.

Although being used primarily for practical training of students attending full-time Level 2 Diploma and Level 3 Extended Diploma courses in Land-Based Technology (Agricultural Engineering), the MF 7616 tractor is available to every department within the college for purposes ranging from tractor driving instruction to general farm work and the movement of tools and materials around the Hadlow site.

"Our aim is to help school leavers, and those looking for a career change, achieve sound engineering knowledge and recognised technical qualifications, enabling them to take up suitable positions within dealerships, manufacturers and distributors, farm workshops and training establishments throughout the UK and overseas," said Scott Clark, Hadlow's team leader in agricultural and engineering studies.

Honda's Apprentice of the Year

MATTHEW Davies of Ibbetts, St Neots, has won the title of Honda (UK) 'Power Equipment Apprentice of the Year'.

Matthew, 21, from St Neots, started out at the family-run agricultural and horticultural supplier as a Saturday-lad at the age of 16. He was presented with the award in December by Philip Crossman, Managing Director of Honda (UK) at a special ceremony to mark the achievement of seventy eight young graduates who had successfully completed a Honda (UK) apprenticeship.

President's Musings

Rising to the challenge

In his final musings as IAgrE President, ANDY NEWBOLD, celebrates the innovation, energy and enterprise of agricultural engineers

I start with an apology, it's the last musings from yours truly, please indulge me?

On reflection, over the past couple of years my feelings towards musings have gone from fear to at least a respect for having to put pen to paper. I recommend having to press the pause button on the busyness of the daily grind and having to think!

In this case parking my self-consciousness and thinking again about how agricultural engineering contributes to society? Your humble correspondent finds himself sat at O'Hare airport, Chicago waiting for a flight home (keeping a lid on the panic a reminder email from hq has started regarding the tight deadline for musings!).

It's 0°F outside (approx -18°C) and yet the car started, there was hot water in the hotel this morning, the food was warm and fresh and life carries on. We take a lot of life for granted now and yet it is and has been engineers responsible.

I am mindful that looking forwards, the challenges to mankind do not get any less, but I am excited about how agricultural engineering is a vital part of the answer to these, and I have great faith in the innovation, energy and enterprise of this industry.

At the LAMMA show in Peterborough in January once again I was fortunate to be able to present the Ivel Award to Philip Garford from Garford Farm Machinery for their robot weeder, an exemplar of innovate thinking leading to a great practical solution, well done and congratulations to British agricultural engineers!

During this last two years we have seen the discipline of agricultural engineering come into its ascendancy, not just in the UK but globally as the world wakes up the challenges its facing and how we can help. Policy makers are starting to see the benefits of supporting and encouraging our industry, whilst our educational establishments are increasingly having a global prominence in world-class research in the field (no pun intended).

It's always better to be lucky than good, and I have been fortunate to serve as your president during such exciting times.

On to climate change, none of us could have failed to notice the terrible plight of Somerset's farmers and latterly those in the Thames valley.

Now it's easy to criticise from afar (and in the dry) but as agricultural engineers, many of us have studied and practiced drainage and water management. There is no agricultural revolution needed to help deal with the issue of flooding and rainwater attenuation.

My hope is that we can contribute to the solution in this.

I could have filled a page with my grateful thanks for the support and encouragement of many within the institution.

Firstly my gratitude to the secretariat who have been at my side always helping, sometimes guiding and occasionally just putting their collective feet down and saying no! You have had a lot to put up with, thank you.

I have been blessed to be surrounded by such wise counsel, from a most excellent council, alongside other friends and office holders who have been more than willing to support me throughout this time. Alongside not one Chief Exec, but at least two (you decide!) during my tenure, Thank you.

Presidential reading matter:

As I step down from being president there will be (may be) available time for new things, so my quest for lifelong learning will continue:

'*Ms. Know-It-All: Stitching Wounds and Other Things You Can Master in 34 Hours*' by Willa Paskin - **tinyurl.com/l9gkayv**

Also as a sidelong look at what the future may hold, how about:

'*30 things being 3D printed right now (and none of them are guns)*' - **tinyurl.com/opj65zb**

> ". . During this last two years we have seen agricultural engineering come into its ascendancy"

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Activities of the
DOUGLAS BOMFORD TRUST

An update

Travel awards for individuals and Student Group visits

An important part of the support provided by The Douglas Bomford Trust relates to travel grants either for individuals or groups of students.

Those receiving an award are asked to provide The Trust with a brief report of their visit and a brief edited summary of some example reports relating to visits undertaken in 2013 is given below. The full reports are given on The Douglas Bomford Trust website.

In November 2013, the Agritechnica exhibition was held in Hannover, Germany and student groups from Harper Adams University and Riseholme College received support from The Trust to attend this exhibition. Unfortunately it was not possible to provide support to all the groups that applied for it because some applications were submitted too late - when all the budget had been allocated and with no time to make alternative arrangements.

The message here for those likely to seek support for any travel plans and particularly for travel by student groups is to approach The Trust in plenty of time - see our website for details.

Examples of visits supported by The Trust

JOANNA NIZIOLOMSKI -

Trust sponsored PhD student at Cranfield University

Attendance at XIIIth International Asparagus Symposium, Nanchang, Jiangxi Province, China. 16th - 18th October 2013

The International Asparagus Symposium, held once every four years, exists to bring together the asparagus industry to discuss recent research and exchange experiences about developments in breeding and biotechnology, pests and diseases, cultivation and physiology and marketing.

A total of 330 delegates attended this symposium and exhibition, of which 60 were overseas delegates and 270 Chinese delegates.

My purpose in attending this symposium was to present my PhD work in which I am investigating soil erosion and runoff control in row crops, with trials undertaken in asparagus fields.

The title of my presentation was '*Soil erosion and runoff control from asparagus: a case study from the UK*', for which I was allocated a 20 minute presentation slot under the theme of crop management. This was the first opportunity that I have had to present my work to a large number of asparagus industry representatives. Remarkably, my work was the only piece concerning soil management in the whole symposium.

My attendance at the International Asparagus Symposium has broadened my knowledge of the global asparagus industry. With this knowledge I can put my work into the context of the wider asparagus production process.

I also feel that with a new understanding of processes and threats I can better relate to growers in future meetings.

STUDENT GROUP FROM HARPER ADAMS UNIVERSITY -

Visit to Agritechnica in Germany

In November 2013, a group of 42 students from Harper Adams University travelled to Agritechnica in Hanover, Germany.

The tour was organised by four final year engineers Edward Worts, Cormac Flaherty, Finlay Whitehead and Robert Pickavance.

The students were commended on their professionalism by members of staff and company representatives aided by the wearing of embroidered gilets which were aimed to allow the students to be ambassadors for Harper Adams University.

Organisers of the Harper Adams trip to Agritechnica: Robert Pickavance, Edward Worts, Finlay Whitehead, Cormac Flaherty

The students spoke of the valuable contacts they made whilst attending the show and the innovations which were unveiled such as the Amazone sprayer suspension system which allowed the boom height to stay relatively level when working on undulating ground.

All students also commented on the precision and accuracy of the control systems which are now being introduced. Manufacturers are being proactive in the need for greater accuracy and precision of application when completing operations such as spraying and fertiliser spreading.

The Rauch fertiliser spreader was an example of this with automatic rate and spread pattern adjustment to apply the fertiliser where it was needed.

TIM FOSTER – PhD student from Imperial College, London studying intraseasonal irrigation behaviour to improve water policy development

Visit to the USA in October 2013

WATER scarcity presents a growing threat to the sustainability of irrigated agriculture. As a result, there is a need to develop policies which balance the needs of rural economies and food security with sustainable water use.

My PhD research addresses this issue and, specifically, aims to develop more realistic models of irrigation decision making in order to predict the impact of water scarcity on agricultural producers and the hydrological system. This research is focused on a case study of maize production in Nebraska, USA, where irrigated agriculture has both contributed to, and is heavily affected by, declining groundwater levels in the underlying High Plains Aquifer.

A centre pivot irrigated maize field that had been recently harvested in Nebraska

Visit to a land retirement and stream augmentation project

In late 2013 I was fortunate to have the opportunity to conduct a two-month research visit to the United States as part of this ongoing work, kindly supported by a generous grant from the Douglas Bomford Trust. A key aim was to carry out interviews with stakeholders to learn about centre-pivot irrigation management and groundwater sustainability issues in Nebraska.

I conducted 10-15 interviews and a number of site visits with farmers and water managers over a two week period in two different Natural Resource Districts (NRDs) in Nebraska, the Upper Republican NRD and the Twin Platte NRD.

From these discussions a number of common themes emerged regarding the structure of irrigation planning and groundwater use.

Farmers indicated that irrigation decisions are predominantly fixed pre-season when choices are made about the area of irrigated maize to plant. Irrigated area is determined based on maximisation of expected profits, and is thus sensitive to economic markets.

However, water availability was also cited as having a large influence on decision making. Producers were especially concerned about declining well yields in the region, which reduce the rate at which they can apply water to fields.

Many stated that poor well yields were forcing them to reduce plant populations or the total size of irrigated area in order to keep up with crop water requirements.

Studentships and prizes

THE Trust has now completed the procedures for selecting students who will receive Student Awards for the 2014 year.

Selection procedures were different this year for the students applying from Harper Adams University. Normally, short-listed students are interviewed by a panel that includes two representative trustees and the secretary of the Trust and this interview is regarded as a component of training and experience that will be helpful to students when they come to apply for jobs.

This year, at the planned time of the interviews, many of the short-listed students were travelling to visit the Agritechnica show in Germany (a visit sponsored by The Douglas Bomford Trust - see previous page) and so the selection was made based on the submitted applications and written cases.

Those from Harper Adams University who were receiving awards attended a presentation event at the University on Wednesday 12th February and received details of their award from Jonathan Bomford representing The Trust.

Douglas Bomford Trust scholarships at Harper Adams University

Back, from left, DBT Secretary Professor Paul Miller, trustee Jonathan Bomford, scholar Jacob Smith, scholar Alex Skittery, Harper Adams Senior Lecturer in Engineering David White, trustee Anthony Burgess

Front, scholars Christopher Siddons, Andrew Dawson, Jennifer Williams and Cormac Flaherty.

Agricultural Engineering Innovation Centre opened

Environment Minister launches new facility at Harper Adams University

KOREC staff demonstrating UAVs to the invited guests

A £2.9 million centre to support advanced agricultural engineering teaching and research was launched at the end of January at Shropshire's Harper Adams University.

Lord de Mauley, Parliamentary Under Secretary of State for natural environment and science, conducted the official opening of The Agricultural Engineering Innovation Centre (AEIC).

The Environment Minister said, "Harper Adams' new £2.9m Agricultural Engineering Innovation Centre for precision agriculture is a world class example of the innovation and agri-engineering expertise we have in the UK.

"We need to do all we can to translate research into new products, processes and technologies if we are to increase the competitiveness of the agricultural sector, address the challenge of food security and enhance the environment."

NATIONAL CENTRE FOR PRECISION FARMING

The AEIC is home to the National Centre for Precision Farming (NCPF), which aims to promote and evaluate the use of technology as a vital aspect of precision agriculture, and provides a focal point for the industry; offering a place for agriculturalists to meet and source information, and gathering and disseminating good practice from within the UK and abroad.

The building houses a range of 'clean' engineering facilities and was developed thanks to an award of £1.5million from the Higher Education Funding Council for England's Catalyst Fund, announced by

Vice Chancellor Dr David Llewellyn with Lord de Mauley

Prime Minister David Cameron in October 2012, plus funding from the Marches Local Enterprise Partnership, the University and philanthropic donations from, amongst others, the Douglas Bomford Trust and the Eric Lea Estate.

Lord de Mauley and invited guests enjoyed a tour of the centre's facilities, which include an electronics/mechatronics lab, hydraulics lab, research lab for tractors and machines and a state-of-the-art lecture theatre, into which tractors and other machinery can be driven.

The AEIC supplements existing resources and provides a physical base around which university/industry collaboration can be stimulated. The building has many specialist features that support product development and training, and also provide a means to verify health and safety measures in the design and development of new agricultural machinery and precision farming applications.

UNMANNED AERIAL SYSTEMS

Running concurrently with the official opening was an NCPF seminar on Unmanned Aerial Systems, attended by delegates from engineering organisations throughout the UK.

Richard Gauchwin, from KOREC with the Unmanned Aerial Vehicle

In addition to presentations from a range of experts, guests including the Environment Minister viewed a flight demonstration of unmanned aerial vehicles (UAVs) by KOREC, a company specialising in the supply innovative surveying, mapping, machine control and geospatial positioning technology.

UAVs can be remote-controlled or can fly autonomously based on pre-programmed flight plans, collecting large amounts of imagery data and video in a short period of time, which has the potential to increase agricultural productivity.

> "..We need to do all we can to translate research into new products, processes and technologies"

Lord de Mauley, Parliamentary Under Secretary of State for natural environment and science

FEEDBACK

Thoughts on our engineering future

by Richard Robinson

I, together with several hundred others, attended the excellent Douglas Bomford Trust event at Harper Adams and was, on one hand truly impressed, and on the other, disappointed.

Let me rush to explain that the vast majority of the event was a huge success and all praise is due to the Trust, the IAgrE secretariat and the college - we saw evidence of the huge investment in facilities which should really encourage our budding Agricultural Engineers.

Let me now explain my concerns:

We are a small Design / Development / manufacturing business employing two full time designers. I have been struggling for many years to find someone to replace me as our Engineering Director - I'm hoping our latest new employee will occupy that post, and the sooner the better.

Just as we are seeing a dramatic growth in Apprenticeships, fulfilling a clear vacuum in our industry, we need to see a similar return to the old (and proven) standards of degree level education. I recall the work of Roy Fedden who did so much to develop the Radial Piston Engine and the Sleeve valves which meant that Bristol Aircraft engines used fully interchangeable parts. He was instrumental in the establishment of Cranfield as *the* world centre for Aeronautical Engineering and of course the organisation which adopted the college at Silsoe. The combination of Research, Academia and Industry is the foundation of any strong Higher Education process, which is then able to command the best jobs for its alumni.

Agricultural Engineering is not all Science - just look at the companies enjoying success - the management had a natural feel for the product (and how to motivate people to build it!) together with a vision for the future.

This vision for the future was evident at Harper but not all of the demonstrations we viewed stood up to close scrutiny and certainly did not impress the students from a mixture of colleges in the group in which I travelled. They showed a keen and informed interest in the presentations and in discussions acknowledged the usefulness of the concepts and the enthusiasm of the presenters.

I was particularly upset that the lovely VMC in the workshop appeared to have never been used - Engineers must design parts that can be made, and to do that you need to know how to use the tools that will produce them.

There was a time in America when the Vice Presidents of Engineering of, I believe, five of the biggest manufacturers had all served their apprenticeships in the same German workshop in Pennsylvania. One of them showed me how to weld with twice the current and, of course twice the speed, that I had been taught.

Agricultural Engineers have an excellent reputation based on their ability to solve problems with what comes to hand - making do is something you learn with your fingertips, eyes ears and brain - our tools of the trade.

Special Feature

The response to this year's winter floods has become a political as well as a practical debate. This LANDWARDS SPECIAL REPORT looks at the options and the role of engineering

MANAGING FLOODS

The Engineering response

LONG TERM SOLUTIONS

Lessons of the past, alongside new technology, have lessened the impact of the recent floods on houses and farmland says David Rooke, head of Flood and Coastal Risk Management at the Environment Agency

FLOOD prevention is, and always has been a long-term strategy, for successive Governments - and actions taken as a result of the severe floods in 1953 when over 300 lives were lost have greatly minimised the impact of the heavy rain and storms during the Winter of 2013/4.

Even remedial action following the floods of 2007 have resulted in far fewer houses being flooded in the Tewkesbury area this time around.

"Despite negative press coverage, we estimate that some 1.3 million properties in the UK which might previously have been at risk of flooding have been dry this time around."

David Rooke, Executive Director of Flood and Coastal Risk Management at the Environment Agency was presenting a lecture on ***Lessons learned in managing the winter floods - the engineering response*** at the Royal Academy of Engineering on 25 February.

"To give an idea of the scale of this winter's rains, the wettest since records began, the Thames Barrier has had 165 closures since it was built 30 years ago.

"Over 25% of those closures have occurred in the three months from December 2013 to February 2014. Without the Thames Barrier, areas such as Canary Wharf would have been underwater during this very wet period.

"We are also getting better at forecasting weather events ahead of time,

David Rooke conducts a Q&A session at the Royal Academy of Engineering


David Rooke

and now have a new profession emerging, that of 'hydrometeorologist'. In recent months hydrologists and scientists from the Met Office in Exeter have started to sit down together to look at impending weather patterns and decide on the likely impact.

"As a result, we were able to indicate six days ahead that there was going to be flooding issues on the East Coast in early December - and be more prepared."

Referring to the flooding on the Somerset Levels, Mr Rooke said, "As of today, we calculate that we have 92 million tonnes of water to remove from the affected area, and even with the 40 pumps on site plus another 30 that we have brought in from other parts of the UK and Europe, we can only pump out 3.7 million tonnes a day - so it is going to take some time to return to normality in that region.

"However, we have to be careful of where we pump the water, because if we get it wrong it could make the matter worse."

Communication is key during periods of bad weather said Mr Rooke, and the Environment Agency had been helped greatly by the use of Twitter Alerts during the recent floods. "We were one of the first agencies to use this system and it has greatly helped us get messages out quickly, as well as receive updates from people in affected areas."

When the waters had subsided and the weather settled down, a complete audit of the state of the nation's flood defenses would be prepared with a full report sent to Government within two months, he added.

A new profession, that of 'hydrometeorologist' is emerging

Referring to a question from IAgrE member Alexander Brawn about the role of agricultural land in flooding strategy, and how run-offs and drainage might be improved, Mr Rooke said that better science was needed on land usage and it might require more input both through investment and knowledge transfer between the stakeholders and the Environment Agency.

The inference being that even with increased funding, there were still choices to be made between agricultural production and protection of homes and urban areas.

IAgrE join with 16 other organisations to urge for clear strategy

THE Institution of Agricultural Engineers has joined together with 16 other professional organisations, who regularly work together on projects designed to manage water, prevent flooding and increase resilience, to ask for proper long-term planning to avoid further flooding devastation in the UK.

The group calls for a complete re-think to the way the country manages, stores and distributes its water, and how we plan both the natural environment, and the built environment of our towns and cities to make them more resilient.

In the letter to the *Daily Telegraph*, experts from 17 environmental and planning organisations - including landscape architects, engineers, hydrologists and ecologists - made a plea for the government to listen to them when it came to devising a flood defence policy for the future.

"While we are pleased to hear that the prime minister will provide leadership and funding, it is essential that government actions are based on best practice developed over many years," they said.

"Water management techniques could have helped prevent the effect of flooding on villages, towns and over surrounding land seen recently.

"Emergency measures are in order for the immediate crisis. But in the long term, the management of water requires a clear strategy."

They suggested measures to cut the risk of future flooding, including:

- **Use of forestry and land management to hold back water in the upper reaches of rivers, as well as dredging for the lower reaches.**
- **Fitting sustainable drainage systems on existing buildings and new buildings.**
- **Buildings and land that cannot be properly protected should be made to withstand flooding.**
- **All new housing on flood plains must be resilient when built.**
- **More co-operation between experts, the water companies, internal drainage boards, local authorities, the Environment Agency, and Natural Resources Wales, as well as between them and landowners or residents.**

The letter urged David Cameron to hold a cross-departmental conference, similar to one set up to deal with ash dieback, and to include Whitehall departments, the Environment Agency and other experts to prevent a repeat of the scale of damage caused by recent floods.

In response to the letter, a Downing Street spokesman said, "We are looking at all potential options to tackle flooding and are spending £2.4bn on flood management and protection from coastal erosion. That is more than ever before.

"We have already announced a record level of capital investment at £370m in 2015/16 rising to over £400m in 2020/21 as part of our long-term plan to improve resilience.

"We need to employ a range of techniques to alleviate flooding, including dredging in some areas.

"We will look at the lessons to be learned to see where additional flood protection can help."

The other signatories were:

Landscape Institute; CIBSE; Institution of Environmental Sciences; IEMA; Institute of Chartered Foresters; Institution of Environmental Science; Royal Institution of Chartered Surveyors; Institute of Fisheries Management; Chartered Institute of Ecology and Environmental Management; Energy Institute; Chartered Institution of Wastes Management; Arboricultural Association; Institute of Fisheries Management; Environmental Policy Forum; CIWEM; Institution of Environmental Science

Flooding

To drain or not to drain?

OPINION:

Tim Havard, MSc NDA, EngTech, CEnv, MIAgrE

TO steal a phrase from today's electronic jargon - that's a no brainer. When thought through it is clear that controlled drainage has more positives than negatives.

The key word however is *controlled* and in today's UK I would suggest that it is nigh on impossible to bring about controlled drainage systems due to the multitude of organisations, institutions and other interested parties that have a say in the matter; none of which it would seem, are obliged to talk to or communicate with one another.

Just listen to the chatter and noise in the media over The Somerset Levels problem recently. As a nation, like anywhere else, we use water for many different reasons but we are, compared to a significant number of the world's population, blessed with abundance.

But do we use it wisely? It would seem not. We waste a great deal and at some considerable cost to the overall economy.

As it is clearly a basic of life, the water companies store, clean and manage water for us all to drink, wash in and flush away sewage; an essential process irrespective of one's views on the way it is done.

Water, via the canal system, was once a major national artery and is still in use by many both for business and pleasure. It has become a major asset in the leisure industry allowing canoeing, boating, fishing, swimming, golf and a wide range of so called natural habitats that provide the wide range of wildlife many love and enjoy.

Water is also however a major if not key component of sound land management for food and other crop production such as fibres and timber without which our economy would most certainly be seriously damaged.

Water is also often referred to as 'The Universal Solvent' and as such is a major player in just about all life supporting natural processes.

WEATHERING

One key process is soil generation (pedogenesis). By a process known as weathering, an aqueous solution, ranging from acid through neutral to alkaline depending on the parent material and the pH of the rain, along with other climatic factors such as freezing and drying, breaks down the underlying rock and sub-surface material into a crude soil.

This in turn is worked on in a moist environment by the myriad of soil micro-flora and fauna. Water can move tiny pieces of soil just by the effect of slope and gravity; acting as a slope changer, or it can move mountains in an erosive storm like a giant bulldozer and/or heavy duty tipper truck.

It can also act as a particle separator as the particles fall out of the flow as the velocity decreases (differential separation) producing areas of silt and sand. This process however nearly always takes place within a natural geological formation that forms a crude basin on a slope - *a water catchment area.*

The catchment area is the natural basin of ground that due to its shape acts as a concentrator of the rainfall from raindrops through bogs, rivulets, streams and rivers and usually on to the sea. More than one catchment area may form a group before the water flow is discharged into the sea.

Over many hundreds of years, man, through tree cutting, land drainage, house building and other major constructions such as reservoirs and highways, has significantly distorted this system.

Politics, no respecter of natural systems, has furthered this physical damage by dividing up these catchment areas into a mishmash of man-made boundaries.

In the past the old parish boundaries may have followed a water course here and there but that was pretty much the best we could expect. We now have Parliamentary Boundaries, Planning Authorities, River and Canal Boards, Local Councils, National Parks and no doubt some I have forgotten or never knew about which also divide up the catchment area with positions to protect - political, professional or personal. There certainly seems to be very little or any interaction between them.

This lack of river basin catchment area cohesion gets even worse when central government gets in on the act. What we seem to have ended up with in UK is all these various 'important' users fighting each other through their chosen Institution, apparently defending their own vested interest without too much thought to the general condition of the natural resource itself - the water - and its role in all of our society.

The Somerset Levels seems to fit this description pretty well.

STRATEGY AND APPLICATION

In reality, with only a little understanding of the water cycle, it is clear that a single entity has to manage the clearly definable catchment area that is a water system.

As there are many such catchment areas each with its own set of special characteristics it would seem extremely unlikely that a central government institution; no matter how well meaning, could control the day to day needs.

The strategy needs to be country wide but not the application. What is also clear is that over the hundreds of years of mismanagement, but particularly in the past 70 to 80 years, so many mistakes have been made that it will take many years to put right.

And now we have to add one more, but very powerful factor, and that is climate change.

Well founded scientific evidence and long term field data supports the view that the total annual rainfall is increasing, but more importantly this increase is from increased storm intensity and not an even spread. This means the increased energy stored in the storm is released as increased water flows over very short periods of time which in turn increases the rate of erosion.

In terms of drainage the storm intensity is critical particularly when the system is under massive strain anyway. We must also factor in that climate change may well mean longer, hotter dry spells - there is also good evidence to support this.

This indicates that we, as communities, and as significant water users need to store a great deal more of it.

Not only must it be stored it must be stored in such a way that it can, and at a reasonable cost, even out the peaks and troughs of flow and then be available to be used to the best advantage.

There is clearly a case of responsible stewardship of a critical natural resource to be resolved.

It would seem wise to start at the upper edges of the catchment basin, gaining as much advantage as possible from gravity, and instigate a process of collecting and storing water as the water attempts to move down the slope - *a cascade collection system*.

As water accumulates it can, due to the effect of gravity, store immense amounts of energy hence hydro-electricity; and this must be exploited. At first the need is to keep as much of the rainfall stored or at least slowed down in and around the area that it falls in. Firstly to minimise local slope degradation and local erosion thereby minimising silt load and secondly to encourage aquifer recharge.

It must not be forgotten that all over a catchment area there will be springs and wells that rely on the recharging of the aquifer for their flow.

At the upper edge of the catchment areas, usually the poorer agricultural land but not always, the best option is natural perennial vegetation to absorb and slow down water movement. Although this vegetation is usually determined by the climate and the soil, economic forestry and woodlands will have their place. All well balanced contributions to the cost of management must be welcomed.

However as the water volume increases and the local natural soil storage / infiltration rates are exceeded a need arises for a series of many small dams to continue to slow down the discharge rate. These flow control dams need careful design work and must be very carefully integrated within the local sub-catchment landscape.

This second level of water management, to a considerable degree, takes place on viable agricultural land.

To justify the construction farmers and land users need to see a gain from this along with downstream users feeling that they are not being disenfranchised and the urban areas comfortable that the water flow is under positive management. This is also a key aspect for the insurance industry.

Farmers need to obtain a useful water resource that can be for livestock or for supplementary irrigation. Down-stream users must also be able to store significant quantities of the surplus surface run off caused by storms - sometimes in larger dams higher up on the catchment.

The object is to sustain the minimum safe low level flow at all times thus maintaining the riverine habitat but allows controlled increased flows at times when general storms strike or storms occur within a

continues over

IAgrE calls for renewed focus into soil and water drainage

COMMENTING on the recent appalling weather and devastation to farmlands Alastair Taylor IAgrE CEO said, "The current extreme weather is definitely bringing into emphasis how the nation has neglected land drainage and flood mitigation work.

"This brings into focus the role of agricultural engineers, specialising in soil and water engineering, in preventing, or at least minimising the impact of any future weather event."

The country's inability to cope could be demonstrated by the fact that a number of land drainage systems, mostly installed in the 60s and 70s, are ill equipped to deal with the heavy rainfall, with silting and damaged existing pipe work being common problems.

Mike Hann, drainage consultant, Chartered Engineer and IAgrE Fellow comments that mole drainage, very commonly practised in heavy soil regions, often has a life-span of less than 30 - 40 years rendering the soils liable to much greater levels of run-off contributing to flooding.

Farmers are discovering first hand why they need to invest in improvements to their land drainage and many are beginning to factor drainage operations into their annual timetable.

IAgrE Fellow and Chartered Environmentalist Jane Rickson who is a soil science specialist added, "Flooding not only occurs when water tables are high; a lot of the flooding is due to soil condition (and not just saturated soil profiles). Infiltration of rainwater into the soil is severely limited by loss of soil structure due to compaction. The use of increasingly larger and heavier machinery causing soil surface smearing, especially on wet soils.

"High animal stock densities, over working the soil, losses of organic matter, soil biology and so on all add to the problem. You often find the soil is relatively dry over a spade-depth down because water cannot infiltrate - it was certainly the case during the floods around Tewkesbury a few years ago. Without soil and water storage, flooding risk is increased."

Many drainage schemes are poorly maintained (sometimes deliberately so for ecological restoration, other times due to lack of investment/financial support). The concern is that draining land or dredging of channels will simply send the flood water somewhere else, possibly at a faster rate, so peak floods might be even higher in downstream areas - possibly urban areas with higher population densities.

Summing up Alastair Taylor said, "It is important that lessons are learnt from this current crisis. We need more agricultural engineers with an understanding of soil and water engineering. Environmental courses and training programmes need to include more focus on this vital subject. We need environmentalist to have a better understanding of the agricultural engineering solutions to this significant challenge."

> "... Without soil and water storage, flooding risk is increased"
>
> Professor Jane Rickson

Mike Hann adds, "Improved soil management results in improved soil / water storage which will lower the risk of flash-floods, especially downstream."

catchment area. They can also release water into the system in times of drought.

The key is to have a good understanding of the dynamics of the catchment area; that is some grasp on expected storm intensity along with infiltration rates, and thus the potential amounts of surplus flow to be slowed down and/or retained.

Plus a clear view of the classes of rural and urban landscapes the system flows through. This will help to describe the water demand of all the enterprises within any given catchment area over its annual cycle.

SPILLWAYS

The majority of dams do not need to be complex nor of a size that would be considered hazardous.

The key is many of them, virtually all natural waterways, should have some sort of flow regulator. Well-constructed clay core dams are well suited as long as the spillway is designed and built to manage variable discharge rates. Basically the spillway is built with an adjustable flow capacity managed by simple 'gates'.

The gates are set such that the land owner is holding an agreed amount of water for on-farm use and the overflow maintains the agreed riverine flow rate. However the design also allows for extra amounts to be stored or discharged by agreement.

In the event of an anticipated general storm, the owner can be instructed to increase the discharge rate (raise the gate) prior to the storm, thereby increasing the storm water storage capacity and then reduce the discharge rate (lower the gate) close to storm arrival - holding back a significant quantity of the storm water.

In the case of sudden local storms (cloud bursts) the whole gate can be closed providing short term local storage. The excess storm water being discharged into the system once the riverine levels have dropped.

The maximum water storage capacity also determines the safe design of the dam and its safe free-board and also the spillway characteristics.

The overall site design of the local ponding structures, as well as all other larger water storage lagoons, need to be integrated with local bogs and other local water features that help to slow down storm flow. This will maintain their status through dry periods thus sustaining wildlife.

These riverine corridors along with thoughtful tree planting form the basis of an interlocking habitat system throughout the catchment area.

As the water moves down the slope some further larger water conservation structures may be needed. These should be reservoirs intended for human consumption and leisure usage but must still meet the needs of maintaining minimum riverine flow.

Advantage should be taken of the slope, where at all possible, to generate low cost, CO2 neutral, electricity either on-farm or for commercial use.

PLANNING

As previously mentioned, but I repeat, the key is to have a good understanding of the dynamics of the catchment area.

With the use of mobile phone technology and automatic computer alarm systems all spillway owners in an area will get instructions as to just where their spillway gate should be at any given time. Such a system will significantly slow down the accumulation of storm water and lower the silt load giving the urban areas lower down the slope time to prepare but also allow their structures to cope with the flow.

Sadly there is little doubt that urban planners lost the plot and lost contact with rural planners at some point not long after World War 2. It would seem the concept of Town & Country Planning disappeared - and far too much construction has taken place on low lying areas with a poor grasp of the overall water drainage requirement.

Sustainable Urban Drainage Systems (SUDS) are a somewhat half-hearted attempt to correct some of the urban drainage problems. And being half hearted and well intentioned will cause, for sure, as many problems as they solve.

However it is also true that many land owners and farmers have continued to develop their enterprises on land that clearly has become significantly threatened by flood with little thought to absorbing the risk.

All these people are however, as the State controls all planning approvals, entitled to expect the State to put in place a programme to resolve the problem now that it is here, and not put its head in the sand. What the State cannot do is stop what it has been doing up to now and just do nothing.

There is considerable concern that this is what is happening, possibly wrapped up in a cost saving exercise disguised as or hiding behind the banner of Managed Retreat.

In the light of new events and new information, and no matter how wrong historical actions may now seem, this whole problem is clearly dynamic and is thus a process under change to be continuously managed.

It is not a 'project' to be approached over some carefully defined period with milestones and sign-posts as management targets. It is the natural environment which recognised no master, certainly not on this planet anyway.

SILTING

The Somerset Levels appear to be a casualty of this situation and a case in point for the whole of the country.

Stopping dredging and allowing the area to flood in a random manner is not an answer. This just destroys good farm land and rare wildlife in a manner such that no remedial action can be applied in a sensible way.

Neither UK- nor any other country for that matter - can afford to lose good agricultural land or habitat diversity. Lessons from past history also inform us that a considerable degree of self-reliance is always a good position to be in where food and raw material supplies are concerned.

Significant silt accumulations are carried by large fast flowing quantities of water. This silt is derived from an increased discharge rate up stream due to degraded landscapes.

At present, water, because it is carrying a heavy silt load, is encouraged to flow as fast as possible. It is often forced into urban constrictions deliberately designed to ensure that silt is not dropped within the urban drainage area.

Silting up under the present regime is clearly a problem. By slowing down the whole drainage system across the whole catchment area will reduce this but it will not totally eliminate it.

Once the riverine water reaches the lower edge of the catchment area, usually the saline fresh water interface, the flow rate falls significantly, depositing whatever solid load it is carrying. The nature of the problem has now changed as the problem of maintaining the rate of discharge against the tide cycles has to be dealt with.

Personally, I find myself generally in agreement with the idea of managed retreat along the coastal areas where sea water has been allowed, by breaching existing sea defences, to spill into existing saline coastal habitats. Especially in the face of increased storm intensity and costly sea defences that will most probably fail anyway.

However I do not agree with the way various agencies are going about managing the potential flood areas that are clearly non-saline and back from the coast and not generally threatened by saline tidal surge.

High tides meeting large riverine discharges are a problem but there is no need to ruin good freshwater habitats and good agricultural land - '*spoiling the ship for a happorth-of-tar*'.

With a catchment wide management system it can be brought into a manageable cost and work framework but drag-lines will always be needed, as will pumps.

Surely the Somerset Levels can be divided up into a 'Polder' like system allowing a controlled back flood both from the main discharge points and from raised river bank over-spills when needed.

Basically banks constructed parallel to the raised river providing a large over-spill ponding and banks constructed around the discharge points also providing an over-spill capacity between tides. There will most probably be a need for a second line of defence set back from the first set of control bunds but significantly smaller.

Have we learned nothing from the Dutch?

The discharge capacity, by gravity flow whenever possible but backed up by pumps as and when tides and down stream flows dictate, must be maintained.

This critical discharge management system must be integrated into the whole system control of the catchment area.

FORWARD THINKING

There will be a need for farmers and villagers to rethink just where they live and, over the next 30 years, all those situated with in the polder zones should be assisted financially to relocate to higher ground or if suitable raise the site they are already on.

These low lying areas, often very fertile, are very close to very dense urban areas with a massive potential through bio-digestion of sewage and other urban waste to produce significant quantities of heat, waste CO2 gas and bio-digestat compost.

As it is, much of this sewage is apparently floating around in the flood water harbouring major disease problems for both man and beast.

The heat and CO2 along with the compost can well be used on these low areas; for example with poly-tunnels, to significantly increase the production of vegetables / fruit over much longer periods of the year. In a world that looks increasingly unstable, food production capacity must take a strong priority.

Even if we are able to get a positive attitude over this problem it cannot take less than 20 years to solve and thus before we stop actions such as dredging, the cause of the problem has to be fully identified and new strategies put in place. We really need to be thinking about tomorrow, not yesterday and using all the resources that past scientific research has shown are feasible - now we need to make them viable.

To justify the construction and management of such a system :-

1 Farmers and land users need to see a business gain from this. They need to obtain a useful water resource that can be used for livestock or for supplementary irrigation. As it is likely that longer dry spells can be expected many crops such as potato and greens but also grain crops come under moisture stress. This associated yield loss can be ameliorated by small amounts of timely applied irrigation but only if farms can hold the water in on-farm dams and use as the dam for supplementary irrigation toping up soil deficits and thus making investment in irrigation equipment justifiable.

2 Down-stream users, such as water companies and the leisure industry, need to feel that they are not being disenfranchised. Down-stream users must be able also to store significant quantities of the surplus surface run off caused by storms. As it is, we lose valuable quantities of water at a time when not needed but then have little in hand when we do. The object is to sustain the safe low level riverine flow at all times thus maintaining the riverine habitat but allowing controlled increased flows at times when demand or storms occur either within or all over a catchment area thus smoothing out the downstream peak and trough flows.

3 The urban areas management such as local councils, house and business owners and the insurance industry, must be assured that the water flow is under positive management and that their flood protection measures will do the job.

4 The people of the catchment area are empowered, within the law and appropriate legislation, to appoint a board of local recruited members and professional work staff to"act & manage" without outside interference and the fear of constant referrals to various law courts.

To put it in place the following steps would be needed:-

1 Establish a national water resource strategy that recognises water in all forms, clean or polluted, as a resource and then

2 Describe carefully the country's natural catchment areas, then

3 Set up locally staffed Catchment Area Authorities (CAA) to take forward the national strategy by local interpretation. (Each CAA must be flexible enough and powerful enough to deal with its own unique water and social system.)

4 Repeal national and local planning constraints and environmental constraints that continually cause friction and prevent a cohesive CAA from functioning. (Exemptions from the system should not be allowed for any reason but locally agreed modifications that do not breach the over-all concept could be accepted.)

5 Put together a locally agreed water management system designed to slow down and smooth out water flows by the use of natural and engineered local storage systems, encourage sound environmental management and enforce the need for surface water storage at all levels within the catchment area.

> "..We really need to be thinking about tomorrow, not yesterday"

CONCLUSION

The present Water companies will have to be covered by new regulations and there are many serious issues concerning local power and authority hidden inside these proposals but these need to be addressed because, can you believe it, they don't only apply to water.

It goes without saying that any significant system change comes with an initial increased cost. However once established, the cost will stabilise - certainly lower than that the terrible costs being caused by the continual uncertainty of urban flooding and lowland / coastal farm land damage, but still a cost.

This could be easily paid for if all the various players' water roles are rationalised and their drainage and water budgets consolidated.

Some no doubt would have to come from pillar 2 of the CAP at farm level, and worth it, if on-farm irrigation water is the outcome.

But the main chunk will come out of the urban budgets being wasted by the myriad of agencies and water businesses that are wasting scarce funds on a natural resource that should be seen as an asset and not one that is a problem to be solved as if it was waste.

Safety

Farm Safety Partnership & machinery safety

IAgrE recently signed-up to support the industry-led Farm Safety Partnership (FSP), building on the Institution's recent activities on this important topic.

ALAN PLOM, IAgrE Member and a member of the FSP's Board, reports on the work of the Partnership and invites members to help reduce the toll of deaths, injuries, ill health and suffering caused by the high level of tragic incidents which continue to occur in farming, forestry and other land-based industries.

IAgrE SUPPORT

IAgrE became involved after running the Landwards Conference: '*Agricultural Engineering and Compliance - Thorn in the side or competitive advantage?*',held at Harper Adams in March 2013. [See report at **tinyurl.com/orttket** and presentations from the Conference on the IAgrE website at: **tinyurl.com/nkjonfg**].

IAgrE has also sponsored an annual Award for Students' safety-related projects for several years. However, the response to this initiative - aiming to involve and engage students (and their lecturers) - has been disappointing and should be better supported by Colleges. [Contact *sylvia@iagre.org* for more information.]

In the last issue of *Landwards* (Winter 2013) IAgrE President Andy Newbold mused on the challenges faced by the industry and the potential contribution of agricultural engineers. He referred to the successful Machinery Safety Workshop run at the NFU HQ,Stoneleigh last October by the Institution of Occupational Safety and Health (IOSH), on behalf of the FSP.

Paraphrasing Andy, he highlighted (and corroborated) the stark fact that agriculture is a highly dangerous occupation and questioned if the challenge faced by agricultural engineers is to design 'safer' products, or is it more subtle than that, ie is it more about providing (better / more effective) information, instruction and training to operators?

The Landwards Conference had identified that the key challenge is how to change behaviours - a factor highlighted in analyses of the fatal incidents reported to HSE over many years.

As a member of the FSP's Board, Chair of the FSP's Machinery Safety sub-group and Vice-Chair of the IOSH Rural Industries Group, I welcome Andy's comments and his personal contribution at the Workshop, raising the flag for the profession. It certainly wasn't a white flag either, as he and several members played an active part in the Workshop.

Other delegates from across the industry, (who included representatives from machinery manufacturers and dealers, researchers, colleges and trainers, insurers and advisors, unions and trade organisations as well as farmers and contractors) left the meeting with a better understanding of what IAgrE members can offer.

AGRICULTURE IS THE MOST DANGEROUS INDUSTRY

The Health and Safety Executive (HSE) report '*Health and safety in agriculture in Great Britain, 2013 - Work related injuries and ill health*' summarises the latest statistics and confirms that the continuing high numbers and rates of fatal injury in agriculture, forestry and fishing make it the riskiest industry sector.

Although only just over 1:100 workers (ie employees and self-employed) work in agriculture, it accounts for >1:5 of all fatal injuries to workers (across all industries).

This picture and above: FSP Workshop delegates

For more detailed information and summaries of the detailed analyses of injuries and ill health prevalent in the industry, see **tinyurl.com/o6hnluj** .

The FSP Workshop attracted nearly 80 people, providing a wide range of perspectives which were teased out during 'round-table' discussions, when delegates shared their concerns, practical solutions and ideas for the future. These helped to identify gaps in guidance and the need to improve training and, in particular, to work with others, eg to develop campaigns to target key topics and change the 'can-do', 'risk-taking' culture in farming.

Topics of concern and interest raised by delegates at the Workshop included design, safe use and maintenance of machinery, eg clearing blockages in combines and other harvesting equipment; avoiding potential contact with overhead power lines and PTOs; safe operation of tractors and trailers on the road, ATVs, older machines, etc. Improving awareness, training and communications were common themes.

It is proposed to discuss and progress these issues through a series of 'task and finish' groups - some of which may meet virtually through webinars.

Some of the presentations from the Workshop, including a detailed statistical analysis of machinery-related incidents and typical causes can be viewed on the IOSH website at **tinyurl.com/lc4atu2**

'SAFE STOP' CAMPAIGN LAUNCH

The FSP's first campaign - 'Safe Stop' -was launched at the Workshop.

This aims to reduce the number of incidents in which operators are run over by their own tractors (eg due to failure to apply or maintain handbrakes) or become entangled in machinery (eg during maintenance or clearing blockages because they are left under power). This had previously been identified as the Number 1 priority, based on the incident statistics.

Although the Safe Stop procedure, ie . .

- *handbrake on*
- *controls in neutral*
- *engine off and*
- *remove the key*

. . is not a new concept and is already included widely in guidance, operating instructions and in training, it is clear from the many deaths and injuries which have occurred that these simple precautions are often ignored.

Tractors and loaders have often moved and run over the driver who has dismounted - usually due to the handbrake not being applied or being defective due to lack of maintenance. Many operators have been drawn into machinery during maintenance or clearing blockages, because the machine remained under power.

Adam Quinney (NFU Vice President, left) and Alan Plom (Chair of FSP Machinery Group, right) launch the 'Safe Stop' initiative

We need to rejuvenate and spread the message and encourage operators to take these simple precautions as second nature.

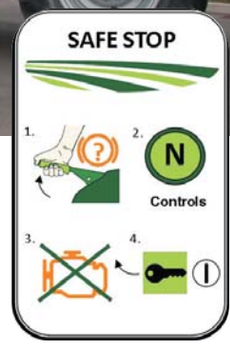
To kick-start the process the FSP project group produced a series of stickers based on standard pictograms used in machine manuals. Sets of these stickers are initially being issued by participating machinery dealers following installation checks and operator training when delivering new or second-hand machines to customers, but a self-contained handover sheet with instructions to be passed on to operators should be available soon.

Farmers and operators will be encouraged to place the stickers in locations which will remind them how to stay safe. In addition to tractor cabs, this could be anywhere that might make operators stop and think before taking an inappropriate action, e.g displayed on tool boxes, mobile phones or in the office on calendars, etc, or on machines (see below).

WE NEED *YOU!*

The FSP is looking for other ways to distribute the stickers, posters and messages more widely, eg through colleges and other organisations.

Stickers on machines



We hope this will develop into a wider publicity campaign, based on the various decal designs and we are now planning our next campaign, which will focus on maintenance of PTO shafts and machinery guarding. We are also working on improving safety in storage of slurry and cattle handling (common cause of fatalities and injuries).

The FSP and its Partners have recently issued a series of leaflets, eg on safe use of machinery and child safety, and comprehensive guidance on deliveries to farms. These supplement existing HSE guidance such as 'Farmwise' and the online guidance for designers, manufacturers and users of machinery. This is relevant to self-built, second-hand and older machines too.

Perhaps we do not need to reinvent the wheel, but we do need to raise awareness of existing guidance, and to fill the gaps in advice and training.

Together, these various initiatives will all help to encourage adoption of simple, sensible, practical precautions - from students and new entrants through to the most experienced of operators.

However, we need YOUR help to develop and spread the messages and a long-term concerted effort throughout the industry (from the machinery supply chain to operators) is essential, if we are to change the risk-taking culture that evidently prevails.

The Farm Safety Partnership is open to suggestions and offers of help, and many IAgrE members have the relevant experience, expertise and contacts to help make a real difference.

For further information on the FSP, its guidance and developing campaigns, and to express your interest in any particular topic (or joining any future Working Groups), please go to the 'contact us' page on the FSP website:
www.farmsafetypartnership.co.uk

IAgrE 2020 - a vision for the future

IAgrE Chief Executive, Alastair Taylor has been in post for six months and in this article, he explains his thoughts on the future of the institution and highlights the priorities which have been agreed by the IAgrE Executive Committee going forwards over the next few years . . .

The Institution of Agricultural Engineers IAgrE) is one of thirty-six institutions licensed by the Engineering Council.

When choosing which institution, the general plan is to join one closest to the discipline of engineering you work in. For some engineers there could be two or three suitable institutions. As Institutions go IAgrE is one of the smaller ones (but definitely not the smallest). Institutions are categorised as group A, B and C. At the end of 2013, we had 2944 members and 713 registrants through the Engineering Council. This puts us firmly in the C category, the group with less than 1000 registered engineers.

Without our Engineering Council (EngC) and Society for the Environment (SocEnv) licences IAgrE is nothing. On our agenda for the whole of 2014 is the need to make sure we have a successful reaccreditation which is scheduled for spring 2015.

that my professional status has helped me in my career. Current research would suggest that the earning powers of a registered engineer are higher than someone who remains unregistered. The fact that around three quarters of IAgrE members have decided that professional registration is not for them is an interesting conundrum! It brings me back to the question "what's in it for me?"

This is a question which I am often asked. It is not an unreasonable question and given the world we live in where the concept of fraternity is less important and the instantaneous nature of the online global village means that anyone can get any information, at any time and in any place, you are left wondering what we need to do to give current and future members the confidence that there is something tangible and useful to be had by being an IAgrE member and registered engineer or environmentalist.

> "... Standing still is not an option and it will take considerable effort to merely maintain the current position"

There is no reason why we should fear this exercise but none the less, it is something which is very important as it is our raison d'être - absolutely. Over the next few months, the IAgrE secretariat will be making sure we are doing all of the things we should be doing. Our membership committee will be checking that we administer our membership matters according to the best practice expected.

The reasons why engineers register themselves with EngC or SocEnv are many fold. From my own perspective, it is about professional recognition. I firmly believe

The IAgrE is a pretty lean outfit in terms of staffing and infrastructure.

Volunteers make a very significant contribution and from a personal perspective, it is great to be surrounded by such high calibre people who support our work, either as advocates representing us at meetings, or just by being a wise counsel and sounding board. However, wouldn't it be great if we were able to secure more income and allocate this to employing expertise to support out initiatives - and at any one time there are scores of worthy initiatives which need time and energy!

Those looking at the IAgrE accounts will see that our key sources of income are membership subscriptions and publishing. We definitely need to spread our income streams as a means of strengthening our ability to employ people to further our cause. This is something of a chicken and egg situation but an important one to consider.

Why is this important? Some would say that providing we pay our bills and break even, then size doesn't matter. My first impression is that size does matter, particularly when you are trying to get a place at the government table of influence. In many respects, the IAgrE feels as if it punches above its weight but this does not happen without hard work by employed officers of the Institution and volunteer members.

We need to be bigger if we are to have the influence expected by our members and the communities we serve. Having presence and influence also costs money and as CEO, I could spend every day of the week representing IAgrE at meetings and conferences. One has to prioritise.

It is against this background that our 2020 vision has been agreed. Overall, the IAgrE is in good heart and lean in its operations. Currently financially secure and with sufficient reserves there are no major concerns about our ability to maintain current operations - certainly for the short to medium term. However, standing still is not an option and it will take considerable effort to merely maintain the current position.

This vision sets the agenda for the next stage of the development of the IAgrE and will propose some strategies designed to both maintain and expand operations.

Everything we do over the next few years should be gauged against four identified themes of the 2020 Vision with the anticipation that all actions and developments will meet at least one of these.

The four themes and their rationales are identified as follows:

- **What's in it for me**

  Members and potential members need to feel the benefit and value of IAgrE membership and associated professional recognition. For some, the professional recognition is reason enough, for others there needs to be more tangible benefit which is viewed as something worth paying for, maintaining and supporting.

- **Maintaining our licence**

  2015 marks an important year for IAgrE with the reassessment of the Engineering Council and Society for the Environment licences. The loss of this would be catastrophic for the institution and for members so immediate actions need to ensure that the Institution is meeting its obligations and demonstrating best practice.

- **Growing the business**

  Current turnover delivers a margin, adds to the reserves and permits business continuity. However, income streams are limited with over reliance on single product lines. This theme is concerned with the development of a broader range of income streams which will allow IAgrE reduce its risk and exposure and to engage with new worthwhile initiatives.

- **Presence and influence**

  IAgrE needs to have a greater profile and be viewed as the first port of call for intelligence and intellectual capital relating to the Engineering for Agriculture industry. This theme is concerned with how we improve the communication of our message, how we get ourselves heard, and how we influence the national agenda. This will raise the status of the Institution and its members bringing new opportunities for both.

Whilst these themes are not specific actions, and the list of actions waxes and wanes as priorities shift, they should be used as the acid test against which we monitor our progress, the mirror we hold up to see if we are looking as we should. Our Executive Committee and Council, as well as ordinary members need to keep these themes at the back of their minds.

This brings me to my final comment, and a plea for your support. As members, it is your opportunity to influence where we go, and to check the extent to which we maintain a focus on the four themes identified above.

As a starter, the table below should give you some ideas as to how you can contribute to our 2020 Vision.

From time to time, I will update you on where we are with all of this. In the meantime, do please get in touch if you have anything to add or wish to get involved with progressing these developments and themes.

What's in it for me?	• Are you happy to be passive as a member, just picking up *Landwards* and your professional recognition? • Do you want more branch meetings, more virtual meetings, more publications, more online access? • How can we connect you to the right people, the right networks and the right information?
Maintaining our licence	• Remember that when you commit to being an EngTech, IEng or CEng you are also committing to the professional standards which go hand in hand with this. • When was the last time you reminded yourself of the current UK Specification for registration? • Maintaining your Continuing Professional Development (CPD) is a central requirement of professional recognition. • How can you help us to show that you do this and that your records are up-to-date? • Log on to MyCareerPath and log your CPD
Growing the business	• More members equals more influence, more resources and more efficiency. • Is there anyone you know who should be a member who we need to recruit? • Can you include the IAgrE in your business, as a corporate member, a source of training or a source of consultancy? • Subscribe to our services; use our CPD opportunities, use or network.
Presence and influence	• Do you have something to say and an audience to say it to? If so, make sure that you reference the IAgrE (providing that your message is in line with our aims and objectives). • Are you involved in committee work on behalf of your company? If so talk to us as to how you can also represent the IAgrE agenda. • Are you well connected? If so make sure your connections know about the IAgrE and what we do. • Do you know anyone we should be talking to about the IAgrE cause? If so, tell us who they are and put us in touch.

Graduation day for John Deere technicians

John Deere's 2013 Ag Tech, Parts Tech and Turf Tech third year graduates at the John Deere Forum in Mannheim, Germany, with Dr Lutz Schueppenhauer and Chris Wiltshire of John Deere, and James Kesterton and Warren Barraclough of Babcock. The apprentices and their sponsoring dealers are (not in order in the photo):

Ag Tech: Iain Bond, Sharmans Agricultural Ltd, Leicestershire; James Bray, Farol Ltd, West Sussex; Matthew Bretherton, Cornthwaite Agricultural Ltd, Lancashire; James Close, Ripon Farm Services Ltd, East Yorkshire; Curtis Dodd, Farol Ltd, Leicestershire; Jake Marshall, Farol Ltd, Oxfordshire; Samuel Miskin, Burden Bros Agri Ltd, Kent; Euan Munro, W M Dodds Ltd, Roxburghshire; Mike Randall, Tallis Amos Group Ltd, Gloucestershire; Tom Richardson, Thomas Sheriff & Co Ltd, Northumberland; Tom Rowland, P Tuckwell Ltd, Bedfordshire; Robert Smerdon , Masons Kings, Devon; James Warren, Frank Sutton Ltd, Gwent.

Parts Tech: Richard Brown, RBM Agricultural Ltd, Yorkshire (not in photo); Carl Dannatt, RBM Agricultural Ltd, Nottinghamshire; Jade Farnell, Bob Wild Grass Machinery Ltd, West Yorkshire; Jason Hewitt, RBM Agricultural Ltd, North Lincolnshire; Ryan Murch, Smallridge Bros Ltd, Devon.

Turf Tech: Nathan Setchfield, Peterborough Grass Machinery Ltd, Cambridgeshire.

A TOTAL of 19 young service technicians have graduated from the latest John Deere Ag Tech, Parts Tech and Turf Tech advanced apprenticeship programmes, run by national training provider Babcock.

Iain Bond from dealer Sharmans Agricultural Ltd of Melton Mowbray in Leicestershire was named ag & turf apprentice of the year, while parts apprentice of the year was **Ryan Murch** of Smallridge Bros Ltd, Barnstaple in Devon.

The group of third year students received their certificates at the John Deere Forum visitor centre in Mannheim, Germany during a specially arranged visit to the company's tractor and cab factories and European Parts Distribution Centre (EPDC). The presentations were made by Deere & Company's regional training delivery manager Dr Lutz Schueppenhauer, John Deere Limited training manager Chris Wiltshire and Babcock programme manager James Kesterton.

Iain Bond received a crystal plaque, a certificate and vouchers for workshop tools worth £300. In his nomination for the award, Babcock's training assessor Dave Fisher said, "Iain Bond performed excellently for his Level 3. The work he produced was above standard and discussions were all of good quality. This is the kind of lad I want on the scheme all the time!"

Sharmans marketing director Sally-Anne Hazard added, "We are extremely happy and proud of Iain and his achievement. He is a great asset to our dealership, being enthusiastic, hard-working, motivated and a very genuine individual."

Babcock assessor Amanda White said of Ryan Murch in her nomination, "Ryan has been an excellent student. All his Level 3 exams were passed first time with good scores, and his written assignments have been exceptional. He is a valued member of his dealership and has grown from strength to strength."

Director David Shambrook of dealer Smallridge Bros added, "Ryan has given everyone in our company a very good feel-good factor by achieving this award. The new programme has given us the excellent level of training we need, and we look forward to supporting it with more apprentices in the future."

These three-year apprenticeships lead to the BAGMA / City & Guilds of London Institute 4025 agricultural / groundcare service engineers NVQ Level 2 & 3 certificates and Level 3 IMI Diploma in vehicle parts competence. Apprentices can choose to complete their education for a fourth year to gain the John Deere Diploma and register at **LTA2 level** in the industry's Landbased Technician Accreditation scheme, while starting their adult training within the John Deere University.

Now in its 22nd year, Ag Tech was the first such scheme to be introduced in the UK and won a National Training Award at the end of 1997, the only one ever made to an agricultural machinery apprenticeship programme.

Since the first programme started in 1992, more than 540 apprentices have graduated through all three John Deere schemes (Ag Tech, Parts Tech and Turf Tech) and are now working in the company's nationwide dealer network. A new Customer Service Tech training programme was also introduced last autumn for the current training year.

In the left pic John Deere ag & turf apprentice of the year Iain Bond of Sharmans Agricultural and in the right pic Ryan Murch of Smallridge Bros, parts apprentice of the year, with (left to right) James Kesterton of Babcock, Dr Lutz Schueppenhauer and Chris Wiltshire of John Deere

Barony hosts Technician 2025 conference

The aim to identify the building blocks that need to be put in place for delivery in 2025

BARONY College (SRUC) staged a two day event on 12 and 13th March 2014 designed to raise awareness of the land based engineering industries training and educational needs for the future.

It has long been recognised that there is a significant challenge in recruiting the right type of individual capable of developing the knowledge and skill set the industry needs for it to have a future. A further challenge is retaining the individuals once their education and training has been concluded.

According to Drew Easton, head of the Engineering Section at Barony, "This is not a problem that will go away and with ever increasing levels of technology used in our everyday lives there is a need to develop an educational platform that will deliver education and training at a level to provide customer support for the expensive equipment they have purchased.

"Realistically for delivery in 2025 we need to put in place the building blocks of what we need now, a good solid structure which can remain stable and be reasonably 'future proof'. It will require a good foundation and regular maintenance in its use."

The two day event was an opportunity to be proactive and to make a difference, bringing together dealers, manufacturers, customers and educationalists to facilitate a solution to many of the problems they are facing or at least to be fully aware of them.

"By raising awareness we can plan and identify who is best placed to influence the outcome and to be proactive in shaping up all our futures," said Drew Easton


Barony College

The event was split into an Industry day involving Dealers, Manufacturers, Customers and Educationalists.

It identified some of the challenges they face at the moment and some of the challenges they perceive they may face in the future.

The second day was a Careers day involving School Careers advisors, School pupils, (Including Females) School leavers, Adult learners, Career changers, Dealers / Potential employers, Job centre staff and other stakeholders

This event was supported by suppliers including John Deere, AGCO, CLAAS, Kubota, Lely, Krone, Kuhn, Clark Engineering, Ritchie (Forfar), as well as by SDS (Skills development Scotland) BAGMA (British Agricultural and Garden Machinery Association) and AEA (Agricultural Engineers Association).

Progress to be based on Continuing Profesional Development Programme

Ransomes announce new Awards

RANSOMES Jacobsen, the Ipswich-based manufacturer of commercial mowing and turf maintenance equipment, has introduced a Sales and Dealer Technician Certification and Awards programme.

The aim is to recognise and encourage sales staff and technicians in their career development with the technicians' initiative structured around the Land-based Technician Accreditation (LTA) programme.

Hanfried Sievers, Training Manager at the company's Cutting Edge Training department, explained, "Our aim is to recognise personal achievement and development within the Dealer network as it's the individuals within our business, who push themselves to achieve, who are the people that will build and take our business forward. We feel they should be rewarded accordingly and we have introduced an awards element into the programme."

The Awards programme, which recognises participation and merit performance at Bronze, Silver and Gold levels, came into effect on 1 January 2014. Every 12 months a selection process will determine who is eligible for the awards. Salesmen and Technicians will be advised of their progress using the Continuing Professional Development programme, launched in 2013, to guide them through the levels. The Gold level awards will be presented at a 'Gold Club' luncheon ceremony, to be held at Ransomes Jacobsen's Ipswich headquarters, hosted by the President of Jacobsen, David Withers each year.

Hanfried Sievers concluded by saying, "We believe that these awards will recognise the skills and values acquired by both Sales and Customer Support Staff across the Dealer network and that they will provide added motivation for individuals to become more professional in all areas of the job function. We are looking forward to hosting the first Awards Luncheon early 2015."

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Conference convenor, Professor Mark Kibblewhite hopes that the event will result in IAgrE presenting a compelling case for the design and future funding of development projects

New thinking, new perspectives

THERE have been many technological and scientific advances in agricultural production over recent years, says Professor Mark Kibblewhite, but if we are to meet future demands for food we need to start 'thinking outside the box'.

"For instance, we should be questioning why we plant crops in straight lines, why cows and pigs need to be outside on valuable farmland or why we cannot grow different compatible crops in the same field?

"Should we be making more use of underground facilities for growing food? What are the advantages of vertical farming which can bring crops closer to population centres?"

All of these new ideas and techniques - and more - are being trialled across the world, he says, but crucially they are going to need engineering to make them happen on a large scale.

Which is exactly the thinking behind the title of the 2014 IAgrE Annual Conference '**RE-IMAGINING AGRICULTURE: Engineering as the strategic enabler**'.

As Conference Convenor, Mark Kibblewhite who takes over as IAgrE President in May, wants to look far beyond the content and papers to be presented at Cranfield on 21 May.


Mark Kibblewhite

"I hope that the delegates will get excited about the ideas that are outlined, and indeed weigh in with their own visionary thoughts, but I don't want to leave it there.

"I see this conference as being a catalyst for forward thinking. It should crystallise agri-engineering's views on its role in facilitating the design, implementation and funding of new and exciting development projects.

"But, to do this, we must present a clear and compelling case to those who hold the purse-strings - and I see this Conference as being just the start of that process."

Speakers include . . .

Exploiting ecological potential - options and constraints


Professor Karl Ritz, Cranfield University


Professor Tim Benton, University of Leeds

Defining the engineering challenges


Dr Dionysis Bochtis, Aarhus University


Dr James Taylor, Lancaster University


Professor Eldert van Henten, Wageningen University

Pathfinder developments in agricultural science


Professor Peter Gregory, East Malling Research

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MEMBERSHIP MATTERS

BRANCH REPORTS

NORTHERN IRELAND BRANCH

First meeting of 2014 - EUROPEAN TRIP REPORT

AT the January 2014 meeting, Northern Ireland Branch Hon. Secretary Ian Duff summarised a recent visit by IAgrE members and friends to the Trioliet factory in Southern Holland and the Krone factory in North Germany. Both well known family run companies have well defined specialist product lines, strongly supported by research and development, and have a strong emphasis on export markets.

Trioliet

Trioliet was first set up in 1950 by 3 brothers (trio) with the surname of Liet and their product range concentrates on the forage feeding sector.

It ranges from their traditional reciprocating silage block cutters to a range of vertical auger type feed mixer feeders including the largest (in the world) of which is a triple auger 52 cubic metre tri-axle trailed model. They also make various self-propelled and self loading versions.

The group were also taken to see a local farm where the Triomatic Auto Mix Feeder system was in action. This consists of a base station where ingredients are held and automatically dispensed to an unmanned robot Trioliet mixer feeder which travels along a gantry to dispensing feed to livestock in the building. Other innovations included a Trioliet feeder fitted with a 2 speed auto-change gearbox responding to drive line torque sensing.

The party also saw a large biogas anaerobic digester installation in operation. Trioliet supply static versions of their mixer feeders, with a special protective lining, to chop and mix forage before it enters the digester.

The trip was hosted by Robin Hansen (Trioliet Export Manager) and facilitated by Mr Padraig O'Kane, a member of the Northern Ireland IAgrE Branch who is also Trioliet's Area Sales Manager in Ireland and Scotland.

Further details of the Trioliet product range can be viewed on *www.trioliet.com*

Robin Hansen and Padraig O'Kane at the Trioliet factory with the IAgrE Group


Henrik Feldman welcomes the IAgrE Group to the Krone facilities at Spelle

Krone

The IAgrE group then travelled the short distance to Spelle in Northern Germany which is the home of Krone.

The company was founded there in 1906 with a blacksmith engineering venture and a small hotel. Both have now developed to much larger scale ventures. Krone is also well established as a major manufacturer of arctic trailers to the road transport industry.

Within the agricultural machinery sector, Krone is now a worldwide brand with a comprehensive range of forage harvest equipment including mowers, tedders, rakes, balers, self loading forage trailers and the Big X self-propelled forage harvester.

The group were shown the production facilities with precision engineering and features such as the total immersion paint area. They also followed the Big X production line.

The farm machinery manufacturing company employs around 1,200 fulltime and 300 temporary workers at Spelle, 20% of whom are engineers. The new Technology Centre and 2.5m euro training and technology centre are an indication of the high priority given to staff training and product development / testing.

The party also saw the computer controlled export parts warehouse from where parts are sent out to customers and dealers across the world. Spelle is in a rural area and it was interesting to note that many employees still arranged their work season to allow them to spend harvest time on their own farms.

Krone started in the general machinery business and they still own and run the biggest John Deere dealership in Germany. Large numbers of machines are displayed under cover, with price and technical specification details, and a large proportion are sold during open days.

During the visit the service facility also had many self propelled forage harvesters in for their pre-arranged fixed price winter service.

The party was welcomed by Mr Henrik Feldman, (Divisional Sales Manager for Krone's Export Department) who had visited an IAgrE Northern Ireland branch meeting during 2013 to deliver a talk about the Krone story.

Further details about Krone products can be viewed on *www.krone-uk.com* or *www.farmhand.ie*

ERTH ENGINEERING TALK

The guest speaker was local manufacturer Mr David McCoubrey of Co. Down based ERTH Engineering.

Mr McCoubrey is an agricultural engineer with a special interest in soil cultivation and management who, prior to developing his own range of cultivation equipment, had worked with F W McConnel Ltd and then Simba International. ERTH Engineering is now known for its Panbuster grassland subsoiler designed to alleviate soil compaction caused by intensive grazing and machinery traffic. The high stone content of many

continues over

Northern Ireland, often wet, soils provides a tough proving ground for soil engaging machines.

The close mounted auto-rest Panbuster subsoiler was first produced in 2005 and designed to be reliable in tough conditions and to produce a clean, good quality, top finish. It has robust construction and the auto-reset legs work against an interconnected hydraulic ram system with pressure set by a Scandinavian sourced piston type main accumulator.

The working depth of the legs (23-30cm) is easily controlled by hydraulic control of the position of the finishing roller. Each leg is of 3 piece construction for strength and ease of replacement of wear parts. The side swing breakaway action both protects each leg and helps to minimise stone heaving. The high lift action and a shear bolt give additional protection.

The 4 leg model, which can be pulled by a 100hp tractor on level ground, is the most popular. There is also a 5 leg option and a modular version starting with 3 legs and the option to add more is being developed.

Other options include soft drive to the roller, a steel toothed packer and various leg options including mole plough types

Hundreds of Panbusters have been now been sold both to a strong home market in the UK and Ireland as well as worldwide sales to places as far away as New Zealand, North America and even Uruguay. One machine was selected in 2011 to be used in an official 5 year field trial in Canada.

The Agriseeder has been produced from 2013 for direct stitch-in seeding to grassland. It has the layout of opening disc coulters with tungsten carbide tipped seed coulters at 125mm or 160mm spacing followed

George Wallace IAgrE NI Branch Chairman and David McCoubrey ERTH Engineering

by a roller for depth control and finish.

The drill frames are partitioned into 1 metre sections each pressurised downwards by a hydraulic ram. This is known as the 'Auto Contour' system and the rams are linked so that download per frame equalises despite land undulations.

Seed is distributed from the 300 litre hopper to the coulters via a central distribution unit and flexible tubes by an electrically driven fan. Metering is regulated by a sensor which detects rotation of the rear roller and performance information including feed rate, forward speed and area covered is displayed on the in-cab control box.

Further options include a hydraulically driven fan, larger hopper, Farmflex roller and bout markers. The widest model is a folding 6m version for the Dutch market. Versions are being developed with subsoiler tines for both grass and arable applications.

ERTH Engineering hopes to further develop sales to the Southern Hemisphere to extend its customer base and smooth demand over the working year.

Discussion

Northern Ireland Branch IAgrE members always enjoy the interactive discussion after meeting talks and this was no exception when the following topics were included

- The effect of 'winged' subsoiler tines.
- Preferred materials for wearing tips in various soil types.
- Independent trials for soil aerators.
- Panbuster power requirement per leg in different soil conditions.
- Optimum working depths and how to recognise them.
- The effect of wet or dry soil working conditions.
- Bulk buying of components by manufacturers.
- The cost of research and development for smaller scale manufacturers.
- Support for technical innovation in Northern Ireland manufacturing business ventures.
- The role of the internet in providing links and opportunities for small manufacturers.

Mr. George Wallace, Branch Chairman thanked Mr. McCoubrey for providing such an informative and interesting presentation.

ERTH Engineering is based at Seaforde in Co Down and more details of its product range and contact details can be viewed on *www.erthengineering.co.uk*

Terrance Chambers

WESTERN BRANCH

Balers presentation at Lackham College

In November Lackham College hosted a presentation on Balers on behalf of the Institution of Agricultural Engineers

It was attended by 25 of their own students some of whom are associate members of the Institution and some 25 other members of the Institution from the local area, many of who are employers within the Agricultural Engineering industry. The meeting had been arranged by the branch secretary Rupert Caplat and Glen Craig a member of the Institution and Programme Leader for Land based Technology and Farm Mechanisation at Lackham.

The guest speaker was ex-student Ben Mitchell who left Lackham in June of 2012 with a National Diploma in Land Based Technology and went to work for AGCO one of the main manufacturers of tractors and machinery in the world.

His role within the corporation is that of Technical Service Specialist for Large and Small Square Balers for Europe, Africa and the Middle East having started with AGCO less than eighteen months ago as a Field Service Technician.

Ben spoke for about an hour explaining his roles within the company to date and the work he undertakes both in the UK and the rest of the world. After an excellent presentation the floor was opened up for questions. This went on for another forty five minutes with students and other attendees (some staff) asking some very technical questions to which Ben faultlessly gave exceptional replies.

After the presentation the Past President of IAgrE Mr Richard Robinson of Autoguide Equipment thanked Ben and the college for hosting an excellent evening. Refreshments followed before everyone left for home.

Glen Craig and Mike O'Sullivan, Lackham College

SOUTH EAST MIDLANDS BRANCH

South East Midlands Branch member Alan Plom and Chair Tim Chamen review several of their recent meetings, showing the wide range of topics typically enjoyed by members:

1. Automation in the dairy and cropping sectors

This was a double-header, giving us a fascinating insight into what is fast becoming the norm on dairy farms and also what the future holds for row crop automation.

First, Peter Wheeler (Lely's Technical Services and Support Manager for Forage and Dairy equipment in UK and Ireland) outlined his company's interesting history.

Even Peter, who has worked with the Lely organisation for 35 years, does not go back to the company's origins in the late 1930s, when Cornelis and Arij van der Lely sketched and designed a machine they felt sure would help improve the quality of farmer's lives. This is a recurring theme that is still the primary objective of Lely today.

Peter then brought us up to date (and gave us a glimpse of the future) by describing Lely's range of automated products for the dairy industry, which demonstrate the enormous engineering and control systems advances in this arena. These have all been developed from a clear-cut starting point: the cow. Animal welfare is at the heart of the Lely system, because this delivers increased production from well nurtured cows.

He started, logically, with the latest version of the 'Astronaut' robotic milking machine. These enable cows to milk and feed themselves on an as-needed basis, but also reduce the stress of being herded into cowsheds.

According to Peter, cows are much less skittish when they are being managed in this way and produce a significant increase in milk yield, whilst guaranteeing the highest achievable milk quality. Each cow is constantly monitored for any potential health problems, and of course there is the inevitable App to warn the herdsperson 24/7 - wherever they may be!

Some 20,000 of these auto-milking units having been sold already speaks for itself. [For more information see: **tinyurl.com/nc2rgyr**]

Peter also described Lely's other suite of innovative robots, including the 'Discovery' barn cleaner and the 'Juno' feed pusher.

Juno feed pusher

Some of Lely's automated machines at work

This is totally automated and has increased feeding visits by 10.9 % and intake of dry matter by 3.5 %, compared with 3x day manual or tractor-powered operations.

Another novel machine is the 'Vector' mobile automatic feeder. These are all supported by the Lely T4C monitoring and communication system, with 8 tools which act as the farmers personal assistant, able to "check, act and improve" the health of cows and the performance of the farm, 24/7 . . A vision of the future, and a universal desire for every livestock farmer.

Robocrop

In-row version of Robocrop

Nick Tillett (of Tillett and Hague Technology Ltd - a phoenix arising from the ashes of Silsoe Research Institute) was the other half of the double act, and brought us up to date with what has been happening in crop care in the form of vision guidance and automation for weed management in the field.

Progress on use of automation in crop production has also been substantial, with physical and chemical weed control both within and between crop rows being achieved. Of particular interest was testing of the use of large droplets (c. 1 mm) of glyphosate on volunteer potatoes. Although there may be some splash onto the neighbouring crop, the negative effects were much less than that of the volunteer potato.

Nick also described the development of vision guided inter-row hoes and the birth of their 'Robocrop' weeder, which has come of age with 350 machines having been sold worldwide by Garford - mostly exported though. The latest development is an in-row version of the machine, and over 70 units have been sold since its introduction in 2008.

Future direction and drivers

Nick explained that the drivers for this technology have not diminished and may start to influence broad acre crops.

Key issues and challenges include:

- increasing environmental awareness and safety of operators, bystanders and consumers;
- tackling herbicide resistance, and
- the world-wide drive for more food using less resources.

Legislation is also a key driver, reflecting these issues, but it changes slowly. Targeted spraying can provide selectivity where biochemically selective agents are lost to legislation, and technology may even drive legislation - e.g why allow broadcast application when targeted application is possible?

Research is ongoing in this area but the detection of weeds is more challenging, as it requires an accurate outline of the plant not just a centre position.

Further work includes developing spot spraying of individual large weeds and patch spraying groups of smaller weeds. This requires data to be generated on both weed and crop status, linked to GPS position to facilitate mapping.

They aim to apply spot and patch spraying and mapping to some of the broad acre crops, e.g oilseed rape and corn - possibly as part of a resistance management plan.

Nick offered some interesting and thought-provoking conclusions, endorsing the key role that ag engineers have to play:

- Speculative research does sometimes come good!
- Machine vision and robotic technology have a lot to offer agriculture, but they need to be accompanied by good basic engineering.
- The drivers for this work - food, operator and environmental safety, as well as

continues over

scarcity of resources and resistance management - are only likely to intensify.

- Legislation and economics drive farmer behaviour.
- Good people are key to success - and they are rare!

See *www.thtechnology.co.uk* for more information.

2. Weather Forecasting

We were fortunate to be given a 'behind the scenes' look at weather forecasting by none other than well-known, local TV Weatherman, Jim Bacon.

A fascinating topic and one that farmers should be aware of if they are to get the best information for their particular farm. Not surprisingly it attracted a good number of local farmers.

Jim described how his company Weatherquest (*www.weatherquest.co.uk*)can provide this service. He also gave a fascinating overview of how weather forecasting works and how it has improved in accuracy and developed beyond all recognition since the late 1960s. Heavily developed (and still developing!) mathematical models combined with super computers means that predictions are now far more reliable.

Weatherquest has greatly improved their ability to look into the future by using ensemble forecasts. These compare and analyse weather data from the past 30 years up to the present day and from this they can see how well they predict the actual climate and weather of today. They may run the models 50 times with small but likely perturbations in the input data at the start to see which set of conditions leads to the most accurate prediction. They can also provide graphical presentation of the results to show the range of probabilities in particular weather conditions.

The clever thing of course is that if they can get good predictions of what happened over the past 30 years, this immediately gives them confidence to predict (on a broad scale) what will happen over the next 30 years! We can only hope it is not a continuation of the recent excesses!

In terms of delivering specific advice to farmers, Jim said that using postcodes as a means of getting a reliable forecast was prone to considerable error. Due to the current location of the network of sensors and weather stations, present modelling can only provide a resolution of 12 sqkm. This means for example that the probability of showers at a particular farm location could not yet be accurately forecast.

However, the more precise forecasting service provided by Weathequest, based on combined computer and expert analysis, certainly sounds like good value and any farmer wishing to avail themselves of a free trial of their system should e-mail Jim Bacon at *jim.bacon@weatherquest.co.uk*

Winner Joanna Niziolomski receives her cheque from James Hunter (SEM Branch Vice Chair)

3. Student Presentations Evening

Most recently, we held our annual Student Presentation Evening, alongside our AGM.

This popular event gives an opportunity for students to explain their research work in front of an inquisitive audience. A prize is awarded for best style and use of visual aids, technical content, clarity, timekeeping and dealing with questions.

This year's winner was Joanna Niziolomski from Cranfield University, who described her research aiming to develop a run-off and soil erosion management system for asparagus production. The cost of soil erosion to UK farmers alone equates to £180-280 mill/year. In addition, the costs of environmental pollution caused by sediments and nutrients in water are estimated at a further £100mill/yr for the environment agencies and another £270mill over 5 years incurred by water treatment companies.

Effect of severe run-off from field of asparagus

Joanna's field trials comparing shallow-tine soil disturbance vs low and high levels of star or green compost mulches should go some way to helping reduce this. She found that the addition of high levels of surface mulch can dramatically reduce soil erosion.

Two other (excellent) presentations were given by Emily Smith and Nyaz Sulaiman, both from Harper Adams.

Traffic vs Tillage project


Lodging Project

Emily described part of the multidisciplinary long term project at Harper Adams looking at the effect of traffic and tillage on crops, soil and energy consumption. Emily focussed on the interaction between 3 levels of traffic (ie Random, Low Ground Pressure and Controlled Traffic Farming) and 3 methods of tillage (i.e. Deep, Shallow and Zero Tillage) on crop growth and yield.

This demonstrated that traffic management increased yields [LGP by 4%, CTF 6%] and the highest yielding treatment was CTF with Shallow Tillage, which increased yields by 17% compared with the control of random traffic and deep tillage. CTF gave the highest yields on average and scaled up results (for 12m) show potential increases of up to 30%.

Further work will involve studying the performance of these systems on farms across the UK, in different crops, soils, and weather conditions and extending the project to grassland production.

Nyaz spoke about his project aiming to reduce lodging of cereal crops, by improving plant anchorage. This depends primarily upon the mechanical properties of the basal coronal roots and the soil.

Manipulating soil conditions affects plant anchorage and resistance to lodging because this depends upon root development and soil strength - both of which are influenced by cultivation. He has found that the plant anchorage moment was significantly influenced by soil bulk density and cultivation systemand identified optimum levels for the soil textures evaluated in his study.


Student presenters with SEM Branch Vice-Chair James Hunter. From l to r Emily Smith, winner Joanna Niziolomski, James and Nyaz Sulaiman.

4. Getting the wind up

We actually started the New Year with a presentation on wind turbines given by James Hunter (pictured left) - a local farmer and Branch Vice Chairman.

This should have been another double-header, but James kindly extended his presentation at short notice to cover for his fellow speaker who was going to cover solar energy, but succumbed to flu.

In typically open and blunt fashion - interspersed with plenty of amusing anecdotes - James described the trials and tribulations of installing an 11 kW turbine (for powering the farm house) followed by a more ambitious 50 kW unit. Spectacular photos were matched by the spectacular numbers of companies involved in the process - much to James' bemusement! Clearly not a project for the faint hearted, but an excellent presentation to acquaint people with the realities of the job.

Technical details of this installation will be provided in *Landwards* after our Summer Tour of on-farm renewable energy sites in north Bedfordshire. In addition to visiting James' farm to see the 'windmills of his mind', we will also visit a large anaerobic digestion plant and a solar panel farm.

The Tour is on 20 May (the day before the Landwards Conference at Cranfield), and is open to anyone attending the Conference, as part of the Branch's contribution to the IAgrE's 75th Anniversary celebrations.

For further details see listing on page 35.

OBITUARY: Robert Gordon Williamson

GORDON was born just before the outbreak of the Second World War and his interest in agriculture was 'hatched' on the family smallholding where he was brought up in Dunkeswick near Harewood in Yorkshire.

He was educated at Leeds Grammar School and then started his engineering career at John Fowlers of Leeds, as an apprentice toolmaker, in the days when they made crawlers. After his apprenticeship and a period of work with Fowlers he moved to machinery dealerships at Appleyards as a service engineer and then to Wharfedale Agricultural Services as a branch manager.

In 1970 Gordon joined County Commercial Cars, as service engineer for the North England. In his first two years with County, he drove a total of 96,000 miles in the first of nine company cars, a Mark 2 Ford Cortina. He subsequently took on a worldwide service role for County, specialising in torque converters, before progressing to a combined sales and service position.

He was to travel all over Scandinavia, most of Europe, parts of Africa, much of the Far East and also to Canada and America for the company. True to his Yorkshire roots Gordon considered that he was incredibly lucky to be able to make so many trips abroad and not have to pay for any of them.

From County, Gordon moved to Valtra in 1995 as the Valmet Tractors were establishing a UK presence, starting out as service manager and then progressing to become dealer development manager. In this role he was also involved in managing and developing relationships with a range of non-agricultural customers, including the Ministry of Defence.

Gordon married Yvonne in 1959 and they were blessed with two sons Anthony and Nicholas, and subsequently with two grand-children. Gordon and Yvonne took a keen interest in their sons and had them enrolled in the Boston Spa Cubs and Scouts. Gordon helped the first Boston Spa Scout troop as much as he could and the scout leader was so appreciative of the huge amount of work that Gordon did for the troop that he was presented with a special Scout silver badge in recognition of this work.

Gordon has been an associate member of IAgrE for approaching 30 years and has been an active Yorkshire branch committee member since 1992. For many years Gordon, acted as branch secretary and he effectively kept the branch meetings and activity programme afloat with his hard work and enthusiasm, even through the last few years after he had been diagnosed with cancer.

Gordon identified and arranged almost all of the speakers and topics for branch meetings and he promoted the Institution within the regional agricultural engineering industry through his many industry contacts.

He was awarded the IAgrE Branch Meritorious award in 2010.

COUNCIL MEETING - IAgrE visit to Royal Agricultural University

Members of IAgrE received a warm welcome when they visited the Royal Agricultural University for the February Council meeting.

Chris Gaskell

University Principal Chris Gaskell, who joined the University in 2007, and received a CBE last year for services to veterinary science and agriculture, took the opportunity to remind his audience about the University's impressive history. It was the first agricultural college in the English speaking world and began after a meeting of the Fairford and Cirencester Farmers Club in 1842.

Following the meeting a prospectus was circulated, a general committee appointed and funds raised by public subscription with the majority coming from wealthy landowners and farmers, there was no government support at this time.

The first 25 students were admitted in 1845 and many of the students went on to careers in Colonial Agricultural Administration and the Diplomatic and Foreign Service.

The first modern degree programme began in 1984 in cooperation with Reading University. Known as a college, it was independent of government control until 2001 when it received funding from the Higher Education Funding Council for England, allowing the college to widen access to its courses to students of all backgrounds.

It was awarded full University Status by the Privy Council in 2013.

Professor Gaskell went on to talk about Harnhill Manor farm.

The University has invested £1.2 million in a new Rural Innovation Centre on the farm and its intended the Centre will enable the sharing of cutting-edge knowledge between those involved in agricultural production and those undertaking applied research, enabling the promotion of education, innovation and knowledge exchange in the field.

The Centre was opened in November last year by the Prince of Wales and Professor Gaskell said, "The ambitions for the Rural Innovation Centre underpin the Royal Agricultural University's goal to play a role in meeting the challenges of sustainably feeding a growing global population whilst stimulating growth, diverse employment opportunities and economic activity in rural areas."

Professor Gaskell also drew attention to John Beddington's report, known as 'the perfect storm' and remarked it was probably in IAgrE's favour that agricultural engineering was mistakenly omitted from the report as it has given IAgrE opportunities to promote its importance which began with the Beddington sponsored IAgrE report: *Agricultural Engineering: A key discipline enabling agriculture to deliver global food security*.

In summing up Professor Gaskell said, "It's an exciting time to come into agricultural engineering and colleges and universities have a great responsibility to ensure students leave with the passion and responsibility to want to make a difference in agriculture."

Toby Mottram

Professor Toby Mottram, appointed to the Douglas Bomford Trust Chair in Applied Farm Mechanisation and Management in 2012, gave a talk on his work in precision livestock engineering.

Professor Mottram is well known for his eBolus implement, which wirelessly measures the rumen pH in cows. The tool was designed by a design engineer at eCow Ltd, the company founded by Toby in 2007 and has since been sold across the world. It was developed to improve cow rations and can be used in experiments to develop new feeds.

Professor Mottram talked about his experiences with robotic milking in the late eighties and why managing the cows health and nutrition, its environment and conserved forage is so important.

"Nutrient analysis particularly of silage is very unreliable and we don't know what cows will do with a diet until we feed it to them. The rumen pH bolus allows us to assess the energy intake of cows and adjust diets to encourage cows to eat frequently. With new sensors we could look at the nitrogen balance and VFA levels in the rumen and move from a model-based open loop control to sensor-based closed loop systems."

Professor Mottram added, "The perfect environment for cows might be characterised as a place where plentiful digestible food is always available, there is a surface to walk on which is non-slip and causes no damage to the feet, there are plentiful places to lie in family and friend groups, and where the air is clean and dry."

One of the main challenges is to replace bare concrete as the walking surface. Concrete is very hard and it quickly becomes slippery. Urine and faeces also mix together increasing emissions of ammonia.

According to Professor Mottram what is needed is a non-slip surface that is soft to walk on and separates urine and faeces and that is easy and cheap to maintain.

"Road builders have developed numerous surfaces and it is time we applied those approaches to the places cows walk," he said.

Kanes Rajah

The final presentation was given by Professor Kanes Rajah who is Dean of the School of Business and Entrepreneurship. Professor Rajah is involved in strategies for marketing, management and business, entrepreneurial behaviour, creativity, innovation and change.

He is the author of books and chapters on management, business, NLP and business creativity as well as in food, dairy and edible oils technology.

Professor Rajah led a lively debate on the impact of agricultural technology on farming and food production in the future. He reflected that enterprise will only get bigger and even more technical and the need for well trained and highly skilled technicians will be a key feature of future growth.

Despite this, he did not foresee the demise of the family farm. In rounding up his presentation, he agreed with Council members that the role of engineering and technology in agriculture and food production will demand new management approaches and new attitudes from those working in agriculture.

Before leaving members were invited to tour the facilities and see the Rural Innovation Centre at Harnhill Farm.

Membership changes

Admissions

A warm welcome to the following new members:

Fellow
Brighton J L (Bedfordshire)

Member
Bragg L (Monmouth
Corstanje R (Bedfordshire)

Associate Member
Rook D (Cambridgeshire)
Sumpter I P (Bedfordshire)

Associate
Haresign J A (Norfolk)
Henderson H (Lincolnshire)
Masroon M H B (Malaysia)

Student

Bicton College
Ball H A
Burden M K
Bush R
Dart W
Diment S
Doyle D S
Foster G
Howarth D
Jones F
Larkman S J
Musgrave L
Rees J
Tucker B
Wombwell T
Wilson K
Winter S

Coleg Sir Gar
Barratt K
Clements B
Davies A
Davies G
Davies T
Duggins S P
Evans E
Gammon J A
Harries I
Hendrie C R O
Howells D H
Hughes C S
Hughes S I
Evans M R
Jenkins T L
Jones E W
Jones H J
Jones O C
Joynson J
McKenny E J T
Morgan D
Osborne D
RaynerJ
Reynolds D J S
Telka L
Tucker H
Wathan J M
Weston J
Whittingham S
Wiseman M J

Cranfield University
Ashley R P
Babi Almenar J
Cardot R
Carpenter I
Chimezie K C
Ehiomogue P
Gerardy A
Giannitsopoulos M
Kervroedan L
Mancini A
Mawenu C
Moya Esparcia A
Musinguzi P
Okoseimiema A J
Sanangura T
Springer J H A
Tearle J
Verdet C
Whitlock D S

Easton & Otley College
Adcock B
Carter J
Cole J
Colman A
Dunbabin A
Edwards C P
King C
Mayes J
McVicar L
Ravencroft R
Simpson B

Harper Adams University
Adams J A
Angus C
Bagnall J
Brothwood E J
Brown H D
Cohen B
Coldicott W A
Fisher A
Flach J
Godwin J O
Green C
Hennity P
Jones L D
Joynt C
Kings J J
Manners W
Markham D J
Martin N T
McCarthy O
McDiarmid J
Montgomery N D
Oram A M
Ormond L H
Owen G R W
Patterson A
Phillips H J B
Reddaway O R
Reed C
Round D
Rowlinson B
Sallam M
Sambell J
Smart N
Smith M
Studer M
Theakstone M
Thornley E
Treadgold A
Tye C
Vaughan J
Walmsley M
Walsh K
Whitrow A L
Woods R W

Myerscough College
Birchall A D
Edwards D O
Grieve-Robson J J
Hopkins D

Reaseheath College
Donohoe J
BeechT
Belcher M
Blakely H J
Bloor J
Broster D
Campbell J
Cleator K
Crank C
Davies R S
Davies T
Donohoe M
Doonan R
Faulkner J
Fleming R
Fowles J
Hawkins J W
Humphries D
Jones D
Jones W
Lee P
Love J J
Morris N
Pink B
Poyser M
Scott T L
Shore W
Snape J S
Sparke P
Tatler G
Williams T J
Yates A

Institute of Technology, Tralee
Allman N
Connolly C
Corbett N
Fitzmauric D
Healy P
Houlihan D
Joy G
Lynch P
Nolan B
O'Sullivan D S
O'Sullivan S
Smith J
Whelan C

Wiltshire College Lackham
Beer H
Bleaken D W
Booth J
Broom A
Burns M D
Earl C A
Eyles C
Faithfull R
Fear J
Frost G E
Godwin D J P
Horler R J
Hunt J L
Jeal A
Lund W
Mitchel MI
Perry G
Ralph A
Raven J
Rendell T
Robinson S
Rogers C
Smith R
Turrett C C R
Whitcombe P
White S
Whitley D

Readmission

Member
Lomas J E (Worcestershire)

Deaths

We have recently learned of the death of the following members and we send our condolences to their family and friends:

Mr Paul Thomas Delecroix Turner (IEng MIAgrE) (Warwickshire) - a member since 1968

Mr Robert Gordon Williamson (AIAgrE) (Yorkshire) - a member since 1984

Transfers

Associate Member
Bristow D R G (Northern Ireland)

Associate
Ashton J E (Lincs)
Hill P (Surrey)

Long service certificates

Name	*Grade*	*Date of anniversay*
50 years		
Stephen Godfrey **Brunner**	MIAgrE	9/1/14
David Gardiner **Mitchell**	MIAgrE	9/1/14
Anthony George **Moon**	MIAgrE	9/1/14
Oliver John Henry **Statham**	IEng, MIAgrE	9/1/14
Peter Bernard Forba **Fru**	IEng, MIAgrE	2/2/14
35 years		
John Hunter **Park**	IEng, MIAgrE	19/01/14
Henry Edward **Johnson**	MIAgrE	4/2/14
Peter Clive **DeVillez**	MIAgrE	15/2/14
Anthony Charles Martin **Linfield**	IEng, MIAgrE	5/3/14
Jonathan Michael **Chapman**	CEng MIAgrE	11/3/14
25 years		
Kenneth John **Ray**	FIAgrE	1/1/14
Piers David **Austin**	MIAgrE	1/1/14
Donald Crawford **Cochrane**	AIAgrE	1/1/14
Andrew Temple **Cragg**	MIAgrE	1/1/14
John Bourne **Shropshire**	AIAgrE	1/1/14
Catherine Lucy **Cook**	CEng, MIAgrE	1/1/14
David John Trevor **Taylor**	AIAgrE	1/1/14
Robert **Evans**	MIAgrE	1/1/14
Michael **Gould**	AMIAgrE	1/1/14
Howard Maxwell R **Proctor**	CEng, FIAgrE	12/1/14
Nigel James **Penlkington**	MIAgrE	16/1/14
Andrew Nicholas **Marchant**	CEng, FIAgrE	19/1/14
Simon George **Melhuish**	IEng, MIAgrE	1/2/14
Michael Patrick **McTeague**	AMIAgrE	15/2/14
William Irwin **Hanthorn**	AIAgrE	7/3/14

Academic members

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Askham Bryan
York
YO23 3FR

SRUC- Barony Campus
Parkgate
Dumfries,
DG1 3NE

Bicton College
East Budleigh
Budleigh Salterton
Devon
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Bishop Burton College
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Bishop Burton
Beverley
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Brooksby Melton College
Asfordby Road
Melton Mowbray
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LE13 0HJ

Coleg sir Gar
Pibwrlwyd Campus
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Bedfordshire
MK43 0AL

Easton & Otley College
Easton
Norwich
Norfolk, NR9 5DX

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

Harper Adams University
Newport
Shropshire,
TF10 8NB

Institute of Technology
Tralee
Clash, Tralee
Co Kerry, Ireland

Pallaskenry Agricultural
College
Co Limerick
Ireland

Plumpton College
Ditchling Road
Lewes
East Sussex
BN7 3AE

Reaseheath College
Reaseheath,
Nantwich
Cheshire,
CW5 6DF

Royal Agricultural
University
Cirencester
Gloucester, GL7 6JS

Riseholme College
Riseholme Park
Lincoln
LN2 2LG

SRUC - Auchincruive
Auchincruive Estate
Ayr
KA6 5HW

Wiltshire College -
Lackham
Lacock
Chippenham
Wiltshire
SN15 2NY

Commercial members

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

AGCO Ltd
Stoneleigh, Abbey Park,
Kenilworth,
Warwickshire,
CV8 2TQ

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

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
Narrowboat Way
Hurst Business Park
Brierley Hill
West Midlands
DY5 1UF

We want to hear from members

Send branch reports or correspondence to:
The Editor, Chris Biddle
Email: *chris.biddle@btinternet.com*
Or the IAgrE Communications Officer, Marion King on:
pressroom@iagre.org

Landwards

EVENTS

IAgrE Branch Meetings and Events

East Midlands Branch
Tuesday 18 March 2014, 19:00
BRANCH AGM
Venue: Blankney Estates Ltd, Estate Office, Blankney, Lincoln LN4 3AZ
Refreshments will be served.
For further information please contact either the Branch Secretary, Sandy Donald (details below), or Paul Skinner Tel: 07941 604177
Email: paulskinner57@btinternet.com
Tel: 07977 521231
Email: sandytd2000@tiscali.co.uk Web: www.blankney.com/

Northern Ireland Branch
Thursday 20 March 2014, 18.00
BRANCH AGM + FERTILISER SPREADING TECHNOLOGY
Speaker: Dermot Forestral, Teagasc
Venue: Drum Suite, Glenavon House Hotel, Cookstown, BT80 8JQ
AGM: 18:00hrs Technical Meeting: 20:00hrs
For further details please contact the Branch Secretary: Ian Duff
Tel: 028 8673 6977 Email: duffi@iagre.biz

East Midlands Branch
Wednesday 2 April 2014, 19:00
RON KNIGHT, VINTAGE FARM MACHINERY
For further information please contact either the Secretary (details below) or richard.trevarthen@gmail.com
Tel: 07977 521231
Email: sandytd2000@tiscali.co.uk
Web: www.fensvintage.co.uk/collections/index.htm

South East Midlands Branch
Tuesday 22 April 2014, 19:00
TOROTRAK VARIABLE SPEED DRIVES: FROM VARIABLE RATIO SUPERCHARGING TO OFF-ROAD VEHICLES
Speaker: Dave Burtt and Brian Donohue (Torotrak plc)
Venue: Gold Lecture Theatre, Whittle Building, Cranfield University, Cranfield, Bedford MK43 0AL
Torotrak products and partners span both the on- and off-highway, and passenger car industries. It designs products to meet the common need for cleaner, more efficient vehicles, focusing on key areas of supercharging, kinetic energy recovery and main drive transmissions.
For further information please contact the Branch Secetary: John Stafford
Tel: 01525 402229 Email: john.stafford@silsoe-solutions.co.uk

Wrekin Branch
Monday 12 May 2014, 19:30
MEASURING RIVER FLOW USING RADIO CONTROLLED BOATS
Speaker: Nick Everard and Stephen Baker (Environment Agency)
Venue: AgEng Innovation Centre, D.Bomford Lecture Th, Harper Adams University, Newport, Shrops TF10 8NB
A presentation on the developments of river flow monitoring and bed surveying techniques using Acoustic Dopplar Current Profilers mounted on board radio controlled boatts
For further information please contact the Branch Secretary: David Clare
Tel: 01952 815087 Email: dclare@harper-adams.ac.uk

South East Midlands Branch
Tuesday 20 May 2014, 14:00
RENEWABLE ENERGY TOUR
The date is confirmed and this afternoon Tour of renewable energy sites in north Bedfordshire will commence at 2pm with a visit to BIOGEN's anaerobic digestion plant, followed by a solar panel farm and a local farmer's wind turbines. The Tour will finish with a bite to eat in a local hostelry.
As part of the South East Midland's Branch contribution to the IAgrE's 75th year anniversary celebrations, delegates attending the Annual Conference the following day at nearby Cranfield would be welcome to attend.
For further information please contact the Branch Secetary: John Stafford
Tel: 01525 402229 Email: john.stafford@silsoe-solutions.co.uk

Wrekin Branch
July 14, *date tbc*
BRANCH SUMMER VISIT
For further information please contact the Branch Secretary: David Clare
Tel: 01952 815087 Email: dclare@harper-adams.ac.uk

Other Events:

Tuesday 1 April 2014 - *PLEASE NOTE NEW DATE*
IAGRE'S YOUNG ENGINEERS COMPETITION
Venue: JCB, Rocester, Staffs ST14 5JP
Annual competition for students with cash prizes as well as products from our sponsors. Visit the Young Engineers page of our website for more information.
Tel: 01234 750876 Email: secretary@iagre.org
Web: www.iagre.org/careers/devcareeryecomp

Wednesday 9 to Friday 11 April 2014
Institution of Mechanical Engineers
ESSENTIAL MANAGEMENT SKILLS FOR ENGINEERS
Venue: Keele University, Staffordshire
Discounted rates for IAgrE members - entry charged at reduced IMechE member price.
Tel: 020 7304 6837 Web: www.essentialmanagementskills.org
Web2: www.imeche.org/events/C1375

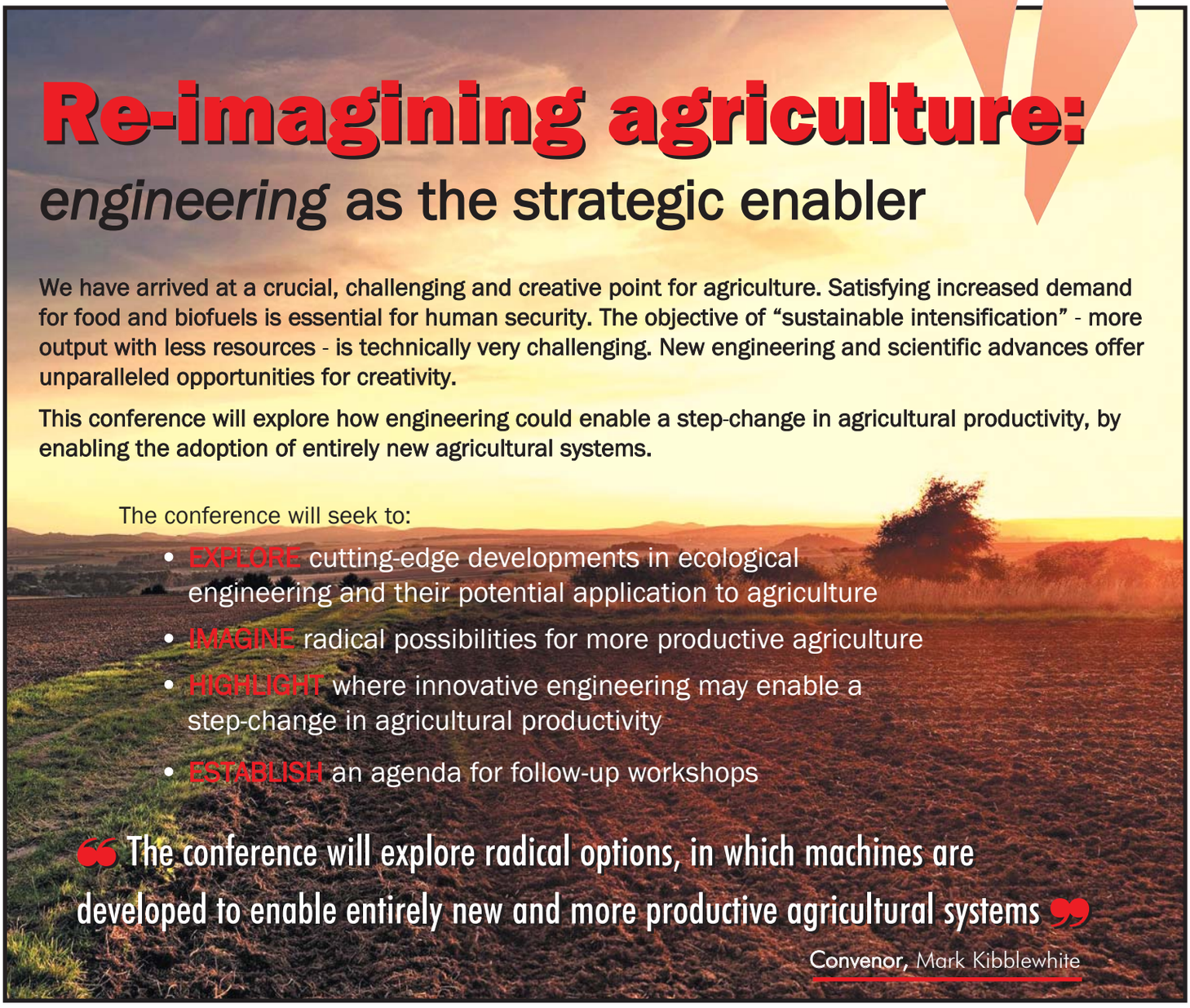
Wednesday 21 May 2014
IAgrE
RE-IMAGINING AGRICULTURE:
Engineering as the strategic enabler
Venue: Cranfield University, Cranfield, Bedfordshire MK43 0AL
Tel: 01234 750876
Email: conferences@iagre.org
Booking form: www.eventbookpay/iagre2014

06 July 2014 to 10 July 2014
EurAgEng
AGENG 2014 - ENGINEERING FOR IMPROVING RESOURCE EFFICIENCY
Venue: Zurich
A conference focusing on the latest research and development in the whole field of agricultural engineering.
Deadlines: Submission of abstracts: 1 November 2013 Submission of Full Papers: 1 May 2014
Contact Robert Kaufman
Email: AgEng2014@art.admin.ch Web: www.AgEng2014.ch

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

INSTITUTION OF AGRICULTURAL ENGINEERS ANNUAL CONFERENCE

Wednesday 21st May 2014,
Cranfield University



Re-imagining agriculture:

engineering as the strategic enabler

We have arrived at a crucial, challenging and creative point for agriculture. Satisfying increased demand for food and biofuels is essential for human security. The objective of "sustainable intensification" - more output with less resources - is technically very challenging. New engineering and scientific advances offer unparalleled opportunities for creativity.

This conference will explore how engineering could enable a step-change in agricultural productivity, by enabling the adoption of entirely new agricultural systems.

The conference will seek to:

- EXPLORE cutting-edge developments in ecological engineering and their potential application to agriculture
- IMAGINE radical possibilities for more productive agriculture
- HIGHLIGHT where innovative engineering may enable a step-change in agricultural productivity
- ESTABLISH an agenda for follow-up workshops

"The conference will explore radical options, in which machines are developed to enable entirely new and more productive agricultural systems"

Convenor, Mark Kibblewhite

Speakers include . . .

Exploiting ecological potential - options and constraints

- Professor Karl Ritz, Cranfield University
- Professor Tim Benton, University of Leeds

Pathfinder developments in agricultural science

- Professor Peter Gregory, East Malling Research

Defining the engineering challenges

- Dr Dionysis Bochtis, Aarhus University
- Dr James Taylor, Lancaster University
- Professor Eldert van Henten, Wageningen University

Landwards

FOR FURTHER DETAILS:

IAgrE Secretariat: 01234 750876
conferences@iagre.org

ONLINE BOOKING:

www.iagre.org