Landwards

@IAgrE

The professional journal for the Institution of Agricultural Engineers

IAgrE Professional Journal www.iagre.org
Volume 77, Number 3 - **Autumn 2022**

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In this issue...

AGRICULTURE HORTICULTURE FORESTRY ENVIRONMENT AMENITY

SocEnv
Society for the Environment

"The launch of REnvP is a landmark moment for environmental professionalism, providing more individuals with the opportunity to gain professional registration and achieve external verification of their competence."

Dr Emma Wilcox
Chief Executive Officer of the
Society for the Environment

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launched in partnership between the Institution of Agricultural Engineers (IAgrE) and the Society for the Environment is the new grade of Registered Environmental Practitioner (REnvP).

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Although the standards are high, IAgrE makes the process simple.

IAgrE

Contents:

farmsmart publishing

Landwards is published on behalf of the IAgrE by FarmSmart Publishing Limited.

Editor – Andy Newbold 01539 620255 andy@farm-smart.co.uk

Design – Ann Newbold, Smart Design and Print www.smartdesignprint.co.uk

Guests enjoyed a fascinating day celebrating 50 years of the Douglas Bomford Trust see p26 for more details

Editors Welcome

Sometimes as an editor the equivalent of 'writers block' (editor's curse?) occurs, but not with this Landwards. Despite having a set editorial plan of articles 'in the works', as ever timing and serendipity come to the fore.

Hence a couple of fascinating pieces from members, firstly Nicholas Corker's excellent piece (p18) starting with some 171 year old land drainage history which rapidly challenges the reader to think afresh regarding Paludiculture (cultivating wetlands – yours truly had to look it up).

Back to basics, members enjoyed a fascinating lunchtime lecture in August from William Tuer on Anaerobic Digestion, which formed the basis of Practice from p22.

The editor always welcomes letters (my apologies to any writers whose submissions don't make the page) and in this case a pair of eminent IAgrE members responded to the summer edition with a thoughtful reflection on soils and runoff, well worth a read from p32.

I recommend this edition to you and please keep those letters and suggestions coming.

Andy Newbold

Andy Newbold

Editor

andy@farm-smart.co.uk

Hybrid Drivetrain Konzept wins red dot Design Award

- Judges recognize ingenuity in design of hybrid diesel-electric combination
- Development work continues on Hybrid Drivetrain Konzept

STEYR® has received a Red Dot Design Award, after the Hybrid Drivetrain Konzept diesel/electric hybrid powertrain, on which the brand's development team continues to work, was recognised by judges of the 2022 awards for the ingenuity of its design as well as its potential efficiency gains.

Judged by a panel of jurors from across the globe, the Red Dot Design Award is one of the world's largest design competitions, and has become established internationally as one of the most sought-after marks of quality for good design. Given the diversity of manufactured product design, the Red Dot Design Award is judged across three separate disciplines, with competitions for each of these held annually.

The STEYR Hybrid Drivetrain Konzept was entered into the Design Concept category, for design concepts and prototypes. As a winner in this class, the Hybrid Drivetrain Konzept will feature in the next edition of the Red Dot Design Yearbook, and be presented in the winners' area of the www.red-dot.org website. The award will be given at a ceremony in Singapore on 27th of September.

"We are delighted that the hard work of our design and development team has been recognised by this award," says Christian Huber, Vice President Global Tractor Product Management.

"The Hybrid Drivetrain Konzept offers enormous potential for efficiency savings that will benefit both tractor owners and the environment, and while it is a concept study it incorporates features which may find their way into future tractors across our ranges. Electric drive systems have the potential to power a lightweight, high-horsepower tractor delivering fuel consumption advantages averaging 8%, plus new levels of driving experience and performance in the field and on the road."

Harper Adams University Agricultural Engineering students, are the latest recipients of the AEA Scholarship

Gareth Ford (AEA), David Goodchild, Tom Edwards and Ruth Bailey

The Agricultural Engineers Association (AEA), a trade association representing manufacturers and importers of agricultural machinery and outdoor power equipment, announced the most recent recipients of its coveted AEA Scholarship.

David Goodchild and Thomas Edwards, both BEng/ BEng Honours Agricultural Engineering students heading into their year at Harper Adams University, were selected by a panel of industry representatives and experts. Not only will they both have a great opportunity to connect with key industry partners, and to work with them to promote careers in the agricultural and outdoor power equipment sectors, they will work closely with the AEA to boost awareness of the opportunities and educational routes within our sectors.

Aiming to promote and support the industry through finding and attracting new talent, the AEA will collaborate with David and Thomas to develop social media content that inspires others to consider a career in agricultural engineering. This will focus on not only their time at university, but also during their upcoming placement years within industry.

On receiving the news of his win, **David said:**

This has given me an incredible boost and redeemed my confidence in myself as an individual. It has inspired me to continue with commitment and dedication to both my studies and working in the Agricultural Engineering sector. I am looking forward to forming a close relationship with the AEA as an ambassador and student representative of the association. I have already put the funds to good use, purchasing additional tools that will aid my studies.

Thomas added: Thank you very much for awarding me your prestigious AEA Scholarship! I am extremely grateful for this opportunity and look forward to working with the AEA over the coming months. The Scholarship funding is already helping me to fund several projects that will enhance my career in Agricultural Engineering.

AEA CEO Ruth Bailey, said:

"One of the biggest issues the agricultural and outdoor power equipment sectors face today is the accessibility of skills and attracting the next generation. The scholarship is a fantastic opportunity for an agricultural engineering student of any background to help promote and support the industry as it looks to find new talent and attract others who may wish to look to agricultural engineering as a profession.

Both David and Thomas will be perfect Ambassadors for the sector, relaying a great message about how exciting this industry can be for anyone of any age or background to join."

Honor Miles, an Apprentice Technician, stands in front of the new John Deere Training Centre

Students study at the John Deere Training Centre when they are not working in a dealership.

Apprentices can work on agricultural or turfcare machinery, or opt for a qualification in parts and service

30 years of training the talent of tomorrow

John Deere is marking the 30th anniversary of its renowned apprenticeship programme with an open day to recruit the next generation of technicians to work across its agriculture, turf and parts business.

Well in excess of 1,000 apprentices have qualified since 1992, and the company is keen to showcase the exciting career path that lies ahead of those who complete the course.

On 6 October, John Deere and the scheme's training provider, ProVQ, will open the doors of its new training centre in Upper Saxondale, Nottinghamshire, where candidates will be offered guided tours, practical demonstrations and driving experiences.

Classrooms and workshops will be staffed by instructors and apprentices, providing a unique opportunity to view the state-of-the-art learning facilities on offer and talk to those who know all about the programme.

John Deere's apprenticeship programme sees technicians work within the company's dealership network as a paid employee while completing either a two or three-year course comprising on-the-job practical learning and classroom studies.

Three courses make up the programme; Ag Tech – focusing on agricultural machinery, Turf Tech – focusing on professional turf equipment, and Parts Tech – focusing on parts service and support.

"It's a hugely exciting time to be part of the agricultural and turfcare industries – they are evolving and becoming more technologically advanced than ever before," John Deere Branch Training Manager Allan Cochran says.

"The job is so much more than just servicing and fixing things. The machines and parts our apprentices work on and with are some of the most advanced in the world, many capable of levels of automation or operating at capacities we could only dream of a few years ago.

"With exam results now known and young people planning their futures, we're encouraging them to join us for our open day to find out how John Deere can ignite their careers.

"It's not just for people who love tractors – if you want to earn while you learn and be part of a huge, global brand with a reputation for ground-breaking innovations, then a John Deere apprenticeship could be the perfect start to your career."

The open day will be held on 6 October, with three sessions being run at 10am, 1pm, and 3pm. Refreshments will be provided throughout the day, and entry is free, although pre-booking is a requirement as places are limited.

A mission to encourage engineers to become professionally registered

- IAgrE launches a suite of videos to promote professional registration and membership of a professional Institution
- Independent research tells us that registered engineers are more successful in their careers than those that are non-registered. Not only can you earn more, but professional registration also gives you enhanced status and demonstrates your commitment to your profession and your career development.

To achieve registration, you must first become a member of a Professional Engineering Institution, such as IAgrE. A series of 4 videos have been created that demonstrate the benefits of membership and to encourage engineers to become professionally registered with the Engineering Council or the Society for the Environment through IAgrE.

"If you are thinking about becoming registered, whether it's as an Engineering Technician, a Chartered Environmentalist or the various other grades, IAgrE will mentor you through the process. We are a friendly Institution for engineers and environmentalists working in agriculture, horticulture and the land-based industries, with members from all sectors, ready and happy to help and support you through your career journey," said Charlie Nicklin CEO of IAgrE.

In the first video young members and employers talk about the benefits of belonging to a professional membership organisation and why IAgrE is great value for money. The second video looks at the benefits tailored to the needs of its membership. The focus of video three is the importance of professional registration and how it benefits you in your career. The final video is all about how IAgrE is a community more than an Institution and the value of professional networks. "Many members are leaders in their field. It's very easy to talk to somebody in IAgrE and you feel like you are part of a family. There are plenty of networking opportunities and you can make great new friends – you can't put a value on the knowledge you will get from members," added Charlie.

Click here to access the videos

https://iagre.org/why-join-iagre

From the CEO's desk

As I stated in the previous edition of Landwards, the sun is (still) shining! Most of us seem to have had excellent weather this summer with warm sunny days in abundance.

Validation and assessment

On the UK's hottest day back in July, the IAgrE team were over at Harper Adams University where we were invited to attend a course validation event for the new MEng/BEng Agricultural Engineering courses being developed for September 2023. The following day we completed the Engineering Council 5 year accreditation assessment of the new course content, teaching methods and facilities. As we expected, the university has excellent facilities and highly professional, enthusiastic staff and the output of the accreditation was positive. Thank you to Chris Watts and Malcolm Carr-West for their very thorough assessment work leading up to, and during, the university visit. As a reminder, those of you that have graduated from Harper Adams and the other colleges and universities should certainly look into professional registration at EngTech level, it's a great way to make your CV stand out to prospective employers. Equally, if you're starting your industrial placement, don't forget that the experience you gain will count towards your future registration, so it's good to keep detailed records of what you do.

Service accreditation

During the summer period, I visited Reaseheath College a couple of times, the first was in June for the Milking Equipment Association (MEA) conference. A number of presentations were given by industry experts and the feeling, despite rising input costs, was that the industry was buoyant. Sadly, there is a 4% downward trend in producers, however the actual UK herd size remains stable. The previous Parlour safe scheme has now been relaunched as the Milking Systems Technician Accreditation scheme to encompass the wider dairy industry. Technical service, especially in installation and commissioning remains variable, so a big push on accredited technicians and training continues. Both Reaseheath and Hartpury Colleges offer accredited dairy technician training courses. My second visit was focussed on land-based engineering, and a key element of the discussion was the challenges of staff recruitment that the Further Education sector faces. The college has great facilities, but more funding is desperately required to attract and retain lecturers to train the future technicians. Whilst touring the campus I took a trip down memory lane and revisited Windsor Hall and had a peek in my old room from when I was a student there at 16!

Cereals roundup

One of the various prizes promoting the industry IAgrE offers is for members of the British Guild of Agricultural Journalists for an article on the application of engineering within the land-based sector. Peter Hill won this year and I attended the Cereals event in Cambridgeshire to present the award. The show was very well attended, both by visitors and exhibitors, with some great products on show. Autonomous tractors/robots and drones have an increasing presence; it was interesting to see the latter being demonstrated in the sprayer section for aerial spot spraying. With the increased use of autonomous vehicles, the standards and regulations need to play catch up, a number of our members are involved in working groups supporting this.

Design and practice

Hopefully you will have seen the communication for our conference this year which is set for the 1st November at Peterborough; the first face to face one in three years! We are excited to bring you a mix of current and future product design, academic thinking and practice all focussed on the theme of soils and sustainable crop production. The topics should appeal to a wide variety of people, especially given the focus we have on food security and climate change. Please check out the conference details on our website, book your place and spread the word.

Charlie Nicklin CEng FIAgrE

ceo@iagre.org

President's Musings

Steve Constable

At the time of writing the GB harvest is in full swing and 89% completed by week 6 (16th August) according to the AHDB harvest report which certainly backs up the position in my locality in Lincolnshire where activity is high around the clock.

Compared to the 5-year average you would expect the harvest to be 52% complete at this time so the effect of the dry warm weather has brought everything forward.

Adapting to change

Changes in the environment, due to global warming, have significant effects on operations. Therefore as engineers we must recognise and adapt practices offering smart engineering solutions to the challenges. For example, this harvest, some farmers have been baling straw at night utilising the dew effect in order to reduce the brittleness and losses occurring as it is so dry, some have been shadowing the combines with strategically placed water bowsers and ploughs just in case a fire starts. Last year combine fire claims (according to NFU Mutual) increased 35% on the previous year and a desktop search today has numerous headlines of combine fires this year. Many farmers have had to aerate the grain when in store to cool it down rather than dry it as normal. These are some of the challenges that will become more common as the seasons change for which engineering will have to meet and offer solutions.

A history lesson

Historically, engineers have always identified problems and worked to develop solutions. For example the first driverless tractor was developed by Frank W Andrew in 1940 which utilised a barrel placed in the middle of a field and a wire cable wound around and fixed to the steering arm in the front, then this was followed by Henry Ford's 'Sniffer' prototype tractor, but it never went into production. The first real progress was made by Silsoe Research Institute in 1994 where they developed the picture analysis system.

Moving forward to the present day there are manufacturers developing very technical tractors such as the Monarch Tractor for example. This tractor can be either driverless or manned, it is a 70hp 4x4 full electric vehicle which operates for 10 hours on a 6-hour charge but does have removable battery so could operate nearly continuously in theory. The technical information that this tractor can provide is very impressive. They advertise it as a data driven tractor incorporating a full sensor and camera suite. They claim that one operator can operate eight tractors simultaneously using the tech.

Monarch is not working in isolation and many manufacturers are working towards the same goal and operating this type of tractor system linked to a big data farm system, such as AgriEdge by Syngenta, which will ensure that all variables can be monitored correctly with maximum efficiency. Obviously, this is one specific example, however the future of land-based engineers from all areas of the industry is exciting. We should embrace the future with open arms and certainly encourage the younger generation to have a look at what we do.

Soil technologies

Finally, a quick reminder that the IAgrE Landwards Conference 2022 is due to be held at the East of England Showground, Peterborough on November 1st with the theme of 'Engineering Sustainability in Agriculture'. At this event we will explore how soil management technologies will change the way we farm land to produce food. We are very excited as it will be our first face to face conference in three years so, please put this in your diaries and please say hello.

Throughout the day we have many very talented presenters already lined up and some more will be added, visit the IAgrE website for the most up to date information.

Biosystems Engineering

Biosystems Engineering, owned by the IAgrE, and the official scientific journal of EurAgEng, is published monthly with occasional special issues.

Head to https://www.sciencedirect.com/journal/biosystems-engineering to view the full article list of the latest edition and to find out more about depth and breadth of articles accepted for publication.

Reduced subscriptions are available to IAgrE members. Go to **https://iagre.org/biosystemsinformation** for details of the preferential rates for

Biosystems Engineering

Volume 217, May 2022, Pages 26-40

Spectral monitoring of salinity stress in tomato plants

Timea Ignat, Yoav Shavit, Shimon Rachmilevitch, Arnon Karnieli

Ben-Gurion University of the Negev, Israel

Water salinity is a widespread agricultural hazard that affects approximately 20% of irrigated land, causing a significant yield reduction in crops. Stress coping mechanisms by plants were thoroughly examined but understanding of plant adaptation and acclimation is still lacking and is often species- and variety-specific. Presently, the biochemical and physiological methods that are used to assess plant stress are costly, destructive, and time-consuming. The objective of the current work was to build a spectral-based model for detecting plants under salt stress, in order to optimise plant-status monitoring in a non-destructive manner. Spectral data acquisition with chemometrics showed high ability to predict salt accumulation in plants. Moreover, a hyperspectral, robust decision-supporting classification model was established for detecting plants under salt stress (prediction specificity: 0.94). The capabilities of predicting Cl–, Na+, and the K:Na ratio in a non-destructive manner, by utilising spectroscopy, could serve as the basis for developing a low-cost, fast, and efficient stress detection method, independent of environmental conditions.

Biosystems Engineering

Volume 218, June 2022, Pages 200-215

Investigation of the mechanism of aerodynamic separation of rice husks from brown rice following paddy hulling by coupled CFD-DEM

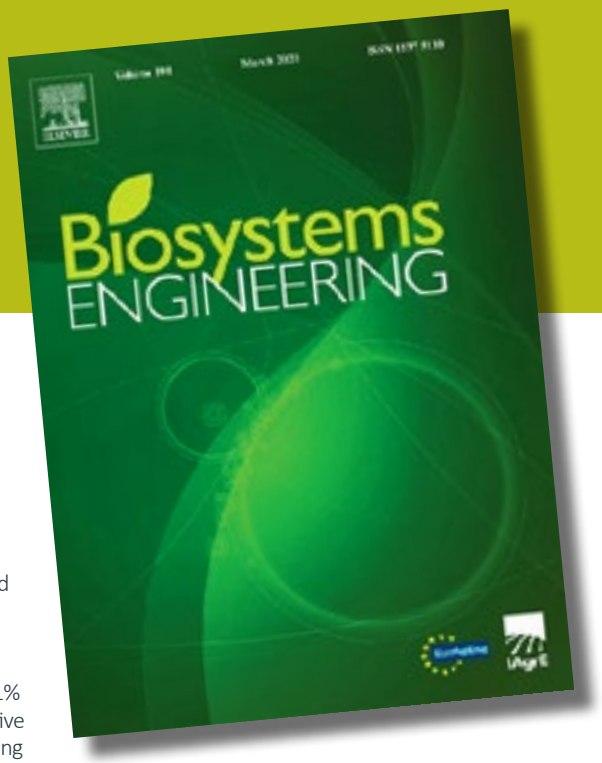
Peiyu Chen, Yanlong Han, Fuguo Jia, Dan Zhao, Xiangyi Meng, Anqi Li, Yanhao Chu, Hongwei Zhao

Northeast Agricultural University, Harbin, China

Aerodynamic separation of rice husks from brown rice grains after paddy husking is one of the important processes in rice processing. Computational fluid dynamics (CFD) and discrete element method (DEM) were used to simulate the process, and the simulation results were verified by experiment. The mechanisms of brown rice loss and the rice husk retention were explored by analysing the collision process of the husks and rice in the separation duct. The interaction between mixture particles and airflow was explored. The results show that feeding of the mixture particles led to the decrease in the airflow velocity; however, it did not disturb the airflow stability or produce obvious turbulence. Adjustment of airflow velocity significantly influences the separation; nonetheless, incomplete separation of rice husks and brown rice still remains. Brown rice loss and rice husk retention in the separation process occurred simultaneously in the separation region. As a result, brown rice and rice husk entered the opposite regions and collided with each other in their opposite region, respectively.

both paper and electronic versions.

The managing editor of Biosystems Engineering, Dr Steve Parkin, has kindly summarised a selection of papers published in the past three issues, which will be of interest to IAgrE members.



Biosystems Engineering

Volume 219, July 2022, Pages 218-234

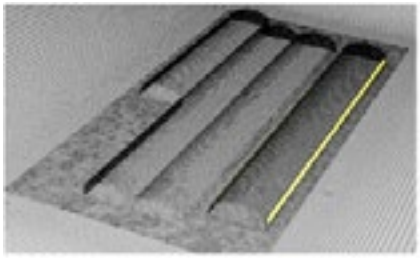
Dynamic energy model of a naturally ventilated duck house and comparative analysis of energy loads according to ventilation type

Seoul National University, Republic of Korea

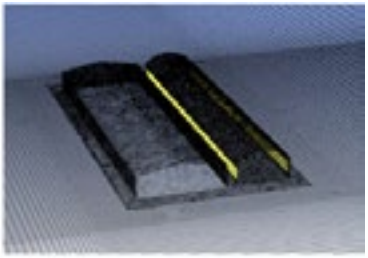
Agriculture, Animal & Aquaculture Intelligence Research Centre, Republic of Korea

National Institute of Animal Science, Republic of Korea

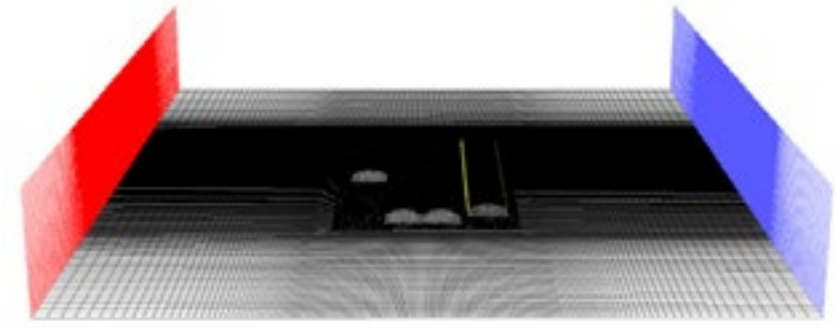
A building energy simulation (BES) model for the analysis of thermal and hygroscopic environments inside a naturally ventilated duck house (NV duck house) was developed by quantitatively considering the natural ventilation rate of duck houses according to the external wind environment measured in real-time. A field experiment was conducted to monitor the internal and external environmental monitoring of a duck house converted from the plastic greenhouse (PG duck house), which is the most common form of duck house in Korea. In addition, in order to evaluate the natural ventilation rates of duck houses, the wind pressure coefficients of NV duck houses were calculated through computational fluid dynamics (CFD) simulation. A dynamic energy model of the NV duck house was developed by considering the energy exchange between the outside and inside of the building, the energy exchange by ducks, evaporation rates from the duck-house litter, moisture condensation on the walls, and the natural ventilation rates of the duck houses. The BES model was validated by comparison of the BES-computed and field-measured data of the internal air temperature and relative humidity. The results showed errors of 2.38% and 2.91% for the air temperature and relative humidity, respectively. Finally, using the validated energy models of duck houses, the energy loads were analysed according to the type of duck house and seasons.



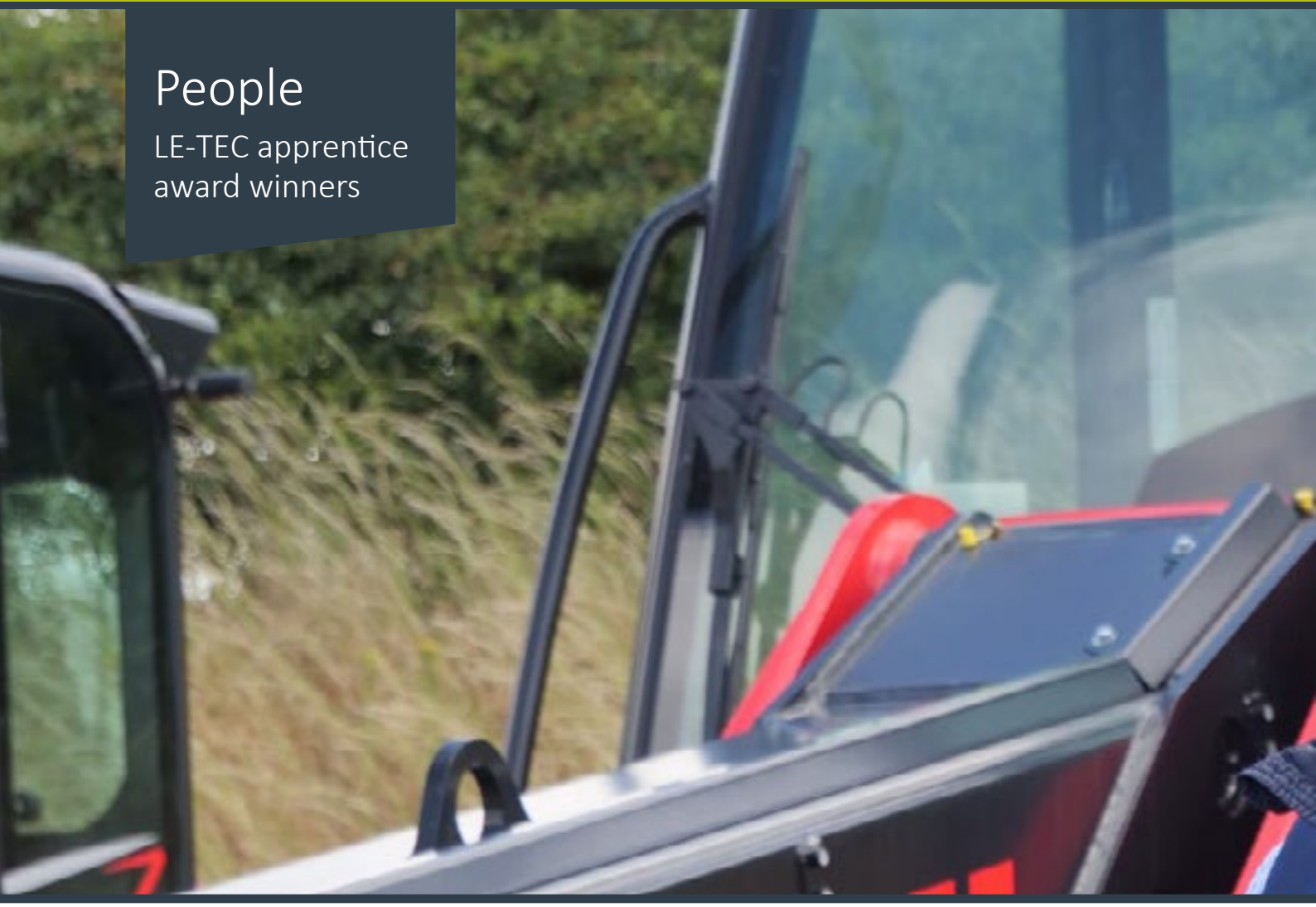
(a) Mesh design of the duck house converted from the greenhouse



(b) Mesh design of the Winch-curtain duck house



(c) Mesh design of external domain for simulating the external wind environments



People

LE-TEC apprentice award winners

Winners of LE-TEC Technicians For 2022 competition

The Land-based Engineering - Training and Education Committee (LE-TEC Ltd) are proud to announce the winners of the Technicians For 2022 competition. Designed to find and celebrate the UK's best Technicians in the Land-based Engineering sector, entrants submitted a short video explaining a little bit about themselves: who they were, how long they have been a Land-based Technician and why they enjoy their day-to-day job.

As an industry collaboration, the LE-TEC Ltd judging panel consisted of representatives from the Institution of Agricultural Engineers (IAgrE), British Agricultural and Garden Machinery Association (BAGMA) and the Agricultural Engineers Association (AEA) alongside industry independents. Aiming to highlight the skills and passion for the sector, the judges were extremely impressed by the quality of entries received and after much deliberation they shortlisted their top three.

Ruth Bailey, CEO of the AEA, explains the initiative: "Recruitment, as within many industries, has been difficult for several years, and our industry is an absolute gem but one that is little-known outside of industry. We are looking for someone who conveys the magic of our sector and someone who embodies the message that we want to get across to those outside of our circles. These technicians really show what it means to them. We've found some fantastic champions for our industry over the past three years of this competition, and we can now include three more. We cannot wait to work with them further."

Keith Christian, Director of BAGMA, said "Technicians provide the underlying fabric within the UK dealer network for agricultural, groundcare and garden machinery. The unique aspects and importance of the dealer network is their ability to provide service and support for the equipment they sell through technicians who will mostly be highly qualified through their apprenticeship and product training.

Technicians of all ages and ability provide the backbone of the land-based engineering industry.

Technicians of all ages and ability provide the backbone of the land-based engineering industry with nearly 50% of dealer staff being involved in the technical side of the business and they should be recognised through award schemes at all levels."

Charlie Nicklin, CEO of IAgrE, remarked on James Hood's winning video, "A great example of how with passion and the right attitude, this industry can take you far."

The judges' top three videos consisted of Craig Farmer of Bryson Tractors in third place, Brad Smith of B&B Tractors in second place, and James Hood of Manitou UK in first place. All three videos display incredible passion for their work and show just how rewarding a career in Land-based Engineering can be. Each will receive some fantastic prizes which are detailed below.

- **1st Place – James Hood**

  Winner of both a Karcher Pressure Washer and Multi-day Air Conditioning Training Courses with AP Air Ltd Training for two

- **2nd Place – Brad Smith**

  Winner of Makita UK Radio and BAGMA Handover and Installation Training for two, to be held at Merlo UK

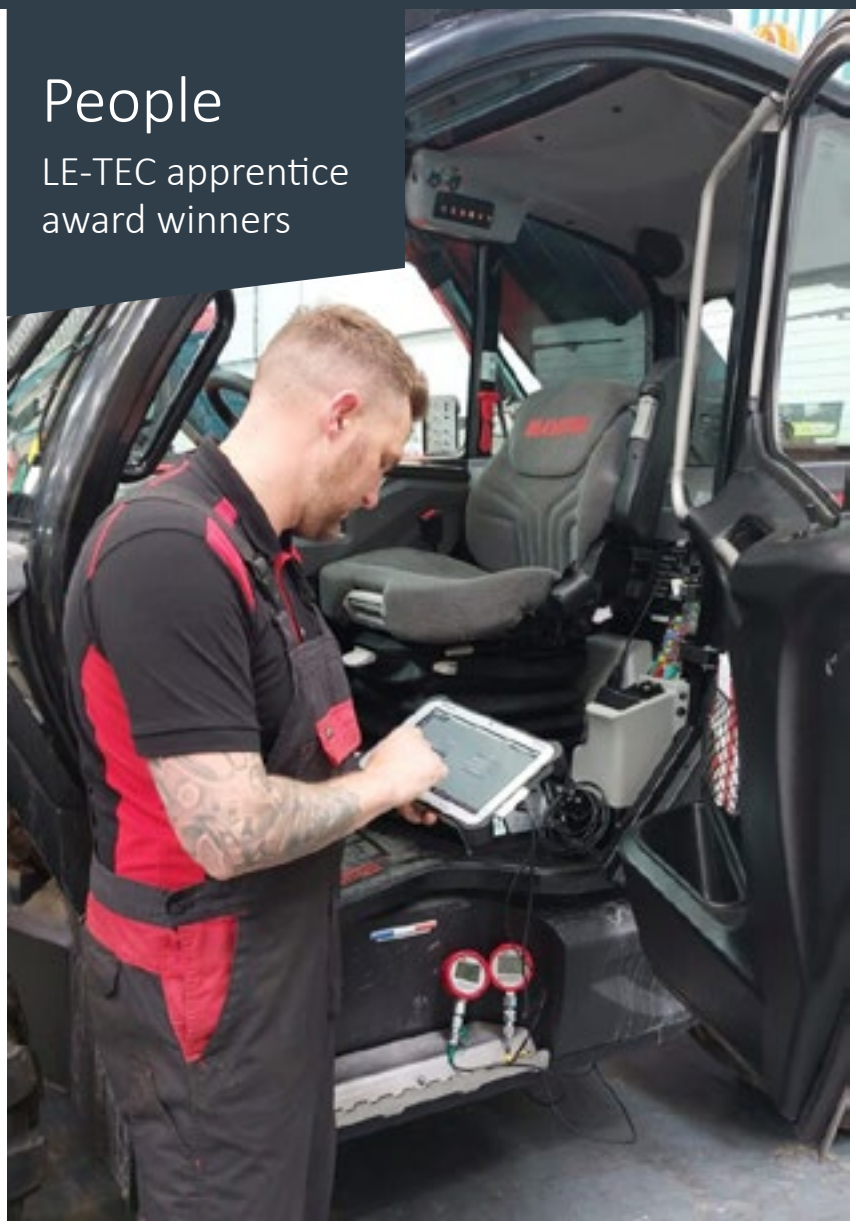
- **3rd Place – Craig Farmer**

  Winner of 70pc Sealey Tool Kit provided by Kubota UK

  All three winners also receive 18 months membership of IAgrE.

People

LE-TEC apprentice award winners



James (pictured) started in the industry as an apprentice in 2003 at Robert Davies machinery in Shropshire and progressed on to Manitou UK in 2018. On receiving the news of his award, James said: "Winning the LE-TEC competition has highlighted how much I would like to give back to the industry and promote agricultural engineering to the younger generation because the industry is in need of a big injection of youth talent right now."

Brad commented "It feels great to win this award because it shows that the hard work and good work ethic can really get you places in this agricultural industry".

This competition will return again in December 2022, so keep an eye out for updates.

For further information, please contact AEA's Digital Media & Marketing Specialist, Gareth Ford via

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01773 207607

About the Land-based Education and Training Committee LE-TEC

James Hood - 1st Prize


Brad Smith - 2nd Prize


Craig Farmer 3rd Prize

It is sponsored by three main industry bodies:

The Agricultural Engineers Association (AEA)

British Agriculture and Garden Machinery Association (BAGMA)

Institution of Agricultural Engineers (IAgrE)

Its aims are to promote training and education for people working with farm and horticultural machinery and associated areas.

As an industry collaboration, LE-TEC is looking to tackle one of the biggest current issues the agricultural and outdoor power equipment sectors face today: that of skills. The training and recruitment of youngsters for our industry, particularly in respect of attracting young talent into our manufacturing and retail base, is ever more critical. As an industry, we face a huge crisis in the skills gap if we do not start to look more pragmatically about enticing a new intake of recruits and then genuinely offering them a progressive career path which recognises skills and competence levels within the technicians' and customer service-related roles.

Preview
Engineering Sustainability in Agriculture

Soil is key to agriculture. It is the foundation for the production of food and sustaining life.

Date: Tuesday 1st November 2022 – 9.30am-3.30pm

Location: Peterborough Suite, East of England Conference Centre, Peterborough PE2 6XE

Background

Soil is key to agriculture. It is the foundation for the production of food and sustaining life. The loss of this key ingredient in food production will have disastrous consequences. Intensive agriculture, especially broad acre crop production is having an increasingly negative effect on the soil, resulting in processes such as erosion, compaction, organic matter loss to name a few.

Over the past few decades we have seen significantly increased focus on soil, whether it is from changes in farming techniques, machinery design or the crops grown. We have now added into the mix carbon sequestration and the desire not to release carbon into the atmosphere through cultivation, coupled with the significant increase in input costs, such as fuel, fertiliser and chemicals.

Soil health is not new: the old saying "look after the land and the land will look after you" is still very true. So what can engineers do about it? The answer is of course, everything. It is engineers and technologists working in agriculture and environmental sciences that we rely on to solve these issues.

In our Landwards 2022 annual conference, "Engineering Sustainability in Agriculture" we will explore how soil management technologies will change the way we farm the land to produce food.

Our experienced presenters will take us through a selection of developments in the agricultural industry and how these can bring us closer to sustainable food production, supporting carbon net zero and other environmental opportunities and challenges faced by farmers and growers.
Our conference will interest people working within agriculture and its associated industries, plus equipment manufacturers, dealers and service providers, and education, research and agri-tech organisations. It will give a taste of the technologies and practices being explored and what we can expect in the future.

Thank you to our sponsors:

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The Programme

0930	**Arrival, registration & networking**
1000	**Introductory Remarks -** **Steve Constable, IAgrE President**
1010 	**Drilling without tilling - Developments in seed drills** **George Sly – Horizon Agriculture Ltd** *George's presentation will provide an insight into his company's vision and the concepts being applied to their seed drill development. Their no-till approach is driving a number of innovative features and technology employed on their products. This importantly provides a host of efficiency benefits for the customer, whilst working towards a sustainable future.*
1100	**Refreshment break**
1120 	**Managing the Soil - the Science of Soil** **Paula Misiewicz – Harper Adams University** *Paula's presentation will provide an in depth look at the various research projects centred around soil mechanics and management, with a focus on ground compaction reduction methods, alternative tillage systems and precision agriculture methods. Paula will explain how science is providing the answers to sustainable land use and food production.*
1210 	**Sustainable mechanisation - a new mechanisation on the Land** **Ole Green - Agrointelli** *This presentation will explore a new kind of mechanisation on the land, not only driverless operation, but also powered by sunlight. Offering a light footprint and zero emissions to providing chemical free weeding surely has great sustainability credentials. Robots will certainly play a part in providing a sustainable future for agriculture.*
1300 - 1400	**Break for lunch**
1400 	**Regenerative farming** **Ben Taylor-Davies – RegenBen** *Ben's presentation offers a fascinating journey in his farming career, specifically how to farm sustainably in harmony with the environment. The audience will be taken through Ben's regenerative agriculture approach and how it is being practically applied in a commercial farming enterprise and what the future holds.*
1450	**Q&A and Speaker Panel Discussion** **Hosted by Andy Newbold, FarmSmart & Charlie Nicklin, IAgrE CEO**
1530	**Close and thanks** **Charlie Nicklin CEO IAgrE**

The nuts and bolts

Cost: £100 + vat for IAgrE Members, £70 + vat for Retired Members, £40 + vat for Student Members. Non-Members £150 + vat

Booking: https://iagre.org/events/IAgrEConf2022

For SatNav follow: PE2 6HE

Practice
Low Carbon Opportunities

Opportunities for innovation within a low carbon farming system

In 1851, William Wells of Holme travelled to Hyde Park and here within the Great Exhibition's Hall of Machinery and Mechanical inventions he met George Appold the inventor of an improved centrifugal pump. Nicholas Corker CEnv MIAgrE FRSA takes us to the present day.

A chart of the beautiful fishery of Whittlesea Mere in the County of Huntingdon (1786).

A deal must have been struck as shortly afterwards Easton and Amos, steam engineers erected a house and engine to drain the 1549 acres of Whittlesea Mere. Cartloads of fish had to be removed and lakeside industries abandoned until finally 18 months later the area was cultivated. This event though celebrated as a feat of engineering at the time and the associated loss of naturally functioning Fen across East Anglia has been called England's greatest ecological disaster. The effect of drainage on peat soils at this scale was arguably foreseen and documented, the Holme Post inserted with some effort into the ground (circa 1848) was intended to stand witness to land shrinkage and silently records its dramatic consequences.

How might farming practices in high carbon landscapes emerge?

One evergreen business challenge is to foresee new areas of work, ideally activities that do not require too much re-tooling and with some homework can be tackled with confidence.

Innovative companies tend to be adaptive, reacting creatively to new regulations, are connected to relevant information flows, open to different perspectives and not slaves to convention. Signals of new opportunities often come through work associated with regulation and policy development eg., UK Peatland Strategy, Government and NGO scientific reports, field trials and economic modelling of new land uses and associated products and value chains.

The maturity of a scientific field being indicated by dedicated journals such as Mires and Peats the convening of Government working groups eg., The Lowland Agriculture Peat Task Force and its reports provide evidence of changes in thinking and direction.

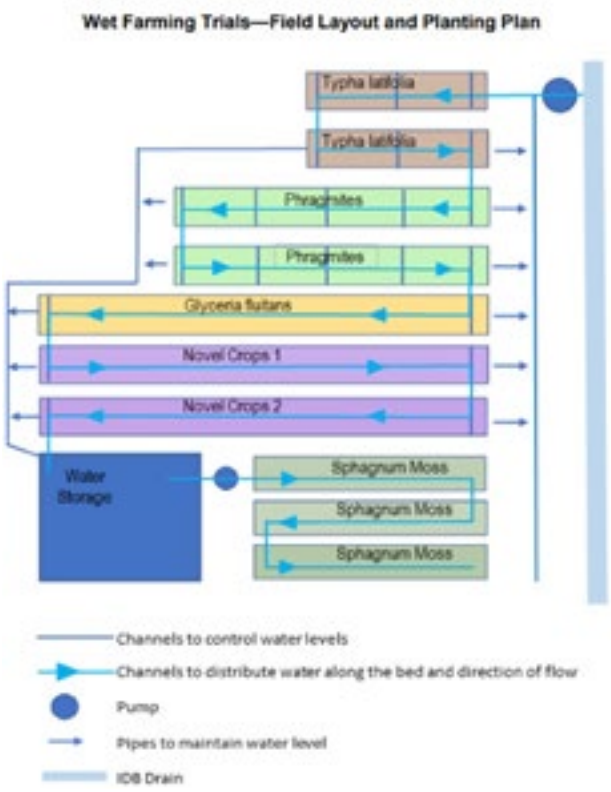
Looking to net zero in UK land use has foregrounded the dilemma of finding alternative uses for peat lands switching current use from carbon emitting to carbon capture. The peat and wet lands of England and Wales are extensive, recognised globally, complex in character and some highly productive in conventional agricultural and horticultural terms. It is interesting to speculate as to how new ideas and practices become familiar and common-place. How many and what sort of activities are required to facilitate path defining innovations, technical and economic steps that create pathways for new markets and new ways of producing and consuming?

Practice
Low Carbon Opportunities

Paludiculture as practiced in northern Germany (Mecklenburg-Vorpommern 2017)

Innovation opportunities for agricultural engineers

With the need to increase and maintain water tables, paludiculture involves the creation of an unconventional environment for agriculture, extending conceptions of machine size, traction, reach, motive power and 'safe' working. The Water Works project has rewetted an area of 12 acres to further understand wet farming's practicalities and implications. Crops being planted include sphagnum moss, bulrush, reed, sweet manna grass and flag iris, water mint, wild celery, meadowsweet, cuckoo flower, hemp agrimony and watercress.



The wet farming trials layout within the Water Works project.

Cultivation of wet soils

Paludiculture (palus = mire or marsh) the cultivation of wet or rewetted soils has been evaluated and trialled in Northern Europe for at least a decade. Much experimental work undertaken in Holland and Northern Germany, particularly at the innovative Greifswald Mire Centre in the German province of Mecklenburg-Vorpommern, has resulted in a regional paludiculture strategy and practical guide.

A key part of agricultural production is scale. The larger the area taken up by a crop the greater the incentive and need for associated machinery, infrastructure and markets to be developed. Scale is thus an important consideration for adoption and development of paludiculture. Identification of the UK land stock having the potential to support paludiculture will help determine whether it is worth investing time and effort in developing this form of agriculture beyond small trial plots. A review for Defra (April 2020) in questioning the convention that wetland soils are not agriculturally productive, evidences the issues and opportunities of managing peat as a sustainable resource. The report impresses as to the scope of current understanding of land areas potentially suitable for paludiculture these are estimated from known areas of deep and shallow peat, and riparian wetlands. Potential crops are discussed with reference to an official list of suitable plants for paludiculture and markets explored for growing media (peat substitution), bioenergy, food production, health and medicine, and construction materials.

Designated peatland sites are often surrounded by agricultural land on peaty soils. For conventional agriculture, the usual aim is to keep this land dry, while the designated land adjacent to it attempts to keep the land wet for conservation purposes. By encouraging paludiculture adoption around designated sites, a working buffer zone could be established, bringing both areas of land use into a mutually beneficial system of infrastructure and water management.

Paludiculture reduces greenhouse gas emissions by re-wetting drained peatlands, combined with continued biomass production under wet conditions.

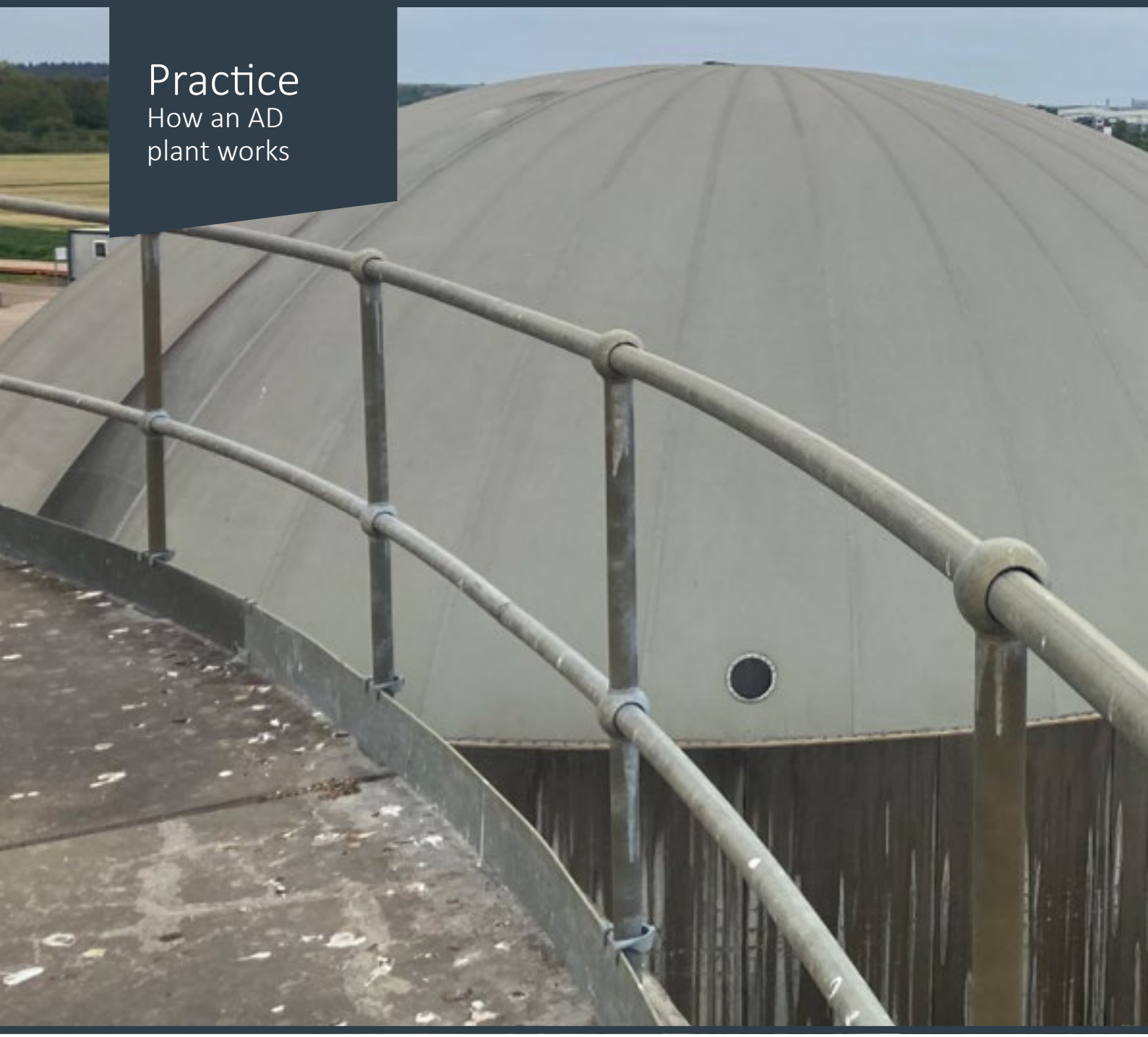
A monitoring regime by the University of East London is to include soil moisture loss and the accumulation or loss of peat. The UK Centre for Ecology & Hydrology is monitoring and modelling CO_2 and CH_4 fluxes arising from the novel crops and their carbon balances comparing these to conventional agriculture.

Techniques may be learned from the traditional harvesting of reeds with small hand operated machinery and larger machines such as those supplied by LogLogic and Off Piste Agri's 'Pisten Bulley'. The work of regional bioeconomy groups associated with wet ecosystems such as Lake Winnipeg have more than a decade of data and experience, particularly harvesting novel fibres such at cattails (Typha latifolia)

Working machinery in the conditions typically found in wet ecosystems requires high levels of skill, safe working and alongside suitably designed machinery a carefully considered workflow that accounts for loading weights, frequency of passes, trackways and, rescue and recovery plans.

Cattail harvesting for fibre, Lake Winnipeg

Cutting activities unbalanced by front mounted equipment



Practice
How an AD plant works

How it works – Anaerobic digestion (AD)

This report has been written following a recent lunchtime lecture, ably delivered by William Tuer, entitled Anaerobic Digestion - A 'Volatile' Business. To address the nuts and bolts of how AD plants work, with a skim across the science and engineering which makes the concept a reality.

The first thing to remember is that all an AD plant is doing is producing the optimum conditions for anaerobic bacteria to reproduce, in a controlled environment a naturally occurring process.
In practice there is no 'set' design most AD plants are slightly different and yet based on the same feedstock and biology principles. Usually they are liquid based, with 3-18% DM, running from 25-42°C (mesophilic range), and from 43-60°C,(thermophilic range). With either dry or liquid feeding.

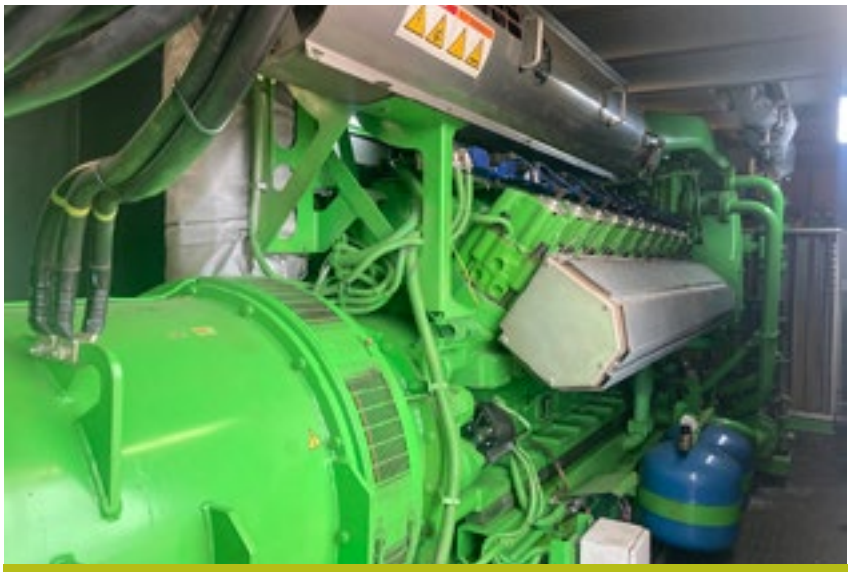
There is no set design for AD plants, despite being based on the same principles.

What is Anaerobic Digestion

Anaerobic Digestion is a four stage, natural process where organic material is broken down by bacteria (micro-organisms) in the absence of air.

1. **Hydrolysis -** Anaerobes decompose organic substances and work on amino acids, fatty acids and water.
2. **Acidogenis -** Acid forming bacteria break down further into organic acid; CO_2 and H_2S.
3. **Acetogenic -** Processing of non-degradable substances to acetis acid bacteria into acetate, hydrogen and carbon dioxide.
4. **Methanogenic -** The products of the previous phases are changed in the alkaline range by methogene bacteria to methane (CH_4), carbon dioxide (CO_2) and water = Biogas.

Practice
How an AD plant works



Gas engine

Potential feedstocks

AD plants can be fed with a range of products, and are designed with a feedstock in mind.

Waste products ranging from sewage, food waste, animal bi products, manures and slurries.

Bi products of animal feed manufacturing, spent grains and kernels, whey permeate, distillery products, fats and proteins.

Energy crops – maize (silage and grains), wholecrop and grain cereals, hybrid rye (cereals), grass silage, energy beet and lucerne.

System analysis and benchmarking

To quantify the efficiency of the process, it is necessary to collect data and be able to effectively benchmark the system.

This is split into three distinct aspects:

Biological - temperature, pH, FOS/ TAC, Biogas CH_4 O_2' H_2S, CO_2 and VFA, NH_3, Carbon and N_2

Feeding - Organic Loading Rate (OLR) – (kg/m^3) oDM (volatile solids) and Retention Time (days in the process).

Mechanical aspects - Mixer loading, pump loading, biogas flows and power consumption.

These three aspects are relevant when trying to accurately compare and benchmark systems when the variation in designs and feedstocks is taken into consideration.

The energy market

Given the state of the world, it is quite exciting being at the heart of producing 'green' energy, and the financial drivers for the AD business revolve around the government's imposed renewable obligations on the energy companies. Most AD plants are paid per Kilowatt/Hour (Kw/h) of electricity sold, and this rate is pegged to the global energy markets, in this case the price of gas is the barometer.

Energy cropping

Growing crops for energy requires a different approach to traditional 'cash' cropping. In some cases, this is not grown on the AD plants own land, but rather is contracted. This in turn requires an open and frank relationship with landlords and /or growing partners. Again measurable factors are needed to verify the success or otherwise of cropping and to ensure accountability of partners.

The list isn't exhaustive, but it's a good idea to understand each party's expectations when it comes to harvest (who cleans the road?), anticipated and actual dry matter, sugars and leaf density. The optimum timing for harvest (and the chosen contractors availability) and that the proposed harvesting kit can reliably deliver the expected chop length are important considerations.

Feedstock

Likewise (and those with dairy farming experience will be able to relate), the importance of clamping the feedstock, rolling to an acceptable density, clean uncontaminated incoming materials and an airtight sealed clamp are all in the mix.

Output consistency

As well as producing biogas and usually electricity via a gas engine, the residual digestate has to meet the ***PAS 110*** standard.

'PAS110' *was developed by WRAP to help create a market for the use of anaerobic digestate as a renewable fertiliser.*

The key elements of the standard are:

- Controls on input materials and the management system for the process of anaerobic digestion and associated technologies
- Minimum quality of whole digestate, separated fibre and separated liquor
- Information that is required to be supplied to the digestate recipient

Processing food waste and other organic materials such as livestock manures and slurries in an anaerobic digester (also known as a biogas plant) produces biomethane, which can be used as a source of renewable energy and digestate. Digestate is a slurry like liquid that is rich in nutrients and used as a renewable fertiliser.

The British Standard Institution's Publically Available Specification ***(BSI PAS 110)*** provides a baseline quality specification for digestate, ensuring that it is safe and reliable to use. PAS110 includes requirements about how food waste and other materials can be processed, and is one of the fundamental pillars of the Biofertiliser Certification Scheme.

Close to two million tonnes of digestate accredited under the Biofertiliser Certification Scheme are produced in the UK every year. They are used as renewable fertilisers in agriculture, field-grown horticulture, forestry and land restoration.

Watch again

This brief article is based on the full lunchtime lecture which William kindly delivered. Go to the IAgrE's YouTube channel to get the low down.

About William Tuer MIAgrE IEng

William provides operational management, feedstock and energy advice to AD plant mainly in Northern England and Southern Scotland along with supporting businesses around energy strategy.

Qualifications:

Newton Rigg College; ND Agricultural Engineering (1999-2001)
Harper Adams University; HND Engineering Design & Development

CIWM WAMITAB AD (2015 - 2018)
IENG IAgrE (2020)

John Deere UK & Deere & Co (2004 -2014)
Product Training, Service Support, Sales

AWS Power Ltd (2014 -2018)
Technical Sales, Feedstock Consultancy, Grid Connections.

WST Rural Ltd (2019>)
AD & Feedstock Advisory, Strategy, Ag Engineering

1Up Natural Products Ltd (2019>)
Will & Al's Natural Plant Food Company
Yadmoss Ski Club (2013>) Crosby Ravensworth Show

Profession
DBT Anniversary event

In Bomford we trust

The remarkable contribution that the Douglas Bomford Trust has made to agricultural engineering over the last 50 years was celebrated at a special event held at the Trust's spiritual home at Pershore, Worcestershire in early September.

The event recalled the Trust's history; its achievements – through the mouths of several people who have benefited from its support – and considered how it might meet future challenges.

The Trust was formed in 1972 to help young engineers access training.

Sound foundations

The Douglas Bomford Trust is "built on 400 years of Bomford family farming heritage", Jonathan Bomford, the family member on the Board and host of the event, told the audience.

The Trust was founded in 1972 by Douglas' widow Betty with the aim of helping young engineers access training and get a start in the industry.

Douglas, a twice wounded World War One veteran, had been studying medicine before the war.

Jonathan Bomford

Profession
DBT Anniversary event

But he returned to the family farm and continued the family tradition of engineering innovation via Bomford & Evershed Ltd, securing many world-wide patents for his innovations.

In 1939 Douglas published 'Power Farming in National Defence', which explained how he felt increasing use of machines could help make the country self-sufficient in food and so support the war effort.

His passion for innovation and thoughts on reducing farming's labour needs and costs could be very relevant in today's economic scenario, Jonathan noted.

Among Douglas' designs were the Bomford Midget tractor and a reversible plough.

And he was into re-cycling: he bought four funnels from a ship that was being scrapped and converted them into storage silos.

He and his wife Betty had no heirs, so after he died in 1969, Betty – aided by John Fox (HonFIAgrE), then MD of Bomford & Evershed – established the Trust to manage his legacy with a clear aim:

'To advance education, training and research in the science and practice of agricultural engineering and mechanisation.'

Over its first 50 years the Trust has sponsored and supported many students into the industry.

Alumni currently work right across farming and associated industries as well as in research, education, design, production, marketing, conservation and the environment.

The Douglas Bomford Trust

The only UK charity committed primarily to supporting engineering for agriculture and related industries, the Trust currently allocates around £150,000 a year in a number of ways:

CO-SPONSORING up to 10 PhDs at any one time, often in partnership with other funders like charities or manufacturers.

SUPPORTING up to 10 scholarships a year for promising students to aid their studies and encourage them to consider a career in the sector.

AWARDING annual prizes at several universities and through the IAgrE for notable published papers.

PROVIDING scholarships though the Arkwright Scheme to four A-level students to encourage them to consider agricultural engineering as a career.

SPONSORING 300 IAgrE memberships for students, so they gain many membership benefits.

FUNDING travel grants to individuals and groups to help improve their knowledge and experience.

INVESTING in facilities for teaching and research, such as the substantial contribution the Trust made to building a new agricultural engineering facility at Harper Adams University.

In addition to the above, Nick August, the Trust's chair, announced at the event that another significant donation has just been made to support another PhD student:

"The Trust would welcome further donations, which are vital to continue and expand the support it offers the sector, and remain vital to encourage essential **'new blood'** into the industry."

Testimonial Speakers - Jane Rickson, Nick Tillett and Paula Misiewicz

Thanks from us

The practical help the Trust offers was highlighted by three recipients:

NICK TILLETT used its support to help develop his ideas for using camera-guided implements in outdoor production systems.

Bomford's contribution included sponsoring Tony Hague – then a student – for a year, at the end of which Nick says "he forgot to leave".

The pair ended up founding Tillett & Hague Technology Ltd, which initially worked with basic black and white cameras and a simple computer.

Together they developed precision guidance systems that are now used by companies around the world to facilitate things like inter-row/rotary weeding and spot spraying.
"I am proud of what we have achieved since the Trustees took the decision to back us 30 years ago and very grateful for the support we got then and the many other occasions that they have helped us."

For **JANE RICKSON** from Cranfield University, the Trust has supported many students – including those from overseas, right from its days as Silsoe College.

(Footnote: Douglas was involved in founding the National College of Agricultural Engineering, and the Trust funded the language training facility there).

Among the subjects being studied are some of the most pressing issues currently facing farming, including the efficiency of irrigation and how it can produce more of the energy it needs to reduce its dependency on fossil fuels.
One project she highlighted was run by Mike Giannitsopoulos to test the effects of non-inversion tillage on a range of factors.
These include soil health, organic carbon, earthworm populations, erosion control and cover cropping.
This started off in the soil bin at Cranfield University before moving to full outdoor trials at Lamport, Northamptonshire.

This work continues today, with many ongoing projects related to soil and food production.

The Trust's support helps build both the students' confidence and their employability, she adds, with alumni being employed across a wide range of companies and bodies like DEFRA, NIAB and AHDB.

Dr PAULA MISIEWICZ, senior lecturer at Harper Adams University, says the Trust helped her get "the best job in the world".

It helped fund her PhD from 2006 to 2010 and then supported her in establishing a long-term traffic and tillage project which started in 2011 and is now being run by the 4th PhD student co-sponsored by the Trust.

That project has attracted both national and international interest, with a number of related projects in Scotland, the USA and Zambia:

"In the past 15 years, with the Trusts support, we have established strong

Profession
DBT Anniversary event

links with academia and many agricultural companies.

"All of these things would not have been possible without the initial and continuing support of the Douglas Bomford Trust."

She credits it for making a big difference in her life:

"What would have happened to me? I'm not really sure – I would probably be OK, but I would not have the best job in the world."

Fit for the future

The Bomford Trust expects to build on its 50 years of achievement by becoming more pro-active in future, while sticking to the principles that have fuelled its past success.

David Llewellyn, former Vice Chancellor of Harper Adams University, who has become the Trust's first Patron told the audience that agricultural engineering had tended to "fall between the stools" of Government support:
"It tends to fall between BBSRC and the Engineering Council. They have got all 'high tech' rather than concentrating on turning practical research into practical ideas. We need to get those basics right."

Progress was essential to ensure farming could produce enough food while dealing with the effects of climate change.

"We need to keep agricultural engineering in the view of Government and ensure it understands its importance".

That included highlighting its role in protecting the environment and preventing climate change, and the positive contribution that precision techniques could play.

It could also help farmers find both the manual labour and the technically qualified people it needs to produce food with fewer inputs and less environmental impact.

Paul Miller, former secretary of the Trust and now a Trustee, says the charity's aim is to select the right projects and identify those which deliver benefits to the industry.

"We can take a bit of a risk, but we have to ensure we secure value for money. The Trust has a bigger opportunity now than it did in 1972.

"Our resources are growing and it is important that we use them effectively, and we now have the opportunity to move in a slightly different way than we did before.

"Up until now we have been more often responsive, but now we are going to take the initiative and allocate a proportion of our resources to priority areas (based on horizon-scanning research funded by the Trust), so we can try to set the way some of our projects go".

FOOTNOTE:

The slides used in these presentations and audio recordings of these and other testimonials will be made available on the Trust's website:

www.dbt.org.uk

The DOUGLAS BOMFORD Trust

along with further photographs and a new leaflet promoting the Trust.

L-R Trustee Nick August with the Trust's first Patron Dr David Llewellyn

Twittering on.....

Please follow us on Twitter

@BomfordTrust

"We need to keep agricultural engineering in the view of Government and ensure it understands its importance".

Profession

Soils and run-off

A reflection on soils and run-off

Dr Bob Evans CEnv MIAgrE, Visiting Scholar at the Global Sustainability Institute, Anglia Ruskin University and John Boardman, Emeritus Professor, Environmental Change Institute, University of Oxford have penned this reflection upon reading the last edition of Landwards, Volume 77, Number 2- Summer 2022

Sheep grazing slopes can have a significant impact on run-off.

Bob Evans

John Boardman

It's good to get Landwards and so keep up with what is happening in Agricultural Engineering and to be reminded that the Institution includes not only the people who design and make the machines that work the land but also those who assess the impacts of that land being farmed and the teachers who pass on that knowledge. In other words, it

Profession

Soils and run-off

deals with all aspects of farming and food production, and the results of that farming for food production.

A warm welcome

Bob Evans is amazed that IAgrE welcomed people like himself, not a farmer with any farming background who started off his research career wanting to know how the land was formed, took a geography degree and whose initial research interest was purely academic, i.e did slope angle control how rapidly soil moved downslope, as he was taught. The quick answer is 'No', and in finding out that a realisation that what goes on is generally much more complex than initially thought. In other words what went on, on slopes was the result of many factors – soil type, vegetation, but above all, over the short term, land use.

The influence of sheep

This might seem odd in a place like the Peak District, chosen for its wide range of slope angles, but sheep were much more important. They created bare soil which eroded far more rapidly than did vegetated slopes, and their numbers depended on farming agricultural policy decided by government.

Thus, started a career researching soil erosion and run-off and their impacts, which in turn led to examining government's agricultural policies. And that gets us neatly, in this instance if sadly, to the latest Landwards.

Erosion events

I met Caroline Drummond, whose obituary is in Landwards, many years ago at a meeting to discuss soil erosion at Stoneleigh, probably around 1985. In November 1985 I, along with Professor Gordon Spoor, well known in the Institution, and others were there to talk about Better Soil Management for Cereals and Oilseed Rape at which I talked about 'Soil Erosion – The disappearing trick'.

By then a monitoring project to assess if erosion was a problem was in its fourth of five years. The project was a joint Soil Survey of England and Wales and ADAS exercise. Air photograph transects of 16 locations in England and Wales were taken by the ADAS Air Photography Unit and fields on the transect were monitored by staff of the Soil Survey for evidence of erosion and run-off - from very visible rills, gullies and their downslope sandy deposits - large erosion events, to splashed sand grains and lines of dark deposited organic particles indicating rainfall splash and run-off flow – of small and very small erosion and run-off events.

This was at the start of my career in assessing erosion and its impacts in arable landscapes. This was after I moved to Cambridge and noted in the first few years widespread evidence of erosion and run-off. It was that work that brought me into contact with a member of the Institution. On a farm in North Norfolk, which was on the air photo transect, where we investigated techniques to combat erosion and run-off.

John Boardman joined the monitoring project in 1987 when there was extensive and severe erosion on the Sussex South Downs accompanied by flooding of homes. This was recorded on an air photo transect already chosen because the landscape was considered vulnerable to erosion. John has continued his research on erosion ever since.

A changing world

In the Summer 2022 Landwards IAgrE President Steve Constable referred to a changing world. Knowing what is going on is crucial. The great changes in agriculture in Britain came in from 1945. During World War 2 Britain faced the

Erosion

imminent threat of starvation, staved off by importing food in ships threatened by submarines. The new government considered we needed to intensify our agriculture and increase productivity and brought in policies to bring that about. Unfortunately, the government did not bring about a way of monitoring those changes. It still hasn't.

Many of the problems IAgrE is presently tackling came into being because of that intensification. By about the turn of the 1970s many observers of the British landscape began to see changes - disappearing field boundaries, changing cropping and land use patterns, drying up of chalk streams, evidence for soil erosion associated with the incoming of winter cereals. In 1978 the recently deceased Bob Bunce of the then Institute of Ecology initiated the Countryside Survey to monitor these changes in the landscape. That Survey fortunately continues and is why we know how things have changed. In 1982 the SSEW/ADAS monitoring project came into being but was not funded after 1986.

Erosion event frequency

Because John and I have continued to monitor the occurrence of erosion, myself on landscapes at low risk of erosion which are mostly soils of high clay content and John on more high-risk soils, with higher sand and silt contents, we have noted that on the higher risk soils where visible erosion indicating larger events is more common, farmers often try to combat erosion; whereas on lower risk soils where small and very small events are carrying fine particles and organic matter in solution in run-off to streams, rivers and reservoirs little is done.

Looking for run-off

But we know, from Questions asked in Parliament in the 1990s that the cost of removing agricultural pollutants from water in reservoirs to make it drinkable is high to comply with regulations. Such pollution by run-off can occur frequently when soils are at field capacity during rainfalls as small as about 3mm. We think that such evidence of sheetwash carrying very small (not modellable, hence not predictable) amounts of erosion can only be seen in the field.

The locations within the field can be targeted to see if there is evidence of run-off, but this can be best done by training the tractor driver to look for the evidence, i.e., as part of their training to acquire a qualification. It seems to us that such information could be inserted, for instance, into an IAgrE accredited qualification. This would greatly increase the knowledge of how often run-off occurs resulting in pollution of reservoirs, and so lead to a solution to mitigate run-off and reduce the costs of water companies complying with regulations.

"Many of the problems the Institution is presently tackling came into being because of agriculture's intensification".

Membership Matters

Sharmans of Grantham

East Midlands Branch

June visit to Sharmans of Grantham

Report by David Preece

A most interesting, albeit quite informal presentation, was arranged for us outlining how the Sharmans business is developing. The six existing Sharman depots, with just over 100 employees, will soon become nine, as land and premises are currently being developed. All this as they have recently taken the Case International and the JCB franchises as their main dealership.

Being the IAgrE we were then led through a very interesting service department presentation by Mark Hodson (Service Manager, Grantham) on the 'up to date' services available to their Case IH customers and how remote communications with the machines (mainly large tractors) have developed where the feedback provides and allows the dealer service department to make decisions to reduce and eliminate machine 'down time'.

Questions throughout the meeting were dealt with from a Sales, Service and demonstration point of view. A tour of the works revealed the full scope of the dealership's activities and I think we were all amazed at the scale of their operation and the actual size of the dealership.

It was a good meeting on a nice summer's evening where not only was there tea and coffee but cans of cold drinks as well.

Following a vote of thanks we were all invited to 'Stop in' at any time for a chat if we were passing their

door. All in all, a very interesting and excellent evening.

July visit to Yates Engineering Ltd. Thurgarton, Nottingham

Report by Phil Spencer and Richard Trevarthen

Our own Branch members will know that earlier this year what with Covid etc the decision was taken to move our meetings from the Winter months to the mainly Summer months And so this July, some 20 members were blessed with a beautiful, calm sunny evening visiting the immaculate facilities of the family run business of Yates Engineering Ltd.

Company directors, David Yates, his son Rob, and his wife Diane met us, and certainly gave us a warm welcome with a variety of delicious homemade refreshments, made by Diane, served with a selection of hot and cold drinks.

Also on hand were members of David's staff who later gave us demonstrations of the most up to date technology/equipment used in their fabrication business and Robin Drury and his daughter Emily Alcock who had come to fire up a 100 yr old Aveling Porter steam roller, (restored to a very high standard by David) which later those who wanted a go driving it around the yard were shown how to do so by Emily.

Following a short presentation we learned that Yates Engineering was started in 1980, built on the back of David's career in Agricultural Engineering. Hence David's interest in restoring over the years a range of vintage tractors and equipment, some of which were on display for us.

Membership Matters

The company grew and developed and for over 23 years they were the repair, restoration and parts provider for Keenan Animal Feeder Wagons. From here they developed the ability to specialize in fabrication, which is now the mainstay of their business.

As David said the more awkward, difficult, or specialized the fabrication is the better, and it is here that a big investment in up to date equipment has been made.

It was then made very clear how diverse their work is as staff gave us various demonstrations of this equipment in use, including Plasma cutting, which gave us examples of projects undertaken, along with some of the technical challenges undertaken.

Examples of which included:

- Special lifting attachments for forklifts and lifting equipment.
- Fabrication of gates, catwalks, work platforms, over-bridges, safety rails.
- Skips and stillages.
- Drain outfall grills and precast concrete moulds

David and Rob were also proud to show us their continuous up-dates to all the Health and Safety Regulations, and their latest CHAS Accreditation.

In closing we as members on these visits are often amazed at the thought, organization and work that our hosts put into such a visit.

David and Rob are both members of the IAgrE and regularly attend branch meetings. So it was wonderful to see what they have to offer on their home ground. A very sincere thanks to all concerned for an excellent and informative evening.

Yates Engineering Ltd


FX 9641
No 415
LINTON

Membership Matters

Wrest Park

South East Midlands Branch

May visit – a celebration of agricultural engineering (and life) at Wrest Park

Report by Alan Plom

The 'spiritual home' of agricultural engineering research in UK, the National Institute (NIAE), latterly Silsoe Research Institute (SRI), Wrest Park is now run by English Heritage (EH).

Delayed for two years by Covid, this half-day event was also the Annual Reunion of ex-staff. More than 80 attended, many being IAgrE members. It was organised in collaboration with their 'coordinator' Edwina Holden MBE (who many will know from her IAgrE days) and the Wrest Park Volunteer History Research Team.

Our aim was to highlight the worldwide impact of research carried out at Wrest Park. EH historian Richard Luscombe set the scene in a lecture describing the establishment of NIAE in Oxford in 1924, through WW2 when it was based at Askham Bryan, near York, (training farmworkers in efficient methods for food production), its relocation to Wrest Park in 1947, through to its closure in 2006. EH recognise that its presence here ensured the survival of the house and estate, when many others were 'erased from the landscape'.

Branch member Dr Paul Miller shared his recollections of social life at the Park, as well as many of the innovations which changed the face of agriculture. Based at Wrest Park throughout his career, Paul's company Silsoe Spray Applications Unit (SSAU) is still based there - along with several other companies set up by ex-staff, so the work of the Institute continues in other ways. Paul provided a wealth of further information for EH to pass on to visitors in the future.

The EH History Team mounted a large display based on their research and interviews with ex-employees, along with Martin Nellist's amazing collection of photographs. Thanks also to those who supplied posters about their research and other memorabilia. You can see hundreds of Martin's top-quality images at:

https://adobe.ly/3BCk56G

Some original and current farm machinery were also displayed, depicting how efficiency and safety were improved by research at Wrest Park. Supplied by local farmers, these included a unique self-propelled row-crop weeder manufactured in nearby Bedford by Darren Maskell's grandfather.

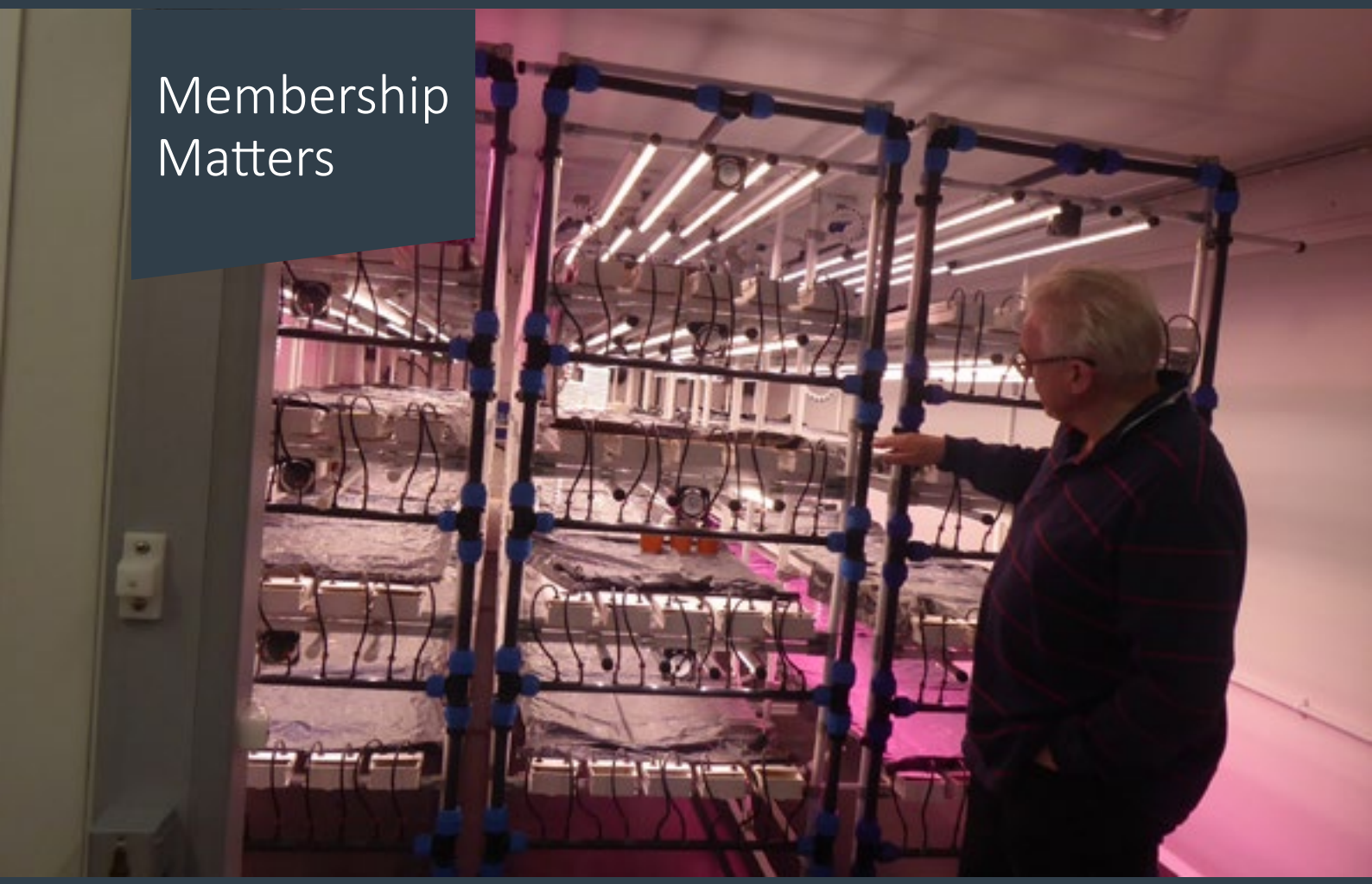
The weather was perfect for the occasion and conversations on the Terrace were accompanied by music from a barrel organ made by an ex-employee.

To quote the report in the EH Volunteers Newsletter: "One conversation was particularly revealing. A past employee told us of an invention from his department in the 1980's, which has been newly developed on German farm machinery in the 2020's. Yet, his original idea came from reading about technology in 1857, (when, coincidentally, Earl de Grey [who owned Wrest Park] would still have been alive.) Proof, if needed, that the Institute and its time at Wrest Park, was a distinguished chapter in history, with an ongoing legacy."

Amen to that. We would also like to thank IAgrE for co-sponsoring room hire.

A sad footnote: As reported elsewhere, Silsoe stalwart John Chisholm died recently. He was a great supporter of the ex-Staff association and was in fine form at the Reunion event, when he made an impromptu 'thank you' speech at the end.

Membership Matters



The hydroponic growth chamber at Pershore College

West Midlands branch

June visit to the Agri-Tech Research Centre at Pershore College

Report by William Waddilove

We were welcomed with an introductory talk by Professor Roy Kennedy about the range of work that they were doing in the research and development field as well as how they are organised as part of a multi organisational group of colleges and businesses.

We quickly realised that such coming together was important to provide the organisation and funding to support work that is of wide interest. In this way the results can be shared and developed.

After this overview he handed us over to Dr Anjana Patel who was working on some aspects of disease management and control within the centre.

She started her talk by informing us of the issues that were ahead of us, they being food security, soil erosion, intensive farming, and water shortage. Whilst not offering any answers she went onto describe some of her work and how it could be helping.

Much of her laboratory-based work related to early detection of plant diseases and locating antibodies and the disease management. They are working to develop easy field detection in a similar way to the lateral flow tests used during the recent Covid pandemic.

Her final statement was a quotation from the Sustainable Food Trust that "We only have enough soil left for 100 harvests". Certainly, emphasising the need for action.

We then went to the research laboratory building to see their hydroponic growth chamber. An enclosed room where they could, in addition to the hydroponic nutrient flow, control the lighting and colour regime as well as the atmosphere, for example with a pre-selected carbon dioxide level.

In the adjacent laboratory some more of their work was described introducing how detection equipment was evolving to become smaller and easier to use.

In the nearby greenhouse we saw vertically grown strawberries and some herbs. In discussion as to the range of suitable plants it appeared that they had tried growing beetroot and turnips with mixed success. This intensive vertical growing was a great contrast to a farm I had visited the week before of 2,800 acres in Lincolnshire as one of the country's largest growers of Dutch white cabbage.

A small political element crept in towards the end in commenting that a lot of this sort of pioneering work had previously been government funded but it was now left to industry to be organised to come together to fund and work cooperatively in joint ventures. With the speed of development perhaps this is the way forward.

Western Branch

April visit to Palfinger UK

Report by Nick Handy

The IAgrE Western Branch recently enjoyed a visit to the UK headquarters of PALFINGER UK (a member of the T H WHITE Group) at Devizes, Wiltshire. The visit was kindly hosted by Liam Young, Design Engineer and Ian Childs, Production and Engineering Director.

T H WHITE has been involved in the supply and installation of lorry loader cranes since 1974. In 1990 it become the main concessionaire for England and Wales for the class-leading PALFINGER range of lorry loader cranes. In 2002 it expanded from its Devizes headquarters with a site at Bradford, West Yorkshire. 2018 saw further expansion with a site in Falkirk, Scotland and the division rebranded as PALFINGER UK to better reflect its UK-wide operation.

Our visit began with a presentation in the Company's boardroom, which detailed the history of T H WHITE from its beginnings in 1832, as an agricultural ironmonger, right through to the present day as a multi-disciplined engineering group with 13 branches, over 600 staff and an annual turnover exceeding £100 million. PALFINGER UK, the lorry crane division, now employs over 200 staff, has 50 mobile service vans and is the second largest division in the T H WHITE Group in terms of staff numbers.

Members and guests were then shown the engineering design process involved, which begins with an axle load and stability calculation to determine feasibility. This ensures that the installation will not overload individual axle or vehicle gross weight capacities as well as ensuring that the final installation passes its stability test.

On completion of the initial engineering calculations, the subframe – the mounting interface between the truck and the crane – is designed using AutoCAD and Solidworks, as well as in-house PALFINGER software to evaluate stress within the structure. Once the design is completed, a full drawing pack is created for the production line to allow the fabrication to begin. Also included in the drawing pack is a hydraulic circuit diagram, once again designed using in-house software.

Once the crane and bodywork installation is complete, a full stability test and quality control inspection is completed. This involves a 25% overload test for stability through the full working range of the crane. The test data from the crane's on-board computer is then sent to the main PALFINGER factory in Austria as a record of its initial commissioning.

After the presentation members and guests were given a tour of the 10-acre site. Beginning in the subframe fabrication and crane installation workshop, the tour continued through the body workshop and spray shop, before finishing in the quality control inspection workshop.

After the tour everyone returned to the boardroom where Liam and Ian answered any questions that arose from the tour. Finally a vote of thanks was given and all members showed their appreciation. The IAgrE Western Branch would like to thank T H WHITE Group for hosting us and giving us such an interesting visit.

Palfinger UK

Membership Changes

1/05/22 to 31/07/22

Admissions

Fellow

Member

Mr Tom Farr (West Midlands)
Ms Laura Cumplido-Marin (East Midlands)
Mr Aaron Bray (S Western)

Associate Member

Affiliate

Mr Ivan Jensen (Kenya)
Mr Nihal Dhillon (Wrekin)

Technician

Student

Sheffield Hallam University
Miss Lydia Banks

Wiltshire College - Lackham
Mr Gareth Miller-Hall

Cranfield University
Mr Tadesse Asrat

Harper Adams University
Mr Macenzie Holmes

Readmission

Member

Mr Mark Palmer (East Midlands)
Mr Jonathan Pocock (West Midlands)

Associate Member

Miss Silvia Arpano (Italy)

Deaths

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

Mr Colin R Willcocks – MIAgrE

A member of the Institution for nearly 60 years. He joined IAgrE as an Associate Member in 1964 and then transferred to Member in 1969.

Mr David B Shelton – FIAgrE

A Fellow of the Institution for nearly 20 years joining in 2003.

Dr David Chesmore – FIAgrE

A member of the Institution for over 20 years. He joined in 1999 as a Member, and transferred to Fellow in 2001. David gained CEnv registration in 2004 and had been a member on the Membership Committee and Executive.

Transfers

Member

Mr David Sayer (S Eastern)
Mr Paul Stevens (Southern)
Mr Richard Silvester (S Eastern)
Mr Henry Thorpe (East Midlands)

Engineering Council

Registrations

IEng

Mr Bruce Hamilton (Scottish Region)

Long Service Certificates

50 years

35 years

25 years

Name	Grade	Date of Anniversary
George Brian Sangster	AMIAgrE	26 June 2022
Andrew Downing	AIAgrE	16 Jul 2022
Laurence Victor Brown	AMIAgrE	22 Sep 2022
Linus Umezuruike Opara	FIAgrE	26 Sep 2022

Academic members

Askham Bryan College
Askham Bryan, York, YO23 3FR

Berkshire College of Agriculture
Hall Place, Burchetts Green, Maidenhead, Berks, SL6 6QR

Bishop Burton College
York Road, Bishop Burton, Beverley, HU17 8QG

Brooksby Melton College
Asfordby Road, Melton Mowbray, Leics, LE13 0HJ

City College Norwich
Easton, Norwich, Norfolk, NR9 5DX

Coleg Cambria – Llysfasi
Rhuthin, Sir Ddinbych, LL15 2LB

Coleg sir Gar
Gelli Aur Campus, Llandeilo, Carmarthenshire, SA32 8NJ

Cranfield University
Cranfield, Bedfordshire, MK43 0AL

Duchy College
Stoke Climsland, Callington, Cornwall, PL17 8PB

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

Harper Adams University
Newport, Shropshire, TF10 8NB

Hartpury College and University
Gloucester, GL19 3BE

Lincoln Institute of Agri-Food
Technology, Lincoln University, Lincoln, LN6 7TS

Manchester University
School of Electrical and Electronic Engineering, C39, Sackville Street Building, Sackville Street, Manchester, M1 3WE

Munster Technological University
Tralee Clash, Tralee, Co Kerry, Ireland

Myerscough College
Bilsbarrow, Preston, Lancashire, PR3 0RY

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

Plumpton College
Ditchling Road, Lewes, East Sussex, BN7 3AE

Reaseheath College
Reaseheath, Nantwich, Cheshire, CW5 6DF

Royal Agricultural University
Cirencester, Gloucester, GL7 6JS

Salesian Agricultural College
Pallaskenry, Co Limerick, Ireland

Sparsholt College
Sparsholt, Winchester, SO21 2NF

SRUC – Auchincruive
Auchincruive Estate, Ayr, KA6 5HW

Suffolk New College
Suffolk Rural Campus, Charity Lane, Otley, Suffolk, IP6 9EY

University of Manitoba
Winnipeg, Canada, MB R3T 2N2

Warwickshire College Group
Warwick New Road, Leamington Spa, CV32 5JE

Wiltshire College Lackham
Lacock, Chippenham, Wiltshire, SN15 2NY

Writtle University College
Lordship Road ,Writtle, Chelmsford, Essex, CM1 3RR

Commercial Members

Ace Aquatec Ltd
16B City Quay, Camperdown Street, Dundee, DD1 3JA

Agri-EPI Centre
1-4 Bush House Cottages, Edinburgh, Technopole, EH26 0BA

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

Amazone Ltd
Orchard Farm, Hurst Lane, Aukley, Doncaster, South Yorks, DN9 3NW

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

BAGMA
225 Bristol Road, Birmingham, B5 7UB

Case New Holland
Cranes Farm Road, Basildon, Essex SS14 3AD

City and Guilds
1 Giltspur Street, London, EC1A 9DD

City Farm Systems Ltd
25 Hepplewhite Close, High Wycombe, Bucks, HP13 6BZ

Claas UK Ltd
Saxham, Bury St Edmonds, Suffolk, IP28 6QZ

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

Douglas Bomford Trust
The Bullock Building, University Way, Cranfield, Bedford, MK34 0GH

DSL Systems
Adbolton Hall, Adbolton Lane, West Bridgford, Nottingham, NG2 5AS

Fullwood
Grange Road, Ellesmere, Cheshire, SY12 9DF

Household Sprayers
Roughton Moor, Woodhall Spa, Lincs, LN10 6YQ

HSS Hire
Building 2, Think Park, Mosley Road, Manchester M17 1FQ

JCB
Rocester, Staffs, ST14 5JR

John Deere Ltd
Harby Road, Langar, Nottinghamshire, NG13 9HT

Knight Farm Machinery
Wireless Hill Industrial Estate, South Luffenham, Rutland, Leicestershire, LE15 8NF

Magna Specialist Confectioners Ltd
Magna House, Stafford Park 3, Telford, Shropshire, TF3 3BH

Marks & Clerk LLP
90 Long Acre, London, WC2E 9RA

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

Merlo UK Ltd
The Paddocks, Headlands Business Park, Salisbury Road, Ringwood, Hampshire BH24 3PB

National Fluid Power Centre
Carlton Road, Worksop, Notts, S81 7HP

NFU Energy Services
Stoneleigh Park, Kenilworth, Warwickshire, CV8 2LS

Nick Young Tractor Parts
Unit 2, The Forge, Moor Road, North Owersby, Market Rasen, Lincolnshire, LN8 3PR

Reesink UK Limited
1-3 Station Road, St Neots, Huntingdon, PE19 1QF

Shelbourne Reynolds
Shepherds Grove Ind Estate, Stanton, Bury St Edmunds, Suffolk, IP31 2AR

Spaldings Limited
25-35 Sadler Road, Lincoln, Lincolnshire, LN6 3XJ

Teagle Ltd
Blackwater,Truro, Cornwall, TR4 8HQ

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

Witham Oil and Paint Ltd
Outer Circle Road, Lincoln, LN10 6YQ

Obituary

Philip John Thirtle

The IAgrE was saddened to learn of the passing of Phil Thirtle who has died recently aged 75. A farmer's son from Suffolk, Phil gained his degree in Agricultural Engineering from Silsoe College. On graduating in 1968 he joined the Mechanisation Department at Harper Adams Agricultural College and was pivotal in establishing the HND course in Agricultural Engineering at the college in 1978 and subsequently the BSc course. In 1986 he left teaching to establish FarmForce Engineering, a company based in North Yorkshire specialising in the manufacture and sales of tractor front linkages and front mounted equipment predominantly for crop establishment. He took early retirement in 2001 and enjoyed flying a Cessna light aircraft and playing tennis and golf. He was a member of IAgrE from 1972 - 2001 and during his Harper years was active within the Wrekin Branch Committee. He is survived by his wife Joyce and their sons Paul and Adam and their families.

Reunion of past students of the National College of Agricultural Engineering

A reunion of past students and staff members who attended the National College of Agricultural Engineering, Silsoe, from 1962- 1968 was held on June 30, 2022, at the 'Cross Keys' Restaurant at Pulloxhill. Paul Baskerville reports.

Around thirty-five past students and staff met for lunch, and to partake,in a rendition of 'Silsoe then and now' ably presented by Dick Godwin outlining the significant achievements made by the College and its students to the Agricultural Engineering industry during the period 1962- 2007 after which the College moved to the Cranfield University site.

Dick covered the reasons that led to the College being established in the early sixties and the impact it had worldwide, in providing a formal education for students wishing to enter the Agricultural Engineering Industry. He also presented the role that Cranfield University, together with Harper Adams University, now plays in providing a significant educational role for our Industry.

One of the NCAE former students, Bruce Giddings, then gave a colourful account of his career 'What I did after Silsoe' with Ford Tractors/CNH after graduating from NCAE Silsoe in 1967. This included Sales/Service and Product training experiences, on a worldwide basis.

The feedback from the audience made for an entertaining afternoon!

On conclusion of the meeting, the group made financial contributions to the 'Street child 'Ukraine Crisis Appeal and to UNICEF to help fund their work to support children in Ukraine.

Finally, many thanks to the Members of the organising committee for all their challenging work in making the 'Reunion' a successful event.

We look forward to the next one!

Research Round up

Cranfield awarded funding to research clean hydrogen generation from biomass

Funding for researchers at Cranfield University to look at new ways to generate hydrogen energy from biomass has been announced by the Government.

The technology would allow biomass – organic products such as wood, grasses or used brewery hops - to be used to generate hydrogen while capturing CO_2 emissions at the same time.

Rather than being burned, the biomass undergoes a process to turn it into a gas. The gas is then broken down into hydrogen and CO_2, and a sorbent – a material used to absorb liquids or gases – is then used to capture the CO_2.

The Project, which is called Bio-HyPER, is a collaboration between Cranfield University, Helical Energy, Bioenergy Infrastructure Group, Gas Technology Institute, Petrofac, and Origen Power.

The funding was announced by the Department for Business, Energy and Industrial Strategy (BEIS) through

The technology would allow biomass to be used to generate hydrogen while capturing CO2 emissions at the same time.

the Net Zero Innovation Portfolio (NZIP) as part of its Hydrogen BECCS (bioenergy with carbon capture and storage) Innovation Programme.

The £250,000 funding for the Bio-HyPER project will allow Cranfield researchers to carry out a feasibility study looking at integrating biomass fuel into the HyPER pilot plant, which is currently under construction on campus.

Dr Peter Clough, Senior Lecturer in Energy Engineering, said hydrogen and low carbon fuel research was a key strength of Cranfield and added: "This internationally collaborative project will place a strong emphasis on demonstrating the greatest CO_2 capture rates to support the UK's Net-Zero goal.

"This emerging technology offers the potential to achieve negative-carbon hydrogen whilst also providing a useful heat output."

Cranfield is also involved in various other projects awarded BEIS funding. One of these is led by Helical Energy and seeks to use disruptive technology processing other organic or natural fuels by gasification at high pressures and temperatures. An additional project led by the University of Aberdeen aims to develop an innovative and sustainable process to obtain hydrogen from the organic matter present in many types of waste.

Sustainability is a core theme for Cranfield and is present throughout much of the university's research. This includes everything from water to aerospace, agrifood to transport, design to energy, and manufacturing to the environment.

Research Round up

Agri-EPI Centre welcomes DEFRA automation in horticulture review

Duncan Ross

The recommendations of the independent review, co-chaired by then Secretary of State for Environment, Food and Rural Affairs, George Eustice, and Professor Simon Pearson of the University of Lincoln include establishing a consortium to bring together government and industry to drive adoption of proven technologies, adopting a mission-led approach to fast-track new technologies, and the horticulture sector setting up working groups to share novel harvest practices.

Duncan Ross, Agri-EPI Centre business development manager crops, said: "We support the report's recommendations as collaboration and additional funding in this area are needed. Agri-EPI Centre is creating a collaborative framework around agri-robotics and building development facilities so that people can come and build their systems. The UK is not alone in experiencing worker shortages and any solutions we can create will help domestic and global markets.

"Following the success of the Innovate UK automated lettuce harvester led by Grimme - which was funded through 'Robotics for a more resilient future', we are also looking at selective harvesting of broccoli with funding from Defra FIP.

"A common theme across our current robotic projects is monitoring to optimise existing processes such as spraying and harvesting. In orchards and vineyards we are developing more accurate ways of monitoring blossoms, pests and disease and potential yield which can also optimise actions, such as where to send staff to harvest. The next stage will be about in-field logistics.

"Dedicated government funding can de-risk technology development, encourage further private investment and speed up technological solutions around areas of harvesting which are harder to achieve but will have greater impact on labour resource availability."

Scots scientists to spearhead urgent EU research into how climate change is impacting our ability to grow crops

- A Scottish scientist is to co-lead an elite project group of 22 European partners, looking to create resilient crops for the future
- Yield is projected to plummet by a third due to extremes in temperatures and greater variation in rainfall patterns impacting on soil and the type of crops which can be grown

Dr Tim George, a Rhizophere Scientist at the James Hutton Institute, based at the Invergowrie site near Dundee; is joined on the five-year, 9m euro project– called 'Root2Res' - by top soil scientists from the University of Dundee and 20 other organisations from across the European Union (EU) and Africa.

The project, led scientifically by the Institute and France's ARVALIS, an agricultural research organisation dedicated to arable crops; is funded by the EU's flagship research program, Horizon Europe. It will look to address the climate resilience of soil in combatting rising temperatures and greater variability in rainfall which in turn place stress on crops. Work will also include research into improving soil nutrient availability and cutting the greenhouse gases being emitted from soil.

Dr Tim George, lead scientist on the Root2Res programme said: "There is both a soil and crop crisis developing in Europe. In 20 years' time, we will need to have more resilient crops which can tolerate extreme temperatures, more variable rainfall and be able to grow in more marginal soil conditions. Managing the interface between the soil and the plant is where the real battle against climate change is going to play out. I am delighted to be selected to play a major role in such a vital and urgent project which is a real coup for the Institute."

Landwards Conference 2022

IAgrE

ENGINEERING SUSTAINABILITY IN AGRICULTURE

LANDWARDS CONFERENCE 2022

Tuesday 1st November 2022

09:30 - 15:30

Peterborough Suite, East of England Conference Centre,
Peterborough, PE2 6XE

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