



The Institution of Civil Engineers

Panel for Historical Engineering Works

NEWSLETTER

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horizontal plain steel preventing shear along the longitudinal;

- b. the projections to the main bar resist 'any sliding action of the steel through the concrete', and;
- c. inclined bars were better able to resist shear than verticals (but Hartlake Bridge has recently had Macalloy bars stitched in to resist shear).

These bars were known as 'KT' (Kahn Trussed) and were sized as follows:-

Early Kahn Bridges ... Dr M H Gould

In Newsletter 58 I put an appeal for further information on early Kahn reinforced concrete bridges. With the help of Bill Bailey, J B Campbell (York Race Committee), Roger Cragg, Peter Cross-Rudkin, Harry Eagles, Kenneth McCrae and James Sutherland, it is now possible to give a more detailed account.

March (Reinforced Concrete, 1904) discusses the system of reinforcement introduced 'quite recently' into the United Kingdom by Julius Kahn of Detroit. The system was intended for buildings but it is recorded that in 1908 discussions were in hand with the SE and Chatham Railway for the casting of 24 ft span beams; but with no note of the outcome.

In the Kahn system the main longitudinal bars were of rolled diamond section with projecting wings. These were slotted off the diamond for a certain distance and were then bent up at 45° on alternate sides. The stated advantages were:-

- a. vertical plain reinforcement was rigidly connected to

size in.	wing thick in.	wing width in.	lb wt/ft
1/2(x1/2)	1/8	1 1/2	1.4
3/4	3/16	2 3/16	2.7
1	1/4	3	4.8
1 1/4	1/4	3 3/4	6.9

The system was marketed by the Trussed Concrete Co. of London. The inclined steel shows clearly on the drawing for Hartlake bridge.

Known early bridges are detailed below.

1. *Lilbury and Lucker (Northumberland)*
Concrete Construction & Engineering (CC&E) vol.1, 1906/7, p.426.

Apparently built in double quick time after two masonry bridges were washed away by the flood of 19 May 1906, they were identical in all major respects with mass concrete abutments (Lucker had to be piled). Tested by two 15 ton traction engines run side by side and in tandem.

band of revolutionaries. He carried out main drainage schemes in a few towns, and, with others including (Sir) Joseph Bazalgette, gave advice to the Metropolitan Board of Works on the drainage of London. As late as 1892 he gave evidence to a Royal Commission on London's water supply, and advocated the use of the Thames as a source. He installed gasworks in several towns, including Nottingham.

Hawksley gained a great reputation as an expert witness in court cases and arbitrations, and before Parliamentary committees. According to one source: 'Mr Hawksley might be described an invincible witness. His appearance in a case was heralded by the introduction of piles of statistics and other data which he had sent before him. Let a question arise about the fall of rain in any part of the district that was affected by the Bill, or the capacity of the smallest of the streams, out came a mass of figures relating to the subject which appalled the opposing counsel. He displayed a manner which was almost contemptuous when efforts were made to entrap him'.

Hawksley could be irascible in temper and acerbic in his contacts with others. For many years he worked in close and amicable cooperation with the lawyer and social reformer (Sir) Edwin Chadwick, who was Secretary of the Poor Law Commission and who, like Hawksley, insisted that proper sanitation was essential for any improvement in living conditions. But then Hawksley quarrelled bitterly with Chadwick over points on which it is now recognised that Chadwick was right, such as that water supply schemes must have complementary drainage schemes done at the same time, and that the government should examine the technical details of such schemes before allocating public funds to them. The breach between the two men was never healed. Yet many professional colleagues and juniors paid tribute to Hawksley's interest in their welfare and his kindness to them.

He died on 23 September 1893 at his home in London, having remained active professionally until a week before. A large memorial plaque to Hawksley and his wife, which used to be in the Nottingham High Pavement Chapel where they had been worshippers, is now displayed in the engine house at the Wollaton Museum, facing the beam engine.

Thomas Hawksley was a leader in his profession. He was President of the Institution of Civil Engineers in 1871-1873, President of the Institution of Mechanical Engineers in 1876-1877, and was elected a Fellow of the Royal Society in 1878. He virtually originated the visits of students to engineering works by taking a party (and lavishly entertaining them) to see his Leicester waterworks in 1872. His son Charles joined him in partnership in 1866, and was himself President of the Institution (Civils) in 1901-1902.

Only one other water engineer stands comparison with Thomas Hawksley - J F Bateman (1810-1889), whose

works included the Longdendale reservoirs for Manchester and the Loch Katrine reservoir for Glasgow. If water engineers had enjoyed the same popular attention as railway engineers received in the 19th century, Hawksley and Bateman would have been seen as ranking alongside men like Robert Stephenson and I K Brunel.

References

1. *Obituary in Minutes of Proceedings, Volume CXVII, pp.364-376. Institution of Civil Engineers, London 1894.*
2. *G M Binnie. Early Victorian Water Engineers, Chapters 1, 2 and 8. Thomas Telford Limited, London 1981.*

The Chairman's Column ... Roland Paxton

Many readers may by now have had the pleasure of perusing the Panel's two readable and attractively produced heritage books covering Southern, Eastern and Central England, published in December. Through this column it would be appropriate to record again my thanks to all those who played a part in this excellent achievement, particularly Bob Otter, Ted Labrum and Bryan O'Loughlin. Work is continuing on the preparation of volumes for Scotland, Ireland and London to complete the series. A revision of volume I: Northern England, which has now been in service for two decades, will be considered.

NCE (25 November 1993) readers of the coverage of the prestigious Saltire Awards for recent Scottish civil engineering work will have noticed that the conservation of works of historical importance has been recognised for the first time. Also, that the advice of PHEW was taken in deciding which projects merited the new class of commendations. Following examination of seven entries, two commendations were made by Lord Younger of Prestwick in the presence of Mr Stuart Mustow, President of the Institution, on the recommendation of the Scottish Group of the Panel which cited that,

"Dunglass 'New' Bridge 1798 is awarded a conservation commendation for investigation and repair with maximum retention and use of original materials.



Crossford Footbridge over River Clyde near Carlisle
made by P & R Fleming & Co., Glasgow, 1897

Crossford Footbridge 1897 is awarded a conservation for economic repair in compatible materials with minimal disturbance of original ironwork."

This important role, which undoubtedly encourages a higher quality of conservation, will in future be exercised annually by the Panel in Scotland. The question of seeking a similar role covering England, Wales and Ireland will be considered at the Spring Meeting of the Panel. In order to prepare for such a development Panel Members should take every opportunity of increasing their knowledge and experience of engineering conservation. The findings of the Sub-Committee chaired by Roger Cragg presently investigating meritworthiness classification systems for HEW's should be helpful in this respect.

The Laigh Milton Railway Viaduct 1812 conservation project initiated by the Panel in Scotland is still not irrevocably committed, but a company with charitable status has been formed, promised funds now exceed £400,000 and a contract has been awarded for the construction of an access road to the viaduct before the end of March. Subject to outstanding legal and administrative matters being satisfactorily progressed, it is hoped to start work on the stabilisation and repair of those parts of the structure most at risk before the end of April.

Panel Members often find themselves considering historic building listings and not always agreeing with the official ratings. It was pleasing to hear recently, following my presentation of a case at a public lecture and subsequently to Historic Scotland, that Glenesk Bridge on the former Edinburgh & Dalkeith Railway should be up-listed from category B to A, has been accepted. This bridge, which last year had been tastefully conserved as a footpath link, was widely thought to have been the work of John Miller in 1847. It is now recognised as the work of Telford's close associate James Jardine (1776-1858) from 1829-31 and as Scotland's finest pre-Victorian railway bridge.



Glenesk Bridge, Dalkeith

This year the centenary of Robert Louis Stevenson, which is being celebrated worldwide, has presented an opportunity of promoting knowledge of civil engineering in a fascinating context. Based on a theme suggested by his book *Records of a Family of Engineers*, a 'Stevenson Family of Engineers' Symposium has been arranged to take place in his favourite city, Edinburgh, on Saturday 16 April 1994. Further details are given in the enclosed leaflet.

The Panel's international face has not been neglected, correspondence recently having taken place on various matters of mutual interest with members of ASCE and JSCE. I am pleased to say that Mr Hiroshi Isohata, Professor Alan Prasuhn and Dr Emory Kemp will be visiting Britain later this year.

HEWs in the News ... Brian George

The Autumn Newsletter of the National Trust in Devon and Cornwall reported that Lord Falmouth had inaugurated the regular steaming of the Levant steam mine engine and that it had been open to view six days a week from 1 July to 12 September (Sunday to Friday 11.00am - 4.00pm). Details of the restoration of the Levant Steam Engine were reported in our Newsletters Nos.56 and 58.

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The *Express* and *Echo*, Exeter, of 17 November brought further news of the Brunel Atmospheric Pumping Station at Starcross (HEW 792). This has closed as a museum of atmospheric memorabilia and has been bought by the Starcross Fishing and Cruising Club for a reported £67,500.

A club spokesman has said that the space will be used for storage and workshops. The flat will be renovated and a caretaker will live on site. Some work is apparently required to make the building waterproof.

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New Civil Engineer, 25 November, contained an article on the construction of the Howden and Derwent dams (HEW 185, 839) summarising Brian Robinson's book *Walls Across the Valley* published by Scarthin Books, Cromford, Derbyshire. Three massive dams were built in the heart of the Peak District to supply water to the cities of Sheffield and Nottingham, the boroughs of Leicester and Derby and the counties of Derbyshire and Nottinghamshire.

The Derwent Valley Water Board was formed in 1898 and is now part of the Severn Trent Water. It was charged with the construction of five dams in the Derwent and Ashop valleys, excavation of tunnels to allow water to flow under gravity to Sheffield and provision of a 45km aqueduct to deliver water to service reservoirs for distribution to Leicester and Derby.

Work on the first stage of the Scheme, construction of Howden and Derwent dams, began in 1901 under the