

Landwards^{@IAgrE}

The professional journal for the Institution of Agricultural Engineers

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- People: A day in the life of...
- The importance of mentoring
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Editor's Welcome



Sometimes one puts things off, often for a variety of reasons. For the editor, workload, other priorities or perhaps plain old procrastination.

For this leader, whatever the reason, the enthusiasm was not felt until now. What a good job that was. As initial planning for this edition began, the country's lockdown was tightening, UK Covid vaccination roll-out was just beginning and the daily news stats of deaths and hospitalisations were on a sharp upward curve (and we were in the dead of winter).

Now a couple of months later, virus controls and vaccination are having a dramatic effect, snowdrops are well out, daffodils are coming, and spring is around the corner. There are tangible reasons for hope.

I trust that reading this Landwards

gives you a shot in the arm with some agricultural enthusiasm as we feature some fascinating engineers at various stages of their careers and look at the great work being done.

I want the Institution to be the go-to body for everyone working in the land-based engineering sector and hope this edition gives support and encouragement to move on in your career. And please consider how you can help the Institution and your fellow members.

Andy Newbold

Editor

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Farmers say poor rural connectivity is leaving them behind

- NFU survey reports persistent poor broadband connectivity and mobile coverage is hampering business growth in rural areas
- The NFU renewing its call to both government and the telecommunications industry to tackle lack of rural connectivity as a priority

More than four in 10 farmers still don't have adequate fast and reliable broadband in order to run a modern farming business, according to a new NFU survey. The results highlight the ongoing division between rural and urban areas, with the potential for essential food production business growth hampered by persistent poor connectivity and mobile coverage in rural areas.

Trying to farm more efficiently by monitoring crops and livestock, taking part in virtual business meetings, online banking and remote learning as part of home-schooling, all

feature in the survey as reasons why farmers have been left frustrated over the past 12 months by slow broadband speeds and lack of mobile signals, a situation exacerbated by the global pandemic.

NFU Deputy President Stuart Roberts said: "For too long, those living and working in the countryside have been dealt a poor hand when it comes to digital connectivity; waiting for improvements which never seem to arrive. It is completely unacceptable that in this digital age we have a two-tier system of haves and have nots – particularly at a time when communication has become even more important.

"Modern farming relies on fast and reliable internet access, yet as our survey shows, more than four in 10 farmers feel they still don't have the connectivity they need to run their businesses. This comes at a critical time for these businesses when much is changing.

"We have consistently highlighted poor mobile signals in rural areas, which put farmers at risk and prohibit the adoption of new technologies which have much to offer the sector and how we produce food. The current pace of change is just too slow and, with the introduction of 5G and fibre broadband technology in cities, the gap between urban and rural areas continues to widen. As the Public Accounts Committee recently highlighted, people living in rural areas 'risk being left even further behind' if government fails to raise its game on rural connectivity.

"We will continue to campaign for investment in the country's digital infrastructure so that farm businesses can meet their huge potential, not only as food producers and custodians of the countryside, but in helping to tackle climate change and deliver on our net zero ambitions."

Demand surges for graduates to commit to a career in fresh produce

Due to a further surge in demand for trainees, Management Development Services (MDS) is calling for ambitious graduates, from both recent and previous years, to apply for its two-year graduate training programme in the fresh produce industry.

The MDS graduate training programme works with some of the country's leading agri-food businesses, of all sizes and at various stages of the supply chain, including Barfoots, BASF, Aldi, Adrian Scripps and Riverford Organic Farmers.

MDS business development manager, Kirsty Barden, said:

“As the food industry responds to the wider pressures of the pandemic, Brexit and the economy, member companies are looking to take on more driven and able graduates

than ever. We placed 50% more graduates in the autumn and demand has increased by 50% again this spring.

“This is huge credit to the MDS trainees who have shown their true worth and capability, particularly in the past few months when many have had to work autonomously from home. We are always proud of how they respond under pressure, which is what they are trained to do. We are also delighted that this opening up of further positions will give more young people a chance to embrace a career in a dynamic, challenging and rewarding industry.”

Spanning two years, each MDS graduate trainee undertakes four different six-month secondments in a wide range of member companies and roles, from harvest management to

procurement, marketing, technical development and logistics. The training integrates a Level 5 leadership and management apprenticeship qualification - accredited by the Chartered Management Institute and developed with the industry in mind.

MDS currently has 66 graduates on the scheme – its highest number since the organisation was founded by three growers in 1986 - and in the past year has increased its member companies from 48 to 60 businesses in the agri-food and fresh produce sectors.

MDS placements have not been interrupted by the pandemic. Sixty per cent of the current trainees are working on a flexible arrangement with employers, dividing their time between working from home and on-site; the remaining 40% are working in the office full-time.



Harper Adams research reduces the environmental impact of milk production by feeding lower protein diets and forage legumes

- Researchers at Harper Adams University have been focussing on reducing nitrogen, carbon and phosphorus from dairy farms
- Of particular interest is reducing nitrogen output by feeding low protein diets

There is considerable public and government interest in lowering the environmental cost and improving the sustainability of milk production. Researchers at Harper Adams University have been addressing this by focussing on areas such as nitrogen, carbon and phosphorus reduction from dairy farms.

One area of particular interest is the reduction in nitrogen output by feeding low protein diets. This is due to the high and volatile cost of purchased feeds, such as soyabean meal, along with their associated environmental costs. The recent Defra Clean Air Strategy (2019) also identified that 88% of ammonia emissions in the UK were from agriculture, with 28% of these due to dairy cattle.

The Harper Adams University researchers have been focussing on home-grown forage legumes such as red clover, lucerne and forage pea silages. These forages are of interest because they are higher in protein than traditional feeds such as grass silage, and therefore require less supplementary protein to be fed. They also have the added benefit of not requiring artificial fertiliser nitrogen as they naturally fix it from the atmosphere.

“Only about 25% of the protein that a dairy cow consumes ends up in milk, but by lowering protein in the diet to 15% we were able to increase this to 35%,” said Liam Sinclair, professor of animal science at Harper Adams, leader of the research programme.

“This is a tremendous improvement and means that less N is excreted



that could end up in watercourses.

“Additionally, most reduction was due to less nitrogen in urine which is then lost to the environment as ammonia,” said Professor Sinclair.

This reduction will greatly help dairy farmers meet the UK government’s requirement to reduce ammonia emissions by 16% by 2030. The improvement in N use was also achieved without affecting milk

performance or quality. It also reduced the cost of purchased soyabean meal by around 1 penny per litre.

“This reduction in purchased feed costs will improve dairy farmers’ profitability, but it is very important that the diet is properly formulated to meet the cows’ requirement for absorbed protein,” added Professor Sinclair.

Notice of meeting

Notice is hereby given that the **Seventy-fourth Annual General Meeting** of the Institution will be held via Zoom on;

Tuesday 27 April at 11.00am

Agenda

1. To receive and confirm the minutes of the seventy-third AGM held on 2nd May 2019.
2. To propose as an Ordinary Resolution:

“That the Annual General Meeting authorises the Trustees of the Institution to review members’ subscriptions and to make such adjustment, if any, as may be required with effect from 1 January 2021”.
3. To receive and consider the Annual Report for the year ending 31 December 2019.
4. To receive and consider the Accounts for the year ending 31 December 2019.
5. To report on the Council elections for 2020/21 session.
6. To confirm the re-appointment of Landers Accountants Ltd, registered auditors, as reporting accountants and to authorise the Executive to fix their remuneration.

NB This is much later than it should be, and the delay has been caused by the Coronavirus restrictions.

Notice is also given that the above AGM will be followed by the **Seventy-fifth Annual General Meeting** of the Institution via Zoom on the same date at approx. **11.15am**

Agenda

1. The minutes of the seventy-fourth AGM will be received in 2022
2. To propose as an Ordinary Resolution:

“That the Annual General Meeting authorises the Trustees of the Institution to review members’ subscriptions and to make such adjustment, if any, as may be required with effect from 1 January 2022”.
3. To receive and consider the Annual Report for the year ending 31 December 2020.
4. To receive and consider the Accounts for the year ending 31 December 2020.
5. To announce nominations for election to Council for the 2021/22 Session.
6. To re-appoint Landers Accountants Ltd, registered auditors, as reporting accountants and to authorise the Executive to fix their remuneration

By Order of the Trustees

Charles Nicklin, Chief Executive and Secretary

10th February 2021

NB ALL papers are available on the IAgRE website and hard copies by request – the invitation will be circulated electronically and also is below – please contact **secretary@iagre.org** for details.

Join Zoom meeting

<https://us02web.zoom.us/j/84753946381>

Meeting ID: 847 5394 6381

Passcode: 631632

Join by telephone: +442039017895, 84753946381# * 631632# UK



From the CEO's desk



Well, this quarter has flown past, and in what feels like an eternal lockdown! The big difference this time is of course the children are not in school and pubs are shut.

I was hoping to have been able to get out and about, but it's not been possible, and I've remained in a world of MS Teams, Zoom, email and the phone. I'm sure I don't need to tell you, these are really challenging times. Those who are remote working and have young children have the daily battle of home schooling, and those who can't work remotely have the childcare challenge.

Covid challenges

Business performance in different industries is contrasting. Manufacturers seem to have a good forward order bank, but continue to battle to keep production lines running with parts supply issues and

keep people Covid-free. Agricultural businesses continue to forge ahead eagerly awaiting spring. Leisure, travel and hospitality industries remain in complete turmoil; I'm sure many will simply not be able to recover for a significant time.

The great news is that the vaccine is being rolled out fast, the Government and NHS are doing a great job with over 15 million completed by mid-February. Where I am left bemused is that only now do we seem to be restricting entry into the UK from high risk countries, and making people properly quarantine. The big question, which you may know the answer to when you read this, is 'when will we come out of lockdown?'

College quest

I've continued my quest to contact all the colleges and universities who carry out land-based and ag engineering education, following up with student (and staff) presentations on IAGrE and my route into the industry. Colleges and universities are also having a tough time with setting up remote learning for students, especially difficult for practical sessions. Similarly, manufacturers find themselves having to do the same to complete essential technician training. The educational picture is very different between the many establishments, some are thriving with healthy student numbers, others suffering through lack of investment and staff skills shortages. The fact remains that more complex equipment, with larger capital investment and new technologies are not only going to need engineers to design and develop equipment and systems, but also high-quality professional technicians to commission, service and repair the same. We all need to do our bit to promote the industry, make it more visible, educate and encourage people into it, whether it's through schools, colleges or social media.

At an operational level, the IAGrE team has been busy as always. We

are now up and running with the new Registered Environmental Practitioner (REnvP) grade for the Society for the Environment, with our first applicants coming through. We really hope this will appeal to those working in agronomy, forestry, soils, water, etc. Lunchtime lectures and podcasts are still proving popular, we've had some really great presentations and interviews. If you know any people who you think would make good listening, please get in touch. Just after Christmas we held the first meeting of the Executive for 2021 and my first one in this new role. I was really encouraged and really look forward to driving our Institution forwards, attracting new members and improving the membership offer.

Spring is on its way

Finally, after all the post-Christmas snow and lots of sharp frosts the ground seems to be drying up really well and daffodils appearing in full force. It's certainly the case in South Cheshire anyway and I'm not allowed to go anywhere else! There's a certain aroma in the air due to the ensuing flurry of tractor and muck spreader activity making use of the frozen ground. Spring is on its way, I'm sure everything will start and feel much better!

Charlie Nicklin C.Eng MIAgrE

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Presidents Musings



Climate, energy and change

I was interested to listen to Bill Gates predicting that the challenge of arresting global climate change would make beating the global pandemic seem easy. There is no doubt that many capable minds are now increasingly focussed on climate change and the level of challenge this presents will need a huge engineering resource; that has to be good for our community.

Increasingly eyes are turning to the option of hydrogen as a relatively high-density fuel. This, in itself, will produce massive infrastructure development if it is to be rolled out to on or off-highway vehicles even in a country of our modest scale. Jaguar Landover's recent announcement that all their new vehicles will be electric powered from 2025 is a further indication of the urgency of the quest for alternatives to fossil fuels.

Whilst disappointing for many the decision to cancel the LAMMA show this year was prudent. The cost of exhibiting at events like this is high

and exhibitors need certainty that their investments are going to give them exposure to a good number of potential customers.

A sad farewell

I, along with many others, was saddened to learn of the recent passing of Helmut Claas, long-term MD of the Claas group. Claas and JCB, the company for which I worked for many years, have close synergy both being privately-owned, employing similar numbers of people and having similar financial turnovers. Both companies have exhibited high focus on their respective marketplaces and private ownership has given them the ability to think and act quickly which has led them both to considerable commercial success. For a while the two companies benefitted from joint distribution in some markets in the days before Claas had launched the Xerion tool carrier or acquired Renault tractors. Helmut was a massive presence in the agricultural engineering industry and will be sadly missed.

Going virtual

We will be holding both the 2020 and 2021 IAgRE AGM's virtually this year and have set the date for April 27th. In the same vein our '2020 and 2021 Awards Presentations' are being held virtually on the evening of the same day. I would urge you to log in and recognise those individuals or teams who will be receiving this year's awards. Simply coping with the demands of 2020 was a significant challenge. To excel in that situation deserves particular recognition.

This is the fourth of my 'President's musings' which must mean that I am approaching the end of my first year in office. I don't suppose any former president has had a stranger year in which to be in the seat than this. It seems somewhat ironic that as I write this piece on Shrove Tuesday, the day when we traditionally think of what we are going to give up for Lent, minds are really focussed on the return of those things that we have been forced to give up over the past 12 months!

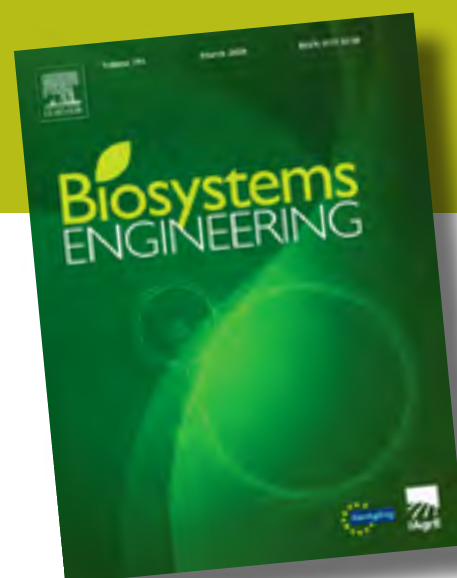
Biosystems Engineering

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 both paper and electronic versions.

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



Biosystems Engineering

Volume 198, October 2020,
Pages 304-322

Energy, carbon and water footprints on agricultural machinery

Edemilson J. Mantoam, Graciele Angnes, Mesfin M. Mekonnen, Thiago L. Romanelli

Case Industry, Brazil

Department of Biosystems Engineering,
University of Sao Paulo, Brazil

Department of Civil, Construction and
Environmental Engineering, University of
Alabama, USA

Agricultural machinery enables field activities and production in large scale. Through mechanisation, agriculture requires inputs such as fuel and indirectly demands materials. Its impact can be assessed through energy, water and carbon footprints. This study presents environmental indices based on energy, carbon and water footprints for the life cycle of six types of agricultural machinery. The machines studied were tractors, sugarcane harvesters, coffee harvesters, sprayers, planters and combines. Inputs used directly (assembly phase) and for the maintenance phase were taken into account. The total energy, carbon and water footprints were by multiplying the material flows by their respective energy embodiments, consumed water and carbon footprints indices. Carbon steel accounted for the highest share (30-70%) of energy demand, 45-79% of carbon footprint and 19-59% of water footprint. Repair and maintenance accounted for a smaller share of all footprints, except for the sugarcane harvester. The water footprint was from 21 to 55 m³ for tractors and between 35 and 391 m³ for other machines. Energy demand varied between 259 and 685 GJ for tractors and between 400 and 3500 GJ for other machines. The carbon footprint varied between 11-30t CO₂e for tractors and between 27-176 tonne [CO₂e] for other machines.

Biosystems Engineering

Volume 199, November 2020,
Pages 4-26

Review Article

A review of measuring, assessing and mitigating heat stress in dairy cattle

Boyu Ji, Thomas Banhazi, Kristen Perano, Afshin Ghahramani,

Les Bowtell, Chaoyuan Wang, Baoming Li

University of Southern Queensland,
Toowoomba, QLD, Australia

Department of Biological and
Environmental Engineering, Cornell
University, NY, USA

College of Water Resources and
Civil Engineering, China Agricultural
University, Beijing, China

Heat stress is a significant challenge in dairy farming. Dairy cows under heat stress will encounter impaired welfare leading to production losses. As the frequency and magnitude of heat stress events increase in the coming decades, a focus on heat stress reduction studies becomes important. Modelling and on-farm experiments have been used to assess the effects of heat stress on livestock over the last few decades. Mitigation solutions including optimal shed structure, ventilation, feeding regimes, farm management and genetic selection have all been explored. Until now, the results from different mathematical models have provided a variety of heat stress thresholds for on-farm use. In practice, it is still costly to determine an accurate heat stress level in order to identify the mitigation requirements. This review summarises previous studies on the effects of heat stress on intensively reared dairy cows and different mitigation approaches. Robust monitoring systems, big data analyses and artificial intelligence algorithms are needed for the future development of dynamic, self-calibrating model-based systems, which could provide real-time assessment and minimisation of heat stress.

Biosystems Engineering

Volume 200, December 2020,
Pages 55-72

Lefteris Benos, Avital Bechar, Dionysis Bochtis

Centre of Research and Technology-Hellas (CERTH), Thessaloniki, Greece

The Volcani Center, Bet-Dagan, Israel

Automatically distinguishing weeds from the crop plant is a complex problem since weeds come in a wide variety of colours, shapes, and sizes, and crop foliage is often overlapped or occluded by weeds. Current technology, cannot reliably and effectively perform the differentiation task in such complex scenarios in real-time. A technology to make crop plants machine readable and reliably distinguishable from weeds for automatic weed control has been developed. Four different techniques have been investigated and developed to make smart crop marking systems such as a) systemic markers, b) fluorescent proteins, c) plant labels and d) topical markers. Indoor experiments have been conducted for each method. Field experiments, using plant labels and the topical markers methods, have been successfully conducted for real-time weed control in tomato and lettuce. The results demonstrated that robots could automatically detect and distinguish 99.7% of the crop plants with no false positive errors in dense complex outdoor scenes with high weed densities.

IAgrE's presence on LinkedIn has changed

IAgrE joined LinkedIn in 2009 and has 520 followers.

In 2018 LinkedIn created Company pages but for IAgrE to change this presence to a company page the original was deleted.

To keep in touch with the IAgrE through LinkedIn please follow the new page:

<https://www.linkedin.com/company/71501233/admin/>



Save the date - Tuesday 27th April 2021

The IAgrE AGM will take place on-line on;

Tuesday 27th April starting at 11am.

The IAgrE awards ceremony will be online;

Tuesday 27th April starting at 6.30pm and we hope you will join us.

Wear your glad rags and grab a glass and join us for the IAgrE Awards 2020 & 2021.

At this online event we plan to come together as a community to honour those who have made their mark in Agricultural Engineering. IAgrE likes to recognise excellence and this is our chance to celebrate with our Awardees and thank them for their contribution to our industry.

Please join us for this online event - everyone is welcome but please login to book your place

<https://iagre.org/events/Awards20202021>

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Practice: SWMC conference report



The scale of change facing modern farmers – and some of the tools and techniques they can use – were explored in a succession of papers at the Soil & Water Management Centre virtual conference in December 2020.

Continuing rises in global temperatures mean species are moving around the world in a progression that would pose threats

and create opportunities, said Professor Simon Jeffrey from Harper Adams University.

Climate change is currently estimated to be propelling a range of crops, pests and pathogens towards the north and south by an average of 2.7 kilometres a year:

“Species either move north or south, or they move up towards higher altitudes.”

This would have an effect both on cropping and livestock farming with livestock being more prone to heat

stress and dairy cows’ milk yields might drop:

“We might need to change the varieties and animals being farmed. New crops could be grown, including vines, sunflowers, pumpkins and garlic,” he said.

Some existing crops such as sugar beet might benefit from higher yield potential, with the longer growing seasons offered by warmer springs and autumns.

But it could also have negative effects on food security unless there



Tools to address trials of the future

was a massive change in the species grown:

“Increased yields depend on the absence of drought, flood, storm damage and new diseases.” Existing diseases might also move and become more persistent, he suggests, pointing out that liver fluke levels are already rising in Scotland.

Supplying carbon sequestration

FARMING has a unique chance to help the nation meet its environmental

commitments, suggests Becky Wilson, product manager for the Farm Carbon Toolkit:

“We are lucky to be one of the few industries that can pull carbon out of the atmosphere and into soils and crops. We can supply carbon sequestration and carbon storage.”

But for farmers to take advantage of this they need to know how close to ‘net zero’ their existing operations are and identify any ‘hot spots’ for carbon emissions.

Addressing the issue could have dual

benefits, as more efficient production would make the business itself more sustainable from both environmental and business standpoints:

“Producing efficiently is actually the best for carbon production as well,” she said.

The first practical step is to identify the farm’s existing emissions and assess the carbon status of the soil.

Consistent sampling was essential. Samples should be taken on the same date and the same location every year.

Practice: SWMC conference report



**The ASSIST E-Planner - can be used to help
locate environmental features**

And, for ultimate consistency, she suggested analysis should be undertaken by the same laboratory each time.

The best location for environmental features

ANOTHER tool – the ASSIST E-Planner – can be used to help locate environmental features. The system covers two million fields in Britain and will complement a farmer's expertise and knowledge of their soils, suggests Professor Richard Pywell from the Centre for Ecology and Hydrology.

The tool assesses a range of different soil quality measures and related issues, such as habitat connectivity and water course proximity.

It combines all these factors to produce a colour-coded map that identifies the most suitable site for individual features.

Prof Pywell believes the tool will help farmers identify areas that are unproductive or difficult to farm, and then consider which environmental feature might be most appropriate to the location.

Slowing river flows



Permeable log dams are one method being assessed to reduce flooding risks in an era of more variable weather.



These dams are positioned across watercourses and above the level of normal winter flow with no mountings obstructing the normal winter flows, which avoids debris build up, blockages and stream bed erosion.



As a result they do not obstruct normal flows, but hold back excess water to reduce flooding risks.





Chris Stoate

Improve soils buffering capacity

Professor Chris Stoate, from the Game & Wildlife Conservation Trust's Allerton Project, said slowing water movement before it gets to the watercourse is also essential:

"We need free-flowing drains to keep arable fields workable, and we need to improve the soil's buffering capacity before water gets to the drains to reduce erosion rates."

The Allerton Project is exploring the role of deep-rooting grass leys to improve organic matter and water infiltration rates as part of its EU-funded 'SoilCare' project.

Initial results suggest that these work best when compaction caused by grazing livestock is minimized.

On its research and demonstration farm at Loddington in Leicestershire, the Allerton Project has examined whether the plough or low disturbance sub-soilers improved infiltration rate more efficiently.

Results suggest that while the plough improves infiltration rates more in early winter, it left the fields more prone to soil erosion.

But in the longer term the sub-soiler, followed by direct drilling, achieved better results because it left earthworm burrows intact which helped improve infiltration rates.

However, results are not consistent, he added, and more research is required to understand fully how infiltration rates vary in different circumstances.

Heavy metal

FARMERS trying to improve soil structure and reduce water run-off risks face one weighty problem, says Professor Dick Godwin from Harper Adams University.

The vehicles they now use are some 13 times heavier than those in common use in the 1930s:

"The pressure which these vehicles exert influences the degree of compaction and the weight affects the depth."

He cited work from Czechia which shows that 85% of the soil surface might receive a wheeling in a conventional plough-based crop establishment system.

This reduces to 65% for minimal tillage and to 45% for no-till systems. While this represents a major reduction in wheelings, it



Dick Godwin

meant that they still covered almost half the soil surface.

Solutions include switching to controlled traffic systems or mounting vehicles on tracks or low ground pressure tyres.

Another option might be to revert to lighter vehicles, in a way that the university's Hands Free Farm project was now show-casing.

Scottish experience suggests controlled traffic could improve silage yields by 13% thanks to improvements in soil structure and not driving over the crop.

Maintaining efficient drainage was also important but might not be enough, especially if ditches and drains had fallen into disrepair or needed cleaning.

If farmers have problems they should consider mole draining as well, with the 'herring bone' of fissures created beside and above the drain itself being as important as the mole itself.

Practice:

Long term soils trial



Soils work for sustainable intensification

How to feed the growing population which is estimated to increase by over 2 billion in the next three decades? Since additional expansion into natural habitats, like forests and grasslands should be avoided as it causes numerous adverse effects on global climate and might lead to permanent loss of various habitats and species, the intensification of farming seems to be the solution.

Until now farming has brought a sustained increase in productivity providing food security around the world and paved the way to a green revolution in the early post World War 2 years. In the UK between the 1960's and 2014 cereals productivity increased two-fold. This resulted from machinery innovation, fertilisers, crop varieties, agrochemicals and irrigation.

Economy of scale led to constant increase in farm machinery power, and consequently machinery size and weight. Recently the productivity curve has flattened, and crop yields are not increasing.

Soil degradation

A potential reason for this is degradation of soil resulting from

increasing machinery size and weight, since the increase in axle load and tyre pressure inevitably leads to soil compaction. For many years, tillage has been viewed as a measure to alleviate soil compaction, at the same time improving soil aeration and water infiltration. However, recent studies suggest that cultivation can lead to soil structure degradation, organic matter loss and erosion. Ultimately this can lead to re-compaction, since deeper tillage often requires more subsequent tractor passes to prepare a seedbed. Consequently, soil compaction can extend to greater depths in the soil profile, which may then require further deep tillage such as sub-soiling.

Does it mean that humanity is doomed to failure? Is there any way

we could keep farming to maintain the soil in good condition so it can deliver for future generations?

Long term trial

To address these issues, a unique long-term experiment began in 2011 at Harper Adams University in Shropshire, UK. This study is investigating the effects of three contrasting traffic management systems on soil managed for three different tillage depths (250mm, 100mm and zero tillage) on soil physical and biological properties, and crop yields, explains Dr Paula Misiewicz, who leads the research programme. The contrasting traffic systems are random (non-controlled) traffic with standard and low tyres pressures (STP and LTP) and controlled traffic farming (CTF). Magdalena



This study is investigating the effects of three contrasting traffic management systems on soil

Kaczorowska-Dolowy, responsible for monitoring the experiment for the past three years says: “Random traffic is still the prevailing approach for field operations. Every farmer does his best to optimise traffic routes in the field, but for a typical cereal-based rotation it turns out that significant areas of the field are covered by at least one wheel-pass every year, depending on tillage depth (the results of traffic studies by the Czech University of Life Science show these to be 85%, 65% and 45% for deep tillage with a plough-based system, shallow and zero-tillage respectively).”

Controlled traffic

In contrast to random traffic CTF is a concept that restricts all vehicle routes in the field to permanent wheelings. This minimises the trafficked area to as little as 30% or even 15% depending on implement width and configuration.

“The ultimate goal of this experiment is to provide the farming community with practical guidelines on how to manage field traffic for different depths of tillage. These guidelines should not only embrace

the short-term gains expressed as crop yield, but also provide sustainable soil management so that the soil’s ability to deliver valuable crop production is not compromised,” adds Professor Dick Godwin.

Magdalena, who plans to submit her PhD thesis this spring, says: “I was lucky to inherit the trial after six years of observations. Therefore, I have been able to investigate not only the effects of traffic intensities on soil properties at different tillage depths, but also to include the time factor to my analysis. This has enabled my research to investigate the effect of different soil management systems on soil biology and the biological processes that require time to reach equilibrium that cannot be achieved in short term experimentation.”



Magdalena Kaczorowska-Dolowy

This project has been funded by the Douglas Bomford Trust and The Morley Agricultural Foundation with technical support and equipment from Vaderstad UK, Michelin Manufactur Française des Pneumatiques and AGCO.

People: Oliver Wood



A day in the life of Oliver Wood

Working with software engineers, bridging the gaps between tractor and machinery manufacturers, advocating technology to farmers and being within an agronomy business might seem a tall order to some, but to Oliver Wood, it's all in a day's work.

His grandfather ran a council farm in Nottinghamshire and retired when Oliver was young, but not before he had passed on the farming bug. At 13 this led to weekend working on a

local mixed dairy and arable farm. At 16, Oliver went to Brackenhurst College, Nottinghamshire to study for a BTEC national diploma in agriculture and then went on to work

on a farm in Grantham for two years. Oliver felt that he wanted to do more, but couldn't because he didn't have a degree. This led him to Harper Adams in 2001 to study for a BSc



Credit: Farming Photography

A diversity of thinking helps to link agronomists and farmers with the complexities of what machinery is capable of.

Agriculture with Mechanisation, including a placement year with John Deere.

Straight from Harper Adams, Oliver joined John Deere in a new role as crop systems specialist covering the north of the UK, specialising in sprayers, combines and precision farming technologies.

At this stage precision farming was in

its infancy and specialism was the key to getting machines to work together.

After a couple of years he moved on to a territory manager role in the south east, still with John Deere. This was a less technical and more general role.

In 2011, after three years in the territory manager's role, Oliver wanted to get back closer to production agriculture. He took a job

with Farm Image, a Kent-based precision farming services business.

This role didn't work out and with a young family they decided to take a different path with Oliver managing an 800ha oil palm plantation in Papua New Guinea on a fixed term. At the end of the contract, they returned to the UK and Oliver took up his role with Hutchinsons in 2014.

People: Oliver Wood

The day job

Oliver is the precision technology manager for the agronomists H. L. Hutchinson Ltd. Day to day he manages a team that covers the development, services and associated products of the Omnia precision farming services.

His responsibilities include

software development of the Omnia platform. This was built in house from the ground up and is a cloud-based precision farming, nutrient management and mapping platform designed specifically for UK farmers.

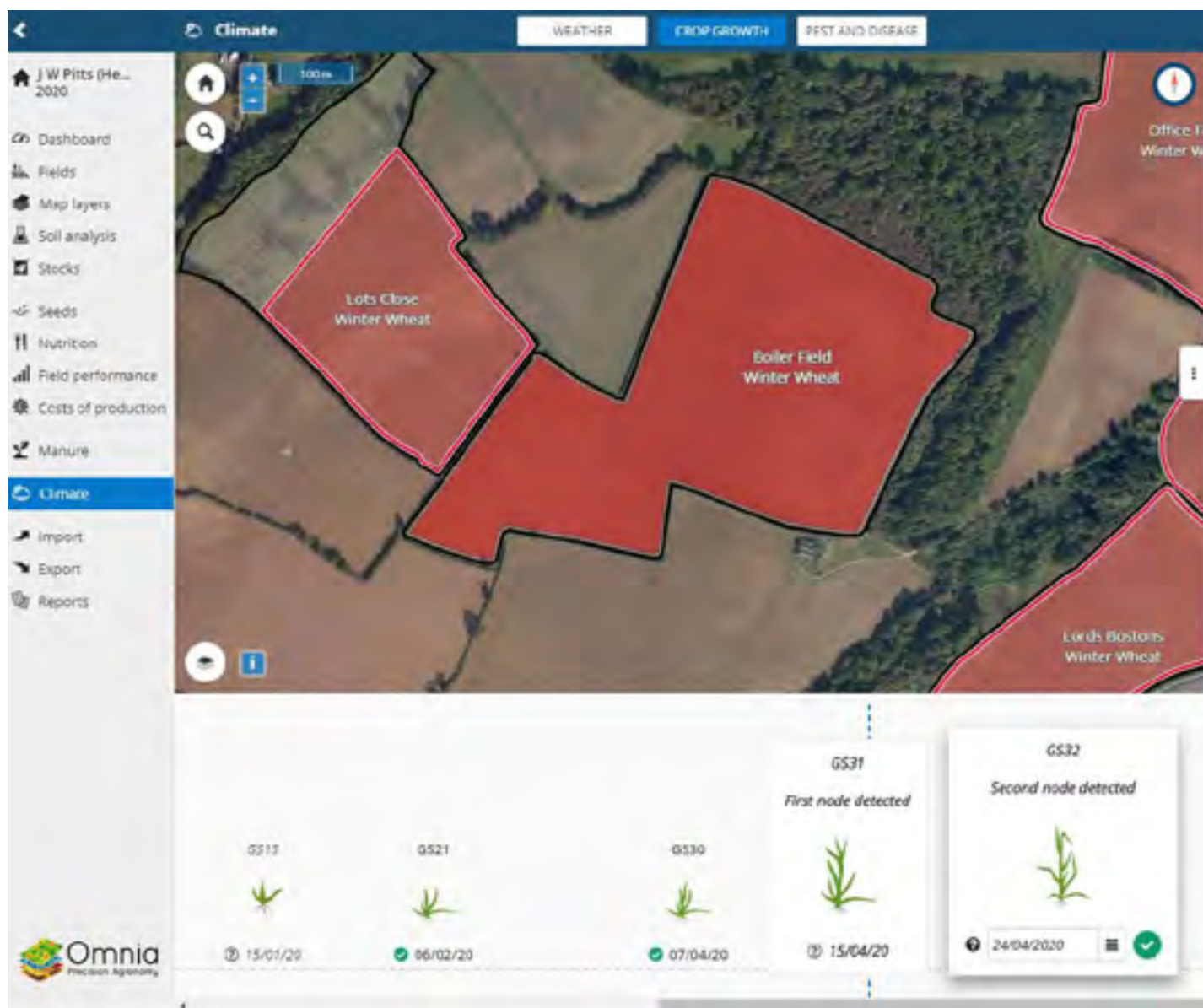
The services include precision farming and NVZ compliance services, and soil mapping using gamma-detection TerraMap which uses the SoilOptix scanning technology from Canada and the iPad-based Connect variable rate control system for inputs.

With Connect, Oliver and his team took a system that was being used in Australia and initially tested it with a number of farmers. Once its concept

was proven, they developed new communications protocols for different manufacturers including Väderstad and Amazone. The Connect app has been rebuilt for the company's requirements and integrated an API with the Omnia platform so that variable rate plans can be wirelessly sent from the office direct to the field. This has helped to overcome two major issues of precision farming, those of data transfer and machine connectivity.

Stakeholders

Oliver deals directly with machinery manufacturers including Väderstad to develop API connections to the company's telematics platforms (currently John Deere and CLAAS).



Crop Growth Screenshot

Alongside this he is available to farmers and contractors for sales and service support to ensure that the products work in the field. On a daily basis Oliver is available to support the company's team of over 200 agronomists with Omnia service activities for their clients, be it over the phone, Zoom, email or – Covid-19 allowing – face to face.

A job well done

One of the most satisfying parts of the job is seeing a software development project going from concept to being used by farmers and agronomists. One of the most recent examples would be developing Omnia Climate module to use weather data to drive crop growth

as well as pest and disease models.

Experience shapes the day job

Working within an agronomy business and having a machinery, rather than agronomy, background gives Oliver a diversity of thinking and really helps to link the needs of agronomists and clients with the complexities of what machinery is capable of.

Words of encouragement

'I have changed direction a number of times within my career and whilst these changes at the time were daunting, it has shaped my experiences and knowledge,'

Key learning for ag engineers:

All previous experience can be brought to bear, moving jobs and shifting focus is a part of professional development.

- Don't be afraid of change
- If things don't work out, move on and do something different
- Think about how to apply that hard-earned experience (pain possibly!) in new situations
- Use your skills and experience to bridge gaps between different disciplines
- Leverage experience to deliver diversity of thinking and perspectives to projects.



People:

Clare Butler-Ellis



How agricultural engineering chose Clare Butler-Ellis

Landwards interviewed Clare Butler-Ellis back in January, this is just a taster but you can hear the whole thing on the Landwards Podcast.

Tell us a little bit about your background?

There was no farming, let alone agricultural engineering in my background at all – I grew up in the West Midlands; my father was a chemical engineer, but I definitely didn't want to be an engineer ever!

Why did you decide to be an agricultural engineer?

I didn't – I think agricultural engineering decided it wanted me! I started by doing a physics degree at Leeds University followed by a PhD in theoretical physics.

What was your route into the industry?

Pure chance, really. I wanted to be a mathematical modeller, and ideally modelling something that was very tangible and meaningful (unlike my PhD which was very intangible and, with hindsight, a bit pointless). A



“I started by doing a physics degree at Leeds University followed by a PhD in theoretical physics.”

job came up at the National Institute of Agricultural Engineering (NIAE) in maths modelling of milking machines, and I thought I'd give it a go until a proper job came along.

Tell us a little more about your journey following qualifications?

While maths modelling at NIAE I was seconded to the Institute of Animal Health at Compton, working on machine milking and I stayed for six years.

I then went to work for a year at AEA Harwell at the Energy Technology

Support Unit, on renewable energy projects. It was a terrible job, but had the silver lining that I met my husband. So I left and spent a year working for ADAS in Reading at the Farm Buildings Unit. Another terrible job, so I only lasted a year there. I tried to get moved to ADAS at Wrest Park so that I could carry on after I got married, but they wouldn't let me, so I left and managed to blag a job back at what was probably by then AFRC Engineering, in the Chemical Applications Group (CAG). When Silsoe Research Institute closed I left again (I keep trying to escape, but I don't seem able to!) and went to work for the Pesticide

Action Network, an NGO in London for a couple of years. Then came back to what was left of the CAG – now Silsoe Spray Applications Unit and took over from Paul Miller when he semi-retired.

How has being a woman affected your career in ag engineering?

Looking back now, I can see that it has been affected more than I realised at the time. Some of it positively, probably – you are definitely more likely to be noticed in a large group of people if you are a woman than if you are yet another white bloke in a suit.

But some of it negatively, mostly in trivial ways, which is why I didn't recognise it when it was happening. And of course, you cannot live the same life twice, once as a man and once as a woman to see what the difference is!

The Landwards podcast

Clare has lots more to say in the podcast.

You can listen to the whole interview and many others at

<http://bit.ly/3pFSzhk>



Profession:

Registered
Environmental
Practitioner



“The launch of REnvP provides individuals with the opportunity to gain professional registration and achieve external verification of their competence.”

The Institution of Agricultural Engineers (IAgrE) launches new qualification in partnership with the Society for the Environment

The Institution of Agricultural Engineers (IAgrE) has announced the launch of the Registered Environmental Practitioner (REnvP) registrations in partnership with The Society for the Environment. This is a huge step forward to ensure high standards of professionalism and proven competence are met by those working to enhance and protect the environment across every sector.

“The IAgrE very much welcomes this new Registered Environmental Practitioner grade of professional registration. This has never been more important and relevant for agricultural engineering and

associated technology sectors; we hope that professionals in our industry will apply for registration. Our industry includes many different disciplines which need people to apply a professional approach and

the Registered Environmental Practitioner grade is ideal for this,” said Charlie Nicklin, CEO of IAgrE.

Dr Emma Wilcox, CEO of the Society for the Environment said:



IAgRE CEO Charlie Nicklin



Dr Emma Wilcox

It is an honour to be the first IAgRE member to be awarded REnvP status, the latest professional recognition from the Society for the Environment. As a professional agricultural engineer working within the sphere of effective and economic machinery management and operation rather than in an environmental setting, REnvP recognises my endeavours to ensure that users appreciate the work that engineers do to ensure environmental and resource sustainability. In an agricultural and land-based setting this covers air, water and soil sustainability. Without these three important elements, there would be no requirement for agricultural engineers. Further more thanks are due to the IAgRE for their work in promoting professionalism for engineers working in the wide-ranging sphere that is agricultural engineering.

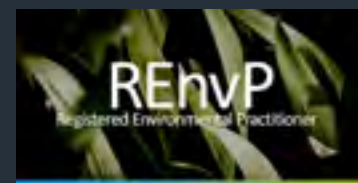
Graham Higginson IEng REnvP FIAgRE



“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.”

“The technology that goes into agriculture and its associated industries encompasses a wide variety of subject areas from precision farming, agronomy, fertiliser and pesticide application, to the science of soils, land reclamation, irrigation and drainage. These are all key areas that need professional people applying a professional approach to achieve sustainable food production,” added Charlie.

Given the focus on the environment through the agricultural legislation which will come into force in the post-Brexit world, together with the government focus on better environmental practices and carbon reduction, IAgRE feels that the time has never been better to demonstrate to all stakeholders, including regulators and consumers, that we are the professionals that the food supply and associated industries deserve. There are many graduates in agriculture and environmental management for which this registration is an important part of their professional development,” Charlie concluded.



- New qualification will ensure high standards of professionalism and proven competence are met by those working to enhance and protect the environment
- The launch of REnvP is a landmark moment for environmental professionalism

Profession

The importance
or mentoring



Nurture people to unleash their potential

Investing in career progression of employees is the key to reduced staff turnover and greater contribution from a team according to Stuart Goodinson, managing director of De Lacy Executive.

“When candidates approach us to help them find a new position, more often than not the reason they give for seeking a new job is lack of progression in their current role,” he comments. “It’s worth thinking about this for a minute. Good people are moving on because the current company isn’t investing in them. This is incredibly short-sighted by the employer.”

Mr Goodinson suggests that investment in coaching and mentoring can deliver real benefits

for minimal cost. He says people respond well to being shown they are valued; that there is clear progression as well as the opportunity to develop and grow. In the current job market, people are looking especially for security and are prepared to devote more energy to their role if they believe it will help their career.

“When you compare the cost of training and mentoring with the costs of replacing a team member, it should be an easy decision.

In our experience, the cost of losing someone is equivalent to a minimum of four months of their contribution to the business.

“When an existing person becomes disillusioned, productivity will drop. You will be short-staffed while you find and train up a replacement and there are costs of recruitment as well. If that same person could be motivated to do more, to be more productive and to stay, the benefits to the business could be substantial.”



People respond well to being shown they are valued

Case study

One business which has got this aspect of people management right in Mr Goodinson's view is Devon animal feed manufacturer Harpers Feeds which won the Supply Trade Employer of the year at this year's Dairy Industry Cream Awards. The firm employs 96 people across a range of areas including manufacture, engineering, logistics as well as sales.

"Attracting, developing and retaining high calibre staff has been a foundation of growth and Harpers has an excellent reputation as an employer and maintains an emphasis on people development. Succession planning is a core principle of the recruitment strategy. The company looks for people who can develop within the business.

It is keen to understand people's aspirations and then manage these as they develop. For example, the sales director, operations director, mill manager, night shift manager and store supervisor have all progressed within the company to their current roles.

"Recruitment does not take place in silos but through a more rounded view which means many staff will move across departments as they progress. Talent is developed within the team by mentoring and promoting from within wherever possible and online CPD.

"For any business looking to build an effective team, I would advise starting by looking at how people are coached and mentored as well as assessing how more progression can be provided. The benefits to the bottom line could be considerable," Mr Goodinson predicts.

The IAgRE mentoring scheme



If you would like some friendly support with your career, the Institution can help in the first instance have a look at

<https://iagre.org/mentoring>

Book Club



With a couple of fairly heavyweight (and timely) volumes on conservation agriculture and a scrapbook charting the development of JCB's products over the past 75 years there is some decent recommended reading in this edition.

If you have read or written a new or recent book which members will benefit from, please let the editor know.

New two-volume collection on conservation agriculture

Two new books on Conservation Agriculture, edited by Professor Amir Kassam, University of Reading, UK, have been published by Cambridge-based Burleigh Dodds Science Publishing Limited.

Conservation Agriculture (CA) is a farming system that promotes continuous minimum soil disturbance, maintenance of a permanent soil cover and diversification of plant species. (FAO, 2020).

Advances in Conservation Agriculture Volume 1: Systems and Science summarises research on key components for successful Conservation Agriculture (CA).

Chapters review the latest research on ways of optimising no-till techniques to minimise soil disturbance in relation to seeding, weeding and other operations. Chapters also review ways to improve soil health in CA, including mulch cover, cover crops, rotations and intercropping.

Advances in Conservation Agriculture Volume 2: Practice and Benefits reviews

ways of optimising CA practices and their benefits.

Chapters summarise research on optimising soil management, crop nutrition and irrigation, as well as weed, insect pest and disease management. The book also reviews ways of optimising the environmental and social benefits of adopting CA practices.

Jules Petty, Professor of Environment and Society, University of Essex, says:



Credit: Jake Freestone

Advances in Conservation Agriculture

“This is an important, timely and authoritative collection on the values of conservation agriculture worldwide. Great advances have been made in recent years over a range of approaches and systems to improve both the productivity of agricultural systems and their positive contributions to ecosystem services and natural capital.”

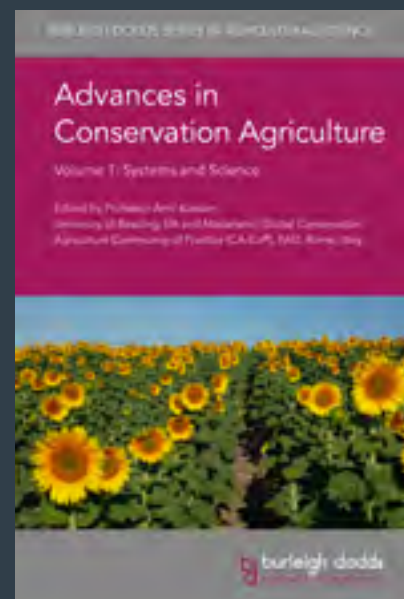
Professor Amir Kassam is visiting professor at the University of Reading (UK) and moderator of the FAO-hosted Global Platform for Conservation Agriculture Community of Practice (Global CA-CoP). He is a Fellow of the Royal Society of Biology (UK) and has received an OBE for services

to tropical agriculture and rural development.

Prof. Kassam is chair of the International Conservation Agriculture Advisory Panel for Africa (ICAAP-Africa), member of the European Conservation Agriculture Federation (ECAF) and vice-chair of the Conservation Agriculture Association for the UK (CA-UK).

Copies of both volumes can be obtained from Burleigh Dodds Science Publishing in print and digital formats costing from £150 each.

<https://bddpublishing.com>



“This edifying book is a compendium of much of what we have learnt across the world about CA... It will serve as an immensely valuable source of reference - and inspiration - for all those who are committed to putting the world’s food systems on a truly sustainable footing. It is with great pleasure, therefore, that I can recommend this book to you,” Qu Dongyu, director general, UN Food and Agriculture Organization.

Book Club

JCB THROUGH THE

ed to invest £12 million in the development of a suitable alternative to other traditional offerings.

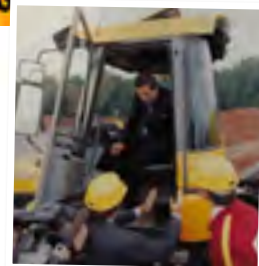
Featuring full suspension, the initial Fastrac models were powered by either a 125hp normally aspirated or 145hp turbocharged Perkins diesel engine with all four wheels being driven through 18 forward and six reverse gears.

This combination enabled the Fastrac to travel at speeds of up to 45mph while hauling a 14-tonne payload – a unique statistic that introduced new levels of efficiency to the modern farming industry.

Launched at the Royal Show at Stoneleigh in 1991, the new Fastrac impressed many, including the Prince of Wales, who acknowledged the need for such a vehicle when being presented with the opportunity to experience the spectacular machine for himself.



The JCB Fastrac picked up several awards, including winning the general category for new equipment incorporating innovative ideas at Stoneleigh's Royal Agricultural Show.



64 JCB Scrapbook



New book to mark JCB's 75th anniversary

JCB are an iconic British brand which has grown from a small, dedicated UK engineering and manufacturing operation to a global construction and agricultural machinery giant.

This scrapbook charts that path through contemporary photos on the occasion of the company's 75th anniversary.

The 144-page JCB Scrapbook has just come off the presses. With over 400 photographs - some published for the first time ever - it promises to be a treat for lovers of JCB and its iconic machinery.

JCB Chairman Lord Bamford said: "This book, I hope, will act as a celebration of the past 75 years: the innovations, the engineering excellence, and the achievements of all those who have made up the wider JCB family from its inception in 1945. I hope, too, that it will serve as an inspiration for the next generation – those talented young

people currently rising through the colleges and universities, including our very own JCB Academy.

The scrapbook has some beautiful illustrations and period photographs which show the innovations alongside the people intimately involved.

Published by Porter Press International and priced at £20, the book is an unabashed celebration of one of Great Britain's greatest engineering names and its remarkable machines. From the first trailer, produced from post-war

scrap metal in 1945 to the latest award-winning electric mini digger, the story of JCB is told through a remarkable collection of images from the company's own archives.

The author, Martin Port has worked as a graphic designer, writer and photographer since graduating from art college in 1993. He was the art editor and contributing journalist to *Classic & Sports Car* for 16 years.

The scrapbook can be purchased from www.jcbshop.com for £20.



Did you know?

In 2007, 'The Stig' drove a Fastrac 8250 around the Top Gear Dunsfold track, posting an impressive time of just 2 minutes 57 seconds!



Professional: The Douglas Bomford Trust



Trustees have held reviews with some interesting new projects for 2021.

Spreading roots and new shoots....

Alan Plom, secretary to The Douglas Bomford Trust (DBT) reflects on the spreading roots of the Trust over a 'virtual' winter and looks forward to the new shoots of spring...

Over recent months our Trustees have held reviews with research teams nearing the end of DBT-sponsored PhD projects as well as 'start-up' meetings for some interesting new projects for 2021. These include projects at two universities new to us too: a study using UAVs (Unmanned Aerial Vehicles) to monitor the effects of Conservation Agriculture on soil erosion (at Worcester), and using LED lighting to improve crop quality in vertical farms (at Glasgow).

The breadth of 'agricultural engineering' and its potential

world-wide impact is also reflected in other DBT-funded PhD projects. These range from studies at Cranfield into use of polyacrylamide (PAM) spray to mitigate soil splash and capping, an in-field soil nitrogen diagnostic tool, and irrigation of sugar cane in Malawi. From developing a system of 'virtual' sheep fencing at Liverpool John Moore's University, to using image analysis to monitor cows (at Nottingham). From devising flood mitigation strategies at Reading to developing a sustainable desalination plant at Birmingham for application in the Jordan Valley.

Grass roots competition

Interviews for this year's DBT Scholarships were also held by Zoom - a new experience for our interview panel members, as well as the students. Congratulations to **Thomas Bowers, Robert Bryning, Will Flittner, Alex Williams and Rhodri Williams**. We think they will be great ambassadors for the sector too and look forward to hearing about their activities. We also hope we will be able to meet them all face to face later in the year.

Student Membership of IAgRE

Sponsored by the Douglas Bomford Trust. We encourage all students on relevant courses to take advantage of membership.

Now all IAgRE meetings are online, it is possible to 'visit' branches around the country, as well as the regular lunchtime Lectures. Topics covered already vary from aquaculture to safety.

With farm safety in mind, DBT is also supporting an MEng student at Bristol University who saw the potential for a sensing device to improve safeguarding of PTO shafts. To help develop the device, DBT's Chairman Nick August has been showing him the machinery on his farm - virtually, of course!

Old Roots? Meet a Trustee - Dr Paul Miller (FREng CEng CEnv HonFIAgRE)

Paul joined IAgRE as a student - in 1968! He is well known to most if not all readers, having been involved in agricultural engineering research and development throughout his long career and being actively involved with IAgRE as well as being the DBT's secretary since 2010.

Notably, Paul received the European Society of Agricultural Engineers (EurAgEng) 'Award of Merit for Scientific Understanding' in 2016, for his 'major international contribution to the advancement of scientific understanding in engineering and related science for the benefit of agriculture, environment, industry and the rural sector in Europe', as a 'leading agricultural engineer and expert in all aspects of crop spraying and fertiliser application.'

Paul has been working on agricultural pesticide application since 1984 and led SRI's Chemical Application Group's research on spray drift from boom and air-assisted sprayers, nozzle performance, dose control and patch spraying. He went on to hold the senior role of SRI's director of

technology. When the Institute closed in 2006, Paul was instrumental in setting up the Silsoe Spray Application Unit (SSAU), to continue their world-renowned research and consultancy as part of The Arable Group. He has been a visiting professor of Cranfield University and is the author of many refereed and (international) conference papers.

Reflecting this, Paul was also elected as a Fellow of the Royal Academy of Engineering in 2016, in recognition of his 'outstanding and continuing contributions to the profession' and being 'one of UK's finest engineers'. The Royal Academy is committed to making the UK a leading nation for engineering innovation and just 1,500 engineers (from all engineering disciplines, in both industry and academia) have received this honour over the past 40 years.

Paul has been a kingpin of the Trust since 2010. When he gave up his role as technical secretary in 2017, he left 'very large shoes' to be filled by his successor. Fortunately, he kept

his feet firmly under the table by becoming a Trustee. His breadth and depth of experience in research and commercial development means he is exceptionally well placed to assess the wide range of project proposals we receive. He is also able to give technical and practical guidance to PhD students (and their supervisors) involved in the cutting-edge research and development projects sponsored by the Douglas Bomford Trust at universities around the UK.

A full copy of this report is available on the Douglas Bomford Trust website at

<https://www.dbt.org.uk/news>



Can you 'cut it' too? DOUGLAS BOMFORD TRUST

If you are interested in helping the Trust and becoming a Trustee, please contact the Trust's Secretary **Alan Plom**, via enquiries@dbt.org.uk or telephone 07951 527051.

Further information about the Trust is available on Twitter @BomfordTrust and LinkedIn.

Profession: Engineering for food



Engineering for food - dairy technology from farm to plant

At the end of February, the IAgRE Engineering for Food dairy technology online event delved into what the future might look like in terms of technology for the dairy sector. Chris McCullough logged on.

On day one Duncan Forbes, head of dairy at Agri-EPI, outlined his vision for the future of milk production.

A vision

Duncan explained that Agri-EPI is one

of four centres set up to deliver the UK government's agritech strategy. These centres were set up to respond to the global challenge of sustainable food production given that world population is expected to rise to 9.5 billion people by 2050. This in turn requires 60 to 70

percent more food production with less environmental impact.

Agri-EPI has invested in three dairy centres, namely Scotland's Rural College, Dumfries; Harper Adams University, Shropshire and Kingshay, Somerset, where several different



“If you look after the cows, they will look after you.”

research projects can be carried out.

One project is the South West Dairy Development Centre which is designed to harness robotic power and sensor technology. It has state of the art housing but one key driver works with precision grazing to optimise cow welfare and productivity.

Duncan presented a detailed overview of some of the technology being used including robotic milking, automated feed systems, controlled

environments, slurry handling technology, cow activity, precision grazing technology and data usage.

Look after the dairy cows

“If you look after the cows, they will look after you,” said Duncan. “I think the dairy farmer of the future is in a really exciting place. Technological innovation is accelerating and growing apace. It’s a massive challenge for producers to choose the right technology for their businesses to optimise animal

welfare and productivity.”

“The challenge for innovators is to integrate their system with others to enable data-driven decisions to occur, that is the key opportunity for producers and innovators. More importantly, the future dairy farm needs to be an exciting place for people already involved, but also for future generations to attract new blood in a world where we are competing with so many other choices.”

Profession:

Engineering for food

“As far as I’m concerned the future of dairy is one where agri-technology will be key to business resilience enabling more to be produced with less impact.”

The milking detail

GEA Westfalia was the main focus for Wednesday’s discussions when the company’s David Simmons highlighted milking machines and links of machine and teat. David said his interest lies mainly in the process of milking cows and offered a detailed look at how milk is produced in the udder and extracted from it.

Some interesting facts emerged from the talk. For instance, a cow needs 500 litres of blood flowing through her body to produce one litre of milk. Plus 80% of a cow’s milk is stored high in the udder in the alveoli which then must contract and press the milk into the ducts in the lower part of the udder so the cow can be milked.

After outlining the basic hardware required, such as a cluster and vacuum, David moved on to explain GEA’s principles for milking. He said: “We aim for smooth non-aggressive milking that ensures a high level of comfort for both operator and cows. Maintaining good teat condition is important as we don’t want teats to pick up bugs due to rough skin condition.

“We promote healthy udders and Low somatic cell counts, reliable and durable equipment and the use of technology to monitor and manage the milking process. “It is essential to have a stable parlour operating vacuum to achieve an even flow of milk and air in the milk lines,” he adds. GEA recommends using low operating vacuum in the parlour,



Duncan Forbes, head of dairy at Agri-EPI

an alternating pulsation and milking well-stimulated cows. To close, David focused on the GEA Dairy ProQ milking parlour which he said was the best and most advanced system in the world.

Milk processing

David’s colleague Daniel Bussmann followed the journey of milk to the next stage and talked about processing milk focusing on the latest centrifugal separation technologies.

A milk separator is a device that removes cream from whole milk. When whole milk gets inside the bowl, the centrifugal force runs it through the holes of the discs. The milk’s fat globules go to the centre of the drum and the skim milk goes to its outer edge because it’s heavier.

“A separator is a ball of stainless steel rotating inside of a housing at between 4,500rpm and 10,000rpm,” said David. “Inside the separator we have segments which support the sedimentation of goods in the milk.

“For the dairy we talk about skimming, or taking off the cream of the milk. Any separator consists

of a distributor which takes milk to the inside,” he said.

David also delved into the technical aspects of separators outlining where they are predominantly used with the three key areas being as a clarifier, a skimmer and for bacteria removal, depending on the need.

He said: “A clarifier is used in milk and whey processing steps; also when the milk quality is on the lower scale. This could be when the milk has a high somatic cell count or has some dirt present.

“A skimming separator is mostly used to produce skimmed milk with a fat content of less than 0.06 percent and producing cream with 30 to 40 percent fat.

“When using to remove bacteria, normally skim milk is fed to the separator. Spores and bacteria are collected in the heavy phase and desludged in intervals.

“This has tremendous results, and we are able to reduce the rates by up to 98 percent for spores and total plate count reduction of up to 98 percent,” he said.

**Centrifuge Separator**

“Food Engineering is a technical multi-disciplinary profession that deals with the system and structures of food, production processes as well as physical, (bio)chemical and biological transformation processes. It is based on scientific laws and economical, ecological and social, cultural and religious norms.”

Watch again



Organised by the Engineering for Food and Drink Special Interest Group of the Institution of Agricultural Engineers, this was a free five-day event, consisting of a series of lunchtime webinars exploring the future of dairy and discussing key global Dairy research topics.

The presentations are available of the IAGrE's YouTube channel here

<https://bit.ly/3kpKVF8>

Lunchtime lectures



How robots are redefining the future of farming

Kit Franklin, principal investigator for the Hands Free Farm, agricultural engineering senior lecturer and a member of the IAgRE Executive, reprised his lecture, first given as part of the New Scientist Live online series last autumn. This is a summary of the IAgRE's recent lunchtime lecture.

Kit began with changes in society and how they are impacting conventional farming. From 1915 to 2015, the UK population has grown from 45 to 65million whilst the farming workforce has dropped from less than 2.4 to 0.6million.

This has been achieved by a combination of plant and livestock breeding, animal and crop health, nutrition developments, and technological developments (ie tractors).

There have been significant positives for the workforce including reduced hours and improved health and comfort. At the same time there has been significant yield and productivity gains. However, society still faces the prospect of a growing



Lighter machines would increase the potential working window and protect soils

population within the context of finite resources and climate change.

Precision farming

The use of technology to observe, measure and understand variation and deliver inputs accordingly has enabled crop management to transition from whole field, via zoned (partial) field to sub-metre accuracy.

These gains have been delivered successfully by enabling technologies including high precision global

positioning systems (GPS), auto section control (for spraying, application and drilling equipment), remote sensing (such as spectral analysis and NDVI) and vision guidance.

Mechanisation issues

As machines become wider, their resolution has reduced. In the case of combines this has reduced the accuracy of yield mapping in line with the reduced number of passes enabled by a wider header. The

same principle applies to wider sprayer booms and spreader widths for control of inputs. This is reducing the data quality gathered and the resolution of inputs applied.

Machines have also become heavier, in the drive for productivity, in large part enabled by wider machines, with bigger tractors to pull them, the load on the soil has increased.

Kit made the point that conventional farming practices can produce soil loading of up to 1875t/ha.

Lunchtime lectures

The small robot future?

A paradigm shift in production approach to small robots would tackle the challenges of 'heavy metal' head on. Better machine resolution improves the accuracy of crop monitoring. This would deliver a marginal gain while reduced and targeted inputs would aid resource efficiency.

Lighter machines would increase the potential working window and protect soils, with 'swarms' of multiple robots replicating the work rate of an individual tractor and operator. The operator's job would be retained as the swarm needs management and smaller field vehicles are intrinsically safer.

The Hands Free Farm

This premise of smaller robots led to the Hands Free Farm which proved the theory of 'Automated machines growing the first arable crop remotely, without operators in the driving seats or agronomists on the ground.'

The project was founded on three objectives:

1. The world's first automated field growing cycle;
2. To challenge perceptions and inspire through real-time coverage;
3. To utilise existing machinery and technologies – an open source approach

Over a couple of harvests the project improved field control and equipment reliability. Remote agronomy, inputs, crop husbandry and harvest were all achieved with some impressive results from off the shelf existing farm technology.

The economics

On the back of the project a paper entitled The Impact of Swarm Robotics on Arable Farm Size and Structure in the UK was written and published by James Lowenberg-DeBoer, Karl Behrendt, Richard Godwin and Kit Franklin.

This addressed the cost of production of a wheat crop by comparing a typical farm unit and machinery configurations with the results of the Hands Free Farm project. The paper identified that the use of multiple small autonomous machines has the potential to significantly reduce production costs compared to conventional approaches.

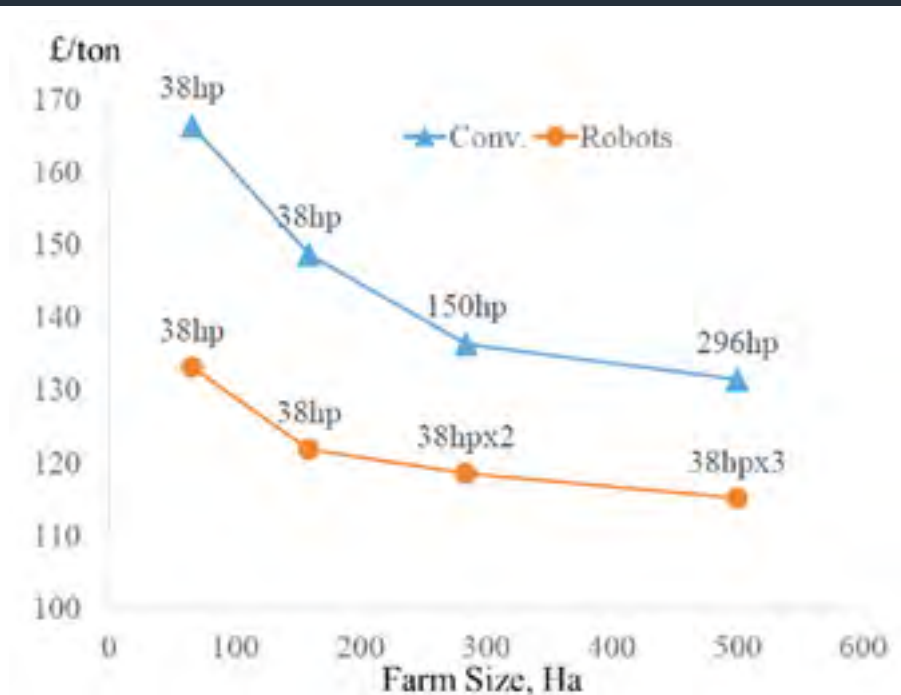


Figure 1. Wheat Unit Production Cost (£/ton) for Farms Equipped with Conventional or Autonomous Machines across a Range of Farm Sizes and with Operator Labour Cost Allocated



L-R Mike Gutteridge, Jonathan Gill
and Kit Franklin from the Hands Free Farm team

The Hands Free Farm

Started after harvest 2020, the Hands Free Farm is a three-year-long project, run in partnership between Harper Adams and Precision Decisions, along with a new partner; the UK division of Australian precision agriculture specialist Farmscan AG.

The project has just got underway and is based at the university's campus in Shropshire. The Agricultural Engineering Precision Innovation Centre (Agri-EPI Centre) are providing the team with development space and project management support at their

Midlands Agri-Tech Innovation Hub, which is also located on the university's campus.

The future

The lecture wrapped up by looking at some of the UK and global developments in farm robotics. Kit discussed some of the wider implications for farming including the need for skilled fleet managers, how agronomists will need to engage with remote sensing, the implications for cyber security and the need for rural communications infrastructure.

Thanks to Kit Franklin for taking the time to give such a fascinating lecture.

Watch again



Don't forget that the Lunchtime Lectures are available to watch on the IAgRE's youtube channel :

<https://bit.ly/3kpKVF8>

Membership matters

Northern Ireland Branch

John Deere Precision Agriculture presentation

Report by Terence Chambers

The recent online technical presentation, by agricultural machinery systems technology consultant Matthew Gilbert, to the Northern Ireland Branch of IAgRE described how John Deere, as a major machinery manufacturer, supports its customers in achieving more efficient field operations by the use of precision farming technology. Matthew, a 2017 Harper Adams agriculture graduate, is now a technology specialist, with local John Deere dealership Johnston Gilpin.

His current role includes introducing customers to the new technology and providing in-field support to ensure that they get the best results from its use. It was also interesting to hear how he had spent a year working with a specialist team based in John Deere's EU headquarters / factory site at Mannheim in Germany, where around 37,000 machines are produced each year. A lot of his work there involved evaluation and development work for a new front-loader range, which is now a popular option for the latest 6M series tractors.

John Deere, as a company, is strongly committed to the application of precision agriculture technology across its product ranges. Its dealerships now routinely encourage its adoption as a vehicle brand selling point. The technology is now well advanced for use throughout the wide range of agricultural enterprises from crops to livestock.

Precision agriculture systems use satellite guidance of field machinery and the assembly of electronic field maps based on information collected from crop yield and other field data. The maps become the guide for future seasons' husbandry and controlled machinery operation.

The future?

Cab-less driverless tractors and other field machines will operate remotely. The use of electrical power systems will be used more on machine drives. Field management observation using drones will be routine as will automated individual plant spot treatments for row crops. The ability to improve soil management, reduce pesticide application, minimise pollution and protect the natural environment depends on controlling inputs in an informed way as well as having the records to prove it is a welcome development. The tone of recent official press reports of how the criteria for future support of UK farming will operate is similar. The Precision Farming technology systems, now available and being advanced by John Deere and others are timely and well equipped to support farmers in this process.

As always, a good presentation resulted in a further lively discussion around the topics before our chairman thanked Matthew for his excellent presentation and wished him well in his career.

More detail on the John Deere products referred to above is available online at

www.johnstongilpin.co.uk

The full text of this report can be read on the IAgRE website.

<https://iagre.org/ni-branch-technical-talk-matthew-gilbert>





Matthew Gilbert works for local John Deere dealership Johnston Gilpin.

Virtual branch meeting

Running a modern contracting business

Report by Terence Chambers

A recent Zoom online presentation was given by James Townley who, with his father Roy, now runs the 75-year-old contracting business of James D Townley and Son based at the family farm near Ballygowan in County Down.

It provides regular high output precision contract field services to both livestock and arable commercial farm businesses across a service radius of up to 30 miles from base and employs 4 full-time staff as well as other regular machine seasonal operators.

Before joining the family business James studied at Harper Adams University and graduated from there, with his Masters degree in Agricultural Engineering, in 2015.

Placement year experience

As well as the normal academic core engineering and management studies taught at Harper Adams, the curriculum includes a placement year spent working out in the agricultural machinery sector. James spent his year working within the Claas UK dealership network in Yorkshire. This gave him close access to the complete Claas product range, experience as part of a dealership team and direct involvement with field services supporting a wide range of farm customers in the area.

Examples included working as a product sales assistant, preparing and manning sales stands at agricultural shows, assisting with delivery of new combines to customers and working at on-farm demonstration roadshows for the Lexion 780 combine, Xerion 5000 and Axion 800 series tractors.

Experience in the Claas used machinery sector showed the qualified economic benefit of planned pre-sale restoration

of specific machines. Whilst refurbishment of forage harvester pick-up reels is routine more detailed specific machine technical knowledge, of the condition of more complex internal components, is necessary to decide what work can be justified when costing a used harvester for resale.

The full text of this report can be read on the IAgRE website.

<https://iagre.org/ni-technical-talk-james-townley>

Wrekin Branch

JCB World's Fastest Tractor record attempt

Report by Bill Basford

The Wrekin's first Zoom branch meeting got off to a flying start, literally. We could not have planned for such an exciting, enjoyable evening courtesy of Alex Skittery, project manager for JCB, and of course Guy Martin, the nation's 'go for it' man.

Some of the audience would have seen the TV programme of the attempt and whilst enjoyable it didn't really take the engineering challenges very far. Alex took us through the initial decisions by JCB to get the project going. He reminded us of the pedigree of JCB always looking at innovation with every product, teamwork to get the job done and yes, a lot of fun along the way. World records are not new to JCB with the Dieselmax car, incidentally pushed to its start by a Fastrac. Given an enthusiastic start from Lord Bamford the project began with his wish – go for 150 mph!

The 8.5t 4220 Fastrac with a 240 hp engine and max speed around 43 mph might suggest a poor start – but actually one full of challenges including virtual wind tunnel testing, not normally used in their product design. Alex enthusiastically took us through videos and stepped us inside the virtual world of airstreams.



Like many of the viewers the Fastrac 4220 was overweight so 3.5 tonnes were lost from the tractor (equivalent to a Range Rover and a Mini) by removing unnecessary parts, redesign or choosing alternative materials. Whilst approximately 50% of parts were retained from the Fastrac the engine was changed using the JCB 672 unit found in

one of company's excavators. This was massively enhanced with a fuel pump from a train, injectors delivering 2.7 l/min and considerable development with the turbocharger, e-supercharger and cooling systems demanded as a result. A water/ice system needed recharging at the end of each run attempt – even Tesco's local supermarket was pressed into



service for extra ice. Tyre development was a serious challenge and BKT supplied a special carcass design for testing, to destruction in one case. This tyre with shaved treads finally incorporated temperature sensors in the tyres linked to a big STOP light in the cab and the challenge was on.

Of course, Guy Martin piloted the Fastrac using a slipping clutch controlled by software and only 2nd to 5th of the 6-speed gearbox – a story in itself! Two runs at Elvington aerodrome resulted in a new World Record of 135.19 mph with Lord Bamford's request for 150 mph being satisfied at 153.771 max mph.

Thanks to Alex and all his team for the project, a fascinating evening emphasising the potential of a great team of engineers. The presentation can be easily viewed by searching the internet for IAGrE – Branch videos – if you haven't seen it yet – find some time!

John Deere Telematics and Artificial Intelligence

Report by Bill Basford

Jack Howard, product specialist for Precision Ag Technologies joined on Zoom to illustrate the developing and interlinked technologies available across the JD range. His presentation is available on the internet just search IAgRE – Branch Videos or go to the IAgRE web site to access it. Thus, this report may be seen as whetting an appetite for further study.

Jack's message was certainly one of continual development in sensing, interpretation, and application to benefit the user, owner, dealer and JD development department. Clearly within this some sensitivity was apparent concerning data privacy but assurance was given that the data is not shared without agreements in place. Some 350,000 JD products now are linked by telematics with perhaps 30,000 of any particular product – 7R tractors noted as an example.

Explaining the overall detail, he showed that all machinery performance parameters were now monitored with JD taking confidence in the system and tractor utilisation to a level where they now offer a guaranteed fuel economy deal. This system being linked to all engine settings, performance in task, GPS spatial detail in field and work areas. One example was quoted of a tractor showing 39% of real time at idle – an obvious question mark for 'why?' Fuel costs representing the major segment of machine ownership was underlined; thus the importance of such monitoring showed a benefit to offset monitoring system cost as well as work opportunity time. Taking such performance monitoring further allowed dealer and manufacturer to look at Expert Alerts and possible product line improvement. A system of Remote Display Access allows this. Whilst history would identify this as 'Big Brother' it clearly offers a significant facility for efficient machine utilisation and identifying potential for downtime early.

GPS linkage to machines through the telematic principle offers another feature of security or Geofencing where criminal activities may be found. The presentation covered a very wide sphere of application

and product use and discussed the linkage of data collection, storage and use to many useful ends. Future use, development and security all featured in the questions raised, all of which can be reviewed through the



presentation video.

Lawn mower racing

Report by Bill Basford

IAgrE membership has many benefits as peripheral subjects are explored. Such was the latest Zoom meeting on lawn mower racing presented by third year engineering student Matthew Torok. Traditional commentators might suggest – we don't do that here but I for one was very glad Matthew spoke to us so enthusiastically with a no holds barred description of this off-beat sport.

Matthew took up the sport in his early teens being greatly encouraged by his father. He came by a Toro Wheelhorse mower and gradually

developed this powered by a 12hp Briggs and Stratton L head (460cc single cylinder) engine. This included a transmission using a standard mower gearbox. When he had finished it had an approximate top speed of 25-30mph with an approximate cost to his first race of £200. However, one of Matthew's first problems was not the mower; it was that there was no class for him as a youngster in which to race. The problem was solved by including him in the ladies race - no comment from me! He did well and was well accepted however it seemed that the biggest problem was to complete the race – 30 minutes or 1 hour. Matthew's massive collection of one liner comments included 'several

gearboxes later' confirmed by a photo of several broken or rather destroyed examples.

As Matthews age and experience increased, he could become a senior, the biggest effect of which was to allow him to enter the modified class. He described and illustrated his approach to developing his current/modified mower (UK Group 4) which is a Westwood. This when first built had a 15.5hp Intek (700cc V-twin). This had since blown up and replaced with an 18hp Vanguard (600cc V-twin). Transmission - Custom T-drive with 25mm solid rear axle. Approximate top speed (pulley ratio dependant) was 50mph during





races - at the end of the straights! Approximate cost to first race £1500. His thrill at completing a two-hour race was evident to hear even though he apparently had no brakes for the last hour! His current mount sports a 3-pointed star borrowed from somewhere, so it is definitely a 'Mowcedes!'

One of the negative effects of Zoom was that we can't share the laughter and fun of the evening, particularly the many short videos taken during races from Matthew's helmet, sometimes sideways. Sound effects from a home-developed silencer were intriguing to say the least.

However, the main message from the evening was one of a tremendously enthusiastic young engineer with a can-do attitude and very little money. Now at HAU Matthew heavily acknowledged his developing understanding of the science and technology of his engineering course in supporting his design work. Put another way he probably understands more easily why things broke...repeatedly.

Beyond all this, Matthew is currently in his placement year applying CAD skills within engineering through to manufacture. He has a developing interest in the classic car field supporting entries in events. Alongside his 'mowing' successes

he has also been successful in being recognised for his engineering skills and abilities.

For more interest and fun have a look at Mower Madness Facebook page (The club that Matthew races with): <https://www.facebook.com/Mowermadness/>

Or the BLMRA (British Lawn Mower Racing Association) website: <http://www.blmra.co.uk/>

The Zoom recording will be on the IAGrE website soon.

Pollution Reduction and Natural Flood Management – the use of satellite imagery and technology in the work of the Environment Agency-West Midlands Group

Jenny Gamble, Dougal Ziegler & Andrew Osbaldiston

Report by Bill Basford

Our third Zoom meeting described how much technology is being used in mapping, topography and thus planning in water management. Jenny introduced us to the work of the EA managing regulation, pollution, fish farming, navigation, conservation and ecology within the UK. In particular, attention was directed to the work of the group

relating this to the local rivers of Herefordshire especially the River Wye. The word pollution usually implies chemicals or wastes which of course it does and certainly falls within the EA's responsibilities. Such unwanted commodities within the countryside have been described many times on many platforms but the question of soils run-off in river waters was the main subject covered in this presentation.

Dougal described the use of imagery within the area. Whether increasing rainfall is a result of climate change or not, the effect of increasing intensity of rainfall per unit time - particularly where soils had been compacted - was discussed. Several striking images and videos confirmed the effect with huge, eroded gullies and flooded roads as a main cause for local concern. The relationship of soils to developing farming practices particularly with potato and maize growing was challenged. Both now normally included contract growing leaving landowners with serious issues particularly around the varying contours and light lands within Herefordshire.

Satellite imagery was shown in use to confirm and record issues as well as building a forecasting detail of terrain 'hotspots' for pollution peak challenges. Interpretation, particularly to forecasting, was reported as being ever more reliable and the way this could be related to specific areas and practices identified.

Andrew directed thoughts to that of flood management and the link between imagery, mapping and forecasting in relation to flooding.

All three speakers showed how modern technology was being used by EA to record, understand and apply lessons learnt to future practices and possible controls. A clear message was that modern practices, whether from arable or livestock enterprises, must be reviewed beyond yields or output to include the various negative effects on local rivers and the environment.

Obituary

Dr P. C. J. Payne

Dr Peter Payne most widely remembered as the first principal of the National College of Agricultural Engineering, Silsoe, sadly died in March 2020 aged 92.

Dr Payne graduated with a degree in agriculture from Reading University and gained an MSc (Dunelm) in Agricultural Engineering at Kings College, Newcastle. His first post was as a Scientific Officer in the Soils Department at the NIAE, latterly Silsoe Research Institute.

At Silsoe he did pioneering work in the application of fundamental soil mechanics principles to the interaction between cultivation tines and the soil. This work showed clearly the influence of tine geometry on the forces involved and the extent of soil disturbance under different soil conditions. It also showed the potential of using this approach in soil / machinery studies in the future. On the basis of this research, he was awarded a PhD by Reading University.

Following his work at the NIAE, he took up a lectureship at Wye College in Farm Mechanisation and whilst there, he developed a particular interest in identifying potential careers and training needs in agricultural engineering. Through papers and numerous visits, he brought these to the attention of the industry and young people contemplating their future careers.

Whilst at Wye he became deeply involved in the work of the Institution of British Agricultural Engineers, later to become the IAgRE. He was a member of Council and Chairman of the Papers Committee and later was instrumental in setting

up the South East Midlands Branch of the IAgRE.

Dr Payne moved from Wye College to the Agricultural Engineering Department, Durham University at Newcastle in 1960, where he was appointed lecturer in agricultural engineering. His time at Newcastle was rather short, being invited during his first year to apply for the post of Principal of a new College of Agricultural Engineering to be located alongside the NIAE in Silsoe.

After numerous submissions and consultations within the industry, particularly with the IBAE (now IAgRE), the AEA and the AMTDA (now BAGMA), the Government accepted that there was a need to establish a college for training personnel in agricultural engineering. This training would have to embrace not only UK needs but also those of international students. As agricultural engineering was a relatively small industry, the Government took the decision to set up a separate National College of Agricultural Engineering to meet this need and it was to this college that Dr Payne was appointed Principal in 1962. The first cohort of students initially studying at Boreham House, near Chelmsford in Essex, courtesy of the Ford Motor Company, until construction of the NCAE at Silsoe was complete. Like with everything else, the 'proof of a pudding lies in the eating', namely the views and thoughts of the thousand students from fifty countries who passed

through the college during his tenure. Examples of their grateful thanks can be seen in the excerpts from the two letters written to Dr Payne in 2017 and 2018 following the '50th Anniversary' reunions of the early graduating years and signed by the attendees. His family report that he frequently talked about being remembered by his former students and was very proud of the letters of thanks. These students, along with subsequent alumni, forged very substantial careers in industry, academia, government, international agencies and farming - but they never forgot and are always proud of their Silsoe roots.

"Silsoe is held in high regard by us all and it speaks for itself that we are coming together after 50 years to reflect upon our time there. Silsoe equipped us well to face the future and the wide and varied career paths that followed."

"It was the skill and efforts of you and your staff that made the NCAE at Silsoe such a rewarding experience for us all. In particular we would like to pay tribute to you personally for your dedication and tenacity in making Silsoe happen and in being the success it was." July 2017

Space only allows this very short summary of the obituary which can be found in full at

<https://iagre.org/dr-peter-c-j-payne>



Membership Changes

1/11/20 to 31/01/21

Admissions

Fellow

Professor Edwin Ekwue
(Trinidad & Tobago)

Member

Mr Stuart Aldworth (Herts & Essex)
Mr Matthew Knight (East Midlands)
Mr Jeremy Taylor (Scottish)
Mrs Rachel Price (Wrekin)

Associate Member

Mr Brian Hourihane (S Eastern)

Associate

Affiliate

Engr Mohammad B Warraich
(Pakistan)
Mr Robert Handcock
(Southern Ireland)
Mr Colin Page (S Eastern)

Technician

Students

Sparsholt College

Lockett C S

University of Birmingham

Nabi A

Riseholme College

Sands T W S

Vail J

Duncan A

Gray A

Wakelen H

Hunter-Evison H G

Lamming W

Marfleet A

Young J

Stacey T

Edwards W

Burnett J

Haigh B

Barker J

Butcher E C

Hauton L

South West College Omagh

Cousley L

Coyle A

Gervais P

Henry A D
Keelagher R
Kelly S
McAneney E
McNulty M
O'Kane C
Sheridan O
Wilson G

Cambridge Regional College

Riordan A

Cranfield University

Browne T W

Roche D

Pathak C

Selleck L

University of Nottingham

Dunn C

Warwick University

Patel S

WCG (Moreton Morrell)

Savage L

University of Suffolk

Tolliday D

Royal Agricultural University

Aardweg C C

Bicton College

Allan F

Budgen C

Callaway N

Clarke H

Clarke-Nisole K

Clarkson C

Crabb D

Dennis V

Dyer A

Floyd C

Flynn L

Gweaaup J J

Jennings T

Millman J

Quick H W

Rosewell G W

Rosewell J

Trewern B D

Re-admission

Member

Deaths

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

Mr J Tyblewski IEng MIAgrE –

A long standing member of the Institution since 1962
(East Midlands)

Mr R J Hunter AMIAgrE –

A member of the Institution since 1980
(South East Midlands)

Mr R G Elrick CEnv MIAgrE –

A member of the Institution since 1999
(Scotland)

Mr R Wells IEng MIAgrE –

A long standing member of the Institution since 1958.
Over 60 years' service.
(Southern)

Mr A Langley MIAgrE –

A long standing member of the Institution for 50 years
(Scotland)

Transfers

Member

Mr N Pigott
(Ireland)

Associate Member

Mr Alex Mill
(S E Midlands)

Mr Jacob Dawson

(Herts & Essex)

Engr Mohammad B Warraich
(Pakistan)

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CEng

Dr David Thaemert
(Herts & Essex)

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Berkshire College of Agriculture

Hall Place, Burchetts Green,
Maidenhead, Berks, SL6 6QR

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HU17 8QG

Brooksby Melton College

Asfordby Road, Melton Mowbray,
Leics, LE13 0HJ

Coleg Sir Gar

Gelli Aur Campus, Llandeilo,
Carmarthenshire, SA32 8NJ

Cranfield University

Cranfield, Bedfordshire, MK43 0AL

Duchy College

Stoke Climsland, Callington,
Cornwall, PL17 8PB

Easton & Otley College

Easton, Norwich, Norfolk, NR9 5DX

Greenmount College

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Antrim, Northern Ireland, BT41 4PU

Harper Adams University

Newport, Shropshire, TF10 8NB

Hartpury College and University

Gloucester, GL19 3BE

Institute of Technology

Tralee Clash, Tralee, Co Kerry, Ireland

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

Myerscough College

Bilsbarrow, Preston, Lancashire, PR3
0RY

Newcastle University

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

Pallaskenry Agricultural College

Co Limerick, Ireland

Plumpton College

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BN7 3AE

Reaseheath College

Reaseheath, Nantwich, Cheshire,
CW5 6DF

Royal Agricultural University

Cirencester, Gloucester, GL7 6JS

Sparsholt College

Sparsholt, Winchester, SO21 2NF

SRUC – Auchincruive

Auchincruive Estate, Ayr, KA6 5HW

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

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Dundee, DD1 3JA

Agri-EPI Centre

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Technopole, EH26 0BA

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B5 7UB

Briggs Irrigation

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NN17 5XU

City and Guilds

1 Giltspur Street, London, EC1A 9DD

City Farm Systems Ltd

25 Hepplewhite Close, High
Wycombe, Bucks, HP13 6BZ

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

NFU Energy Services

Stoneleigh Park, Kenilworth,
Warwickshire, CV8 2LS

Fullwood

Grange Road, Ellesmere, Cheshire,
SY12 9DF

Househam Sprayers

Roughton Moor, Woodhall Spa, Lincs,
LN10 6YQ

HSS Hire

25 Willow Lane, Mitcham, London,
CR4 4TS

JCB

Rochester, Staffs, ST14 5JR

John Deere Ltd

Harby Road, Langar,
Nottinghamshire, NG13 9HT

Marks & Clerk LLP

90 Long Acre, London, WC2E 9RA

Mastenbroek Ltd

83 Swineshead Road, Boston, Lincs,
PE21 7JG

National Fluid Power Centre

Carlton Road, Worksop, Notts,
S81 7HP

Orby Engineering

Craigmore Road, Newry, BT35 6JR

Reesink Turfcare UK

1-3 Station Road, St Neots,
Huntingdon, PE19 1QH

PlantTech Research Institute

Bay of Plenty, New Zealand

Shelbourne Reynolds

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

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

Teagle Ltd

Blackwater, Truro, Cornwall, TR4 8HQ

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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).

This is a huge step forward to ensure high standards of professionalism and proven competence are met by those working to enhance and protect the environment across every sector.

This registration is timely and relevant for agricultural engineering and the associated technology sectors and the intention is that professionals in the industry will apply. The industry includes many different disciplines which need people to apply a professional approach and the Registered Environmental Practitioner grade is ideal for this.

Why should I register?

- Improve your career and salary prospects
- Stand out from the field
- Join a network of dedicated professionals
- Demonstrate your competence and skills.

Register through IAgrE now:

t: +44 (0) 1234 750876

e: membership@iagre.org

w: www.iagre.org

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

