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This bridge stood at <http://g.co/maps/mmn6g> Just off the A76 in Dumfries and Galloway. The G&SW was designed by John Millar. The railway was opened in stages around 1850 and this is in part of the last section. It was demolished some years ago and features here because that demolition was recorded and I have some photographs.



The bridge was 20ft span or 6.096m and like many other bridges on the line has a span rise ratio of about 4. Measuring off the photo above suggests that the rise is actually 6ft giving a radius of 11ft4in and an irrational span rise ratio. This seems unlikely, but I do not have actual dimensions to hand. The ring seems to be about 18in (458mm) thick. Using Rankine's rule for thickness of  $\sqrt{0.12 \times \text{radius}}$  would suggest a ring of only 14 in (356mm).

In this case, though, I am more interested in the construction details revealed by the demolition and that means moving on to further photographs..



I first got involved with the GSW back in 2000. one or two bridges were deteriorating badly and we couldn't work out why. Rather foolishly, I concentrated on the bridges that were suffering rather than looking at them all. Only in 2006, when I got a chance to look at the whole set, did I start to see some of the distinctions and even then I hadn't seen these pictures. Then, in 2011, looking through pics given to me by the Network Rail engineers from Glasgow, I came across pictures of some very small bridges with the fill partly excavated. But more of that later.

Most of the damaged bridges were among the very large number of 12ft span accommodation bridges on the line, but this one was also deemed to be suffering and was demolished and replaced. I didn't, though, get a good look at this while it was still standing. So all I have is photographs.

This photo is, though, very important, because it clearly shows internal spandrel walls buried in the fill.

More on that shortly, along with other photos, but look at that picture. On the right. There is absolutely no reason to use a pick to demolish an arch. Hook the bucket under the arch and lift, the arch will come apart in sensible pieces and the demolition is quicker, quieter and much more controlled.



At first sight, this looks like the same picture again. Actually it was taken rather earlier. The light, and the fact that I had to brighten the pic a lot, says it was taken in the dusk the night before. Here, the excavation has just got down to the crown level and the bucket has scraped the top of the walls without breaking them up.

These walls are not beautifully dressed masonry like the exposed faces of the bridge or the arch itself. they are built from biggish shards left from the masons work. The walls are positioned under the rails and the ratio of wall to space suggests that they are about 2ft6in thick (760mm). I will say more about the strutcural significance of this shortly, but first a look at some more photos.

The skewback is cut as a solid piece with a string course and the string course has been removed from this abutment. Traces of stone shards are visible in the exposed face of the fill and the rather more random inner face of the outer spandrel wall are also visible.



The picture below shows the vast expanse of the top of the abutment. Millar was not mean with that, though some of his (and his son's) bridges had very slender proportions. The platform exposed here is at least 6ft (1.83m) wide and the stone exposed in the soil face suggests that we are not seeing the whole abutment.





Here again is a wide shelf and an almost vertical face. The outline suggests to me that shard concrete fill was used behind the skewbacks and possibly to a dept of about 1m with internal walls above that. Looking back to the previous picture suggests that there is a back wall of shard concrete/masonry too.

The replacement bridge gives better clearance for a modern road but is sadly soulless. It is visible on Google maps at <http://g.co/maps/eb6cj>.

## News and Events

Bill has a busy time coming up. Speaking engagements for:

IStructE in Cardiff on 17th April

ICE in Bath on 24th April

IStructE in Plymouth on 26th April

IStructE Dublin 1st May

On 2nd May he plans to run a Masonry Bridge Seminar in Dublin.

In June he has to be in Scotland on 22nd and will run a seminar sometime around then.

Bill's Sutherland History Lecture from 16th Feb is now available to watch on the web at <http://www.istructe.org/resources-centre/webinars>

After a long struggle with the new protection software we think that the Demo, available from <http://www.obvis.com> is now stable and can be properly activated when paid for. It will work in standalone or network mode. If you are ready for an update or thinking of buying please download this version and then contact us for activation.

We are now ready to embark on the next phase of proper development.