Ovingham Bridge Blog – April-May 2015

29 April 2015

What's happening inside the tent?

The story so far

The truss has been wet grit blasted to remove all the paint back to the original metal. It was inspected and measured to ensure there is enough metal for the bridge to carry 3T vehicles. The current British Standard means the design has to last 120 years.

To achieve the 120 years design life, repairs have been carried out to the truss to strengthen it. See the blogs from 16 and 27 February, for further details.

Once all repairs are complete and the truss has all its sharp edges removed. It is ready to paint. The sharp edges are noted in the blog of 16 February.

Preparation of the truss for priming

Painting the truss requires certain standards of preparation to be achieved. It's like painting your house, preparation is the key to a good finish. So the truss revealed after the wet grit blast has rusted again. In order to apply the primer to the bridge it has to be blasted to achieve bright metal. See the photos below, at the ends of the tent there is a margin of wrought iron which has not been blasted next to a blasted section. Note the difference in colour. The metal with the grey appearance will receive the primer.

Photo taken 28 April
General view along truss showing blasted truss

Photo taken 28 April
Grit blasted truss next to rusted truss.

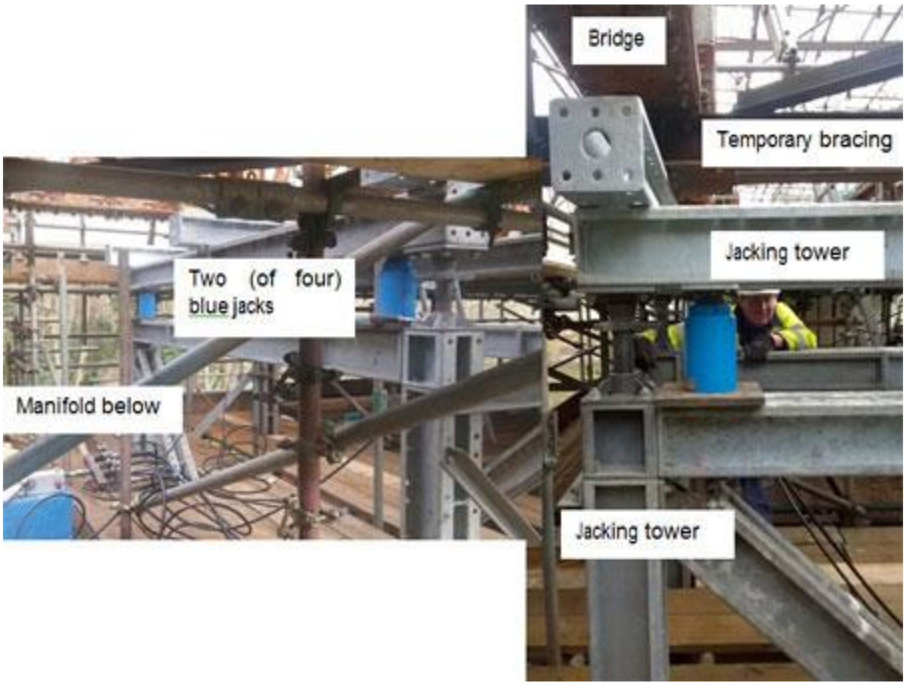
9 April 2015

How did the truss come to be in the air?

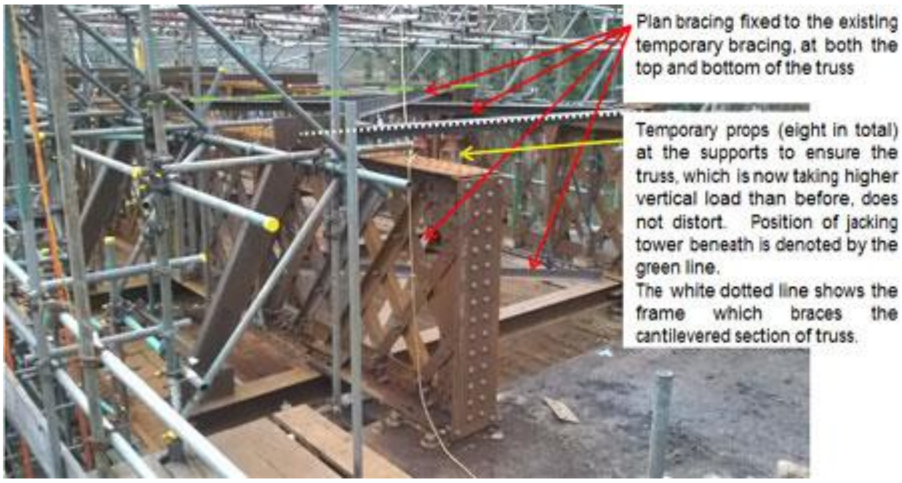
Mystery explained – both trusses are supported from the riverside footpath level by a jacking tower. The jacking tower inside the red dashed box is built from a concrete foundation installed before the scaffolding went up.

Photo taken 8 April, showing the removal of the bearings and the stonework beneath

Following blog 22 on 8 April. This blog explains how the truss is currently in thin air at the Ovingham abutment.



The blue jack is hydraulic, there are another three jacks in the each of the other corners of the frame. They link to a manifold which ensures all four jacks lift evenly. The hydraulic jacks are only used to make the initial lift. The screw jacks hold the truss at its jacked level while the abutment works are carried out. Once the abutment is complete, the hydraulic jacks will be installed again and they will lower the truss onto its new bearings.



In order to jack the truss, it has to be braced. The load path, which for 130 years has resulted in vehicle and bridge loading being transferred to the ground via the end of the truss, has been changed temporarily. In its temporary condition there is only the bridge weight (without the roadway) to transfer to the ground via the jacking tower. This equates to 3 tonnes/truss, or the weight of a vehicle which is permitted to use the bridge. The truss is sitting approx 10mm above its old position. It has to go back to its original level ± 25mm (1”).

8 April 2015

Why is the truss in the air at the Ovingham end of the bridge?

Photo taken 8 April, showing the removal of the bearings and the stonework beneath

The old bridge had its cross girder nearest the abutment fixed to the abutment. As a consequence, the bridge had limited movement under changing temperatures. This movement had become limited, as demonstrated in the photo below.

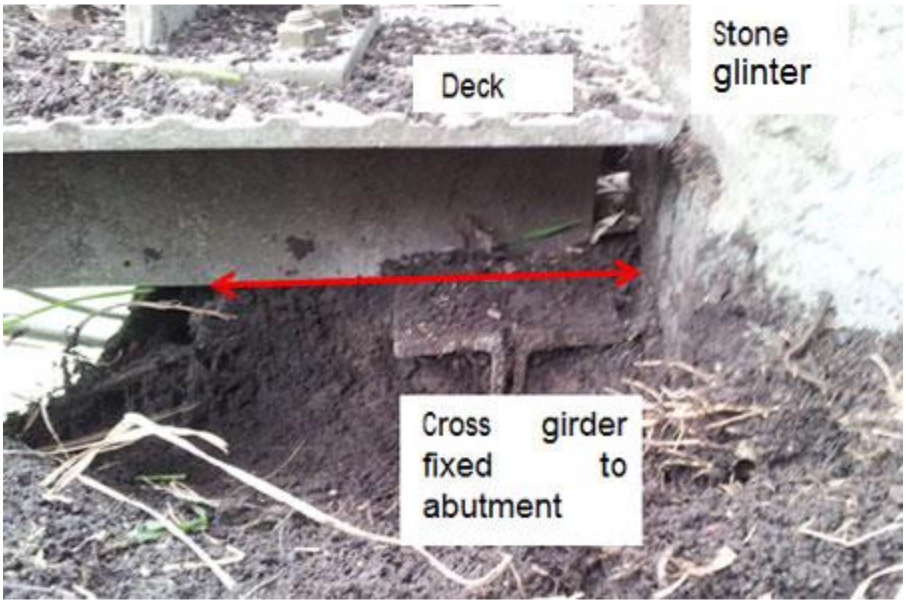


Photo taken March 2013, showing the cross girder fixed to the abutment. Red line shows the direction of movement under temperature change. Note the deck plate is tight up against the stone glinters which provided the width restriction.

The bridge experiences a temperature range between minus 20o C and 40 o C, across the seasons. This 60 o C range equates to a movement of 60mm (approx 2 ½”) for half its length.

If the bridge is restricted and cannot move under daily temperature fluctuations, this can result in stresses building up in the truss.

How will the bridge move when the temperature changes?

Firstly all cross girders carrying the roadway will be fixed to the truss. There will be movement joints at both ends of the bridge, to permit movement upto 80mm.

The final part of the puzzle is to formalise the bearings under the truss.

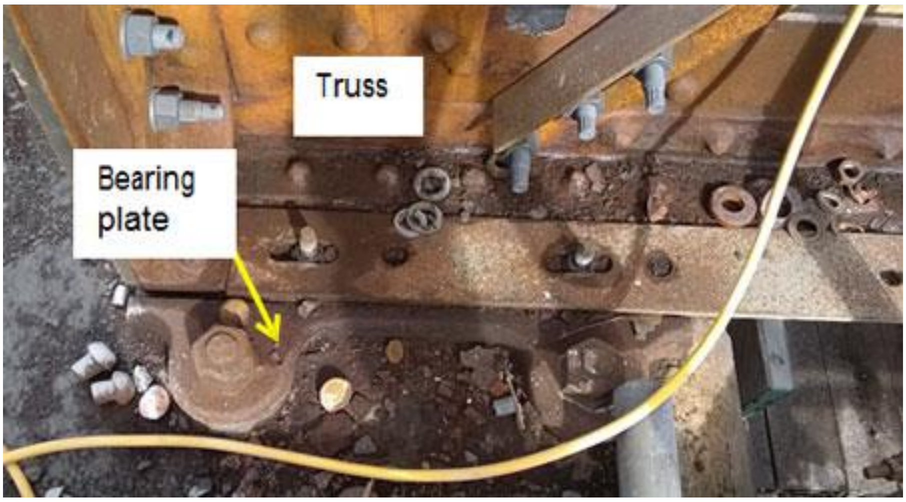
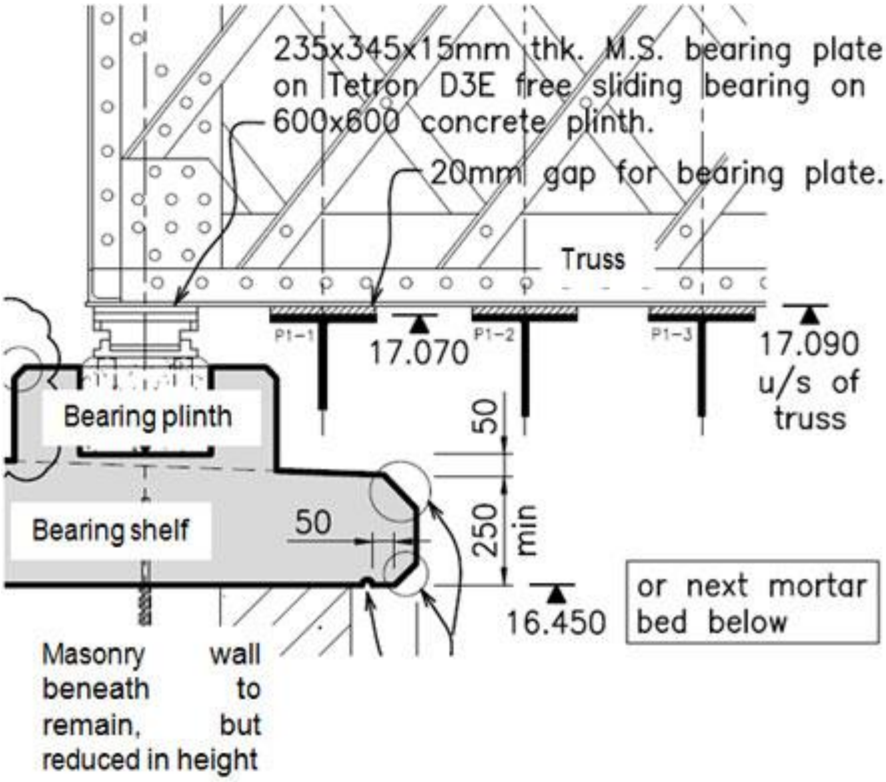


Photo taken 25 March 2015, showing the original bearing plate.



Proposed abutment layout above

Ovingham shown and Prudhoe will be similar.

Existing truss is on new bearings, on new bearing plinth, on new bearing shelf. The gap between the bearing plinth and proposed cross girder labelled P1-1 is 100mm clear. Given the truss will be allowed to move upto 80mm, the clear dimension is ok as modern bearings are virtually frictionless. Meaning the will be no net migration of the bridge resulting in the last cross girder hitting the bearing plinth.

7 April 2015

Why has all the vegetation gone from the Prudhoe embankments?

Photo taken 25 March, showing the vegetation removal on the café side of the embankment.

Photo taken 25 March, showing the vegetation removal on the footpath side of the embankment.

The Prudhoe embankment shows signs of movement, particularly along the footpath side of the road. The fencing has leaned out nearest the footbridge, so the embankment needs investigation to determine the cause of the problem.

What will the investigation involve?

We need to establish what the embankment is made of. To do this, it requires soil samples to be taken from the embankment. This is done using rigs to take samples from upto 15m below ground level.

Before taking samples, the ground has to be checked for buried services. This is done with hand dug trial pits.

Samples on the embankment slopes will be done with smaller rigs, they can only go down to 5m. This provides a useful check to ensure the sides are constructed from the same material as beneath the road.

Samples taken from the embankment are tested to quantify their strength, compressibility and water content (soil design parameters);

Samples include not just the earth beneath the road/slope, but also ground water. The ground water may be acid/alkali or contain contaminants which can damage whatever material is used to repair/strengthen the embankment. This needs to be known to tailor a solution accordingly.

What happens after the investigation?

Once the results are back from the investigation work, along with the ground water results. A scheme will be put together to repair/strengthen the embankment.

The solution will need to take into account the following:-

How the work will be done to maintain access across the river for pedestrians/cyclists;

Proximity of buried and overhead services. How these affect both working space and the built solution;

Results from the site investigation (soil design parameters and ground water testing);

Ensure access to the bridge is maintained for the main refurbishment works to the road bridge;

Cost and works duration;