Report on the Brabyns Park Iron Bridge, Marple

By Tom Swailes, BSc (Hons) CEng MICE MIStructE
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Scope

This report considers the national significance of the Brabyns Park Iron Bridge and offers some preliminary thoughts on its conservation.

The Bridge

The bridge bears the date 1813 and the name Salford Iron Works and was built as a carriage bridge over the river Goyt on the Brabyns estate of Nathaniel Wright, who from 1793 was connected with collieries in Poynton[1]. The bridge spans about 46 feet and has three cast iron arch ribs, each made in two pieces. Circular cast iron rings frame the spandrels between the ribs and the cast iron deck beams. The deck is wooden, with stone edgings (possibly an addition), and the railings comprise four rows of wrought iron bars through cast iron posts. Simple but finely worked stone pillars flank the ends of the bridge, and the masonry abutments are equally substantial and impressive. The bridge stonework is echoed in the lower parts of the adjacent square gatehouse building, and again in the masonry of the surviving weir upstream (known as 'Wright's Folly').

Three factors have contributed to the survival of the Brabyns Park Bridge with all its original features intact, and generally in quite good condition. Firstly, as an estate bridge, the good initial design and detailing of the bridge has not been compromised by twentieth century modification and strengthening works carried out to meet onerous highway safety requirements. Secondly, the bridge is principally of cast iron, a far more durable and corrosion resistant material than modem steel. Thirdly, over a life of almost two centuries, the bridge appears to have been generally well maintained.

Its Place in History

The designer of the bridge was possibly William Sherratt, an engineer working in partnership from 1791 with the iron founder James Bateman. Nathaniel Wright's connections with Bateman and Sherratt, the owners of Salford Iron Works, date from 1795, when the firm installed a pumping engine for the drainage of a Poynton mine. Before research by local historians in Marple, Bateman and Sherratt were known only as makers of steam engines, and rivals of the famous firm Boulton and Watt of Birmingham. Sherratt does not feature in the recently published biographical dictionary of civil engineers active before 1830, so the bridge may be significant as the work of a forgotten early engineer of some importance.

The Iron Bridge at Coalbrookdale is an icon of the industrial revolution and the centrepiece of a World Heritage Site, but was not a direct influence on the design of the Brabyns Park Iron Bridge. A more meaningful comparison can be made with the superficially similar cast iron arch bridges of Thomas Wilson, a Sunderland schoolmaster and engineer. Circular spandrel rings are a detail particularly associated with Wilson, although they were used, for example, in several bridges made by the Coalbrookdale Company. Cound Arbour Bridge,

completed at a time when Telford was County Surveyor for Shropshire, bears the mark 'Cast at Coalbrookdale 1797'. The appearance is spoilt by modern parapet railings, unlike that of the Brabyns Park Iron Bridge.

In 1965, the late John James wrote a paper for 'The Engineer' about Spanish Town Bridge, Jamaica, the oldest known iron bridge in America, with the aim of stimulating its preservation[2]. The bridge bears the date 1800 and Wilson's name, and was made at the Rotherham foundry of Joshua Walker & Co[3]. The Walker brothers probably became interested in making iron bridges through John Hall, a steam engine erector for Boulton & Watt. Steam engine makers are not generally associated with bridge design, but Brabyns Park Iron Bridge provides another example of such a connection. It is a rare survivor from a period of great international interest in iron bridges, with Britain taking the lead in technological developments[4].

The finest Wilson bridge in Britain, at Stratfield Saye in Hampshire, dates from 1802. The bridge is listed Grade II* and its recent restoration has been the subject of a Structural Heritage Award[5]. The bridge provides access over the river Loddon to the Stratfield Saye manor house, which in 1802 was owned by George Pitt, Lord Rivers, a man whose family wealth came from collieries in County Durham[6]. One other estate bridge of the Wilson type (designer uncertain but dating from around 1795) survives in a dilapidated state near Dundee[7]. Coincidentally, Scotland's second oldest cast iron bridge is the Duchess Bridge near Langholm, a carriage bridge completed in the same year as the Brabyns Park Iron Bridge[8]. Tickford Bridge, Newport Pagnell, a Wilson bridge 3 years older than the Brabyns Park Iron Bridge, is a Scheduled Ancient Monument, although as a highway bridge some of its original character has inevitably been lost. The bridge was provided with a reinforced concrete deck in 1976 and a more recent refurbishment involved strengthening of the cast iron spandrel rings using resin impregnated carbon fibre sheet[9].

Conservation

In 1991 a structural assessment identified that the wooden decking to the Brabyns Park Iron Bridge was in a dangerous condition and a Bailey Bridge was placed over until funds could be found for restoration. The decking appears to be still in place beneath an accumulation of leaf mould. These seem to be good conditions for the decay of wood, so complete replacement may now be necessary.

Diagonal iron braces beneath the decking provide lateral stability to the iron structure, so the probable poor condition of the wooden decking has not compromised the integrity of its supports. The principal structural ironwork members that could be inspected from a distance appear to be in good condition, but final judgement must await the provision of access to enable a 'tactile' inspection of all parts. The opportunity must also be taken at that time to properly record all details of the bridge in photographs and measured drawings. The drawings must be based upon a survey carried out by a person with experience of recording historical structural ironwork. In the event of structural ironwork repairs being required, the author of this report can give further advice. The 1991 structural assessment report has not been seen by the author of this report, but if no structural problems were identified at that time, then it is likely that any new problems will be corrosion-related.

The wrought iron handrails are rather bent in places, although this is not necessarily something that requires rectification. At least one bolt to the base of a cast iron handrail support post appears to be missing. The central

cast iron parapet panels with the Wright monogram need to be refixed because of corrosion and expansion of their wrought iron fasteners. Some deck edging stones are missing.

There is a school of thought that generally favours the complete dismantling of small iron structures, stripping all the pieces of paint (replacing those pieces broken in the process), repainting and re-assembling. This would be an unwise course of action for the Brabyns Park Iron Bridge, particularly if closer inspection confirms the good condition of the ironwork. Significant loss of historic connection details arising from compete dismantling would be unacceptable. Carrying out conservation work in-situ will require special precautions to be taken with respect to the cleaning, removal and possible use of lead-based paints, both in terms of the health of operatives and the avoidance of environmental pollution.

Whatever conservation strategy is adopted, regular maintenance will be essential. It may be possible to provide facilities for easier access for future maintenance at the same time as the deck is replaced. 'Vegetation management is also required - the growth of a mature tree in one of the approach slopes has damaged masonry to one of the abutments.

Future loads on the bridge will be no greater than the loads that it safely carried for 178 years. It is interesting to apply modern computer-based structural analysis techniques to old structures, but the results of such theoretical analyses must almost always be disbelieved unless verified by tests on the structure itself. In the unlikely event that testing should be considered necessary, it should be carried out prior to removal of the Bailey Bridge, and further advice may be obtained from the author. In the notorious case of The Carron Bridge, a long span cast iron arch bridge over the river Spey was condemned to replacement in steel on the basis of theoretical calculations. Protests resulted in a Public Inquiry, after which load testing of the bridge confirmed that no structural strengthening work was required.

References

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