

THE CHARTERED
INSTITUTE OF BUILDING

YEAR 2013

INNOVATION AND RESEARCH AWARDS

YEAR 2013 WINNERS



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UNDERGRADUATE DISSERTATION AWARD

Highly Commended Winner 2013

Post-Project Reviews in the Construction Industry: An Institutional Approach

Research Abstract

Post-project reviews are effective tools to empower organisational learning for companies in the knowledge economy. However, their use in the construction industry has been limited. As a result, many companies are not benefiting from the capture and sharing of knowledge from past projects, causing a loss in precious lessons learnt and an overall inability to learn from past mistakes. This study seeks to understand the use of post-project reviews in the construction industry, probing deeper into the root causes of the lack of implementation through the application of institutional theory. Surveys and interviews were carried out with project managers. Identifying factors were then mapped to Scott's three institutional pillars to draw conclusions on the institutional factors that affect the adoption of post-project reviews. A case study was also conducted to examine the features of a strong case of post-project review implementation.

Winner's Bios



Andrew Chin

National University of Singapore

Andrew graduated with a BSc in project and facilities management with first class honours from the National University of Singapore. He is currently working in the field of project management with Keppel Land International, one of Asia's premier property companies. Andrew is interested in the field of process improvement and is also very passionate about technology.

Merit Award Winner 2013

Critical Success Factors for Achieving High CONQUAS Scores by Contractors

Research Abstract

Global competition is intensifying and clients are continuing to demand higher quality buildings. More and more companies are realising that they will have to improve the quality of their products and services in order to successfully compete in the marketplace. However, good quality is often hard to achieve and sustain. Ensuring and maintaining consistent standards can be tough. This is particularly true in the construction industry, where clients expect the final product to be of high quality, built at low cost and completed in the

shortest possible time. Contractors have faced and continue to face increasing challenges when attempting to improve workmanship performance. This dissertation presents the development of the Construction Quality Assessment System (CONQUAS), Singapore's de facto quality performance measurement system. It explains the application of the quality management system to manage CONQUAS and identifies 33 critical success factors for achieving high CONQUAS scores. Questionnaire surveys, interviews and case studies were conducted. The results showed that the critical success factors were known principles of quality, but were not always totally implemented. The dissertation structures the 33 critical success factors into a quality management framework, recommending adoption by stakeholders in order to drive up the quality of products and services in the construction sector.

Winner's Bios



Joy Ong

National University of Singapore

Joy graduated from the National University of Singapore with a first class honours BSc in project and facilities management. She is now pursuing a career in managing acquisition projects, providing contracting advice and expertise to ensure better developmental decisions during the project phase.

Premier Award Winner 2013

Benefits and Return on Investment of BIM for Multi-Disciplinary Project Management

Research Abstract

Building information modelling (BIM) is not a panacea for lack of productivity, experience or knowledge. It is integral for a company to establish an efficient link between the core competencies of its practice and the use of BIM to derive benefits. BIM is perceived as the next-generation solution to enhance productivity of the construction industry holistically and to streamline the delivery process of buildings and structures. However, there is limited evidence showcasing the existence of frameworks or formulas to optimise the benefits and return on investment (ROI) of BIM.

Winner's Bios



Yu Qian Ang

National University of Singapore

Yu Qian graduated as a valedictorian from the National University of Singapore with first class honours in project and facilities management. His notable achievements include the International Cost Engineering Council's Kenneth K. Humphreys Paper Award, the National University of Singapore Society Medal for Outstanding Achievement, and National University of Singapore Outstanding Undergraduate Researcher Award. Yu Qian is actively conducting BIM research and development and has won several local and international BIM competitions under various categories. He has also served as the president of his university's students union and is involved with community work. His other building-related interests include cost management, project financing and sustainable design.

INNOVATION ACHEIVER'S AWARD

Merit Award Winner 2013

Optimising the Strength and Density of Reinforced Concrete

Research Abstract

This innovation demonstrates how the density of concrete in reinforced structures can be reduced, creating a more economical and efficient product. It proposes mixing normal aggregate with a lightweight aggregate derived from clay waste from tunnelling projects such as Crossrail. The result is a high strength structural concrete which is much more efficient to produce. The weight of concrete made with normal aggregates is about 2.4 tonnes(te)/m³, of which 1.2 te/m³ is coarse aggregate. Although it is possible to make minor adjustments to reduce the density of the 'mortar' (cement, sand and water), reducing the mass of coarse aggregate has significantly more impact on efficiency. By reducing its mass by half to 0.6te/m³, the concrete weight is reduced by 25%. Clay, such as the type arising from deep construction projects, could be used to manufacture a designer lightweight aggregate that is suitable, in combination with normal aggregates, for higher strength structural concrete. The lightweight aggregate is made of clay minerals that expand at 1180°C producing a particle density of less than 0.65Mg/m³. As well as being very water absorbent, this produces a concrete mass of about 1.5te/m³ with a 25N/mm² strength limit.

Winner's Bios



Philip Owens

Nustone Ltd., UK

Philip's lifelong involvement with concrete began in 1953 when he joined the central laboratory of Geo Wimpey & Co Ltd. Over his varied career he has engaged extensively with the concrete and cement industries as researcher, trouble shooter, specifier, consultant and author, continually striving to appreciate in-situ concrete and understand its materials and performance. Now based at the University of Wolverhampton, Philip is researching how to increase the efficiency of concrete to improve the economics of construction.

Judge's comments

'The innovation shows concrete density could be reduced by varying the mix of lightweight and normal density coarse aggregate. It also shows the London clay waste from tunnelling could be used to manufacture the lightweight aggregate. The judging panel recognises the idea is somewhat short of commercial adoption, and that there are some barriers still to be overcome, but the panel was

impressed by the applicant's commitment, enthusiasm and tenacity in championing this excellent idea.'

Merit Award Winner 2013

Development of Sustainable Construction Material Using Agro Waste

Research Abstract

This innovation tackles three major challenges often faced by developing countries: a shortage of conventional construction materials due to limited availability of natural resources; the pollution from energy-intensive production of building materials and the accumulation of unmanaged agricultural waste. Turning these three problems into an opportunity, experiments were carried out to discover whether sugarcane bagasse ash could be the main raw material for a new type of energy efficient and sustainable brick. Bagasse ash is a fibrous by-product that arises after sugarcane stalks are crushed. It is also used as a biofuel. Raw lime, which is a lower-embodied energy binder, was used as a replacement for cement in the development of this innovative and sustainable masonry product. The research focussed on mixing different proportions of sugarcane bagasse ash, quarry dust and lime to create the optimum product, known as SBA-QD-L. The resulting SBA-QD-L product is lightweight, energy-efficient and sustainable brick that meets Indian Standards.

Winner's Bios



Dr Rahul Ralegaonkar

Visvesvaraya National Institute of Technology (VNIT), India

Rahul is associate professor in the civil engineering department at VNIT in Nagpur, India. He has more than 13 years of teaching, research, administrative and field experience in the broad field of energy efficient buildings and has won several awards and completed a number of sponsored research projects.



Mangesh Madurwar

Visvesvaraya National Institute of Technology (VNIT), India

Qualified engineer Mangesh is a research scholar at VNIT's civil engineering department and has more than 10 years of teaching, research, administrative and field experience in green construction project management. Both Rahul and Mangesh are regular conference speakers and have individually published numerous research papers in prestigious national and international journals. In India, they have also both been actively involved in the development and deployment of several national professional training programs.

Judge's comments

'The judging panel was attracted to the idea of utilising agricultural waste for producing bricks. The innovation has real potential for future application and is underpinned by good research.'

Highly Commended Winner 2013

Sensing Sheets for Structural Health Monitoring Based on Large-Area Electronics and Integrated Circuits

Research Abstract

This original approach to structural health monitoring uses large area electronics and integrated circuits to create a sensing sheet that detects changes in a similar way to how our own skin detects scratches on the body. The sheet consists of densely distributed strain sensors patterned on a polyimide substrate and combined with functional large area electronics. Integrated circuits are interfaced via non-contact links for sensor readout, data analysis, power management, and communication. The sheet is powered by an integrated flexible photovoltaic sheet, complete with rechargeable batteries, which protects the sensors from the elements. This innovative invention provides monitoring over very large areas, covering hundreds of square meters. The very dense array of strain sensors (several hundred per square meter) can be read and analysed locally. The sheet provides a reliable, comprehensive and affordable monitoring system that can be scaled up to the size of civil structures and infrastructure at an estimated cost of US\$400 per square metre.

Winner's Bios



Professor Branko Glišić

Princeton University, USA

Branko studied civil engineering and theoretical mathematics at University of Belgrade, Serbia, and earned his PhD at the EPFL, Switzerland. He spent eight years at SMARTEC SA, Switzerland before moving to Princeton. His areas of interest are structural health monitoring (SHM) methods, advanced sensors (fibre-optics, large-area electronics, and conductive polymers), SHM data management, and smart structures. Branko is author and co-author of numerous published papers, courses on SHM, and the book Fibre Optic Methods for Structural Health Monitoring. He is active member of several professional associations (e.g. ISHMII, ACI, TRB).



Professor Naveen Verma

Princeton University, USA

Naveen studied electrical and computer engineering at the University of British Columbia in Vancouver, Canada in 2003 before moving to Massachusetts Institute of Technology where he gained an MSc and doctorate in electrical engineering. Appointed assistant professor of electrical engineering at Princeton in 2009, his research focuses on advanced sensing systems, including low-voltage digital logic and SRAMs, low-noise analogue instrumentation and data-conversion, large-area sensing arrays based on flexible electronics and low-energy algorithms for embedded inference in sensing applications.

Judge's comments

'The analogy of the human nervous system applied for the purposes of structural health monitoring is a brilliant idea. The sensing sheets technology has not only shown its originality in innovation, but also shown its scope of potential application. It brings technology to a real-use application.'

Premier Award Winner 2013

ModCell: A Prefabricated Straw Bale Wall and Roofing System

Research Abstract

ModCell is one of the first products to make large-scale, carbon-positive building techniques a commercial reality. The system encapsulates the excellent thermal insulation qualities of straw within modern methods of construction. ModCell panels are solid glulam timber frames filled with straw that can be either lime rendered or dry-lined. The panels are fully engineered and load bearing. They are manufactured locally. ModCell is suitable for low and medium rise structures. Using renewable, locally sourced, carbon absorbing materials, it enables the creation of super-insulated, high-performance, low energy 'passive' buildings. The result is a less-than-zero carbon construction system. The renewable straw insulation components absorb and store significant quantities of atmospheric carbon dioxide as well as reducing heating and cooling requirements by up to 90%. New unique research methods were developed to demonstrate ModCell's viability. Approaches ranged from virtual modeling to analogue testing, taking place in a variety of locations from the laboratory to the field. Research covered acoustic, thermal, moisture, hygrothermal, airtightness, carbon foot-printing, co-heating tests, structural, durability, life cycle analysis, fire testing, exposure testing, accelerated weather testing, thermal imaging and process automation for scaled manufacture. It paves the way for straw bale and other renewable materials to be used in mainstream construction.

Winner's Bios



Craig White

ModCell Ltd., UK

Architect and renewable materials entrepreneur Craig is founding director of architectural practice White Design and also of start-up ModCell Straw Technology. Working in collaboration with Integral Engineering Design and the University of Bath, he led the research and design development work to bring the ModCell system to market. Craig is a board member of the Timber Research and Development Association as well as the Educate Together charity. He is a trustee of the Spike Island Contemporary Arts Centre and a chair of Wood for Good. He is also a steering group member of the Low Impact Building Innovation Platform Steering Board.



Finlay White

ModCell Ltd., UK

Finlay is a Marketing & Operations Manager at ModCell Ltd. He has worked within a wide variety of blue chip organisations, including Coca-Cola & Schweppes and BUNZL. Having spent more than 25 years in sales, marketing and operations, Finlay has extensive experience of structuring and reorganising sales and marketing teams. Working as a consultant and trouble shooter, Finlay helps companies identify operational weaknesses and implement improvement strategies. He has also launched start-ups from scratch, setting direction, methodology and standards for new organisations.

Judge's comments

'ModCell is a highly innovative idea. It comprises a system level of innovation in both prefabricated building product and process. It has also shown a strong application and a clear commercial viability. The panel was extremely impressed by the progress that has been achieved.'

DIGITAL INNOVATION AWARD

Merit Award Winner 2013

Reducing the Carbon Footprint of Existing Airport Terminal Buildings

Research Abstract

This digital innovation explores financially viable ways of retrofitting existing airport terminals to progressively reduce their carbon footprints. The research involved using detailed whole building dynamic thermal simulation (DTS) models to investigate the technical and financial impact of retrofit technologies on existing terminal buildings in the UK, focussing on the case studies of three terminals. Simulation models were calibrated against monthly utility data from the three terminals. The process improved understanding of how energy is consumed in terminals, finding that internal heat gains from lighting and equipment have a large influence on the overall thermal performance of the building. The research evaluated the installation of selected technologies both as single retrofit projects and also as part of packages and pathways. Investment appraisal models were then used to estimate financial impact. The results demonstrate that there are financially viable methods for significantly reducing the carbon footprint of existing UK terminals, but the implications are complex. The solutions that achieve the greatest carbon dioxide reductions and best financial performance are not the most energy efficient ones. Although large biomass combined heat and power units achieve the greatest reductions, their financial viability is reliant on government subsidies.

Winner's Bios



Dr James Parker

Leeds Metropolitan University, UK

James is a research fellow in the Centre for the Built Environment (CeBE) at Leeds Metropolitan University. After gaining a BSc in construction management and an MSc in sustainable architecture, James tackled the environmental and financial performance of large scale retrofits in airport terminals for his PhD thesis, which was funded by the EPSRC and completed at De Montfort University. As the research fellow in the CeBE, he continues to expand on this work, evaluating and analysing the performance of a range of non-domestic facilities and investigating the impact of advanced building control systems using dynamic simulation models. He is currently managing the CeBE element of a large scale solid-wall retrofit consortium project with major commercial partners.

Judge's comments

'The innovation comprises a methodology for applying advanced building simulation software in the evaluation of low-carbon retrofits of airport terminal buildings. The work is derived from the candidate's PhD studies and the judging panel was impressed with the clarity and rigour of the presentation. The panel believes James has an excellent research career ahead of him and would commend him to any interested industry partners.'

Premier Award Winner 2013

LightUp Analytics: Daylight and Sunlight Modelling Software

Research Abstract

LightUp Analytics is a software plugin for 3-D modelling software SketchUp. It enables 3-D architectural or building models to be analysed quickly and robustly for daylight and sunlight access. The plugin was created by combining the Building Research Establishment's calculations for vertical sky component, sky factors and average daylight factors with a powerful ray tracing rendering software developed for the games and visualisation industries. The resultant package can very quickly produce 3-D walk-through results, with spot-meter analysis. It can assess any scheme, from single buildings to architectural master plans of hundreds of buildings. The results provide screening for compliance with daylight/sunlight best practice - quickly and very cheaply; saving considerable consultancy fees. The LightUp Analytics software democratises what has been a specialist service and helps to enable architects/planners/urban designers to make their contribution towards reducing energy demand and improving the health and well-being of people. It been proved to significantly improve the daylight and sunlight access to development.

Winner's Bios



Julian Brooks

LightUp Analytics Ltd., UK

Julian is co-director at Brooks Devlin, an environmental design practice established in May 2008. With more than 15 years' experience in the environmental building sector, Julian works with developers, architects and house-builders that are exploring or committing to the concept of low or zero carbon construction and development.



Gary Jackson

LightUp Analytics Ltd., UK

Gary is an architect and urban designer at Space Strategy. Drawing on more than 18 years of consultancy work, Gary's strong portfolio of technical skills includes spatial master planning (development planning and planning frameworks with urban design).



Adam Billyard

LightUp Analytics Ltd., UK

Adam has been involved in 3D graphics for more than 25 years. He has already created LightUp for SketchUp, a software component that adds realistic, real time lighting to SketchUp models. A co-founder of Criterion Software, which revolutionised aspects of video games production, Adam has been involved in video game development for decades. His first published game was with Atari in 1983.

Judge's comments

'Julian has clearly identified a gap in current software provision for the computer simulation of daylight and sunlight effects in urban design. The LightUp Analytics Software is an innovative application that can be used at very early stages of master planning in an efficient and user-friendly way. It is an affordable product with great commercial potential.'

Highly Commended Winner 2013

The Labour Forecasting Tool

Research Abstract

The Labour Forecasting Tool (LFT) is a web-based strategic planning tool that predicts changing regional labour demands for a wide range of construction projects. The tool covers 26 occupational groups on a month-by-

month basis, given only the project type, its value or gross floor area, its duration and its location. As well as covering the construction phase, the LFT can predict the labour demand generated by the completed project, the so-called “end user” demand. In addition to covering seven major standard industry sectors (housing, infrastructure, public non-residential, private commercial, private industrial and housing and non-housing repair and maintenance), the LFT is capable of producing forecasts for infrastructure projects such as nuclear new build, tunnelling, railway construction and wind power. It enables the development of skills strategy plans, skills gap analyses and training needs at a level of detail that has hitherto been impossible to achieve, providing an evidence base to influence strategic decision making. Current practice relies on expert opinion or industry wide benchmarks (e.g. one apprentice per £m). The LFT advances this by generating specific forecasts on a monthly basis using a bespoke algorithm and taking account the lead and lag times for occupations. The forecasts are continuously updated as new data becomes available.

Winner's Bios



Sandra Lilley

Construction Industry Training Board (CITB), UK

Sandra has worked in the construction industry for 12 years and leads CITB’s commercial research portfolio. She specialises in developing CITB’s forecasting methods such as the Construction Skills Network and Labour Forecasting Tool and also leads on commercial tendering opportunities. Before joining CITB, Sandra headed up the construction research team at the Office of Government Commerce/HM Treasury.



Dr Douglas Forbes

Whole Life Consultants (WLC) Ltd., UK

Doug is a senior consultant with WLC Ltd., a spin out company from the University of Dundee. He worked for a major contractor before undertaking a PhD in sustainability assessment. Since 2008, Doug has worked extensively in the area of labour forecasting, being responsible for researching and managing the development of CITB’s Labour Forecasting Tool.

Judge's comments

'The applicants have identified a real problem and successfully developed a web-based tool for forecasting regional labour demands. It is a useful strategic planning tool with a degree of existing take-up from local authorities and other public sector bodies. The judging panel was impressed by the collaborative working partnership between CITB and WLC Ltd.'

INNOVATION IN EDUCATION AND TRAINING AWARD

Merit Award Winner 2013

The Learner Voice: Workplace Mentoring Scheme for University Students in the North West of England

Research Abstract

The Learner Voice was launched as a pilot workplace-based mentoring scheme in February 2013 by the Construction Industry Council (CIC) northwest regional committee in partnership with the HEA and the Construction Industry Training Board (CITB). Under the scheme, a consortium of universities in the North West of England collaborated with more than 30 locally-based construction and built environment companies. The pilot gave built environment students the opportunity to meet with industry professionals and talk informally about career choices, links between university and the world of work and placement opportunities. As a result of the scheme 65 students were matched with 56 mentors. A subsequent assessment workshop with employers, learners and academics identified a range of benefits arising from the scheme. Participants praised the potential for enhanced local relationships between companies and universities and the valuable insights gained on both sides. Students appreciated the advice and feedback, as well opportunities for networking and site visits. Mentors enjoyed putting something back into the industry and found contact with young people refreshing and inspiring. They also valued the opportunity to network with fellow professionals whilst gaining a continuing professional development in mentoring. Following its success, the scheme is being repeated in 2014. Other regions are also showing interest.

Winner's Bios



Aled Williams FCIQB

Higher Education Academy / University of Salford, UK

Aled has contributed to the development of built environment education with enthusiasm and effectiveness at a regional, national and international level. At the HEA his role is to manage the discipline interface between the academy, practitioners and staff at all levels of higher education as well as agencies and professional bodies. As a senior lecturer at the University of Salford, Aled has substantial experience in designing and teaching professionally accredited courses. He has been pivotal in driving forward new developments at the discipline and industry and is regional chair (North West) of the Construction Industry Council.



Roy Cavanagh

Seddon Construction Ltd., UK

Roy has been with Seddon for 47 years. A lifelong interest in education has seen him chair the 14-19 education group for the Construction and Built Environment (C&BE) and lead the training group for the North West Construction Hub. He formerly led the C&BE diploma and Chair of Construction partnerships for the North West region. His company has won the UK Contractors Group training award twice in three years. Roy was awarded an MBE for services to construction in 2009. Outside work Roy is an after dinner speaker and author of 15 sporting books.

Judge's comments

'The judging panel was impressed with the collaboration between a consortium of universities and industry partners in the north west region. There are real benefits in bridging the gap between industry and education institutions for both students and industry. The initiative aligns perfectly with the employability agenda and the panel would encourage other universities to progress the idea of appropriate mentoring.'

Highly Commended Winner 2013

Project Intermission

Research Abstract

Project Intermission involved students from various built environment disciplines working collaboratively on a 'real' project for a 'real' client with input from industry practitioners, and utilising cutting edge Building Information Modelling (BIM) technologies. The project challenged traditional approaches to built environment education in which different disciplines are educated in narrow silos and there is limited integration across the disciplines. Students came together from different courses and departments to form two teams. Each team had representation from a range of disciplines spanning architecture, construction management, quantity surveying and architectural technology. Students worked collaboratively over an intense period of eight days, including a weekend, to respond to a brief provided in person by a project manager from the university's estates department. Each team was supported by a different architectural practice and by a different quantity surveying practice. The project provided experience, not just for the students but also for the industry partners, of a genuinely integrated collaborative project involving design, cost planning and project planning. The outcomes were outstanding both in terms of the standard of the final proposals and the learning experiences of the students, academic staff, industry partners, and Westminster University's estates department.

Winner's Bios



Rob Garvey

University of Westminster, UK

Rob is a senior lecturer at the University of Westminster. He teaches on the undergraduate and postgraduate courses in the department of property and construction within the faculty of architecture and the built environment. A chartered quantity surveyor with more than 20 years' industry experience, Rob has worked with major companies such as Mace on a range of complex projects including Heathrow Airport's Terminal 5. He specialises in commercial aspects of project and organisational management and is now leading the implementation of building information modelling (BIM) on all courses. Rob is currently academic partner on the UK Government's project procurement trial, monitoring approaches to collaboration and integration

Premier Award Winner 2013

Teaching Construction Health and Safety through Problem-Based Learning

Research Abstract

Health and safety can be problematic to teach as students often struggle to engage. Problem-Based Learning (PBL) replaces lectures with problem-solving tasks in which students explore and research scenarios in small groups. Collecting and presenting data to their peers in this way deepens their learning. In this innovation, the scenario was not a safety incident or accident. Instead it told of a group of fictional students bemoaning their latest boring health and safety lecture, developing a narrative in which they argued about the need to learn health and safety for their future careers. The real students then had to justify or challenge the fictional students – Why is health and safety relevant? What can go wrong? Who is responsible? Through the PBL process, the students quickly engaged with the subject material and were soon able to understand the importance of health and safety to construction, and how they play a significant part in its management. Analysis of attitude questionnaires, administered before and after PBL, found significant improvements in student understanding, suggesting that PBL is a highly effective tool for health and safety learning in the built environment.

Winner's Bios



Dr Fred Sherratt MCIOB

University of Bolton, UK

Fred has over ten years experience in the construction industry. Having started out as site secretary, she worked her way up through planning roles, eventually ending up in construction management. Having moved into teaching, Fred now delivers site practice and management modules on the construction and civil engineering degree programmes at the University of Bolton. Her own research focuses on health and safety and this innovation was driven by her desire to ensure students fully engage and understand this critical aspect of construction, appreciating its importance throughout their courses and in their future professional lives.

Judge's comments

'This initiative is not only refreshing in its simplicity, but also in its novelty. It provides the means of overcoming a significant barrier in terms of students' default reaction to the subject of health and safety. The scenario constructed around opinions and typical reactions of students to health and safety offers a compelling and innovative learning vehicle. There is a core idea that can be replicated in other courses and other institutions.'

MASTERS DISSERTATION AWARDS

Highly Commended Winner 2013

Stonemasonry Skills Development: Balancing New Technology and Tradition

Research Abstract

Scotland's built heritage is an important contributor to the economy and society as a whole. The aim of this dissertation was to examine the challenges associated with the repair and maintenance of historic buildings. Concentrating on neglect and poor practice, the research examined to what extent skills development is a contributory factor to the challenges in the sector, with a view to informing practice. Lack of appropriate skills is a continuing concern in the quest for successful repair and maintenance strategies, despite a plethora of legislation. The dissertation met its twin research aims through an extensive study of relevant literature and the implementation of practical research. Two 'live' case studies were carried out using semi-structured interviews with key stakeholders in the industry. The findings demonstrate that the challenges in the heritage sector can be mainly attributed to poor skills development, and also to the bespoke nature of repair and maintenance carried out on historic buildings. Different blends of traditional and modern stonemasonry skills are required on each project, with solutions from each skillset often overlapping. The main conclusion is the importance of investment in skills development for historic building conservation. At its heart is a solution based on quality, performance and effectiveness. A cohesive and integrated skills development strategy is also required to meet these challenges.

Winner's Bios



Scott McGibbon

Heriot-Watt University, UK

Scott is an experienced and qualified stonemasonry consultant and contractor. He has been diagnosing, working on and advising on appropriate masonry repairs to heritage buildings for nearly 30 years and has been involved in numerous prestigious projects such as Edinburgh's Scott Monument and the Scottish National Portrait Gallery. Currently a stonemasonry and architectural conservation lecturer, Scott is also an external verifier and writer for the Scottish Qualification Authority. He also works with various international training institutions. Scott is a WorldSkills mentor for the City of Glasgow's stonemasonry department, and also mentors under the North East of England Heritage Initiative, as well as being an associate member of CIOB and the Institute of Historic Building Conservation.

Merit Award Winner 2013

Learning from Decision-Making under Uncertainty

Research Abstract

This dissertation considers the existence of a situation of complexity, uncertainty, and value conflict during a construction project's design and construction stages. Difficulties at either end of these phases appear to be caused by uncertain roles and role sets; latent objectives; unstable organisational configurations and the tacit order of the design process. It is assumed that through the exploration of the source and composition of their decision making, project architects may mitigate these uncertainties. Four project architects were interviewed in depth about their experiences in managing this transition. The analysis of the architects' interaction with their design teams draws on Kelly's Personal Construct Theory (1955), Schön's concept of reflective practice (1985) and Harrison's model of organisational culture and levels of consciousness (1995). Based on the methodology of Grounded Theory, an analytical model is developed that gives a clear indication of the circumstances where reflective practice is viable in managing a project's transition from design to construction stage. A space for reflective practice can be identified at the highest level of organisational consciousness that mitigates against the project becoming under-bounded. Transaction cost analysis is used to assess the outcomes of reflective practice. When combined with the analytical model, different aspects of the reflection process on the project can be effectively prioritised.

Winner's Bios



Florian Migsch

The College of Estate Management, UK

Florian is a registered and chartered architect in the UK with a 15-year track record in the residential, workplace, urban and educational sectors. He trained at the Architectural Association in London and also has a fine arts degree from the University of Design, Linz. His professional experience draws on work with well-known firms including Zaha Hadid, Wilkinson Eyre and dRMM, where he gained significant exposure to running and managing projects ranging in scale from £1 million to £45 million. In 2013 Florian received an MBA in construction and real estate from the College of Estate Management.

Premier Award Winner 2013

An Investigation into the Barriers and Challenges of Delivering a Domestic Retrofit Programme in Northern Ireland

Research Abstract

The research identified a real and pressing problem: if Northern Ireland is to meet its carbon reduction targets, it will be necessary to retrofit energy saving measures into the majority of its existing housing stock. The research critically appraised the current situation. Opinions of key stakeholders across all sectors of the retrofit market were obtained to determine not just what the current barriers in delivering a successful domestic retrofit programme in Northern Ireland are, but also what the potential solutions might be. This included working with representatives from Government, as well as the supply and demand sectors in the construction industry. Findings were collated and analysed, based on a questionnaire survey of one hundred owner occupied households. Thematic analysis was also carried out, based on semi-structured interviews with five contractors and three government members of the Legislative Assembly in Northern Ireland. The conclusion was that, in light of the Government's inability to break the vicious circle of barriers or to establish a strategic retrofit framework at regional level, local councils should kick-start the delivery of a retrofit programme in Northern Ireland by replicating an exemplar model such as the one developed by Kirklees Council in West Yorkshire.

Winner's Bios



James Devlin

Queen's University Belfast, UK

James, from Omagh, County Tyrone in Northern Ireland, has been working since October 2012 as a project engineer for Ardmac Ltd. After attending Sacred Heart College in Omagh, he studied for a BSc in construction, engineering and management at Ulster University, Jordanstown, graduating with honours in 2011. Such was his passion for energy efficiency and sustainability that he went on to study a master's degree in sustainable design at Queen's University, Belfast, graduating with distinction in December 2012.

RESEARCH PAPER AWARD

Merit Award Winner 2013

The Effect of BREEAM on Clients and Construction Professionals

Research Abstract

This paper examines the effects and influence of the Building Research Establishment's Environmental Assessment Methods (BREEAM) on construction professionals. Most discussions of building assessment methods focus on either the formal tool or the finished product. In contrast, BREEAM is analysed here as a social technology using Michel Foucault's theory of governmentality. Interview data are used to explore the effect of BREEAM on visibilities, knowledge, techniques and professional identities. The analysis highlights a number of features of the BREEAM assessment process which generally go unremarked: professional and public understanding of the method, the deployment of different types of knowledge and their implication for the authority and legitimacy of the tool, and the effect of BREEAM on standard practice.

The analysis finds that BREEAM's primary effect is through its impact on standard practices. It also has an impact on the use of assessment methods to defend design decisions, and can play a role in both invigorating and obscuring the concept of green buildings. The paper also examines how the authority of BREEAM is tested by the tensions between project and method requirements. A reflection on assessment methods as neo-liberal tools and their adequacy for the promotion of sustainable construction suggests that the sector is locked in by several limitations that hinder variation and wider systemic change.

Paper published in Building Research & Information, Vol. 41/2, pp.129-145, 2013

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. She joined the School of Construction Management and Engineering at University of Reading in 2008 as a principal research fellow and was made associate professor in 2011. Her current research focuses on the way that large construction and engineering consultancy firms have responded to the sustainability agenda, with a special interest in the role of instruments, tools and methods in supporting sustainable construction.

Premier Award Winner 2013

Validation of the Adaptive Reuse Potential Model Using iconCUR

Research Abstract

Adapting old buildings for reuse is an important strategy for sustainable development. It is also essential for reducing waste and the conserving valuable resources. This paper is the culmination of a three-year study into the strategic assessment of building adaptation. It uses a new multiple criteria decision analysis tool, iconCUR, to examine earlier modelling work on the adaptive reuse potential (ARP) of obsolete buildings.

The research uses 12 case studies to compare the different decisions that could arise from iconCUR and ARP methods. The results find a strong correlation between the two approaches, whether based on raw scores or on relative ranking. Both match expert opinion concerning appropriate actions. The research makes a valuable contribution for deciding how best to revitalise existing assets, providing confidence for future modelling techniques.

Paper published in Facilities, Vol.30 No.3/4, pp.105-123, 2012

Winner's Bios



Professor Craig Langston MCIQB

Bond University, Australia

Craig has been researching the built environment sector for nearly 30 years. The author of five international books, over 100 refereed papers and three software programs, his work covers sustainable development issues, building adaptation, multi-criteria decision-making, and construction performance. He has completed four Australian Research Council grants totalling about \$1 million and has won several other awards including the Bond University Vice Chancellor's Quality Award for Research Excellence in 2010 and the Emerald Literati Network Outstanding Paper Award (Facilities) in 2013.

Highly Commended Winner 2013

Exploring the Environmental Modelling of Road Construction Operations Using Discrete-event Simulation

Research Abstract

The practical implementation of sustainable approaches is a challenge for the construction industry. There have been several research efforts to model sustainability. However, current and past modelling approaches have several limitations: they are mainly deterministic, not allowing for the dynamic and changing nature of a live construction site.

This paper explores how a dynamic modelling framework based on discrete-event simulation, which integrates environmental and traffic models, could overcome past difficulties. The modelling framework explicitly incorporates environmental goals in the design of road construction operations in terms of the fugitive and exhaust emissions generated by construction activity and traffic conditions. A hypothetical project is studied to illustrate the use of this framework. The main results show that an optimum number of trucks and front loaders can minimise emission levels. Further research should consider multi-objective analyses involving cost, time and emission levels.

Paper published in Automation in Construction Vol.24 pp.100-110, 2012

Winner's Bios



Dr Vicente Gonzalez

University of Auckland, New Zealand

Vicente is a senior lecturer at the University of Auckland. He holds a PhD and ME in construction engineering and management from the Pontifical Catholic University of Chile. His research and professional interests include lean construction, discrete-event simulation and artificial intelligence applications in construction, as well as the development of decision-making support tools for planning and control, BIM, sustainable construction and the construction supply chain. He is the author of 47 publications including 2 books, 18 papers in world leading journals and 27 peer-reviewed conference papers. Vicente is also a member of scientific boards and reviews international journals and conferences.



Dr Tomas Echaveguren

Universidad of Concepcion, Chile

Tomas is associate professor at the Universidad de Concepcion in Chile and holds an MSc in environmental economics from the Universidad de Concepcion and a PhD in highways management from the Catholic University of Chile. His research and professional interests focus on the roads sector and encompass highway and bridge management, pavement engineering, road safety, environmental Impact of highways, speed modelling, highway vulnerability and sustainable highway construction. His numerous published works include

a book, 41 papers in leading international journals and 81 peer reviewed conference papers. Tomas is a member of scientific boards and also reviews international journals and conferences.