

## Panel for Historical Engineering Works Newsletter

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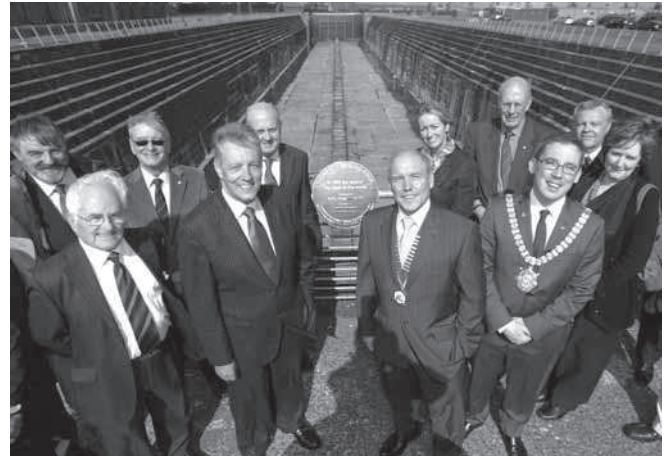
### Belfast Thompson Graving Dock Plaque

by Frank Robinson and Phil Donald

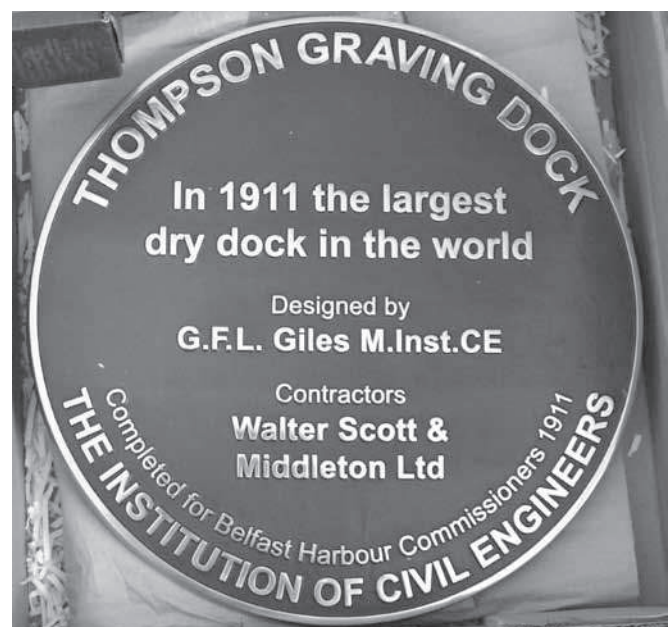
On 5 September 2011 an ICE plaque was unveiled at the Thompson Graving Dock, Belfast to commemorate 100 years from its completion in 1911. It was produced by 'Leander Architectural' in the Peak District.

The Thompson Graving Dock was built by the Belfast Harbour Commissioners (BHC) for Harland & Wolff (H & W) who were building bigger and bigger ships for the North Atlantic passenger market at the beginning of the twentieth century. At 800 feet the adjacent Alexandra Graving Dock (HEW 1816) was the longest graving dock in the world when it was completed in 1889. Even this was not enough for the ships which the White Star Line were planning in conjunction with H & W.

The Thompson Graving Dock was commenced in 1903 and completed in 1911 and named after the Chairman of the BHC, the Rt Hon Robert Thompson MP. With the gate in its normal position the dock is 850 feet long. The gate was similar to that at the Alexandra Dock in that it was hollow and could be deballasted and floated. However, this was a time consuming operation and the gate at the Thompson Dock was moved more efficiently in that it was normally winched sideways on rollers when the water levels on each side were equalised.



Front row (L-R): Frank Robinson (Panel Member PHEW); Peter Robinson (First Minister N I Assembly); Bill Gowdy (Chairman ICE NI); Niall O'Donoghalle (Lord Mayor of Belfast). Back row (L-R): Professor Norman Apsley (NI Science Park); Jim Finlay (Past Chairman ICE NI); David Orr (Past President ICE); Wendy Blundell (Regional Director ICE); Dr Phil Donald (Chairman HEW NI, Past Chairman ICE NI); Dr Brian Hanna (NI Science Park); Una Reilly (Chairman, Belfast Titanic Society) © ICE



Plaque © ICE

The first ship to be brought into the Thompson Dock was the Olympic, which was the first of the three great liners ordered by the White Star Line – the Olympic, the Titanic and the Britannic. One reason for bringing a ship into dry dock was to inspect the hull before the maiden voyage and fit the propellers, which were lifted over the gate by a large German floating crane.

The Olympic and Titanic were longer than 850 feet and to fit them into the dock the gate had to be deballasted, floated out and repositioned against the end of the masonry walls to increase the length of the dock by a further 36½ feet. Soon after the Olympic had left Belfast it was involved in a minor accident and had to be brought back to Belfast for repairs. The dockworkers had become so efficient at moving the gate and manoeuvring ships that the dock was flooded, the Titanic was floated out and the Olympic was floated in, all on the one tide. This need to re-berth the Olympic made the Titanic three weeks late for its maiden voyage. If it had been three weeks earlier would it have met an iceberg? One of the many ‘if’s’ surrounding the tragedy of the Titanic. In the dock the ships were lowered on to keel blocks which sat in line on the dock floor. They comprised tapered pieces of steel (so that the height could easily be adjusted) topped by wood to protect the ship’s hull from damage. The 21 million gallons of water in the dock could be pumped out in 1 hour and 40 minutes. Gratings in the dock floor were situated above pipework which led to the pumps housed in the adjacent pumphouse. The left-hand end of the pumphouse contained the pumps for the Alexandra Dock but when the Thompson Dock was built the pumphouse was extended and the pumps then installed served both docks. The clock tower housed a large water-ballasted tank called a hydraulic accumulator which was raised by steam power and as it lowered slowly under gravity it pressurised water in pipes which drove the winches which manoeuvred the ships into position.

The strength of the gate is suspect and until plans for its strengthening (probable) or replacement (unlikely) are implemented it has been propped.

Recently the Thompson Dock has been handed over to the care of the adjacent Science Park on a 125 year lease and guided tours of the Dock and Pumphouse occur twice daily. As a result the Thompson Dock has metamorphosed into the Titanic Dock. Regardless of its name the future of the Thompson Dock seems to be assured.

## Plaque – John Rennie (1761-1821) – Pembroke Dock by Stephen K Jones

On Tuesday 7 June 2011 a plaque was unveiled to commemorate Industrial Revolution engineer John Rennie at Pembroke Dock, marking the 250th anniversary of his birth. The plaque was presented by the Institution of Civil Engineers (ICE) Wales Cymru to the Milford Haven Port Authority to commemorate the involvement of Rennie in south Wales and particularly with Pembroke Dock. John Rennie’s involvement

with Pembroke came towards towards the end of his career as a civil engineer when he advised the Navy Board on the development of a new shipyard there. Pembrokeshire Royal Dockyard was formally established in 1815 replacing an earlier yard on the other side of the Haven. In fact, his last engineering report produced in 1821 was advice regarding the dock gates at the Pembroke Royal Dockyard. Work on these was carried out under the resident engineer William Wallace and the contractor Hugh McIntosh and included covered slipways to Robert Seppings’s designs.



John Rennie plaque at Pembroke Dock  
(designed by Owen Eardley and Stephen K Jones) © ICE

Rennie’s early projects were mainly canals and river improvements, but he also established a reputation as a bridge builder. Waterloo Bridge in London and Southwark Bridge were two of his designs. He also designed London Bridge, which was completed by his son Sir John Rennie after his death. This bridge no longer spans the Thames but it can be seen in a new location – Lake Havasu City in Arizona, USA.

## John Rennie Remembered in Scotland by Professor Roland Paxton



© Joy Dodd (L-R): John Scott, Andrew Carrick’s grandson; Rev. David Scott; Patricia Stephen, owner of Phantassie; Professor Paxton; Alex Reid, one of the builders of the original memorial aged 101; Stephen Bunyan, chairman ELA&FN Society; Councillor Jacqui Bell; Sheena Jamieson; and, Sir Hew Hamilton Dalrymple Bart.

One of the greatest ever civil engineers, John Rennie (1761-1821), was commemorated recently at his birthplace on the 250th anniversary of his birth.

The event took the form of the re-dedication of the 1936 Rennie Memorial adjoining the public road in the grounds of the house in which he was born at Phantassie, East Linton, Haddingtonshire. The Memorial had been specially refurbished and decorated for the occasion by the East Lothian Antiquarian and Field Naturalists' Society. The ceremony was performed with distinction by the Rev. David Scott, Minister of Prestonkirk in the presence of large local gathering, at which Professor Paxton represented the Institution's interest as Vice-chairman of PHEW and on 7 June by presenting a public lecture on Rennie in the Church following a civic reception by Provost Sheena Richardson of East Lothian in Haddington Town Hall.

After the ceremony, the party was shown round the grounds of Phantassie by Patricia Stephen, including a second Aberdeen granite baluster obtained from the demolition of Rennie's Waterloo Bridge, London, in the mid-1930s (the other baluster can be seen in the picture). The celebrants then adjourned to Prestonkirk Church Hall and a memorable afternoon tea prepared by the Society.

## Celebrating Pont-y-Cafnau, Cast-Iron Bridge and Aqueduct by Stephen K Jones



Pont-y-Cafnau taken on 17 June 2010 © Stephen K Jones

South Wales played an important part in the development of structural cast-iron, notably in the construction of bridges. At Cyfarthfa at Merthyr Tydfil is one of the most significant of these early bridges, significant not for its size but for the innovative design and the fact that this bridge, which was also an aqueduct originally carrying two water troughs, is the world's oldest cast-iron railway bridge. 'Celebrating Pont-Y-Cafnau' was a conference organised by Stephen K Jones for the Institution of Civil Engineers Wales Cymru which took place on the 21 May 2011 at Cyfarthfa, Merthyr Tydfil, on the bridge and its legacy. It covered the development of cast-iron as a structural form, from the famous Iron Bridge of 1779 onwards, the work of the engineer John Rennie, the Welsh dimension of cast-iron and applications for bridges and beams and south Wales canal tramroads and cast-iron bridges. It is hoped that the papers given will eventually appear in learned journals.

The name Pont-y-Cafnau is derived from its purpose rather than location, in Welsh pont means 'bridge' and cafnau 'troughs' hence, 'bridge of troughs'. Construction was authorised in January 1793 and was almost certainly the work of the engineer of the Cyfarthfa Ironworks, Watkin George (fl.1790-1811). It spans the river Taff, immediately below the confluence of the Taff Fawr and Taff Fechan, with a 48ft (14.63 metres) square span and a deck width of 8ft (2.43 metres). The water it carried drove the ironworks waterwheels with one trough incorporated into the tramroad deck whilst another, now long gone, was carried above it. The railway element was the 4ft (1.21 metres) gauge tramroad that carried limestone from the Gurnos quarry to the works.

This, the Gurnos tramroad, ran on the top of the decked-over trough, through which ran water taken from the Taff Fechan. It is supported on each side by cast-iron frames with two raking members dovetailing into a king-post at mid-span. An 'A' frame construction is thus formed with a central kingpost. The lower end of the kingpost connected to a horizontal member linking the two rakers. The deck trough is supported by three transverse members between the two frames and under the deck trough. Some secondary bracings were later added to the structure and some early tramroad rails, still fastened in shoes cast into the deck itself, can still be seen. Between 1793 and 1796 George constructed the 606ft (184.70 metres) long wooden Gwynne Water aqueduct which crossed the river above Pont-y-Cafnau itself. Around 1819-1820 a view of the aqueduct was painted which shows the aqueduct's trestle construction supported by the central uprights along with uprights at each end of Pont-y-Cafnau.

Whilst it no longer carries water Pont-y-Cafnau is open as a foot bridge and, along with the turbine house, is now in the ownership of Merthyr Tydfil Borough Council. The bridge is both a Scheduled Ancient Monument and Grade II listed structure.

## Tees Valley Bridges Leaflet by J Michael Taylor



(L-R): Jason Boddy (Chairman, ICE North East); Charles Morris (Cleveland Industrial Archaeology Society (CIAS)) and Vinny Holden (Chairman, Chartered Institution of Highways and Transportation, North East Branch) © ICE North East