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The Construction of Hastings Pier



An illustration of the first pile for Hastings Pier being screwed into the seabed
HPC014.012



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Steve Peak, author of *A Pier Without a Peer*, *The History of Hastings Pier* and *Peerless Piers* and his website <http://hastingschronicle.net>

The Pier is Launched

The design of Hastings Pier by the imaginative and highly competent Eugenius Birch was seminal in some ways: it was the first British pier to have a grand pavilion, and the first to have it included as an integral part of the design. Until then, Pier entertainment had been limited to a band playing in a small bandstand exposed to wind and rain, but the new Hastings Pier showed that concerts, musicals and plays could be performed in comfort – and profitably. Many other piers would soon follow the example set by Hastings.

The first iron pile of Hastings Pier was screwed into the seabed at 3am on Saturday 18 December 1869. Completion date for the contract was set as 15 months later, 19 March 1871, but it was delayed for over 16 months by many problems, and the construction difficulties sparked a crisis of confidence in the spring of 1870. The company survived, but by July 1870 it had still not raised all the capital, selling only £14,480-worth of the £10 shares. The last of the shares was not taken up until February 1872.

The new Hastings Pier was designed to be 910 feet long. Its structure was supported off a grid of cast-iron piles screwed into the seabed which held up more than 200 cast-iron circular columns (additions to the Pier over following decades increased that number to about 350 by the 1920s). Each column, 12 inches in diameter, had a screw blade at its bottom end and was literally screwed into the seabed. This was done by a large capstan mounted on a moveable wooden platform. About ten or a dozen men would push the capstan arms, trudging round and around the deck of the platform a few feet above the seabed.

The majority of the columns were vertical, but there were also raking columns along the edge of the Pier. Wrought-iron primary trusses connected the columns north-south, with wrought-iron deck beams spanning east-west across them. Secondary trusses also ran east-west. Timber joists and decking sat on the deck beams and secondary trusses.

At the shore end, the piles were driven into solid rock. But further out they went into clay, which was covering a submerged ancient forest. "The huge trunks remaining embedded formed a great impediment in carrying on the work," reported the Hastings News on 2 August 1872. One of the piles broke on hitting a large oak tree. The massive two-ton trunk, 24 feet long and three feet wide, was put on display in Alexandra Park for many years. It is now believed that these trees were part of the forest that ran all along this part of the Sussex coast about four thousand years ago.

Most of the ironwork was transported from Glasgow by sea, being landed on the beach at Warrior Square. The small ships would run ashore at high tide, unload at low tide and float off again at the next high water. This created delays, as it could only be done in fair weather, and it was especially dangerous if the weather deteriorated in the 10-12 hours the craft lay on the foreshore.

The first 100 feet of the Pier at its shoreward end started at 130 feet wide, with two separate 'toll house' entrances, on the east and west sides. Both had onion-shaped roofs. The Pier narrowed at the 100 feet point to 45 feet wide, and ran to seaward as such for the next 500 feet, forming the main 'promenade deck'. There was continuous seating along both sides.

The last 300 feet of the Pier expanded to 195 feet to accommodate the ornate pavilion, built in oriental style, with onion domes and tall finials. The pavilion, capable of housing 2,000 people, was the biggest room in the borough. It was 150 feet long, 100 feet wide and 30 feet high. The pavilion (also known as the saloon or concert hall) was then the only building on the Pier, apart from the two toll houses, which were also oriental in style, being tiny, domed octagonal boxes.

At the seaward end, a landing stage of greenheart piles 200 feet long and 8 feet wide was erected off the south and east faces. Although a depth of from 3 to 5 feet of water remained around the landing stage at the lowest point of the spring tides, sand bars off the pierhead limited the safe approach of vessels when the tide had receded beyond half tide.

With a rise and fall of 25 feet on the spring tides and 16 feet on the neaps, there was adequate depth for quite large vessels at all other states of the tide.

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Helical Screw

Alexander Mitchell, a blind Irish engineer, invented the Helical (screw) pile in the 1830s, an invention that proved to be a major improvement on the standard straight pile design and one that enabled piles to be screwed into sandy or muddy sea or river bottoms, rather than hammering a wooden pile into the sand to create the foundation for the structure. Mitchell and his son promptly patented this cast iron screw pile design and by 1840 the first screw pile lighthouse had been built at Maplin Sands in the mouth of the Thames.



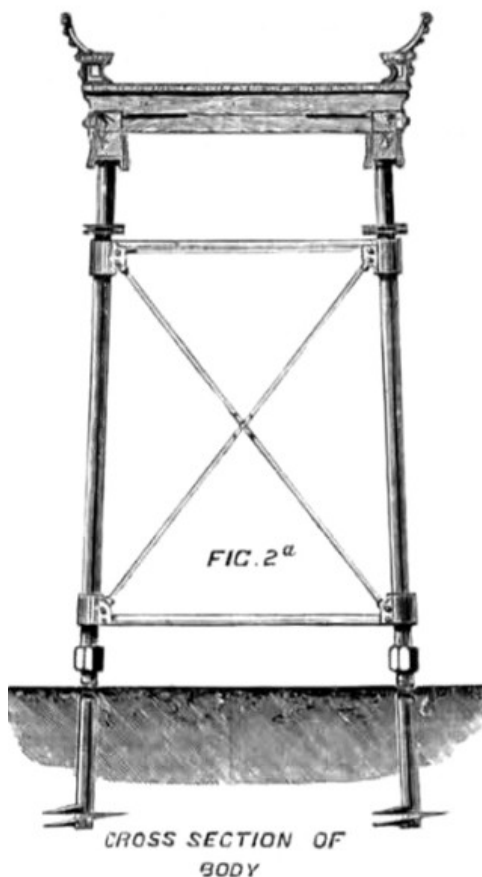
This innovative design proved to be extremely popular and it was not long before the technology was introduced to the United States. Many screw pile lighthouses were constructed in the soft river beds of Carolina's estuaries where lightships had previously been relied upon, but screw pile lighthouses could also be found in the Gulf of Mexico, with one even built in the Great Lakes in Ohio at Maumee Bay.

The typical screw pile lighthouse was a six or eight-sided building, consisting of a central pile screwed into the ground initially, and the six

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or eight perimeter piles screwed into place around it. This increased the bearing power of the piles as well as the anchoring properties.

In 1863 Eugenius Birch, the great Victorian engineer, was invited to design and engineer the Brighton West Pier. The first piles were put in place in March 1864 with dozens of cast iron threaded columns screwed into the seabed and strengthened by a lattice of ties and girders that provide the necessary strength to support the promenade deck. These piles were installed by hand using large torque bars and much man power. The Brighton West Pier stands to this day and will hopefully soon be renovated back to its former glory.



The Screw pile - HPC014.018

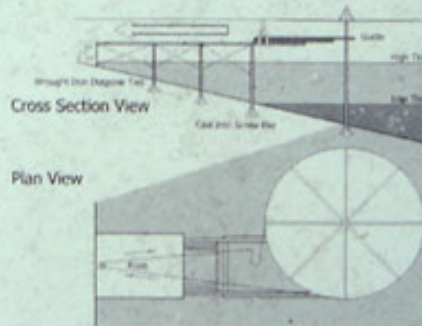
The Helix (screw) pile design is just as effective in the 21st Century as it was back in the 19th Century. It continues to be installed throughout the world.

Screw Pile from Bournemouth pier

The development of screw piles, by Alexander Mitchell allowed the construction of pleasure piers that can be seen around the coastlines of Britain.

The cast iron screw, with blades at the toe was used to penetrate the sand on the beach. This formed a stable base for the pier to be constructed on top. The problem with building piers previous to the screw pile was that the impact driven piles would not penetrate the mud or sand.

This particular screw pile comes from Bournemouth pier, which was designed by Euginius Birch. Bournemouth was his thirteenth pier that was completed in 1880.



Eugenius Birch, another British engineer again adopted the screw piling technique in his construction of many of our seaside piers. In his prolific period of construction, he built over 14 piers, the most famous being the West Pier in Brighton. The first piles were set down in 1864 and were built using dozens of cast iron threaded columns screwed into the seabed. This was strengthened by a lattice of ties and girders that provided the necessary strength to support the promenade deck. In 1880, he built the pier at Bournemouth using the large piles as shown below.





The first pile of Hastings Pier going in, at 3am 18th December 1869, HPC014.012

Pier Construction

The illustration is from an original sketch done at the time by Frank Robinson which was later published in the Hastings Advertiser, 16 July 1917.

A timber staging has been erected around the screw pile which has been set into an excavation in the sand at the desired point. Heaving against the spars, a team of men turns the capstan in a clockwise direction, slowly screwing the pile into the sea bed. The work was hard and slow and could be hazardous in harsh conditions.

Hastings Pier as originally constructed stood on a total of 360 cast iron columns, each one 12 inches in diameter. The Morning Post in 1872 described some of the difficulties that had been encountered: 'Towards the shore the piles have been forced into the solid rock two feet deep; the remainder have been driven to a considerable depth into the clay. It may be mentioned that in the soft clay at the head of the pier the workmen came upon a submarine forest, and were greatly impeded in their task by the huge trunks which they found there embedded, having been obliged to use a double screw 2ft 6in in diameter, to secure a hold. One of the submerged oaks was taken up in excellent condition, although of course, it had become quite black in colour.

It is now to be seen in St Andrew's Gardens, to which it was presented by the contractors'.

The site manager of the construction works was Donald Dawson – possibly the figure on the left in the illustration. This was the fifth pier that he had worked on. He left in June 1872, a few weeks before the pier's completion, to go off to another job in Odessa. At his departure, he was presented with an engraved watch by the appreciative directors of the Pier Company.

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