



Bridge of the Month May 2013

Tummel Bridge



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A pdf version can be download from here

<http://billharvey.typepad.com/BridgeOfTheMonth/2013/April%20Moor%20Street.pdf>

News

Bill is working up lectures and notes for a course for Bridge Inspectors. The intention is that the notes will become a book available for sale and that the course will be repeated. The first is for URS in Chesterfield on 12/13 June.

He is also working with Jose Martin Caro of INES consultants in Madrid, on a broader course for engineers to follow the next round of publications from the International Railway Federation (otherwise UIC).

Watch this space on both counts.

The OBVIS web site has the latest version of Archie-M, 2.5.1. This is largely a bug fix sorting out problems with activation which now seems to work properly. If you need a version for mounting on a server, contact bill@obvis.com who will give you a link. We thought for a long time that we would be able to use a single version but it seems not. The version on the web site should work as a fully functioning demo program for 30 days after which activation is needed.

Network Rail's level zero assessment programme is now in full swing. Our planned tools to assist with this have been somewhat delayed by the arrival of the next generation. (Arthur Magnus William was born on 7th Feb and has proved to be difficult to keep fed). We do, though, have tools in development for follow up work, allowing more automated running of Archie (not something we would normally encourage) for large batches of bridges. We plan also to include multi spans in this automated process. A particular development, though, is the ability for "Autorun" to make sensible use of backing. That involves making the backing work truly as part of the arch.

Two papers from Bill in the ICE bridges journal. The first, though printed second, (A spatial view of the flow of force in masonry bridges, ICE Proceedings, Bridges March 2013) about the generality of force flow in arches is a gathering together of thought from the past two decades. The second (Stiffness and damage in masonry bridges, ICE Proceedings, Bridges, Sept 2012) looks at the vexed issue of "spandrel cracks" in arches.

Forthcoming presentations.

12th 13th June. Inspector training for URS. This one is private.

18th July, ICE Poole: How Designs go Wrong, or what I did on my holidays. (about a suspension footbridge and designed as a discussion meeting

30th August, Scottish Lime Centre <http://www.scotlime.org/>, Charlestown, details to be agreed. Contact: director@scotlime.org.

Links

www.obvis.com

www.billharveyassociates.co.uk

www.moiretelltale.com

Rather smarting from a comment that BoM is very southern centric. One reason for that is my vast collection of bridge photos from the North date back to before Digital and are in a box of perhaps 5000 slides that need sorting and scanning). Anyway, let's go North this month. Loch Tummel is a beautiful place. It is too many years since I was there.



The bridge (<http://goo.gl/maps/kVjYr>) is part of the highway system built by General George Wade after the 1715 rebellion. Before that there were no roads north of Perth. It is somewhat unusual in that we have the original contract. It says (I have tried to maintain the line breaks, grammar and spelling of the original):

Whereas it is agreed between Lieu^t. General George Wade for and on account of His Majesty, and John Stewart of Canagan Esq that he the said John Stewart shall build a stone bridge strengthen'd with a double arch over the river Tumble, within less than a mile West of the house of the said Canagan, which bridge is to have an – Arch of at least forty two foot between the landstools/or more if the breadth of the river shall require an arch of larger dimension./ It is likewise to be twelve foot in breadth including the Parapet Walls, which

Walls are to be three foot high above the pavement, and at least one foot broad, and to be coped with good flag stones, The whole to be of good – materials and well wrought, and to have Access to the same – extending so far on both sides to the Land, as to render it easily – passable for Wheel carriage or Canon, And Likewise to make – sufficient Buttments that shall confine the water to pass under the Arch, that in extraordinary Floods it may not damage or undermine the foundation, For which Bridge and all Materials, and Charges – Relating thereto, the said Lieut General George Wade is to pay to the said John Stewart, the sum of two hundred pounds Sterling Viz. Fifty pounds on signing this contract, and one hundred and fifty Pounds as soon as the work is completed, which he promises to finish before the last day of October next ensuing, and the said John Stewart does oblige himself to give sufficient Security before the last Payment is made to uphold the said Bridge at his own expence for the space of twenty years from the date hereof, whereto we have interchangeably set our hands, this Twenty fifth day of July 1730

Witness John Stewart

Witness Donald McDonald

If you look at the Google Map you will see that Canagan is rendered “The Kynachan” and that the bridge is indeed well within a mile from the house. If the building period seems short, remember that the much bigger bridge at Aberfeldy was started in April and finished in October 1733.



The good condition in which the bridge is found is probably a result of the replacement built in the 1930s to carry heavy machinery to the nearby hydro power station. This picture was taken in summer and the river doesn't look at all friendly to the building of a timber centre for such a large span. It would be wonderful to know more of how it was built. We are entering the era of the Civil Engineer by this time. John Smeaton was born in 1724, James Brindley in 1716.



Here we see the “double arch” referred to in the contract. The gunited soffit is not a happy thing. It is most likely done as a cheap alternative to pointing but the harm it does is untold. It also obscures the nature of construction of the arch itself, though the selected slate like stones exposed on the face are quite likely to have been used through the full width.



The clear width may be sufficient for a cannon to pass, but one might pity the horses. Though, of course, the road itself was similarly steep over much greater distances.

There is a bit more about the history at <http://www.transportheritage.com/find-heritage-locations.html?sobi2Task=sobi2Details&sobi2Id=491>