



Bridge of the Month, December 2013 Göltzschtalbrücke



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News and Events

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Seminars and Lectures

Hertford County Council Offices 29th Jan 2014
MottMacdonald Altrincham office early 2014

Please contact 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.

Recent Publications

Bill's paper about the effect of stiff spandrel walls received the John Henry Garrod King Medal. The medal is awarded annually for the best paper published by the Institution on tunnels, soil mechanics or bridges.

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>

Sutherland History Lecture 2012 at <http://bit.ly/J4gblz>

Göltzschtalbrücke

I was looking for something different to complete the third year of Bridge of the Month. It is still October as I write this but I am off to New Zealand in two days and it is time to tidy up for the year.

This is claimed to be the [biggest brick viaduct](#) in the world. No doubt there are many other claimants to that title but few can be so impressive. It is, after all, 78m high, 574m long and 26million bricks. I have wanted to see it for years and thanks are due to Stephanie Franck of HTWK Leipzig for taking me. We even got a balloon ride to get the aerial photo below. The central span is 30.9m and results from changes made during construction to find better foundations.

If you make a visit, don't (like me) forget to do a bit of research in advance. Wikipedia tells us that:

A museum in the nearby [Mylau Castle](#) opened in 1883 that has dedicated a room to the Göltzsch Viaduct that among others includes a scale model of the scaffolding, copies of the original building plans, a three-dimensional height map of the region, and photographs and paintings made during the bridge's construction.



When I brought home a postcard, Sue noted that the engineer was named in the caption:

Konstrukteur: Prof. Andreas Schubert.

It was built between 1846 and 1851 so is contemporary with many large railway viaducts including Ballochmyle (1846-48, 55.2m span, 53.3m high) and Victoria (<http://goo.gl/maps/Pik2J>, 1838, 49m span 41m high).

The multi-tiered design, getting wider towards the foundations shows a link to the Pont du Gard (http://en.wikipedia.org/wiki/Pont_du_Gard). The complexity here, though, is spectacular. The closer photograph below shows that the piers are solid and widen dramatically to the base, but the stabilising layers of arches are narrower and in pairs.

It seems that the original design had uniform spans but the foundations around the river were moved creating one larger span and two smaller in a four span space.



The shape of these main arches is also interesting. All the others are segmental but this seems different. It is clearly somewhat higher than half the span.



Cropping the arch out of this picture and enlarging it suggests a multi-centred curve with stone voussoirs at the changes of radius. Tracing from the drawing suggests 15.45m radius at the crown (ie. part of the curve that would fit a true semi-circle). Then a slightly tighter 13m curve linking to a 28m radius to the springings. The lowest of these could have been built without a true centre, though some sort of guide would surely have been needed.

The photograph above shows dark patches on the face of the pilasters half way up the span. The structure is surely hollow in some degree and this may mark the base of a void.



The erosion seen here, though is surely a result of drips from the sandstone capping. The arch seen here is the lower of the two main spans. The clean change of colour one brick in from the edge would usually be an indication of impending trouble and a closer look shows that there is a crack half a brick in.

The erosion is matched on a nearby railway building with no apparent chemical mismatch to accelerate the process.



The whole viaduct begins with a stone plinth. This view along the lowest cross arch shows how the rock might dip steeply towards the river making foundations more difficult.



An upward view from the same point shows how the structure is detailed. The blind widows suggest that the piers are voided through most of the height.



The patching seen here shows a considerable level of care for the structure, but so, surely, does that runway beam which will allow rapid access to any point on at least the exposed elevations.

So, there we are, a spectacular end to 2013. All the best for 2014. Bill