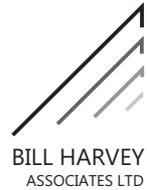




## Bridge of the Month No24 December 2012 Raymouth Road



### News and Events

Please contact [Philip@obvis.com](mailto:Philip@obvis.com) if you are interested in attending a day seminar on Arches and Archie. The program for this year includes:

- Bill's recent work (some interesting bridges!)
- Skew Arches
- Ring separation
- Causes of live load damage

We charge £100 for the day but if you wish to host a session at your office we then wave the charge.

Two papers in the ICE Bridge Engineering journal:

**Stiffness and damage in masonry bridges.** Proceedings of the Institution of Civil Engineers, Bridge Engineering 165 September 2012 Issue BE3 Paper 1100032 Pages 127–134

<http://dx.doi.org/10.1680/bren.11.00032>

**A spatial view of the flow of force in masonry bridges,** Proceedings of the Institution of Civil Engineers, Bridge Engineering 000 Month 2012 Issue BE000, Paper 1100026, Pages 1–8

<http://dx.doi.org/10.1680/bren.11.00026>

# Raymouth Road Viaduct, London

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Bill Harvey Bill Harvey Associates Ltd and OBVIS Ltd

pdf from [www.obvis.com/news](http://www.obvis.com/news)

Several early railways to Kent run south east from near London Bridge Station on viaducts. These are well illustrated at <http://goo.gl/maps/l3lc4> where you can see the combined viaducts beginning to spread. The viaducts are, of course, independent, though where they abut one another the construction may vary.

Most of these arches are tenanted, which makes inspection and assessment particularly difficult. I was called here because access to a particular arch revealed some very noticeable movement.



It is evident here that the line of the crack also marks a significant change in the condition of the brickwork. Some of that is the result of repointing but the water runs clearly emanate from the crack.



The join between two parallel viaducts is evident here, as is the angularity of the arch. There are kinks just to the right of the crown and, more obviously, to the left of the fan frame.



The inner end of the hinge.

Clambering through to the space between viaducts, it is possible to examine the face of this one.



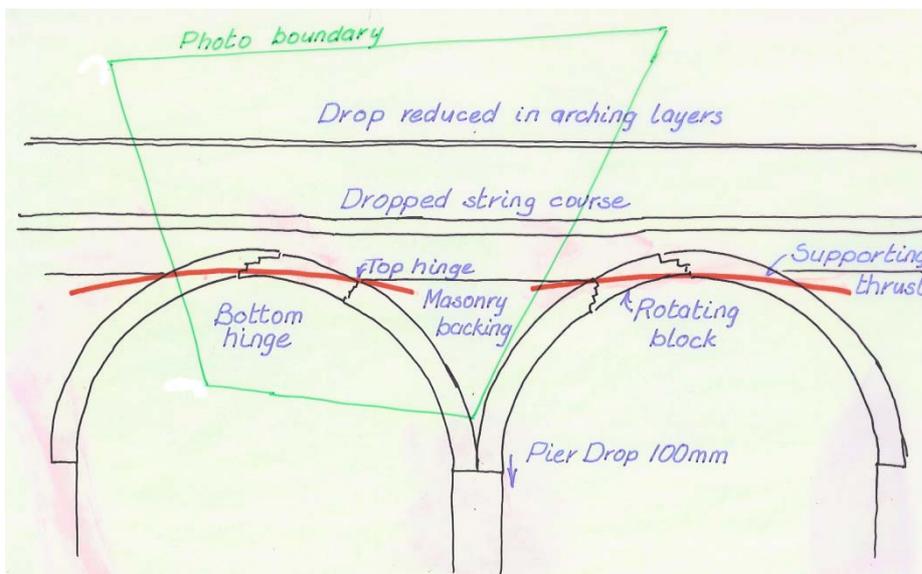
Here, and below, you can see:

The hinge positions. Note that the extrados and intrados in hinges are at the same level so settlement can take place without additional thrust developing.

The water line marking the top of the backing.

The crack working slowly up to the string course. Masonry above the crack is arching over the gap.

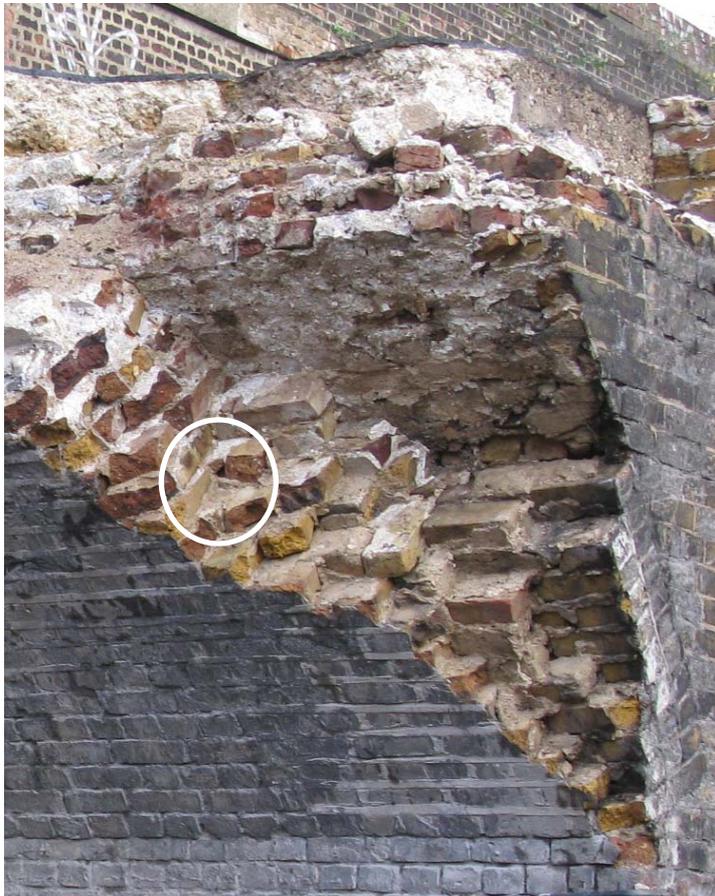
Measurement indicated that the pier had dropped 100mm or thereabouts. The track had been relevelled and the movement remained undetected for years.



The arch being demolished, below, is part of a nearby viaduct.



Here we have solid brickwork backing topped with a concrete layer to produce a smooth wave form and then waterproofed with asphalt. The asphalt appears to be topped with concrete too. Note the voided spandrels in the viaduct behind. We can be confident here that the masonry is solid to level with the extrados of the ring. Where a void has been closed, it appears to be full at least to the half way mark.



A closer look at this picture shows a lot of interesting detail. The rings appear to be fully bonded except on the exposed edge. Near that edge, though, the 2<sup>nd</sup>/3<sup>rd</sup> layer seems to be very short of mortar and looking elsewhere there are empty frogs even in the arch. The ringed empty frog looks as though it shows a brick on edge. It might be that the ring taper was made up in this way.