
THE CHARTERED
INSTITUTE OF BUILDING

YEAR 2014

INNOVATION AND RESEARCH AWARDS

YEAR 2014 WINNERS



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INNOVATION ACHEIVERS AWARD

Highly Commended Winner 2014

Q-Bot: Significantly Reducing the Cost of Insulating Buildings Using Robotic Solutions

Research Abstract

Q-Bot provides robotic services to the built environment that allow tasks to be carried out more easily, cheaply, safely and effectively than is currently possible with existing practices. The patent-pending technology and process empowers operators, helping them to become more efficient and productive. It enables construction companies to offer new services to clients and can help contractors swiftly improve the energy efficiency of buildings, reducing heating costs and making them more comfortable for occupants.

Q-Bot's initial application is retrofitting insulation to UK buildings at a fraction of the current cost, with none of the hassle of traditional methods. In this process, a robot intelligently applies insulation under floors, an environment which, until now, has been inaccessible for human operatives without prohibitive disruption and expense.

Winner's Bios



Mathew Holloway

Q-Bot Ltd., UK

Mathew is the Managing Director of Q-Bot where he leads the development and commercialisation of innovative robotics technologies for the construction industry. He has 8 years previous experience as a founder of two previous high tech start-ups where he turned his ideas into desirable products, generating 7 and 8 figure turnovers. As well as a first class honours degree in innovation and engineering design from Bath University, Mathew has a joint masters (MA and MSc) in engineering and design from the Royal College of Art and Imperial College. His technical background includes electrical and mechanical engineering, innovation mechanisms, intellectual property, industrial design, controls and programming (vision, analytics and interfaces).



Thomas Lipinski

Q-Bot Ltd., UK

Tom is a founder director of Q-Bot, the company using robots to conduct easy, cost effective and non-intrusive retrofitting. He has been involved with energy efficiency and retrofitting for years, not only researching and writing papers but also designing and developing products and systems that can better address the needs of existing homes. In his earlier career he won numerous architecture, design and innovation awards, including two from CIOB, as well as competitive innovation-led projects such as Retrofit for the Future or Energy Efficient Whitehall.

Judge's comments

“Q-Bot’s innovative robotic solution recognises the need for a non-intrusive method of improving under-floor insulation in existing properties. It is an exciting and innovative product which has great potential for improving the energy efficiency of the UK’s housing stock. The panel has high expectations for the Q-Bot’s future development.”

Merit Award Winner 2014

Improving Energy Efficiency of Traditionally Built Constructions

Research Abstract

Traditional stone buildings make up a large proportion of the UK’s building stock, so our focus must be on improving the energy efficiency of these buildings. The challenge is to make improvements that do not alter the external appearance or compromise valuable period features.

Icynene spray foam insulation was identified as the most suitable product for the traditional market. Its unique open cell and vapour permeable nature ensures no build-up of moisture. An added benefit is that this smart, environmentally responsible alternative to standard chemically-based products: Icynene is water-blown and contains no HFCs and CFCs. The initial trial involved one room of a large house. Skirting boards were removed intact to ensure the void between the lath and plaster linings and the solid stone masonry wall was clear of debris. Subsequently, 10mm pipes were inserted into the void from the attic space above and the insulation was injected down the pipes to fill the void. The delivery of the insulation was measured and distributed evenly over the area of the wall. Careful attention was paid to ensuring that no pressure was exerted on the lath and plaster lining to avoid causing any damage.

Separate research which involved the monitoring and simulating of alternative solutions further improved the process. After which, insulation was successfully installed throughout the entire property.

Acknowledgement to all academics and industrial partners: Mr and Mrs Gibbon-Wood – the owners of the building, Dr M. Abdel-Wahab, Dr A. Owen, Dr N. Turner, C. Levi, D. Chouman, D. Herrera, J. Hood, S. Faulkner-Lee, G. Sheridan, and R. Gilmore.

Winner's Bios



Dr Amar Bennadji

Robert Gordon University, UK

Amar is a researcher at the Institute for Innovation, Design and Sustainability and lectures in architecture and the built environment at the Scott Sutherland School, Robert Gordon University. His research focuses on the energy efficiency in the built environment, looking at ways that new technology such as digital media can help reduce energy demand in new and existing buildings. Amar has received various national and international awards for innovation and is a regular keynote speaker at conferences.

As an academic, Amar is constantly looking for ways to feed his research outcomes into his teaching, involving students in interesting and exciting projects, as well as delivering fun-packed lectures.



Mike Tweats

Icynene Kishorn Insulation, UK

Mike started out as a mechanical engineer in Lancashire, and soon moved into construction and civil engineering. After starting his own specialist stone masonry business, he moved to Scotland, where the business continued to grow. With a passion for old stone structures, Mike has developed a keen interest in the energy efficiency of older buildings, and has steered the company in this direction.

Judge's comments

"The innovation shows a non-intrusive method of improving insulation in historic buildings where interior walls are in a delicate condition. The judging panel was attracted to the idea of applying an existing insulation material by means of a new method of application. The innovation is made all the more convincing as a result to the thought given to the skills development required for replicating this method across the sector."

Premier Award Winner 2014

Oxypod: A Clear Solution to Energy Efficiency

Research Abstract

Oxypod™, which has been 11 years in development with financial support from The Goodwin Development Trust, removes entrained air from closed looped heating systems. The device removes trapped and dissolves air down to a level that prevents the build-up of black sludge (magnetites). It is achieved without the need of magnets, filters, inhibitors or any further maintenance. The benefits of installing Oxypod™ include: significant energy reduction in all types of systems; faster heat up and recovery times; lower running temperatures and greater comfort levels. Radiators hold the heat for longer, reducing the frequency of boiler ignition and burn times. Systems are quieter and the circulation pump runs without any vibration.

Research has shown that not only will Oxypod™ reduce system friction, but it will also reduce the viscosity of the heating water. As a result, cold spots in heating systems are eliminated. Modelling done by Hull University has demonstrated that Oxypod™ is a genuine crossover to light commercial use: its shape allows it to run in systems with a flow rate of up to 200 litres per minute.

Winner's Bios



Robert Harris MCIQB

Earthdome Ltd, UK

Robert is a founding member of the Ecological Design Association and member of the All Party Parliamentary Environment Group. He was previously college head of department for Agenda 21 and lecturer in ecological building at Kingston University and the London School of Economics. He co-invented the Oxypod™ implosion device with Stanley Whetstone. His company, Earthdome, was also the first to introduce ground source heat pumps into flats in London. Robert won the energy efficiency category for Master Builder of the Year both in 2005 and 2008. He has also been named British Green Champion for Fuel Power and Energy at the Green Apple Awards. His publications include the Local Government Management Board report Building Control Perspective for the Future.



Stanley Whetstone

Goodwin Development Trust, UK

With a background in engineering, Stanley has been involved with water heating sales for over 30 years. He began developing what is now the Oxypod™ technology in 2003, and started to collaborate with Robert in 2007. Stanley and Robert are continuing to work together to develop further products, including an industrial Oxypod™ for larger heating systems.

Judge's comments

“The judging panel was impressed with this self-contained product which combines innovation and simplicity in equal measure. It promises a significant potential impact on the efficiency of central heating systems across a wide proportion of the housing stock. The panel was especially impressed by the tenacity of the applicants in pursuing the innovation journey. Their commitment to the product is inspirational. The panel wish them the very best of success with this innovative and yet enticingly simple product in the future.”

Merit Award Winner 2015

Pro-active Construction Management System

Research Abstract

Proactive Construction Management System (PCMS) integrates a real-time location technology with virtual construction technologies to facilitate workers to detect unnoticeable hazards (e.g. a heavy machine approaching from behind) and provide proactive hazard-specific voice warnings immediately to workers when they are exposed to dangerous situations. The location technology implemented in PCMS has better suitability in changing construction environments in terms of location accuracy, ease of deployment and maintenance, and costs of purchase.

Moreover, the real-time position data of labour and equipment collected by PCMS enables us to automate safety risk assessment with changing site conditions. Specifically, a quantitative model for hazard exposure assessment was developed. For ease of understanding, in the quantitative model, a hazard is analogised as a radiation source and the hazard exposure is then referred to as the radiation quantity received. The longer duration and closer proximity in which a person is exposed to a radiation (hazard), the more radiation the person receives (the higher risk to which the person is exposed). Consequently, PCMS can provide safety officers with an ongoing and immediate means of comparing safety risk trends from worker, hazard and project perspectives.

Winner's Bios



Dr Xiaochun (Eric) Luo

Hong Kong Polytechnic University

Xiaochun is a senior research fellow and works at the Construction Virtual Prototyping (CVP) lab of Hong Kong Polytechnic University with Prof Heng Li. He earned his Bachelor of Civil Engineering, Master of Computer

Application in Civil Engineering and Doctorate in the field of computer-aided construction briefing in 2001, 2006 and 2010, respectively. His current research focuses on proactive construction safety management, occupational safety and health, and workers' behaviour and productivity. His earlier research areas include virtual simulation of construction processes, knowledge system development for construction briefing, and web-based construction project management.



Professor Heng Li

Hong Kong Polytechnic University

Heng is a world leading researcher in the area of Construction Virtual Prototyping (CVP) and Building Information Modelling (BIM). He is a Chair Professor of Construction Informatics and Director of Construction Virtual Prototyping Laboratory (CVPL). Under his leadership, the CVPL has conducted numerous funded research projects and developed the Proactive Construction Management System (PCMS) to integrate BIM with site management practices. Heng is the Review Editor of Automation in Construction which is a top journal on construction management research.



Mr Bo Ye

Hong Kong Polytechnic University

Bo is a research associate in the department of Building and Real Estate at the Hong Kong Polytechnic University. Bo completed his Master's degree at Chongqing University in China. With a background in software engineering, Bo participated in several R&D projects in the field of construction IT, mainly focusing on software design and development. His current research interest is in construction information technology and Building Information Modelling (BIM). He looks forward to developing a robust software platform to facilitate construction management.

Judge's comments

“The system demonstrates an innovative application of location technologies to help workers detect and control hazards on construction sites. This proactive and real-time warning system has much merit in providing potential solutions for managing health and safety on site. The panel looks forward to its further testing and exploration in real-world contexts, especially with reference to workers’ behavioural responses.”

MASTERS DISSERTATION AWARD

Merit Award Winner 2014

Modelling Building Construction Durations in Nigeria

Research Abstract

There is now widespread acceptance in the research community that time prediction models for construction projects should take time-influencing qualitative and managerial factors into consideration. Consequently, several multivariate models combining project scope with these factors have been developed. However, the literature also points to the limitations of these models: their application is only effective in the regions and countries where they were developed. This study aims to develop a multivariate time prediction model that is suitable for the Nigerian construction industry. A self administered questionnaire was used to source information on the project scope factors and qualitative and managerial factors that should be considered in the study.

Principal component regression was used for the data analysis and model development, using SPSS 16.0 for windows. Three models were developed; two of them - for the public and private sector - had high R2 values. Through testing and validation they were found to be suitable for predicting construction time. By contrast, the third model, which covered all projects, had a low R2 value and was found to be an unsuitable prediction tool. The models with high R2 values serve as a useful tool to help project managers and contractors predict construction time, thereby facilitating effective planning.

Winner's Bios



Hassan Ahmadu

Ahmadu Bello University, Nigeria

Hassan completed his PhD at the Ahmadu Bello University in Zaria, Nigeria, having previously gained a BSc in quantity surveying and an MSc in project management from the same institution. His current research interest is in mathematical modelling, particularly for predicting the duration of construction projects, and he has recently developed a deterministic construction duration prediction model for the Nigerian construction industry. He looks forward to developing a more robust stochastic model during his PhD programme.

Judge's comments

"A well-written dissertation which is tightly written and nicely argued. It draws from a broad and authoritative literature review to frame the research question

in an exemplary way. It has a diligent and statistically-rigorous analysis of quantitative data gleaned from a well-designed questionnaire survey. It is an excellent piece of work and is well deserving of international recognition."

Highly Commended Winner 2014

Japanese Construction Contractors in the International Market

Research Abstract

This study explores and compares the business models and financial structures of leading international construction firms. Its purpose is to identify the key determinants behind the declining presence of Japanese contractors in international markets. Financial ratio analysis indicates that there are no major differences in liquidity and leverage across these firms, although distinct differences in profitability and efficiency between Japanese and non-Japanese contractors have been identified. Moreover, Japanese firms have been found to be particularly capital intensive, for two reasons: First, unlike western countries, Japanese firms tend to grow organically without adequately leveraging the opportunities afforded by mergers and acquisitions. Secondly, the companies are required to invest in innovation and develop technologies that provide disaster-resistant products and services for the domestic sector. Furthermore, cost structure analysis reveals that a company's efficiency in the procurement of materials and services plays an important role in its improved profitability. The corresponding business models of these two analyses indicate that Japanese firms are neither unique in character nor considerably different in comparison to contractors in other countries. Every construction firm has its business model and financial structure deemed suitable for its surrounding environment to enhance competitive advantage.

Winner's Bios



Susumu Isoda

University of Reading, UK

After completing an MSc in civil engineering at University of Tokyo in 2002, Susumu joined the Shimizu Corporation, one of Japan's largest construction firms, as a site engineer. At Shimizu he has been engaged in a number of civil construction projects, specialising, in particular, in tunnelling and underground works both in Japan and overseas.

Having recently completed his MSc in construction management at the University of Reading in the UK, Susumu is currently working as construction manager in Singapore on a new chemical plant.

Judge's comments

“This is a very ambitious piece of work which draws equally from a comprehensive literature review and innovative empirical research. The dissertation addresses a number of complex business models, and provides a comparative analysis of data across the globe. Synthesised data is used to draw conclusions around the reasons for the declining engagement of Japanese contractors in international markets. The conclusions provide new insights which have not previously been recorded.”

Premier Award Winner 2014

Improving the Safety of Single Carriageways in Northern Ireland

Research Abstract

Road traffic collisions are both a social and economic cost on a country's economy. With growing population and rising traffic volumes, road safety improvements are becoming a major policy for authorities. The single biggest cause of road deaths in Northern Ireland is excessive speed on rural single carriageway roads. However the risk of collisions on rural roads can be significantly altered through road safety engineering measures. This study examines road traffic collisions on single carriageways, exploring the performance of wide single 2+1 (WS2+1) carriageways as an effective road safety engineering solution to Northern Ireland's single carriageway network. An in-depth critical analysis of authoritative literature provided contextualisation for this study. Quantitative analyses of bespoke secondary data sets were conducted which found that 90% of fatal collisions occurred on single carriageways. WS2+1 carriageways were the best performing scheme type with a 67% reduction in collision severity. WS2+1 carriageway configurations are a beneficial, cost effective engineering solution that reduces driver frustration and collisions on single carriageways. A wider communication and education strategy is strongly recommended as well as reviewing the viability of providing physical separation in order to eliminate the risk of head-on collisions.

Winner's Bios



Dean Elder

University of Ulster, UK

Dean from Co Londonderry, Northern Ireland, has more than five years' diverse construction experience and is currently working as a section engineer for BAM Nuttall. After graduating from Ulster University in 2010 with a first class honours degree in construction engineering and management, Dean worked in Doha, Qatar on Hamad International Airport, returning to the UK to work on Crossrail's Connaught Tunnel project. His passion for academic study saw him subsequently return to Ulster University to undertake an MSc in infrastructure engineering. He graduated with a distinction in December 2014.

Judge's comments

“A superbly presented and well-written dissertation that addresses a topical issue and mobilises rigorous statistical analysis with full use of available secondary data. The literature review is exemplary. It draws from current literature and weaves together a compelling argument. It is an excellent piece of work that could easily be used for policy development and infrastructure investment in improving road safety in Northern Ireland and globally.”

RESEARCH PAPER AWARD

Highly Commended Winner 2014

Construction Efficiency: A Tale of Two Developed Countries

Research Abstract

Published in Engineering, Construction and Architectural Management, Vol.21 No.3, pp. 320-335, 2014. The measurement of construction performance is a vexed problem. Despite much research effort, there remains little agreement over what to measure and how to measure it. The problem is made even more complicated by the desire to benchmark national industry performance against that of other countries. This paper introduces a new method for comparing international construction efficiency, tested on a dataset of 337 modern high-rise buildings in Australia and the United States. In doing so it demonstrates that the ratio of cost over time is capable of ranking the efficiency of projects, building contractors, cities and even entire industries – not only today, but also retrospectively. The conclusion, based on data from the largest five cities in each country, is that efficiency on site is improving in both countries. The growth in baseline cost/m² suggests a possible rise in project complexity over time. While the trend in efficiency improvement is similar, there is evidence that base costs in Australia have outstripped the United States. As a result, 'real' construction efficiency in Australia is relatively less. The USA is outperforming Australia in terms of construction efficiency by 1.10% per annum.

Winner's Bios



Prof Craig Langston MCIQB

Bond University, Australia

Craig is professor of construction and facilities management at Bond University, and director of the Centre for Comparative Construction Research. He was the recipient of the Vice-Chancellor's Quality Award for Research Excellence in 2010, the CIOB International Innovation and Research Award for best research papers in 2013 and 2014, the Facilities Outstanding Paper Award in 2013, the Emerald Literati Network Outstanding Paper Award for Facilities in 2012 and 2014, and the Australian Institute of Quantity Surveyors Infinite Value MBM Teaching and Research Award in 2014.

Judge's comments

"An extremely well-structured paper that outlines a new model for measuring construction efficiency. The author pulls together a considerable amount of existing data from the principal cities of Australia and USA. The paper tackles a very difficult subject that researchers and economists have struggled with for many years. It shows potential for moving towards more coherent global

measures of construction performance, and how these can be used to inform management from an international perspective.”

Merit Award Winner 2014

Comparing the Fit between BREEAM Assessment and Design Processes

Research Abstract

Published in Building Research & Information, Vol.42, No.3, pp. 300-317, 2014.

This paper explores the mapping of environmental assessment onto design and construction processes. A comparative case study method is used to identify and account for variations in the ‘fit’ between these two processes. The analysis compares eight BREEAM projects and distinguishes project-level characteristics and dynamics. Drawing on insights from literature on sustainable construction and assessment methods, an analytic framework is developed to examine the effect of clusters of project and assessment level elements on different types of fit (tight, punctual and bolt-on).

Key elements distinguishing between these types include: prior working experience with project team members; individual commitment to sustainable construction; experience with sustainable construction; project continuity; project-level ownership of the assessment process as well as the nature and continuity of involvement from assessors. Professionals with experience of sustainability judiciously used BREEAM to support their designs, alongside other frameworks. By contrast, less committed professionals tended to treat BREEAM purely as an assessment method.

The study suggests that more attention should be paid to individual levels of engagement with, and understanding of, sustainability in general - rather than to knowledge of technical solutions to individual credits. More focus should also be placed on ownership of the assessment process and on the potential effect that discontinuities – or interruptions - at the project level can have on sustainable design.

Winner's Bios



Dr Libby Schweber

University of Reading, UK

Libby has a BA from Harvard University and a PhD from the University of Princeton. She trained as a sociologist, specialising in the sociology of knowledge. Her early research focused on the use of statistics and styles of reasoning. Joining the School of Construction Management and Engineering at University of Reading in 2008 as a principal research fellow, Libby was made associate professor in 2011. Her current research focuses on the diffusion of low carbon technologies, the mainstreaming of sustainability in engineering

consultancies and construction firms and the development and use of policy and professional tools such as BREEAM.



Dr Hasan Haroglu MCIQB

Kingston University, UK

Hasan is a senior lecturer and course director of undergraduate construction management programme in the School of Civil Engineering and Construction at Kingston University, London. Prior to his current role, he was a research fellow at the Innovative Construction Research Centre, University of Reading, working on the 'BREEAM-in-Use' research project. Hasan holds an engineering doctorate and an MSc in construction management, both from Loughborough University. His research interests include quality management; design and construction process; sustainable/environmental assessment tools for buildings and procurement and contract strategies.

Judge's comments

"This paper clearly demonstrates how research can reveal the wide variation between formal intent and informal application in the use of environment assessment tools. It points towards the complexity of situations where the BREEAM assessment tool is applied, and demonstrates the differing motivations of individuals in the enactment of BREEAM certification. The work is strongly argued with a good critical analysis, and also shows an excellent use of qualitative data from case studies."

Premier Award Winner 2014

Effect of Safety Investments on Safety Performance of Building Projects

Research Abstract

Published in Safety Science, Vol.59, pp.28-45, 2013.

The construction industry is increasingly reliant on contractors' voluntary initiatives to reduce construction accidents. This study investigates the effect of investment on safety performance, and identifies some key influencing factors. For the study, a regression/correlation research design was adopted. Multiple techniques were used to collect data from 47 completed building projects. Bivariate correlation and moderated regression techniques were used to analyse the data. The results show that basic safety investment does not produce a constant effect on safety performance, but varies according to site culture and project conditions.

Investment in basic safety has a stronger positive effect on accident prevention if the project already has a robust safety culture and project hazard level. On the other hand, corresponding levels of investment in projects with a poor safety culture will not yield such positive results. The findings suggest that increasing protection and creating a safer environment will not necessarily raise safety performance if site culture has also not improved. So contractors' interventions should combine physical protection with other cultural safety measures.

Winner's Bios



Dr Yingbin Feng

University of Western Sydney, Australia

Yingbin is a senior lecturer in quantity surveying at the University of Western Sydney. Earlier in his career he lectured at Chongqing University, China and also worked as a structural engineer at China's No. 6 Institute of Project Planning & Research of Machinery Industry, between 2000 and 2007. Yingbin was awarded a PhD by the National University of Singapore (NUS) in 2012. He also has a BSc in civil engineering and an MSc in construction management from Chongqing University.

Judge's comments

"This paper provides a holistic re-evaluation of safety management within construction, exploring a variety of factors and clearly illustrating the highly complex and multi-faceted nature of safety within the industry. It is a well-executed study that sheds light on how safety investments can lead to both positive and negative safety performance. It is original, well written with clearly articulated objectives. It also has the benefit of being highly accessible to a wide readership."

INNOVATION IN EDUCATION AND TRAINING AWARD

Merit Award Winner 2014

A Discovery-Enriched Smart Mobile Phone App for Teaching and Learning Materials Development

Research Abstract

Traditionally teachers prepare most teaching and learning materials, and students are passive learners. In this new teaching and learning method, teachers prepare an assignment brief based on information about a local project. Students then use the Site Reconnaissance App (SRAP), a tailor-made smart mobile phone app, for exploring the latest applications of sustainable development for these projects. When they have conducted their field work, students share and discuss their findings online with classmates. After being reviewed by teachers, the information is uploaded onto a website. A database gradually develops which becomes an essential self-learning tool for students.

This process incorporates three main innovative teaching and learning approaches:

- a. A new synergy between teachers and students that enhances the educational process
- b. The adoption of the latest information technology to facilitate online discussion of fieldwork observations
- c. Sustainable development of teaching and learning materials.

These innovative teaching approaches motivate and ignite a passion for knowledge and discovery in the students.

Winner's Bios



Dr Kung Wing (Andy) Ng MCIQB

City University of Hong Kong

Kung Wing Andy, is a lecturer of the Division of Building Science and Technology at the City University of Hong Kong. He has built up extensive knowledge of the property-development process from inception stage to the end of the defect liability period. He has worked with building contractors, consultancies and property developers handling diverse projects. Andy started his academic career at the City University of Hong Kong. His recent research includes knowledge transfer, subcontractor management and site coordination problems.



Dr Wing Tak (Arthur) Leung MCIQB

City University of Hong Kong

Wing Tak Arthur has been involved in the management of a number of large projects in Hong Kong. These include the Great Eagle Centre, the Clubhouse and Grandstand for the Racecourses, Harbour City and family clinics. He worked in construction projects for about 14 years prior to joining the City University of Hong Kong. Arthur's research interests include construction management practices, construction planning, site layout planning, safety management and teaching and learning development studies.



Dr Tak Wa (Caroline) Chan

City University of Hong Kong

Tak Wa Caroline is a professional quantity surveyor and has been involved in the contract administration for a number of large projects, such as the Hong Kong International Airport Passenger Terminal and the Hong Kong Convention and Exhibition Centre extension. Her academic career started when she joined the City University of Hong Kong. Caroline's research interests include: estimating and tendering strategies; application of artificial intelligence in construction management practices and pedagogical studies related to AEC students.

Judge's comments

"The judging panel was impressed with the drive of the award winners in championing this innovation. The panel was especially impressed that the smart mobile phone app had encouraged students to engage more proactively during the learning process. It is hoped that this initiative continues to evolve and spreads across different institutions in Hong Kong and beyond."

Highly Commended Winner 2014

Inspiring the Future

Research Abstract

Inspiring the Future (ITF) www.inspiringthefuture.org was launched in 2012 with backing of major business and teaching organisations. The goal was to let pupils hear first-hand about the world of work from industry professionals from a wide range of sectors. Invitations to speak at schools have been traditionally extended to parents or local business people that have long standing connections with the institution. With the ITF website, teachers now have access to thousands of volunteers at the click of a button. Volunteers, ranging from apprentices to CEOs, pledge to give just one hour a year to a state school or college to speak about their job, career and the education route they took to get there.

Talks take a variety of formats. Teachers can filter their searches by sector or specialism, choosing activities that range from career insights to getting an industry perspective on CV writing. Allowing students access to people from a range of sectors, from construction to agriculture, has two major benefits: students gain first-hand insights and make better informed decisions about their subjects and career path; teachers also gain valuable understanding of many sectors of which they have little knowledge and experience.

Winner's Bios



Phil Pyatt

Education & Employers Taskforce, UK

Phil joined Inspiring the Future as director in 2013 at an exciting stage in its development. He helped grow the programme which now engages with 7,500 teachers and more than 18,500 volunteers. In total, Inspiring the Future has generated 68,000 individual invitations between volunteers and teachers.

Previously director of engagement at Localgiving.com, Phil has worked both in interactive television and at the BBC on a number of channels. He moved to the voluntary sector to work on youth projects. This led him to the charity Crimestoppers, where he headed up the youth team, and also to NESTA where he worked on education projects on innovation.

Judge's comments

“This initiative specifically reaches out to experienced professionals at various locations within the construction industry, and brings their experience, expertise and excitement about the sector into the school environment. Young people can hence be inspired to pursue their future career in the construction industry. ‘Inspiring the future’ recognises that one of the most significant issues facing the construction industry at the moment is its failure to market itself to school children.”

Premier Award Winner 2014

BIM-Hub: Educating Future Built Environment Professionals to Work in BIM Environment

Research Abstract

Increasing international collaboration in the building industry is resulting in fast-growing demand for professionals that can work in virtual teams within online BIM environments. International digital collaboration heralds a new way of working on site, and it will inevitably redefine the future of construction education. Built environment students with BIM competencies will have a competitive advantage in the job market. But there is little understanding of how educators can adapt quickly enough to this emerging area. The BIM-Hub initiative explores how educators can help students hone their BIM competencies, and their ability to collaborate internationally in a real-time collaborative BIM environment. The project captured the experience and identified the skills required to collaborate across highly integrated platforms. It also examined the impact of these skills on overall employability.

Guidance for tutors and lecturers on effective practice for international BIM education has already been issued as a result of this initiative. The findings and guidance are now being shared publicly, with the aim of encouraging a community of learning to develop. Information can be found on the project website: <http://bim-hub.lboro.ac.uk/>

Winner's Bios



Dr Robby Soetanto

Loughborough University, UK

Robby teaches construction management at Loughborough University. Prior to this, he held post-doctoral research posts at Wolverhampton and Loughborough Universities and also lectured at Coventry University. His current research focuses on the socio-technical system requirements of virtual collaboration in design teams. He believes that understanding and meeting these requirements will play a key role in the industry's successful transition to building information modelling (BIM). Robby has published over 90 works, including three books and more than 30 referred journal papers. His research has been funded by a number of public and private sector organisations including the Engineering and Physical Sciences Research Council, the European Union, the Higher Education Academy, British Council, Lloyds TSB and Hewlett Packard.

Judge's comments

"The judging panel was impressed that the innovation had been driven on an individual basis. This was a tight cohort of colleagues spread across three universities who clearly found the motivation amongst themselves to implement

this initiative. The innovation not only created cross-disciplinary learning for students in a digital environment, but also achieved the learning at an international level. The panel applauds Robby's effort and enthusiasm in developing this innovative teaching and learning approach in a BIM environment."

DIGITAL INNOVATION AWARDS

Highly Commended Winner 2014

3D MOVE: Mobile Immersive Visualisation Environment

Research Abstract

Fully immersive virtual reality experiences are difficult to achieve. The current solutions on offer - low quality displays within fixed environments; single user head-mounted display systems or expensive specially adapted rooms - all struggle to display complex BIM datasets efficiently. 3D MOVE: Mobile Immersive Visualisation Environment is a compact and transportable system that offers the benefits of a £1,000,000 virtual reality suite for just £30,000, including the cost of hardware and software. 3D MOVE is capable of immersing groups of users within a CAD model at a 1:1 scale. Items displayed are life-size and there is active stereoscopic projection for depth perception. Participants can navigate the system in real time, exploring complex datasets that are typically found on large infrastructure projects. The system's key innovation is its practicality: it fits into a cupboard; is transported to locations in a small van and can be operational within an hour of arriving on site. 3D MOVE is self-supporting, requires no special tools for assembly and runs from a standard power socket. Just two people are required to install it.

Winner's Bios



Dr Maxwell Mallia-Parfitt

University of Reading, UK

Maxwell is a research fellow in the Design Innovation Research Centre at the University of Reading where he develops visualisation equipment and techniques for building information modelling (BIM) and computer aided design (CAD) data. Having completed a PhD in computer science in 2013, Maxwell is currently building a repository of fully immersive visualisation datasets to inform and teach future students about BIM and asset management. Maxwell's background in robotics and systems engineering enables him to design hardware and software solutions that can quickly be applied to complex problems found in the construction sector.



Prof Jennifer Whyte

University of Reading, UK

Jennifer's interests are in use of design data for organisational decision-making. Working with major building and infrastructure projects such as Heathrow Terminal 5, London 2012 Olympics and Crossrail, her recent research has focused on visualisation, managing change, handover of data from projects to owners and owner use of asset information. She founded the Design Innovation Research Centre in the School of Construction Management and Engineering in the University of Reading. Set up with the help of an EPSRC Challenging Engineering grant for future research leaders, its vision is to promote new modes of design in the digital economy.

Judge's comments

"The strength of this highly impressive innovation lays in its practicality and potential impact on practice. Its contribution is to enable the functionality of fixed 3D visualisation facilities to be achieved by means of a highly cost-effective mobile product. The judging panel was hugely impressed, and recognises the product's great potential within the industry."

Merit Award Winner 2014

BIM Development for the Crossrail Farringdon Station

Research Abstract

BFK's goal at Farringdon was to link programme, model and design information so that it could be accessed by stakeholders from a single source at any stage of the life cycle of the asset. The JV selected BIMXtra software from Clearbox to achieve this goal, working with software developer to further adapt the BIMXtra platform for its complex requirements. Farringdon's BIMXtra platform is now compatible with the majority of computer aided design (CAD) systems, enabling design schedules to be automatically populated with the geometric data from different CAD models.

BFK's design team can also add non-geometric information directly onto the schedules during the design process. All information is automatically linked back to model components. One of BIMXtra's major advantages is the streamlining of data gathering for asset management: Instead being transposed by hand, a time consuming activity that is highly vulnerable to human error, data is generated through the linked design schedules. The delivery format can be set at any stage and the process is entirely automated. BFK predicts that the resulting CAD time savings for services subcontractors over the life cycle of the asset can be measured in man-years.

Winner's Bios



Kieran Standing

Bam Ferrovial Kier JV, UK

A Kier-sponsored engineering graduate, Kieran worked on Crossrail's Farringdon project as part of the Bam Ferrovial Kier (BFK) Joint Venture. During his six years in the industry, Kieran contributed to the design and tendering for large infrastructure projects, and also built up experience as a site engineer. At Farringdon he and his team looked at how BFK can help develop BIMXtra to suit large infrastructure projects. The results have not only benefitted BFK at Farringdon, but also provided greater benefits for Crossrail and other construction organisations.



Antonio Torres

Bam Ferrovial Kier JV, UK

Antonio has three years' experience on major projects including Heathrow airport's Terminal 3 integral baggage scheme where he worked as a CAD technical and document controller, managing the design handover. Using his experience and enthusiasm for innovation, Antonio has been a crucial member of BFK's BIMXtra development team.

Judge's comments

"The applicants demonstrated an advanced implementation of BIM technologies on a complex infrastructure project. They not only showed the simultaneous interrogation of multiple models developed in different software packages, but also the collaborative working relationship which included the client and software consultant. The judging panel was impressed by their enthusiasm in applying a range of BIM technologies."

Premier Award Winner 2014

Utterberry Wireless Sensors for Built Environment Monitoring

Research Abstract

UtterBerry is a patented intelligent wireless sensor system which works on extremely low power. Fitting in the palm of the hand and weighing less than 15 grams, UtterBerry sensors are the smallest and lightest wireless sensors in the world. Despite their size, they work to sub-millimetre precision, measuring multiple variables; collecting, processing and interpreting data at source and transmitting information in real time. UtterBerry sensors also analyse data trends to alert of pending and future events.

Some major advantages of the system are the ease at which UtterBerry sensors can be installed, deployed and maintained. Self-calibrating, the sensors can be placed into position by one person on a single site visit, using a pole for hard to reach areas. The system is also robust, automatically optimising communication within the network and continuing to function in the event of individual sensors failing. The low power consumption of UtterBerry sensors allows them to be deployed for years without the need for maintenance visits or battery changes. UtterBerry sensors are suitable for a wide range of industries and applications. They have already been successfully deployed on tunnelling projects.

Winner's Bios



Heba Bevan

Cambridge University, UK

Heba studied electronics and computer engineering at the University of Cambridge, receiving a first for her final year project on robotics visualisation. On graduation she worked as a CPU (central processing unit) engineer for microchip design company ARM. Returning to academia as a research programmer at Rice University in Houston Texas, Heba worked on the PACE Project, a major programme for US defence agency DARPA. Heba is currently completing her PhD at Jesus College, Cambridge, researching low power wireless sensor networks for subterranean mass-rapid transportation applications.

Judge's comments

“Only very occasionally does an innovation occur which is not only brilliant in its inception, but also serves to celebrate the excitement of major infrastructure projects. The Utterberry sensor combines expertise in micro-electronics with a practical understanding of digital applications in monitoring civil engineering works. The judging panel was impressed by Heba’s individual achievement and journey from an initial concept through to practical application. The benefits are clear and convincing.”

Highly Commended Winner 2015

Photogrammetric Monitoring of Construction Environments and Surrounding Assets

Research Abstract

As part of his research to optimise tunnel monitoring, over the last few years Mehdi has developed a new photogrammetric system that has been designed to monitor tunnel deformation with a great precision but yet with a fraction of conventional costs. This system has been installed in a number of tunnels to monitor the

integrity of structure while other construction activities were taking place nearby. This includes monitoring operational London Underground tunnels, and other underground spaces that were affected by the excavation of Crossrail project.

The benefits of using this system are:

- Low cost – saving up to 90% costs as compared to alternative systems
- Accuracy and precision – at resolutions of greater than 0.1 mm
- Redundancy – monitoring more points at no additional costs
- Real-time visual inspection – the software can be used to inspect structures and monitored points in real time in advance of human deployment
- Structural disruption – No need to install targets and often natural features on structure can be tracked as a target
- Installation – the system is small in size and easy to install, in some cases it is possible to install the system in one day
- Historic monitoring – Images can be archived within BIM and re-examined for additional points when needed.

Winner's Bios



Mr Mehdi Alhaddad

University of Cambridge, UK

Mehdi Alhaddad is currently a PhD researcher at Cambridge Centre for Smart Infrastructure and Construction, University of Cambridge. His areas of research include implementing ground-breaking technologies in the monitoring of infrastructure works (during construction and life time). He is the founder of CSattAR, which specialises in structural health monitoring of tunnels using photogrammetric techniques. Prior to commencing his PhD, Mehdi graduated from University College London (UCL) with first class honours, where he was selected in Dean's List at Columbia University as part of his international degree programme. He has also worked for ARUP as a geotechnical engineer.

Judge's comments

“The judging panel was impressed with the application of photogrammetric technology to the monitoring tunnel deformation and structure integrity. The strength of this innovation lies in its relative simplicity, accuracy and un-intrusive nature. This new photogrammetric system shows strong potential in the broader context of monitoring infrastructure works.”

UNDERGRADUATE DISSERTATION AWARD

Highly Commended Winner 2014

The Effectiveness of Current Smart Home Technologies to Improve Energy Efficiency

Research Abstract

This thesis explores the barriers to domestic energy consumption in the context of the implementation of smart monitors. Smart metering – or demand side response - helps consumers to manage and adjust their energy usage. It heralds the creation of a smart grid infrastructure, helping to reduce energy load on the national networks. However, there are considerable shortfalls in current smart monitors, which may present future challenges to effective demand side response. This paper reviews current smart monitors, highlighting the need for design improvements to facilitate sustainable changes in user behaviour.

Winner's Bios



Richard Smith

Loughborough University, UK

Richard studied architectural engineering and design management at Loughborough University. His research on energy consumption reduction highlighted the extent to which the construction industry needs to adapt to contribute towards a sustainable future. He has subsequently joined SDC Construction Group's management training programme as a quantity surveyor and has already worked on a range of projects with BREEAM Excellent credentials in the Midlands. He is an active member of CIOB, and is treasurer of CIOB's Bedfordshire committee.

Judge's comments

"This is a well-written and well-presented dissertation. It sets out clear objectives which were delivered throughout to demonstrate the barriers to domestic energy consumption reduction through the use of smart meters. Both quantitative and qualitative data were well analysed and synthesised to draw the research findings and conclusions."

Merit Award Winner 2014

Does NEC3 Aid Collaboration in Construction?

Research Abstract

This research asks the question: does NEC3 aid collaboration in construction? It begins by addressing the Latham (1994) and Egan (1998) reports which both identified the industry's adversarial approach to contracting as a key factor in poor project performance. With the sector subsequently placing greater emphasis on collaboration and integrated teams, this paper tests whether the NEC3 suite of contracts has had a significant influence on the increased levels of collaboration seen in the industry today. Following a comprehensive literature review, Mark developed a research methodology which utilised open and closed questioning through an online survey. In addition, detailed interviews were carried out with senior industry professionals. The large sample and high level of industry response resulted in a wealth of useful and meaningful data. The research found that NEC3 does aid collaboration in the construction sector. However, the contract will not be effective in isolation: collaboration is a complex issue which also requires high levels of human input.

Winner's Bios



Mark Doherty

Leeds Beckett University, UK

Mark graduated from Leeds Metropolitan University with first class honours in construction management. His achievements include the Dean's Prize for Excellence in Construction and Engineering and the Hays Construction and Property Award for Best Overall Academic Achievement. During his research, Mark conducted extensive data gathering and carried out detailed research to examine what effect NEC3 contracts have had on collaboration within project teams. As a project manager leading multi-disciplined teams on civil engineering projects, Mark prides himself on his customer service and stakeholder management as well as the core principles of delivering to time, cost and quality.

Judge's comments

"This dissertation set out a challenging research question which was addressed in exemplary fashion on the basis of a sound research method. The dissertation was progressed on the basis of a clear and coherent argument using a good blend of both primary and secondary data. It is well written with sound conclusions."

Premier Award Winner 2014

Risk Identification and Allocation of Singapore Construction Joint Venture Projects with Developing Countries

Research Abstract

In response to the increasing globalisation of the construction sector, Singapore's government is encouraging local construction companies to seek new business opportunities overseas. As a result, joint ventures with developing countries have become increasingly popular, despite the complexity and potentially high levels of risk.

This study seeks to identify and assess the critical risks, and propose appropriate risk allocation strategies that Singaporean contractors should adopt when establishing joint ventures with developing countries. Risks were identified through a comprehensive literature review and case studies, and were then assessed through a questionnaire conducted with professionals. Hypotheses were used to validate the significance of the various success and failure factors for forming joint ventures.

Comparing the biggest risk factors for building and infrastructure projects, political and financial risk were ranked as most critical for both groups. While the majority of risks can be shared, the paper identifies five risks that should preferably be allocated to the host or foreign partners. By providing practical guidelines for risk assessment and mitigation, this paper aims to enhance the probability of success for Singaporean joint ventures abroad.

Winner's Bios



Wei Yan (Eileen) Chin

National University of Singapore

Eileen graduated with a BSc in project and facilities management from the National University of Singapore and is currently working for the public sector, handling all the contractual issues for infrastructure projects, from commencement to completion.

Eileen is interested in furthering her studies in project management or contract management law. In addition to this, she also has a passion for community services.

Judge's comments

"The student has demonstrated excellent research skills by presenting this outstanding dissertation. The dissertation not only provides a comprehensive literature review on joint venture projects and related issues, but also possesses a well-justified research methodology with good data analysis. The analysis is

exceptionally clear and logical and leads to appropriate conclusions and relevant recommendations.”
