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IAgrE Professional Journal www.iagre.org
Volume 71 Number 4 **Winter 2016**

Landwards

CONFERENCE ISSUE

FUNDING THE FUTURE

IAgrE CONFERENCE AND WORLD AGRI-TECH INVESTMENT SUMMIT

In this issue

- *N8 Presentation*
- *LTA benchmarking*
- *EurAgEng Overview*
- *AEA Standards role*
- *Forestry Symposium*
- *Douglas Bomford Trust*

IAgrE

Biosystems Engineering

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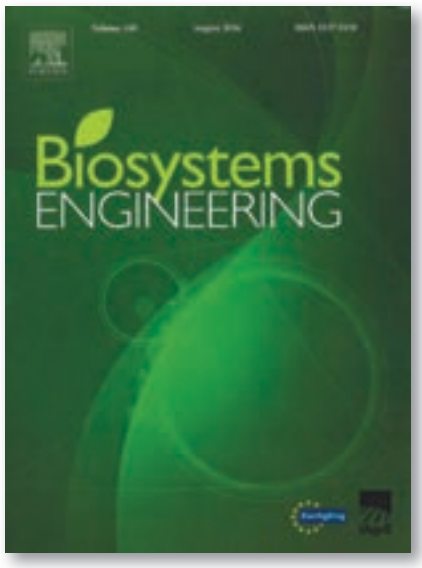

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The Managing Editor of Biosystems Engineering , Dr Steve Parkin, has kindly summarised some of the papers published in the last three issues which he thinks will be of interest to IAgrE members

Biosystems Engineering
Volume 148, August 2016, Pages 18–33
Dust explosions in an experimental test silo: Influence of length/diameter ratio on vent area sizes
Alberto Tascóna, Álvaro Ramírez-Gómezb, Pedro J. Aguadoc
Universidad de La Rioja, Logroño, Spain
Universidad Politécnica de Madrid, Madrid, Spain
Universidad de León, Av. Portugal 41, 24071 León, Spain

Vented dust explosion tests have been conducted in an experimental test silo to analyse the effect of the length/diameter ratio (L/D). The tests were carried out with wheat flour and maize starch, using three different vent area sizes. The silo was equipped with instrumentation which recorded the pressure generated by the explosion at various points in the silo, as well as the instant when the vent panel opened. The L/D has been included in the empirical correlations currently employed in standards EN 14491 and NFPA 68 for calculating the size of vents. Marked differences occurred between the two standards when applied to certain situations, in part due to a different vent area correction for slenderness. The results obtained were compared with the standards, and indicated the advisability of applying an increase in vent area in elongated vessels when L/D > 1, as stated in EN 14491. However, this same standard appears to apply an excessively severe correction in some situations.

Biosystems Engineering
Volume 149, September 2016, Pages 24–37
Methodology for designing accelerated structural durability tests on agricultural machinery Dimitris S. Paraforos, Hans W. Griepentrog, Stavros G. Vougioukas
University of Hohenheim, Stuttgart, Germany
University of California, Davis, Davis, CA, USA

Accelerated structural testing (AST) aims at reducing the time and resources required for this stage. AST methodology was implemented on a four-rotor swather, which is an agricultural implement that drastically changes structure configuration during its working life, depending on its operating mode. Furthermore, recognising the fact that the damage accumulated during each lap varies, automated test facilities were utilised, and Monte-Carlo sensitivity analysis was introduced as part of the AST methodology, to study the effects of damage-per-lap variance on the required numbers of laps calculated via optimisation. When average values were used for lap damages, the total testing time was 1228 h with an acceleration factor of 3.3. However, conservative test design using the 99.9th percentile of the testing time simulation results, required 7.1% longer testing time, leading to a lower acceleration factor equal to 3.1.

Biosystems Engineering
Volume 150, October 2016, Pages 40–53
Development of a grow-cell test facility for research into sustainable controlled-environment agriculture
Ioannis Tsitsimpelis, Ian Wolfenden, C. James Taylor,
Lancaster University, UK
NP Structures Ltd., Colne, UK

The grow-cell belongs to a relatively new category of plant factory in the horticultural industry, for which the motivation is the maximization of production and the minimization of energy consumption. This article takes a systems design approach to identify the engineering requirements of a new grow-cell facility, with the prototype based on a 12 m × 2.4 m × 2.5 m shipping container. Research contributions are made in respect to: (i) the design of a novel conveyor-irrigation system for mechanical movement of plants; (ii) tuning of the artificial light source for plant growth; and (iii) investigations into the environmental conditions inside the grow-cell, including the temperature and humidity. Data were collected from a distributed sensor array to provide improved understanding of the heterogeneous conditions arising within the grow-cell, with a view to future optimisation. Preliminary growth trials demonstrate that Begonia semperflorens can be harvested to the satisfaction of a commercial grower.

EDITORIAL: 'RAISON D'ETRE'

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IAgrE is a founder member of EurAgEng, a licensed body of the Engineering Council and a founder constituent of the Society for the Environment

DEFINE agricultural engineering? The rhetorical question was posed at the recent Council Meeting. Once posed of course, all the elements that contribute to this great industry are inserted to make sure that nobody and nothing is omitted. Dive into Wiki, and you get a smorgasbord of definitions, far too many to concisely embrace our 'raison d'etre'. What we are looking for is the sum of the whole and I think I found it on a careers page which says '***Agricultural Engineering is the design, construction and improvement of farming equipment and machinery. Agricultural engineers integrate technology with farming.'***
Hardly snappy, but I think at least it covers the bases.

DURING November, I attended three Conferences. The World Agri-Tech Investment Summit, IAgrE Conference and the Service Dealer conference.
All very different, ranging from ag bio-tech innovations, data (and more data), new technology, funding opportunities, trade-marks, patents and copyrights through to the new role for ag dealers in this age of robotics and satellite technology.
When you attend a conference, never mind three in a row, you end up taking away a few strong points with the rest being useful background noise.
So what were the verbal 'bullet-points', quotes, views and opinions that stuck in my mind afterwards?
First, that we should never, ever, lose sight of the customer. The people or person who is going to buy, use and hopefully profit from our labours.
Second, that with a vast array of innovative research projects underway, integration of new technology into food production, is never easy. It was a point made by Dr Mark Moore at the IAgrE Conference when he said that farmers' main focus was on producing food, not in sorting out issues of integration and incompatibility.
Third, co-operation and compatibility. With so much data being generated, perhaps too much, there should be a platform for data-sharing to benefit the industry as a whole.
Fourth, accept that business models will change. Uber don't own cars, yet look at the impact they have made. Renting and using, rather than buying and owning, may become the norm and this will impact on manufacturers and dealers.
Lastly this still is, thank goodness, a people business. As technology gets more complex, so the risks increase. As an industry, we need to stay away from the 'legal-eagles' when we can – and sort things out face-to-face rather than in court-rooms whenever possible.
Seasons Greetings to one and all.

Chris Biddle
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PUBLISHED ON BEHALF OF IAgrE BY: Chris Biddle Media

ROYAL ACADEMY WARNS ON FUTURE SKILLS

Engineering a Future lists critical areas post -Brexit

A report published on 17 October by the UK engineering profession hails the government's renewed focus on industrial strategy as a major opportunity to help the UK compete on the world stage, but warns that Brexit must not restrict access to the engineering skills from across Europe that our economy relies on.

The report, compiled by the Royal Academy of Engineering, called '***Engineering a Future outside the EU'***, lists three major areas critical for future success of the engineering sector. These areas are access to skilled workers and academics, access to markets and foreign investment and compliance with and ability to influence European standards and legislations that affect engineering companies.

The authors of the report argue that with engineering contributing at least £280bn gross to the economy, which is 20 per cent of the total, the failure to secure prosperity of the sector could have far-reaching negative effects.

"Engineering makes an enormous contribution to economic and social progress in the UK, and we have heard from a significant cross-section of the engineering profession that leaving the EU poses a real challenge to this contribution," said Professor Dame Ann Dowling, president of the Royal Academy of Engineering.

Engineering research and innovation could be affected by restricted movement of academics and the UK losing appeal to its EU competitors. In academia, engineering has proportionally more staff originating from the EU (15 per cent), than across all subjects as a whole.

The report therefore suggests creating a Shortage Occupation List for engineers containing positions that can't be easily filled domestically, as well as introducing temporary visas for EU engineers possessing skills that the UK needs.

The report warns that the UK risks losing its leading position in engineering research and innovation if it fails to stay open to international collaboration. The UK research and engineering sector has been traditionally successful in winning EU competitive funding and will struggle if those funding streams are not replaced. The report cites earlier evidence of UK researchers already being side-lined in EU-funded research projects as a result of the Brexit vote.

The report recommends the government to seek the closest possible association with EU research programmes and develop schemes that would encourage international mobility and collaboration in the industry and academia.

The importance of staying as close to the future European digital single market as possible is also highlighted. This is particularly important, the report's authors said, as the internet economy contributes 8 per cent to the UK's GDP, which is higher than in any other G20 country.

The consultation also claims that the UK energy industries would benefit from continued membership of the European Energy Community. Remaining a member would help foster security of supply, ensure that the UK can continue to influence regulation, and deliver economic benefits, the report said. IAgrE members were amongst the 38 professional engineering institutions representing over 450,000 engineers to have cooperated on the report.

MORE FOCUS ON DIGITAL TECHNOLOGY

Needs to be differentiated from legislation for automobiles

SPEAKING in his role as President of the European Agricultural Machinery Association (CEMA), Richard Markwell, Vice President and Managing Director Europe/Africa/ Middle East of Massey Ferguson is encouraging European Common Agricultural Policy reform to focus on innovation and include measures and incentives to help farmers invest in digital technology and equipment.

Mr Markwell has recently been re-elected to a second two-year term of office at CEMA and was presenting the Association's latest policy paper at the annual Congress of European Farmers in Athens.

"The next rounds of CAP reform and similar EU finance schemes should favour investment in precision farming and connected tools/services as the solution to both efficient, competitive European agriculture and to 'green' farming," said Mr Markwell.

"Such an approach would be much more intelligent for the farming sector in the context of the EU's environmental targets than the automobile-driven programmes focusing solely on engine emissions. At the same time, it would bring true added value for farmers themselves."

"EU legislation governing EU farm equipment needs to be differentiated from legislation on automobiles as it frequently generates inappropriately huge costs for our industry for little added value and thus reduces the competitiveness of farmers in the EU," he underlined.

"Our role at CEMA is to help farmers produce more food, using less labour, with less land, in a sustainable manner at affordable prices," Mr Markwell stated. "Precision agriculture helps farmers to do this by optimising their input use and maximising their productivity, whilst minimising the impact on the environment. But with less than 25% of farmers in Europe using any form of precision farming, uptake must be increased."

Richard Markwell

"In addition, research and development needs to be stepped up to encourage private partnerships to work together on innovative technology and equipment. The EU must work closer with organisations like CEMA to ensure that we have the right equipment, meeting the right standards of environmental protection and security, to ensure a profitable agriculture sector which farmers are able to invest in," he emphasised.

TOTAL REMOTE FARMING

Hectare of cereals from start to harvest without having to step into the field

Members of Harper Adams University engineering staff are attempting to grow and harvest a hectare of cereal crops; all without stepping a foot into the field.

The project entitled 'Hands Free Hectare' has recently got underway, with the team having to create their first autonomous farming machinery, ready for drilling a spring crop in March.

Kit Franklin, one of the researchers, said: "As a team, we believe there is now no technological barrier to automated field agriculture. This project gives us the opportunity to prove this and change current public perception.

Previously, people have automised sections of agricultural systems, but funding and interest generally only goes towards one single area. We're hoping to string everything together to create one whole system, which will allow us to farm our hectare of cereal crop from establishment to harvest, without having to go into the field.

We are confident that we are going to be successful implementing current open source technology, but obviously there is an element of risk. This is the first time in the world that this has been done but pushing boundaries is what engineering research is about.

We will be using small-scale machinery that is already available on the market, and adapting these in the university's engineering labs ready for the autonomous field work.

We will be drilling a spring crop in March. April to July will comprise crop husband activities with remote agronomy and autonomous application of required inputs and then harvesting in August and September."

The project's main partner is Precision Decisions Ltd. Clive Blacker, managing director and Hands Free Hectare project lead said: "The opportunity to convert our current experience of autosteer and precision agronomy solutions and embark on an autonomous solution is very exciting.

"Automation undoubtedly will become a large part of agriculture's future. By working with Harper Adams, this allows us to understand the challenges autonomous solutions bring and to develop new tools and services from this opportunity.

"What we learn from this experience is fundamental in allowing us to fulfil the needs of tomorrow`s farmer, to fully embrace the digital revolution we face today."

Funding for the project is being provided through the Innovate UK – Satellites and agri-food competition. This competition is providing funding to projects aiming to improve the productivity of agri-food systems using satellite technology.

Martin Abell of Precision Decisions, Jonathan Gill and Kit Franklin of Harper Adams University

JON PRICHARD TO LEAVE ENGINEERING COUNCIL

Appointed CEO of Institution of Chemical Engineers

The Engineering Council has announced that CEO Jon Prichard CEng FICE FInstRE will be stepping down from his role in early 2017 to take up the post of Chief Executive at the Institution of Chemical Engineers.

During Mr Prichard's six-year tenure he has successfully overseen the advancement of UK professional standards; the development of individual Guidance on Risk, Whistleblowing and Security; whilst also ensuring that the reputation of UK registered engineers and technicians has been enhanced and maintained among global partners.

RAdm Nigel Guild CB CEng FIET FIMarEST MIMA FREng, Chairman of the Engineering Council, thanked Jon for his tireless efforts, saying "Jon's drive, vision and energy have transformed the Engineering Council and earned him respect across the engineering community nationally and internationally. He has been an articulate and effective advocate for professional registration to employers, individuals and the public as a whole."

Jon Prichard said: "It has been a privilege to lead the Engineering Council through the challenging but exciting last six years, which have included two office moves and building relationships with our equivalent bodies in Europe"

Jon Prichard

NEW HOLLAND BUILDS ON FULL LINE

Announces acquisition of Kongskilde grain and soil division

New Holland Agriculture has announced, based on CNH Industrial's agreement, the acquisition of agricultural 'Grass and Soil' business of Kongskilde Industries.

This business, part of the Danish Group Dansk Landbrugs Grovvareselskab (DLG Group) develops, manufactures and sells solutions for agricultural applications. Kongskilde's Grain and Industrial divisions are not included.

"The acquisition of the Tillage, Seeding and Hay and Forage activities of Kongskilde adds a key product range that will further broaden New Holland Agriculture's product offering within the agricultural machinery sector", said Carlo Lambro, Brand President of New Holland Agriculture.

"In the meantime the Kongskilde dealer and importer network will remain the reference point for their customers.

"This agreement will provide growth opportunities and create a strong platform to develop the Kongskilde business and its brands and we will also gradually integrate their products in the New Holland portfolio."

The Kongskilde manufacturing operation includes two plants in Europe, located in Poland and Sweden, and other facilities worldwide.

"We are proud to welcome the well-established products and brands of Kongskilde, Överum and JF into the CNH Industrial Group. It is our intention to build upon these proud heritages and significantly increase their market access as part of our worldwide distribution network," commented Richard Tobin, CEO of CNH Industrial.

Kongskilde

The head office team have been hard at work developing the new IAgrE web site and are delighted to announce that it has just gone live. Log on and take a look at www.iagre.org.

The new site is designed to simplify the content and increase the visibility of all the services offered as well as making the Institution easier and more straight forward to join. The new design is clear to navigate and the layout can be easily read on any platform from laptops to mobile phones.

There is a brand new member log in area where you can update your details, pay subscriptions, access branch, SIG and other important information in the landbased sector.

Content will be continuously updated with helpful information, articles and newsletters over time. To access just click on My Account and use your existing user name and password to log in. Please contact Sally – projects@iagre.org if you experience any problems with logging in, or have any questions, feedback or suggestions on the website.

DBT AGM

The Annual General Meeting of The Douglas Bomford Trust was held on 15 November 2016 at Cranfield and was attended by six trustees, two observers and two administrative staff.

At the meeting Jim Robinson stood down as a trustee and vice Chairman of The Board of Trustees. Jim has been an active trustee and in thanking Jim for his contribution to the work of The Trust, the Chairman, Malcolm Crabtree, noted that he had been instrumental in initiating our involvement with the Arkwright Scholarship Scheme. Nick August was appointed as the vice Chairman of The Board of Trustees.

The Annual Report and accounts for the financial year ending 31st March 2016 were accepted and signed. These will be submitted to The Charities Commission and made available via The Trust's web site.

NEW FELLOWS OF ROYAL ACADEMY

Paul Miller

Dr Paul Miller FREng, Secretary of the Douglas Bomford Trust and Director of the Silsoe Spray Applications Unit and Toby Mottram FREng, Douglas Bomford Trust Chair in Agricultural Mechanisation are amongst the names of 50 new Fellows announced by the Royal Academy of Engineering for 2016. Becoming a Fellow is one of the highest honours that an engineer can receive in the UK and Fellowship is awarded in recognition of outstanding and continuing contributions to the profession.

IAgrE AT SALTEX

IAgrE CEO Alastair Taylor was one of the key speakers at the 2016 Sports Amenity Landscaping Trade Exhibition (SALTEX) held on 2-3 November at the National Exhibition Centre, Birmingham. He was promoting the rewards from better staff satisfaction and retention to be gained by employers from promoting engagement through professional registration as Engineering Technician to Chartered Engineer (with the Engineering Council) or as Registered Environmental Technician to Chartered Environmentalist (with the Society for the Environment).

Alastair Taylor at SALTEX

UN WARNS ON CLIMATE CHANGE

Weather and climate related disasters have doubled in two decades

Farmers urgently need help to change methods of growing food if the world is to curb greenhouse gas emissions, the UN has said. A report by the Food and Agriculture Organization said agriculture accounted for about a fifth of emissions, which it said needed to be reduced.

"Unless action is taken now to make agriculture more sustainable, productive and resilient, climate change impacts will seriously compromise food production in countries and regions that are already highly food-insecure," FAO director-general Jose Graziano da Silva said in the report.

"Hunger, poverty and climate change need to be tackled together. There is evidence that adoption of 'climate-smart' practices, such as the use of nitrogen-efficient crop varieties, zero-tillage and integrated soil fertility management would boost productivity and farmers' incomes".

"The world faces an unprecedented double challenge, to eradicate hunger and to stabilise global climate before it is too late," said the report.

The number of weather and climate-related disasters more than doubled in the last two decades compared with the preceding two, the U.N. Office for Disaster Risk Reduction as said recently.

The report says beyond 2030, the negative impacts of climate change on the productivity of crops, livestock, fisheries and forestry will become increasingly severe in all regions.

Significant improvements in food security, as well as resilience to climate change can be achieved with the introduction of sustainable agricultural practices.

The report cites diversifying crop production, better integration of farming with the natural habitat, agroecology and 'sustainable intensification' as strategies to help small-scale farmers adapt to a warming world.

"Business as usual is not an option," said Mr da Silva in a foreword to the report.

The UK government has also released a climate change report this month, calling for any new agricultural policy introduced post-Brexit to include measures to ensure reductions in agriculture's greenhouse gas emissions.

Parliament's Climate Change Committee's report shows that since the passage of the UK's Climate Change Act in 2008 industry and power generators have achieved cuts in greenhouse gas emissions of around 50%, and the waste industry has cut emissions by a huge 80%.

Storm over fields

IN BRIEF *IN BRIEF*

AMAZONE PLOUGH ON

AMAZONE has purchased the plough production facility of the Hungarian company Vogel & Noot.
As part of a bidding consortium, a total of three investors were awarded major parts of the Vogel & Noot Group in September 2016. From this process Amazone secured the plough production including the rights to all the range of ploughs.
This process followed parent company, Vogel & Noot Landmaschinen GmbH & Co KG in Wartberg, Austria, filing for insolvency at the beginning of August 2016. The plough subsidiary in Mosonmagyaróvár, Hungary though was not insolvent and will be taken over completely by Amazone.

LEAF APPOINT

LEAF (Linking Environment And Farming) has named The Countess of Wessex as its new Honorary President**.** She will take over the role of Honorary President from Baroness Hazel Byford DBE. The Countess will help LEAF on its mission to cement its place as the leading global organisation delivering more sustainable food and farming, as outlined in its recently launched Five Year Strategy.

Countess of Wessex

NFU BREXIT DIRECTOR

The NFU has appointed Nick von Westenholz to lead its newly created Brexit Unit. He will join the NFU as Director of EU Exit and International Trade to ensure the NFU has a co-ordinated and constant presence in its Brexit conversations with government in the crucial months ahead.
The new Brexit team is part of the NFU's strategy to refocus and strengthen both its government and external affairs teams in London, to ensure it continues to have the impact needed on behalf of its 46,000 farmer and grower members as all-important Brexit negotiations get underway.
Mr von Westenholz joins the NFU from his current post as Chief Executive of the Crop Protection Association. He is a trained barrister and previously worked with the NFU as its Head of Government Affairs.

POWER UP

The total power of farm tractors (over 50hp) sold in the first 9 months of 2016 was 1.358 million hp, a year-on-year decrease of 2.5%. The average size of unit was 161.9 hp which is a 2.2% increase on a year earlier according to the AEA.

CEO

Reflections on a changing world

SHOWCASING OUR INDUSTRY

Perhaps the Science Museum could connect our technological advances across its whole display

Alastair Taylor *IEng CEnv MIAgrE*

I was talking to a non-farming neighbour the other day who was commenting that the local farmer must be doing well. My neighbour's rationale was that the local farmer had a new tractor and seed drill and therefore must be making good money to be able to afford such equipment. My counter argument was that without such equipment, the farmer would not be able to produce a crop, in the same way as the bricklayer needs a trowel and the hairdresser some scissors. This was not a good analogy and gained very little sympathy.

I tried to explain that the shiny new equipment was not a symbol of profitability so much as a necessity if the farmer is to produce a crop. The concept that such machinery was probably funded through a bank loan or contract hire agreement as part of a well thought out business plan seemed to fall on deaf ears with a throw away comment on the lines of "I was bought up never to buy anything until I had saved up for it" I gave up the discussion at that point.

People will believe a conspiracy theory before they believe the facts.

I certainly would not seek to defend unscrupulous money lenders and in any case, I am sure that agricultural lending is always done so against proper rules and regulations. However, it does disturb me that we have any number of armchair observers who will profess an opinion without any knowledge of business, economics, science or research. It does seem apparent that people will believe a conspiracy theory before they believe the facts.

The need to be straight with the facts was an important point made during a recent visit to the Science Museum in Kensington. The purpose of my visit was to join a panel of experts to assist the museum in planning for a new display on agriculture and associated technological advances. Prior to the meeting, I hadn't given this much thought other than the vague idea of a nice shiny tractor showcasing the sort of technology used in farming.

As I sat around the table, I quickly recalibrated my brain and as I listened to the other panel members came away with the view that this presents the Science Museum with a great opportunity to engage the public – particularly youngsters – with the exciting advances which are now commonplace across agriculture. There was a myriad of suggestions from the panel ranging from robotic milking and the "connected cow", through to the handsfree hectare, advances in seed technology and agronomy.

All of this is very laudable but my overarching thought was that the Science Museum has an opportunity to be brave in its future display. "Don't duck the big issues. Be Brave!" I suggested. We must wait until 2018 to see what the Science Museum does with its new display but I am truly optimistic that it will be exciting.

"Don't duck the big issues. Be Brave!"

What about my nice shiny tractor? I am not sure it will end up on display – well not in the agriculture section of the museum – but it was not lost on panel of experts that agricultural technology probably has a place across the whole of the Science Museum. With current displays covering everything from data to robotics, energy to materials, there are plenty of opportunities for agricultural technology to be included. "Why not take over the whole museum?" was my slightly tongue in cheek question.

As I left the meeting, my first challenge was navigating the line of youngsters queuing to enter the museum. "Wow" I thought. What a tremendous opportunity to influence the thinking of the next generation of young scientists and technologists. How fantastic that the Science Museum is appreciating that modern agricultural industry should be showcased as an innovative and technologically advanced sector with wonderful science, technology and engineering solutions.

More than anything, I hope that the new display which the Science Museum is developing will help in changing societies view of agriculture and food production. If the next generation are more informed of the science and facts, there will be fewer conspiracy theories, less ignorance and hopefully more appreciation of the complexity and opportunities across the industry which us Agricultural Engineers serve.

Feedback

REGENERATION OF SOIL HEALTH DOESN'T JUST HAPPEN

Dr JOHN BAKER PhD, MAgrSc (Hons), FIAgrE, writes from New Zealand on the impact of low-disturbance, no-tillage

As a long time Fellow of IAgrE, who was half-English when born in New Zealand 75 years ago, I am moved to write in praise of a couple of opinion pieces that appeared in the Autumn issue of Landwards.

I loved the anonymous lead article ***Report Critical of Inaction on Soil Health*** with the sub-title: *Rules "Too weak and don't enforce restoration"*.

It is a long time since I read a piece with which I so strongly agree and here are the reasons why.

Back in 1967, I was a young scientist in New Zealand looking for a PhD project in agricultural engineering. ICI's invention of paraquat and later Monsanto's invention of glyphosate unlocked the door on "direct drilling" (as it was then called). The practice was being touted as a "silver bullet" for not only improving soil health, but reducing soil erosion and improving a lot of other environmentally desirable things during arable crop production.

We figured that the UK would be an especially good market because many of its arable soils were in such poor shape.

But the practice was not then biologically reliable in either the UK or NZ. There were too many crop failures for machinery manufacturers or farmers to take it seriously at that time. So I figured that a good PhD project might be to find out what was causing the crop failures and if the reasons turned out to be related to machinery design, see if we could correct them. I budgeted 5 years for the project at New Zealand's Massey University and visited every other scientist I could find in the world who was working in the same area.

Some 50 years later, I am still at it. On the way, 27 graduate students and at least 10 staff contributed to my university team. In 1995, the team principals left the university environment and have spent the last 21 years operating a New Zealand company dedicated to bringing what we had discovered as scientists to commercial realty around the world.

Our recent experience in the UK supports almost exactly what your lead article said.

The science we discovered of what seeds and growing crops really need when sown into untilled soils, all boils down to improving soil health from the compromised state that repeat conventional tillage has left it in – and not just on a macro-field-scale, but also on a micro-scale within the seed slot itself.

We found out so much that FAO commissioned us to write a book on the subject, which was published in 2006 (*No-Tillage Seeding in Conservation Agriculture*, Baker *et al*, CABI print). By then we were manufacturing and selling a unique low-disturbance no-tillage seed drill called Cross Slot®. Although the machine is now used in 20 countries of the world, we figured that the UK would be an especially good market because many of its arable soils were in such poor shape.

In the early 2000s, a lone father-and son contractor in Oxfordshire (Primewest Ltd) purchased a Cross Slot drill from New Zealand and began seeding for clients nearby. It was hard work getting UK farmers interested since many had had their fingers burnt in the 1960s and 1970s with direct drilling using triple disc drills and had become convinced (along with most of the rest of Europe) that minimum tillage was the only safe alternative to conventional tillage. The belief seemed to be that if the UK (which had, after all, invented no-tillage or direct drilling, as it was then called) could not make it work, then no-one could.

Please forgive me for saying this, but that is exactly what they also said about the game of rugby union. And where New Zealand perfected the UK game of rugby union it also perfected the UK practice of no-tillage.

After 10 years of a single Oxfordshire (now Warwickshire) contractor getting regularly-improved crop yields for his clients with (by then) two unique Cross Slot low-disturbance no-tillage seed drills by demonstrably improving soil health.

The reality is that unless there is a net gain in soil organic matter after each arable crop cycle regeneration of soil health will simply not occur with many, so called, "Conservation Agriculture" (CA) practices. Minimum tillage, strip tillage, high-disturbance "no-tillage" and conventional tillage very seldom achieve net gains in SOM. Only true low-disturbance no-tillage does that.

UK policy makers now need to recognise that the regeneration of soil health does not happen automatically just because a farmer stops ploughing. In this case, it happened by applying peer-reviewed science and technology that started in the UK in the 1960s; was refined in New Zealand over the next 50 years; and then was re-applied in the UK - with spectacular results.

And isn't bringing good ideas to fruition the theme of much of the rest of the current issue of "Landwards" anyway? You would be hard pressed to find a better example of doing just that.

Responses to **Landwards** Feedback to the Editor chris.biddle@btinternet.com

NEW PARTNERSHIPS

Supply chain opportunities

President's Musings

IAgrE President
Dr ROBERT MERRALL
MIAgrE, Eng D

"Exporting is Great" says the familiar Union Jack emblazoned slogan. Indeed, notwithstanding increasing international competition in manufacturing and data service industries, the climate for active UK exporters is broadly benign and we are living through a period of real enthusiasm for "Agri-food Technology".

The UK Government is harnessing expertise from significant industry figures to set the direction in this area, in particular Judith Batchelar, Director of Sainsbury's Brand, who chairs Government's Agri-food Technology Leadership Council.

As the Institution of Agricultural Engineers, we seek to support the initiatives of this Council, to help ensure enduring positive impact. It is true to say that with careful planning there are significant opportunities to secure targeted public funding to achieve business goals if they relate to innovation, environmental benefit or job creation.

One of the key objectives of our annual conference last month, was to highlight these opportunities, and to draw attention to the potential pitfalls that can slow the commercialisation of innovation in our sector. We had some fantastic motivational speakers from Innovate UK and The Intellectual Property Office alongside some illuminating shared personal experience from a number of active innovators at every stage in their careers.

Putting technology in the hands of the farmer

I think, however, the quote from the day which will stay with me came from Dr Mark Moore who summed up his career as "putting technology in the hands of the farmer". That, I think, is something we can all reflect on in a world where ensuring food security for all is becoming more of a global political challenge than ever.

DOING THE RIGHT THING

I recently had the pleasure of attending Sainsbury's Farming Conference, and it was interesting to understand more about the nature of the supply chain relationships that exist with our largest supermarkets.

Scope for business incubation within the Agri-EPI model

Sainsbury's focus on brand development is very much about the customer's need to know that the supermarket and their suppliers are "doing the right thing" with regard to welfare and the environment. There is a real emphasis on sustainability and working with suppliers to develop sustainable and profitable businesses.

Of particular interest were Sainsbury's "Hackathon" projects, where the Sainsbury product development team bring together a group of software and sensor specialists to quickly solve producer's problems. This seemed to involve working late hours and large quantities of pizza, but in the example quoted, a poultry producer had hosted a Hackathon which developed prototype growth and health status monitoring equipment inside 3 days. As you might expect - they made an App for that.

EMERGING OPPORTUNIITES

All interesting stuff, and actually all of this fits neatly into the development of the four new Agri-Tech Centres that are being developed in line with the Government's Agri-Food Tech Strategy. We were very fortunate to have Dave Ross with us at our conference to explain about the Agri-EPI Centre which is the Centre most aligned with typical agricultural engineering activity.

I am rather hopeful that this will develop into the kind of "Catapult" (like the High Value Manufacturing Catapult) that successfully acts as a "new technologies broker", introducing potential supply chain partners with existing manufacturers. There is clear scope for business incubation to happen within the Agri-EPI model, and IAgrE are keen to assist to ensure that the Centres are as successful as possible.

The refrain "new supply chain partners" is becoming something of a recurrent theme of late, and with the advent of really disruptive (electric propulsion) technology in the automotive sector, the whole business of identifying new supply chain partners is something that the Automotive Council have been engaged with for some time.

I believe it is time for the agricultural engineering sector to do the same and consider what new supply chain opportunities are emerging in the "agri-tech space": sensors, actuators, vision systems, autonomous platforms, software, data standards etc.

My concern is that we need to "futureproof" our capacity for agri-tech innovation in the UK, and so this will be an area of focus over the next few months. I'm hopeful that by the next Landwards, there will be a little more to talk about in this regard.

UK AND THE EU:

KEEPING UP STANDARDS

In the wake of the recent EU referendum, Landwards talks to Eur Ing Dr Keith Hawken, Technical and Standards Director of the Agricultural Engineers Association (AEA), about its present and future role in the production of standards

Traditionally members of the Agricultural Engineers Association (AEA) contribute to the standards and legislation process by shaping documentation and to ensure that engineering solutions are workable for the industry.

Heading up this function is Keith Hawken. Keith is a Chartered Engineer achieved through IAgrE and the Engineering Council programme thanks to mentorship from Dr Steve Parkin in 2003. He progressed to Eur Ing status in 2008 which complimented his University and practical background gained during his time with the Robert Bosch group. In 2016 he gained a Doctorate through US Universities in Delaware with a concentration in Mechanical Engineering.

Keith has worked in the industry for 43 years completing two apprenticeships (Tool maker/Fitter and Jig & Tool design draughtsman) while with Qualcast in Derby. His family had over 270 years service with the mower company and Keith also spent time at ATCO, as well Bosch before joining the AEA in 2000

He says "Standards have been a key function of member interest since the AEA was founded back in 1875. In fact BSI (British Standards Institute- our UK National Standards Body) was formed in 1901 and the two have complimented each other ever since. But the remit has gone wider over the last 50 years. Standards are not mandatory but are a great way to achieve presumption of conformity in respect of legislation"

Over a period of time national standards have gradually disappeared to become European so that all can follow the same requirements, albeit the BS numbering appears as a dual entity. The goal has always been to achieve global parity and that is why you will see standards named as BS EN ISO for example, as a solution for use in markets world-wide.

The AEA and its members contribute immensely to standards production on behalf of the whole industry. Once internal agreement is reached then the views of HSE, consumer groups, test houses, Institutes, related associations, government departments and other contributors are considered until consensus is reached, and this is taken forwards as the UK view.

The AEA on behalf of industry holds the external secretariat of 5 national committees which includes addressing document control, commenting collation and uploading new work onto the BSI e-committee website, as well as balloting procedures for and behalf of the UK.

Beyond this the AEA and its member representatives also hold secretariats of the European standards body committees (CEN), for mowers, hedge trimmers, All-Terrain Vehicles, Side by Side vehicles, et al and 3 convenorships of working groups (subjects such as PTO Shafts, Accident statistics, Chains Saws, Brush cutters, Lawn mowers, hedge trimmers and other garden related products), all important to maintain the UK industry influence.

In July 2016, Keith Hawken (accompanied by wife Lesley) was one of eight recipients of the 'Order of the Engineer' after respective recent graduations and presented by Professor Bob Gustafson of Ohio State University.

FATALITIES

The AEA are also a member of the Machinery Directive stakeholder working group in Brussels where decisions are made on the validity of standards within the legislative process.

Keith says "This has been a real challenge as member states normally only allow governmental representatives to participate. But over the years the knowledge and expertise of the AEA has gradually been vital, acknowledged, recognised and has helped shape the legislation with some common sense approaches"

Keith recalls when he was first invited to attend "We were not allowed to speak but now the 60 strong membership participants from all EU countries and respective deputies, listen to the issues we address when they appear on the books"

"The fatal accident story is so much improved than when we first started as the member states begin to understand how complex the machinery is, and how we are dealing with this in new safe designs prompted by the work in the standards arena"

"These issues take time and typically the criticism around standards and legislation introduction is more easily recognised because of the nature of the machinery and the amount of hoops people need to consider before setting these in play."

"As ever, much goes on in the background as we continue our quest to try to prevent any fatality. Now we are down to 1% of UK fatalities that may be a contributory factor from a

machine design, and we spend an enormous amount of time and energy to reduce this – and we always will. But mainland Europe a different story albeit many fatalities are because of a lack of training and education. We are trying to address this with our new statistical reporting standard which will help with trends and areas that need to be looked at".

Internationally the AEA has real respect in the global standards picture. In particular ISO (International Standards Organisation) and IEC (International Electrotechnical Commission) are the vital areas of interest. AEA holds secretariats for knapsack sprayers, vocabulary standards, sprayer closed transfer systems, baler and bale wrapper safety, harvesting and conservation machinery, manual forestry equipment, chain saw and brush cutter vocabulary, symbols and pictograms.

Members also hold various working group convenorships. Keith concludes his Chairmanship of ISO/TC 23/SC 7 which looks after combine harvesters, foragers, mowers, balers, and thrown object testing committee very shortly after a maximum 9 year stint. He is also Chairman of ISO/TC 23/SC 17 looking after chainsaws, pole pruners, brush cutters and testing of forestry machinery where the AEA hosted the International meeting in September 2016, welcoming 14 countries including Australia, Brazil, Canada, China, Japan, USA as well as European countries, to work through the next series of new documents that will become standards.

REFERENDUM

Over 100 committees are tracked by AEA members including the interface with legislation and regulation. The AEA sits on the Working Group Agricultural Tractors in Brussels and has contributed to the new legislation on type approval which is some 1500 pages in length. Importantly much of the wording of standards is now inside the legislation and the opportunity to change much easier than the constraints of EU trilogy of parliament, council and commission ideals of the past.

"I truly believe that AEA punches above its weight in all forums as resource is an issue. But the results are for all to see and particularly the ISO/IEC initiatives which help the manufacturer to sell globally"

Recent events with the referendum are a fantastic opportunity says Keith and the work internationally will be a fine catalyst. "Some responsibility in European matters, particularly with CEN as convenors, will be a challenge but with the Vienna agreement (exactly the same standard applies in Europe and world-wide) in place and international lead on subject matter, this will place UK in a good position. Excellent liaison with North America and China will continue to thrive and is essential".

"Some whole type approval of vehicles may suffer as these will not be easily available long term via the UK. Nevertheless the AEA work with OECD and its test houses as well as using global UN ECE agreements on componentry will come more to the fore"

"Interesting times, but for an organisation so steeped in diligence with a great history, super opportunities lie for the technical community in respect of standards and legislation"

USING EXPERIENCE

Keith recalls former times as a homologation/type approval engineer with many different regulations in countries to follow. 'It was a nightmare trying to shore up a specification to meet various markets, but today this is much easier and I believe it will still be fine even after we are on the periphery of the EU".

He says that a couple of European countries in the last few years still did not allow machines to be placed on the market despite all the certificates of conformity (European wide) and documents being totally correct, and to the recognised standard. "So it will not be any more difficult if we are in or out in some cases!".

"The key is to know your product, the people involved and how to use experience within the system constraints. The success of the machine portfolio available today is down to the very safe nature of the respective development coupled with diligent sustained testing, but we strive for more, always".

The AEA technical area core activities are tractors, Implements and trailed, sprayers, ATV's, material handlers, outdoor power equipment, events, member research and input, development of standards, legislation interface and member confidentiality.

UK legislation is also a key factor and the AEA is working with DfT on tractor/trailer schemes, emission regulation, BEIS (Department for Business, Energy and Industrial Strategy) on machinery safety and market surveillance, as well as HSE on issues such as Over Head Power Line safety.

The AEA has many other strings to its bow and works with other associations in Europe like its equivalents (VDMA-Germany, AXEMA-France, FederUnacoma-Italy) and is a member of CEMA (Agricultural), EGMF (Garden) and ATVEA (ATV), and Internationally the various groups in association with ISO/IEC.

AEA STANDARDS FACTS

- 1800 Standards in AEA library
- £250,000 Value of the standards library
- 100+ standards committee representation (UK/EU/global)
- 160 new Standards per year
- 120 new Legislative documents per year (from 1 up to 450 pages and anything in between)
- 2,500 Technical documents per year
- 15,000 Technical emails + to action per year
- Overseas meetings most weeks in Europe but each year North America (several) and Far east
- Monthly technical bulletin to members and many UK meetings
- 3 very busy and dedicated standards staff

WORLD AGRI-TECH INVESTMENT SUMMIT

FUNDING THE FUTURE

Landwards editor CHRIS BIDDLE reports from the major agri-tech conference held in London during November connecting investors with innovators.

As I sat in one of the business sessions at the World Agri-Tech Investment Summit, Identifying the Next Big Horizon for IOT the Automated Farm, and being of a certain age era, I couldn't help myself thinking "What would Harry Ferguson have made of all this?". As recently coined phrases such as the Internet of Things and Big Data were sprinkled freely throughout the presentations, my conclusion was had Harry been a contemporary of Tim Berners-Lee, he would have loved the technology of the future and used his extraordinary engineering flair in a very different way.

Indeed, one speaker Andrew Lazenby, Director of Operations at Farmcare UK (formerly Cooperative Farms) questioned the very origins of tractor design "Did we really get it right all those years ago?" he asked. Which is a bit like the chestnut when asking directions "I shouldn't start from here". Nonetheless, to someone who is neither a venture capitalist, nor an agri-technician, the content was (mostly) highly relevant, full of interest and fascinating.

Hugh Crabtree

Dave Ross

AGRI-TECH INVESTMENT DOUBLES

The World Agri-Tech Investment Summit is only in its fourth year, and is staged in both UK and in the US (the next event is in San Francisco in March 2017). The first event was held in 2012 when around 50 delegates attended. This year, the London event drew over 200 attendees, with a predominance of UK and US delegates and strong representation from France, Germany, Switzerland, Benelux, Scandinavia, Australia and New Zealand, Israel, Malaysia and India.

The rise in interest is reflected by the world picture. Agricultural technology, as a sector of innovation, is gaining momentum. According to the 2015 AGTECH report published by AgFunder, investment in the ag-tech market gathered pace in 2015 taking total fundraising volumes to $4.6 billion across 527 deals compared with $2.36 billion in 2015.

2015 also saw increasing diversity of investors active in the sector, including high profile investors such as Google Ventures and the Bill & Melinda Gates Foundation.

There has however been a cooling during the first part of 2016 in Agritech investment (reflected by a pullback in global venture capital markets). The sector recorded $1.8 billion across 307 deals in the first half of 2016 compared to $2.2 billion in 2015.

However, the Midterm Report of AgFunder says that during the first half of 2016, the number of other investors coming to Agritech increased, with 52% more unique investors recorded compared to the first half of 2015.

However, Saverio Romeo, Principal Analyst of Beacham Research, speaking at the conference said "The development of smart farming and precision agriculture must accelerate rapidly and learn lessons from smart city projects if it is to meet the challenge set by the UN's Food and Agriculture Organisation, which has stated: "The way farmers produce


Joachim Stiegemann, Claas

their food must radically change in order to feed the growing world population in the future."

"The United Nations Food and Agriculture Organisation predicts that in order to keep pace with population growth, food production must increase by 70 percent by 2050; but also estimates that agriculture worldwide is currently responsible for a fifth of greenhouse gas emissions and for using some 70 percent of the world's fresh water."

Despite a growing level of exciting research and new smart farming projects, Romeo says that emerging Machine to Machine (M2M) and Internet of Things (IoT) technologies have been slow to be adopted in agriculture compared to other industries. "The reasons for this are primarily cost – only large farms can afford the investment and the industry is, by nature, conservative," said Romeo.

Against that several speakers cautioned about the dangers of 'lazy' investment. Dave Smardon of Bioenterprise Corporation of Canada said that a number of agritech companies 'never made a nickel' and they were content to live off invested money year after year. "Innovators also need to be salesmen" he said "No new idea is worth a dime, unless you can sell it into the market".

He was supported by Hans Mehn of London based Generation Investment Management who said "Investors need to see businessmen at the helm of every project"

All of which was summed up by one delegate who asked "We have problems seeking solutions, and solutions seeking problems. Somewhere along the line we have to find the connection"

PITCHING SOLUTIONS

There were several sessions of direct relevance to the UK agri-tech sector. Calum Murray from Innovate UK introduced five UK project leaders selected from Innovate's current 350-strong portfolio who would provide a seven-minute 'pitch' of their solutions to agri-tech issues. They were Simon Pearson of Lincoln University, Alex Fisher of Saturn Bioponics, Jim Wilson of Soil Essentials, Philip Charlton- Smith, Soilessentials and Hugh Crabtree, Farmex Ltd.

Calum Murray summarised the importance of Innovate UK "We have a strong track record of driving growth, by working with companies to de-risk, enable and support innovation. We calculate that as a result £13.1bn is returned to the economy and that seven jobs are created for every business we support"

Simon Pearson outlined the shape of the future labour market and the role of robotics as being developed

Simon Lazenby

by the team at the Lincoln Institute of Agri-food Technology (LIAT) "Currently around 75,000 people are employed picking vegetables in the UK. The demand for fresh food will grow, but we face a future of running out of labour – particularly as Brexit is enacted"

"Labour already represents 30% of the cost of vegetable production, and farmers simply cannot pass on inflationary labour costs. The development of crop harvesting robots has to be the future".

Hugh Crabtree's opening was his well-known mantra "You cannot control what you cannot measure"

His company supplies equipment to monitor in the real-time the movements in pig units. Those measurements totalled over 22 million real time data records, he said, which enables farmers to precisely track the growth and feeding requirements of the animals.

CULTURAL CHANGES

In a session, analysing the use of big data, Joachim Stiegemann of Claas warned that there was danger of a disconnect between the farmer and the over-production of data. "The whole industry is sending out more and more data and reports. I fear that more data in the end will result in us selling less machines, so we are facing a cultural as well as a technological change"

He was supported during an Innovation Showcase session chaired by David Ross by Thiago Terzi from Israeli company Scantask who said "Precision agronomy is too complex for many farmers. They are resistant to using multiple technological systems, hesitant to change their routines and find many new systems too technical and too expensive"

In one of the final sessions, chaired by Simon Blackmore of the National Centre for Precision Farming, a panel comprising Andrew Lazenby of Farmcare UK, David Ross, Agri-EPI, Tom Green, CEO of Spearhead International and Matthias Nachtmann, BASF considered how successfully agri-tech innovators were connecting with farmers.

Andrew Lazenby, as virtually the only farmer present at the conference, said that it was clear that major car makers were forecasting that in 20 years they " . . .wont be selling cars, but that vehicles would be hired for use via apps on a day by day, or even minute by minute basis – and that will permeate into our industry".

"We also all seem to be obsessed with big data, but it is unlikely to exist the same format during years ahead".

He also said that the big ag machinery companies such as Claas, Deere, Agco etc need to speak the same language. "Otherwise, we the customer will be disadvantaged in the long run"

Dave Ross, recently confirmed as CEO of the Agr-Epi Centre provided an update on current projects including sensors to monitor live-weight gain in animals and the use of drones within arable production.

Spearhead's Tom Green said that low margins within farming was holding back many innovative projects. "We already accept that we operate in a volatile market coupled with volatile weather, but all of us need to see a payback from new ideas and methods. Innovative solutions need to be coupled with hard-headed business sense to ensure a return on investment"

In summary, the World Agri-Tech Investment Summit was a fascinating coming together of innovators and investors. As a networking event, it will surely have opened new doors for some. As a talking shop it provided a broad-brush sweep of agricultural development. Several issues ran like a strand throughout the presentations. The danger of too much big data, issues surrounding ownership of the data, over-complexity and the need for hard-headed business decisions to ensure a return on investment. In the end though, the need to never lose sight of the basics - the supply of food; by farmers; to consumers.

Simon Blackmore panel

EurAgEng AT A GLANCE

European Society of Agricultural Engineers

EurAgEng (*pronounced "You're Agg Enj"*) is the umbrella association linking 18 national societies of professional agricultural and biosystems engineering from 18 European countries that are not necessarily member states of the EU. It exists to promote the profession of Agricultural and Biosystems Engineering and the people who serve it.

The UK's National Institute of Agricultural Engineering (NIAE), later to be Silsoe Research Institute, organised a conference, called **AgEng**, in Cambridge as part of its 60th anniversary in 1984. This successful conference, organised by John Matthews, led to suggesting a regular AgEng conference within Europe. The next AgEng was in 1986 in the Netherlands and there has been a continuous two year cycle, on the even years, ever since.

EurAgEng became established when the first President, Francis Sevila, was appointed in 1992/3. Francis had organised AgEng Paris in 1988 and subsequent Presidents have come from across Europe.

CONFERENCES

AgEng is the name of the EurAgEng conference when teaming up with the International Commission of Agricultural and Biosystems Engineering, CIGR, in Europe it becomes **CIGR-AgEng,** normally staged in June and July in even years. Recent events have been staged in Bonn (2006) Valencia (2012) and Aarhus, Denmark (2016).

Topics are wide ranging; livestock engineering, greenhouse control and more as well as power and machinery. We expect several hundred attendees; up to 1200 when combined with CIGR and it goes global.

For the odd years EurAgEng teams up with VDI-MEG in Germany for the **Land.Technik-AgEng** series of conferences held as the opening event for **Agritechnica** in Hannover which has been fully international in English since 2007. It is led by the German society, VDI-MEG with EurAgEng as a partner along with DLG (organisers of Agritechnica). Attendance has risen from around 600 in 2007 to 1100+ in 2015.

David Tinker, Secretary-General of EurAgEng provides a guide to the workings and objectives of the European umbrella association for agricultural engineers.

Apart from technical presentations **AgEng** conferences increasingly include many relevant seminars for other organisations, collaborative project reviews, European initiatives and they enable the networking that is important to propose successful collaborative, cross-border European projects. **AgEng** is respected as a highly successful series of conferences and many organisers have volunteered for future conferences; Netherlands in 2018, then Portugal (2020), followed by Germany (in 2022 away from Hannover) and Greece in 2024 while **Land.Technik-AgEng** will be held in the odd years for the foreseeable future.

EurAgEng becomes involved in co-sponsoring many other conferences around Europe, including the IAgrE conference, and publicises these, and other events, that are relevant to engineers involved with agriculture or biosystems.

AWARDS

These are presented at the conferences and include the prestigious, the **Award of Merit,** which is a statuette, donated by Silsoe Research Institute, of the "Earth, Man, Tool and Sky" sculpture in the Mansion at Wrest Park, Silsoe, UK. The Award of Merit exists in two forms: **Innovation into Practice**

(presented at the Land.Technik-AgEng conference) and **Scientific Understanding** (at the AgEng conference). The AgEng events also includes the Biosystems Engineering Outstanding Paper, sponsored by the UK's IAgrE, and more recently the **Francis Sevila Award** has been added and is given to a high achieving mid-career engineer.

MEMBERSHIP

The members of EurAgEng are, correctly, the national societies who pay a small subscription on behalf of their individual members, however the members of each national society are handled individually and receive the "Email Update" and printed "Newsletter" directly from the Secretariat and are also automatically members of CIGR. There are also a few affiliated organisations such as ARO, the Agriculture Research Organisation, in Israel and a small band of founder and lifetime members.

IAgrE is one of the larger members. LTA (Landbased Technician Accreditation) and Parlour Safe technicians registered at level 3 and 4 have the EurAgEng logo on their membership cards. The aim is to get a more pan-European recognition of technician training and skills which is particularly important given the many pan-European machinery suppliers.

FUNDING AND GOVERNANCE

EurAgEng is entirely funded through the membership fees and levies from the annual conferences – and is governed by a Council of representatives from all of its member national societies and elects an Executive board to run the association with the help of a part-time Secretariat (currently Dave and Nicky Tinker). Both the Executive and Council meet annually; either at a manufacturer or the Conference.

EurAgEng does not award professional qualifications such as the CEng and CEnv qualifications awarded through the IAgrE. The Eur Ing title is overseen by the European Federation of National Engineering Associations, FEANI, and this European Engineer Register denotes a "guarantee of competence for professional engineers". It is operated through a series of National Committees (The Engineering Council is the main contact for British engineers) and is entirely separate from EurAgEng.

Biosystems Engineering: the scientific journal, now owned by the IAgrE, was selected by EurAgEng as its official scientific journal and EurAgEng members are encouraged to publish their research there.

BENEFITS

- Discounts for many conferences; not only (CIGR-) AgEng and Land. Technik- AgEng, but also to some of the co-sponsored events.
- Email Update and printed Newsletter
- Belong to a network of fellow professionals across Europe which allows access to collaborations, joint consortia, and contacts at companies, universities and other organisations
- And give something back to the profession - sharing knowledge and expertise particularly with younger engineers.

EurIng David Tinker FIAgrE, MIMechE. Secretary General, EurAgEng,
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CPD SAMPLING

New membership requirement from 1 January 2017

It is a condition of IAgrE Membership that a recommended 30 hours of Continuing Professional Development (CPD) is undertaken annually. The Society for the Environment has made this a condition of Registration from the outset and the Engineering Council have also had an expectation that Registrants are undertaking and recording their CPD.

From January 2017, it is a requirement of IAgrE's Engineering Council license that we sample the CPD of a selection of professionally active, registered members.

IAgrE provide **mycareerpath** (mcp) as a simple tool for members to record their CPD or Initial Professional Development (IPD) if working towards professional registration. When the new IAgrE website goes online there will be a single sign on for this facility making it even easier for members to use. The Engineering Council has developed an auditing facility for Institutions using mycareerpath and this is a very simple way for us to collect member records (whether or not they use mcp already).

Professionally active members will be randomly selected for audit on an annual basis. Emails will be sent to chosen members asking them to login to mycareerpath, set up an account if they have not already done so, and upload their CPD as directed – they will need to use a submission code (which we will supply in the email) to ensure only those chosen can make a submission to the audit.

When the audit is submitted Alison can then assign the CPD to an auditor for feedback. When the audit is completed and moderated a message will be sent to the member who can log in to mcp and see their feedback.

We know this is new to all our members and may cause some confusion but it really is a simple process and the Secretariat staff will be on hand to help you at every stage. More information will be sent to those chosen for the first sample and we hope to begin this process early in the new year.

Sarah McLeod
IAgrE Secretariat

THE POWER OF 8

N8 output is 'greater than all the Premier League teams combined'

Chris Biddle reports

With the emphasis at Government level on developing the Northern Powerhouse, the recent IAgrE Council Meeting held at Manchester University was an ideal opportunity for the recently formed N8 Agrifood group to present an overview of its role with examples of current research.

Operations and Business Development Director, Jonathan Oxley provided the background. He described how the 8 northern universities (Durham, Lancaster, Leeds, Liverpool, Manchester, Newcastle, Sheffield and York) had created the greatest concentration of academics engaged in agri-food research in the UK with:

- More than 370 researchers working in agri-food resilience
- Attracts annual research income of £1.26bn, 88% of all Northern Higher Education research income
- Economic activity worth £12.2bn to the Northern economy
- Contributes a larger share of North of England Region GVA (gross value added) than the entire Northern media, agriculture, or motor vehicle manufacturing, sectors
- Provides consultancy services to more than 17,000 small and medium-sized businesses (SMEs)
- Has extensive research facilities including six research farms, glass-houses, workshops and laboratories.
- Generated £6.6bn GVA (gross value added) for the North of England
- Had delivered a total of 119,000 full time jobs

"The scale and breadth of the economic impact of the universities"

David Chesmore

Jonathan Oxley addresses IAgrE Council

said Mr Oxley "was revealed in a report published by the N8 Research Partnership in September ***The Power of 8 – Knowledge, Innovation and Growth for the North***".

"In fact, N8 output is greater than that of all the Premier League teams combined" he added.

"The N8 Research Partnership's main research areas have been chosen based on existing research strengths in the N8 universities and the potential for growth and economic impact".

There are three distinct focus groups within N8 said Mr Oxley.

SUSTAINABLE FOOD PRODUCTION Combining, soil health, resilient and productive crops and livestock, diagnostics and predictive modelling to promote resilient, sustainable food production.

RESILIENT SUPPLY CHAINS Adapting food supply systems to deliver better resilience while improving nutrition, reducing environmental impacts and sustaining economies fairly.

IMPROVED CONSUMPTION AND HEALTH Improving public health while lowering the burden of food production and distribution on the natural environment: through changes in behaviour, diet and other socio-economic factors.

Knowledge exchange fellows are currently working across a wide range of topics including:

- Improved Crops for Livestock and Human Consumption
- Sensor Technology
- Resistance to Stress in Plants and Livestock
- Soil Health and Plant Stress
- Food Marketing

The N8 group has established strong links with the farming community and with leading food companies such as McCain, Greggs, Nestle and Warburtons added Mr Oxley.

There followed a series of presentations by Professor Bruce Grieve, Director e-Agri sensors at Manchester, Dr James Taylor, Senior Lecturer Precision Farming at Newcastle, Dr David Chesmore, Senior Electronics Lecturer, York and Professor John Gray, Robotics and Systems Engineering at Manchester.

The topics ranged from Bruce Grieve "soon sensors will control virtually everything in agriculture", James Taylor on high resolution soil mapping, John Gray's fascinating insight into automated packaging systems for the food industry – and even measuring the mating call of the speckled bush cricket and the sound of furniture beetles in wood, complete with sound recordings by David Chesmore.

John Gray

BENCHMARKING EXCELLENCE IN LANDBASED ENGINEERING

David Kirschner Independent Specialist, Learning and Skills

How can landbased engineering customers be confident that the 'Technician' maintaining and repairing the capital equipment their businesses rely upon is competent? Or that the 'Parts Person' whose expertise is essential in ensuring the supply of the right parts, on time, has the ability to do just this?

David Kirschner speaking at launch of LTA scheme, December 2007)

Additionally, how do employers recruiting new staff establish the level of the applicant's development and the competences achieved. Or conversely how do new employees gain an indication that their prospective employer commits investment in staff development thereby offering the potential to advance within a structured career path.

All of these objectives can be established and demonstrated through employer and staff participation in the Landbased Technician Accreditation (LTA) scheme. LTA has proved to be a multi-faceted tool benefitting many aspects of the landbased engineering industry, the benefactors being employers, their staff, customers, colleges, suppliers and manufacturers alike.

The recognition and accreditation of staff concept within landbased engineering was conceived within the industry's Careers Project Committee during 2005. LTA as we know it today since being launched by Princess Anne in 2007 at Smithfield Show has grown in stature and remains an essential part of the armoury that industry uses to successfully combat part of the recruit, retain and develop challenges it faces today and in the future.

With the guardianship of the LTA scheme having passed into the safe care of the Landbased Engineering Training and Education Committee (LE-TEC), a soon to be 'not for profit' legal entity involving the Agricultural Engineers Association (AEA), British Agriculture and Garden Machinery Association (BAGMA) and Institution of Agricultural Engineers (IAgrE) as equal stakeholders, the future of LTA is safeguarded.

This move from a virtual industry organisation to a legal entity will give structured stability to LTA and the many other projects undertaken by LE-TEC. It is anticipated that LE-TEC will attract greater confidence from those either in a position to give access to funding or those wishing to make donations. These measures will culminate in more money being reinvested into the development recognition and celebration of those promoting and participating in the LTA scheme

LTA has recently undergone a review of procedures and practices which has greatly oiled the wheels of administration making it less burdensome to progress to the appropriate level of LTA recognition. The Registration Tier remains free of charge with the remaining newly named 3 tiers of career advancement, these being 'Standard', 'Advanced' and 'Master' Technician. All of these have a standardised annual registration fee of £15.

EngTech registration whilst being preferred and recommended to all members of the LTA scheme achieving LTA Standard Technician status and above is now only mandatory on the achievement of Master Technician status.

So what are the benefits of LTA for each interested party?

- For the equivalent of £1.25 per month (£15 per year) the technician's or Parts Person's LTA card demonstrates their stage of development and professional standing to both colleagues and industry.
- LTA technicians and Parts Persons can plan their training requirements with their employer mapped against the LTA scheme requirements and forward their career aspirations.
- The achievement of an LTA tier is proof to the world of 'can physically do' as opposed to a qualification which indicates 'has knowledge of'
- For the employer there are cases that prove that provision of LTA access aids the recruitment and retention of service staff. Investment in LTA and provision of excellent customer service improves profitability, plays a part in customer, brand and product loyalty, improves the image of the business and supports the argument for a realistic charge-out rate.
- Then there is LTA for the customer, remembering that suppliers and manufacturers are also customers. The customer requires assurance that when required, cost effective service and parts support are available. Poor customer care impacts on the customer's margins and reflects equally badly on the dealer, manufacturer and brand alike.
- And finally for the colleges who have a role to play in bringing new blood to the industry, when talking to prospective students and their parents they can demonstrate a career path within the industry not just a job.

It's worth considering that amongst the requirements for a business and its suppliers to function successfully, there is a need for a customer base and an efficient workforce to service the customer's needs. The development of staff comes at a quantifiable cost which can be built into a budget. The benefits may not be immediately obvious however they are priceless.

AG ENG INNOVATION: CONCEPTS TO CASH

Report by CHRIS BIDDLE

"As engineers, we need to be better at business"

IT was highly appropriate, coming hard on the heels of the World Agri-Tech Investment Summit (see page 14), that the 2016 IAgrE Conference should also focus on money.

Money to support research and innovation, money to take a product to market and money to be made from a successful product over time.

The conference theme was simple and unequivocal. How can ideas become a workable reality?

"As engineers, we need to get better at business" said Dr Robert Merrall, IAgrE President, in his opening remarks. "Commercialising innovation is always challenging, and particularly so in agriculture".

There is little doubt that the conference really hit the spot. Presentations from those at the heart of agri-food research. From funders and those responsible for connecting new innovations with the farmers. From protectors of new ideas and those at the sharp end of manufacturing and distribution.

Finally, it provided an insight into innovative projects that are in the latter stages of incubation – and aiming for a permanent toe-hold in the agri-food business.

The 2016 IAgrE Conference stimulated ideas, created debate and discussion and reinforced the claim that "there has never been a more exciting time to be an Agricultural Engineer".

AGRI-EPI CENTRE UPDATE

Early projects underway

David Ross, CEO AGRI-EPI CENTRE

The newly confirmed CEO of the Agricultural Engineering Precision Innovation Centre (Agri-EPI), Dave Ross, opened the conference with an overview of the progress of the unit to date.

Agri-EPI Centre is one of four AgriTech Innovation Centres established by the UK government, with support from Business Innovation and Skills Department and managed through Innovate UK. It is a Company Limited by Guaranteed owned by Scotland's Rural College (SRUC), Harper Adams University, Cranfield University, and three companies from across the agri-food industry, Harbro Ltd, Ag Space Agriculture Ltd

and Kingshay Farming. More than 75 companies are supporting the Centre, including large supermarkets, food producers, farmers, processors and engineering and technology businesses.

This consortium of key organisations in the field of precision agriculture and engineering brings together expertise in research and industry, as well as data gathering capacity in all areas of farming.

"There is a strong need for R&D to address the challenges of feeding a rapidly growing population in a sustainable manner" he said "and particularly in the field of agri-tech"

"Precision farming and engineering is one of the fastest growing agri-tech sectors, and already worth £1 billion to the UK economy. It underpins the UK agri-food industry, which from agriculture to retailing and catering is worth £96 billion and employs 3.8 million people"

But the impact of the newly created four innovation centres extends far beyond these shores said Mr Ross. "Agri-EPI aims to link with other international organisations to supply ideas and agri-technology across the world"

"This is particularly relevant in sub-Saharan Africa where the population growth is forecast to grow by over 30% by 2025, compared with a population growth of less than 10% in developed countries. This will put a considerable strain on food producers as consumption grows".

There are three projects currently underway, said Mr Ross

- Precision methods for identifying pig welfare
- Precision soil mapping
- Remote sensing opportunities in livestock farming

"And there are many more in the pipeline" he added.

INNOVATE UK

Connecting the players and funding innovators

Calum Murray, AgriFood programme leader, Innovate UK

"Innovation doesn't just happen" said Calum Murray "and strategic innovation doesn't just happen. It happens as a consequence of coordinated collaboration between business, government and research"

This is where Innovate UK comes in, he said, by connecting the players and providing funding to innovators.

The success of Innovate UK is plain to see said Mr Murray

- Supported 7600 organisations
- 55,000 jobs have been created
- 7 jobs for every business supported
- £13.1 billion returned to the economy

"We have also been restructuring ourselves internally into simpler sector groups, making sector funding groups simpler and broader in scope and introducing an online competition applications system"

The Agri-food sector within Innovate UK is focussed in two main areas. Improved Agri Productivity in areas such as advanced and precision engineering, genetics, and combating agro-chemical and anti-microbial resistance. and in Enhanced Food Quality through smarter packaging, reduction of salt, fat and sugar and in enhanced nutritional values.

"We can't stop thinking about the future" he said Innovate UK works with people, companies and partner organisations to find and drive the science and technology that will row the UK economy and keep us competitive in the race for future prosperity"

FOUR ENGINEERS, FOUR STORIES

A lively and highly interactive session, chaired by former IAgrE President Andy Newbold, saw four engineers talk about the pain and pleasures of bringing products to market. Topics ranged around patents and protection of copyright, cash, confidentiality and customer needs.

Professor Toby Mottram told how he had first filed for a patent for his rumen bolus in 2007, and made his first sales in 2011. "During that time we had to build the company ensuring there was sufficient cash available, identify customer needs, establish software platforms, build data and get the product quality absolutely right".

"Software patent? Don't give away the source code"
Rob Morrison

"Much of this was achieved single-handedly, but we now employ five full-time staff and seek opportunistic projects to underpin our core line. Yes, it can be high-risk at times, but that is more than out-weighed by the enjoyment, credibility and sense of achievement".

Brian Knight, the specialist sprayer manufacturer said that during development of new products it was advisable to 'keep your cards close to your chest'. He said that protecting patents was a constant challenge. "I'll walk round shows and spot something that I believe is a copy of our design".

The Panel

Brian Knight
MIAgrE, Knight Farm Machinery

Rob Morrison, Fullwood Ltd

Professor Toby Mottram
FREng FIAgrE, e-Cow

Richard Robinson
CEng HonFIAgrE Autoguide Equipment

Chair: Andy Newbold
CEng MIAgrE

"Some of my best friends are those I've met through their infringement of our patents!" *Brian Knight*

"In my experience, it is best to tackle the issue front-on with the company concerned. Stay away from lawyers whenever possible. You don't know what spending money is all about until you have to pay out £400 an hour for a lawyer!".

Rob Morrison, Product Manager at Fullwood said that 'standing still was never an option'. "You constantly have to stay ahead of the market. There are huge risks for companies who do not adopt new technology or keep up with changing customer expectations. There are massive pitfalls in conducting poor market research, not having a credible business plan or profit expectations for new products and not testing enough. But when you get everything right, that is intensely satisfying"

The Panel (l to r) Richard Robinson, Rob Morrison, Brian Knight, Toby Mottram, Andy Newbold

"During product development, always, always keep and store away your notes"
Richard Robinson

Finally, former IAgrE President, **Richard Robinson** said he had variable experiences when introducing new products. "We have had good patents, bad patents, and no patents at all" he said. "Sometimes it can be worthwhile avoiding the costs associated with obtaining a patent, because a bad patent can often bring its own problems". He quoted as an example, a specialist ride-on cylinder mower for which his company Autoguide Equipment acquired the manufacturing and marketing rights. "It came with patents and we made about 20 machines but it had a basic operating flaw which could not be resolved, so we dropped it".

FUTURE FARM PROJECT

The problems with integrated systems

Dr Mark Moore, FIAgrE. AGCO Ltd

Generally, farmers are poor at integrating new systems because their focus is on running a farming business to produce food, said Dr Mark Moore. "They are reluctant to spend time sorting out a multitude of incompatibility and integration issues. This is often also compounded by a lack of local support that the farmer can access to ensure the smooth operation of new technology"

"Therefore, in addition to concentrating on the development of new technology, we should be asking how the customer can best obtain best value from new technology and who does he call when he needs help".

"Vertically integrated technology is often most successfully adopted. For instance, the Ferguson system from the 1940s which matched a range of implements to the features of the tractor, notably weight transfer systems. A more recent example of successful vertical integration is the Auto-guide guidance system which enables the farmer to benefit from decreased input costs without increased management time"

"Problems arise within horizontally integrated systems when bringing together a number of organisations and sectors to integrate technology into a system. Precision farming is an example of a horizontally integrated system that has had limited success. Not because the technology is poor, quite the contrary, but because no one agency owns the system. Machinery companies, farm input suppliers, software providers and agronomists all contribute to precision farming systems – and it is left to the farmer to become the integrator"

AGCO is trying to address this by developing the Future Farm project in which we address three elements:

- Integration and confirmation that elements work together
- Education and Training – on the system rather than the component parts

Mark Moore

- Distribution and Support with local access to products and services

Dr Moore then provided examples of how such practices have been used to great effect in Brazil and in Zambia where AGCO has established a 150-acre farm divided into different crop areas and supported by a new training centre to advise on agronomy, post-harvest solutions and mechanisation.

"Some would say we don't need any more technology, we just need to integrate what we have already into working farming practices".

TRADE MARKS, PATENTS AND COPYRIGHT

Protecting intellectual property

Gary Townley, Intellectual Property Office

Gary Townley of the Intellectual Property Office gave a rumbustious and very amusing presentation on the work of the agency that oversees trade marks and copyright issues in the UK.

"96% of UK businesses do not know the value of their Intellectual Property Rights" he said "and only 4% have an Intellectual Property policy".

Intellectual Property covers Patents, Trade Marks, Registered Designs, Plant Varieties and Copyright.

"A Registered Trade Mark is a Badge of Origin. It is any sign which is capable of being represented graphically. Or it is any sign which is capable of distinguishing the goods or services of one undertaking for another".

"As far as Patents is concerned that is a deal between the State and the Inventor. A patent provides exclusivity of 20 years, whilst Copyright last for 70 years for literary pieces, films and sound recordings".

Care however needs AGRI-EPI CENTRE over design said Mr Townley. He gave an illustration of a new logo that had been created for use by the Office of Government Commerce at a cost of over £14,000. "Perfectly good logo when displayed as intended, but get it wrong – you can see what it turns into".

When they realised, a spokesman for the OGC said ". . it's not inappropriate for an organisation looking to have a firm grip on government spending"!

On copyright, Mr Townsley gave the example of a leading freelance wildlife photographer who left his camera unattended, only for a gorilla to snatch it and take a 'selfie'!

"Who owns the copyright"? he asked. The answer is that for a work to be copyrightable it must owe its origin to a human being. Materials produced by nature, by plants or by animals are not copyrightable.


Gary Townley

THE INNOVATORS

Three "out there" case studies of projects in current development

BEEF MONITOR

Dr Andrew Edwards
David Ritchie (Implements) Ltd

Andrew Edwards

Andrew Edwards described how his company was taking the concept of precision farming into the beef industry. A collaboration project between Ritchie, SRUC and Innovate UK is being developed and commercialised, and is a method of monitoring the average daily weight gain of finishing cattle with little or no manual labour. The cows are automatically weighed as they approach a water trough. "Data is then sent via an app to a computer or a phone, so we are now building up real-time data. We can also monitor and deal with any health issues in the animal at an early stage".

The next stage, said Dr Edwards, was to introduce 3D imaging to measure cattle before slaughter, and subsequently transmit that data direct to the abattoir.

Beef Monitor

BIG BALE AND CFT

Alex Baylis, Big Bale South
Kit Franklin and Jonathon Gill, Harper Adams University

Former Harper Adams graduate, Alex Baylis, outlined the development of the Big Bale Transtracker (BBT) since it was acquired from Walton Eclipse. "Big Bale South is a machinery dealer specialising in the supply of Massey Ferguson balers" he said "but today all the development and project management for BBT has been brought in-house. That's quite a challenge as there is a big difference between being a dealer and a small equipment manufacturer".

"I recall the view of Tim Chamen that straw handling is the biggest obstacle to the implementation of Controlled Traffic Farming". Supported by a £550,000 grant, Alex is working with HAU precision farming specialists Kit Franklin and Jonathon Gill to integrate the Big Bale Transtracker into a CFT environment. The team plan to launch the system at LAMMA 2018.

Alex Baylis with Kit Franklin and Jonathon Gill

ROBOTIC STRAWBERRY PICKING

Stephen Pattenden, AUTOPIC

Originally a farmer, but now a specialist in developing innovative methods of automation, Stephen Pattenden is carrying out R&D for AUTOPIC an autonomous and robotic strawberry picker. "We start with the premise that humans are rather good at picking strawberries" he said "so any machine has to be better and faster. Our aim is to be able to pick a strawberry every 3 secs and put in a punnet".

"Our challenge is to be able to identify the ripeness of the fruit and also be able to get at fruit which is often covered with leaf. To build a machine with the same intelligence and feel as a human provides many technical issues but with the likely exodus of labour in the coming years, the race is on to provide a robotic solution – otherwise we may not have a soft fruit industry in the UK".

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ARKWRIGHT SCHOLARSHIP SCHEME

The Trust has continued its support for The Arkwright Scholarship Scheme by sponsoring two more students – George Hammond from Hertfordshire and Harry Stichbury from Kenya – both now working towards their "A-levels" at Uppinghan School and with an interest in agricultural engineering as a possible future career. George and Harry were presented with their awards at a prestigious ceremony held at The Institution of Engineering and Technology headquarters in Savoy Place, London on Friday 28th October.

The Trust is aiming to improve the way in which we work with our Arkwright Sponsored students by providing them with:

- Student membership of The Institution;
- Opportunities to experience commercial activities in the agricultural engineering sector through company visits and short-term work experience placements – we plan to do this in collaboration with the Agricultural Engineers Association.

Arkwright scholars Harry Stichbury (left) and George Hammond (centre) with Douglas Bomford secretary Paul Miller having received their scholarships at the 2016 presentation event in London.

BELOW: The presentation of Arkwright Scholarships at The Institution of Engineering and Technology in London

STUDENTSHIPS AND PRIZES

Studentships

Fifteen applications were received for DBT studentships for the 20016/17 academic year. These awards typically provide successful undergraduate students with up to £1,500 to support their studies during the year. Eight students have been selected for interview at Harper Adams University on 17th November and the results of the selection process will then be finalised.

The Trust was pleased to congratulate two of its sponsored scholars, James Charnley and Adam Montgomery, at their graduation ceremony on 23rd September 2016.

Adam Montomery (Left) and James Carnley (Centre) with Trust secretary Paul Miller at the 2016 Harper Adams University graduation ceremony.

Prizes

This year The Douglas Bomford Trust prize "For the best FdSc Agricultural Engineering student" at Harper Adams University was awarded to Kevin Walsh. The award, comprising a scroll and a cheque, was presented to Kevin by Paul Miller, secretary to The Trust, at the Harper Adams University Graduation day on 23rd September 2016.

Kevin Walsh receiving The Douglas Bomford prize from Paul Miller, Trust secretary, at the Harper Adams University graduation ceremony in September.

PROJECT REPORT
Bio-lubricants

PhD student, Julia Carrell from Sheffield University, presented the results of her research concerned with bio-lubricants at a seminar at Harper Adams University on 15th November 2016 attended by Trustees, staff and students from the University. Julia received a small one-off grant from The Trust back in 2014 and is now working to complete her PhD next year.

She explained that interest in bio-lubricants was being stimulated by environmental concerns associated with oil leakage and disposal issues. Her work to date had particularly examined the interactions between the performance of sealing materials with different oils including both mineral and vegetable oils. The results she had obtained contradicted information in the published literature with less change in seal dimensions when using some vegetable-based oils than would have been expected. Some sealing materials (e.g. EDPM) also showed larger changes in dimensions than expected with all types of oil.

Julia indicated that the future potential for all oil types using surface bonding additives was exciting and had the potential to substantially improve engine performance and economy. Her work to date had used simplified laboratory apparatus but she was hoping to conduct tests with a full-scale engine before completing her studies.

Julia indicted that much of the funding for her PhD had come from The Institution of Mechanical Engineers but she was very grateful to The Douglas Bomford Trust for providing the funding that had enabled her to conduct the practical work associated with her project.

OTHER NEWS

The Trust web-site has been updated and now includes links to project and travel grant reports – see www.dbt.org.uk

LAST WORD:

Random thoughts by The Engineer

FROM BUSINESS AS USUAL, TO BUSINESS UNUSUAL.

The concept of precision farming has really only been around since the mid-1980s, when researchers at the University of Minnesota found that by grid sampling, they could vary lime inputs into crop fields. With the development of new technology such as yield sensors and the advent of GPS, precision farming has moved on rapidly.

Early adopters were United States, Canada and Australia and the UK, followed by France in the mid-1990s along with many Latin American countries.

In the space of two decades, precision farming techniques have been honed and improved with the common aim of extracting maximum yields from the soil (a finite resource), eliminating variables and exerting control over unnecessary application of inputs.

The farming industry, scientists, engineers, researchers et al have worked their socks off to produce more and more food to supply a growing need.

Food. The elixir of life. The sustainer. The pleasure provider. Food, glorious food. Except . . .

So much of the hard graft put in by the farming community is wasted as food waste is reaching ridiculous proportions.

A report published in 2013 by the Institute of Mechanical Engineers (IMechE) suggested that up to 50% of the food produced worldwide, estimated at 2 billion tonnes – never reached a human stomach. The report went on to make further staggering findings. It claims that as much as 30% of UK vegetable crops are not harvested due to them failing to meet exacting standards based on their physical appearance by food retailers.

Furthermore, about 550 billion cu metres of water is wasted globally in growing crops that never reach the consumer, whilst up to half of the food that is bought in Europe and the US is thrown away by consumers.

How can we be so casual about discarding food at a time of the year when our TV screens are filled with appeals to help those in countries where food is scarce?

The blame game has no end.

A mind-set that 'demands' perfect looking fruit or vegetables.

> " . .the antithesis of responsible food usage comes in the form of the hotel breakfast buffet"

A weakness to buy more than we need, responding to BOGOF offers. Adherence to 'Use-By' dates which are often unnecessarily cautious. Yes, we can blame the supermarkets for setting the trap, but they will respond by saying they are simply meeting customers' expectations.

Isn't it strange that with the television schedules now crammed with cooking and baking shows, that the cooking is not now taught in school. But why should it be? So, say the education authorities when the shelves are filled with ready-meals, delivery services are sprouting up to provide the evening meal to your door when you need it, not to mention all the fast-food outlets (and not forgetting the 'fish and chippers')?

Perhaps the antithesis of responsible food usage comes in the form of the help-yourself buffet breakfast laid on by many hotels – often at an eye-watering cost. Convenience yes, but at what wasteful cost?

It is unfortunate that the creation of food banks should have become a political issue. With the proper controls, the availability of food to people without the means to provide for themselves is surely a step in the right direction.

But more needs to be done, and can be done.

In their report **Food Future – from business as usual to business unusual**, WRAP (Waste and Resources Action Programme) forecast that data and data-enabled technology will be at the core of food waste initiatives.

"The effective use of data-enabled technology presents one of the greatest opportunities for the food system since the Green Revolution. Whereas the Green Revolution saw increased agricultural productivity, the 'Green Data Revolution' will create a smarter, more flexible and resilient food system, as more data is created and shared between suppliers and consumers"

They are talking about smart fridges, automated ordering, food sensing. 'This is eating, Jim, but not as we know it'

It is therefore clear that organisations such as IAgrE need to place as much emphasis on post-production (transport, storage etc) as it does on production itself.

Everyone will have a part to play.

Back to the IMech report, it forecasts that there is the potential to provide 60-100% more food by eliminating losses and waste while at the same time freeing up land, energy and water resources if the whole world tackles food waste head on.

'Perfect, imperfect'

LAST WORD

Views expressed are those of the author and not of IAgrE*. The aim of* ***Last Word*** *is to present original, contentious or provocative opinion by IAgrE members on an industry-related topic. Authorship will be credited if requested or appear under the nom-de-plume of* ***The Engineer****. Copy for consideration should be around 750 words and be sent to the Editor (chris.biddle@btinternet.com)*

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COUNCIL MEETING: 20 October 2016 at University of Manchester

Chris Biddle reports on a lively and constructive debate surrounding identity and purpose

HELD in the ornate surroundings of the Council Chamber at the Sackville Building of Manchester University the IAgrE Autumn Council Meeting (chaired by President, Dr Robert Merrall), crackled with stimulating debate and vision for the Institution today - and tomorrow. Such meetings can get bogged down with formal procedure, but the 'round-table' (well oblong-table) format encouraged lively discussion on a range of issues and future challenges.

This was followed post-lunch by a series of presentations from the newly formed N8 Agrifood group which magnificently illustrated the diversity of our industry, which ranged from harnessing the mating call of the wood beetle (complete with sound effects) to the computerised packaging of tomatoes (*see report on page 18*).

One of the issues debated by Council, was the updating of the IAgrE Memorandum of Association (MOA) and Articles of Association (AOA). This key document is currently being reviewed by the Executive Committee and legal advisors, and views on its content were sought from Council by CEO Alastair Taylor.

The Institution' s original MOA was incorporated on 27 January 1960. "In the circumstances, the founding members did a remarkable job creating a document which has stood the test of time" said Alastair Taylor. "But the world has moved on, language has changed and technology common today was simply not invented in those days".

The IAgrE MOA has been revised nine times during the intervening years (1962, 1965, 1968, 1973, 1976, 1989, 2000, 2007 and 2008). "As an Institution with charitable status, we have to be clear and precise about our core objective which is defined as '*To promote and coordinate the study, development and regulation of the profession of Agricultural Engineering* ***in the public interest***'"

"Those final words 'in the public interest' has to be our guiding principle as a charity, and I am confident that nobody could challenge our role in facilitating the feeding of the world's growing population" he said.

DEFINING AGRICULTURAL ENGINEERING

"This revision has resulted in us having to reconsider the definition of the phrase **Agricultural Engineering** included in our Regulations" said Alastair Taylor. "IAgrE represents the five sectors of Agriculture, Horticulture, Forestry, Environment and Amenity, but within those there are many specialities. Should we try and list every one, or offer a broad categorisation?"

With the addition of relatively new areas such as precision farming, satellite imagery, computer modelling and the like, Paul Hemingway (JCB) urged that the design and manufacture of machinery and equipment ("the bedrock of the Institution") should not be forgotten in our haste to encompass new research and development.

Council Meeting held in University of Manchester Council Chamber

It was felt that 'less was more' when it came to trying to find an all-encompassing definition of Agricultural Engineering as over-complication could confuse and detract from the core activities.

Another key proposal considered by Council was the introduction of a new grade of Technician Member to bring into scope of the Institution, technicians who have achieved an agreed level of competency who might be working for a manufacturer, dealer or in a research capacity, and who do not come under the scope of existing qualifying schemes (such as the Landbased Technicians Accredition scheme (LTA). This was accepted by Council as a positive move, and follows the lead of other professional institutions.

EGM

In his Executive Summary report to Council, Alastair Taylor said that once the Executive had finalised the Memorandum and Article of Association following feedback from Council and members an EGM would be arranged (probably in the Spring 2017) to adopt the new wording.

He presented his Budget for the forthcoming year that was agreed and adopted. The 2016 forecast indicated a loss for the year. "However, this was in our plans and mainly reflects considerable investment in the new website due to be completed before the New Year. Membership remains relatively stable notwithstanding a slight decline. Our focus during 2107 will be on membership recruitment and retention" he added

On matters relating to the Engineering Council he said that new guidelines surrounding security, codes of conduct and professionalism had been issued by the EC which would be incorporated in IAgrE Policy and Procedures. Alastair Taylor added that an on-going review of the collective roles of the Engineering Council, Royal Academy of Engineering and Engineering UK which has led to some discussion across the smaller professional engineering institutions. As a result, IAgrE is involved along with 35 other PEIs in taking a long-term view on formulating new ideas and different ways of working.

The Sackville Street Building

"We continue to review business risk likely to impact on IAgrE, particularly with regard to security of IT platforms and the possible impact of the EU exit" he said "We are grateful to the audit panel for their work in monitoring and assessing our systems which are generally deemed to be good or satisfactory"

He also reported on a meeting with the Science Museum who are planning to redevelop their display of agricultural equipment in 2018, and to which IAgrE had been invited to provide guidance. "Along with AEA and BAGMA, we have also been undertaking a complete review of the Landbased Technicians Accreditiation scheme (LTA), and revised arrangements are now in place which will give IAgrE closer relationship with technicians and employers" he said.

Forestry Engineering Group Symposium

Engineering to Stem the Flow

Report by: Bruce Hamilton MIAgrE MIQ TMICE FEG Secretary

Forestry Engineering Group held their Annual Symposium on 8th September at their usual location of Newton Rigg Campus, Penrith. The opening speaker was **Morgan Vuillermoz** of the FCBA (the French timber supply chain technical organisation). Her presentation gave an overview of the changes in the level of mechanisation of forest harvesting in France including a breakdown of the numbers and types of machines and their resulting improvements in productivity due to both machine technological advances and to improved working practices. The presentation also described the lessons learned from managing various crises – specifically the 1999 wind blow when 140Mm3 of timber was floored overnight.

MORNING SESSION

Dr Andrew Black of Dundee University set the context with the main theme of the day being '***Engineering to Stem the Flow',*** describing the dark art of flood risk estimation.

He began by suggesting that the pragmatic solution will perhaps be to simply specify an oversize culvert to deal with the eventuality of a flood situation, but when it comes to expensive bridges and runoff mitigation measures, more multiple and complex sources of information (and a hydrologist!) are required to reduce uncertainty of forecasts.

Tom Nisbet of Forest Research and **Alan Eves**, Forest Management Director for Yorkshire FD, described the studies conducted since 2009 on flood risk management around the Pickering area. The studies focused on the effectiveness of large woody dams and timber bunds as a means of slowing runoff in the upper catchment areas.

They showed that it was vital to intervene at the right place in the catchment area otherwise chance synchronicity with flows from other catchments can worsen the downstream situation. The study also made clear that, there are practical benefits of working in a well-roaded forest with plenty of available timber rather than in the middle of a boggy moor. It also raised the important question of the need to establish standards/guidelines for the construction of these dams, and for the need to identify who has the financial responsibility for their long-term maintenance.

Jock McKie of John Deere was our last speaker before lunch. He described the manufacture's continual struggle to balance the demand for bigger, more productive, more powerful, more robust, low-emission machines, with the extra physical weight these requirements entail.

Jock explained that the average forwarder was now 7 tones heavier than its counterpart of 15 years ago. In northern Europe where rising temperatures are driving the loss of the once typical hard-frost winters, the increased weight problem is much exacerbated on the softer and wetter ground conditions. To better distribute this weight, manufacturers have moved from 3 to 4 axles, wider wheels, longer wheelbases and band-tracks which again make machines heavier thus, requiring more power, creating more weight etc. etc.

Audience at Symposium

PRESENTATION

Prior to lunch, a special presentation was made by IAgrE CEO Alistair Taylor to John Scott of JST Services. The Special IAgrE award was in respect to his many contributions to Forest Engineering. John started his working life as a timber haulier but his natural flair for problem solving led to him into delivering major innovations in low ground pressure vehicles, floating piers and loading equipment. Over the years he frequently attended the FEG Symposia and never failed to make pertinent contributions to the procedures. And on show over lunch was a shiny new John Deere 1270G harvester (pictured with the speakers)

AFTERNOON

Fiona McLay of SEPA gave a guided tour through the headings of the Natural Flood Management Handbook. To give a perspective on SEPA's scope the publication states that there are 108, 000 properties at risk of flooding in Scotland, with expected Annual Average Damages of £252 million. It also explains that The Flood Risk Management Scotland Act establishes the principle of Sustainable Flood Risk Management to manage this risk. A key aspect of this is "working with nature" or Natural Flood Management (NFM).

In December 2015 SEPA published Flood Risk Management Strategies that set the national direction of future flood risk management, helping to target investment and coordinate actions across public bodies. For each Potentially Vulnerable Area the strategies identify agreed objectives and targeted and prioritised actions for managing flooding, including a number of NFM schemes and studies into the potential for NFM.

Hugh Chalmers of Tweed Forum described their ongoing work in accordance with the long-standing Tweed Catchment Management Plan. His presentation looked at how natural flood management techniques can be incorporated into changes to land use. Examples from two sub-catchments of the river Tweed were shown.

On the Eddleston catchment, a large scale (70km^2) trial is under way to try to measure the effect of installing natural flood management techniques into a variety of land use scenarios. These include; headwaters in forestry plantations, constructing storm water ponds, riparian native tree planting, removing artificial river banks and re-meandering the Eddleston water which had been straightened 200 years before.

The driver for this trial is the Scottish Government funded project that complies with the Water Framework Directive (2000/60/EC). The questions the project seeks to answer are; how can we improve the quality of a water body and reduce flooding by manipulating land use, and how much will it cost? Behind this work is an appreciation of Integrated Catchment Management which is a pragmatic approach taking into consideration the awareness that forest and farm land is firstly a productive resource, but which, with a bit of knowledge and willingness, can also be managed so that it contributes a broad range of goods and services to the wider community.

Conor Price, our final speaker of the

John Deere Harvester and speakers

Award to John Scott

day, then presented the recent work by Scottish Borders Council implementing a flood risk management scheme for Selkirk. It implemented, a combination of traditional hard infrastructure and 'deliberate' natural flood management; the latter sometimes involving some major civil engineering to reinstate the natural processes.

Alastair J Taylor CEO, IAgrE gave an excellent summing up of the day thanking all the speakers for their contributions and making this yet another successful symposium for FEG.

Finally, the FEG committee would encourage all foresters and engineers to attend the annual FEG symposia and so keep abreast of the new developments in Forest Engineering.

WEST MIDLANDS BRANCH

VISIT TO J C CHANNING TO VIEW BIO DIGESTER
Report by William Waddilove. Photos by Stuart Martin

Generator monitoring panel

This is large scale cooking! Take a very large loader and put in four scoops of maize silage, two of grass silage and one of poultry manure and repeat until you get to 41 tons. Stir in some slurry until pump-able and add some to the pot every 30 minutes and maintain the heat at 39 degrees and out comes 10 tons of gas a day a gas comprising 51% methane. As you might guess it is not quite as simple as that as there is a secret ingredient to control the hydrogen sulphide, a carbon filter and lots of monitoring equipment.

The principal output is electricity, however the Channings are limited to the amount they can generate. The vee 12 generator is run as close to the maximum as they can but they have excess gas and heat. They are unable to increase their generating capacity due the size of the 11kv powerline. Also there is no possibility of selling the gas into the grid. This has led to some interesting challenges and solutions.

Heat from the engine is used, though a drier, to take some of the worked out slurry and dry it to a crumb. It can then be spread as a fertilizer on some of their outlying fields. Other slurry is spread by tanker and an umbilical cord system.

The potato store with its drying floor is now used for drying woodchips. The harvested chips come from a forest in Wales and over two days are dried down to 21% and are for use in commercial boilers.

There is a second whole crop drier and when we were there had been used for drying peas. They have three biogas boilers producing extra heat.

Quite a circular scheme, grow maize, put it into a bio-digester, put slurry back on the land and grow more maize. Sell the electricity. As we were told it is the feed-in tariff that makes the system work.

They said that they had been Dairy farmers until six years ago but decided to diversify. Our hosts said it was good to have a party of engineers around as we asked a lot of different questions. Actually I don't think I overheard any questions being asked about the crop husbandry side!

A question we didn't ask was about the possibility of using the gas for tractors for field work thus eliminating the buying in of fuel. Knowing this enterprising farm I am sure they will be thinking about it.

Silage to slurry mix

Bio digester controls

EAST MIDLANDS BRANCH

VISIT TO MASTENBROEK
Report by Jonathan Booty

The East Midland branch's first meeting of the season was kindly hosted by Mastenbroek, near Boston, Lincolnshire. Known and respected globally for state-of-the-art trenching and drainage equipment - and now, within the East Midlands Branch for an entirely locally sourced, first class buffet including ham, pork pies, potatoes and beer! All produced within Mastenbroek's native county of Lincolnshire.

Founded in 1965, and still owned by the same family today, for Mastenbroek's first 12 years it imported and sold machines designed and built in Holland. Independent design & manufacture of chain and flight trenching machines targeting the UK market started at Boston in 1977, and the first exports from the UK were made the same year. Mastenbroek machines generally stay in commercial service for 15 to 20 years and it's impressive that UK machine number 1 is still in use, and Mastenbroek can supply parts for it.

1983 saw the introduction of the massive 'V Plow'. Today these machines can weigh up to ~80 tonnes and are capable of laying up to 10km of pipe per day with minimum disruption to ground or resident livestock.

Toward the end of the 1980's the company added drainage machine products targeting the utility and amenity sectors to their established agricultural range. This spawned further diversification into new and different civil engineering territories where Mastenbroek now operate - successfully designing, building and commissioning substantial one-off engineered projects.

In this arena ventures include the design and build of turn-key sub-sea submersible ROVs (remote operated vehicles) capable of trenching beneath water down to depths of 20m, powered by their own diesel hydraulic power packs running up on deck.

The list of bespoke projects is long, but includes a rock trenching machine for use in North Africa, where the government takes a particularly dim view of the use of explosives, and recognising the additional pressure on levees due to the increased propensity for flooding in Central Europe, Mastenbroek supplied a machine to key the above ground portion of a levee to the parent material beneath, whilst reinforcing the above ground portion too.

Meanwhile, alongside the bespoke products, around 25 trenchers and tracked backfill transporters are built annually. Sold either directly, or through specialist dealers for applications varying from drainage inside glass houses to open sugar cane fields. Machines' destinations include North & South Africa, Syria, Columbia, Belarus, Lithuania, Latvia and the Baltic states.

Conver and Herder machines

Complementing their suite of home grown products, and being a member of the Association of Drainage Authorities, Mastenbroek also sell a range of environmental machines built by Herder and Conver in The Netherlands, which are being taken up by Local and Waterways authorities.

Herder support the commercial uptake of anaerobic digestion: A truck or tractor mounted flail mower trims roadside verges, but instead of leaving the cuttings to mulch, they are collected in an 18m^3 bin by vacuum. Conver's focus is the maintenance of inland waterways and drains.

It is clear that, at every step Mastenbroek has been led by engineering and technological innovation.

Pioneering the use of laser to indicate profiles to the operator in 1973 led Mastenbroek on to become involved in the development of GPS depth and guidance systems with Trimble in around 2003. By 2006 this was taking full control the machine's lateral (±25mm) and vertical (±50mm) systems, and now the GPS option often outperforms laser based controls opening up project savings in the order of 10-15%.

Challenges that have shaken much larger OEMs, such as the adoption of EU Stage IV engines, EU ROPS & FOPS compliance and other EC Machinery Directives have been met seamlessly, despite their doubtless heavy impact on machine design.

As one may expect, technical evolution has required significant ongoing investment in management, engineering and manufacturing. The design team use Autodesk for design and product documentation, using its full capability to execute some deep virtual testing in CAE to evaluate ROPs & FOPs performance prior to committing to the ~£50k physical tests.

Understandably, Mastenbroek remain the sole manufacturer of self-propelled drainage machines in the UK today.

On behalf of East Midlands branch, sincere thanks to Chris Pett (General Manager), John Geelhoed (Service Manager) and Fred Clarke (Sales Engineer) for hosting a first class meeting. A high benchmark has been set for the rest of the season's meetings.

Mastenbroek trencher

VISIT TO ANDREW GUEST LTD, COTHAM
Report by Richard Clarke

Andrew Guest is a company that specializes in refurbishing Kuhn power harrows and Accord grain drills. It's great that there are still surprises in the Ag industry where we still find nuggets of professional workmanship. The visit to Andrew Guest's business at Cotham near Newark was one such place.

Andrew himself conducted a 2 hour talk and tour of his extensive premises which recondition and restore previously used Kuhn power harrows and Accord drills to a very high standard, emulating a brand new machine. Andrew and his team of 11 employees, is a 'larger than life character' who says how it is!

He started his business in 1982 and worked out of a small barn, now 34 years on he has a number of purposes built buildings providing the facilities to totally strip and rebuild the fore mentioned equipment. The partially worn items are replaced using many parts that are manufactured onsite or locally, these include casting, housings and crumbler rollers etc.

Before the rebuilds take place Andrew emphasis that no corners are cut as he 'doesn't want to see the machine back again', so a thorough examination takes place. All new parts that have been fabricated are shot blasted and either powder coated or Two pack painted depending on what best suits the item in question.

Many of the machines used to produce the new parts are state of art and bespoke to Andrew's requirement, these include a robotic welder, CNC laser cutting etc.

The business itself exports the finished remanufactured equipment to many countries, going as far a field as Japan and New Zealand.

As I stated at the beginning, isn't it great that there are companies and people like Andrew Guest and his team to fly the flag for Britain with professional and quality workmanship.

SOUTHERN BRANCH

VISIT TO R HUNT LTD, TUNNEL TECH AND SOLAR PANEL FARM
Report by Denis Welstead

A packed day took in three fascinating visits in the area around Stockbridge in Hampshire**.** Our first visit of the day was to the impressive premise of **R Hunt Ltd** at Chilbolton, the company's main branch.

The company is main agents for John Deere, and also for I*szu.* We were welcomed by tea coffee and biscuits served by Mrs Hunt and then went to the training room. Tim Hunt MD in his audio visual presentation told us the company was founded by his father Roger Hunt who sadly passed away 2 years ago. He started his career as an apprentice with Walker and Stevens.

Roger left them in 1967 and started his own business in tractors and agricultural machinery. The farming community thought this was a brave move and he owed much to the company's success by the loyalty of his early customers.

The John Deere Franchise was taken on in 1971 and the business started to grow which was put down to government strategy at the time of 100% tax allowance on new machinery subject to invoice and delivery on the farm.

Another help was MF and Ford were exporting to a more lucrative market abroad. This resulted in the UK market being short of tractors. So with farmers needing to offset tax they wanted to buy tractors and John Deere were able to supply. Farmers of course needed a good deal and John Deere were not well known at the time. So hard negotiations took place before a deal was completed.

In 1978 Roger Hunt moved to a former RAF airfield Chilbolton - the HQ premises and now have three more depots on the Isle of Wight, Basingstoke and Tilshead. A total of 55 staff are employed and 150 tractors a year are sold. Turnover for the business is £35,000,000 pa.

Tim showed us the SatNav remote contact system which enables the company to know where each of the tractors and combines are working. The most expensive tractor sales for £175,000 and combines sale for up to £300,000. Members were given the opportunity for a ride in the cab of a JD tractor.

TUNNEL TECH

Members had a fascinating visit to **Tunnel Tech** and where mushroom compost is

Members at Tunnel Tech

produced with emphasis on hygiene. All of us were greatly impressed with the cleanliness of the compost producing areas.

Site manager Tim Harker told us the site was opened in 1984 and the compost is sold to mushroom farmers. The company has another plant situated near Doncaster.

Straw and poultry litter are brought to the site and gypsum is added then mixed together. This is put into a process of controlled fermentation where accurately controlled pasteurisation and conditioning takes place. This is followed by adding mycelium spawn causing soil to stimulate the change from negative to reproduction growth then grown on for a further 18-20 days

The finished product is sent to mushroom farms where it is put on shelves and covered with layers of peat to stimulate change. The first mushrooms are harvested 16-17 days later.

Twenty people work on site 15 are involved in the production process. Current production is around 23,000 tonnes annually mostly for use in the UK.

The final visit of the day was to **a SSE solar panel farm** at Cowdown Farm near Andover, the site covers 155 acres. The working area is 128 acres. An explanation of the setup was given by Edmund Andrews who came from the SSE London Office.

The site is held on a 25-year lease. and came on stream on 29th March this year. Work had started in mid-January and commissioned 10 weeks from start of construction.

At SSE Solar Farm

Each panel is 255 KW or 260 KW. There are 155,000 panels on the land with a total installed power 39.861 MW. The panels produce low voltage direct current to create AC current. This then fed into 16 transformers on-site which steps up the power from 400 V to 35 kV and fed into the national grid. It is predicted that 39.838 GWh/year will be produced which would be enough to supply 9,500 homes (a town the size of Andover). Average daily production is 110Mwh. Payback for the investment is 10-12 years and on-going cost of maintenance and upkeep rent is approx. a fifth of income

Southern Branch member John Weir adds:

"From my own experience I can certainly appreciate the amount of time and effort that Denis has devoted to organising successful events over the past decade. Not only we of the Southern Branch but also the IAgrE in general have benefitted from the information gained from them. I join our members in thanking you for all you've achieved in preventing the Southern Branch, which covers one of the UK's most important and diverse agricultural/horticultural areas, from becoming permanently moribund over the last ten years and certainly hope you find a successor to follow your achievement"

Group at R Hunt Ltd

MEMBERSHIP CHANGES

ADMISSIONS

Member
Bradney S A (South East Midlands)
Lim KS (Herts & Essex)

Associate Member
Akery I C (Yorkshire)
Borrows R (East Midlands)
Brown A D (Scottish)
Cracknell D G (East Anglia)
Daw FW (South Western)
Day C E (Western)
Dodd B S (Scottish)
Douglas P W (Scottish)
Evans J G (Western)
Harrison J (East Midlands)
Kelsall D (Yorkshire)
Kimber C (Wrekin)
King J H (Northern Ireland)
Madley S (Western)
McGregor E (Scottish)
Monument P (East Anglia)
Orr R W (Yorkshire)
Rial-Lovera K E (Western)
Richardson G (Scottish)
Riley C (Yorkshire)
Roffe R (Yorkshire)
Scott M D (Scottish)
Thomas R (S Eastern)
Threlkeld P D (Scottish)
Trotter G W (Scottish)
Watson P (Scottish)
Watt J A (Scottish)
Sztandera J (Western)

Associate
Corker N (Southern)
Magri B (East Anglia)
Shahar Y (Scottish)
Yerburgh W (Western)

STUDENT

Bicton College
Foster J
Grabham C

University of Ulster
Murphy N
Patterson M

University College Dublin
Tuffy K

Sparsholt College
Brown T A W O

TRANSFERS

Fellow
Sumpter I P (South East Midlands)
Cooke A (East Midlands)

Member
Trevarthen R H (East Midlands)

Associate Member
Brown M (Wrekin)
Chapman T P (East Anglia)
Hollands R (West Midlands)
Ward E (East Midlands)

Associate
Nelson M (Northern Ireland)

ENGINEERING COUNCIL REGISTRATIONS

EngTech

LTA MASTER
Avery I C (Yorkshire)
Day C E (Western)
Evans J G (Western)
Riley C (Yorkshire)

LTA ADVANCED
Borrows R (East Midlands)
Brown AD (Scottish)
Cracknell D G (East Anglia)
Daw FW (South Western)
Dodd B S (Scottish)
Douglas P W (Scottish)
Harrison J (East Midlands)
Kelsall D (Yorkshire)
Kimber C (Wrekin)
King J H (Northern Ireland)
Madley S (Western)
McGregor E (Scottish)
Monument P (East Anglia)
Orr R W (Yorkshire)
Richardson G (Scottish)
Roffe R (Yorkshire)
Scott M D (Scottish)
Thomas R (S Eastern)
Threlkeld P D (Scottish)
Trotter G W (Scottish)
Watson P (Scottish)
Watt J A (Scottish)
Sztandera J (Western)

LONG SERVICE CERTIFICATES (1.10.2016 - 31.12.2016)

IAgrE congratulates the following members on reaching significant milestones.

Name	*Date of Anniversary*
60 Years	
Alan George Chadborn MIAgrE IEng	13/11/2016
35 Years	
Johannes Koster MIAgrE CEnv	04/10/2016
Richard Mildmay Stayner FIAgrE	05/11/2016
Philip John Wright MIAgrE CEng	16/11/2016
Brian Francis Lovell MIAgrE IEng	22/11/2016
Christopher John Leamon AMIAgrE	02/12/2016
Peter Michael Crowe AMIAgrE	02/12/2016
James Martin Knight Ellis MIAgrE CEng	02/12/2016
Richard Michael Camm Bennett AMIAgrE	02/12/2016
Peter Nixon Burt MIAgrE IEng CEnv	02/12/2016
Peter Davis Rowland MIAgrE CEng	11/12/2016
25 Years	
Angus Malcolm Lindsay MIAgrE	21/10/2016

ACADEMIC AND COMMERCIAL MEMBERS

ACADEMIC MEMBERS

Bishop Burton College
York Road
Bishop Burton
Beverley HU17 8QG

Brooksby Melton College
Asfordby Road
Melton Mowbray
Leics LE13 0HJ

Coleg sir Gar
Gelli Aur Campus
Llandeilo
Carmarthenshire SA32 8NJ

Cranfield University
Cranfield
Bedfordshire MK43 0AL

Duchy College
Stoke Climsland
Callington
Cornwall
PL17 8PB

Easton & Otley College
Easton
Norwich
Norfolk, NR9 5DX

Greenmount College
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

Myerscough College,
Bilsbarrow
Preston
Lancashire PR3 0RY

Newcastle University
King's Gate
Newcastle Upon Tyne NE1 7RU

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

Sparsholt College
Sparsholt,
Winchester SO21 2NF

SRUC – Auchincruive
Auchincruive Estate
Ayr, KA6 5HW

Wiltshire College Lackham
Lacock
Chippenham
Wiltshire SN15 2NY

COMMERCIAL MEMBERS

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

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

Alvan Blanch Development Co,
Chelworth,
Malmesbury,
Wiltshire SN16 9SG

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

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

Bomford Turner Limited
Salford Priors
Evesham,
Worcestershire WR11 5SW

City & Guilds
1 Giltspur Street
London EC1A 9DD

City Farm Systems Ltd
Paragon Studios, East Burnham Park
Crwone Lane, Farnham Royal
SL2 3SF

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

Fullwood
Grange Road
Ellesmere
Cheshire SY12 9DF

HSS Hire
Head Office
25 Willow Lane,
Mitcham, London
CR4 4TS

John Deere Ltd
Harby Road
Langar
Nottinghamshire NG13 9HT

Mastenbroek Limited
83 Swineshead Road
Boston, Lincs, PE21 7JG

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

TeeJet London Ltd
Headley House,
Headley Road,
Hindhead,
Surrey, GU26 6UK

FORTHCOMING EVENTS

EVENTS

All enquiries regarding IAGRE events, contact Sarah McLeod
Tel: 01234 750876
secretary@iagre.org

January/February 2017 TBC
IAgrE Hub Event - Easton & Otley College
Venue: Easton & Otley College
An opportunity to get together members, staff and students for networking and to listen to an

BRANCH EVENTS

EAST MIDLANDS
CONTACT: Richard Trevarthen
01509 215109
richard.trevarthen@gmail.com

Tuesday 13 December 2016
Visit and tour of the facilities at the University of Lincoln
Venue: Rm MB1010, Minerva Building, University of Lincoln, Brayfield Campus, Brayford Pool, Lincoln, LN6 7TS

Tuesday 10 January 2017
The work of the Agricultural Engineers Association
Venue: AEA, Samuelson House, 62 Forder Way, Hampton, Peterborough, PE7 8JB

Tuesday 14 February 2017, 7 for 7.30pm
Visit to The Doubleday Group
Venue: Doubleday Group, Station Road, Swineshead, Boston, Lincs, PE20 3PN

Tuesday 14 March 2016
Excellence in Engineering 50 years of the Land Rover
Speaker: John Holland, Head of Jaguar Land Rover Group Strategy
Venue: Quorn Lodge Hotel, 48 Asfordby Road, Melton Mowbray, Leics LE13 0HR

NORTHERN IRELAND
CONTACT: Ian Duff
028 8673 6977 duffi@iagre.biz

Wednesday 18 January 2017
70 years of Zetor Tractors
Speaker: TBC
Venue: Belmont Hotel, Banbridge
This meeting will be held at Banbridge and a representative from Zetor will speak.

Tuesday 7 February 2017
Agricultural Engineering teaching programmes and resources
Venue: South West College Omagh
This meeting will include the tractor hydraulic simulator

Tuesday 28 February 2017
AGM followed by "Funding agricultural engineering research in the modern world"
Speaker: Dr Robert Merrall, President of IAgrE
Venue: Clonavaddy Suite, Glenavon House Hotel, Cookstown
Tel: 028 8673 6977

SOUTH EAST MIDLANDS
CONTACT: John Stafford
01525 402229 john.stafford@silsoe-solutions.co.uk

Tuesday 13 December 2016
CNG-Fuelled tractors
Speaker: TBC
Venue: Maulden Church Hall, Church Road, Maulden MK45 2AU

Monday 9 January 2017
Tier 5 Emissions
Speaker: Rob Fillingham, Claas
Venue: Maulden Church Hall, Church Road, Maulden MK45 2AU

Monday 6 February 2017
AGM & Student Presentation Evening
Venue: Maulden Church Hall, Church Road, Maulden MK45 2AU

Monday 6 March 2017
Engineering for Precision
Speaker: TBC
Venue: Maulden Church Hall, Church Road, Maulden MK45 2AU

Monday 3 April 2017
Success with No-till – under any conditions – a Nuffield Scholar report
Speaker: Russell McKenzie
Venue: TBC
Russell entered his scholarship wanting to find out if crop establishment with tillage was doing more harm than good. He will share his Nuffield travelling experiences, reporting on know-hows of no-till farmers from the extremes of dry in Australia to the opposite in Brazil and of many places in between. He found more sustainable systems than those of the 1970s, and with the addition of cover cropping, also the means of enhancing soil organic matter levels.

Wednesday 17 May 2017
Visit to Silsoe Spray Unit
Venue: SSAU, Silsoe

WEST MIDLANDS
Contact: Ian Moore
0121 704 5700 ianw@whale.co.uk

Tuesday 6 December 2016, 7.30pm
'Assist Drive Technology - For When The Going Gets Tough'
Speaker: Mark Cheetham. Linde Hydraulics Ltd.
Location - Friends Meeting House, 37 Maidenhead Road, Stratford upon Avon

WESTERN
Contact: Mike Whiting
07751 345580
mike.whiting@newmac.org.uk

Wednesday 25 January 2017
Visit to Miller Wiseman Dairies TBC

Wednesday 8 March 2017, 6.30pm
Branch AGM and lecture. Subject to be confirmed
Speaker: TBC
Venue: Royal Agricultural University, Cirencester

WREKIN
Contact: David Clare
01952 815087
dclare@harper-adams.ac.uk

All meetings will be in the Agricultural Engineering Innovation Centre at Harper Adam University unless otherwise stated. Tea and coffee will be available from 7:00pm with the technical meetings starting at 7:30pm unless otherwise stated.

Monday 23 January 2017, 7.30pm
Efficiency Gains in Hydraulic Wheel Motors
Speaker: Neal Arminger & Matt Maher, Poclain Hydraulics
Venue: Agricultural Engineering Innovation Centre at Harper Adam University
Tea and coffee will be available from 7:00pm with the technical meetings starting at 7:30pm

Monday 20 February 2017, 7.30pm
Engineering Solutions for Trenching
Speaker: Christopher Pett, Mastenbroek Ltd
Venue: Agricultural Engineering Innovation Centre at Harper Adam University
Tea and coffee will be available from 7:00pm with the technical meetings starting at 7:30pm

WREKIN

Contact: David Clare
01952 815087
dclare@harper-adams.ac.uk

Monday 20 March 2017, 6.30pm
Wrekin Branch AGM & Technical Presentation
Speaker: TBC
Venue: Agricultural Engineering Innovation Centre at Harper Adam University
The AGM will be followed by Tea and coffee with the technical meeting starting at 7:30pm

Monday 3 April 2017, 7.30pm
Visit to Morris Corfield - Broseley
A prensentation and demonstration of the latest diagnostic equipment. Numbers may be limited so please contact David Clare to book you place

Monday 15 May 2017, 7.30pm
Innovative welding technology
Speaker: Chris Dungey of The Welding Institute
Venue: Agricultural Engineering Innovation Centre at Harper Adam University
Chris Dungey of The Welding Institute will be taking about the latest jointing technologies, additive manufacturing and deposition coatings.
Tea and coffee will be available from 7:00pm with the technical meetings starting at 7:30pm

FOR UP TO DATE INFORMATION ON ALL BRANCH MEETINGS AND ACTIVITIES. VISIT EVENTS: www.iagre.org/events
BRANCH DETAILS: www.iagre.org/brgpselect

INDUSTRY EVENTS

Tuesday 10 January 2017
Westminster Energy, Environment & Transport Forum
Next steps for waste and recycling policy in the UK
Speaker: Baroness McIntosh of Pickering, former Chair, Environment, Food and Rural Affair
Venue: Central London
www.westminsterforumprojects.co.uk/forums/event

16-17 February 2017
MnM Conferences
European Intelligent Agriculture Congress
Venue: Brussels, Belgium
The European Intelligent Agriculture Congress will feature, displays and presentations of currently available and near future agri-tech innovations.
Email: ajay.nimbalkar@mnmconferences.com
Web2: www.mnmconferences.com/European-Intelligent-Agriculture-Congress

25 February 2017
'Intensive and environmentally friendly agriculture: an opportunity for innovation in machinery and systems' Pre-SIMA one day conference organised by AXEMA, Sitmafgr and EurAgEng
Parc des Expositions de Villepinte, Paris
http://www.eurageng.eu

22 - 24 March 2017
IMechE
Essential Management Skills 2017
Venue: Warwick Manufacturing Group, Coventry
Essential Management Skills 2017 is the flagship management event from the IMechE, dedicated to preparing young engineers for a successful career in project and people management.
Web: www.imeche.org/ems

9-10 May 2017
Turret Media FZ LLC
GFIA Europe - Global Forum for Innovations in Agriculture
Venue: Jaarbeurs Expo Centre, Utrecht, Netherlands
The Global Forum for Innovations in Agriculture.
Web: www.gfiaeurope.com

11-13 May 2017
Biosystems Engineering 2017
Tartu, Estonia
http://bse.emu.ee/

16-20 July 2017
11th European Conference on Precision Agriculture
Edinburgh, UK

18-20 September 2017
13th Conference: Construction, Engineering and Environment in Livestock Farming 2017
Stuttgart, Germany
http://www.btu-tagung.de/de/

10-11 November 2017
AGRITECHNICA 2017
Hannover Germany
https://www.agritechnica.com/en/

IAgrE LANDWARDS CONFERENCE PICTURE GALLERY
HARPER ADAMS UNIVERSITY 16 NOVEMBER 2016





(1) IAgrE President with Sarah McLeod
(2) Conference delegates
(3) Dick Godwin with Paula Misiewicz
(4) John Fox and Jim Loynes
(5) Andy Newbold and Jane Rickson

Institution of Agricultural Engineers

2017 YOUNG ENGINEERS COMPETITION

Can your team create a remote or radio controlled vehicle to tackle our competition track?

- Open to Sixth Form teams, Landbased Colleges and University Departments
- Winners plaques and valuable prizes
- Free IAgrE Student Membership to all competitors

WHERE AND WHEN

Kubota Training School, Kubota UK Headquarters, Thame, Oxfordshire

TUESDAY 4 April 2017

FURTHER INFORMATION AND COMPETITION PACK

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