English engineering equipment - Pontoon Bridging Equipment Mk II

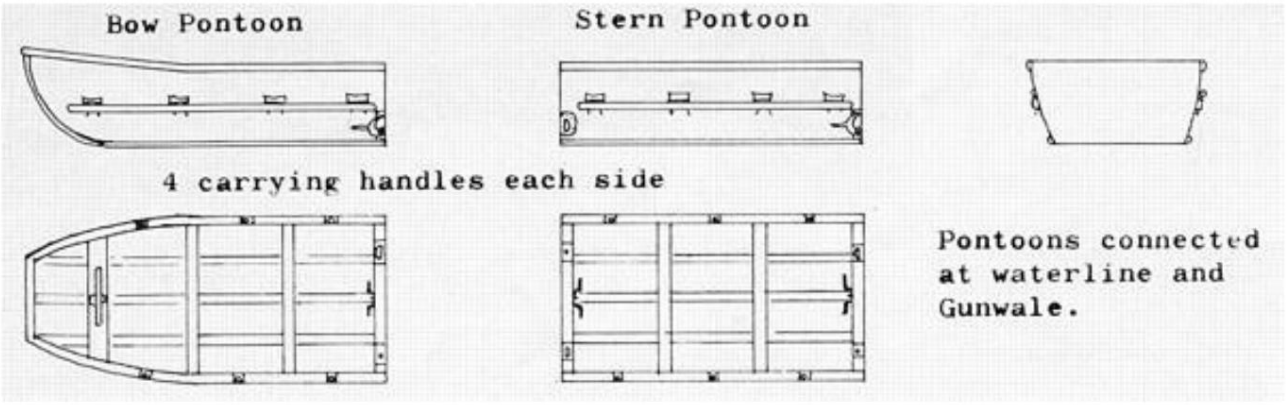
Introduction

The following presentation describes the pontoon bridging equipment - *Pontoon Bridging Equipment Mk II* - which was part of the British bridging and bridging equipment used during the First World War.

The material

Pontoons

The Pontoon Mk II (Clauson Pontoon) was constructed by Lieutenant JE Clauson, *Royal Engineers,* and with minor modifications was used from 1889 to 1924 1). The half-pontoons consist of a wooden frame, covered with American pine *(White Pine).* The pontoon is covered inside and outside with rubberized canvas, which is additionally treated with waterproof glue.



Glossary and data

Bow Pontoon Half Pontoon - For Length: 3.5 m; width: 1.6 m; height: 0.7 m. Weight: 270 kg.

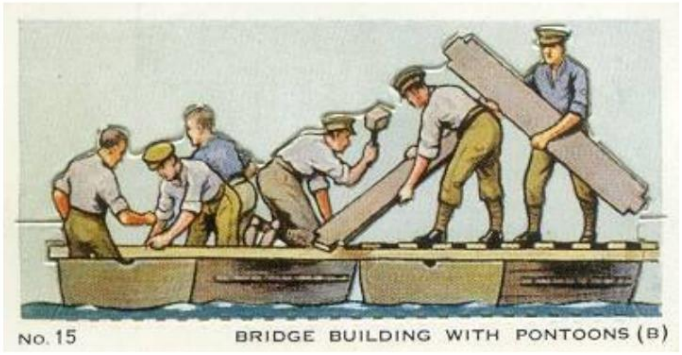
Stern Pontoon Half pontoon - Aft Length: 2.9 m; width: 1.6 m; height: 0.7 m. Weight: 230 kg.

Gunwale Railing

Application

- The pontoons can be used to carry bridges or as ferries.
- The half-pontoons are used individually or several together, depending on the task at hand.
- The half pontoons are attached to each other using metal handles.

Half pontoons are rowed in place.

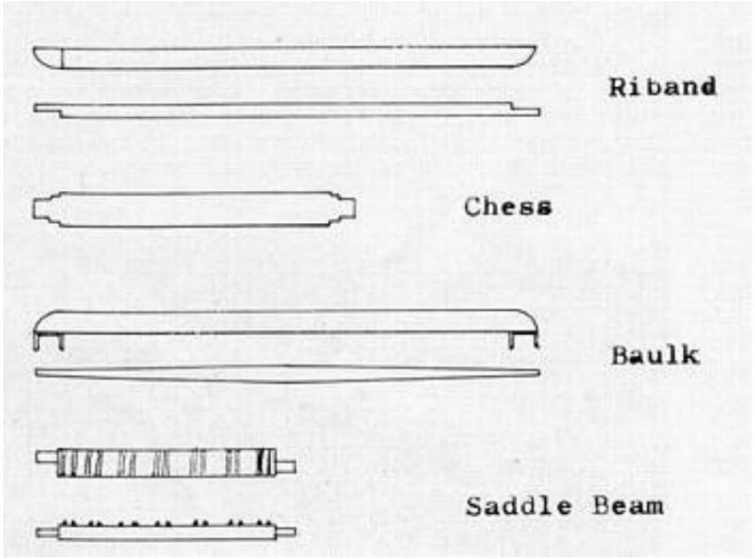


Deck planks are installed.

The two images are from the *A Model Army* cigarette card series published by Stephen Mitchell & Son, circa 1930. The motifs were cut out in such a way that they could stand on their own with a little dexterous bending - something between a cigarette card and a cut-out sheet.

Beams

The various beams and planks from which the bridge itself is constructed are made of American pine *(Oregon* or *Kauri Pine).* The individual parts fit together precisely and thus form a kind of advanced construction kit. Equipment of a similar type was in service until the mid-1920s.



Glossary and data

ribbon	Edge beam Length: 4.8 m

Chess Deck plank Length: 3 m; width 0.3 m

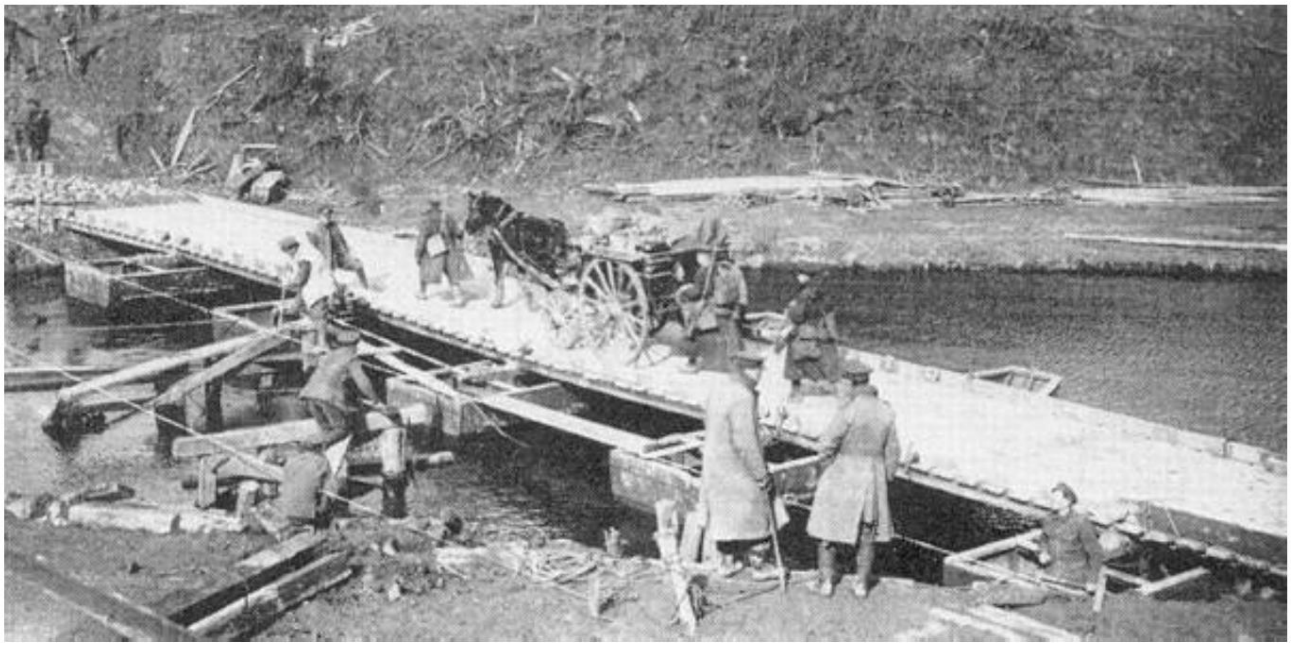
Baulk Tension beam Length: 4.8 m

Saddle Beam Bearing beam Length: 2.1 m

Application

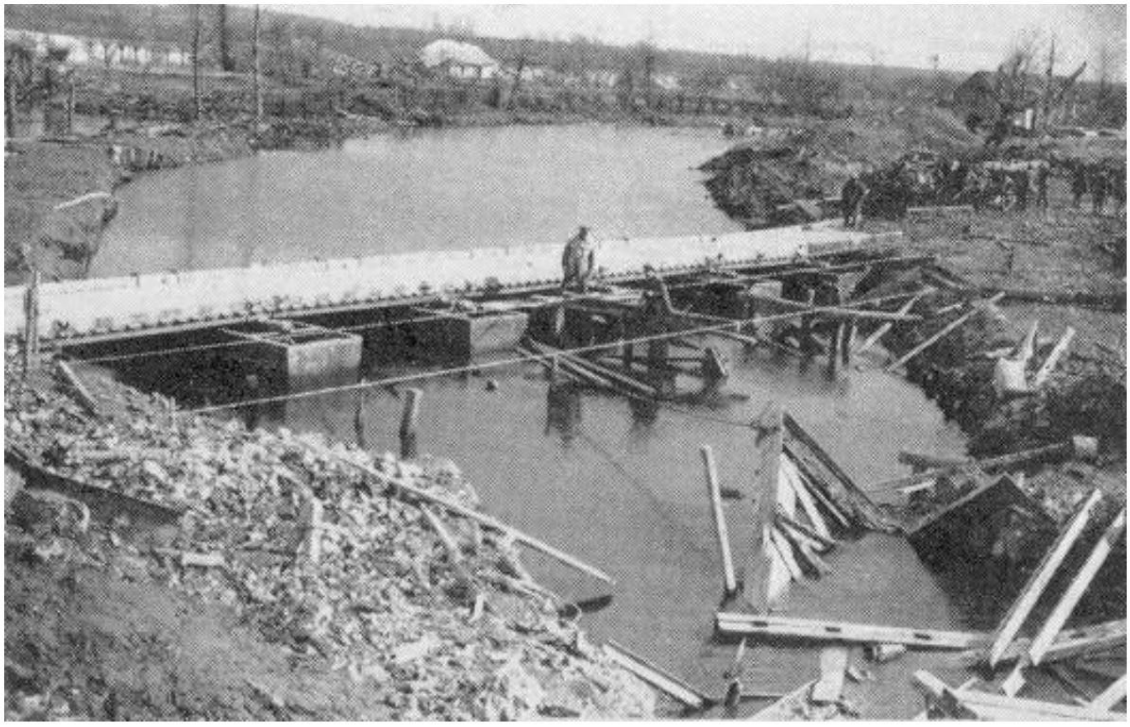
- In the middle of the pontoon's tofts, one or more support beams are mounted, which fit together using pins and holes.

- On each support beam there are seven grooves in which the tension beams fit.
- The deck planks are mounted on the tension beams; 15 deck planks make up a bridge section.
- The edge beams are attached along the outer edges of the deck beams, using straps and pegs.



Light column bridge leading over the Somme, March 1917.

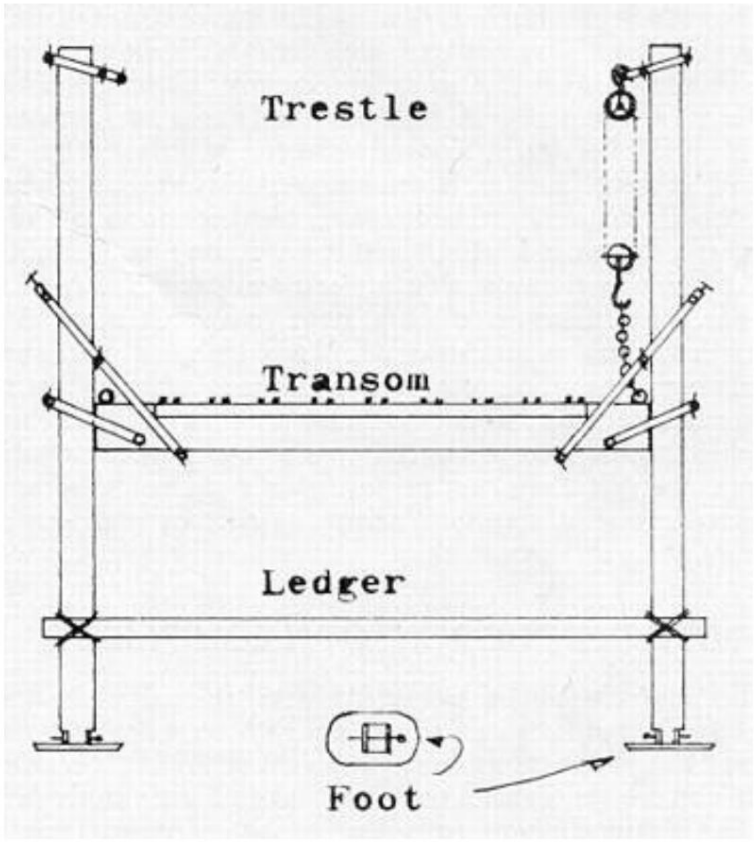
The pioneers on the left in the picture have started a permanent bridge, whereby the pontoon bridge material can be freed up for other tasks.



Same bridge, seen from the opposite bank.

Buck

The Mark IV Trestle (Weldon Trestle) was constructed by Lt. Col. Weldon in the late 1890s and, with minor modifications, was used until the mid-1920s. The frames and beams are made of American pine *(Oregon Pine),* while the plinths are made of steel.



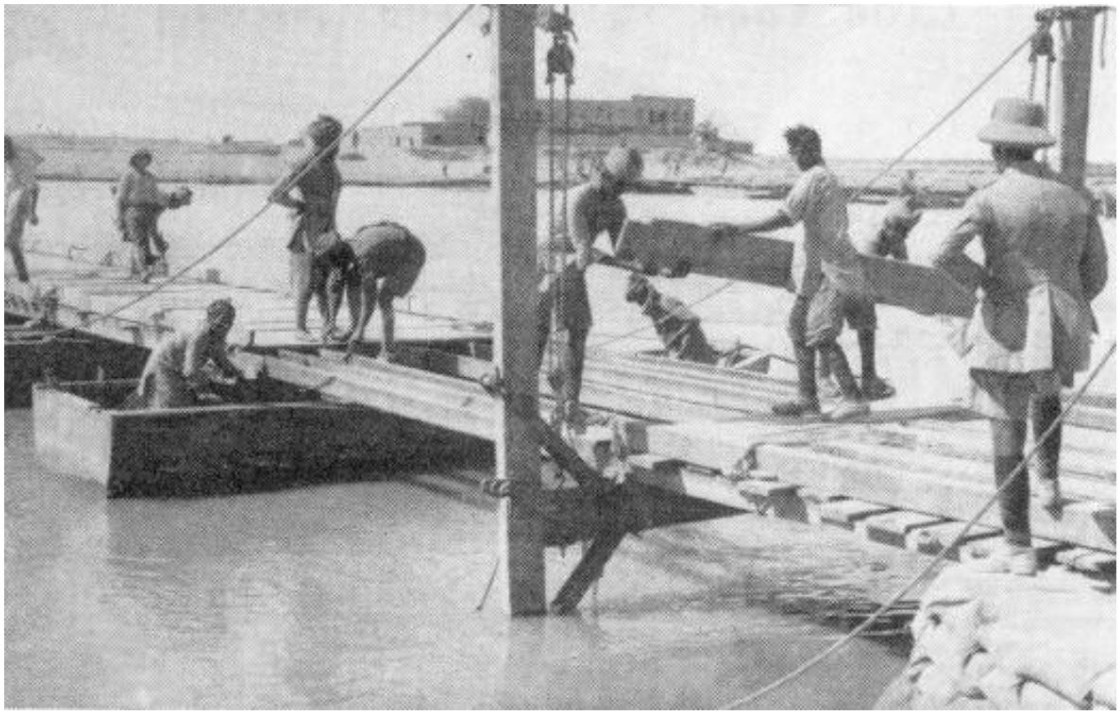
Glossary and data

Trestle Buk	Length: 4.8 m
Transom Transverse beam	Length: 4 m
Ledger Lashing beam	Length: 4 m
Foot Pedestal	Dimensions: 0.6 x 0.4 m

Application

- If the water depth is not sufficient to support pontoons, trestles are used to support one or both of the pontoon bridge's land anchors; if a bridge is to be built over a dry area, the entire bridge is carried by trestles.
- The legs of the trestle are placed in the steel plinths.
- The legs are connected by means of cross beams and lashing beams, which are fixed by means of straps of steel wire, wedges and connecting pieces.
- The connecting pieces are mounted in holes designed for this purpose. The position of the cross beams is also ensured by means of pulleys.

- The cross beams have nine grooves in which the tension beams fit.



Indian pioneers build a light column bridge over the Tigris, 1917.

The picture gives a good impression of how the pontoon bridge's anchorage is supported by a trestle.

Organization and capacity

During the mobilization in 1914, *the Pontoon Bridging Equipment Mk II* was part of the two engineer companies of the infantry divisions and the two bridging *trains of the Expeditionary Corps.*

The engineering companies

Each engineering company included a division of pontoons *(Pontoon Section)* consisting of:

- 2 pontoon wagons, each with two semi-pontoons,
- 1 trestle wagon, with two trestles.

The wagons also transported beams, deck planks and edge beams.

Using the company's equipment, it was possible to build one of the following bridges:

- A 22.5 m long *light column bridge,* a
- 45 m long *walking bridge.*

The field troopers

A field broekvipage consisted of:

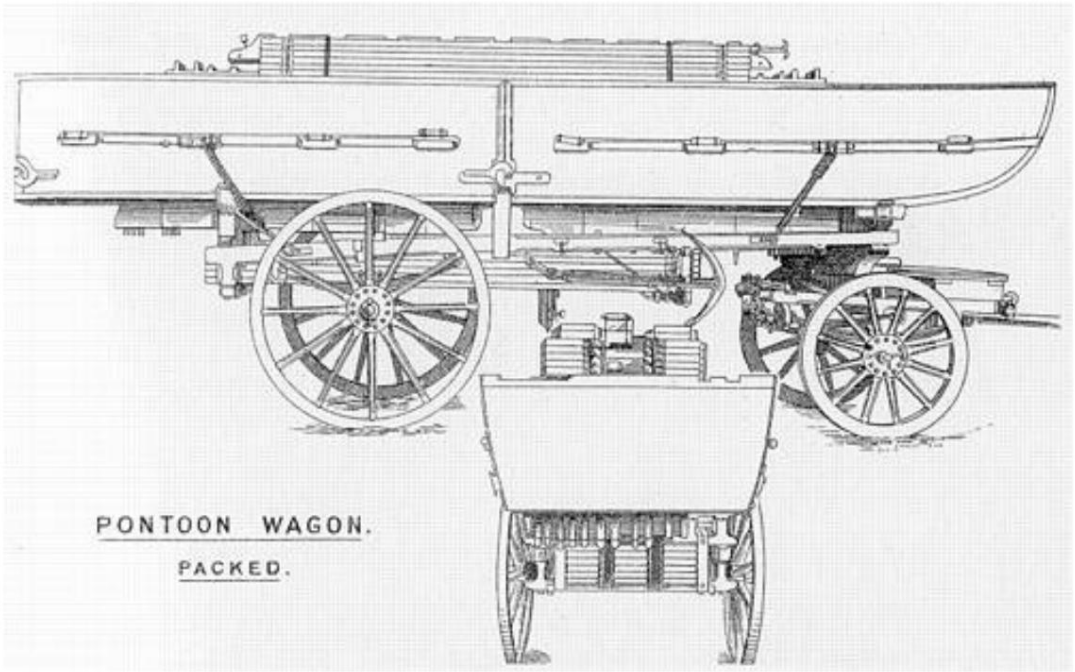
- 42 pontoon wagons, each with two semi-pontoons,
- 8 trestle wagons, each with two trestles.

The wagons also transported beams, deck planks and edge beams.

With the help of the feltbroekvipagen's equipment, it was possible to build:

- A 180 m long *Light column bridge* or a 90 m long Heavy column bridge, on pontoons, and A 36 m
- long *Light column bridge* or an 18 m long Heavy column bridge, on trestles, or A 114 m long
- *Heavy column bridge,* strong enough to carry heavier motor vehicles , on pontoons and trestles.

Means of transport

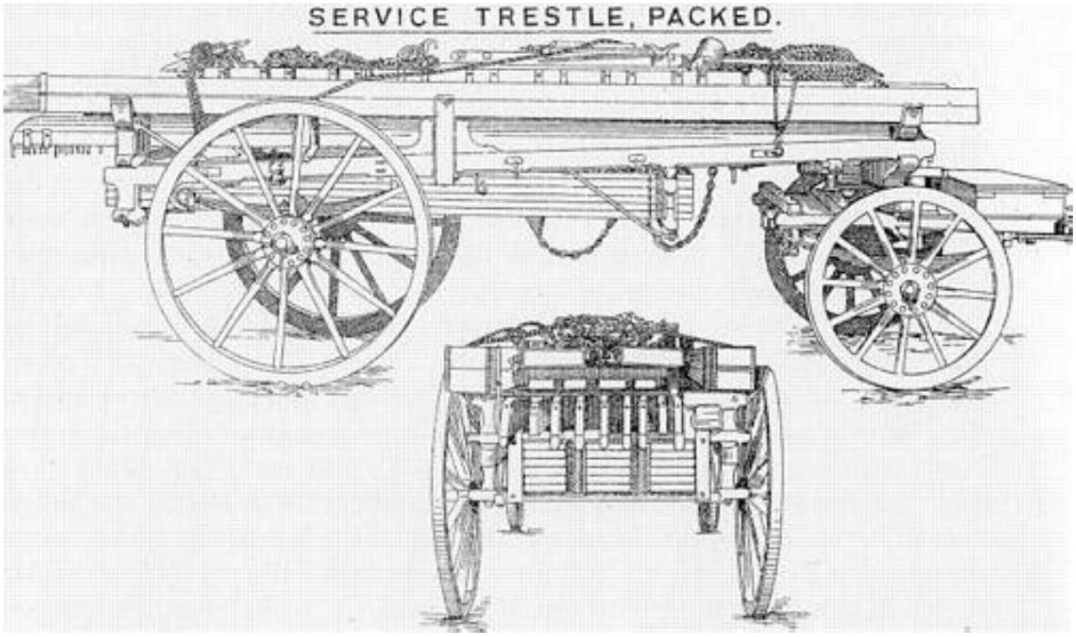


The pontoon car

The pontoon wagons in both the engineer companies and the field troop crews were pulled by six horses.

The pontoon wagon is additionally packed with deck planks as well as tension beams and support beams.

Under the pontoon - in the middle between the wheels - an anchor can be seen.



The trestle wagon

The rickshaw was also pulled by six horses.

On each trestle wagon, two trestles were transported, as well as the unit's remaining planks and beams.

Parts of an engineering company tree, photographed in England, 1906.

Batting times

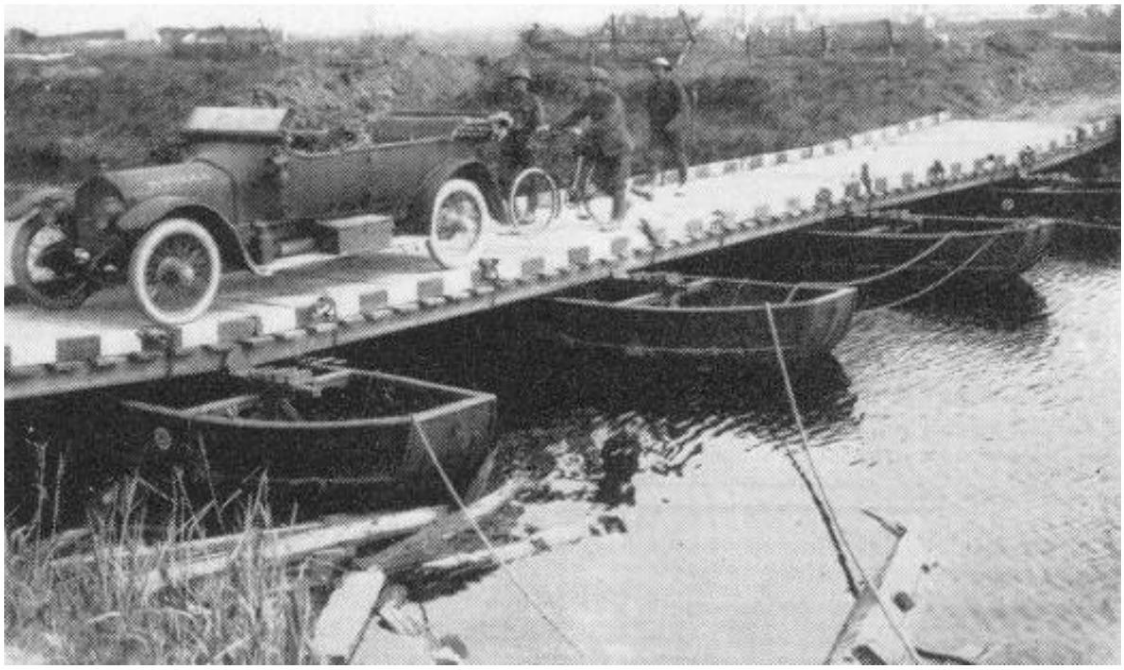
The following overview indicates rules of thumb for hitting times, under commonly occurring conditions and with sufficient numbers of well-trained personnel. Time for special earthworks in connection with approaches and descents to the moorings is not included.

As a general rule, it is not the task of getting the pontoons towed into place that is the most time-consuming.
It is the preparation of access roads to the transition point and the distance that pontoons and other equipment

must be carried, there are the critical factors.

If work is carried out at night, the listed cutting times are increased by 50-100%.

Length	Bukke	Hitting time	Remarks
1. 22,5 m	No	½ - ¾ hour	The laying time includes the time required to get the pontoons in place and to lay the bridge deck.
	2	2 timer	The slaughtering time includes the time involved in unloading the bucks from the buck cart and collecting the bucks.
2. 45 m	None	1 - 1½ hours	The workforce is divided into two teams: One that unloads the material from the transport vehicles, while another builds the bridge.
	2	2½ - 3 timer	As above, but it is assumed that a trestle is required at both abutments.
3. 90 m	No	2¼ - 2½ time	The workforce is divided into two teams: One that unloads the material from the transport vehicles, while another builds the bridge.
	2	3½ - 4 timer	As above, but it is assumed that a trestle is required at both abutments.
4. 180 m	7-8	8 - 10 timer	A bridge of this length requires the use of the entire field bridge slope. In practice, the slaughter time depends on how long it takes to place the bucks.

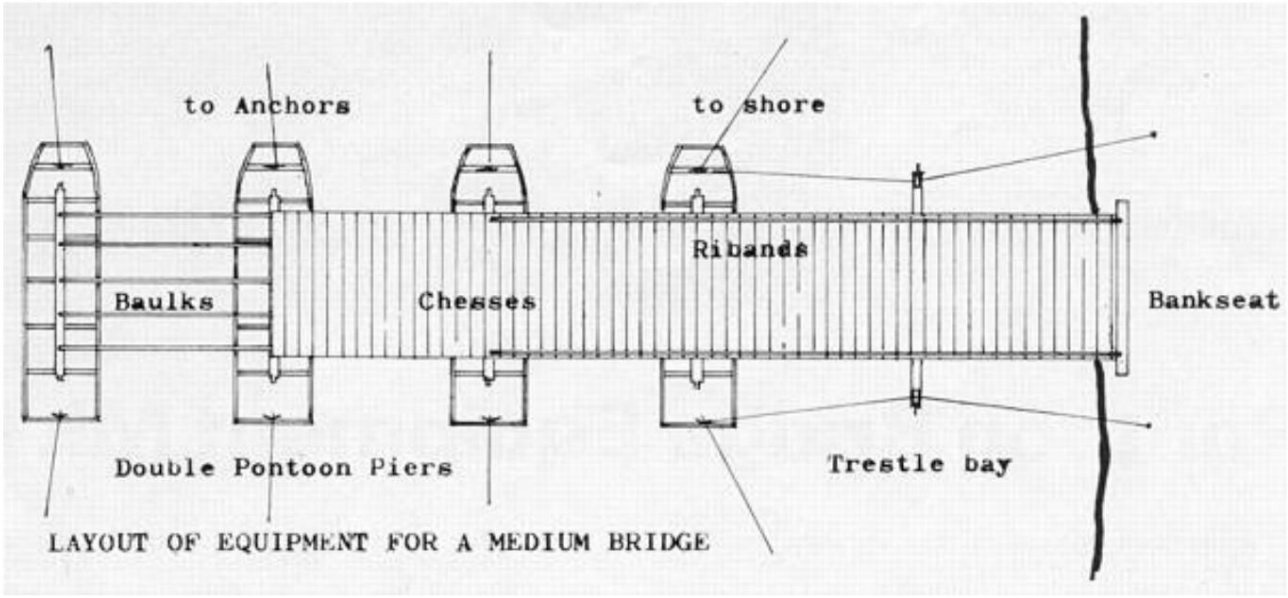


An English ambulance passes a Light column bridge at Newport, September 1917.

Note how the pontoons are moored at the river bank, an alternative to using the anchor belonging to the pontoon.

Let kolonnebro *(Medium Bridge)*

With *Light Column Bridge ,* the majority of field bridging tasks could be solved until heavy motor vehicles became common.

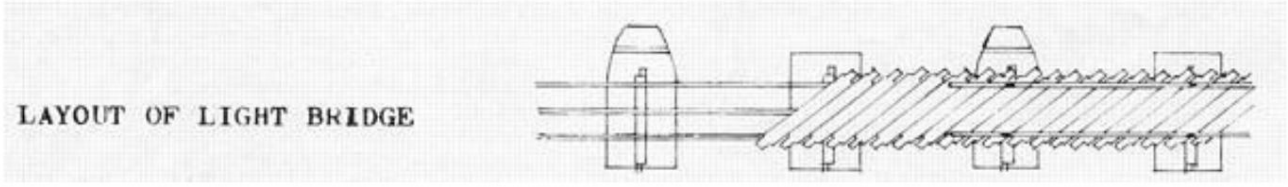


Application

- The bridge is supported by composite half-pontoons, on which two support beams are placed.
- The pontoons are connected with five, seven or nine tension beams.
- Deck planks and edge beams are laid on the tension beams.

- The bridge deck (the distance between the edge beams) is 2.7 m.
- A *Light column bridge* can be passed by personnel in column of four, cavalry in column of two, horse-drawn vehicles and light motor vehicles.

Løbebro *(Light Bridge)*



Application

- The bridge is supported by half-pontoons, placed alternately fore and aft.
- The deck planks are placed at an angle of 45°.
- The bridge deck (the distance between the edge beams) is 1.4 m.
- A *gangway* can be passed by personnel in a single column.

Heavy column bridges

Impressed by the increasing use of motor vehicles, the *Royal Engineers* carried out a series of experiments in 1912-14, but the financial means for a much-needed replacement of the pontoon bridge material were not present.

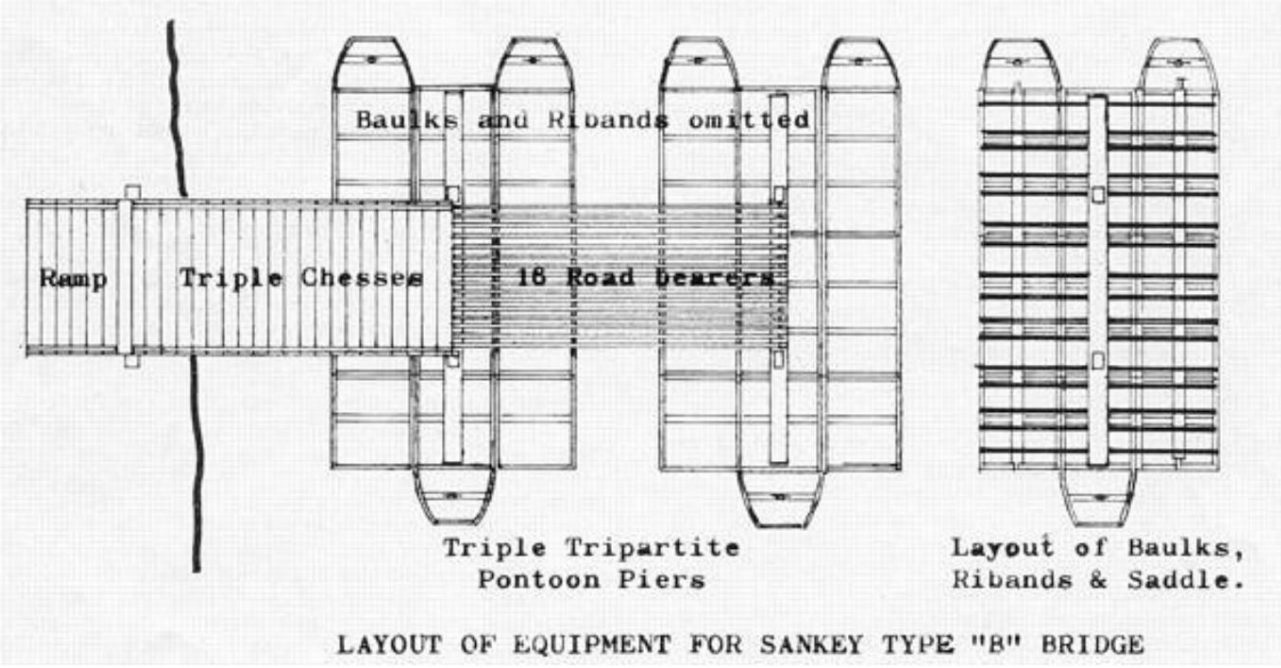
Captain *CEP Sankey* pioneered a method by which, using existing equipment, they were able to meet the demands of more difficult bridges. Three different types of *heavy column bridge* were introduced, and named after their inventor:

Sankey Bridge Type B Can carry material classified A and B - See below under Bridge classification.

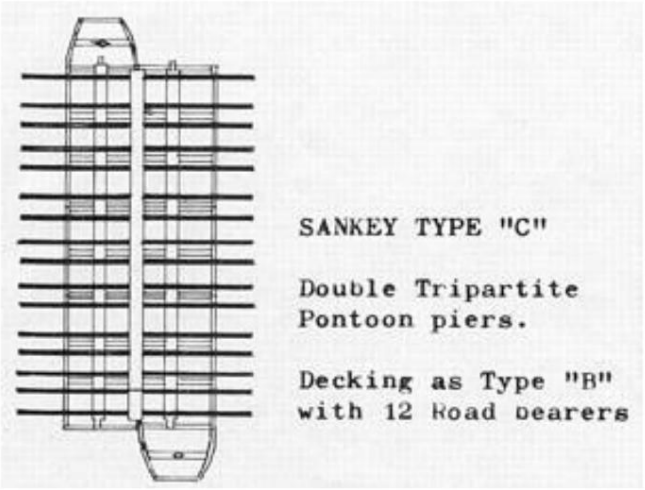
Sankey Bridge Type C Can carry Heavy Commercial Lorry type trucks .

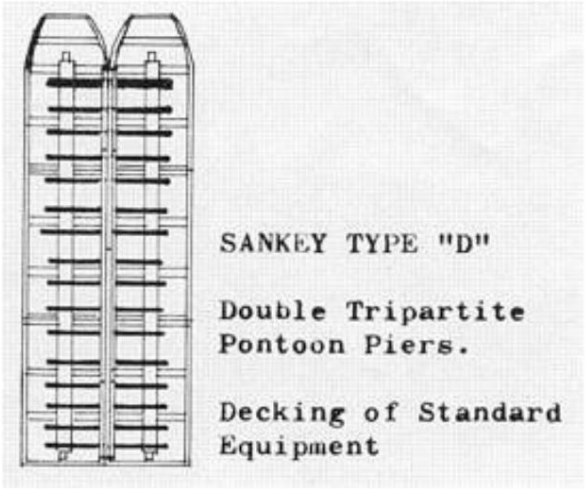
Sankey Bridge Type D Can carry 3-ton lorries, with cargo.

The method consisted of putting together three half-pontoons, which in combinations of two or three came to carry the bridge. They were connected by 6.7 m long steel tension beams (referred to as *RSJ - Rolled Steel Joist),* assembled in pairs. The tension beams rested on support beams of heavy timber. The bridge deck consisted of three layers of standard type deck beams.



LAYOUT OF EQUIPMENT FOR SANKEY TYPE "B" BRIDGE





Bridge classification

An actual bridge classification - the forerunner of the system we know today - was first introduced in the summer of 1915 and published in the *Memo on the Construction and Repair of Road Bridges:*

Bridge class

16 ton Steam Tractor; 14 ton Steam Tractor; 14 ton Caterpillar Tractor; 13 ton Petrol Vehicles *Tractor.*

A

Cannons 6" Ship's cannon, in field aftutage.

Motor Omnibus; ASC Heavy Lorry; Heavy Commercial Lorry; Foot Steam Lorry; 11 ton Vehicles *Holt Caterpillar Tractor.*

B

Kanoner 8" Haubits; 9,2" Haubits; 12" Haubits, i to dele; 15" Haubits, i fire dele.

With the introduction of tanks in 1916, the **AA** class was added to the list, which, however, exceeded the capacity of *the Sankey* bridges.

Sources

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2. *One More River to Cross - The Story of British Military Bridging* af J.H. Joiner, Leo Cooper, Barnsley/South Yorkshire 2001, ISBN 0-52052-788-0.
3. *Military Bridging - Pontoon Bridging Equipment Mk III* af Arthur North, Tidsskriftet Modelworld, december 1972.
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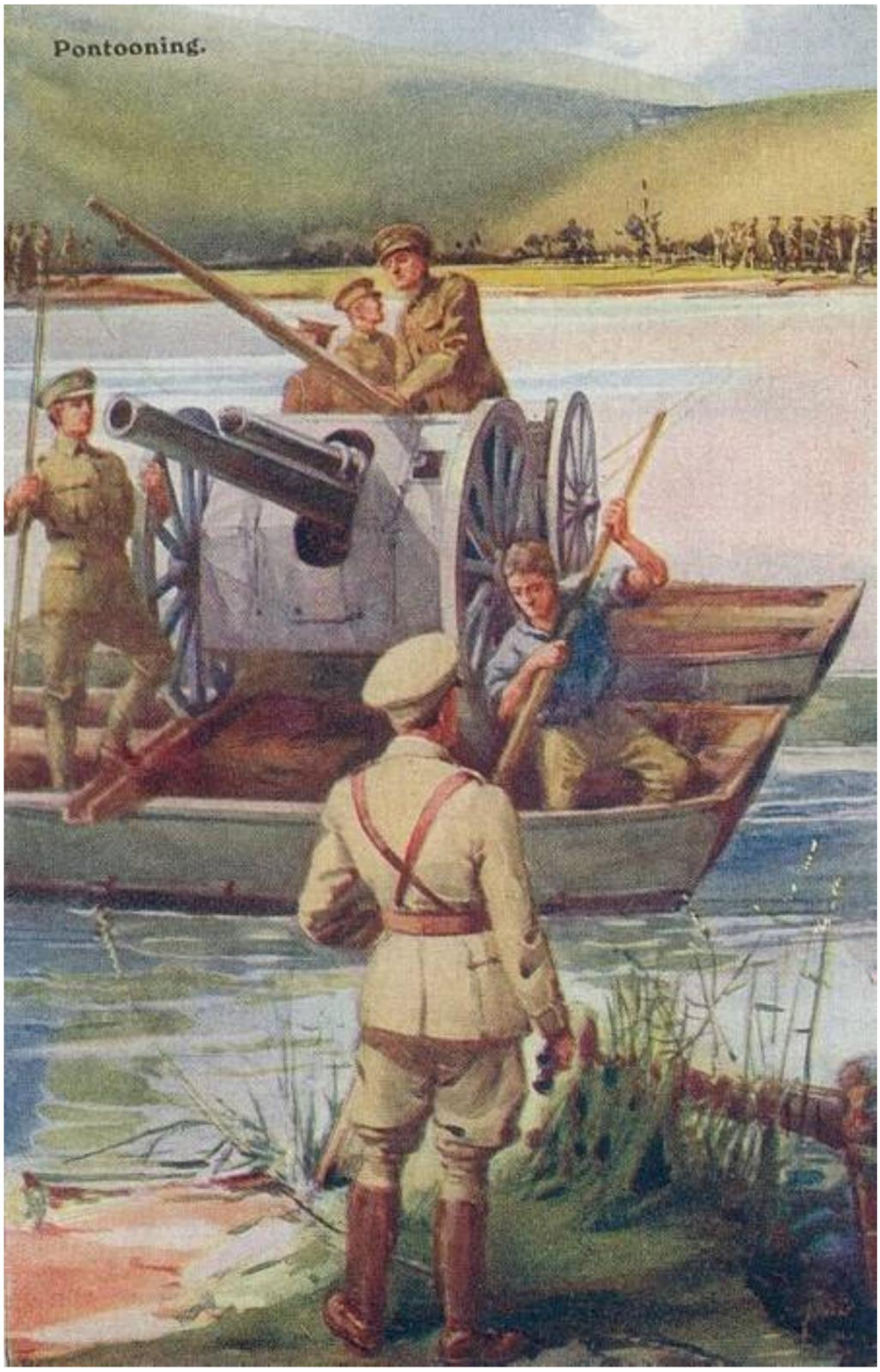
5. *The Corps of Royal Engineers 1066-1996* Tidsskriftet Regiment Nr. 13, April/May 1996.
6. *The Danish Corps of Engineers 1684-1984* edited by Ole L. Frantzen and AV Skjødt, Tøjhusmuseet, Copenhagen 1984, ISBN 87-7491-143-0.

7. *Ingeniørkorset 1684-1934* by Willy Andersen, Special Edition of Journal for Engineer Officers, Copenhagen 1934.
8. *Memory book for use in the field, during exercises and war games* by HH jørgensen, N. Olaf Møllers Forlag, Copenhagen 1936.

Per Finsted



This postcard from about 1914 shows how an 18-pdr field gun is transported across a stream, using a ferry built from two pontoons.

To note

1) During the war, a *Mk III* version of the pontoon is introduced. The two versions look the same, but *the Mk III* is covered with mahogany *(Honduras Mahogany)* instead of pine. It was not until 1924 that steel pontoons were introduced.