It is an honour for me to address you as Republic of Ireland Regional Group Chairman for 2014. Even though I am in the position almost a year now, I am still finding my feet. I would like to sincerely thank the past Chairman, Joe Ryan of Hanley Pepper Consulting Engineers, for all his support to date. I would also like to thank our Honorary Secretary Una Beagon, Honorary Treasurer Henry Mullen and Vice Chairman Peter Finnegan. The Regional Group are very fortunate to be able to avail of such experienced and enthusiastic people. We are also fortunate to have a very hardworking and dedicated committee with a number of very impressive and enthusiastic young people. I would like to mention especially Darragh Noble, Tara Reale, Mairéad Ní Choine and Patrick Mulhall, whose contributions have been invaluable.

The current committee have had a very busy year organising and coordinating a wide range of activities both for the benefit of our members and by way of promoting the Institution in Ireland. These activities include the very successful stand at the BT Young Scientist Exhibition in January, organising talks in Cork and Dublin on the new Firth of Forth Bridge, a talk on the redevelopment of 10 Trinity Square London for the James Daly Memorial Lecture in March and Graduate evenings in Dublin and Cork. In February, the Regional Group hosted a reception in the University of Limerick in support of the Punch Lecture Series, a lecture by Professor Chris Wise and Professor Ed McCann of Expedition Engineering.

Committee member John Jones presented a very successful series of seminars on the use of Eurocodes for members in the southwest at the Institute of Technology Tralee while committee member Paul Sexton continued his considerable involvement in the promotion of BIM and Lean Construction. Peter Finnegans was involved in the development of the Code of Practice for dealing with pyrite in buildings. A link to this code can be found on the ROI IStructE website. I would also like to congratulate Peter and his co-authors on the publication of a paper on the pyrite issue in a recent issue of the Structural Engineer.

Committee members Darragh Noble, Tara Reale and Mairéad Ní Choine have recently formed the Republic of Ireland Regional Group Young Members Panel and have already developed a comprehensive programme of activities as well as considerable interest in the region. Committee members actively involved in the Institution at headquarters include Tara Reale and past committee member Victoria Janssen who are members of...
Working hard at a committee meeting in DIT Bolton Street
Rosie Hackett Bridge -
The Newest Bridge over Dublin's River Liffey
by Dr Tony Dempsey, Roughan & O'Donovan Consulting Engineers.

The Rosie Hackett Bridge, recent winner of 'Engineers Ireland Engineering project of the Year', forms a key part of the proposed public transport network that is being developed in Dublin City Centre. The scheme involved the construction of a single span post-tensioned concrete bridge which connects the north bank of the River Liffey at the location of Marlborough Street and Eden Quay to the south bank at Hawkins Street and Burgh Quay. The bridge provides a strategic link between the north and south sides of the city and will ultimately carry the southbound Luas BXD. The bridge also provides two dedicated bus lanes in the southbound direction and cycle tracks on both sides of the bridge as well as pedestrian walkways.

The design team, Roughan & O'Donovan Consulting Engineers and Sean Harrington Architects, was supported by David Slattery as Conservation Architect and Kevin Cleary & Associates as Electrical Engineers. The brief for the project emphasised the need for the bridge to be considerate to its surroundings with respect to aesthetics, setting, historic context, conservation, architecture and urban design. It was also anticipated that the new bridge will, in time, open up Marlborough Street and Hawkins Street to prospective commercial development creating a new hub in Dublin City Centre running from Abbey Street in the north to Pearse Street in the south. Therefore, it was imperative that the pedestrian areas of the bridge were created as public open spaces not only to be used as a link to either side of the river but also as a civic amenity to enhance and complement the existing surroundings.

The bridge is an elegant single span concrete structure, with a shallow mid-span structural depth that minimises the hydraulic impact on the River Liffey and respects the navigational requirements of the River Liffey. The vertical alignment for the bridge is also limited by Luas Line BX. The Luas alignment ties in with the alignment of the existing roads at the junction of Marlborough Street and Eden Quay and the junction of Hawkins Street and Burgh Quay. The use of structural concrete provides flexibility in terms of aesthetics and geometry which would be very difficult to achieve using any other material. The underside of the bridge follows a shallow parabolic curve, which tightens before reaching the quay walls, forming abutments. At the intersection with the riverbed, the abutments form a double-bulge on plan. This allows the structure to pass either side of the existing syphon drain located in the riverbed and also limits the protrusion of the abutment into the river. As the abutment rises, the double curvature gradually flattens out and morphs into the gentle single-curve underbelly of the bridge.

The structure spans 47 metres and is 26 metres wide with a span to depth ratio of approx. 1 to 100 at mid-span. The deck is integral with the abutments and has been designed to minimise/negate longitudinal loading on the existing quay walls. The bridge is a portal frame, carrying horizontal and vertical loads in to the overburden and rock below. High-strength concrete (105N/mm²) has been used in the bridge deck to minimise the structural depth required. The quay walls on either side of the river are of masonry construction and date from circa 1663 to the early 19th century. Strengthening works in the form of mini piling and rock anchors were also required to ensure the stability of the quay walls during all stages of construction of the bridge.

For more details visit the Roughan & O'Donovan website at http://www.rod.ie/ marlborough-street-public-transport-bridge-ireland/
The Australian Experience So Far
by Dr Colin Caprani, Monash University.

G’day! First some background. In July 2013 my family and I left Ireland for Melbourne. We left to get some worldly experience and take advantage of opportunities that lay elsewhere. I was fortunate that DIT supported me by offering a career break, so that I may return with new skills and experience from Monash University. It’s been a busy almost 18 months since then, having moved house several times, having a new baby and starting a new job. In spite of the effort required, it’s been fabulous so far, and the time has flown. I’ll try to give some idea of lessons learned so far, in the hope that they might be of use.

In Monash University, there is a very strong emphasis on partnering with industry to solve practical problems with cutting edge research. This presented a new challenge to network quickly and prove one’s worth. VicRoads (the state road authority) manage Victoria’s main routes, and as a researcher in bridges, is my main ‘customer’. The freight industry strongly pushes for increased allowable tonnage, and VicRoads allow some of the highest legal limits on their roads, of up to 68 tonne B-doubles. Australia uses some innovative ways of managing this risk, including on board mass measurement and approved-route GPS tracking. However, there remain quite a few areas for research, especially in the assessment of existing bridges. With some projects already underway and others proposed, there is the great prospect of helping to improve efficiency in Australia’s haulage sector and the assessment of the existing bridge stock, leading to cost savings for VicRoads.

In other research, as part of a Monash University-Warwick University Alliance project, we have been studying human-induced vibration on lightweight floors, and the phenomenon of human-structure interaction. We are pioneering the use of baropedometry and gait analysis to better understand the ways humans interact with vertically vibrating surfaces. Our current mathematical models are typically onerously conservative, resulting in significant costs related to the installation of dampers and other mitigation means, which may be unnecessary. In our next project, we will develop some better mathematical models that can capture the phenomenon. This is especially important for lightweight long-span FRP (fibre-reinforced polymers) flooring systems which are increasingly being proposed as part of modular construction for both domestic and office use.

My teaching experience here has many differences to Irish practice, best captured under three heading. Firstly, there is class size. The student cohorts at Monash University are typically around 200+ students. This means that I deliver lectures, but manage a team of tutors who deliver tutorials to smaller groups. Such large class sizes has presented a challenge in managing the sheer volumes of emails, phone calls and “quick questions”. A key consideration is quality assurance management of marking assignments. This requires multiple meetings and hours of deliberations, but mitigates potential student-tutor conflict. We also use Moodle, a web-based course delivery tool, that eases the workload of interacting with students. A second difference is the huge number of international students at Monash. Australia has embraced Asia and offers its western-world education to those who can afford it. At around $35,000 tuition per year, it’s an income stream that Ireland could surely benefit from. In working with international students, there is often some language and cultural differences to be aware of, but the multiculturalism, energy and (understandable) enthusiasm in the classroom makes it a wonderful place to be. The third main difference I’ve found is the autonomy afforded to the lecturer in delivering a unit (module). I manage the unit budget, a team of tutors, their timesheets, and am a one-stop shop for student complaints and special considerations. University central will only get involved for serious breaches of the Student or University Charters. However, students are well supported by their undergraduate and postgraduate associations.

As you may have heard – it’s true: Melbourne is one of the most liveable cities in the world. It has fantastic public transport, good (but variable) weather, and a great outdoor lifestyle. However, we do not throw shrimps on the barbie! It’s mainly sausages. There is a strong Irish community around Melbourne, and the Irish Australian Welfare Bureau (Marion O’Hagan in particular) has been a rock of support for our family in difficult times when we really miss friends and family. Through a few Facebook groups, we have met lots of other young Irish families, and it’s great to share jokes with people who ‘get you’. However, we’ve found it’s also important not to surround yourself with migrants, but to try integrate with locals too. Through work and family or mums-and-babies groups, we’re gradually doing that. Though there are no doubt some tough days (our daughter’s first birthday for example), all-in-all it’s a wonderful experience, with an endless horizon of opportunity ahead of us.

Finally, I am maintaining strong links with the institution’s branch here in Victoria and bringing some Irish ideas to their work. Also, I would like to sincerely thank all of those who elected me to council of the Institution where I hope to represent your views and wishes for the Institution. Please do let me know if I can help.

With very warm Aussie regards, Colin
In order to represent the views of the younger members of the profession on a range of Institution topics, the Institution must continually look at how it engages with young members to increase Student and Graduate membership. To that end, HQ has launched an initiative this year to look at how Young Members are catered for in the different regions.

Given its fairly sizeable proportion of young members and the fact that the majority of these are centered in the Dublin region, the Republic of Ireland Regional Group has been selected as a Pilot Group for HQ to assess the feasibility of setting up these groups everywhere.

The purpose of the group from HQ’s perspective is to get young graduates involved with IStructE events early and to increase awareness and presence of the Institution itself. From a graduate perspective though, we hope to help with graduates’ development as engineers, particularly in bridging the gap between University and the workplace.

This year, the Republic of Ireland Regional Group of the IStructE has been working hard, in conjunction with colleagues in HQ in London to establish a “Young Members Group” in the Republic of Ireland.

According to the Institution’s main website (www.istructe.org):

“The Young Members’ Group primary objective is to represent the views of young members of the profession within the Regional Group and to develop initiatives that will generate the interest of Young Members in the Institution. It is also intended that the group involves young members in the community who aspire to be Civil and Structural Engineers and are therefore not members of the institution.”

“The Group aims to supplement normal Regional Group functions with programmes particularly designed for young members. The Group is responsible for undertaking initiatives independently without the direct involvement of the Regional Group but accountable to it. Young Members and aspiring members are encouraged to express their views and ideas on all matters of Regional Group interest.”

The Group will be organising a series of events throughout the year, including professional lectures, interesting site visits, social events such as pub quizzes, in conjunction with the numerous events already run by the Regional Group Committee.

We had our first event on Tuesday 30 September and are delighted to say it was very well attended by representatives in the various structural firms. The talk was entitled “Roads to Chartership” and was kindly given by Kieran Ruane, Director, RPS Group and Roger Tegart, Director of Cronin & Sutton Consulting Engineers. We also organised a site visit, in association with BAM Building, to the Research Hub Phase 1 Building in DIT Grangegorman. In the coming months, we plan on organising a few more site visits, some project talks and the odd social event. Any suggestions would be greatly appreciated and if anybody wants to get involved please email Tara Reale (realet@tcd.ie), we’d love to hear from you!

Setting Up a Young Members Group in Ireland
By Dr Tara Reale, AECOM.

Invite to the Annual Dinner at Trinity College

The ROI Regional group would like to invite you to the Annual Black Tie Dinner to be held at the Dining Hall in Trinity College on Friday 6th February 2015. Last year, over 160 members attended the event and a great night was had by all. The night will begin with a drinks reception at 7pm and the banquet dinner will be served at 8pm. If you would like to attend the event, please contact Una Beagon on una.beagon@dit.ie
Frank Fox & Associates have recently been shortlisted for the Small Practice Award at the IStructE Structural Awards. The shortlisted project, involved the construction of a new museum & extension to the existing Theatre Royal at the heart of medieval Waterford. The awards took place in November 2014 in The Brewery, London.

The €5m project, for Waterford City Council, was the key stone in the redevelopment of the Viking Triangle quarter of the City, an area that dates back to the 9th century Viking settlers and location were Henry II was the first King to set foot in Ireland. The new museum would be the jewel that would display Waterford’s rich collection of medieval material.

Frank Fox & Associates in conjunction with the design team commenced work on the project in late 2010, with both buildings being completed and open to the public in the summer of 2012. The structure is comprised of 4 stories, constructed in reinforced concrete & built directly over the 13th century Choristers Hall, which served for both storing wines and minting coins over its 700 hundred year history.

The original site was enclosed on 3 sides by a number of listed buildings including the Mayors Parlour and directly opposite Waterford’s Christ Church Cathedral. The new structure was developed in close cooperation with the Office of Public Works to incorporate Choristers Hall into the design of the new museum. An enabling contract was undertaken to void the site of Archeology and work done to refurbish the existing fabric of Choristers Hall prior to the arrival of the main contractor. The project scope of works also included the redevelopment and extension to the rear of the Theatre Royal, which designed as a separate entity would ultimately share a common stone façade. The façade originally modeled in clay was further developed using 3D modeling process before each and every stone was individually
machine cut. A number of details were added to the stone by hand, including text and a 5m tall figure of St Margaret, an exact replica of a broach pin found on the site during archeological excavations.

Due to the requirements of incorporating the existing medieval undercroft into the structure we had to devise a structural scheme for the architect in advance of an architectural concept. In effect the scheme was built on the structural premise that the building could be designed to span front to back over Choristers Hall while providing a clear internal ground floor plan of 22m. The areas in which the loads could be transferred were also limited due to archeological concerns and so the initial design of piles was consigned in favor of large raft foundations thus minimizing the amount of possible disturbance to uncovered archeology.

The challenge of incorporating the undercroft into the fabric of the final structure, while achieving a 22m clear span at ground floor level, meant many different design solutions were initially considered.

Ultimately, our recommendation was to use reinforced concrete to achieve the required structural form within the tight site constraints. The city architect then began the process of developing a fair faced concrete finish to many of the architectural features including walls, ceilings and stairwells.

Creativity & Innovation were forefront in the design of the museum. One of the earliest challenges posed was how to safely incorporate Choristers Hall into the fabric of the new museum. The solution arrived at was to effectively create a hard hat for the hall, so as to protect it from works over head during the construction phase. This was done by constructing low level masonry walls over the outer existing walls of the hall. Precast cast units were than placed on top of the walls to form both part of the ground floor, as well as the necessary protective cover.

As mentioned the problem of incorporating the 13th century Choristers Hall while achieving a functioning museum posed many challenges. Due to the limitations of the site the ability to transfer load to the foundations was limited.

To overcome this, an innovative design of cross over wall beam arrangements was used to transfer load from the top down. This had the net effect of the front wall beam distributing over 5000KN some 2500KN per column to the outer edges of the front façade. The wall was designed as a deep beam to allow the first floor float over the ground floor and the ability of the front glazing façade to slide open in its entirety to reveal the full 22m span of the structure at ground floor level. The first floor beams which appear to span front to back are in fact suspended by the central partition first floor wall over. These downstand beams were seamlessly incorporated into the final finish of the ceiling with traditional ceiling finishes either side of them to conceal ducting. Much of the electrical conduit was also concealing in the concrete walls to minimize the impact of visual services.

The museum has been well received by both the local community and visitors alike. It has brought a degree of vibrancy to the area and is now one of the leading tourist attractions in the area. The buildings contemporary style was designed to be site specific and fits well into its surrounding environment. Several features have been published in local and national press praising the buildings enhancement of the city, with the building receiving a Civic Trust award in 2014. No doubt the museum will become a city heritage icon in the future.

Institution Announces Changes to Chartered Membership exam

The Institution of Structural Engineers has announced changes to the timetable and structure of its Chartered Membership Examination. The changes come as a result of an extensive review by the Institution’s Examinations Panel, Membership Committee and Board. The exam will now be held twice a year, in January and July. This is in response to continuing candidate feedback requesting alternative dates. The format of the Chartered Membership Examination will also change, featuring a reduced number of questions. Whereas the 2014 exam included nine questions, future exams will contain five. The change is being made to better align with international examination standards and content. The format of the individual questions and the overall standard of the exam will not be affected.
The BT Young Scientist & Technology Exhibition was born in 1963 when two UCD physics researchers came across the concept of “Science Fairs” while conducting research in New Mexico, America. The first competition was held in Dublin and attracted 230 entries.

Over the years the number of entries has increased dramatically, reaching an all-time high last year when 1879 projects were submitted. The event attracts over 40,000 people making it one of the largest events of its kind in Europe, if not the world!

The BT Young Scientist & Technology Exhibition is much more than a competition; it is an unforgettable experience of a lifetime for the students who take part.

This year the event celebrated its 50th year and for the third year running, Institution members brought structural engineering to an audience of young science enthusiasts over three days in Dublin. The Institution stand, which included projects completed by final year Structural Engineering students at Dublin Institute of Technology (DIT), gave young students and parents an introduction to the principles of structural engineering and an opportunity to learn about careers.

It is always a pleasure to take part in the event, the enthusiasm and energy exuded by the young people attending the exhibition provides great hope for the future of mankind. This event allows us to give the Institution and structural engineering profession excellent exposure to all levels - it’s like visiting a school classroom of 40,000 made up of pupils, parents and teachers.

I believe we have to instil the concept of Structural Engineering in the minds of students at a very young age, as this may play an important role in their career decision at a later date. It also affords an opportunity to increase public awareness of the roles and responsibilities of a Structural Engineer.

Attracting a lot of attention at the Institutions stand was a “Shake Table”, on loan from DIT. This allowed young students to see the effect of simulated earthquakes on model structures. The big hit at the stand was the “Think Make Test Play” corner where young budding engineers compete to build their own unique structures and overcome the challenges of gravity. Many students who visited the stand three years ago return each year determined to build a structure bigger and better than the previous year. Some of these students are now graduating towards University and it is rewarding to learn that a good number of these students are seriously pursuing a university place in engineering.

The Republic of Ireland Regional Group Committee are very committed to promoting Structural Engineering and would also like to thank all at Institution HQ for their support in this event. If you would like to help out in the future, please contact Una Beagon at una.beagon@dit.ie.

Such events are our investment in the future of our profession and The Republic of Ireland Regional Group Committee look forward to continuing with this initiative in future years. More information on the event can be found at the website: http://www.btyoungscientist.ie/