



Panel for Historical Engineering Works

for

Hunningham Railway Bridge

Details

Name of work:	Hunningham Railway Bridge
Place:	Hunningham
HEW no:	2044
HEW class:	T3d5
PHEW area code:	09
Ordnance Survey sheet number:	151
National Grid Reference:	SP 383665
Description:	
Significant features:	A large wrought iron lattice girder bridge over a railway cutting. At the time of construction was the largest lattice girder bridge in the world. Original span of 150ft reduced to three 50ft spans by later propping.
Accessibility:	public access at all times
Owner	Railtrack
County/Unitary Authority:	Warwickshire
District Council:	
SMR Office:	Warwickshire
Construction date:	1849 - 1850
Opening date:	1851
Designers, with dates:	Doyne W T, AMICE

Resident Engineers, with dates:	
Contractors, with dates:	Smith, Smith & James, of Leamington Spa
Current status:	LII*
Current condition:	railway now disused and lifted. Bridge now only carries a farm road. Proposed to convert the railway track into a long distance path.
Subpanel grade	
Location of other records (e.g. manuscripts, drawings, technical papers, photographs, etc):	W T Doyne(1850) 'Description of a wrought iron lattice bridge constructed over the line of the Rugby and Leamington Railway' MinProcICE, IX.353-359
Illustrations attached (no.):	7 colour prints; digital images available from R. Cragg
Similar works:	none
Recorded by:	Roger Cragg
Date recorded:	01 Jun 1995
Amended by:	
Revised by:	
Revision date:	
Latest inspection by:	D Brown
Inspection date:	01 Aug 2012

Supplementary Record

Further description

a wrought-iron lattice girder bridge of 150ft span built in 1850. Girders are 10ft 6in. deep and spaced 20ft apart by wrought iron transverse girders 12in deep. Roadway is sited at about the mid-depth of the lattice girders and is now supported by concrete jack arches on longitudinal beams. The vertical distance between the roadway and the line of rails is given as 51ft 6in. At a later date the bridge was propped at the third points of the span by lattice columns, cross-braced by tie rods.

General Description:

The bridge carries a farm access road over a deep cutting which formerly carried the Rugby to Leamington line of the L.N.W.R. The site of Marton Junction lies approximately 200 metres to the east of the bridge. The bridge has two wrought iron lattice girders spanning 150ft, at the time of construction the longest span recorded for a bridge of this type (1). The bridge was built in 1850 and the railway line was opened as a single line in 1851.

The main Contractor for the railway was George Knight (contract let in 1847 for £260,000). The Hunningham bridge was built by Smith, Smith & James of Leamington Spa (2) for £3579 19s 4d.

Main Lattice Girders:

The girders consist of a 60 degree lattice made up from 3in wide "spoke iron" with double flanges, intersected by horizontal bars of 3in. x 1/2in. section to form a lattice of equilateral triangles of side 1ft 11in. The bottom flange of the lattice is made up from two 5in.x5in.x5/8in. angles, back-to-back, with wrought iron plates rivetted underneath, the plates being 11 1/4in wide and 3/16 in. thick. The number of plates varies from 3 at the ends of the girders to 8 at the centre, the lengths of the plates varying from 12ft to 16ft. The effective area of the bottom flange is 26 in². The top flange is of constant cross section and is made up from four 3in.x3in.x 5/8 angles arranged in pairs to form an inverted channel section rivetted together with a 1/2in. plate. On top of these angles is rivetted a further pair of 6in.x 3in. angles. The effective area of the top flange is 40 sq.in.. The overall depth of the main girders is nominally 10ft 6in.

The girders are 156 ft. long with a clear span of 150ft, having a bearing of 3ft upon each abutment. The ends of the girders rest upon bed plates 4ft long, 3ft 9in. wide and 3in thick which are secured to the masonry of the abutment. Vertical cast-iron brackets are situated at intervals along the main girders, the spacing of these brackets being 32ft, 23ft, 23ft, 23ft, 32ft. These brackets run the full depth of the girder and are connected to the top and bottom flanges and the transverse girders.

Transverse Girders:

The transverse girders are spaced at 7ft 6in. centres and are of 12in. deep I-section, the bottom flange being formed from two 2 1/2in.x2 1/2in. angles, the web from 3/8in. thick plate and the top flange from two 3in.x3in. angles. Over the centre section the girders are further stiffened by the addition of 5/8in. plate on both sides of the web and 3/8in. plate under the bottom flange. The transverse girders are fixed to the lattice about 4ft 6in. above the bottom of the bottom flange of the main girders and are also fixed to the cast-iron brackets (see above).

Bracing:

The main girders are braced horizontally by 3in.x 1/2in. bars running diagonally between

the bottom flanges below the ends of the transverse girders, the amount of bracing varying across the span.

Additional bracing is provided in the vertical plane by 3in. x 1/2in. bars running diagonally between the lower flanges of the main girder and the point of fixing of the transverse girder on the opposite main girder.

The Roadway:

The roadway was originally supported on corrugated iron sheets 1/10in. thick with corrugations 9in. wide and 3in. deep, the sheets being supported on the transverse girders with an effective span of 7ft. 2in. The corrugations were filled with concrete to give a level surface upon which a road surface of 6in. gravel and loam metalling was originally laid.

At present, the roadway is formed from a concrete slab which is supported by concrete jack arches spanning between longitudinal girders (11 No.) the ends of which rest upon the transverse girders. The concrete roadway has concrete edging strips 5 1/2in. deep and 2 1/2in. wide. It is not known when the reconstruction of the deck took place.

Parapets:

The parapets of the bridge are formed by the upper sections of the lattice girders to give a parapet height of about 4ft 9in. At the ends of the bridge are substantial brick pillars about 10ft long and 3ft 6in. wide surmounted with stone copings.

Abutments:

The abutments are of blue brick with bed-plates, string course and coping of Derbyshire stone. The abutments are founded on the cutting slope approximately 17ft below the top of the cutting.

Later Propping of the Bridge:

At some time during the life of the bridge it has been extensively propped. This propping is by four steel lattice columns, each pair of columns forming a portal frame, which supports the bridge at approximately the third point of the span. The upper ends of the portals are positioned under the vertical brackets referred to above and are therefore 55ft from the ends of the girders and are 46 feet apart. The vertical columns are formed from four 3in equal angles with a lattice of flat bars 2in. wide and 1/4in. thick, the spacing of the ends of the lattice bars being 2ft 1 1/2in. The columns are 1ft 11 1/2in. square overall and are raked inwards transversely, the spacing of the bottom of the columns being 31ft 6in. and the spacing of the tops of the columns being about 20ft to match the width of the bridge. The portal formed by each transverse pair of columns is connected at the bottom, approximate mid point and top by horizontal lattice girders of a similar construction. These horizontal girders are 1ft 11 3/4in. wide and 1ft 3in. deep. The overall height of the columns is about 48ft 9in. and the central horizontal girder is 23ft 6in. above the base. The columns are founded on a sandstone block with a steel baseplate 1 3/4in. thick. In addition, the two trapezoidal panels formed by the raked columns and the horizontal beams in the two portals are braced by twin diagonal rods, 7/8in. diameter attached to the corners of the panels. The rods are tightened at their lower ends by hexagonal turnbuckles 6in. long and 2 1/4in. across flats.

The two portals are connected by a pair of longitudinal horizontal lattice girders 1ft 3in. deep at the same height as the mid-point girders referred to above. Similar diagonal bracing is provided for the upper rectangular panel formed by the main bridge girders, the vertical columns and the mid-height lattice girder with twin rods running from the corners of the panels to an octagonal ring into which the ends of the rods are bolted.

Turnbuckles of similar design are provided at the outer ends of the rods.

History of the Bridge:

The bridge was required by the building of the L.N.W.R. line from Rugby to Leamington. The Engineers connected with this railway were:

Robert Stephenson (Consulting & Chief Engineer)

Edward Dixon (L.N.W.R. Engineer)

W.T.Doyne (Resident Engineer)

The line (3) was authorised as a separate Company by an Act of 1846 but was taken over by the L.N.W.R. upon its formation. Construction of the line started prior to September 1848 but was halted whilst the L.N.W.R. Board considered abandoning the line. Work restarted in 1850 and the line was completed and opened on 1st March 1851. Originally a single track, it was doubled in 1882-83.

In 1895 a line was opened by the L.N.W.R. from Weedon to Leamington Spa which joined the Rugby-Leamington line at Marton Junction.

The whole of the Rugby to Leamington line is now closed and lifted.

References:

1. James J.G. - The Evolution of Iron Bridge Trusses to 1850 - Transactions of the Newcomen Society - Vol.52 (1980-81) p.82
2. Popplewell L. - A Gazetteer of the Railway Contractors and Engineers of Central England 1830-1914 - Melledgen Press 1986
3. Christiansen R. - A Regional History of the Railways of Great Britain - Vol 7 The West Midlands - David & Charles 1973 - pp 140-142, 147