

The railway in Bath is interestingly routed. Obviously Brunel wanted his station in the city itself but there was no way in or out so he carried it along the opposite bank and crossed the river Avon with two skew bridges to plant it just on the very corner <https://goo.gl/maps/z0PzV>. The viaducts approaching the river on the two sides are remarkably different. I recently had a day holiday in Bath and wandered down here. There is a lot going on. My descriptions may seem uncritical to some readers but it is important to note that:

- 1) I am confident there is no short term danger.
- 2) I see no reason to suppose the damage will progress rapidly.
- 3) I am only just beginning to understand the behaviour described (though I did go here specifically looking for it).

This sweep panorama (modern cameras are wonderful) distorts things somewhat, indeed the viaduct actually curves around the photographer, but it does provide a general picture.



The river is to the right here. The span just visible to the left is skew and the next two short spans are closed at the inside because they are making space in an otherwise massive abutment.

The stone is a bit grubby but I think it is clear that the whole thing was originally Bath Stone. As I was just returning from a week working on Archie in Hungary, I had no measuring equipment with me but I think the original spans were about 20ft (6.1m). The most prominent arch here looks very thick but as we will see it has been reskinned and under ringed.



This, less distorted shot allows some of the history to be extracted. The stone voussoirs at the crown and quarter point of span 26 are apparently 18in (457mm) thick. Where it has been patched it is just 4 bricks. At the springing the pier face seems to align with the bottom of the fifth ring with an additional 3 added later. I suspect this shows two phases. A single under-ring and re-skin followed by 3 more when that didn't stop the movement, for movement there certainly was.



A closer look shows all sorts of things. Perhaps the most obvious is the stream of mud apparently coming from the full width, including through the ring at the stone voussoir on the left. At the next course up the stone is spalled over some length and at the right, the damage progresses into the ring. Also at the right, the inner ring seems to be separating. In span 27, the separation at the crown above ring 2 has created a path for the muddy water again.

The stone parapet seems to be both original and sound. The band of brickwork below it, though, suggests that there has been damage at this level.





Looking to the right, the damage continues and is perhaps worse. The stains on the ring in span 29 (to the right) show that it is articulating enough to allow mud through 5 rings.

The process driving this behaviour is described in detail in a paper recently submitted to ICE. This is not the place to do more than note the damage and ask readers to look out for similar things and let me know please.



Looking along this run from the East we can see why this span has not been lined. To do so would be to severely restrict the access for traffic through this skew span. At the far end we can also see the main river spans.

The skew span also exhibits damage that I first came across recently.



These cracks run more or less along the skew and there are many more of them than one might expect. I am still struggling for ideas about how this happens.

The issue will return.