ENGINEERS IRELAND
structures & construction

free half day seminar

ElevArch®, The Hogarth flyover, DLR Lexicon Library and Dublin Waste to Energy (DWtE) Facility

On: Wednesday 22nd March 2017

At: 1.45 pm to 6.00pm

In: Engineers Ireland, 22 Clyde Road, Dublin 4

Programme

1.45 pm **Registration**

2.00 pm **Welcome** – Fergal Cahill Chartered Engineer – Chairman Structures and Construction division

2.05 pm **ElevArch® - A revolutionary new technique for vertically jacking masonry arch bridges**
Dr Bill Harvey - Bill Harvey Associates

2.55 pm **Q&A**

3.00 pm **Redecking the Hogarth Flyover, London**
Jack Rose - Aecom, United Kingdom

3.50 pm **Q&A**

3.55 pm **Coffee Break**

4.05 pm **The LexIcon, Dunlaoghaire - Construction Challenges**
Marcella Murphy – Senior Executive Engineer, Dunlaoghaire Rathdown County Council

4.55 pm **Q&A**

5.00 pm **Structural Design and Construction at the Dublin Waste to Energy (DWtE) Facility**
John Diffley – Senior Structural Engineer, PM Group
Diarmuid O'Sullivan – Senior Construction Manager, PM Group

5.50 pm **Q&A**

5.55 pm **Seminar Close**
Fergal Cahill Chartered Engineer – Chairman Structures and Construction division.

ElevArch® - A revolutionary new technique for vertically jacking masonry arch bridges

Bill Harvey is a world expert on masonry arch and tunnel behaviour and author of the Archie-M software package for analysis of masonry arch bridges. Bill was determined to become a bridge engineer at age 7 when an uncle took him to see the Clifton suspension bridge. That lifted someone who had a bare pass at 11+ and took him through Leeds University and on to a PhD followed by work on the Humber Bridge. In 1977 he moved to Dundee as a lecturer and worked in Universities until 2000 when he set up as a consultant working on masonry bridges. In 2006 he joined the Flint & Neil team looking after the bridge, contributing to work on the towers and vaults. As Noel Coward once said, work is so much more fun than fun.

Collaborating with Freyssinet, Dr Harvey was part of a team that explored cost-effective, alternative solutions to demolishing rail overbridges, which often becomes necessary when electrification or larger rolling stock needs to be accommodated on a railway line. Following two years of research and development, the world's first ElevArch® masonry bridge arch lift successfully took place on the 26th of October 2016. The 161-year-old, 220 tonne masonry arch bridge at Moco Farm in Buckinghamshire was lifted 900mm using ten 50 tonne jacks, lowered to 450mm above its final resting place and built back into place. This is proof of the concept of lifting arches to make clearance for power lines on railways. It also showed a lot of details that would otherwise be hidden.

ElevArch® is a patented technique where the arch of a bridge is cut free from its abutments and walls so it can be jacked upwards, enlarging the space beneath. During the lecture, Bill will discuss the method and the technical difficulties of achieving such an innovative feat.

Bill will talk about the planning, design and process of the Moco farm masonry arch lift in Buckinghamshire.

The lifting of the masonry arch bridge at Moco Farm, Buckinghamshire

Redecking the Hogarth Flyover, London

Jack Rose CEng MEng MICE – Aecom UK

Jack is a chartered civil engineer (Institution of Civil Engineers), specialising in the design of bridges. In his short tenure in the industry, he has been fortunate to have worked on major infrastructure projects in the UK and Middle East. These include Manchester Metrolink, Forth Replacement Crossing (Queensferry Crossing), Riyadh Metro and Hogarth Flyover. All were with AECOM; he is now an MBA candidate at Trinity College Dublin.

Hogarth Flyover is one of west London's most notorious flyovers, used every day by around 10, 500 vehicles going eastbound from the A316 to the A4 Great West Road, crossing over the Hogarth roundabout.

Following a detailed review and structural assessment by Conway AECOM, the structure was deemed to be in a seriously poor condition, prompting the need for vital refurbishment works to demolish and reconstruct the concrete deck.

Challenges included carrying out the repairs on the 250m structure within a six-week closure. The urgency of the programme was to avoid unplanned closure on safety grounds, whilst at

the same time planning around other road closures for bridge strengthening work at Hammersmith Flyover and Putney Bridge.

Hogarth Flyover was re-opened to the public on 31 August, 10 hours ahead of schedule. The presentation outlines that journey.

Arial View of the Hogarth flyover London

The Lexicon, Dunlaoghaire – Construction Challenges

Marcella Murphy BE MBA MICE - Senior Executive Engineer, Dun Laoghaire Rathdown County Council

Marcella has over 25 years' experience in civil engineering works in Ireland and in the UK having worked on numerous large scale construction projects.

The new Central Library represents the biggest single investment by Dunlaoghaire County Council in a civic amenity. Under the 2004-2010 DLR County Development Plan, the Central Library was envisaged as a crucial element of regeneration in Dunlaoghaire. The tender price was €27.5m ex VAT and was financed solely by Dunlaoghaire Rathdown County Council. At its peak, there were 160 workers on site, not including supervisory staff. The LexIcon ultimately won a number of national and international awards. This presentation will discuss the challenges of the construction of the LexIcon and how they were overcome.

View 1: Elevation of DLR Lexicon

View 2: Arial View of DLR Lexicon

DLR Lexicon - Groundworks involving rock breaking

Structural Design and Construction at the Dublin Waste to Energy (DWtE) Facility

John Diffley – Senior Structural Engineer, PM Group
Diarmuid O'Sullivan – Senior Construction Manager, PM Group

The new €400m DWtE Facility Project in Dublin is fast approaching the completion of the construction phase. The 52m high thermal treatment plant has been designed to cater for 600,000 tonnes/annum of municipal waste that would otherwise go to landfill. The new facility will have the capacity to generate up to 80MW of electricity and provide district heating to 50,000 homes.

Building a facility of this size on a brownfield site poses significant structural design and construction challenges.

Internal View of DWtE facility – Dublin Ireland

John Diffley, Lead Structural Engineer for the project will discuss some of the structural design challenges presented by the facility, including foundation solutions, steelwork design including fatigue design for crane girders, concrete design and how the design evolved and developed to meet the project requirements.

Diarmuid O'Sullivan, the Construction Manager for the project will discuss the construction challenges the project presented, including the restrictions of the brownfield site, managing the schedule and health and safety management. Diarmuid will talk about how the construction management team worked to overcome these challenges and build this landmark facility.

About DWtE

In September 2014 Covanta signed a contract with DCC to design, build and operate the facility for 45 years, when it will revert back to DCC ownership. Covanta engaged PM Group to provide the Architectural, Civil, Structural and M&E design (all non-process elements) and the Construction Management of the facility.

For more information: http://dublinwastetoenergy.ie/

Arial View of DWtE facility – Dublin Ireland