Industrial Archaeology Notes
1981

Compiled by Malcolm G. Knapp

DEEPING ST NICHOLAS Counter Drain Railway Bridge
(Grid reference TF 175208)

Gerald A. Lewis

On 21 September 1980 a group from the Industrial Archaeology section surveyed the single track railway bridge which carried the Midland & Great Northern Joint Railway over the River Glen at Counter Drain between Bourne and Spalding (Fig. 1).

As far as can be ascertained, the bridge was constructed by Messrs Handsyde and Company of Derby. The line became operational in 1866. The bridge comprises three sections, two outer sections of differing length employing parallel compound girders and an arched centre span which crosses the river.

There are abutments at each end with seven unevenly spaced piers supporting the girders. These girders are riveted fabrications formed into joist sections with vertical tee-irons at regular intervals.

The base on which the track was laid is of two designs, that between the outer sections being fabricated cross joists with two longitudinal fabricated rail support joists set between the cross joists, spaced at the same distance as the track, overlaid with longitudinal timbers 9½ inches x 3½ inches.

The base of the arched span consists of pressed steel plates formed into flanged channel sections laid side by side, the flanges uppermost, joined together by riveted flat bars. The hollows of the channels are filled with concrete, the longitudinal timbers not running along this section of the bridge. The chairs supporting the rails were bolted into the longitudinal timbers over the outer sections of the bridge and presumably directly on to the steel formed members of the arched centre section.

Smaller sectioned longitudinal timbers are fitted between the main rails, supporting timbers for use in walkways for the maintenance staff.

The type of piers originally supporting the bridge is not known, but the original piers had to be replaced by the present ones and the work was carried out in the early 1920s. In order to maintain rail services, brick abutments were built to the north of the bridge, temporary supports consisting of 12 inch square timbers were driven into the river and adjoining bank and the girders were slewed across on to the temporary piers whilst the new piers were constructed. The bridge girders were then slewed back to their original position and the temporary piers dismantled, although the sawn-off stubs are still to be seen just below the normal water level. A photograph in A Short History of the Midland and Great Northern Joint Railway by R. H. Clark shows the girders being repositioned on to the new piers.

The piers are of a pleasing appearance, made from reinforced concrete blocks of many varying shapes. The M. & G.N. were pioneers in the development of reinforced concrete. They built and patented their own concrete-forming machinery and produced square, triangular, circular-sectioned telegraph poles, concrete window frames, many double sided station name boards, signal gantries and posts for their own use and to the order of other railways.²

Some of the blocks have now become dislodged and fallen to the ground. They have the date of manufacture impressed into the inner face, one dated 6.5.21. The abutments are ashlar faced concrete. The bridge was closed to passenger traffic in 1959 and to goods traffic in 1965 and now serves only as access to the River Glen banks for the River Board maintenance staff. Some of the timber walkways have rotted and fallen through, so it would appear that all the maintenance on the bridge has long since ceased, and that it will not be long before it is demolished, following the bridge further west along the line where the railway crossed the Bourne Eau. This bridge was demolished by local contractors in 1978, and there are no remains.

FOOTNOTES
1 R. H. Clark, A Short History of the Midland & Great Northern Railway, 1967.
2 Ibid.

NEW HOLLAND PIER
(Grid reference TA 080245)

Herbert S. Waddington

With the opening of the Humber bridge in 1981, the New Holland to Hull ferry has ceased to exist and the New Holland Pier has become redundant. So now is an appropriate time to look at the pier's history.

In plan the pier is a T shape. The stem, over a quarter of a mile long, is the approach carrying trains, road vehicles, pedestrians and cattle to the pierhead where the ferry boats berth. The approach and the pierhead have been reconstructed in stages over the years.

The First Pier³

The first pier was opened in 1848 but there was a ferry from New Holland to Hull before that, starting in 1832. This was in competition with the centuries-old ferry between Barton-on-Humber and Hull from which it wrested the London to Hull mail service in 1836, paddle steamers being employed on both routes. The transfer was made after practical tests were carried out consisting of races every day for a month to the Hull Post Office from the junction (grid reference TA 027169) at Bonby Lodge where the road divided, with the mail coach drawn by four horses continuing to Barton and a mail cart drawn by one horse going to New Holland. Sometimes one route won, sometimes the other. The average saving via New Holland was three minutes and this was decisive.

The Manchester, Sheffield and Lincolnshire Railway bought the New Holland ferry rights in 1846 for £20,000 and proceeded to construct a pier. This structure was necessary in order to reach water deep enough for the steam paddle ferry boats to moor at low water so that sailings, previously impossible at low water, could be to a timetable, irrespective of tides, to fit in with the trains to and from New Holland.

The pier consisted of a long approach jutting out at right angles to the shore with a pierhead projecting
Fig. 1 Counter Drain Railway Bridge, Gerald A. Lewis.
downstream at which the boats berthed. The approach, 35ft. 6in. wide and 1375ft. long, carried two lines of rail, an 8ft. roadway and a 6ft. footpath and incorporated a station, 'New Holland Pier,' at the outer end. There was also 'New Holland Town' station on the land at the inner end. The pier was a piled structure of uncreosoted memel timber, tarred at some later period, in spans of 50ft. The contract for the pier and associated works went to John Linn for £70,457 in April 1847 and public ferry traffic began on 1 March 1848, even though the proper landing stage was not then ready.

This landing stage in the downstream arm of the pierhead consisted of a pontoon, 400ft. long, 51ft. 8in.

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**Fig. 1**
Aerial photograph of New Holland Pier. By courtesy of Grimsby Evening Telegraph.

**Fig. 2**
wide and 8 ft. deep, which floated up and down with the tide, a vertical distance of 22 ft. 6 in. at spring tides. The pontoon was of wrought iron with Watertight bulkheads and a pitch pine deck. It weighed 400 tons and was "the largest stage of its kind in one piece". It was made by E. B. Wilson and Co. at Leeds, conveyed in sections by the Aire and Calder Navigation to Goole where it was re-assembled and launched sideways into the River Ouse and then towed to New Holland. Access to it was by two wrought iron tubular bridges each 140 ft. long, 10 ft. wide and 10 ft. deep (or high), hinged at the pier end and sliding on the pontoon. Passengers, vehicles, livestock, etc., passed through the tubular bridges. The whole was completed in December 1849.6

Hydraulic machinery formed an integral part of the design for the pier and the adjacent harbour for barge traffic. There were truck hoists at the end of the pier. Previous hydraulic installations had worked at a maximum pressure of 90 to 110 lb. per square inch, obtained from a high level tank of which system Grimsby Dock Tower with its tank 200 ft. up is an outstanding reminder.7 History was made when what is thought to be the first hydraulic accumulator was installed at New Holland by Armstrong, which permitted a working pressure of 600 lb. per square inch to be used, obtained from pumps or rams driven by a 30 h.p. steam engine. The hydraulic machinery in the hoists and cranes operated on this system was much smaller in size and therefore more convenient than that formerly in use. This historic accumulator was unfortunately sent for scrap c. 1936.8

During the period of construction, the waiting room at New Holland Town station was used for religious services for the railway staff.

The engineer for the New Holland Works, the whole of which were finished early in 1851,9 was the M.S. & L.R.'s Engineer, John Fowler, who later was to become joint engineer, with Benjamin Baker, for the Forth Bridge. John Fowler, who exhibited a model of the New Holland works and gave a full description of the Paris Exhibition (1855 or earlier), was awarded a gold medal for the design.

Pierhead slopes, 1869

The pontoon was sunk and destroyed by storm on 20 October 1869 and was not replaced. Instead, two timber piled arms were built, one downstream where the pontoon had been, the other upstream, forming a pierhead with a continuous berthing face. Each arm had a 1 in 8 slope 200 ft. long rooted over down to nearly low water from which the boats could be boarded at any state of the tide.10 Parcels traffic in barrows was worked up and down the slopes on flat trolleys attached to a cable operated by a hydraulic winch at the centre of the pierhead.11

Reconstruction of pier (except pierhead slopes), 1923-912

The condition of the approach was causing anxiety before the 1914-18 War, but it was kept usable by strengthening with new timber, by replacing the two railway tracks with one track down the centre of the pier and by prohibiting in 1915 heavy types of locomotives. Early in 1923 complete reconstruction was begun, when railway traffic was stopped but public vehicular and foot traffic continued, by temporary gangways when necessary. The approach, 1345 ft. long, to the timber pierhead slopes, was completely replaced by a structure of steelwork encased in concrete for protection against corrosion, supported on cylinders 50 ft. apart longitudinally sunk under compressed air to a firm chalk stratum. Below mud level the cylinders were of steel plate but above mud level were of cast iron which was more expensive than steel but is more resistant to corrosion especially in 'wet-and-dry' tidal conditions. Most cylinders were 7 ft. 9 in. diameter below mud and 6 ft. above but some were bigger. The new work was on exactly the same line as the former work. The roadway and footpath were each widened by one foot to 9 ft. and 7 ft. making the width 37 ft. 8 in. between handrails. The roadway was designed for a motor vehicle of 8 tons. The timber stumps of the original pier can still be seen projecting above the foreshore at low tide, half way between the present pairs of cylinders. The station buildings were rebuilt at the end of the pier, re-using much of the material from the earlier buildings. The timber slopes at the pierhead were retained unaltered. The reconstruction was completed in February 1928 and the train service to the pier station re-commenced on 19 March 1928.

The first contract, which included the sinking of forty-six cylinders, was carried out by Logan and

Plate II  New Holland Pierhead, with slopes, c.1869, with Pier Station, 1923-9, beyond. Photographed before 1938. By courtesy of Humberside Libraries.


Hemingway, who were followed by Sir William Arrol and Co. Ltd. in a further contract for the twenty-two remaining cylinders and the complete superstructure. The work was designed by C. J. Brown, Engineer, Southern Area, London and North Eastern Railway and Harry Blundell, formerly Engineer, Great Central Railway.

Reconstruction of downstream arm of pierhead, 1935-9

By the early 1930s increasing traffic, the age of the ferry steamers, the condition of the pierhead and the difficulty of transferring vehicles between ship and ship on the pierhead made the railway decide to build three new ferry steamers and to replace the downstream slope with a pontoon landing stage connected to the pierhead by a hinged bridge, i.e. basically to revert to the 1848 arrangement. The pontoon is 150ft. long, 50ft. wide and 9ft. deep, and draws 3ft. 9in. of water. It is of riveted steel construction and roofed over. The bridge, hinged at the pier end and sliding on the pontoon, carries a 10ft. road between its two N-trusses with two 5ft. footways cantilevered on the outside. Its length is 234ft. as contrasted with 140ft. for the original tubular bridges. The reason for the greater length was to limit the maximum gradient to 1 in 9 at low water spring tides, as this was considered to be the steepest allowable for elderly and infirm persons and for cattle, for which there was an extensive traffic to the Hull markets.

To keep the pontoon in position, an openwork reinforced concrete piled structure was built extending downstream for a length of 525ft. from the top of the western timber slope. The inner or landward face provided a lying-up berth.

Although the works, begun in 1935, were not all finally completed until November 1939, the new facilities were opened to traffic in July 1938. On the first day cattle caused considerable consternation as they went down the bridge to the pontoon. Narrow drainage gratings stretched across the full width of the roadway. Without fail, every beast sniffed at each grating and then jumped it as though it were a five-bar gate. The drainage system was thereupon altered to small gratings at the sides and the cattle approved!

The approximate cost and main contractors for these works were:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete staging (Yorkshire Hennebique Contracting Co. Ltd.)</td>
<td>29,200</td>
</tr>
<tr>
<td>Pontoon (Goole Shipbuilding Co.)</td>
<td>13,900</td>
</tr>
<tr>
<td>Bridge (Dorman Long &amp; Co.)</td>
<td>9,000</td>
</tr>
<tr>
<td>Miscellaneous costs</td>
<td>3,600</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>£55,700</strong></td>
</tr>
</tbody>
</table>

The chief maintenance problem encountered was the continual, difficult and expensive dredging necessary under the pontoon. The obstruction to the tidal flows caused by the piles produces a sandbank under the pierhead which can be 8ft. above the river bottom. A hollow had to be dredged initially for the pontoon and it tends to silt up. The sediment if allowed to accumulate would cause the pontoon to ground at low water with possibly disastrous consequences if the grounding was at one corner.

Reconstruction of upstream arm of pierhead, 1946-9

It had been proposed originally that, once the downstream arm with its pontoon had been completed, the timber western slope should be demolished without replacement. However the amount of traffic and other considerations dictated that the western slope should be retained. The maintenance of this old timber structure became increasingly expensive during the 1939-45 war and it was decided to reconstruct it as a piled reinforced concrete structure on generally similar lines to the timber slope. The structure is 22ft. long and 27ft. 4in. wide, with the slope itself 21ft. wide at a gradient of 1 in 9.6.

The surface of the slope is steel chequerplate supported on precast prestressed concrete planks 10ft. 5½in. long, 8½in. wide and 4in. thick, two planks end-to-end being laid in the width of the slope and supported at intermediate points by the reinforced concrete structure. This was a very early, possibly only the second, structural application of precast prestressed concrete in this country.

The inner or landward face of this upstream arm provides a lying-up berth.

The reconstruction of this and the other (downstream) arm of the pierhead involved the usual problems of pile driving, fixing the shuttering and placing the concrete in tidal waters with a range of 22ft. 6in. at springs and an ebb current of up to 5 knots. Difficulties also arose in the removal of piles of the earlier structure especially when broken off near river bottom level.

In order to reduce the impact forces on the reinforced concrete structure when vessels moor, rubber buffers are provided between the concrete and the vertical timbers with which the vessel actually makes contact as it comes alongside. Trials to test whether the intended buffers were suitable were carried out using one of the ferryboats. The buffers proved themselves adequate and, with some modification, were used.15
The maximum labour strength on site was about 12 carpenters and 12 labourers. A comparison of rates of pay for the downstream and upstream arm reconstructions and approximate present day figures is of interest:

<table>
<thead>
<tr>
<th></th>
<th>1935</th>
<th>1946</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tradesmen</td>
<td>10p (2/-)</td>
<td>17p (3/4)</td>
<td>£2.70</td>
</tr>
<tr>
<td>Labourers</td>
<td>7p (1/4)</td>
<td>13p (2/8)</td>
<td>£2.25</td>
</tr>
</tbody>
</table>

The work on the upstream arm, begun about April 1946 and completed in October 1949, was carried out under the control of J. I. Campbell, Civil Engineer, Eastern Region, Railway Executive, the contractor being A. Jackaman and Son Ltd. of Slough.

Arrival of redundancy, 1981

With the opening of the Humber Bridge at noon on 24 June, 1981, the New Holland to Hull ferry lost its raison d’être. Trains from Cleethorpes to New Holland Pier were re-routed to Barton that morning to connect with a bus service between Scunthorpe and Hull. However, the ferry service, provided by the diesel paddle steamer *Farringford*, continued to run throughout the day, the final arrival at New Holland Pier being at 8.05 p.m. on a cold, windy and blustery evening. The six hundred people on board had paid a specially enhanced fare of £2.50 for the return voyage. A large number disembarked, waved goodbye to the *Farringford* and its North Humbersiders, and trekked to New Holland down that long pier approach — the final batch of passengers who have walked up and down it for 153 years.

FOOTNOTES

1 This section is largely based on: *The Lindsey Observer*, Barton-on-Humber, 15.11.1855, anonymous article; J. H. Nicholson.

5 Dow, op. cit., pp.112, 119.
6 Dow, op. cit., p.172.
8 Information from W. J. Sivewright.
9 Dow, op. cit., p.172.
10 Nicholson, op. cit., p.130.
12 This section is largely based on Nicholson, op. cit., pp.129-52 and plate 6.
13 This section is largely based on Sivewright and Horsfield, op. cit.
14 This section is largely based on Sivewright and Horsfield, op. cit.


**BRANSTON Barn, Rectory Lane**

**Fig. 3** Branston barn, Rectory Lane. *Barry Brooke*. For description, see *Lincolnshire History and Archaeology*, vol. 16, 1981, pp.48-9.

**Fig. 4** Branston barn. *Barry Brooke*. 
Fig. 5  Waddingham. Brandy Wharf bridge. Barry Brooke. For description, see Lincolnshire History and Archaeology, vol. 16, 1981, p.49.