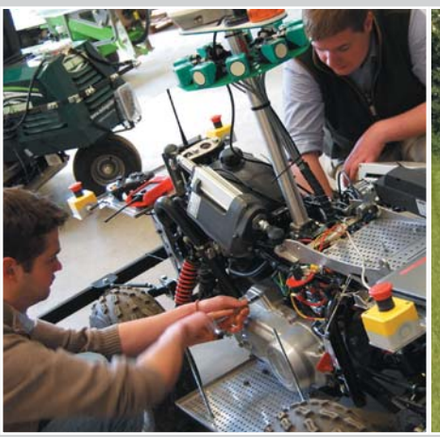


WORLD *of* OPPORTUNITY



exciting opportunities . specialist training . great fun!


CAREERS GUIDE 2015

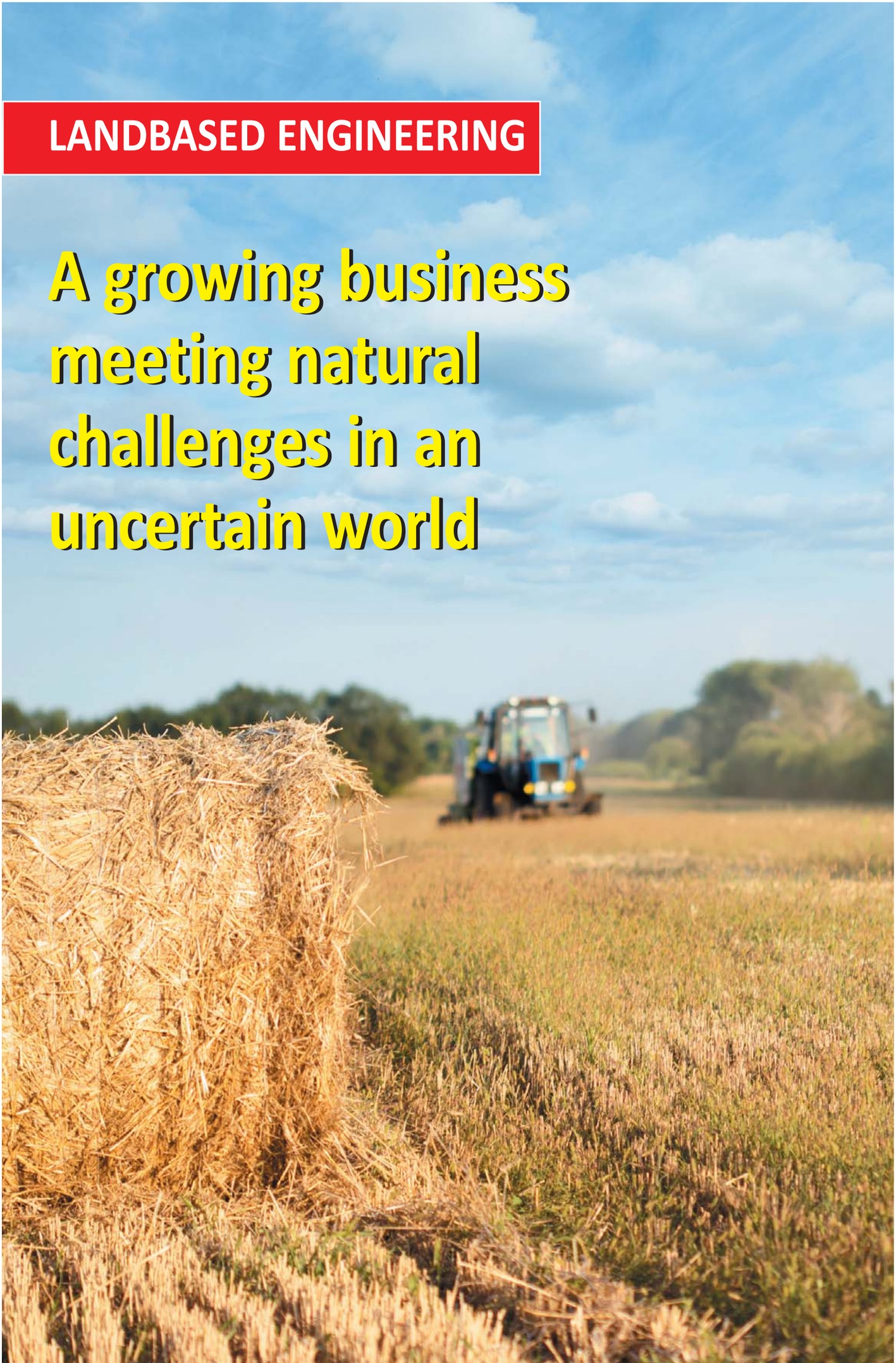
LANDBASED ENGINEERING

Engineering for Agriculture: *Feeding a Hungry World*

landbasedengineering.com

LANDBASED ENGINEERING

A growing business meeting natural challenges in an uncertain world



A World of Opportunity

LANDBASED ENGINEERING. What exactly does that mean?

In past generations, it would have meant building bigger and more powerful tractors and farm machinery.

Today, the game has changed.

The disciplines and skills now required include robotics, computer-based imaging, GPS technology, science-based solutions, climate forecasting, technological solutions, environmental controls and much, much more.

Although farming and food production is a major focus, our industry extends into a number of complementary areas. Everything concerned with the upkeep and control of the countryside, forestry, sports grounds and open spaces involves the application of engineering solutions.

What is for certain is that if you are keen on science, technology, engineering or information technology - and want to make a difference - then a career in Landbased Engineering could well be for you.

We hope this booklet gives you a sense of some of the opportunities offered into what is simply one of the best careers - on earth.

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LE-TEC

This booklet is published by the Landbased Education and Training Committee (LE-TEC).
LE-TEC brings together the following organisations (and others highlighted on page 15) representing the interests of manufacturers and suppliers working across the Landbased Engineering sector.

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CEO Agricultural Engineers Association

BAGMA

KEITH CHRISTIAN
DIRECTOR British Agricultural and Garden Machinery Association

ALASTAIR TAYLOR
CEO Institution of Agricultural Engineers

LANDBASED ENGINEERING

What is Landbased Engineering?

fast moving, challenging, exciting . . .

The agriculture and food production industry uses some of the most advanced and progressive engineering in the UK, successfully harnessing innovation and technological wizardry to meet the demands of the fast-moving agricultural sector.

Set this against the burgeoning world population, scarcity of natural resources, extreme weather and climate change; the need for new engineering and technology as a solution to the challenge has never been more important. Do you want to be part of that solution and leave the world a better place?

Where previously three or four tractors were used on a farm, today typically a farmer will have one or two massive tractors to cope with the huge acreage. These tractors will have an engine capable of producing 200 hp and upwards - and will be packed with as much computer-power, electronics and sophisticated control systems as an F1 car.

The down side is the bigger the tractor, the heavier it is! All of this has a negative impact on soil structure and drainage which in turn leads to reduced crop yields. What will the future hold? Perhaps a great number of lighter driverless tractors will be the future. Do you want to be involved with developing such an approach?

And as tractors and machines have grown in complexity, so the service support required to keep the equipment working at full efficiency requires a new breed of technicians and technical support, highly trained, committed and adaptable.

Challenging career

Working in Landbased Engineering is both rewarding and challenging.

You will probably enjoy the outdoor life, working on a variety of technology, and be attracted and fascinated by new innovations - and above all you will relish a challenge.

Whether as a design engineer or a service technician, career opportunities are broad ranging. The network of some 1500 UK agricultural machinery dealerships, most of them working hand in hand with one of the major manufacturers, are always on the look-out for fresh talent, and offer a variety of training opportunities.

You will work as part of a team, but be given the opportunity to build a career in whatever sector of the business appeals to you most.

NOT JUST TRACTORS . . .

Precision Farming

Precision Farming and the technology of mechatronics such as remote sensors, robotic systems and automation is now playing a vital role on our farms and in efficient food production.

Sensors and systems are adding a new level of precision and sophistication to performing accurate operations in the field, saving on seeds, fertiliser and pesticides. By doing so, environmental and financial benefits are achieved.

Dairy Equipment

WE drink around 5 billion litres of milk in Britain each year - the equivalent of 2,000 Olympic-size swimming pools - but many of us rarely think about the journey that milk makes from farm to fridge.

With modern dairy equipment, engineering meets biology. Farmers need qualified technicians working on their milking machines where raw milk is in direct contact with the machine - and must have the confidence that they are receiving the highest level of expertise in design, installation, maintenance, servicing and repair to ensure that the highest quality milk is harvested and animal health issues are minimised.

Turfcare machinery

AS with agricultural machinery, there are a range of qualifications that can lead to you working with a groundscare dealership.

And once you are there, the opportunities are endless.

You might be maintaining machinery for golf courses, working on fine turf machines for homes, - even working at a Premiership football club, a Championship golf course or a Test Match ground

And it is not only about mowers. Groundscare dealers look after a range of equipment.

Compact tractors, lawn tractors, irrigation equipment, Quads and All-Terrain Vehicles (ATVs), sportsground construction machinery - the list goes on.

Off-road Vehicles

THE term ATV (All-Terrain Vehicle) is used to describe a whole range of versatile vehicles that enable farmers, land-owners and event organisers to get around areas that would be largely inaccessible by a car or off-road vehicle.

Many farm machinery and grass machinery dealerships hold one or more of the leading ATV franchises, and there are plentiful opportunities to become a trained service engineer, salesman or trainer passing on riding skills and operator safety.

Forestry

Today's forestry equipment is packed with innovative technology, designed to make the job of the professional forester and landscaper easier and safer.

Chainsaws and cutting equipment are high power, compact and ergonomically designed.

Forestry is as much about timber production as it is the management of the forest as an amenity. Engineers for Agriculture are involved in innovative projects such as the design of bridges and structures to give improved access to the natural environment. This might include tree top walkways, mountain bike paths, and viewing platforms.

Environment

Sustainable development is central to the agricultural and associated landbased engineering sector. The condition of our environment is influenced by our behaviour and we have the opportunity to either nurture or mistreat it.

Landbased Engineering will play a leading part in developing alternative fuels in the coming years.

As producers and users - many tractors are today designed to run partly or wholly on biodiesel - farmers will increasingly be stepping up production of wheat which goes to make alternative fuels such as ethanol, or biodiesel made from rape seed.

Want to know more?

See the industry contacts listed on the inside back cover of this booklet.

VOCATIONAL TRAINING

Do you want a career that is . .

Challenging, inspiring, dynamic, influential, different, fast moving?

Then take a look at the vast range of opportunities offered by Landbased Engineering.

As the name suggests, we are all about making the best of the land and open spaces in this country - and overseas.

Agriculture, farming and food production of course. For there is no greater need today than to ensure that enough food is produced to feed the ever-growing world population.

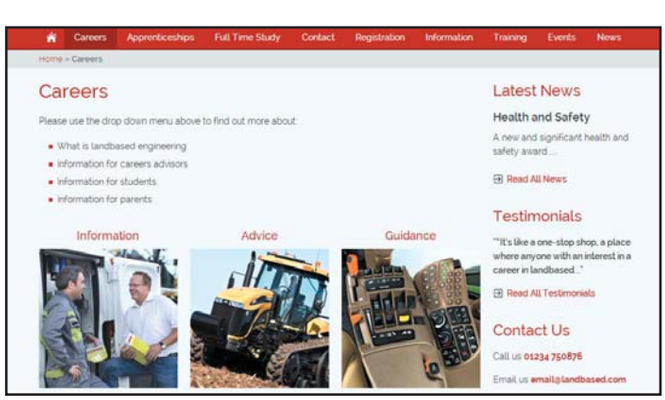
That needs machinery and equipment to maximise production. New technologies, new science-based solutions, robotics, GPS systems and much more.

The care of the environment, management of trees and forests, land for sports and recreation, sports-grounds, parks and estates. All require machinery and equipment to maintain them in optimum condition. All require skilled engineers to design, develop, maintain and service that equipment.

Whether it's working on a big tractor with enough gad-getry under the bonnet as a Formula One car, or keeping mowers in tip-top condition to prepare Wembley, Lord's or Wimbledon for major occasions - all come under the banner of Landbased Engineering.

If you are the type that is up for a challenge, looking for something different, then there are potential employers and colleges that can set you on the path.

A place to start is the industry's own careers website - **landbasedengineering.com** - where you can find an array of options and details of the more than 20 colleges in the UK, specialising in providing full-time and part-time training.



COLLEGE TRAINING

Training and education courses are run by experienced teachers, often with wide experience in the industry.

Here's what four of them have to say about the appeal and opportunities within Landbased Engineering

MARK MOORE

AGCO Corporation

I joined Massey Ferguson in 1990 as a technical training instructor - where I taught dealers how to service and repair MF machines.

However, I quickly got involved in precision farming and helped develop the technology and its application in agriculture. Today I am directly responsible for developing and introducing mechanised solutions to farmers in Africa. In Zambia, I run a programme called the Future Farm that is developing agricultural knowledge to both the commercial and emerging farming sectors. We don't have all the answers, but we use teamwork to generate and disseminate education and knowledge. We bring expertise and knowledge from around the world to Africa and see if it works.

Everyone says we need to feed 9 billion people by 2050 and we are running out of land. This is not true - there is tremendous opportunity in Africa and the Future Farm project will be one of many initiatives that demonstrates how we will use this natural resource in a sustainable way. We need more people with a range of skills out there teaching agriculture and mechanisation. We need to develop new methods, modern technology and new media to deliver training education - and we need bright young people to achieve this.

MELVIN JOHNSON

Head of Training, Reaseheath College

The Agricultural Engineering community is something special. I have met fantastic people through the industry and the future for Agricultural Engineering education is bright.

We attract many great young people into our profession and as a leading training college we respond to technological changes in a measured way

DAVID LLEWELLYN

Vice Chancellor, Harper Adams University

At Harper Adams we have a unique group of students who go on to make major contributions to agricultural engineering.

Like many sectors, agricultural engineering needs more new entrants to meet industry demand; people who can be equipped to play leadership roles in the sector and who will continue to innovate to find new engineering solutions to the challenges that lie ahead.

RICHARD JENKINS

Trainer for John Deere equipment

I am a Technical Trainer at Babcock International Group working on the John Deere Advanced Apprenticeship Programme - and deliver knowledge and practical sessions to Landbased Engineering apprentices who are starting out in their career.

At Babcock, we usually run a theory based session in the morning followed by a practical session in the afternoon. I really enjoy de-mystifying subjects or systems; this element of my job is by far the most rewarding.

The image of agricultural engineering is perhaps not as good as it could be. This is a shame, as the technology we are dealing with is now so advanced, that we are in many ways far ahead of other industries.

HIGHER EDUCATION

University Courses in Landbased Engineering

Many Universities offer learning programmes in engineering, agriculture and environmental subjects and a number in Landbased Engineering, Agricultural Engineering or Biosystems Engineering - that unique connection of Biology and Engineering.

These include:

- **Cranfield University**
- **Harper Adams University**
- **Newcastle University**
- **The Royal Agricultural University**
- **Institute of Technology - Tralee, Republic of Ireland**

Keep an eye out for programmes which link Science, Technology, Engineering and Mathematics (STEM) subjects. In addition an increasing number of universities will be introducing new programmes and modules linked to mechanisation, agricultural engineering and landbased technology subjects. Other key terms you might consider are Agri-food or Agri-tech.

Many learning programmes will give access to accreditation from the Engineering Council at CEng, IEng and EngTech registration. This is administered by the Institution of Agricultural Engineers (IAgrE).

HARPER ADAMS UNIVERSITY

Agricultural and Off-Road Engineering Degrees

The engineering industry has a huge shortfall of suitably qualified people, so professional engineers are in great demand in the UK and worldwide. Harper Adams provides the skills, knowledge and, vitally, experience that employers and society needs. Because of the strong engineering and management elements of the courses, students have the skills to find employment throughout the engineering industry and are not restricted to agricultural or off-highway engineering careers alone.

Harper Adams graduates have an excellent rate of employment; many are offered their first job by their placement employer. They can be found working around the world as designers, consultants, project managers, test and development engineers, and product specialists. An engineering degree is regarded by employers as a highly flexible degree which incorporates a range of transferable skills. Harper Adams have developed strong relationships with some of the biggest names in the industry JCB, Claas, John Deere, BAE Systems, CNH, AGCO and Jaguar Land Rover - many of which also offer scholarships.

Most scholarship students will spend placements and holidays working with these employers, have their final year projects sponsored, and then go on to develop successful graduate careers with them.

96.2% **of Harper Adams graduates obtained full-time employment within six months of leaving university**

(Higher Education Statistics Agency report 2012/13)

CASE STUDIES

Wine growing and robotics

Two students at Harpers Adams, Kit Franklin and James Thomas have recently helped design a robotic tractor - for use in vineyards.

The University had joined a consortium with experts from Israel, Denmark, Germany, Greece, Italy, Switzerland, Turkey and the United Kingdom to develop an innovative irrigation solution for orchards and vineyards.

Scientists from universities, research institutions and industry combined their experience in robotics and automation, sensor technology, spatial decision support systems, irrigation and plant physiology.

Head of Engineering at Harper Adams. Professor Simon Blackmore said, "Our University is the home of the National Centre for Precision Farming and has a fine reputation as an innovator in the agricultural engineering field."

Farming from the air

A £2.9 million Agricultural Engineering Innovation Centre (AEIC) to support advanced teaching and research has recently been opened at Harper Adams University.

The AEIC is home to the National Centre for Precision Farming (NCPF), which aims to promote the use of technology as a vital aspect of precision agriculture

The facilities include an electronics/mechatronics lab, hydraulics lab, research lab for tractors and machines and a state-of-the-art lecture theatre, into which tractors and other machinery can be driven.

Part of the work of the AEIC is the development of Unmanned Aerial Systems, otherwise known as drones. UAVs can be remote-controlled or can fly autonomously based on pre-programmed flight plans, collecting large amounts of imagery data and video in a short period of time, and have the potential to increase agricultural productivity.

Wireless technology

Harper Adams engineering student, Richard Davies, 18, has devised a wireless camera which has won him an award from the Welsh Government.

Richard found inspiration for the project whilst helping to run the family contracting business in Montgomeryshire, when he noticed that it was difficult to reverse large vehicles. He designed a completely wireless camera, which works alongside any Smart device that helps drivers to manoeuvre vehicles whilst reversing.

What originally began as something for farm machinery, has since been developed for use with caravans and the wider market.

Apprenticeships are an excellent way to gain nationally recognised qualifications and valuable workplace skills, all whilst earning a wage! Why wouldn't you be interested in that as a package?

Training in the skills which employers want, an apprenticeship gives you choice in your career. Following your apprenticeship, you will most probably continue working for your employer or progress to higher education at college or university. The options are varied and exciting.

The main benefits of apprenticeships are:

- **Earn a wage.**
- **Paid holiday.**
- **Gain a nationally recognised qualification.**
- **Learn through working alongside experienced staff.**
- **Learn job specific skills.**
- **Start your training at any point in the year.**

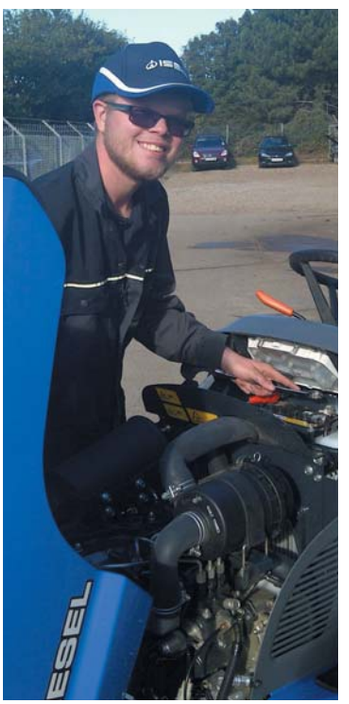
Apprenticeships are designed to allow you to 'earn while you learn' with most time spent at your workplace and usually training away from the workplace 'off-the-job' at a college or training provider.

Apprenticeships in Landbased Engineering are available at Level 2 (Foundation) and Level 3 (Advanced). Both lead to Work-based Diplomas - the certificates that qualify you as a skilled crafts person or technician, and something that will remain with you for life.

Getting involved

In Landbased Engineering, you will need to find an employer, machinery manufacturer, local college or training provider who offers apprenticeships.

Many machinery manufacturers offer their own apprenticeship and link this to a college of their choice.



Some local employers offer apprentices opportunities and these will probably send you to a local college or training provider for 'off-the-job' training.

The choices are:

- **Talk to your local Landbased college - if they don't offer apprenticeship in Landbased Engineering, they will be able to refer you to someone who does.**
- **You might already have a job lined up with a local machinery dealer and they may already be working with a local college of training provider.**
- **Most large machinery manufacturers will have a chosen college or training provider in place and will recruit apprentices from time to time.**

NEW APPRENTICESHIP STANDARDS

LE-TEC (which comprises AEA, BAGMA, IAgrE), in conjunction with representatives of independent employers and manufacturers, have worked together to develop the new Landbased Service Engineering Trailblazer apprenticeship standards.

New from 2016, subject to contiuned Government apporoval, the role of a Landbased Service Engineer (LBSE) at Level 2 Foundation (**tinyurl.com/m3csbdh**) and LBSE Service Technican Level 3 Advanced **(tinyurl.com/o9cm35v**) was included amongst 40 new standards in various industries.

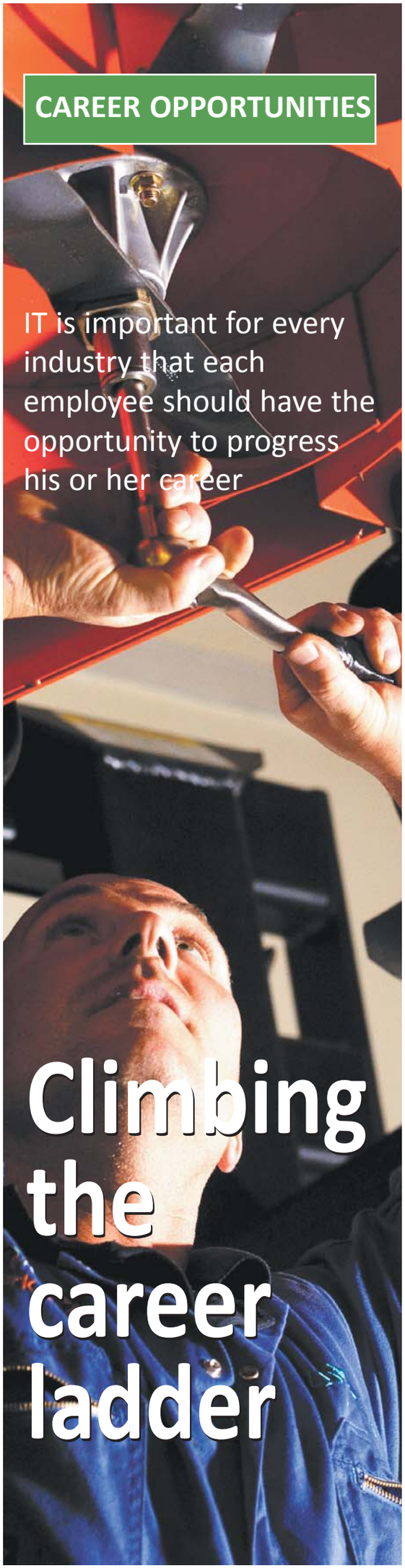
"Technicians are the backbone of every dealership and as an industry we need to make sure we provide them with a structured training programme and a recognisable career path. With modern agriculture increasingly reliant upon fewer, higher capacity machines, service is the lynchpin of any forward thinking dealership. Farmers and contractors cannot afford to have their machine standing idle, which makes the availability of well trained, highly skilled service personnel essential and often a key consideration in the buying decision. To achieve best-in-class apprenticeship standards will also make the industry more attractive to new recruits and help dealers retain their highly valued technicians", said Alastair Tulloch, Claas UK Divisional Manager - After Sales.

The Institution of Agricultural Engineers (IAgrE) CEO, Alastair Taylor commented, "I am absolutely delighted that two apprenticeship standards have received the stamp of approval from the government. This new approach really puts employers and industry in the driving seat."

IAgrE joined forces with the Agricultural Engineers Association (AEA), the British Agriculture and Garden Machinery Association (BAGMA) and machinery dealers such as CLAAS UK Ltd, Toro, Kubota (UK), AGCO Ltd, Ransomes Jacobsen, John Deere and Case New Holland to develop the standards for the new apprenticeships.

The Landbased Technician Accreditation Scheme (LTA), a scheme administered by IAgrE which you can learn about on page 12, formed the backbone to the new proposals. Under this scheme IAgrE, where appropriate, facilitates the registration of suitably qualified technicians as Engineering Technicians (EngTech) with the Engineering Council.

- Read more about current Apprenticeship Standards - **tinyurl.com/o6x8lb4**
- Read more about the future of Apprenticeships and the Trailblazer initiative - **tinyurl.com/purd8to**



TECHNICIAN ACCREDITATION

Unique to the Landbased Engineering industry and with the backing of the major manufacturers of agricultural, horticultural, forestry and groundscare equipment, the Landbased Technician Accreditation scheme (LTA) was launched in 2007.

LTA is governed by the industry body LE-TEC and administered by IAgrE. The objective of LTA is to provide a nationwide means of benchmarking, monitoring and assessing the competence of technicians employed within the sector.

The LTA scheme will also provide encouragement and recognition for both employers and technicians who voluntarily commit to continual professional development in pursuit of technical support excellence.

There are four categories or tiers with all tiers being registered on a central database held by IAgrE.

LTA 1: Entries on this register would be categorised as Students on a recognised landbased engineering course at a recognised Landbased engineering college, OR Apprentices (on recognised programmes)OR more skilled/mature entrants not yet otherwise assessed and categorised.

LTA 2: Newly qualified apprentices or assessed skilled technicians meeting the required criteria.

LTA 3: A skilled & experienced technician who has successfully attended a series of assessed course programmes - may be a product specialist.

LTA 4: A professional technician having a proven and assessed track record. Additional assessment criteria are included to demonstrate exceptional diagnostic and technical ability together with customer and technical mentoring skills.

All training is accredited by the relevant manufacturers in conjunction with the employers to guidelines agreed jointly. The scheme also provides a clearly defined career path for those working in the landbased engineering sector. LTA is administered by the IAgrE, and where appropriate, IAgrE facilitates the registration of suitably qualified technicians as Engineering Technicians (EngTech) with the Engineering Council.

With the ever increasing complexity and sophistication of tractors, harvesters and groundscare equipment, there has never been a greater need for competent technicians. LTA recognises their professionalism but also provides the confidence to customers that their equipment is being cared for by qualified and competent staff.

PARTS AND AFTER SALES

The parts operation of a land-based engineering dealership, regardless of the sector the business, operates within is an essential element of the businesses overall success and profitability. The objective of the LTA Parts Career Path (PCP) is to define the stages of career development for those working within parts departments of the land-based engineering industry.

PCP 1: The registration tier; open to persons employed in the parts department. Those registered will range from unskilled, apprentices undergoing training, and skilled but not qualified.

PCP 2: There are two methods of achieving the criteria required. Satisfactory completion of a Level 2 Parts Apprenticeship or alternatively a Level 2 Diploma in Vehicle Parts Principles, or the achievement of the PCP assessment aligned to the contents of the Level 2 Diploma in Vehicle Parts Principles.

PCP 3: There are two options. Satisfactory completion of a Level 3 apprenticeship or Diploma in Vehicle Parts Principles or individual assessment aligned to the Level 3 Diploma in Vehicle Parts Principles. Those attaining PCP3 will be required to join the IAgrE as an Associate member (AMIAgrE)

Milking Equipment

A separate and complementary LTA scheme is available to those technicians working the dairy industry. The scheme has been established by the Milking Equipment Association.

Technicians registered under the LTA MEA scheme will be those working on milking equipment supplied by manufacturers who are partners in the scheme. In conjunction with Reaseheath College, the MEA has developed a series of courses, designed to be delivered over three years, specifically aimed at those working on today's sophisticated milking equipment.

PROFESSIONAL QUALIFICATIONS

A major benefit of belonging to a professional institution such as the Institution of Agricultural Engineers (IAgrE) is that it demonstrates you have attained certain minimum standards of education and training. Membership of IAgrE is an internationally recognised professional qualification in its own right. IAgrE, as a licensed body of the Engineering Council (EngC) and the Society for the Environment (SocEnv), can offer its members professional registration which:

- **Recognises your expertise and hard work**
- **Provides high self-esteem**
- **Improves career prospects**
- **Improves influence in your organisation**
- **Gives access to life long learning**
- **Provides international recognition of your qualifications**

Amongst the professional qualifications are

- **Chartered Engineer (CEng)**
- **Incorporated Engineer (IEng)**
- **Engineering Technician (EngTech)**
- **Chartered Environmentalist (CEnv)**
- **Environmental Technician (REnvTech)**

Under the terms of its licence from the Engineering Council, IAgrE is able to accredit suitable engineering degree courses for Incorporated Engineer and Chartered Engineer.

Landbased Engineering

FREQUENTLY ASKED QUESTIONS:

What are the best subjects for me to study at A-Level?

Ideally you should study maths and physics. Electronics, chemistry, design technology, biology, geology or geography are also useful.

Do I need to have a farming or rural background?

Not at all. You will however need an interest in engineering, science and computer studies. You will be enthusiastic, adaptable, resourceful and keen to learn. You will also be likely to enjoy the outdoor life.

What if I am thinking of becoming an apprentice?

Many young people enter the industry through a dealership, either a farm machinery specialist or grass machinery dealership (although many sell and service both and a whole lot more equipment).

Talk to a local farm machinery dealer to see what opportunities they offer.

What could I be earning?

Once fully qualified, it is not unusual for a technician to earn a salary of £35,000 to £40,000.

There are also opportunities to work as part of the sales team, as a demonstrator or in the parts department.

Is it a long term career?

Think about it. Between 1990 and 2010 the world population grew by 30 percent. At the same time, as land resources reduce, and as climate changes, the need for solutions to feed the world are urgently required.

Engineers hold the the key to many of these solutions.

We're here to help . . .

Here are the key organisations involved in finding, advising, encouraging, training and employing young people in one of the most interesting and challenging careers - on earth

LANDBASED ENGINEERING

AGRICULTURAL ENGINEERS ASSOCIATION

The AEA was established in 1875 to promote the technical, trade and commercial interests of British manufacturers and suppliers of agricultural machinery. Since then it has championed the cause of manufacturers of agricultural machinery and more recently outdoor power equipment. Today its members cover a broad spectrum of manufacturers of land based equipment from combine harvesters to secateurs and everything in between.

www.aea.uk.com

BRITISH AGRICULTURAL AND GARDEN MACHINERY ASSOCIATION

The British Agricultural and Garden Machinery Association (BAGMA), is the dealer trade organisation for agricultural, garden and ground care machinery dealers. It was first established in 1917 as the National Association of Agricultural Engineers and Implement Dealers and has progressed through the last ninety or so years becoming BAGMA in 1972. BAGMA is now a Specialist Division of the British Independent Retailers Association (bira).

www.bagma.com

INSTITUTION OF AGRICULTURAL ENGINEERS

IAgrE is the professional body for engineers, scientists, technologists and managers in agricultural and allied landbased industries, including forestry, food engineering and technology, amenity, renewable energy, horticulture and the environment. IAgrE's prime remit is the promotion of professionalism at all levels through IAgrE membership and professional qualifications.

www.iagre.org

LAND BASED COLLEGES ASPIRING TO EXCELLENCE

LANDEX, which stands for 'Land Based Colleges Aspiring to Excellence' is an organisation representing 36 member Colleges and Universities in England and 6 Members in Wales, Scotland and Northern Ireland who deliver education and training in land based occupational areas.

www.landex.org.uk

SECTOR SKILLS COUNCIL for LAND-BASED INDUSTRIES

The UK's Sector Skills Council for land-based and environmental industries. As a Sector Skills Council they support skills and training for people and businesses in the land-based and environmental sector. Lantra are an independent UK organisation owned and managed by their industries. They work with employers and the UK's governments to address skills and productivity needs.

www.lantra.co.uk

It's all in a name . . .

When searching online, use the words 'Landbased Engineering' or 'Agricultural Engineering' to discover a world of opportunity . . .

LANDBASED ENGINEERING

NEW HORIZONS

. . . be part of the quest to feed the world in the years ahead

WORLD OF OPPORTUNITY is published by LE-TEC & sponsored by Edge Apprenticeships