

these 408 ft. spans constitutes one of the wedged up on the centre bearing only. The ment of the pilot scow for the placing of Froudes formula R=fs $\left(\frac{v}{6.9}\right)^2$ see plan 6. most interesting portions of the work. The whole reaction being thus concentrated on the upstream spans. Under this arrangescheme was to launch the span endwise one point required the end panel of ment the new spans were allowed, while with its rear end supported upon an in- stringers in the 270 ft. spans to be reinforc- travelling, to rub along a specially prepared genious truck or buggy, while the forward ed. Details of this floating operation will vertical skidway bolted to the lower chords end was supported on a large scow of spec- be referred to later. The 120 ft. spans were of the downstream spans already in place. ial design. In order to avoid overstraining erected by means of a temporary span, as Details of the actual operation of launching the adjacent 270 ft. span by the concentrat- shown on general diagram E, on plan 2. are clearly shown in the plates and in the ed loads of the sliding gear, an ingenious The 240 ft. spans were erected by the same photographs. framed structure was devised by which it 120 ft. temporary trusses supported upon a The carrying scow was really composed was possible to so distribute the end re- wooden pier in the centre, as shown, be- of two independent scows with two 100 ft. action over the floor system of the carry- tween piers 7 and 8, and in the photographs. deck plate girder spans (4 girders) placed ing span, that no part would be strained the reaction at each of the outer ends of work. the triangulation. Thus, there is a three

over allowable units. A diagram of this same 120 ft. temporary trusses supported scows. On these equalising girder spans truck or buggy is shown on plan 5, from on a temporary tower about 30 ft. wide, as was erected a stiff timber tower on which which it will be noted that the secret of the shown on diagram between piers 11 and 12, the span itself was carried. Anchors, each construction lies in the fact that there is the only falsework at any time in the river composed of concrete blocks securely strung no vertical tie inside the triangulation but, being the towers as shown, and at no time together, weighing approximately 76 tons in its place there is an exterior strut, which was railway traffic placed upon the tempo- out of water or 52 under water, were placed by reason of the proportions of the mem-rary falsework. This was required by the about 1.500 ft. upstream from the bridge, and bers, carries a reaction which is equal to railway company from the beginning of the generally respectively in line with piers 12

point bearing with equal reactions. The weight and general characteristics, but two beam embedded in the rock. On the main skidways consisted of 8-100 lb. greased methods differing somewhat in detail were carrying scow a dynamometer was inserted rails (2 sets of 4), on which cast steel skids used in launching them. The two down- in the reaving of a 14 roped tackle which or slippers were imposed. The scheme was stream spans were launched on the same was attached to the main anchor line, in to move the span forward until it came to set of carrying scows, but with a pilot scow order to record the pull on the anchor ropes. the last panel of the 270 ft. span, where, of upstream to take up the slack in the cables. The readings taken from this dynamometer course, the front bearing of the three would and to otherwise control the movement of fully corroborated experiments which had naturally tend to pass overboard. In order the spans during launching. The experi- previously been made regarding the reto satisfy all conditions, the two outer bear- ence gained in launching the two down- sistance of floating bodies to the current in spans, which were allowed to rub against

The 270 ft. spans were erected by these on them, to equalise the load over the two and 13, but on the land above pier 14 a The four 408 ft. spans were alike in "dead man" was used composed of an 1

and 8 miles an hour, according to the location where the meter was used.

DETAILS OF LAUNCHING OPERA-TIONS.—When all was ready, an ordinary Lidgerwood unloader, such as is used on railway work, was located and strutted in a position where a direct pull could be made from the drum of the engine. Communication was at all times maintained between the man in charge of the Lidgerwood engine, those in charge of the scows and the man in full charge of the operations, by means of a system of flag signals. The span was started by a number of jacks. after which the Lidgerwood engine controlled the whole of the movement and at no time was there any unexpected trouble. While the span moved forward the anchor cables allowed the anchor scow to float across the current with a radial motion. This necessitated the cable connecting the anchor scow with the main scows to be constantly shortened in order to maintain the true alignment of the span. As has already been stated, this anchor scow was used only in connection with the floating of the two downstream 408 ft. spans. It was omitted when floating the upstream 408 ft. ings were here abandoned, and the span stream 408 ft. spans led to the abandon- the river. They also agreed generally with the neighboring spans already in position.