

CORRESPONDENCE  
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Paper No. 5585.

“ Captain Cook Graving Dock, Sydney.” †

By JOHN GUTHRIE BROWN, M.I.C.E.

Paper No. 5587.

“ The Sturrock Graving Dock, Cape Town.” ‡

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Mr. E. J. Buckton suggested that the design and construction of dry docks primarily for large naval units could not be divorced from policy.

Mr. Guthrie Brown had described a fine engineering work carried out during the war period. In design and execution it was largely the same as if it had been constructed under peace-time conditions, instead of during periods of threat, of attack, and of serious losses, with the very existence of the British Commonwealth as free nations in the balance.

In May 1940, when it was decided to construct the dock, war was in progress with Germany, and Japan was threatening. A dry dock for the British battle fleet was needed urgently in Australia. Before America entered the war she had given a lead in quick dry dock construction and under actual war conditions still quicker methods were of great importance.

Mr. Buckton's firm had produced a scheme in 1942 for a quick-construction dry dock at Karachi, which was to be 660 feet long, with an 80-foot entrance and a depth of 33 feet 9 inches over the sill at high water. Time ruled out orthodox methods and a design was developed to enable construction to be completed within twelve months from starting. That was conditional upon the availability of labour and materials and upon the highest priority being accorded. The general principle of design was for reinforced-concrete shell sections to be floated out and sunk to a bed

† J. Instn Civ. Engrs, vol. 28 (1946-47) p. 286 (Oct. 1947).

‡ *Ibid.*, p. 328 (Oct. 1947).

prepared in a dredgable area and then filled with concrete to form the walls. A grid system of pre-cast rib units divided the floor into compartments, which were then tremie-filled. Six dewatering pumps were to be installed in prepared chambers in alternate wall units. A special reinforced-concrete entrance unit with caisson grooves and filling culverts ready formed linked up with the wall sections.

The design was appropriate to the Karachi site and variations could have been made for other conditions. In the case of the Captain Cook dock, the siting was arranged so as to pick up a ridge of rock for founding. Quick construction methods would probably have called for the adjustment of the siting to permit of founding on a dredgeable site.

A comparable form of construction for a large dry dock at Sydney might have taken nearly 2 years to complete. That compared with less than 2 years for the American Navy Docks built at Pearl Harbour in 1941, and with from 2 years to 2½ years for the 1,100-foot by 150-foot docks at Philadelphia, Norfolk, and New York for the American Navy, using specially quick construction methods.

The Captain Cook dock, which Mr. Buckton had visited when in Sydney in 1946, had been completed only just in time to serve the fleet to help to finish off Japan, 3 years after the loss of the large dry dock at Singapore, whereas it would appear that policy might well have called for a "Mulberry" effort.

Mr. Buckton appreciated that policy rather than engineering was involved in his comments, which were not intended in any way to detract from the credit due to the design and construction of such a fine dock.

**Mr. Guthrie Brown**, in reply, observed that Mr. Buckton's remarks on the design of a quick-construction dry dock at Karachi were of interest.

A modified design of graving dock could have been developed for Sydney so as to reduce, to some extent, the construction period, but almost certainly another site would have had to be chosen. It should not be overlooked that when the Garden Island site was selected early in 1940 and the design of dock was developed to suit that site, the Singapore naval base was in full use by the Navy and continued to be available up to February 1942. The urgency and importance of the Sydney dock became evident thereafter, but by that time the scheme was well advanced, with pumping and other machinery under construction. Therefore, any radical alteration in design in order to expedite matters might have done more harm than good.

Fortunately, the Captain Cook graving dock was, thanks to the Australian efforts, finished in time for naval requirements. As the result, Australia now possessed in that dock a much more valuable asset, well suited and sited for all present and future requirements, than if one of quick-construction design had been built in its place.