

There are all sorts of plans afoot for seminars and stuff but nothing really coming to a head yet.

Bill will be talking about New Zealand cable bridges at the IStructE History Group in March and probably about viaduct behaviour in September.

This is the start of the fifth year of BoM. Next month will be number 50 which is something of a landmark.

Merry Harriers

I have already written about one bridge in this stretch of railway. [Cowley Junction](#) in Exeter was certainly built under the direction of William Froude and I suspect this one was too. Froude is best known, of course, for his work on scale modelling of ships.

This is also the second very similar bridge I have looked at on this stretch. [Merry Harriers](#) and [Duke Street](#) Cullompton, only 3Km further north are essentially identical, including having been built up at one end to bring the road high enough to cross the adjacent motorway.

The photographs of Cullompton were taken in daylight, though with a film camera so I am not able to retrieve all of them. This view of the high end of the span show just how much it was built up.



These bridges are clearly unusual in that the brickwork of the arches is bonded through. That means that creating tight radii is difficult and here the curves are made by inserting a tapered course into

every fourth or fifth. It is also notable that the ring thickens dramatically towards the springing. At Duke Street, some doubt was expressed as to whether this would extend through the width of the bridge but a small trial hole in the grass verge left no doubt.

In the records at Swindon there are drawings of very similar bridges on the original GSW to Bristol. I am indebted to Steven Brindle for these photographs, and recommend his book on Brunel where I first saw them.

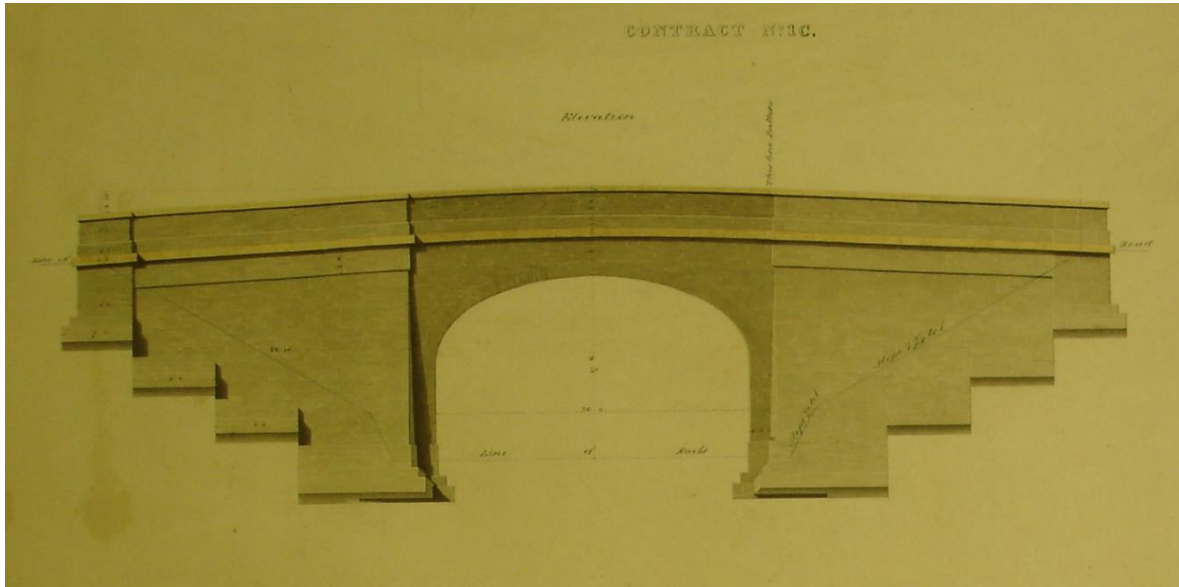


Figure 2 Brunel Drawing, Elevation

The elevation shows a semi elliptic arch on vertical abutments but with battered wing walls.

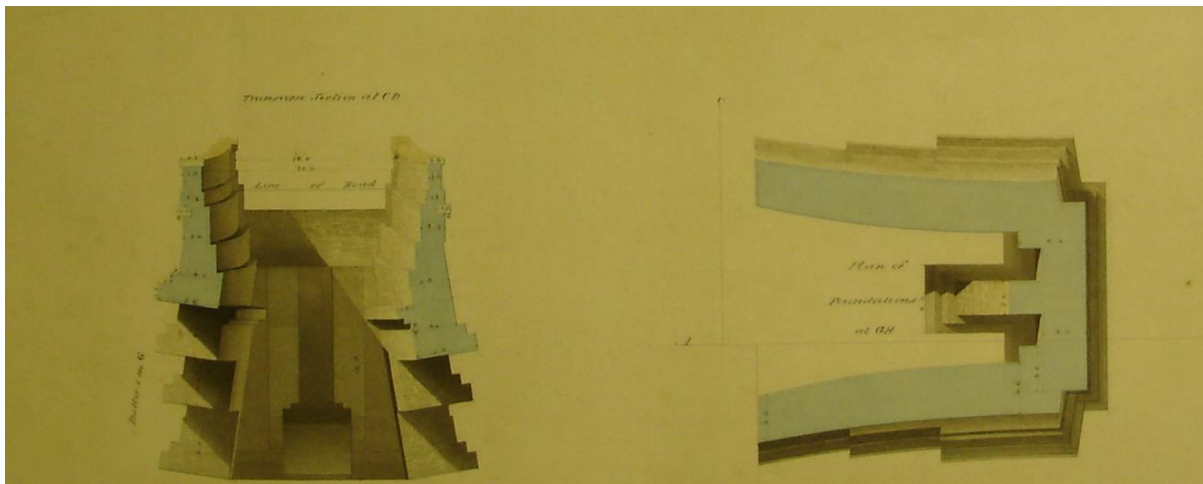


Figure 1 Brunel drawing abutment details

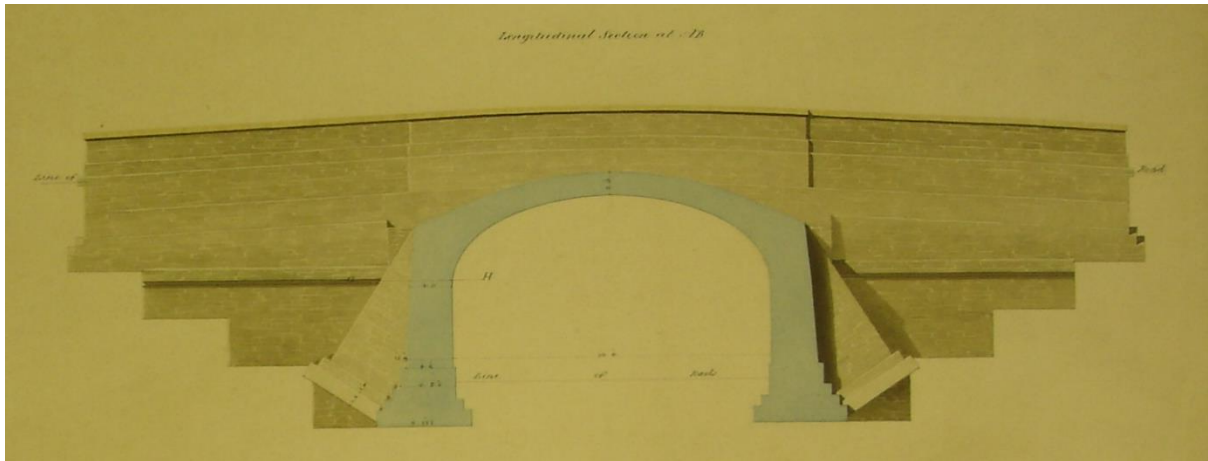


Figure 4 Long section through the bridge

The long section shows a battered counterfort with an inclined foot. The wing wall foundations also step upwards away from the bridge. This was normal construction for a cutting. Where the railway crossed flat land, the foundations were also usually flat and the design might change in detailed ways.

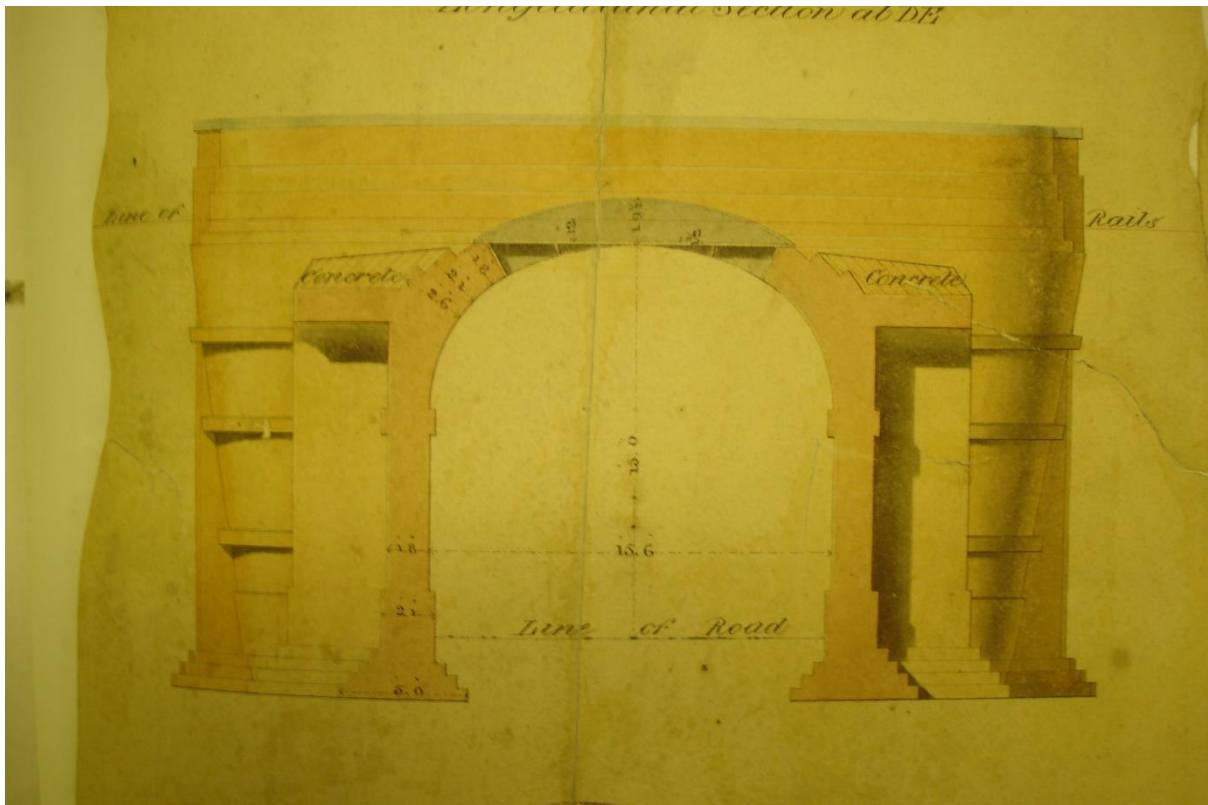


Figure 3 Long section of a bridge with very shallow cover.

The long section in Figure 3 shows all the foundations on level ground as is most likely the case at Merry Harriers. This drawing shows a structure with very shallow cover. The longitudinal sleepers favoured by Brunel were set in Cast Iron troughs so they actually passed through the crown of the arch.



Figure 5 Merry Harriers, photographed at night during an inspection by engineers from Devon County Council

From the drawings, we have a reasonable indication of the construction. There is a marked change in condition of the brickwork of the spandrel wall, roughly at the level of the first increase in arch thickness. This might be taken to correspond with the top of the backing, but from the drawing we might infer that it is merely the location of a substantial increase in the wall thickness.

Time being what it is, I will conclude with a brief comment on shape. For many years, especially while I lived in the north, I believed that three centred arches were much more common than semi ellipses. They are quite different shapes, even at a span rise ratio of 4 as here. There is a survey of the bridge and I have superimposed a set of points showing the three centred curve and another showing a semi ellipse. It is clear that this arch is (or was at the time of construction) a semi ellipse.

Making a plot like this is always the first thing I do when I get details of a new bridge. It is well to remember that these structures were all built using imperial measures. It was normal for carpenters, masons and bricklayers to work in round units, typically feet, thirds and quarters, though in bricks sometimes one sixth of a brick or 1.3in was used. GWR bridges typically spanned 30ft (9.144m) to clear the broad gauge stock. This bridge clearly began at 30ft span and 7.5ft rise but has moved a little with time.

Merry Harriers survey

