

## Chairman's Review

I would like to express my sincere thanks to the outgoing Chairman, Martin Mannion, for all the hard work and perseverance that he has put in as Chairman for the past two years, particularly his achievement of extending participation to the regions outside Dublin.



I would also like to sincerely thank Colin Caprani, Honorary Secretary, John Dunny, Honorary Treasurer and the rest of the committee members for their hard work in the past two years.

Given the economic situation and having come through a construction boom lasting some 15 years, the Republic of Ireland Branch has embarked on a number of measures to ensure that members face the challenges ahead.

Firstly, the Institution of Structural Engineers, Republic of Ireland Branch in conjunction with the Association of Consulting Engineers of Ireland successfully completed a Eurocodes training course which ran from March to May 2010. This course was attended by 150 engineers and the response to the course has been extremely positive.

As a follow up to the training course it is proposed to hold working sessions implementing the Eurocodes. Please keep an eye on the website for announcements.

The annual dinner, held in February 2010, was attended by our President Norman Train and Chief Executive Martin Powell. On the day of the dinner the President was led by a congregation from the Republic of Ireland Branch to visit the National Convention Centre and the Grand Canal Theatre. Our President was overwhelmed by the structural complexity of both buildings and commended the achievements of the Irish structural engineers involved. It should be noted that next year's annual dinner will be held in the Burlington Hotel on Friday 4<sup>th</sup> February 2011.

Once again candidates from Ireland have performed well in the Institution exams. I wish to extend my sincerest congratulations to all. We would encourage all members including graduates to take the membership examinations, particularly in this economic climate, as the Chartered Membership of the Institution of Structural Engineers is an internationally accepted qualification.

It is also recognised that the role for structural engineers is changing and in particular with respect to the built environment and its future demands.

The structural engineer is being encouraged to become the leader of the design team in this area which is a very important role going forward.

We have had some wonderful lectures throughout 2010, including the National Convention

Centre as presented by Ken Moriarty of O'Connor Sutton Cronin which won the Branch prize this year.

The Grand Canal Theatre lecture by Holger Falter and Salam Al Sabah of Ove Arup was a fantastic revelation of the many challenges put in front of the designers and how they mastered a solution for each one of them as they arose.

I would like to congratulate Mr. Breffni Fitzgerald who was the winner of the student prize for 2010.

Earlier in the year we had an open forum presentation and discussion on Professional Indemnity Insurance, the main speaker being Graeme Tinney of Griffith & Armour Insurance.

As a result of this forum we have been requested by a number of members to focus in on some case studies that have occurred in the recent past. We are working on this topic taking into account, however, the fact that many of these cases tend to be of a confidential nature and therefore case histories are not easy to find.

We will continue to hold open forums to give consulting engineers the opportunity to discuss topics including Health & Safety Regulations and the implementation of Eurocodes.

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### Republic of Ireland Branch Committee Members 2010:

- Pearse Sutton (Chair)
- Colin Caprani
- Jonathon Billings
- Paddy Butler
- Martin Mannion
- John Dunny
- Peter Finnegan
- Sadhbh Ní Hógáin
- Gavin Hughes
- Victoria Janssens
- Joe Kindregan
- Henry Mullen
- Joe Ryan
- Paul Sexton
- Don Twomey

## Chairman's Review (cont'd)

I would like to thank our Honorary Secretary, Colin Caprani who is responsible for the development of our new website [www.istructe.ie](http://www.istructe.ie) which is a central focal point for members' information, calendar of events and other usual services such as access to IStructE publications.

I would also refer members to the headquarter site [www.istructe.org](http://www.istructe.org), in particular the "webinars" that are

available for viewing giving members access to Continuing Professional Development in many areas.

It is recognized that these are tough times for structural engineers both in Ireland and abroad. However, at times like these one must evaluate one's skills and improve on weak areas to take advantage of the opportunity when the economic turnaround happens. Our goal is to continue to make available to our

members opportunities to advance and improve their skill set by providing seminars, forums and lectures throughout the coming years.

In conclusion I would like to thank our members for the support you continue to give to our events.

Pearse Sutton

## Chartered Membership and Associate Membership Exam Results

Chartered Membership (CM) & Associate Membership (AM) Examinations took place on Friday 9<sup>th</sup> April 2010 in Dublin and Cork. A total of 27 candidates sat the CM exam, 23 in Dublin and 4 in Cork. One candidate sat the AM exam in Dublin. This compares to 30 candidates sitting the CM exam and 1 candidate sitting the AM exam in 2009.

Five candidates for the CM examination had progressed through the Professional Review Interview as did one candidate for the AM exam. The remainder of candidates were either repeats or candidates progressing through the mutual agreement with Engineers Ireland. Twelve candidates taking the CM

exam attended the preparation course in Bolton Street as did one candidate sitting the AM exam.

The results were released on 12<sup>th</sup> August with an overall worldwide pass rate of 33% for the CM exam. Candidates from The Republic of Ireland branch obtained a success rate of 33.3%; this is down on last year's success rate of 43.3%. Of the 12 candidates attending the CM preparation course, 4 were successful. 7 Candidates were successful from the Dublin centre whilst 2 were successful in Cork.

Congratulations are extended to one of our successful candidates, Mr. John Morrissey from Limerick, who won the Graham Wood Prize for offering the highest design standard

in a structural steel solution.

Candidates wishing to sit the 2011 examination through the Institutions various routes such as respective collated or mentored routes should have made their application before 1<sup>st</sup> September. Candidates applying through the mutual recognition route with Engineers Ireland should make their application using form M-MRA on or before 20<sup>th</sup> November 2010.

The CM preparation course for 2011 will be held in Bolton Street every Monday from 7<sup>th</sup> February to 14<sup>th</sup> of March 2010 between 6.30pm and 9.30pm. The course fee is €250.00. Candidates should register their interest with Joe Ryan ([joe.ryan@hanleypepper.ie](mailto:joe.ryan@hanleypepper.ie)).

Joe Ryan

## Associate and Chartered Membership

We are experiencing probably the worst economic downturn for decades, which is compounded by the fact that it is global. Many of our members and aspiring members are concerned as regards their future employment prospects. Several have already suffered redundancy and those fortunate enough to still have work fear that job loss may occur in the not too distant future.

Ironically there is a worldwide shortage of good structural engineers. However, it is important to stress the adjectives, worldwide and good. So is there anything the Institution can do to assist?

This article is aimed at those who are neither Associate nor Chartered members. Thus the advice given will primarily be confined to these. However, the Republic of Ireland

Branch reminds all members of the importance of keeping up their CPD. This can be accomplished in many diverse ways, including pursuing post-graduate qualifications and short courses, some of which may be undertaken through distance learning. The Branch will continue to play its part with evening/night lectures and seminars.

The Branch has a long and successful history of running courses for those taking the Associate-Membership and Chartered Membership Examinations. In Dublin the courses take place in the Dublin Institute of Technology at Bolton Street and in Cork at the Cork Institute of Technology.

Members and aspiring members should be aware that the Institution is represented by branches in more

than 100 countries. Thus holding either the Associate or Chartered Membership qualifications is a passport to job opportunities worldwide.

The Republic of Ireland Branch advises aspiring structural engineers to actively pursue the Associate-Membership or Chartered Membership qualifications.

Further information on the courses in Dublin is available from:

Colin Caprani, and for the courses in Cork from: John J Murphy.

Email: [colin.caprani@dit.ie](mailto:colin.caprani@dit.ie)  
[john.justinmurphy@cit.ie](mailto:john.justinmurphy@cit.ie)

Martin P. Mannion

## Criminal Courts of Justice



The newly completed Criminal Courts of Justice at Infirmery Road, Dublin 7 is the largest Courts Project completed in the history of the State to date.

The 11-storey, 25,000m<sup>2</sup> building contains 22 state-of-the-art courtrooms, legal offices and associated judicial which were previously accommodated in the Four Courts complex.

The Circular form of the building and the stacked layout of the Courts solved the architecturally difficult task of providing segregated internal access routes for Judges, Jurors, Accused Persons and the Public.

A central Great Hall with a diameter of 40m and a height of 28.4m provides a public meeting space and access to the courtrooms at all levels.

The project was procured under the PPP Process.

Contract: Amber Infrastructure

Design and Build Contractors: PJ Hegarty and Sons Ltd

Consulting Engineers Services: DBFL Consulting Engineers

The 0.95 hectare site is located on the historic flood plain of the River Liffey at the entrance to the

Phoenix Park and the building straddles the original river bank.

Stiff black boulder clay was encountered at formation level at the original river bank and historic fill material in the original flood plain area of the site. As the building straddles both of these areas it was decided to use a piled foundation solution to support the building off the underlying limestone bedrock.

The site had latterly been used as a Great Hall. Attached to these Garda car pound and a large footbridges are glazed high-speed underground surface water culvert feature lifts. The structural design of these elements are interlinked as the top of the feature lifts are not supported laterally by the main structure of the building; thus the lift framework provides vertical support to the footbridges while the footbridges provide lateral support to the lifts.

The plan area of the building on this confined inner City site required close coordination to accommodate the large number and complexity of underground services in and around the building.

To meet the 100-year design life the main structure of the building was constructed in reinforced concrete. The reinforced concrete solution also assisted with the necessary acoustic reductions required within the building.

The building is circular on plan with the courtrooms, service cores and offices forming a 'doughnut' shape around the central Great Hall. The courtrooms are separated by service cores that provide the segregated access routes. 27 lifts provide vertical access up through the building.

The double-storey height courtrooms are stacked 4 high above a 700mm thick reinforced concrete ground floor transfer slab. Precast concrete floor slabs in the courtrooms are supported on 275mm thick reinforced concrete courtroom side walls. The legal offices are constructed using reinforced concrete flat slabs following the circular shape of the building supported on circular reinforced concrete columns. Public access at the courtroom levels is provided in the Great Hall by continuous 5m wide cantilevering reinforced concrete walkways.

The roof over the offices and courtrooms is a reinforced concrete flat slab supporting the rooftop mechanical plant. The roof over the central Great Hall is constructed using structural steelwork. A north-light type roof design was chosen to provide natural light into the Great Hall. The primary and secondary roof trusses were designed as a steel framework to control deflections and to carry the 1300 Tonne roof loading to four steel support columns which rest on the reinforced concrete elements.

Glass-floored footbridges link between the reinforced concrete cantilevering walkways at courtroom level in the

A public access stairs is provided in the Great Hall between ground floor level and the second floor level footbridge. This stairs is a three flight freestanding scissors stairs with no support at the landings. The total stairs rise is 7.1m and the cantilever from the supporting bridge is 10.25m. DBFL were able to use the enclosed architectural shape of the stairs to structural advantage to design the curved steel trusses in the balustrades to provide the necessary strength, stiffness and frequency response for these stairs. The stairs have a stone finish on a concrete-filled steel tray and the balustrades are clad in timber.

The façade of the main portion of the building is a glazed twin skin system. The 21m (6-storey) high faceted external glazing is hung from a curved 14.5m max. span reinforced concrete parapet beam. The design of the hung system was chosen to overcome thermal movements in the stainless steel framework support system due to solar gain in the cavity, hence easing weatherproofing details between the panels.

The €140m project commenced on site in May 2007 and was completed for handover in November 2009 on budget and 3 months ahead of programme.



Derek Jones, CEng, Director, DBFL Consulting Engineers

## Calendar of Events

## 2010

## October

- 6<sup>th</sup> October 2010  
Committee Meeting
- 12<sup>th</sup> October Student  
Competition
- Presentation of  
Projects, DIT Bolton  
Street Room, Room  
259 at 18.30
- 27<sup>th</sup> October –  
ACEI/ISE/ICS EC2  
Concrete Seminar

## November

- 3<sup>rd</sup> November 2010  
Committee Meeting
- 9<sup>th</sup> November 2010  
Graduate Evening  
Presentation in Dublin  
and Cork

## December

- 1<sup>st</sup> December 2010  
Committee Meeting
- 7<sup>th</sup> December AGM,  
DIT Bolton Street  
Room, Room 259 at  
1800
- 7<sup>th</sup> December “Aviva  
Stadium” by Paul  
Coughlan (PM) and  
Michael Barnwell, DIT  
Bolton Street Room,  
Room 259 at 1830

## 2011

## February

- 3<sup>rd</sup> February  
Presentation of  
Certificates for  
Professional  
Examinations by  
President of IStructE,  
DIT Bolton Street  
Room, Room 259 at  
1830
- 4<sup>th</sup> February Annual  
Dinner, speaker  
President of IStructE

## Sustainability for Engineers

The need for sustainable design has arisen out of a concern for the increased effects that anthropogenic climate change is having on the natural environment and the depletion of finite resources.

Sustainability is the design, planning and building to meet the needs of future generations. It is defined as having three equal pillars – the environment, the society and the economy (Pope et al., 2004).

A sustainable building is one that has been designed and constructed in order to minimise the use of energy, water and materials (Berge, 2009). The design of these buildings should be sufficiently flexible to allow for their use and design to be adapted. In addition these buildings should be built using locally available and sustainable materials - that is, materials that can be used without any adverse environmental effect, and which are produced locally, reducing transport and therefore reducing the embodied energy and carbon.

The energy used in the life cycle of a material is known as embodied energy. The embodied carbon is emitted during the manufacture and transport of a product.

Structural engineers have the potential to be leaders in sustainable design and construction. At design stage a Life Cycle Analysis can be carried out to determine the environmental impact of the design, construction and use of the building for the various designs proposed. This will enable engineers to choose the most energy-efficient option. Structural Engineers can influence material selection – fly ash in concrete, recycled materials in steel and sustainably harvested FSC wood.

Four years ago the Irish construction boom was coming to a close; Ireland is now left with a legacy of poorly-insulated, unsustainably-designed energy-guzzling buildings. The opportunity being presented to structural engineers is refurbishing, upgrading and reusing these buildings sustainably.

Intelligent design through sustainable thinking is needed to meet the future challenges of land use, energy consumption and resource availability.

This table outlines key areas for engineers.

Sustainability for structural engineers includes:

- Enabling change of use
- Enabling refurbishment
- Design for future reuse and/or recycling materials
- Reduce use of resources at design and construction stage through intelligent design
- Select and use materials with low environmental impact
- Efficient use of materials
- Design for long life and future adaption
- Integrated design with architects, engineers and planners
- Design buildings for de-construction

Sadhbh Ní Hógáin

References:  
Berge, B., 2009, *The Ecology of Building Materials*, Architectural Press

Pope, J., Annandale, D., and Morrison-Saunders, A., August, 2004, *conceptualising sustainability assessment*. Environmental Impact Assessment Review

## The Structural Engineer Awards

The Branch congratulates two members following their success in winning the Institution's annual awards.

Professor Tom Cosgrove CEng, FIStructE of the University of Limerick

together with three former colleagues from Michael Punch and Partners, Limerick won the Murray Buxton Award for their paper on the *Redevelopment of Thomond Park, Limerick*. This award is presented by the

DIT Communications Strategy Committee to the author(s) of papers published in *The Structural Engineer* that are agreed to be of general interest. The paper describes the design and construction of the new stand and terrace

structures. Emphasis is given to the architectural and engineering concepts, the tunnel testing, the dynamic analysis, and the fabrication of the two 150m span 'rainbow' roof trusses.

Mr Michael Hough CEng, MIStructE of Barrett Mahony Consulting Engineers, along with one of his colleagues, and Mr Eddie Mullarkey from the Department of Civil and Structural Engineering at the DIT won the Clancy Prize for their paper on *Stone Cantilever Stairs – inspection and analysis of cantilever stairs*. This is awarded to the author(s) of papers published that advance the understanding and practice of Structures including surveys,

investigations and testing. The paper outlines the inspection of cantilever stairs and a method of analysis that predicts the behaviour of a flight of rebated threads under a variety of loading conditions. The model testing and theoretical analysis provide formulae for calculating torsion, vertical and horizontal reactions, thread rotation, displacements and shear stresses.

The President of the Institution, Mr Norman Train, presented the awards in London in June 2010.

These awards recognise the valuable contribution made by the authors to structural engineering. The Branch encourages members to submit papers to the Institution for publication in *The Structural Engineer*.

Joe Kindregan