

Project: Killiney House

Killiney House is built on the site of a demolished 1950s residential dwelling and comprises a 500m², partial three storey reinforced concrete structure including part basement, knitted into the rocky granite site with a glazed, south facing front elevation overlooking Killiney Bay.

Downes Associates was involved as the Civil & Structural Engineering Consultants, O'Donnell Tuomey as the Architects and Townlink Construction as the main contractor on the project.

The superstructure consists of a cranked and folded reinforced concrete shell roof supported by 114mm diameter steel circular hollow sections along its south elevation and by reinforced concrete perimeter walls along all other elevations. Lateral stability is achieved via the roof diaphragm action through to the perimeter shear walls and the central reinforced concrete core, which houses the chimney flue.

A comprehensive finite element analysis was undertaken to determine the moments, shear stresses and deflections of the faceted three-dimensional reinforced concrete shell roof structure. Due to the nature and complexity of the roof structure, along with the architect's desired finish, it was found that a 225mm thick reinforced concrete slab was the optimum structural solution and provided an economical balance between slab thickness and reinforcement quantities. Due to the requirement of an exposed concrete ceiling it was vital that deflections and predicted crack widths were designed to an absolute minimum. Punching shear reinforcement at the steel CHS locations is provided in the form of parallel flange channels welded to the CHS' top plate which allows for the additional stresses associated with punching shear to be catered for without increasing the depth of the slab, a method which is commonly employed by the American Codes of Practice. A 115mm thick non-structural screed lies on top of the roof's weathering and rigid insulation to provide a solid concrete finish to the roof structure with a surface similar in nature to that of the exposed ceiling below to provide a continuity of expression throughout. The structure's first floor consists of 225mm thick reinforced, in-situ concrete slabs supported by reinforced concrete walls below. The external terraces and balconies that project



Killiney House: North West elevation of the completed structure.

from the building are constructed of reinforced concrete cantilevered beam and slab arrangements.

The walls, along with the underside of the roof and first floor, were to be left exposed and it was therefore imperative that a class A concrete finish was achieved. A bespoke concrete mix, which included the infusion of granite mica chippings, was used to add a lustrous finish to the concrete while Ecocem GGBS cement was also incorporated into the mix to provide a whiter appearance along with its greener credentials. Due to the geometry and required finish to the underside of the roof it was essential that a first-class formwork system was employed. The setting out of joints in the formwork was therefore crucial and it was this design, construction and attention to detail that paved the way for Killiney House to win the Irish Concrete Society's overall award for 2007. Prior to completion of the project, the exposed surfaces of the concrete walls and ceiling were sandblasted to achieve the architect's desired finish and a clear water-

proofing membrane was applied externally to counteract the effects of sandblasting on the concrete's permeability.

The partial basement comprises 250mm thick reinforced concrete walls designed with integral strip footings and grade 4 waterproofing was provided throughout.

Extensive geotechnical investigations were undertaken at an early stage to establish ground conditions and the extent of the granite outcrop which straddles the south east boundary of the site. This revealed mass granite underlying approximately 1.5 – 2m of topsoil/stiff brown boulder clay. As a result traditional strip footings were used to transfer the structure's loads down to suitable bearing stratum.

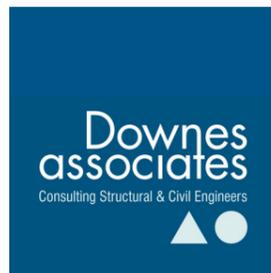
In April 2006, Townlink Construction Ltd. commenced construction of the concrete shell. In July 2007, they successfully completed the structure which has forever changed the landscape of Killiney in a unique and innovative way.

Ian Connolly, Downes Associates



Exposed concrete ceiling. Note carefully designed formwork joints.

This Newsletter has been kindly sponsored by Downes Associates



The Institution of
Structural Engineers
Republic of Ireland Branch

Main website:
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BRANCH NEWSLETTER

Chairman's Review of Recent Activities

Newsletter No. 20

April 2008

Edited by Colin Caprani
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Special points of interest:

- Centenary Conference in Hong Kong a great success
- Republic of Ireland well represented in Hong Kong
- AE Wynn Chartered Member Exam Prize Winner is John Wickham of Royceton
- The Structural Engineer, Republic of Ireland Branch, Special Edition in August 2008
- Updates being made to Irish members database
- Andrew Mannion Structural Engineers unveil new rig in DIT Bolton St.



The so-called 'Celtic Fringe' in Hong Kong—a rough assemblage of those aspiring to be, or already are, Irish.

Since our last Newsletter the Branch has been particularly active. We have held a number of evening/night lectures, all of which have been well attended. Graduate evenings were held in both Dublin and Cork, at UCD and CIT respectively. On both of these occasions graduates with less than two years experience presented their work to date. The level of responsibility that these young engineers are undertaking is quite remarkable and they are to be commended on their ability to handle it. Both events were so successful that we will endeavour to run them again next year.

The evening course on Structural Engineering Design Course, run jointly with ACEI, has been a great success in Dublin. As a result it has at the time of writing been decided to offer it in Cork, running on 3 consecutive evenings com-

mencing on 31st March. The venue is the Metropole Hotel and it is being organised by committee member, Paddy Butler.

The seminar, "Deep Basements," that attracted close to 100 people in Dublin in May 2007 was offered in Cork on 11 March. The format was slightly different and the papers were in general biased towards the particularly difficult ground conditions that exist in Cork city. The seminar, run in conjunction with the Cork Region of Engineers Ireland, was a great success.

Another Cork event, which attracted almost 300 people to CIT on the evening of 4 March, was the lecture given by Prof Philip O'Kane of UCC, on the Life and Work of Peter Rice. The occasion was marked by the presence of our President, Sarah Buck. This was the first ever visit to Cork by a President of IStructE while

in office. The event was accompanied by the launch of a Virtual Archive of Peter Rice's work, and both his widow and son were present for the launch. Our thanks to ARUP for sponsoring a cheese and wine reception for the very large attendance.

In the last Newsletter, I stated that I would like to offer events outside of Dublin. From the above, it can be noted that I have achieved this in Cork. I would again appeal to members in other parts of the country to propose suggestions for events that we may be able to offer in their regions.

Our Annual Dinner, held on 9 November, was reasonably successful. Numbers were slightly down on previous years but in either event the Herbert Park Hotel venue could not accommodate many more. We will be reverting to the Conrad Hotel for next year's Dinner, and it should be noted that

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Chairman's Review Contd.

this will be held on 6 February 2009. This date change is necessary to synchronise with the Institution's move to a calendar year with respect to its programmes, etc. Our speaker at the Dinner, Mr Fred Barry, CEO of the NRA, painted a bright picture as regards the future of Ireland's road infrastructure. The large number of bridges and other structures involved makes this good news for structural engineers.

As you are aware it is the Institution's Centenary and a highlight of the celebrations was the Hong Kong Centenary Conference. A large number of Irish members attended and we were very satisfied with the event. The papers presented were of an extremely high standard and their authors included many eminent structural engineers of world renown. The papers are well worth reading and members

can obtain proceedings from IStructE in London. Hong Kong itself is an amazing city, not least from a structural engineer's viewpoint. The journey from the airport alone is a showcase of structural engineering.

In conclusion, I would like to thank you, our members, for the support you have given our events over the past several months. The committee mem-

bers put considerable time and effort into organising these events to ensure members are kept fully abreast of the latest developments in structural engineering.

Our AGM takes place on 22 April in DIT, Bolton Street. A lecture on the Royal Marine Hotel, Dun Laoighaire will accompany the event. I strongly urge members to attend.

Martin P. Mannion
Chairman

Branch Member wins AE Wynn Prize in CM Exam

John Wickham, of Royceton Construction Design and Management Company, sat the Chartered Member (CM) Exam in April 2007. In doing so, John obtained the best overall worldwide mark for answering a question with a concrete solution. The Institution awards the AE Wynn Prize to those who do so.

John's achievement is remarkable, given both the standard of the CM exam, as well as the

number of candidates sitting it. However, as a branch we have a remarkable history of such accomplishments.

In 1965 Michael Carew won the Graham Wood Prize for the best steel design solution, followed in 1976 by Eddie Fallon. More recently, Peter Brunner also won the AE Wynn Prize in 2005.

John's achievement was recognized at the recent Evening Meeting for the lecture on the

Living Bridge in University of Limerick. He was awarded with a branch prize in recognition of his achievement.

Of further note, is that all winners of such prizes have been associated, either through study or lecturing, with DIT Bolton St.

Such awards show that the branch as a whole can be proud of the standard of our education and structural engineering in practice.



John Wickham receiving a branch award in recognition of his achievement from Immediate Past Chairman, Declan Monaghan

Changes to Calendar of Activities

"The next Annual Dinner will be held in February 2009, and each February hence."

To coincide with the Centenary, the Institution is changing its annual calendar from an academic basis to a calendar basis. Consequently, there are changes to the normal schedule of activities in the branch, that require interaction with headquarters.

From 2009, an outline of our events are as shown in the table.

We would appreciate any comments members have on this provisional schedule.

Month	Event	Month	Event
January	Graduate Evening Evening Meeting	July	Summer Break
February	Annual Dinner Evening Meeting	August	Summer Break
March	Evening Meeting	September	Evening Meeting
April	Evening Meeting	October	Student Prize Evening Meeting
May	Seminar Evening Meeting	November	Annual General & Evening Meeting
June	Summer Break	December	

AMSE Donates New Testing Rig to DIT Bolton St.

Dublin Institute of Technology, Bolton St., has received a significant donation by Andrew Mannion Structural Engineers (AMSE), enhancing the resources available to structural engineering students.

Final year students will now benefit from the availability of a structural steel testing rig, valued at €80,000, and is believed to be the largest of its type to be installed in an Irish college. The rig will enable loads of up to around 100 tonnes to be used.

John Turner, Head of the

School of Civil & Building Services Engineering at DIT, explained the thinking behind initiatives such as this, "DIT has a commitment to the development and support of the knowledge economy and a proactive approach to building links with industry. The donation of this facility is a massive boost for our department as our students now have an excellent facility for project-based research. By enhancing the resource base at DIT in this way, we can work more effectively with Irish compa-

nies to enhance R&D."

The testing rig was officially unveiled by AMSE Managing Director Andrew Mannion, himself a past graduate of DIT Bolton Street. Addressing final year students at the launch of the rig, Mr. Mannion stressed the need for Irish engineering students to have the best resources available to them whilst at college, and underlined the role of the private sector in supporting such needs with donations such as this one.



Unveiling the rig are (L to R) Ross Galbraith (DIT), Colin Caprani (DIT), Andrew Mannion (AMSE), Denis McNelis (AMSE), Margaret

Sessional Programme to June 2008

Date	Lecture	Presenter	Location
8 April 2008	James Daly Memorial: Elysian Tower, Cork	Hugh O'Dwyer, Arup	Rm 259, DIT Bolton St.
22 April 2008	AGM Lecture Royal Marine Hotel, Dun Laoighaire	Denis McNelis, AMSE Kevin McDonagh, Muir Associates	Rm 259, DIT Bolton St.
In Abeyance October 2008	Seminar: Structural Aspects of Medium Rise Buildings	IStructE Rol	TBC
20 May 2008	Elm Park Development	O'Connor Sutton Cronin	Rm 259, DIT Bolton St.

The branch Annual General Meeting is on 22 April 2008. Several motions are to be tabled, so members are requested to attend. Information on the motions will be sent out shortly.

Forthcoming Publications: Call for Articles and Information

The Structural Engineer Branch Special Issue

The branch committee has reserved an issue of *The Structural Engineer* in August 2008 as a Republic of Ireland Branch Special Issue. This follows on from the success of the branch special issue of 16 August 2005.

The committee would like if branch members would consider submitting an article for inclusion. Articles can be full technical/academic journal papers; project case studies; technical notes, and; news

articles. Certain types of articles will require peer review and will be required sooner than other article-types to facilitate this process.

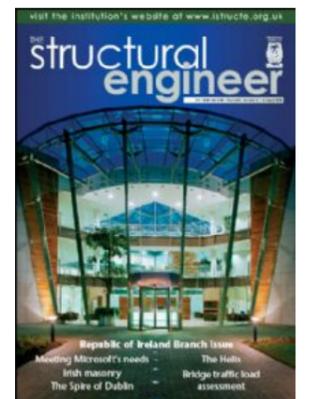
Those wishing to advertise in the branch special issue are also welcome. The cover of the issue is available for sponsorship, as are other prominent pages.

For further information and for submissions please contact Colin Caprani (email on front page) who is coordinating the preparation of the special issue.

Centenary Publication

In 1983 the branch published the booklet *75 Years of Structural Engineering in Ireland*. To celebrate the centenary of the institution, the committee are updating this publication to include notable structures from the last 25 years.

We would like if members could suggest appropriate structures for inclusion, and also advise us of changes to structures in the original booklet. Please contact Colin Caprani for more information.



Cover of last branch special issue.