

Along the Line

The Iron Aqueduct

Most visitors to Daisy Nook walk across Crime Lane Aqueduct barely noticing that it is there. Yet this small and unobtrusive feature has an interesting place in the story of canal development.

At the time when the Ashton Canal and its branches were being constructed, navigable aqueducts were still something of an evolving art. Britain's first navigable aqueduct at Barton, where the Bridgewater Canal crosses the River Irwell, was opened in 1761 to a certain amount of scepticism that such a structure

A series featuring points of interest along the line of the canal, past or present.

could work. But work it did and further, smaller aqueducts across rivers and roads were constructed along the Bridgewater's arm towards Preston Brook and Runcorn.

As canals spread across the country over the next few decades, aqueducts became commonplace. They were



built, like Barton Aqueduct, as massive masonry structures with substantial infills supporting the canal bed. The aqueducts designed by Benjamin Outram at Store Street on the Ashton Canal (1798), Waterhouses on the Hollinwood Branch (c.1796) and Marple on the Peak Forest Canal (c.1800) are examples of this.

However there were some locations where this type of masonry structure was not suitable and the use of iron was explored.

Although cast iron was invented in China in the 5th century, it was not until the 1770s that it was first used for structural purposes. It was soon after this, in 1781, that Abraham Darby built his famous Iron Bridge at Coalbrookdale.

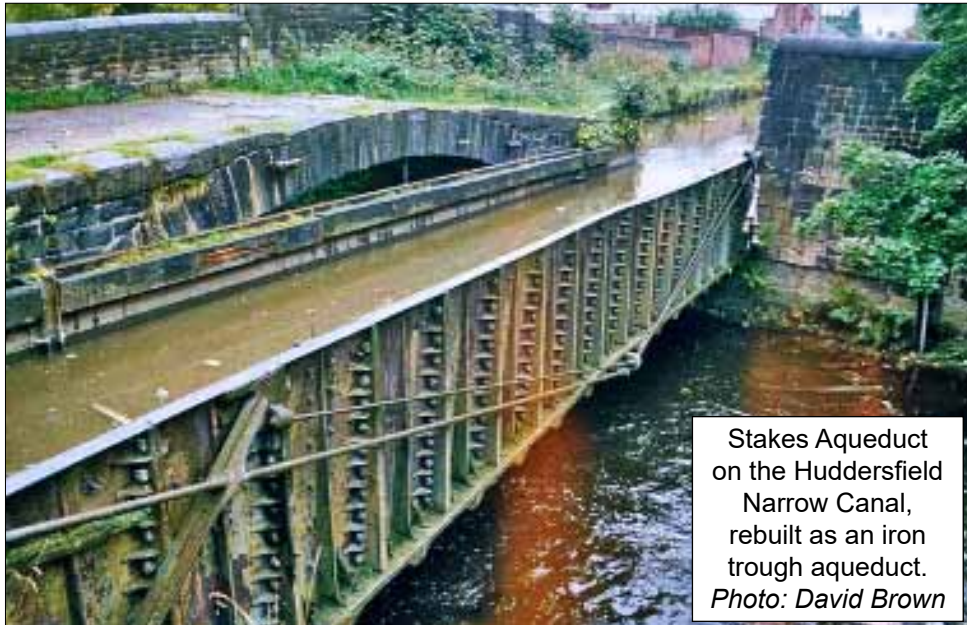
Holmes Aqueduct, in Derby, was the world's first navigable cast

iron aqueduct. It was designed by Benjamin Outram and opened in February 1796. (Sadly, it was demolished in 1970.)

A few months later in 1796 the Longdon-on-Tern Aqueduct was opened on the Shrewsbury Canal. This was designed by William Reynolds with input from Thomas Telford. Longdon-on-Tern Aqueduct still stands but the canal on each side of it is no longer there.

Nearer to home, Stakes Aqueduct on the Huddersfield Narrow Canal in Stalybridge was originally built, like the Royal George Aqueduct on the same canal, with very low stone arches.

In 1799 there was a bad flood and the water built up behind Stakes Aqueduct and eventually swept it away. Outram realised that to re-build it in the same



Stakes Aqueduct on the Huddersfield Narrow Canal, rebuilt as an iron trough aqueduct.
Photo: David Brown



Longdon-on-Tern Aqueduct (*Photo: Allan Williams*)

style was to invite a repetition, so he applied his experience with Holmes Aqueduct in Derby and constructed a cast iron trough to replace the aqueduct. The towpath was carried on a single stone arch alongside, higher than the water channel.

It wasn't an elegant solution and later had to be strengthened by iron trusses. Opened in 1801, it can claim to be the world's oldest navigable iron trough aqueduct still in use. Telford's stunning Pontcysyllte Aqueduct, although under construction at this time, was not completed until 1805.

Iron Aqueduct?

So, where does Crime Lane Aqueduct fit into this? It was known as The Iron Aqueduct, and a walk down the steep steps to the lane underneath will reveal why. Although built with the appearance of the usual masonry structure, it can be seen that the canal bed is carried on iron plates.

The design of an aqueduct in this location would have posed a real

challenge. Even with the steep lane being sunk into a cutting, a standard masonry arch would not have provided enough headroom.

Step forward Benjamin Outram! Although he wasn't appointed as Consulting Engineer to the Ashton Canal Company until 1798, it is thought that he had been involved with the

company from its beginning, perhaps as a contractor or adviser, and is credited with the design of nearby Waterhouses Aqueduct.

The construction of the Hollinwood Branch was taking place at the same time as that of the Derby Canal with its iron trough aqueduct. It would not be surprising, therefore, for Outram to suggest a similarly innovative approach to that he had used at Holmes Aqueduct.

Outram's use of iron in these projects must owe something to him being the part-owner of the ironworks established in 1792 at Butterley on the Cromford Canal.

The solution at Crime Lane was to construct a navigable trough from iron and to incorporate it into the more traditional masonry structure.

The base consists of six iron plates and with sides appearing to use flanged plates with bricks lining the exterior. Whilst it is not a more obvious free-standing iron trough



aqueduct, this was a sort of hybrid solution, with an iron trough being incorporated into a masonry structure at a time when iron was just starting to be used for aqueducts. (Other such hybrid solutions were later used for the Tone Aqueduct and the Nynehead Aqueduct.)

Completed the same year as Holmes and Longdon-on-Tern aqueducts, the hybrid structure at Crime Lane deserves recognition for its place in the early development of the use of iron in aqueducts.

However, there is a complication. A datestone above the arch on the south west face reads '1859', indicating that the structure was at least partly rebuilt by the Manchester, Sheffield and Lincolnshire Railway

Company, which had bought the canal 11 years earlier.

What is not clear is just how much of the structure was rebuilt. It might have been the entire structure. It might have been just the outer face or, indeed, just the parapet. Different sizes and facings of stone can be seen in the outer structure to tease us.

It seems likely that the iron trough visible today is part of the original structure. Replacing this would have been difficult, as there is a continuous flow of water across the aqueduct, fed by the Wood Brook entering Crime Lake, with no outlet until the spillway just above Lock 22. Also, the bricks that can be seen here are not the blue bricks often favoured by the railway companies.

Even if what we see now was a replacement, it would have been very similar to what was there originally, as there was not enough height for a masonry arch.

We thought it might be possible to find an answer to this puzzle in the archives.

The decision to carry out major work on the aqueduct was likely to have been recorded in company minutes. We thought these might make it clear just how much of the structure it had been decided to rebuild.

The canal at this time was in the ownership of the Manchester Sheffield and Lincolnshire Railway Company.

The National Archive doesn't seem to have separate minutes for the company's Ashton Canal Department.

The railway company's minutes for the relevant years (1857-9) are in the National Archives but have not yet been digitised, so a scrutiny of these would necessitate a visit to Kew.

Fortunately, Dave Wedd and Stella Wentworth were able to visit the National Archives at Kew in search of an answer. They located the relevant railway company Minutes Books.

There was not time to read each page but a scrutiny of the extensive index pages showed that these books do indeed include canal business,



Datestone says '1859' but the walls in this photo show different sizes and styles of stone. Is it possible that only the parapet was rebuilt in 1859?



such as a new boiler being required at Waterhouses pumping station. However, the indexes make no mention of any aqueduct in the area being repaired or rebuilt.

This might suggest that the repairs could have been fairly superficial, being confined to the parapet and wing walls.

More substantial rebuilding would have involved a closure of the canal with subsequent loss of revenue from the important coal traffic, which might be expected to have been mentioned prominently in the Minutes Book.

Of course, this is speculation, but it seems to support the idea that the ironwork may be original.

Metallurgical tests on a sample of the iron may also be a way to confirm the age of the plates.

What seems clear is that Crime Lane Aqueduct was one of the first

navigable aqueducts in the world that used iron in its construction.

Whether the iron plates that we see today are the 1796 originals or 1859 replacements, the Hollinwood Branch's "Iron Aqueduct" nevertheless has a place in the history of aqueducts.

Martin Clark (revised 2022)