LOW & ZERO CARBON CONSTRUCTION | INNOVATIVE HUB FOR SUSTAINABLE TRAVEL | INTELLIGENT REMOTE MATERIAL HANDLING

Autumn/Winter 2019

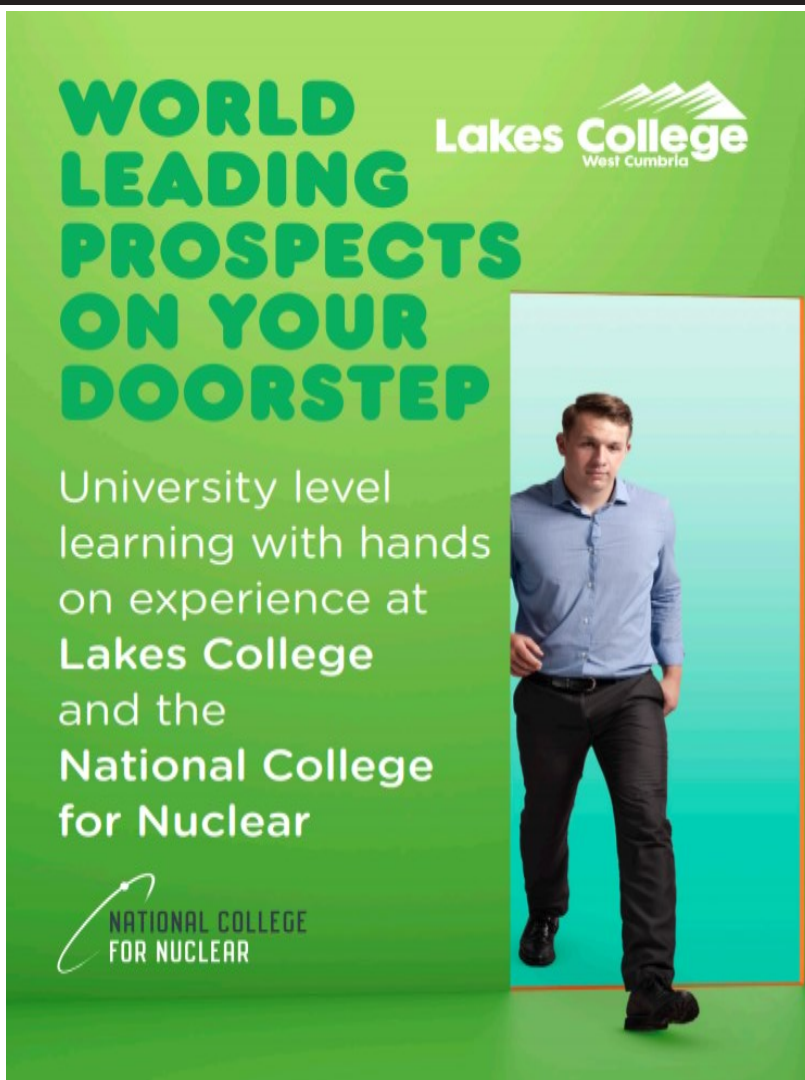
WEST CUMBRIA NEWSLETTER

Institution of MECHANICAL ENGINEERS

CUT DOWN TO SIZE

The 30-month project to remove Sellafield's FGRP hazardous stack

PLUS
Our prestigious event of the year, the IMechE West Cumbria Annual Dinner



Institution of MECHANICAL ENGINEERS

EVENT WRITE-UPS

ABOUT IMECHE

The Institution of Mechanical Engineers is the professional body overseeing the qualification and development of mechanical engineers. It has 120,000 members in 140 countries.

Visit imeche.org for more information about membership or professional registration and its benefits, visit www.imeche.org/membership-registration/become-a-member.

If you're an existing member of the Institution with a vision to be a future volunteer in education, become a STEM Ambassador, visit www.imeche.org/get-involved/volunteering-opportunities/volunteering-opportunity-details/stem-ambassador.

EDITORIAL

Editor and Designer: Matthew Williamson
Published on behalf of the Institution of Mechanical Engineers West Cumbria Area.

CHAIR'S COMMENT

Hi all,

Doesn't time fly. Here I am again, having the pleasure to once again reflect on another successful six months as Chair of the West Cumbria Area Committee, and look forward with anticipation to what looks to be a fantastic Autumn events programme.

This edition of our twice-yearly Newsletter tells you all about the Engineering Learned Society activities that we have undertaken over the last six months, including lectures on subjects including, CDM -Temporary Works; the Workington Transport Hub, as well as visits to more Engineering companies that thrive in our beautiful part of the world, such as PaR Systems, and TIS Cumbria Ltd.

You'll find on the back page a poster for our upcoming Autumn Events Programme. These include a talk on the Queensferry Crossing, and Tidal Energy, plus highly informative and interesting visits to Carrs Mill, Silloth and Harrison & Harrison, in Durham - who you may remember came to Whitehaven's United Reform Church about a year ago to tell us about the work they do in refurbishing church and cathedral organs. Please come book your place on the events, as well sharing the events poster and encourage your friends and colleagues to come along to them as well.

We're to develop our STEM (Science, Technology, Engineering, and Mathematics) Educational Engagements activities this year, culminating in the highly successful "Our World in 2050" Educational Extravaganza at Lakes College on 27th/28th June in conjunction with the Annual Dinner. We'd be delighted to get more of you involved in our STEM activities. If you're interested, get in touch with our STEM Co-ordinator, Ned Furniss (ned.furniss@sellafieldsites.com).

Talking about our Annual Dinner, yet again we raised the bar. "Sustainability" was the theme, and the menu reflected that. We had Colin Brown, IMechE CEO and Michael Ditchburn, Chief Engineer at Sellafield Limited, on the top table, along with Baroness Julia Brown, Vice Chair of the Government Committee on Climate Change developing the UK's strategy to attain zero Carbon Emissions. Our after-dinner speaker was Tamara Taylor, who represented England at the 2006, 2010, 2014 and 2017 Rugby World Cups, winning the trophy in 2014, and captained England in the 2015 Women's Six Nations Championship. In my University days, I had the pleasure of playing rugby union alongside Tamara and even went on tour to Russia with her... but that's a story for another day!

The Dinner was a sell out , and once again our sponsors are fantastic. Without their support, we would not have the funding to underwrite the dinner and continue to grow our Educational Initiatives. Furthermore, guests on the night dug-deep and raised £1318.61 for our 2019 Charity Raffle beneficiaries; Cockermouth Mountain Rescue, Hospice at Home and the Great North Air Ambulance.

And it does stop there, the planning for the 2020 Annual Dinner began in September, and we have a challenge and a half to match or better this year's event.

We're still looking for new Members to refresh our Committee, so if you feel like boosting your CV, improving your Chartership/Fellow credentials and want to help us keep West Cumbria as one of the most productive and successful Area Committees in the country, please get in touch with me.

With best wishes.

Caroline Hamilton CEng MIMechE
Honorary Chair – IMechE West Cumbria Area

KEEP IN TOUCH

Stay up-to-date with our Institution, locally and nationally, though our websites and social media networks:

IMechE West Cumbria: nearyou.imeche.org/near-you/UK/North-Western/West-Cumbria-Area
IMechE West Cumbria Young Members: nearyou.imeche.org/near-you/UK/North-Western/West-Cumbria-Young-Member-Panel
IMechE UK: www.imeche.org

IMechE West Cumbria *@IMechE_WCumbria* *Get in touch with a member of our committee via our Near You website*

WORKING TOWARDS ZERO

Michael Pemberton, CEO of Cumbrian property development venture BEC, together with **Joe Martin**, BEC's Head of Energy, provided and insight into the latest advances in low carbon construction. With a vision to create extraordinary communities for people to enjoy living and working in.

On 29th January we were joined by local property firm, BEC, to hear how it is putting low carbon at the heart of its developments, with case studies from two major projects: the installation of a smart energy microgrid at Westlakes Science Park, and the development of Whitehaven's North Shore with low carbon aspirations.

The UK's property and construction industry is a huge contributor to the country's carbon emissions. Pioneers from across the sector are working to reduce and reverse the negative impact buildings have on our environment.

BEC (British Energy Coast) sees itself as 'property developers with a difference'. The company strives to combine knowledge in the arena of sustainable development with a responsible business approach, and a drive to build extraordinary communities and deliver valuable local regeneration. It is owned by the Nuclear Decommissioning Authority, Copeland and Allerdale Borough Council, and Cumbria County Council and works in collaboration with many local organisations.

North Shore is an exciting regeneration plan that will bring new life to Whitehaven's harbour area. With plans currently under consultation for a four-star hotel, modern workspaces, food and drink offerings and supporting parking infrastructure, this development is looking to set new standards in urban regeneration. One of the most crucial elements is the potential for delivering a Zero Net Carbon development.

In the talk, Joe Martin – BEC's Head of Energy – walked us through plans to reduce energy loads, while optimizing passive design and active systems together with the recovery of energy. He further outlined plans to generate energy on-site as well as buying renewable power to fill any gaps, and explored the merits of this versus offsetting.

Joe delved deeper into the first building under construction at North Shore – The Buzz Station, a start-up hub for digital and creative firms. He explained that as a retrofit-style development, BEC was targeting BREEAM Very Good rating with great insulation and sustainably sourced materials. Added to this, the development is being assessed for suitability for solar PV, air source heat pumps, and MVHR (Mechanical Ventilation with Heat Recovery). Joe explained that to achieve true impact, the little things have to be considered just as much as the big things – and the level of detail being explored at the Buzz Station was impressive: DC Power over Ethernet (POE) circuit fed by solar PV and utilising battery storage together with low voltage lighting, PCs, USB charging points and telephone system. Crucially, the Buzz Station will be developed with future proof ducts to enable its future connection to the wider North Shore low carbon energy system, to enable local energy trading.

Artist's impression of Whitehaven's new £4.1 million creative hub

© BEC

Joe went on to explain plans for Westlakes Science Park – a site familiar to many of our members as either as place of work or a regular spot for meetings. BEC intends the site to be capable of complete independence from grid power in the near term, and heat in the longer term with self-sufficiency in generation from renewable energy sources. Crucially, this isn't just an expensive pipe dream, the plan is for commercial returns in the near future from the low carbon energy portfolio BEC develops that will in turn support tenants on site with lower energy costs and clean energy – all delivered via a smart micro-grid.

Diving into what will make the micro-grid function, Joe explained plans to make use of digital data from the likes of Smart Meters to provides autonomous intelligent decision making that will optimise CO_2 savings across the site with a micro-grid control centre.

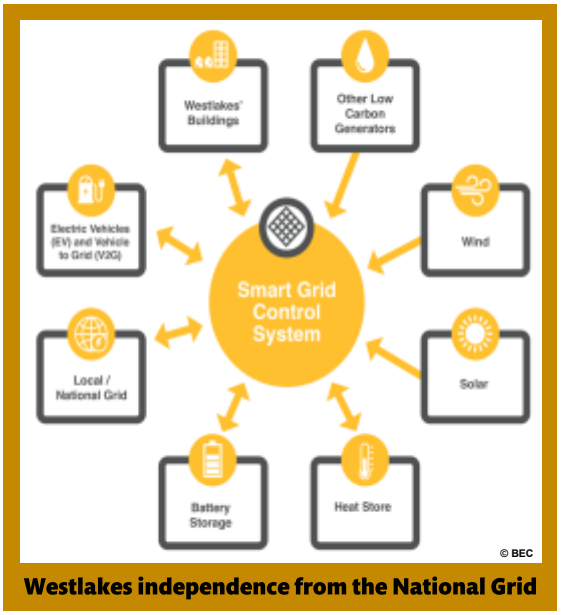
We heard that it is early days for the plan, but BEC has pressed ahead with a Low Carbon Energy Masterplan for Westlakes Science Park that benchmarks its current position and outlines potential routes towards the goal. Joe told us that the first engagement event with tenants was happening a few days after our presentation and we look forward to seeing the plans develop.

Closing the well-received talk, BEC's CEO Michael Pemberton thanked us for the opportunity to share the team's progress.

David Williamson

Artist's impression of Whitehaven Harbour area regeneration

© BEC



Westlakes independence from the National Grid

INDUSTRY CONSENSUS WORKING PRACTICES

Steve Ingle, Nuclear Access Compliance Manager Responsible for the Development of Temporary Works Policy, Procedure and Training within Altrad Industrial Services, held a talk on why the Temporary Works British Standard was introduced, the types of temporary works and how the standard affects the industry.

On 5th March 2019 at Lakes College West Cumbria, IMechE members and guests were presented with a talk under Construction (Design and Management) CDM Regulations of 2015, specifically aimed at Temporary Works Appreciation and BS5975 Code of Practice for Temporary Works.

The event highlighted the key personnel involved in Temporary Works (TW) and about the requirements set down in BS5975. Steve identified the different types of temporary works, discussed the available legislation, and outlined the need for Temporary Works Policies, while also providing explanation of design solutions in scaffolding access.

What is Temporary Works?

Temporary Works (TW) is a widely used expression in the construction industry for an "engineered solution" used to support or protect an existing structure or the permanent works during construction, or to support an item of plant or equipment, or the vertical sides or side-slopes of an excavation. BS5975 is a key document outlining TW recommendations, with practical guidelines on design, specification, construction and the use and dismantling of falsework.

Under the CDM Regulations of 2015; there is a need for all clients to understand the risks associated with temporary works. Clients must ensure that the contractual and commercial framework does not compromise their integrity, health, safety and welfare. There must be the appointment of organisations with the skills, knowledge, experience and capability to manage health and safety.

Works Roles

The correct design and execution of temporary works is an essential element of risk prevention and mitigation in construction. There are a number of roles within its execution which hold Health and Safety responsibility. The **Principal Designer** has a duty to plan, manage and monitor the pre-construction phase of a project, and share with the Principal Contractor (PC) information which may affect health and safety, and ensure that all Designers comply with their duties under CDM.

"BS5975 provides an industry consensus view on what's considered to be good practice. The legal requirement is that the party in control must ensure that work is allocated and carried out in a manner that does not create unacceptable risk of harm to workers or the public"

Health and Safety Executive (HSE)

During construction, the **Principal Contractor** (PC) is regarded as the key organisation in relation to Temporary Works and should plan, manage and monitor the works to ensure cooperation between contractors. The **Temporary Works Coordinator** (TWC) is responsible for managing the PC's TWs, and the PC should check that the contractors are competent at their tasks. The TWC is the named person responsible for safe and timely management of the temporary works on the site.

A **Temporary Works Supervisor** (TWS) can be appointed to support the TWC and their activities. Tasks involve producing a Temporary Works Register which ensures that temporary works are properly identified and managed. A Design Brief should be produced with key information for Designers, including any risk and complexities of the job. When the TWC and TWS are completely satisfied that the works have been done in accordance with the design, a Permit to Load is issued, as well as a Permit to Unload, the latter being the final stage, and need to be conducted in a controlled manner.

The **Permanent Works Designers** (PWD) must consider the buildability of the structure; the overall design should have taken account of the methods of construction and the space required. The PWD should provide information such as risks involved in construction.

The **Temporary Works Designer** (TWD) has overall responsibility for the temporary works design and should take the significant risks provided by the permit work designers into account in the preparation of the design.

Inadequate Planning

Three men were killed and ten seriously injured when steel scaffolding for the Loddon Viaduct collapsed into a river bed near Reading in 1972. HSE launched an investigation resulting in the 'Bragg report' as the final document. This document identified recommendations on how to eliminate unnecessary accidents occurring in temporary work schemes - concluding that a Temporary Work Code of Practice should be produced and a Temporary Works Coordinator should be appointed on each site. In 1976, Professor Stephen Bragg commissioned to investigate such disasters. The resulting final report, the 'Bragg report', helped to set the UK standard for temporary works.

An example where a Temporary Works Code of Practice was not followed was a scaffolding collapse in Milton Keynes during 2006. Here, it was discovered that the scaffolding was wider than it should have been, the façade bracing was missing, there was unauthorised removal of loading bay–stability and leg loads, more than two tonnes of unused scaffold was placed on it when the design was not for bearing loads, and that the scaffolding was not regularly inspected. The contributing factor to highlighting the flaws was the vibration from the workers' duties - the scaffolding was not strong enough or stable enough for the work being carried out.

After the lecture, Steve carried out a Q&A session on the back of an eye-opening talk into the practices of temporary works.

Adrian Norendal


Steve Ingle with event organiser Adrian Norendal

Guest photoshoot featuring Chief Executive of the IMechE Dr Colin Brown (second from left) between Caroline Hamilton (IMechE West Cumbria Chair) and her husband Craig. To the right of Caroline is Tamara Taylor (English Rugby Union Player), Michael Ditchburn (Chief Engineer of Sellafield Ltd) and his wife Lorraine. Finally, to the right of Lorraine is Baroness Julia Brown of Cambridge, Paul Shechter (IMechE North West Regional Chair) and his wife Caryl.

THE DINNER

SUSTAINABLE ENGINEERING

A prestigious evening celebrating local engineering at the 15th IMechE West Cumbria Annual Dinner, with this year's theme being Sustainable Engineering. Special guests included **Dr Colin Brown,** Chief Executive of the IMechE , **Baroness Julia Brown** of Cambridge, British engineer and crossbench member of the House of Lords, and **Michael Ditchburn**, Chief Engineer at Sellafield Limited.

This year's Institution of Mechanical Engineers (IMechE) West Cumbria Area Annual Dinner took place on Thursday 27th June 2019 at the Lakes College West Cumbria, Lillyhall, Workington.

The Annual Dinner is the culmination of yet another highly successful year for the West Cumbria Area Committee and Young Member's Panel, and this year we had a very impressive Top Table with the Chief Executive of the IMechE, Dr Colin Brown CEng FIMechE FIMMM, Baroness Brown of Cambridge DBE FREng FRS and Michael Ditchburn BEng CEng FIET, Chief Engineer at Sellafield Limited, as our guests of honour.

This autumn also sees the Rugby Union World Cup being held in Japan, for both the men's and women's national teams. To celebrate this, we had a very special guest as our after-dinner speaker, Tamara Taylor, who represented England at the 2006, 2010, 2014 and 2017 World Cups, winning the trophy in 2014, and captained England in the 2015 Women's Six Nations Championship

Following the pre-dinner canapés & drinks reception, the 140 guests enjoyed pre-dinner talks by Caroline Hamilton, IMechE West Cumbria Area Committee Chair, and James McNally, IMechE West Cumbria Young Members Panel Chair, who provided updates on the activities of their committees over the past 12 months. Guests were also fascinated by an informative and interesting talk by Baroness Brown, Vice Chair of the Government Committee on Climate Change on 'Sustainable Engineering – The Path to Net Zero'; the UK's strategy to attain zero Carbon Emissions.

Following the pre-dinner activities, the guests adjourned to the college restaurant where they were served a variety of incredible culinary delights devised, prepared and presented by the college catering students, in keeping with the "Sustainability" theme.

This year's dinner was once again linked to a high-profile 2-day Science Technology, Engineering and Maths (STEM) Education Outreach Event. IMechE West Cumbria would like to extend its thanks, using the proceeds from last year's Annual Dinner, and the very kind help from the REACT Foundation, who organised the school's attendance to ensure that this year's Educational Extravaganza was another massive success. This year's event was "Our World in 2050" and is linked to our "Engineering Sustainability" theme; you can read more about this event on page 8.

As part of the visit to West Cumbria by Colin Brown and Baroness Brown, the opportunity was taken to show our guests some of the exciting sustainable engineering activities that are taking place in West Cumbria, including a walk and talk visit to one of Iggesund Paperboard's Willow Plantations, to show how the company engages with local

farmers to use fallow land to grow willow to provide carbon neutral fuel for the company's bio-mass Combined Heat and Power Plant at their Siddick Mill.

Presentations were also given on what the National Trust is doing in the Lake District to provide sustainable, non-visually intrusive hydro-electric schemes for remote areas, as well as a detailed presentation and site visit by Nigel Catterson on the Derwent Forest Development Project.

Another important element of the IMechE West Cumbria Annual Dinner is our Charity Prize Raffle. Once again this year, thanks to the generosity of the attendees at the Dinner, we raised a total of £1318.61 from our Charity Prize Raffle Draw, which we split equally between our chosen Charities on the night; Cockermouth Mountain Rescue, Great North Air Ambulance and Hospice at Home West Cumbria - three deserving causes.

Finally, the IMechE West Cumbria Area would like to extend a massive thank you to all the sponsors of the evening particularly our Gold Sponsor, ARUP; our Silver Sponsor, Babcock and Lakes College West Cumbria; and our Bronze Sponsors, Jacobs, Iggesund, North West Projects, PaR Systems, Altrad, Design Services Alliance and the University of Cumbria, as well as the REACT Foundation and Derwent Forest Development, for their help with "Our World in 2050" STEM Event. Without the continued support from our local companies it would not be possible to hold such an enjoyable social event, nor help Inspire the Next Generation through our STEM Outreach activities to take up the Engineering Cause.

David Williamson

Behind The Food

Using fresh ingredients and the first hand industry knowledge provided by their tutors, who have worked in some of the best restaurants in the country, the Graduates Restaurant at Lakes College has consistently delivered fantastic food and hospitality for our Annual Dinner.

Each year the students cater for our chosen theme, with this year's being "Sustainable Engineering" the students turned to the issue of sustainable food.

The sustainable food problem is nothing new. In January 2011, the Government's Foresight programme reported on The Future of Food and Farming: Challenges and choices for global sustainability. Whilst discussing the balancing of various factors, the report warned that without changes in farming practice, the global food system would continue to degrade the environment and compromise the world's capacity to produce food in the future, as well as contributing to climate change and diminishing biodiversity.

So the challenge was set to Lakes College West Cumbria catering staff and students to provide a menu for the IMechE West Cumbria Annual Dinner that fitted in with the events 'sustainable' theme. The immediate response was understandably; 'we always consider sustainability, using local and seasonal produce within our menu', however the students agreed to look deeper at what a sustainable menu could actually mean.

The result was a menu which, without serving up meat grown in the lab rather than reared on the hoof, or an array of nutritionally-positive insects, enabled the students to provide a fabulously delicious, yet sustainable feast that was enjoyed by all. The approach to the meat element of the menu has been to 'use the whole of, rather than selective parts of ...' which unfortunately in our developed world we tend not to do.

STUDENT AWARDS

COMMENDING THE NEXT GENERATION

As is the tradition of our Annual Dinners, a key element of the evening is recognising the outstanding achievements of the 'Next Generation of Engineers' with our Lakes College Engineering Students Awards.

The awards were presented by Dr Colin Brown, CEO of the IMechE. The recipients were; Callum Gentles, for 'Best Higher National Diploma Mechanical Engineering Student' and Travis James for 'Best Higher National Certificate Mechanical Engineering Student'. Well done!

This year a new Educational Award has been introduced, sponsored by Balfour Beatty Kilpatrick (BBK), for the "Best Level 3 Engineering Student of the Year".

This annual award will be known as the Ray Clements Award, in honour of Ray who managed the Sellafield Operations for 20+ years - he sadly passed away last year. Ray was highly regarded within the Cumbria, being a true advocate for apprenticeships and training. He was instrumental in BBK providing in excess of 85 local apprenticeships during his tenure and helped to develop countless careers.

The award recipient, who received an engraved shield along with £250 was M-Sport apprentice Michael Thompson. Congratulations!

Michael Thompson
Best Level 3 Engineering Student of the Year

Callum Gentles
Best Higher National Diploma

Travis James
Best Higher National Certificate
Mechanical Engineering Student

EDUCATIONAL EXTRAVAGANZA

OUR WORLD IN 2050

Coinciding with this year's Annual Dinner, our "Educational Extravaganza" high-profile 2-day Science Technology, Engineering and Maths (STEM) Education Outreach Event this year was the return of "Our World in 2050", linking this year's IMechE theme of Engineering Sustainability.

'Our World in 2050' is a off-timetable cross-curricula STEM enrichment activity focused on the topics of adaptation to climate change and sustainability.

This innovative initiative is aimed at Year 6 pupils (10-11-year olds) and has been designed to prepare them for Key Stage 3 of the National Curriculum. It aims to engage a more diverse range of pupils in thinking about engineering careers at a relatively early age in their educational development, and thereby attract wider participation in STEM subjects.

Aim and Approach

One of the key roles of the IMechE is to engage with young people and inspire them to become the UK's next generation of professional engineers. To this end, in common with other engineering Institutions, we organise, deliver and contribute to outreach activities that use practical technical-based approaches to engender an interest in engineering (such as building mechanical devices, racing cars, robots etc.).

However, it has been observed that this traditional approach can often alienate pupils who are not intrinsically motivated by such activities yet might have the potential to become excellent engineers in the future.

In response to this, the 'Our World in 2050' initiative was devised using a different approach which focuses on the conceptual stage of the engineering design process. The idea is to tap into the environmental concerns and creativity of young people. This engages a more diverse range of pupils in thinking about engineering as a career, dispels common myths and stereotypes surrounding the term 'engineer', and thereby has the potential to attract wider participation in STEM subjects.

What's Involved?

The activity encourages pupils to imagine how climate change could affect their world in 30 years' time, by 2050, and to come up with ideas for adapting the built environment, transport, technology and vulnerable areas (coastal fringes, flood plains etc.) to meet the associated challenges.

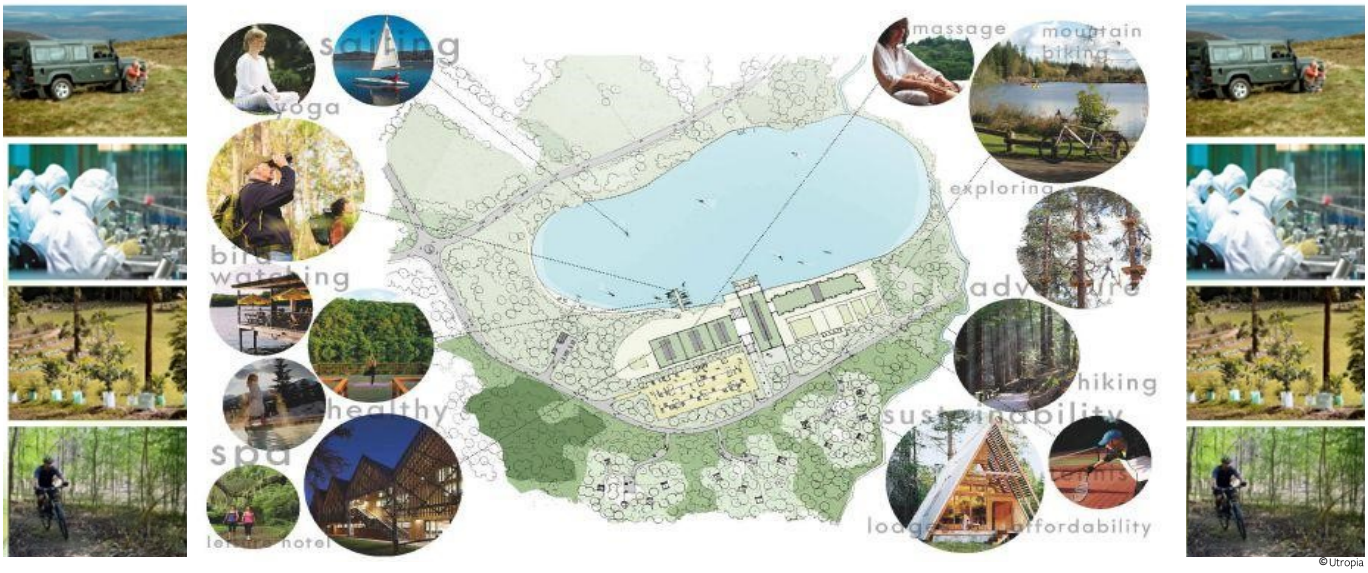
The pupils explore their ideas in relation to engineering feasibility, business criteria and sustainability and are directed to think about what they are doing in the context of engineering design. A competitive dimension, through a judging process, brings fun to the activity as well as innovation, teamwork, enterprise and technical rigor. The underlying message is that engineering will be needed to turn their creativity into reality and that engineers are fundamental to meeting the challenges of climate change and sustainability.

Schools taking part in the event were; Dean CofE, Dearham, Wiggonby CofE, Broughton Moor Primary, Ewanrigg and Flimby Primary, with each day being introduced by Nigel Catterson, Managing Director of Utropia - the project which is sustainably developing Derwent Forest (formally Broughton Moor Naval Dump).

Utropia Project

The Utropia Project is a model of sustainable living, working and being. It will be underpinned by a set of environmental and ecological foundation principles and values. It will be a living laboratory where we learn how to do things differently for the benefit of the plant. At the site, it will build and encourage a range of developments that will demonstrate sustainability and renewable energy technologies, and eventually it will generate its own power and take care of its own waste.

David Williamson



©Utropia

LEADING FABRICATION, WELDING AND NDT SPECIALISTS

On the 18th of June, IMechE West Cumbria were given a tour of the Workington TIS plant by Quality & Technical Director, Paul Edmondson.

TIS Cumbria Limited (TIS) is regarded as West Cumbria's leading fabrication, welding and NDT specialist capable of taking concepts from design, through to production, installation and inspection. The company have a home grown workforce with a reputation for quality, efficiency and reliability.

The £2.9 million 54,000sq ft facility in Workington includes offices, rig hall, manufacturing space with three overhead cranes and a radiography unit for use in the nuclear, oil and gas industries.

Paul explained how their initial work load consisted of predominantly nuclear work in support of the decommissioning activities at Sellafield. He stated how the company has now diversified to include work for oil and gas, and further afield with contracts for the London Sewer project. With respect to oil and gas, at the time of the Deepwater Horizon event, there was a requirement to produce an oil rig umbilical to aid capping off the Deepwater Horizon rig. TIS won the competition to produce this, which technically was extremely difficult with many conflicting procedures to comply with, and established providers to the oil and gas industry declining to tender.

Paul also explained that TIS were fully certified to undertake CE marking activities and regularly provide advice to clients on how to comply with the legislation. With regards to the current workload at TIS, Paul detailed that they were currently doing work for Sellafield, Westinghouse and the London Sewers project.

The tour moved from the conference facilities to the plant where the party were able to see the large rig hall and crane facilities, as well as the offices. Paul gave a detailed description of each of the projects and the associated difficulties faced, these included in several cases TIS undertaking a great deal of investment in infrastructure and equipment.

With TIS's commitment for providing good quality employment opportunities for young people in West Cumbria, especially though its Community Apprentice Scheme, the future looks exciting at TIS.

Tom Pritt

Paul Edmondson with event organiser Tom Pritt

TRANSPORT HUB IS A BOOST FOR SUSTAINABLE TRAVEL

© Story Contracting

On Monday 25th April, John Slee, Project Manager for Story Contracting (Carlisle), provided a great insight into the design and build of the Workington Transport Hub.

Now retired, John was a successful Strategic Director who operated at senior level within both public and private sector organisations. The Workington Transport Hub was one of the final projects for John to work on. During the latter part of his career, John set up his own consultancy, having worked at operational Board level within a FTSE100 outsourcing company.

The Hub is one of a number of multi-mode transport interchanges either already constructed or to be constructed in West Cumbria, the goal being to promote better use of public transport. The Workington project aim was to encourage sustainable rail travel along the Cumbrian Coast, reduce traffic congestion in the area, improve access to both Workington Railway Station and the Cumbrian Coast railway line, and provide an appealing gateway to the town.

Story Contracting worked in collaboration with Cumbria County Council to deliver the scheme, which received £3.08m of funding from the Department for Transport through the Cumbria Local Enterprise Partnership. Design work was carried out by Capita Property and Infrastructure. The site covers a 1 hectare area of land between the Cumbrian Coast railway line and the A597, immediately east and south of Workington Railway Station in Belle Isle Place.

Story is a family-owned business, founded in 1987, who believe in 'doing it right'. They deliver complex projects within sectors of rail, plant construction and property. The business has also earned a reputation of maintaining outstanding health and safety practices across all of its regions and operating divisions. This was recognised nationally in 2018 and 2019 with the awarding of the prestigious RoSPA 'Gold' Award. More recently, Story were awarded 'Gold' on Network Rail's Route to Gold, for plant reliability and continuous improvement.

As John explained, the Workington site presented several challenges, including dealing with contaminated ground and the need for a drainage attenuation system. The talk covered the innovative solutions adopted and how construction work was planned and completed.

John described how work began in April 2016, with initial testing to determine the extent of contaminated ground in order to agree the required earthworks treatment in preparation for the new car park. Work was also progressively carried out to widen the A597. As part of the planning consent, a drainage attenuation system had to be created in order to collect surface water and then pump it to Soapery Beck, by installing a new pumping station.

Once the new car park was completed, work began on environmental enhancement work. This involved the use of conservation paving, foliage and signage. Towards the end of the scheme, additional work was requested to widen the existing footpath alongside the A597 and create a shared cycleway to further promote the use of the new transport hub.

The Hub became fully operational and opened to the public on Friday 24th March 2017. An event to mark the completion of the new hub at was held on 23 May 2017 with representatives attending from Community Rail Cumbria, Story Contracting and from other key organisations that have been involved in this high profile £3m scheme.

Caroline Hamilton

KEY FACTS

- 141 space visitor car park
- Attenuation system and pumping
- New paving and new surface treatments
- 135 metres of railway track renewed
- 45 tonnes of hazardous waste removed
- Realignment of existing paths & carriageways
- New signage, new streetlights, a new bus shelter
- Drop-off area, disabled parking, bike facilities

Birdseye view of the complete Workington Hub

© Story Contracting

INTELLIGENT SOLUTIONS DRAMITIC VALUE

John McGibbon, Managing Director of PaR Systems Ltd UK, welcomed IMechE West Cumbria to the European Headquarters for their International Remote Handling company in Workington. PaR Systems has been creating intelligent solutions for critical applications since 1961 and ensure that its clients succeed for their customers.

On Wednesday 13th February, John McGibbon, Managing Director of PaR Systems Ltd UK, welcomed a group of 39 members and friends of IMechE in West Cumbria, to a tour and insight of their new European Handling Solutions Centre of Excellence facility location in Lillyhall, Workington.

As a trusted partner since 1961, PaR Systems provides material handling, automation, and robotic solutions to many diverse industries and specialized markets. Their clients recognise PaR as the solutions provider for driving quality, productivity, and safety in manufacturing and other demanding environments.

PaR Systems has opened its new European Handling Solutions Centre of Excellence facility at Lillyhall, Workington. The new facility has been built with workshops for assembly of robotic and remote material handling equipment, together with equipment for the building, testing and refurbishment of nuclear manipulator systems.

As part of its official opening on 4th October 2018, an Inactive Hot Cell was unveiled as a unique facility feature to support UK nuclear sector. The cell will be used for trials and testing, building and servicing of remote handling systems for operations in nuclear and laboratory facilities such as reprocessing, and for decommissioning equipment development. This facility mocks–up a full 'Hot Cell', equipped with Master Slave Manipulators (MSMs), a nuclear crane and a PaR robotic manipulator system, all viewed through cell windows to simulate real 'hot cell' environments.

PaR Systems Ltd UK HQ

PaR Systems is skilled in material handling, from single cell packaging and palletising systems to specialty gantry crane systems. They have over 50 years of experience in designing and developing automation solutions. PaR Systems is also a FANUC Authorised System Integrator for robotic systems.

The company has over 100 years of legacy specialty crane experience to design practical solutions, and offers services and support for any crane system, even if PaR is not the OEM. PaR Systems also design bespoke systems, drawing from a wide range of prior experience with unusual constructions to provide a practical alternative.

In some cases, their special systems may not be recognised as cranes, even by others in the industry. When an application requires a very long lift, high capacity, high speed, extra safety, reach into corners of a structure, or any feature that is not available "from a catalogue", PaR Systems can help. In fact, it's common for their competitors to refer their customers to PaR when a standard, pre-engineered crane does not fit their requirements.

Following a highly informative presentation by John on the company, its history, its high-profile achievements and clientele, a comprehensive tour of the Workington facility took place.

The evening closed with a Q&A session and the now customary presentation of the IMechE West Cumbria Pit Tankie as a vote of thanks to John and PaR Systems for hosting the visit.

David Williamson


Event organiser David Williamson offers his thanks to John

CASE STUDY

CHERNOBYL

PaR Systems played a large role in the Chernobyl clean-up system, after the disaster of 1986. PaR's TensileTruss™ Technology and the Main Cranes System (MCS) was installed in Chernobyl, 30 years after the accident.

This MCS will be used exclusively for the clean-up efforts of the destroyed nuclear reactor at the Chernobyl Nuclear Power Plant in Ukraine. PaR Systems is providing their patented TensileTruss™ technology which enables a rigid lightweight extendible Mobile Tool Platform (MTP), along with a full suite of specialized technologies, for robotic clean-up.

This TensileTruss™ technology was also provided by PaR to support the clean-up activities at the Fukushima nuclear site in Japan.

The MCS is enormous in size, measuring in at 96 meters long, which is taller than the Statue of Liberty. The MCS is made up of the four major components: two 96 metre (315 feet) bridges, a classic carriage hoist, a secure carriage hoist, and a Mobile Tool Platform (MTP) utilizing PaR's TensileTruss™ technology; one classic carriage hoist 50-ton capacity, one secure hoist 40-ton capacity-single failure proof Class 2 Nuclear lift, one mobile tool platform with 6 hoists operating simultaneously, runway rails and conductor bars and a control and camera system.

The major components of the MCS required extensive engineering and reliability analysis to ensure it could operate in the harsh radioactive environment. PaR Systems' sophisticated crane system will be instrumental in safely cleaning up of one of the world's worst nuclear accidents at the Chernobyl Reactor 4 site.

The structural elements being dismantled will be large and heavy, so this massive and thoroughly engineered MCS is required for the safety of the citizens and the environment.

DEMOLISHING A STACK ON A NUCLEAR SITE

Innis Wilkinson, the Stakeholder Manager for the Stack Demolition Project, talked to IMechE West Cumbria Young Members about the painstaking 30 month project to remove one of Sellafield's most iconic structures, the First Generation Reprocessing Plant Stack.

On 16th April 2019, Innis Wilkinson, the Stakeholder Manager for the Stack Demolition Project, kindly gave a talk on the demolition of the First Generation Reprocessing Plant Stack at Sellafield Ltd.

Anyone who has driven past Sellafield will recognise its distinctive skyline. This iconic skyline is now undergoing a process of great change. The First Generation Reprocessing Plant (FGRP) was constructed and commissioned in the 1950s and today sits within the most crowded area of the Sellafield Site, close proximity to several hazardous nuclear buildings. The FGRP stack was an authorised gaseous aerial discharge outlet for a number of operational and decommissioning buildings. Standing at 120m above the ground, the stack consisted of a reinforced concrete windshield with stainless steel flue liner.

The project's success is thanks to a collaboration between Sellafield Ltd, demolition partner Nuvia, steeplejacks Delta International, and lift operator Alimak, who came together to produce a three tier Self Climbing Platform (SCP) which ascends to the top of the stack and provides a platform for the demolition teams to work from. The platform was built and tested off site, before being carefully labelled, dismantled and exactly rebuilt on site.

Unlike Battersea Stack, the FGRP stack has an internal steel flue, is externally tapered and assumed to be radioactive. A structure was designed and developed, consisting of fourteen pads connected to the floor and roof by friction bands. These surround the stack and forms the SCP. An Alimak hoist system was added to facilitate personnel access and controlled waste removal.

The SCP is bound by 3 friction bands (two restraining bands and one lifting band). The figures below display show some of the statistics involved.

Project Challenges:

- 61m-high stack and extending to some 122m above ground level
- Stack located in close proximity to other key buildings and hazardous facilities
- Working height
- Safe access and egress to platform
- Environmental Impact and Waste Management

Nuvia Group

Levels one and two need to "shrink" as the SCP climbs to ensure the floor plates remain in contact with the concrete wind shield. The methodology developed by the design team is similar to the shutter on a camera.

The Stack climb took 9 months, with the descent process working in reverse to the ascent, which began in December 2017, meaning levels one and two need to expand with the growing stack taper to ensure the floor plates do not crash with the concrete windshield. Level three has to expand with the growing SCP but the inner circumference has to remain static against the parallel sides of the inner flue. This was achieved by sliding a second set of plates from under the fixed inner floor plates to ensure the floor was able to stay in contact with the inner flue. The gap between the concrete windshield and the steel flue expands with the taper of the windshield against the parallel steel flue. During demolition this gap needed to be filled to prevent demolition rubble falling down the annulus and falling down the stack to the building below.

Part of the stability of the SCP is provided by the rigidity of the interaction between the roof, the flue liner platform and outer framework. The roof is supported on the outer framework by lockable bearings to allow the SCP to grow under the roof while maintaining the core .

The platform climbed to a height of 58m up the stack in 52 increments having started 9m above the stack base. The platform was configured with level three and the roof to take the highest point of the platform to over 63m above the stack base which itself sits 60m on top of a building. By January 2019, the SCP had descended 29 increments removing both concrete windshield and steel flue liner in the process. As of August 2019, 9m of stack is all that remains and has significantly reduced the risk of the stack falling on surrounding buildings. A new chimney – known as the Separation Area Ventilation project – began operating in 2016 .

Rebecca Steven

This event counted towards CPD for all professionally registered engineers.
Log on to www.imeche.org/membership-registration for more information on CPD.

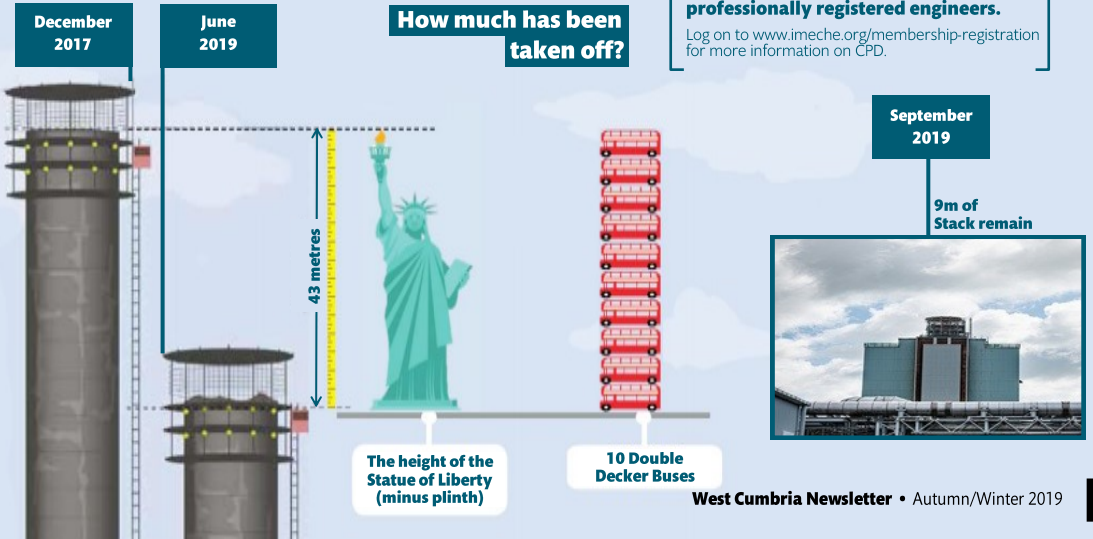
400 tonnes of concrete removed

30 tonnes of steel removed

200,000 tasks individually carried out

340,000 checks of the equipment and stack

How much has been taken off?



WEST CUMBRIA EVENTS CALENDAR

Institution of MECHANICAL ENGINEERS

TALK & PRESENTATION

The Space Race - NASA Asset Management

17 September 2019, 19:00 (registration from 18:30)

There's a great deal goes behind the scenes to enable NASA to continue to progress human-kinds thirst for exploring space. This presentation will give a high-level overview of the multi-year journey, undertaken in partnership between Jacobs and NASA, who use the space agency's testing facilities at the Langley Research Centre in Virginia, to provide critical engineering services.

Location: Lakes College, Lillyhall, Workington
Organiser: Tom Pritt (Tom.Pritt@jacobs.com)

TECHNICAL VISIT

Harrison & Harrison Organ Builders

Limited Numbers!

08 October 2019

As a follow up to last year's presentation by Harrison & Harrison, this is a visit to H&H's workshop in Durham; makers and restorers of pipe organs throughout Britain and abroad since 1861. The visit will see the progress on current projects; reconstruction of the York Minster and St Mary's Cathedral Edinburgh organs.

£10 per person and includes coach travel. Pick ups are Lakes College 09:00hrs and Cockermouth Main Street (outside Boots) 09:20hrs. Expected return times are 19:20 Cockermouth and 19:30 Lakes College.

Location: Harrison & Harrison, Durham
Organiser: Jim Furness (Jim_Furness@hotmail.com)

TALK & PRESENTATION

Queensferry Crossing Project

28 November 2019, 19:00 (registration from 18:30)

Presentation on The Queensferry Crossing, Scotland's largest infrastructure project for a generation and the longest three-tower cable-stayed bridge in the world. This stunning, globally unique bridge forms the centrepiece of a major upgrade to the important cross-Forth transport corridor in the east of Scotland. Arup was selected by Transport Scotland as part of a joint venture with Jacobs Engineering UK Ltd for its design.

Location: Lakes College, Lillyhall, Workington
Organiser: Mark Holmes (Mark.Holmes@arup.com)

TECHNICAL VISIT

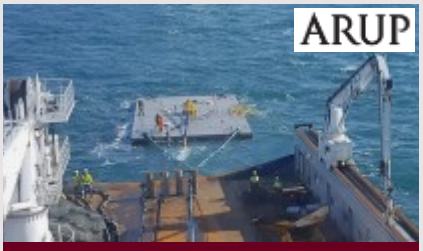
Limited Numbers!

Carrs Flour Mill - Solway Mills

05 December 2019, 18:00 (registration from 17:30)

Carrs Flour Mill in Silloth is a Victorian-built corn mill constructed in 1887. This visit will tour the operating mill, which supplies flour to a number of food manufacturers such as United Biscuits and several other leading bakeries and confectioners. Now part of Whitworth Holdings, Carrs Flour Mills is a thriving 21st century business processing 300,000 tonnes of wheat a year from its mills at Silloth, Maldon and Kirkcaldy.

Location: Carrs Flour Mill (Solway Mills), Silloth
Organiser: Caroline Hamilton (Caroline.Hamilton@holmen.com)



TALK & PRESENTATION

Development and Provocations in Tidal Energy

30 January 2020, 19:00 (registration from 18:30)

Tidal energy is a predictable, mature technology with the potential to produce 10% of the UK's electricity power supply. This presentation, by Arup, will look into current and future technologies of tidal power, and how high level calculations based on average tidal ranges have deduced that Admiralty Chart tide levels tend to underestimate energy potential, and the number of turbines required to move a volume of water.

Location: Lakes College, Lillyhall, Workington
Organiser: Mark Holmes (Mark.Holmes@arup.com)

>> BOOK YOUR PLACE ONLINE NOW <<

For more details and book visit: **nearyou.imeche.org/near-you/UK/North-Western/West-Cumbria-Area/events**

Pre-booking your place on an event is mandatory. Events will become active for bookings nearer its date. To hear first about bookable upcoming events, sign up to our IMechE West Cumbria mailing list; simply forward your email to: WCumbSec@imechenetwork.org. Our events are for all ages with no specific requirements unless specified. You do not need to be a member of the IMechE to attend, all are open to the public and free entry unless stated. For additional event specific enquiries visit the events page of our website or contact the relevant event organiser.

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