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PLYMOUTH BREAKWATER



The Plymouth Breakwater with Penlee Point and Cornwall in the distance.
From a postcard.

The Plymouth Breakwater lies at the mouth of Plymouth Sound, between Bovisand Bay on the eastern side and Cawsand Bay to the west. The National Grid reference is **SX472 503**. The National Grid reference of the Breakwater Fort is **SX472 505**. It is nearly one mile long and is 2½ miles out from [Plymouth Hoe](#).

Before the Breakwater was built Plymouth Sound was open to storms from the South West, which made it a dangerous anchorage. Many sailing ships were shipwrecked on the coast by Bovisand. In 1788 a plan was put to the Government by a Mr Smith, the Master-Attendant at the nearby [Royal Dockyard](#), to construct a pier from the eastern shore at Staddon to the Panther Rock. The usual in-action followed until 1806 when John Rennie (1761-1821), civil engineer, and Joseph Whidby, the Master-Attendant at Woolwich Dockyard, London, were ordered to draw up a report and plan for a breakwater. They were assisted by the current Master-Attendant of the Plymouth [Royal Dockyard](#), a Mr Hemans.

The three of them met on March 18th 1806 and their report was completed on April 21st, recommending that a free-standing breakwater

be built along the line of the Panther, Shovel and Saint Carlos Rocks. The plan was finally accepted and an Order in Council was issued by the Prince Regent on June 22nd 1811, which was followed by the Admiralty instructions to Rennie to draw up detailed plans. These involved setting a solid wall of stone from a base 210 feet wide to a level just 10 feet above low water mark, where it was to be 30 feet in width. To construct the whole breakwater of some 3,000 feet, was estimated to involve some two million tons of stone and was expected to cost £1,055,200. These measurements were altered at a later date.



Workmen on the Plymouth Breakwater.
Note the Breakwater Fort on the right.
From a postcard.

In March 1812 a twenty-five acre site at Oreston was purchased from the Duke of Bedford for £10,000 and opened as the Breakwater Quarry for the supply of limestone. It is said that the first limestone block weighed 7 tons. It was transported to the site via the [Breakwater Tramway](#) by one of the ten specially converted sailing barges and dropped some 30 feet onto the seabed on August 12th 1812, the Prince Regent's birthday. These barges were able to make four trips a day from the Quay at the Breakwater Quarry out to the Breakwater. There were also 45 smaller vessels that carried the smaller stones in holds capable of storing up to 50 tons of material. The contractors for this part of the operation were Messrs Billings.

The Breakwater as constructed comprises a central portion of 1,000 yards in length and two arms each 350ft long and formed at an angle of 120 degrees to the main section. It is 45ft broad and some 80 ft deep.

By March 31st 1813 the corners of some of the stones had appeared above the surface at low water spring tides. In 1815 it was decided to raise the structure to 20 feet above low water instead of 10 feet as planned. In 1817 a hurricane displaced much of the work and altered

the seaward slope from 1 in 3 to 1 in 5. Although this natural slope had been indicated by the damage done, the work continued on the original plan. However, a still more violent storm on November 23rd 1824 removed upwards of 200,000 tons of stone and reduced the slope once again to 1 in 5. The hint was taken this time and the centre line removed 36 feet towards the shore and the width of the top reduced from 55ft to 45ft. The slope on the landward side stayed at 1 in 2.

For added protection, the top of the Breakwater was paved and one of the granite blocks is engraved ~ *Prince Wm. Henry, Duke of Clarence, Duchess of Clarence, July 17th 1827*~ commemorating their trip to the Breakwater during their Royal visit.

The actual cost of the work was quoted as £1,500,000, some £300,000 over estimate. Although the work is generally quoted as being completed in 1841, it has also been stated that by June 1847 there was still 70 yards of the eastern arm left to be finished, requiring a further 50,000 tons of stones on top of the 3,620,440 tons already used. In the end some 4,500,000 tons were reputed to have been needed, far outstretching the original 25 acre quarry. The number of workmen employed on the project at any one time was apparently 765. Joseph Whidby is said to have resigned around 1826 and when John Rennie died in 1821 the work was continued by his sons George (1791-1866) and Sir John (1794-1874).

In 1871 a concrete wave breaker was placed in position to afford extra protection from the heavy seas. No further ones were laid down until 1928 when the first of over 100 such wave breakers was installed.



The lighthouse at the western end of the Plymouth Breakwater.
From a postcard.

The lighthouse, on the western end, was designed by Messrs Walker and Burgess and built of the best white granite from Luxulyan in Cornwall. It was started on February 22nd 1841 and completed on November 9th

1843. Its height was 126 feet, of which 78 feet were above the top of the Breakwater. The lantern was 8 feet tall and it had 118 mirrors, making the light visible for 8 miles except during fog. It was first lit in June 1844.



The cage at the eastern end of the Plymouth Breakwater.
From a postcard.

It was originally planned to put a lighthouse on the eastern arm as well but as it was the lesser important channel entrance into the Sound, it was decided to substitute a beacon. This was erected between June and November 1845. The stepped base is 25 feet high and was topped by an African Oak pole 17 ft high, on top of which was a wrought iron globe, 6 feet in diameter, capable of holding several shipwrecked mariners.

Despite appearances from the shore, the breakwater (or Shovel) fort is not on or connected to the Breakwater, although that was the original intention. It is in fact about 32 yards from the edge of the Breakwater, on the Shovel Rocks. In June 1862 a quadrangular staging was laid around the site. Piles 70 feet deep were fixed into the rock with iron shoes. The whole was swept away by a westerly gale in August 1862 and again later by an easterly gale. The work was completed during September 1862 and a crane was placed on the staging to lift the stones from the barges. The foundation stone was laid on the twenty-first birthday of the Prince of Wales, November 9th 1862, the foundations being prepared with the aid of four diving bells. Some 2,400 tons of concrete blocks were placed in position each week and this was faced with

granite. The concrete was raised to a height of 32 feet and then 14,000 tons of masonry rubble were thrown on top.

The walls of the fort were 14ft thick. Fifteen guns were provided on each of the three floors and magazines were provided to hold 1,500 barrels of gunpowder. Tanks to hold fresh water and a coal store were also provided. The fort was built by Messrs Henry Lee and Sons of London and the work was under the supervision of a Mr Orminston, CE.