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## Historic Bridge and Infrastructure Awards 2006

by David Greenfield

On 16 November Quentin Leiper, President of the ICE, made the presentations at the 9<sup>th</sup> Annual Awards Ceremony, celebrating civil engineering heritage conservation across England and Wales. This year the judges selected two outstanding projects for Awards, with Commendations going to a further three.

Professor Roland Paxton again chaired the panel of judges, who were:

- Terry Girdler, Chief Structural Engineer of English Heritage,
- Mike Winney, Editor Emeritus of NCE, and
- Andrew Leadbeater, ex-Chairman of the County Surveyors' Society Bridges Group.

This was Professor Leiper's first 'public' engagement as President, and he expressed delight at the depth of engineering knowledge and the benefits of sustainable solutions (two of the fundamental themes of his term of office) apparent in all the projects. In fact, neither of the two projects which received Awards could be called traditionally civil engineered conservation projects. For more about the President's views on the Awards see:

[http://www.ice.org.uk/about\\_ice/president\\_weblog\\_view.asp?WEBLOG\\_ID=63](http://www.ice.org.uk/about_ice/president_weblog_view.asp?WEBLOG_ID=63)

Grateful thanks are again due to English Heritage, Network Rail and British Waterways for their continuing financial

support which covered running costs. Support-in-kind was again provided by ICE, CSS Bridges Group and NCE.

The two projects which received **Awards** are:

- **Fritwell Railway Bridge assessment**, Oxfordshire
- **Fosdyke Railway Embankment protection**, Lincolnshire

The three **Commendations** went to:

- **Red Bridge refurbishment**, Helpringham, Lincolnshire
- **Derwent Mouth Lock refurbishment**, Derbyshire
- **Publow Bridge refurbishment**, Bath and North East Somerset

## PROJECT DESCRIPTIONS – AWARDS



**Fritwell Railway Bridge assessment**

In the case of elderly metallic beam bridges it is frequently found that the assessed capacities of the outer girders are very low, when the relatively simple methods and guidance given in current Standards are adopted. This arises because of the lack of quantifiable restraint to lateral torsional buckling. Consultant Pell Frischmann has been using Eigenvalue Extraction Analysis for re-assessing road-over-rail bridges. The analysis is a powerful but relatively simple linear buckling technique which can take account of initial imperfections and local stiffening, and is more cost-effective than full non-linear finite element analysis. In many cases it has been shown to improve the assessed capacity of edge beams so that only localised strengthening is necessary to increase to full 40 tonne capacity.

The judges felt that Fritwell Railway Bridge is a particularly noteworthy case, where the declared capacity was improved from less than dead load to full 40 tonnes, obviating the need for any structural intervention – the ultimate conservation aim, and a great cost saving to Network Rail and the highway authority, Oxfordshire County Council.

*Judges' comments:* A practical analysis technique for making effective use of all the structural material, offering substantial cost and time savings. Virtual strengthening.

works within the original very restrictive timescale. This scheme consisted of anchoring the walls back with soil nails drilled through the walls, and constructing a reduced thickness slab on top of the original brick invert.

Disturbance at each soil anchor head was restricted to a couple of bricks – these were removed before drilling, the anchor heads were grouted into the brickwork, and reclaimed facing bricks were then built in.

*Judges' comments:* Close cooperation between all parties has ensured a secure future for Brindley's historic structure. Our chairman Roland Paxton particularly stressed the historical significance of the lock.



### Publow Bridge refurbishment

Parts of Publow Bridge date back to the 15th century, when it was a single span masonry arch. In the late 18th century a second span was added and the original arch was widened. It carries a minor road over the river Chew about 10km south of Bristol, and thankfully survived the disastrous Chew Valley floods of 1968 which destroyed many ancient bridges in this area.

In 2005 Bath and North East Somerset Council commissioned Mott MacDonald to prepare a strengthening and refurbishment scheme. Following arch strengthening using the ubiquitous Cintec 'Archtec' system, main contractor Dyer and Butler carried out a programme of masonry repairs, spandrel strengthening and anti-scour works. Of particular interest was the 'spreader beam and tie bar' design which provided strength to the spandrel walls while minimising the removal of historic fill. An extensive archaeological recording programme was undertaken, resulting in the in-situ preservation of a number of historic timbers forming part of an earlier scour protection scheme. Traffic flow along the narrow, varying width and tortuous carriageway was improved by constructing a new designated footway and installing clear priority signing.

*Judges' comments:* A thoroughly sympathetic repair of a historic bridge in an idyllic location.

The full list of **short-listed projects:**

- Fritwell Railway Bridge assessment, Oxfordshire – Network Rail, Oxfordshire County Council, Pell Frischmann
- Fosdyke Railway Embankment protection, Lincolnshire – Network Rail, May Gurney, Salix River and Wetland Services
- Red Bridge refurbishment, Lincolnshire – Lincolnshire County Council, LCR Highways

- Derwent Mouth Lock refurbishment, Derbyshire – British Waterways, Arup
- Publow Bridge refurbishment, Somerset – Bath and North East Somerset Council, Mott MacDonald, Dyer and Butler
- Clarks Bridge refurbishment, Grantham Canal, Nottinghamshire – British Waterways, Galliford Try Construction
- Bursledon Bridge refurbishment, Hampshire – Hampshire County Council, CRL Limited

## William K Burton Memorial

by Roland Paxton

On 9 September at Napier University Craighouse Campus, Edinburgh, The Rt Hon Lesley Hinds Lord Provost of Edinburgh unveiled a sculpture to the eminent water and sanitary engineer William K Burton (1856–1899) at his birthplace on the 150<sup>th</sup> anniversary of his birth. It was a prestigious event organised by the Scottish Council for Development and Industry which I attended for our PHEW interest.



Graciela Ainsworth (sculptress), Dr Inaba, The Lord Provost, Mr Takahashi (Consul-General of Japan)

© Roland Paxton

After the unveiling, Mr Yasuhiko Kobayashi presented an informative lecture on 'Japan's Water Supply and Sewage System developed by William K Burton'. Burton is revered in Japan for his fundamental contribution to public health in many places, for his teaching as Professor of Sanitary Engineering at the Imperial University, Tokyo and as designer of the first high tower 'Ryou-un-kaku' in Japan built in Tokyo Asakusa.

Burton is better known in the western world for his books on photography and his classic '*The Water Supply of Towns and the Construction of Waterworks*' published in London in 1894, a copy of which I was delighted to loan to Ann Jones Heriot-Watt University Archivist who is mounting a display on Burton's achievement. In the same year he married Mits, who bore him a daughter whom they named Mitsuko.

Burton became ill when working in Taiwan in 1899 and died prematurely at the early age of 43. When in Japan I visited the impressive grave in Aoyama Cemetery where he is buried not in the 'Foreigner's' section but, perhaps even more impressively, with the Japanese occupants '*on the other side*'.