

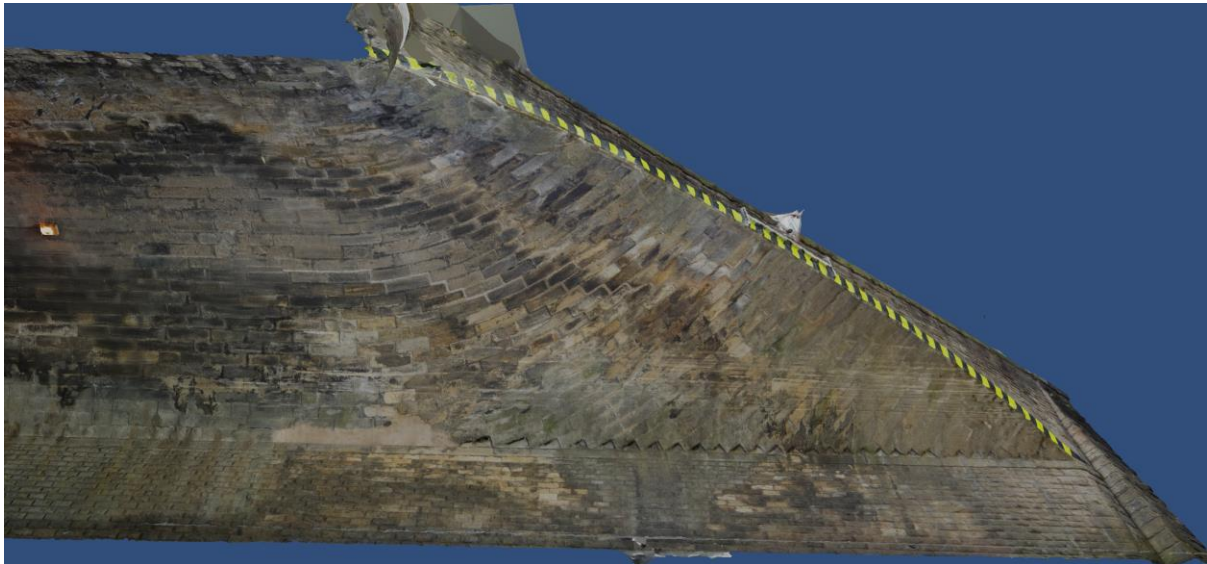


Bridge of the Month No82, October 2017 Very skew bridge near Todmorden



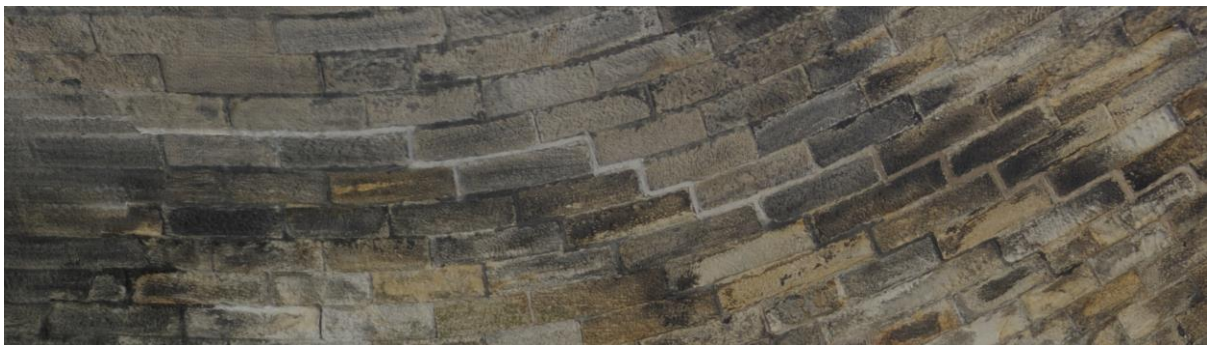
What I really went looking for in August was [this skew bridge](#) to the north of Todmorden at Cornholme. On Google Maps you can see that the railway is more skew than the bridge, but even the bridge is skewed at 60 degrees. The main reason for going is that the pictures I had, supplied via an inspector some years ago) were too dark and too restricted to be really useful. The outcomes from my visit include a [3D model](#) which can be accessed [here](#).

Even that model, which is cut down in resolution for web use, is spectacular. In our own viewer the detail is much better. Contact hamish@billharveyassociates.com if you would like to see what is possible.



The width of the bridge meant that it was worth using different grades of masonry in different parts. Constructing this sweep was a serious technical feat. The mating faces of the stones are both curved and warped and no two faces are the same.

The general behaviour is seriously compromised by the presence of a culvert and stream under one abutment. It is almost certainly that which has allowed one abutment to drop slightly and tilt, increasing the effective span and creating a substantial hinge at the arch crown.



The matching hinge at the springing has created serious trouble too (though not threatening to the structure. Rotation on those skewed, pointed skewbacks results in the load sitting on the points which naturally break off.



The photographs used to create this model were all taken from the footways. At one side, it is very narrow but still accessible and safe enough if you listen for traffic and stay alert when there is any about. That is also necessary to avoid getting moving vehicles in the photos.

There are areas near the centre of the span where the quality of the model declines because we only have photos from two particularly oblique directions. In many circumstances, it would be possible to get photos from the centre of the road with very brief traffic control. That could be done at night with a good flash, or possibly better, a decent LED flood light.

The camera used for this was a Sony NEX7 quite old now. I had a very wide angle lens from Canon which was good but created considerable delay in focussing etc. A more modern camera such as a Sony Alpha with a 16mm lens would be much faster. Even a pocket camera, typically with a 24mm lens would do quite well with this, though obviously requiring many more photos to create the coverage. There are 155 photos here taken over 18 minutes.

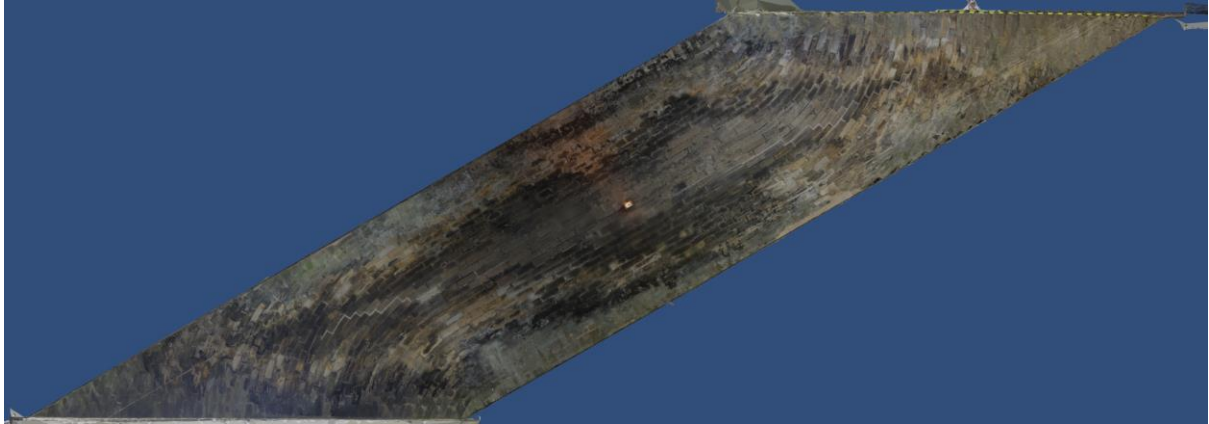
A typical single frame photo is below.



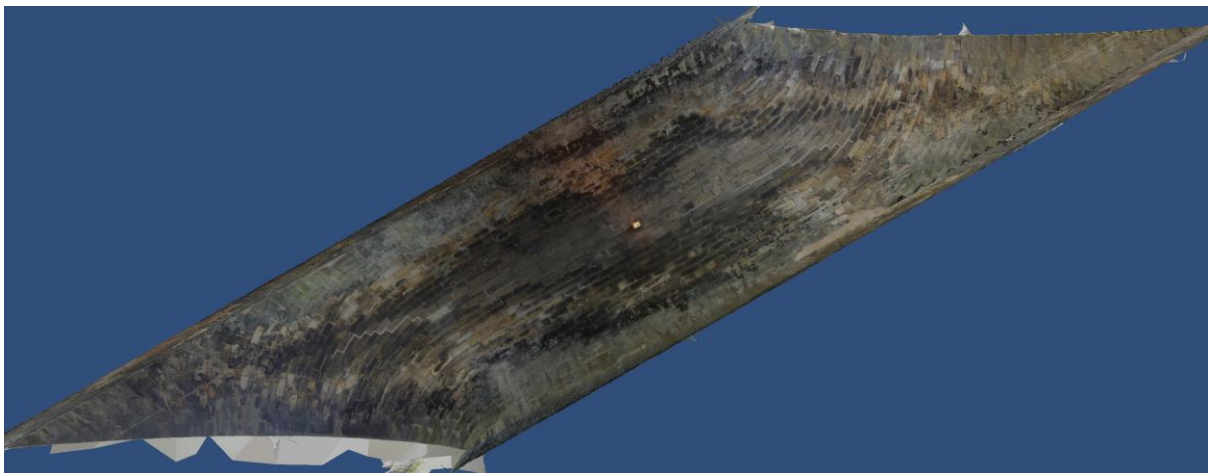
Notice that the lens distortion from the very wide angle obscures some of the detail.

The model allows you to take views that are not otherwise accessible. For example, our viewer allows a bottom view in either perspective or orthographic projection.

Orthographic:



Perspective:

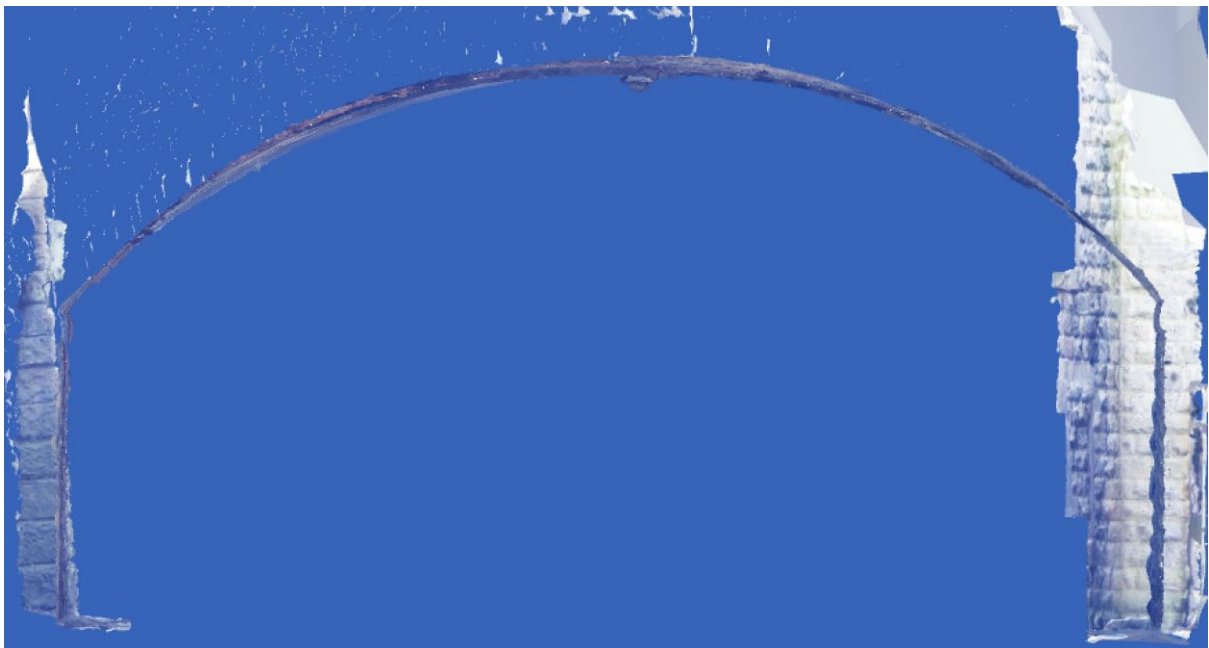


Notice how the perspective view shows the abutment walls and creates a dish at the arch ends.

The model even allows you to stand in relatively inaccessible places like the middle of the road to get an orthogonal view showing the true shape of the arch.



Or to cut a section through the model from which dimensions can be extracted. I think it may even be possible to see the cusp at the crown in this view.



And here to finish is a simple photograph, as near as I could square to the spandrel wall. Again, you could do that accurately from the model.



From the model, we can create a much truer view but also get light under the arch and see both arch and spandrel.



Notice that the tree has created a little difficulty in the model but much less than in the photograph.

Most of the modelling work here is in the hands of Hamish, with the model viewer being built by our friend and colleague Keith Cassidy. If you think this might be of interest to you please contact Hamish direct hamish@billharveyassociates.com

Right now, I am on a train to Hull. A reunion tonight and tomorrow morning for engineers who were involved (in a very lowly role in my case) in the construction. I will miss the Civic Dinner tomorrow because I have to get a train to Maidstone at mid-day to be there to give a talk at 1730.

Bill