

## Early local examples of ferro-concrete bridges

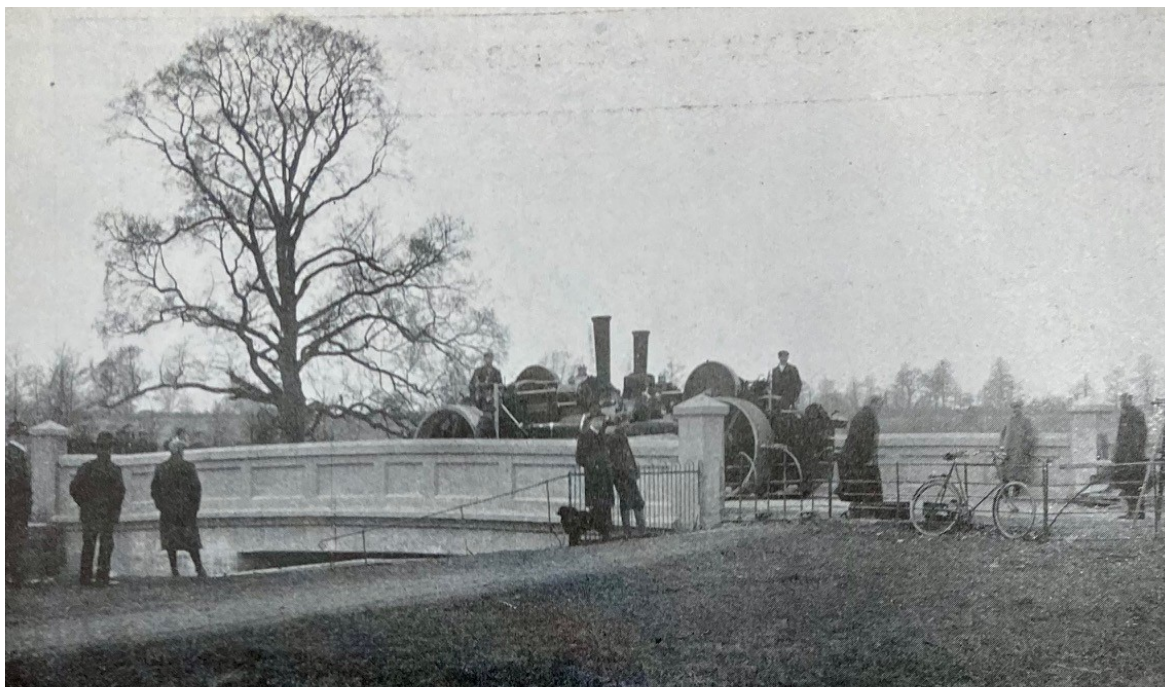
Stephen Mills    November    2024

As we all know, bridges have long been an important means for keeping one's feet dry and have been around in various forms for millennia. Although the Romans built some substantial stone bridges, over the following centuries, many more modest ones were built of wood. These clearly had a limited lifespan and many were later replaced with something more substantial. Which brings us to the subject of this article – Meadow and Churchend bridges in the village of Eastington, near Stonehouse.

In 1908, Gloucestershire County Council built replacement bridges over the two branches of the River Frome that cut through the village at the foot of Spring Hill, using what at the time was called new ferro-concrete. Although concrete had been in use for many centuries, concrete structures could now be strengthened by the inclusion of reinforcement often in the form of iron or steel bars, usually embedded in the concrete before it set – today, this is usually referred to as 'rebar' and is used widely in all manner of construction projects.

The two new bridges were constructed on the 'Hennebique system' under the supervision of Mr E S Sinnott, the county surveyor at the time. The system was named after a French engineer, the first developer to use iron then steel beams encased in concrete to add strength to buildings and other structures. It was soon used for building reinforced concrete bridges such as our two, although it was not until the first decade of the 20<sup>th</sup> century that its use began to spread. The first confirmed bridge project in the UK was in Hampshire in 1902, and its success led to many others over roads, rivers, and railways. So, the new Eastington bridges were early examples of the technique. Another rather larger local example was Westgate Bridge in Gloucester, also built on the 'Hennebique System'. By the 1930s there were about 2000 reinforced concrete bridges in the UK.

Naturally, especially as this was a fairly new form of bridge construction, the Council was anxious to make sure that the Eastington bridges had been properly built and were up to the job, so a series of load tests were carried out. This was reported in the *Cheltenham Chronicle and Gloucestershire Advertiser* of March 1908, which is where the fascinating photo came from.



The article mentions that the foundations, abutments, deck, and parapets were all of ferro-concrete, and that the cost compared very favourably with masonry and steel girder decking. And, the ferro-concrete had the additional advantage of not requiring painting or maintenance.

Both the Meadow and Churchend bridges were tested with the specified load of two steam rollers (visible in the photo) of about 35 tons standing side by side. The rollers were both built by Aveling and Porter and were probably from Gloucestershire County Council's fleet. The tests were carried out under the watchful eyes of the county surveyor, accompanied by Mr R A Lister, county councillor; Mr E J Cullis, representing the patentees; Messrs Ractliff and Hall, district surveyors; Mr Howells, the Clerk of Works, and Messrs T B Cooper and Co of Bristol, the contractors. The latter were well-known for their bridge projects that included one over the River Avon near Evesham in 1908 for The Great Western Railway Company.

Meadow bridge had a span of 28 ft, and with both rollers in place, had a maximum deflection on the centre of the bridge of only "three thirty seconds of an inch", the road deck returning to its former level once the load was removed. With the same load, Churchend bridge, with a span of 12 ft, didn't budge at all!

The superb photo was uncovered by Mike Dodd from the Restoration and Archiving Trust, based at Toddington on the Gloucestershire and Warwickshire Railway, and kindly passed on by GSIA member Mike Smith.