Half Day Seminar – The Life Cycle of Bridges
– Construction, Monitoring and Rehabilitation
Monday 25th of April 2016
Engineers Ireland
22 Clyde Road, Dublin 4
Admission – Free Entry

Programme

13.45  Registration
14.00  Welcome – Dr Alan O’Connor – Chairman, Structures and Construction division
14.10  Constructing on Dublin soils
Dr Eric Farrell Chartered Engineer – AGL Consulting Director / Senior Consultant
15.10  Questions and Answers
15.20  160 year history of the Boyne Viaduct Drogheda
Eamonn Greene – Formerly Iarnród Éireann Principal Engineer - Structures
Stephen Bateson Chartered Engineer – Iarnród Éireann Principal Engineer – Structures
16.20  Questions and Answers
16.30  Coffee Break
16.45  Drive by Bridge Inspections
Prof Eugene O’Brien Chartered Engineer – Roughan & O’Donovan Director & Professor at University College Dublin
Dr Jennifer Keenahan – Arup CFD Modeller & Bridge Engineer
17.45  Questions and Answers
17.55  Seminar Close – Dr Alan O’Connor – Chairman Structures and Construction division
Highlighting topics for October 2016 Structures and Construction Seminar
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Lecture Details

Constructing on Dublin Soils

Dr Eric Farrell Chartered Engineer – AGL Consulting Director / Senior Consultant

Dr Eric Farrell has over 40 years’ experience of geotechnics in Ireland and with specific expertise of the geotechnics within the Dublin area. He is co-founder of AGL Consulting where he is currently Senior Geotechnical Consultant/Director. His expertise as a geotechnical consultant has been extensively used over the years on large civil engineering projects in Ireland and abroad where he has, for example, undertaken numerical analysis of complex design situations such as the recently constructed Alexandra Quay East refurbishment, advised on the cut and cover section of the Dublin Port Tunnel and was part of the design team for the casting basin of the Limerick Tunnel. He has also developed innovative design solutions, such as the groundwater control system of the Kildare Town Bypass section of the M7. He has also acted as expert witness in many arbitration, conciliation and litigation cases and carried out forensic analyses of geotechnical failures. He has been involved in over 300km of Irish motorway design which has given him a good understanding of the ground conditions around the country. In this lecture Dr Farrell will discuss constructing on Dublin soils and features that designers should note.

Alexandra Quay East refurbishment
Dublin Port Tunnel Construction
The Boyne Viaduct Drogheda was designed by Irish civil engineer Sir John Benjamin Macneill. Works began in 1853 and was completed in 1855. On completion it was the seventh bridge of its kind in the world and a major feat of structural / civil engineering.

The viaduct comprises twelve stone arches on south side, and a further three on the north. The central pratt truss bridge was originally made of three iron spans that were wide enough to carry two tracks. When the bridge was refurbished in the 1930s, new steel girders replacing the ironworks were constructed inside the original bridge before the iron structure was removed. This allowed trains to continue running throughout the renewal process.

In 1932, the three spans over the river were replaced with the current iron trusses. These were built by the "Motherwell Bridge Engineering Company" with G.B. Howden as the chief engineer. When the tracks were relaid in the 1990s, the interlaced tracks were replaced with a single track over the viaduct and points at each side.
Over €6.1m was awarded to the refurbishment of the Boyne Viaduct in Drogheda. Financed through the European Union’s INTERREG IVA programme and managed by the Special EU Programmes Body (SEUPB).

Match-funding for the project was also supplied by the Department for Regional Development (DRD) in Northern Ireland and the Department of Transport, Tourism and Sport (DTTAS) in Ireland.

The project involved a number of essential refurbishment activities including:

- Steel repairs
- Full re-painting
- Renewal of work over the viaduct
- Waterproofing of the deck
- Installation of a new drainage system.

Eamonn Greene formerly principal structural engineer of Iarnród Éireann will discuss the 160 year history of the bridge from a historical and structural perspective and provide an appreciation of how much of a landmark in bridge construction this structure was for its time. Stephen Bateson current principal structural engineer of Iarnród Éireann will discuss the major renewal and strengthening works which were very recently undertaken to preserve this structure and keep it functioning well into the future on the Dublin to Belfast line.
Lecture Details

**Drive by Bridge Inspections –**

**Dr Eugene O’Brien** Chartered Engineer - Director at Roughan & O’Donovan / Professor at University College Dublin &  
**Dr Jennifer Keenahan** CFD Modeller and Bridge Engineer at Arup

This lecture will focus on the PhD research of Jennifer Keenahan supervised and mentored by Professor Eugene O’Brien at University College Dublin in which the research won ‘Best Paper in Bridges’ at the 2012 Bridge and Concrete Research in Ireland Conference. Jennifer’s and Eugene’s winning paper fought off stiff competition from over 40 bridge related papers from across the county. This novel concept of ‘Drive by’ bridge inspections is a process whereby sensors on a truck can be used to detect damage in a bridge as the truck drives overhead. The research was supervised by Professor Eugene O’Brien and the work was a collaboration with Dr Patrick McGetrick of the University of Kyoto and with Dr Arturo Gonzalez of University College Dublin.

Dr Keenahan receiving her award from Brian Madden of OCSC
Figure 3. Bridge deflections from the vehicle model for different levels of damage for a single mode of vibration.