

**PATENT SLIP AT
DUN LAOGHAIRE HARBOUR**

**ARCHITECTURAL HERITAGE
REPORT**

10th July 2023

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Summary

This report has been produced as a written and photographic record of a patent slip at Dun Laoghaire Harbour. It is proposed that the patent slip be dismantled and put into storage in view of the heavy congestion on the adjacent slipway at busy times of the year and the need to increase the available width of the slipway for safety and operational reasons. It is intended that an alternative site for the patent slip be identified at some location in the harbour and that it be re-erected.

The report commences with a historical analysis of the patent slip to identify its origins and subsequent modifications.

The greater part of the report consists of a comprehensive selection of photographs of the patent slip and its ancillary facilities, including a turntable and two sidings, and the photographs are accompanied by text that describes the various elements of the patent slip.

The report concludes with an analysis of the slip and its component parts with a particular emphasis on the use of the patent slip and the turntable and changes to them it over time.

Background

This report has been prepared for Dun Laoghaire-Rathdown County Council as a record of the patent slip adjacent to the boatyard between the Coal Quay and Traders' Wharf in Dun Laoghaire Harbour.

The site was inspected for the purposes of preparing this report on 30th March 2023 on which occasion the photographs incorporated in the report were taken and the site examined to prepare the descriptions contained therein. A final visit to the site was undertaken on 10th July 2023. The slipway had previously been examined by the present author on 5th October 2006 and 16th September 2022 and some photographs from those inspections are also included.

Historical research was carried out on the background history of the property and the results are set down below.

While this report contains comment on aspects of the condition of the slipway it is not a condition report or a structural report and must not be read as such.

This report has been prepared by Rob Goodbody BA(mod), DipEnvPlanning, DipABRC, MA, MUBC, MIPI.

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Historical background

The original harbour of Dunleary was in use at least as early as the late medieval period, when the monks of St Mary's Abbey had a fishery at the small inlet at this location. It is probable that the inlet had been so used since time immemorial, though nothing now remains of either the medieval harbour or any earlier facility.

In the eighteenth century the village and harbour of Dunleary became important as a port for the importation of coal from England and to facilitate this trade a coal pier was erected in the 1750s-60s to the design of the military engineer, Charles Vallancey, later to become a general. This quay survives as the inner face of the present Coal Quay, though half of its original length is now buried beneath reclaimed land, with the road down to the harbour running along it and with car parks flanking it on both sides.

The modern harbour of Dun Laoghaire owes its existence to the difficulties of entering the port of Dublin in years gone by due to the presence of a substantial sand bar across the mouth of the Liffey. This did not affect early shipping, such as the Viking longboats, as they were of shallow draft, but from the later medieval period, as ships became larger, the problem became greater. Ships leaving the port could time their departure to suit the tides, while those entering could not and any ship arriving in Dublin Bay when the tide was too low for them to cross the bar would have to drop anchor and wait, or else discharge their cargo or passengers into smaller boats that could land at Ringsend, Dunleary or Dalkey. During storms, particularly those from the east or north-east, ships anchored in the bay were often driven ashore with the consequent loss of ships, lives and cargoes.

Many potential solutions were put forward over the years to overcome this problem, including ship canals on either the northern or southern sides of the bay or harbours of refuge at locations such as Dalkey Sound, Sandycove or Dunleary. None of these was implemented and no decisions were made until a double shipwreck in 1807 spurred a Dublin ship broker, Richard Toutcher, to launch a campaign to resolve the issue.

Richard Toutcher believed that a pier at Dunleary could act as a breakwater to provide an area of sheltered anchorage where ships could remain in safety until a storm abated and they could proceed to Dublin. He prepared a design for the pier, with costings and calculations as to how it would be paid for, and campaigned through public meetings, publication of pamphlets and other means. Finally, in 1815, an act of parliament was passed to establish the Dunleary Harbour Commissioners, with the responsibility to select a site for the pier and prepare a design.

The commissioners engaged the engineer John Rennie to select the site and design the pier and his opinion was that the pier needed to be significantly larger than Toutcher's design and that it should be located significantly further to the east. Work commenced on the new pier in 1817, following which Rennie proposed that the new asylum harbour would be significantly more successful if a second pier were to be built and in 1821 work began on the second pier, commencing at the old village of Dunleary.

As the construction of the new harbour progressed, the population of the town began to grow rapidly. In 1816 the population of the village of Dunleary was about 300. Five years later, the first census of population recorded that the town of Dunleary had a population of 1,505 – a five-fold increase in just five years. This is understandable, given that there was an influx of workers to build the harbour and as they would be here for a long period many of them would have brought their families. This number of people needed services such as grocery shops, shoemakers, clothing shops, pubs and building workers to build the houses needed, all of which would have increased the population. What is less obvious is what happened in the next ten years, when the population almost quadrupled to 5,736, making it not only the largest town in County Dublin, but twice the size of the next largest, which was Balbriggan.

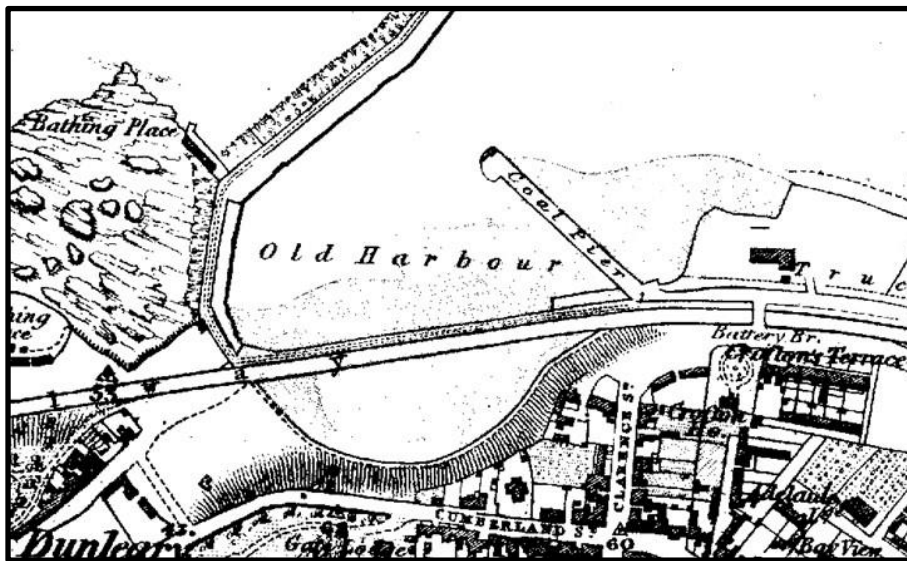


Figure 1: Detail of first-edition Ordnance Survey map of 1843

The Ordnance Survey's first published map of the Dun Laoghaire area, published in 1843, showed the old harbour, with the coal pier, and with the new railway passing the base of the coal pier. The map also showed the heads of the East and West Piers, though the East Pier head was still being completed and work had only just begun on the completion of the West Pier head.

With the growth of the town came an increase in the shipping using the old harbour of Dunleary. In addition to the importation of coal, ships now came in from England carrying bricks and from Wales bringing slates, both of which were to feed the boom in house building. Eventually, the harbourmaster, William Hutchison, recommended that the commissioners provide facilities for these trading vessels, and in the late 1840s work commenced on the construction of Traders' Wharf. This was brought into use by 1851, though it was not completed until 1854.

In conjunction with the building of Traders' Wharf, the commissioners reclaimed land alongside the ramp leading down to the new wharf and this was designated for use as a boatyard. To provide the facility for boats to be taken out of the water to this yard, and launched into the harbour, a slipway, or inclined plane for small craft, was constructed.

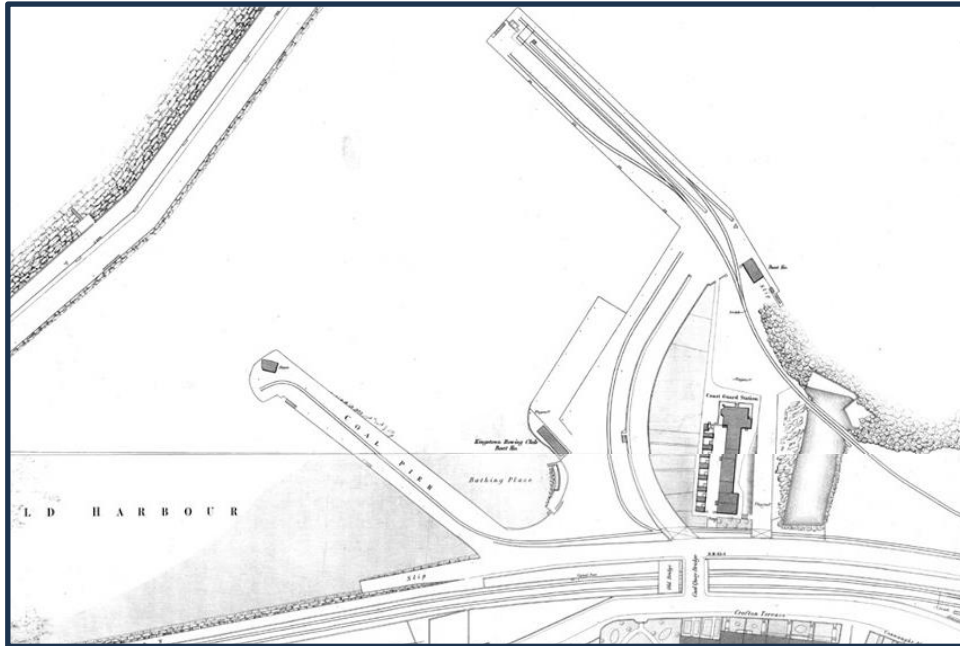


Figure 2: Ordnance Survey map of 1866

The completed Traders' Wharf was depicted on the Ordnance Survey's map of 1866, as seen above. This also showed the slipway and the boatyard, to the west of the ramp leading down to Traders' Wharf. The map also shows that the Kingstown Rowing Club had its clubhouse at the top of the slip, and this must have created an awkward angle through which boats would need to be turned when manoeuvring onto and off the slip. The map shows three types of railway track, including the mainline railway at the south, a railway branch leading from the eastern margin and onto Traders' Wharf, and a branch of the Metals running to the north of Harbour Road and along the Coal Quay and through the boatyard. No tracks were depicted on the slipway, indicating that the patent slip was not yet present.

Patent slips were invented in 1818 by Thomas Morton in Scotland. He had a boatyard but could not afford the substantial capital cost of a graving dock and devised the patent slip as a cheaper alternative. The patent slip improved on conventional slips by providing a cradle onto which the boat would be floated, following which the cradle would be hoisted up the slip, running on rails to ease the movement. Morton's patent expired in 1832 and he was refused its renewal, despite which the term *patent slip* continued to be used.

The date of construction of the Patent Slip at Dun Laoghaire is uncertain. In 1840 the eighth annual report of the Board of Public Works made reference to a patent slip¹:

An arrangement has been made with a respectable individual, possessed of sufficient capital, for the establishment of a patent slip, with suitable workshops and stores, upon a scale adapted to the careening of large class steamers and vessels of considerable tonnage.

¹ 1840 (327) *Public Works. Eighth annual report from the Board of Public Works in Ireland*, p. 4.

It is not clear whether any such facility was provided. The boatyard and slip near Traders' Wharf had not been constructed at that time and there is no sign of a patent slip on the 1843 or 1866 Ordnance Survey maps, as has been seen above. In 1888, the Ordnance Survey produced large-scale maps of part of the Dun Laoghaire area, though, unfortunately, this was the eastern part of the town and did not extend as far west as the harbour.

The Royal Navy produced a chart of Dun Laoghaire in 1882 and, as seen in the extract below, this did not show any rails running down the slip. This information is not definitive, however, as the information on land was derived from the Ordnance Survey and hence may not have been fully up to date.

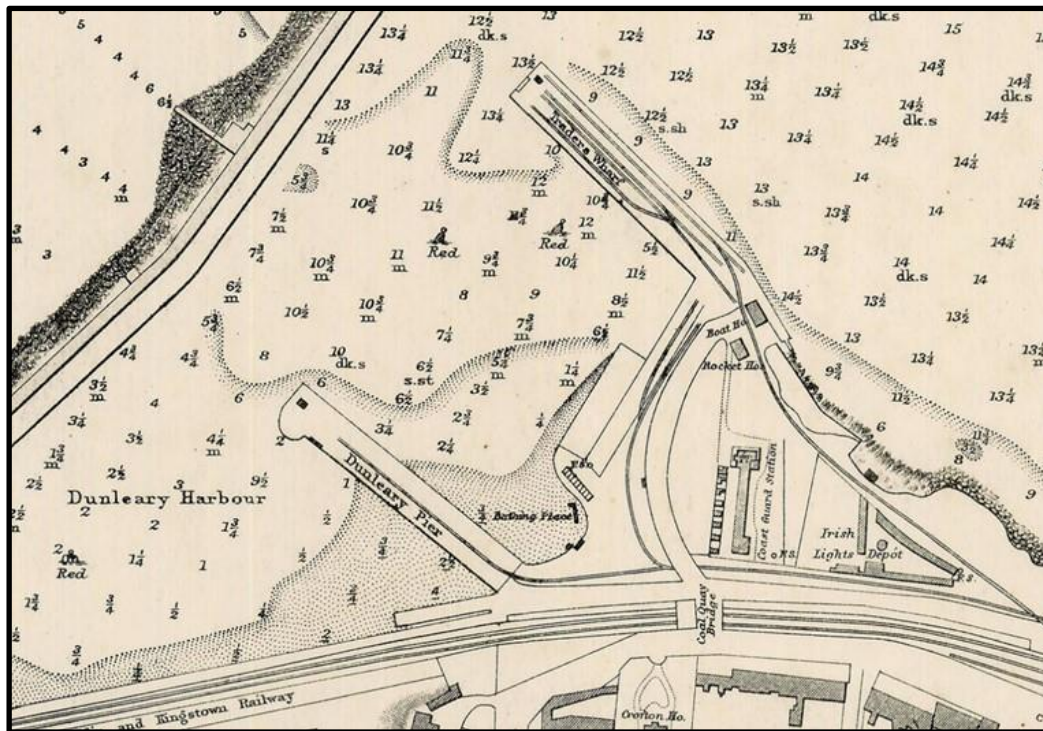


Figure 3: Detail of naval chart, 1882

It is more than likely that the patent slip was installed in 1891 or 1892, as the sixtieth annual report of the Commissioners of Public Works for the year 1891-92 recorded that “Some improvements were made to facilitate landing yachts etc.”² Twenty-one years later, the Commissioners’ eighty-first report for the year ending 31st March 1913 recorded that:³

The Yacht Slip was altered and improved, with a turntable being erected and the lines of rail straightened, to avoid the risks attending the haulage of yachts round a curve. This work had become necessary owing to the increase in the size of yachts requiring to use the slip and storage ground.

² 1892 [C.6759] *Public works, Ireland. Sixtieth annual report of the Commissioners of Public Works in Ireland: with appendices, for the year 1891-92*, p. 22.

³ 1913 [Cd. 6971] *Public works, Ireland. Eighty-first annual report of the Commissioners of Public Works in Ireland: with appendices for the year ending 31st March, 1913*, p. 25.

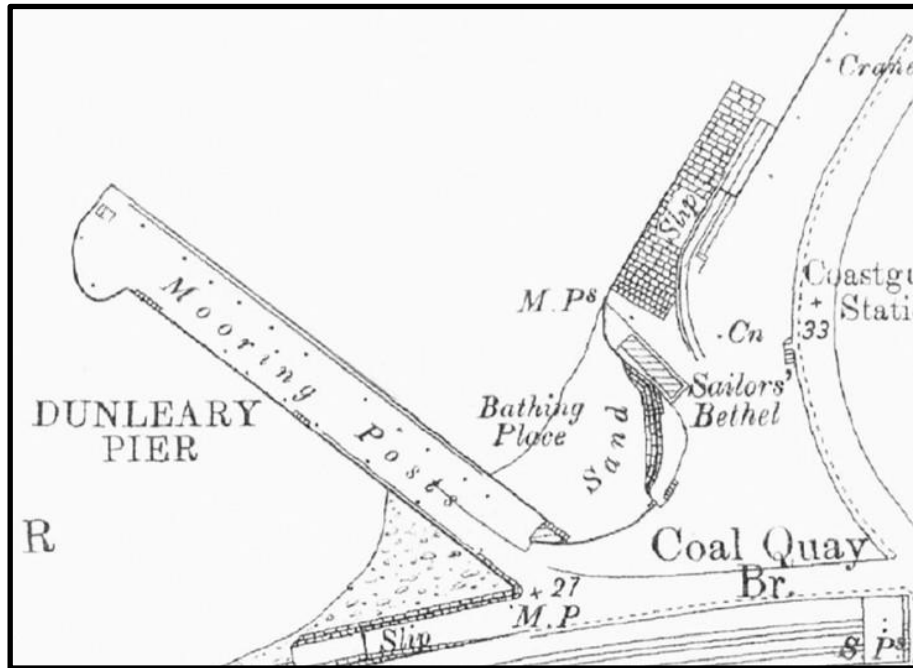


Figure 4: Detail of Ordnance Survey map of 1907

The Ordnance Survey map that was produced in 1907 shows the patent slip with its rails curving at the top of the slope to run into the boatyard, while the bottom of the patent slip does not extend as far into the harbour as the main slipway.

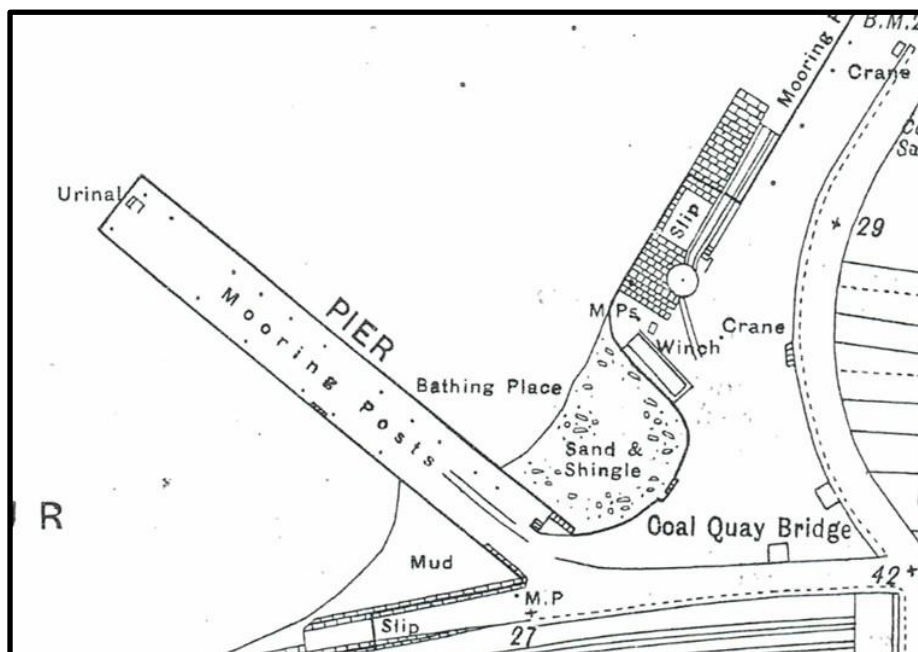


Figure 5: Detail of Ordnance Survey map of 1920

The Ordnance Survey map that was produced in 1920, a detail of which is reproduced above, shows the patent slip clearly, with the rails running down the slip and with the turntable and winch at the top end. The rails are shown to run south-south-eastward from the turntable into the boatyard. As with the 1907 map, the main slipway is seen to extend further into the harbour than the patent slip.

Conservation context

Record of Protected Structures

The patent slip is not a protected structure. Various elements of Dun Laoghaire Harbour are included in the record of protected structures, including Traders' Wharf and the Coal Quay. In my opinion neither the slip nor the patent slip would be considered to be in the curtilage of either of those piers.

Conservation areas

Dun Laoghaire Harbour is a candidate architectural conservation area and to date this has not been adopted as an architectural conservation area.

National Inventory of Architectural Heritage

The National Inventory of Architectural Heritage has not yet published any surveys relating to the Dun Laoghaire Harbour area.

Survey



Plate 1: View of slip from landward side, looking north, with patent slip at right

The patent slip is located in the inner harbour of Dun Laoghaire Harbour, adjacent to and to the west of the boatyard that lies between the Coal Quay and Traders' Wharf. The original slipway is paved with granite flags, with two lines of flags aligned along the length of the slip to provide an even surface for the hauling of wheeled carriages carrying boats up and down the slip. Along the eastern side of the slip is the patent slip, located about 1.4 metres from the edge of the quay.



Plate 2: View up slipway with patent slip at left



Plate 3: Patent slip, seen from the quayside at the boatyard in 2006

The patent slip consists of a pair of masonry ramps, each with a rail fixed to the top surface, while the western ramp also has an iron rack of cogs set into its upper surface. The ramps run northward down the slip at a steeper angle than the slipway, such that they gradually descend toward the surface of the slip, ultimately running below the level of the slip at the northern end.



Plate 4: View down the patent slip to the north

Many of the cut granite blocks and flagstones have small holes drilled into the surface. These holes were drilled at the time that the granite was cut to shape and were provided as a means of fixing lifting apparatus when the stones were being hoisted into position.



Plate 5: View of patent slip and turntable at upper end

At the top of the patent slip is a turntable that permits the rails to turn to carry boats between the boatyard and the patent slip.



Plate 6: View up patent slip from lower end

The original main slipway terminated approximately 15.3 metres from the point where the main slipway and the patent slip are at the same level. The patent slip also terminates at this point, though it descends to the sea bed, while the main slipway terminated at a point somewhat above the sea bed and has since been extended downward, mainly in mass concrete.



Plate 7: Lower end of patent slip, seen from main slipway

As noted above, the patent slip runs at a steeper angle than the main slipway and at its lower end, to the north, it runs below the level of the adjacent slipway, as seen in the photograph above. The photograph also shows that there is a shelf of masonry alongside the quay wall that is at the same level as the main slipway, suggesting that this section was left in place when the patent slip was constructed, and that the construction of the patent slip involved removal of part of the original slipway. The photograph below shows the lowest level of the patent slip, as seen below water level at low tide. Two lines of granite flagstones are seen, aligned with the two ramps on the patent slip, while flanking the two lines and between them the surface is of loose sand. It is not known whether there is stonework below the sand.



Plate 8: Lowest section of patent slip, below water level

Western ramp



Plate 9: View down the western of the two ramps on the patent slip

The western of the two ramps on the patent slip stands approximately 1.6 metres high above the adjacent slipway at its highest point, which is where the rising slope levels out to a horizontal surface as it approaches the turntable. The upper surface of the ramp is of substantial granite blocks, dressed to smooth on the upper surface and on either side, though uneven on some of their lower surfaces and not all of the same height. An iron or steel rail runs up the centre of the top surface and to the east of this a rack of cogs runs up the slope, embedded in the stone, the upper surface of each cog being at or close to the top surface of the stonework. Toward the lower end of the ramp the paved surface between the two ramp runs at the same level as the top surfaces of the ramps.



Plate 10: View up the western of the two ramps on the patent slip



Plate 11: Western side of the lower part of the western ramp

The western side of the western ramp is faced with granite below the level of the upper stones, the stones in the masonry in the lower level varying in size, progressively smaller toward the lower end to fill the space allotted. Toward the upper end of the ramp the wall is of mass Portland cement concrete, with a smooth face, though with traces of the shuttering and lifts. The concrete facing runs along a distance of approximately 8.7 metres from the junction with the turntable. Investigation into the masonry indicates that the ramp was built off the surface of the pre-existing slipway.



Plate 12: Upper end of the western ramp on the western side



Plate 13: Eastern face of western ramp at lower level

As with the western face of the western ramp, the eastern face is of granite toward the lower end of the ramp, before it runs in the same plane as the space between the ramps. The granite stones in part of this face are large, though most are relatively small to fit the space available as the ramp descends. The upper part of this face of the western ramp is of mass concrete, with traces of the shuttering and lifts. The concrete in the upper section rises to the top surface of the ramp and across part of the top surface, more than half way toward the location of the rack of cogs.



Plate 14: Eastern face of western ramp at upper level



Plate 15: Top of western ramp showing iron rings

Two iron rings are set into the upper surface of the granite of the western ramp. One is located just below the break in slope, to the west of the rail, while the other is fixed on the last granite block, very close to where the ramp meets the turntable. In each case an iron eye is set into the granite, with a ring running through the eye. There are no similar rings on the eastern ramp, though it is noted that there is a similar ring on the edge of the quay near the patent slip.



Plate 16: Iron ring at northern end of western ramp

Eastern ramp



Plate 17: Lower part of eastern ramp

The eastern ramp maintains the same height and slope as the western ramp as it runs down toward the water. As with the western ramp, the top surface of this ramp is formed with large granite blocks, dressed to smooth on the upper face and the two side faces, while the lower surface, generally flat, varies in depth and to some extent in its regularity. This ramp has a rail of iron or steel but no rack.



Plate 18: Middle part of eastern ramp



Plate 19: Western face of lower part of eastern ramp

Below the top layer of substantial granite stones the lower part of the eastern ramp is faced with smaller granite stones, while the majority of its length is faced with mass concrete, with traces of the shuttering and lifts.



Plate 20: Western face of central section of eastern ramp



Plate 21: Lower part of eastern face of eastern ramp

At the lowest level of the eastern side of the eastern ramp the facing is mainly of smaller granite stones. In the middle and upper sections of the eastern side the ramp is faced with a mixture of granite stones and mass concrete. The concrete extends to the top surface in some places, including the angle between the top surface and the vertical eastern side. This is seen in places on both photographs, above and below.



Plate 22: Upper part of eastern face of eastern ramp

Upper section of ramps



Plate 23: View to top of ramps

At a distance of 3.5 metres from the turntable the slope of the two ramps terminates and there is a break in slope where the top surface of the two ramps becomes horizontal. The two rails and the rack also turn to run horizontally along this section.



Plate 24: Upper part of ramps

Area between ramps



Plate 25: View between the ramps toward the top

The area between the two ramps is paved, the paving being similar to that on the adjacent slipway. It is probable that the paving is a continuation of that on the slipway and exploratory opening up at the base of the western ramp suggests that the ramps were laid down on the surface of the slipway except at the lower end. As the slope of the rails on the ramps is greater than that of the slipway a point is beyond which the two ramps and the paving between and on either side descends beneath the level of the slipway, as has been noted above and as is seen in the photograph below.



Plate 26: Area between the ramps at lower end



Plate 27: Upper end of area between the ramps

At the upper level of the area between the ramps there is an area of spoil that has been deposited in recent times. From the earlier inspection in 2006 it is clear that the paving continues upward beneath this spoil, though at that earlier date the topmost part of the slope was concealed beneath a growth of vegetation on deposited material.



Plate 28: Iron loop set into stone between the ramps

In two locations between the ramps there are iron loops set into the paving, both slightly off the vertical and both located off the centre of the paving.



Plate 29: Steps at top of area between the ramps

At the upper end of the area between the ramps a flight of six steps leads up to the level of the platform on the turntable. The steps are of mass concrete. At the top of the steps is a short landing of mass concrete at the end of which is a metal roller, the axles of which rest on the lower halves of bearings, the upper halves of which are missing, probably to remove the liners for scrap.



Plate 30: Roller at top of steps

Area between ramps and wharf



Plate 31: Area between the eastern ramps and the quay wall

The patent slip is located about 1.5 metres from the quay wall at the northern end, reducing to about 1.4 metres at the southern, or upper end. The intervening space between the eastern ramp and the quay wall is paved in a similar way to that on the main slipway and on the area between the two ramps, with roughly rectangular granite flags. Toward the upper end the surface has a covering of sand and the nature of the surface beneath is uncertain

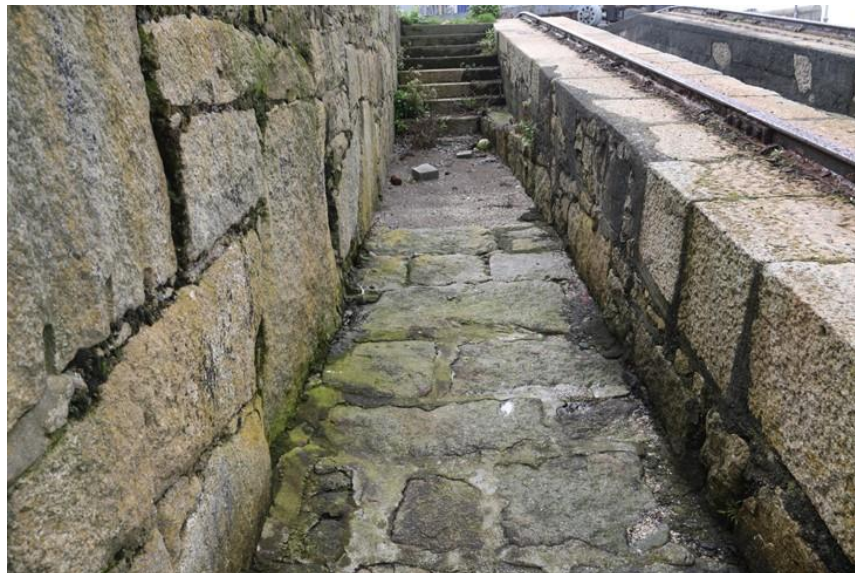


Plate 32: Upper part of the area between the patent slip and the quay



Plate 33: Steps to the east of the top of the eastern ramp

At the top of the slope of the area between the quay and the eastern ramp is a flight of nine steps, the lowest of which is almost buried. The topmost step lies just below the level of the tops of the ramps. The uppermost four steps are of mass concrete, while the lower five steps are of granite, though not across the full width, the section closest to the eastern ramp being of mass concrete. At the base of the eastern ramp a shelf of stonework projects slightly and at an increasing distance from the side of the ramp, meeting the two lowest steps at the end of the granite section. This projecting shelf commences approximately 2.6 metres from the steps. The granite parts of each of the three steps above this shelf are progressively shorter and the width of the concrete part of the steps are correspondingly wider.



Plate 34: Steps adjacent to eastern ramp

Turntable



Plate 35: View of turntable from the south

The turntable consists of a cylindrical wall of mass concrete and a circular timber platform. The upper surface of the turntable is horizontal, though the height of the cylinder varies due to the slope of the slipway, the maximum height being approximately 1.4 metres. The overall diameter of the concrete cylinder is 6.7 metres. The greater part of the cylinder is formed with a smooth, fine-grained mass concrete, with the shuttering faintly visible. The top surface is of somewhat coarser concrete and is of a separate pouring, with a plainly visible break between the two sections. This upper part has rounded arrises on the inner and outer margins.



Plate 36: View of turntable from the west



Plate 37: Turntable platform, seen from the south-east

The turntable platform is faced with timber boards set in a ring of iron or steel and not extending to meet the concrete external walls. The inner diameter of the cylinder within the concrete enclosing wall is approximately 5.7 metres. Rail track of the same type as that on the ramps runs across the width of the platform, set symmetrically.



Plate 38: Turntable platform, seen from the south



Plate 39: Boarded surface of turntable

There is a significant amount of damage through rot in the timbers on the surface of the turntable, as seen in the photograph below. It is noted that in the photographs taken on the visit to the site in 2006 the boards looked relatively clean and fresh (see Plate 35 above and Plate 65 below). On this evidence it seems likely that the lifespan of the boarding in the damp conditions is less than twenty years.



Plate 40: Rot in boards on the turntable platform



Plate 41: Hub cover in the centre of the platform

In the centre of the platform is a metal plate bearing the maker's name "COWANS SHELDON & C^O. L^D", "CARLISLE", and the numbers "2862" and "1912". The latter number is clearly the date, as this accords with the date of installation of the turntable as given in the annual report of the Board of Public Works. The other number may be a catalogue reference. At six points around the circumference of the turntable there are plates set into the edge of the turntable, each originally having a rectangular bar that pivots at the end furthest from the edge, though in some cases these are missing. These fold down into a receiving plate on the steel surround to lock the turntable in place when necessary.



Plate 42: Lock at perimeter of the turntable



Plate 43: Seatings of bearings at western side of turntable

Three pairs of rails meet the turntable, representing directions in which a boat could be moved. Diagonally opposite each of these there is a pair of seatings for bearings fixed to the upper surface of the concrete surround of the turntable. In each case only the lower seating is present, while the upper seatings, the roller and the bearings themselves are missing. Directly beneath the bearings on the western side of the turntable an iron ring is set into the concrete perimeter, with an iron shackle fixed into the ring.



Plate 44: Shackle below bearing on western side of turntable



Plate 45: Door and pyramid of concrete on south-western side of turntable

In the side of the concrete surround of the turntable, on the south-western side, is a small wooden doorway. It is presumed that this gives access to the mechanism for turning the turntable. Adjacent to it is a truncated pyramid of mass concrete with chamfered corners on the outer margin. This feature rises to the same height as the concrete surround of the turntable, and it has an iron ring cast into its upper surface. The feature is located adjacent to the pair of seatings of bearings that lie diametrically opposite the slope of the patent slip. The concrete pyramid is of a different consistency than the adjacent turntable and may be a later addition.



Plate 46: Bearings and ring on south-western side of turntable.

Rails and rack



Plate 47: Detail of rail on top of ramp

The total length of the original rails was approximately 40.1 metres up the slopes, with a further 4 metres or so on the level section that approaches the turntable.

The rails on each of the ramps are flat-footed, i.e., they have a head on which the wheels run, a spread-out foot that is broader and thinner than the head, with the two connected by a vertical web. The rails are fixed to the granite base by spikes, which are steel rods, bent to a right angle and driven into holes in the granite surface.



Plate 48: Detail of fixing of rail



Plate 49: Fishplate joining rails

Where two lengths of rail are joined the rail ends are butted together and joined by metal fishplates set into the web on either side and secured by bolts and nuts run through holes in the rails and fishplates. At each join there are two bolts in each rail.



Plate 50: Fishplate joining rails



Plate 51: Bend in rail at break in slope

Where the break in slope occurs at the top of each ramp a short length of rail is bent to cross the angle and is joined to straight lengths of rail near to the angle.

As noted above, a cog rack runs alongside the rail on the western ramp, and this is seen in the photographs above and below. This consists of a groove cut into the stone, in which iron or steel cogs are set at regular intervals. These would have facilitated the use of a cogwheel as part of the lifting or moving of a boat or to act as a brake to ensure that no sudden movement or running away of the carriage occurs if the cable hauling the cradle should break or the winch should fail.



Plate 52: Rack alongside track

In the photograph above the brown colour on either side of the rack is rust staining on the granite; there is no metal on the surface in the area adjacent to the rack.



Plate 53: View down the lower part of the patent slip

Toward the bottom of the patent slip the rails stop, while the rack continues onward to the bottom. This is not part of the original design, as there were rails along the full length of the patent slip originally, though the rails have either become detached from the base through failure of the fixings or they have been deliberately removed. The holes for the fixings of the rail are visible in the photograph below. The rails are missing from approximately 17.7 metres of the patent slip at the northern or downhill end.



Plate 54: Detail of rack and fixings for rail on lower part of patent slip



Plate 55: View toward turntable along longer rails in boatyard

Two lines of rail track run away from the turntable into the boatyard. The longer of the two runs to the south-south-east for a distance of 18.5 metres. The cog rack runs only for the first 16.4 metres from the turntable. The part of the rail siding that is nearest to the turntable is set in mass concrete, though there is granite across part of the width near the southern end of the rail, particularly on the eastern side.



Plate 56: View of end of longer rails in boatyard



Plate 57: Southern end of rail siding at boatyard

The western rail is slightly shorter than the eastern rail at the southern end of this siding and beyond the ends of each rail is a rectangular metal plate set into the surface of the ground and measuring 0.95 by 0.41 metres. From this point granite paving continues, with flagstones laid in courses that increase in length, the paved area extending to 7.8 metres broad where it terminates some 7.2 metres from the end of the rails.



Plate 58: Paved area beyond rail siding in boatyard



Plate 59: Eastern siding, adjacent to turntable

A second siding runs eastward from the turntable over a shorter distance than the southerly siding. The rails run for a distance of 4.5 metres, while the rack terminates 3.85 metres from the turntable. As with the southerly siding there are rectangular metal plates set into the ground immediately beyond the ends of the rails. The paving along the entire length and width of the siding is of mass concrete.



Plate 60: View toward turntable along eastern siding



Plate 61: Paving at end of eastern siding

Beyond the ends of the rails of the eastern siding there is an area of granite flagstones, laid in regular courses, and extending 4.1 metres beyond the ends of the rails. This paving increases in width to a maximum of 6.7 metres at the eastern end, within the boatyard. The surface surrounding this paving is of mass concrete.



Plate 62: Paving at end of eastern siding



Plate 63: Plate and iron ring at end of rails on southern siding

A short distance beyond the ends of the rails on the southern siding there are iron rings set flush into the granite flagstones. These are similar in type to those near the top of the western ramp, except that they are recessed into the stone. Two rings are located at the southern siding, one close to the end of each rail, while there is one on the paving beyond the eastern siding, near to the eastern end of the paved area. The location of that ring may be seen in Plate 62, just above the nearest granite flag near bottom centre of the photograph.

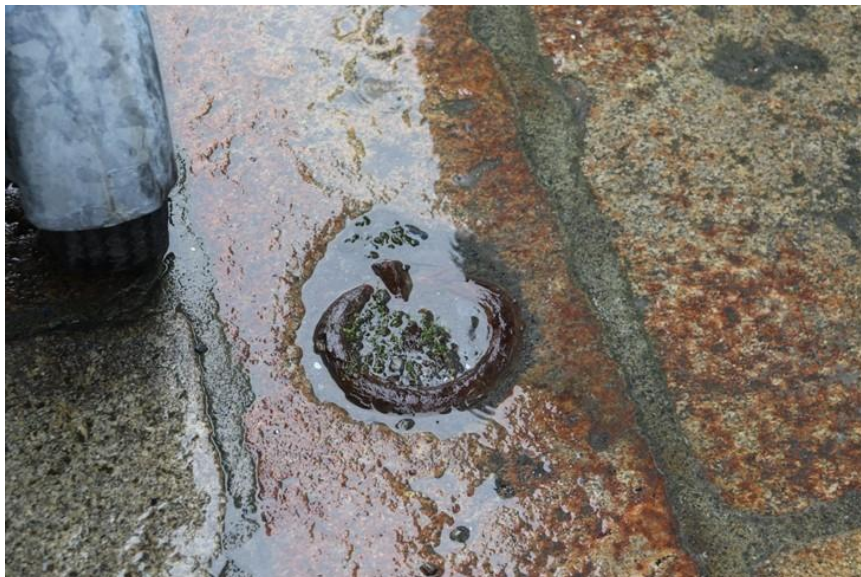


Plate 64: Iron ring at eastern siding

Carriages



Plate 65: Larger carriage on turntable

There are two carriages on the rails at the top of the patent slip. The larger of the two is located on the turntable, while the smaller is on the rails of the southerly siding. The larger carriage consists of two long substantial timber beams 6.75 metres long running lengthways and two beams running below the long beams across the width to form a frame. This carriage has metal plates set on either side of the long beams and the structure is held together by a system of metal straps. This carriage is painted, including the axles and the wheels.



Plate 66: Larger carriage on turntable



Plate 67: End of larger carriage

The wheels are broad, with the inner part having a slightly wider diameter than the outer part. The smaller diameter element is the part of the wheel that runs on the rail, while the adjacent area with the wider diameter is also of greater width and would act as the wheel when the carriage is off the rails within the boatyard, while also acting as the flange to keep the wheel on the rails. The wheels are set on a cylindrical axle solid metal and held at the ends of split pins. The outer ends of the wheels are perforated. The axles are heavily pitted due to corrosion.

At each end of the carriage a towing eye is set into a metal plate bolted to a cross beam.



Plate 68: View from above of end of carriage and axle



Plate 69: Smaller carriage

The smaller carriage is similar in construction to the larger carriage, and while it is the same width it is shorter, being only 4.25 metres long. This carriage is not painted, and the timber appears to be older and in poorer condition than that on the larger carriage. There are no metal plates fixed to the sides of the long timber beams. As with the larger carriage, there are towing eyes at either end, set into metal plates that are fixed to the cross beams.



Plate 70: Smaller carriage



Plate 71: Side view of smaller carriage

The axle of the smaller carriage is more slender than that of the larger carriage and it exhibits the same level of corrosion pitting as on the other carriage.



Plate 72: Detail of smaller carriage showing pitting of axle



Plate 73: Detail of wheel on smaller carriage

The photograph above shows a wheel resting on a rail, with the broader part of the wheel acting as a flange. The photograph below shows the rear of one of the wheels, where it is hollowed to allow for space for the fixing onto the axle.



Plate 74: Rear of wheel on larger carriage

Assessment

Historical and map evidence

As the historical background section above has shown, the boatyard, Traders' Wharf and the ramp that carries the road down to Traders' Wharf were all constructed in the late 1840s and early 1850s. As part of these works a slipway was constructed to enable the movement of boats into and out of the water, down from and up to the boatyard. The earliest Ordnance Survey map, dating from 1843, shows the area prior to this construction, while the larger scale map of 1866 shows the boatyard, Trader's Wharf, the roadway and the slip. These are also shown on the Admiralty chart of 1882 and there is no indication on those maps that there was a patent slip adjacent to or part of the main slipway. The slipway shown on those maps was approximately 16 metres wide and projected from the side of the quay such that access onto and off the slipway necessitated a turn – this being reflected in the two lines of flagstones that provided a smooth surface for waggon wheels and which turn toward the boatyard at the top of the slipway.

From the evidence of the annual reports of the Commissioners of Public Works it appears that the original patent slip was built in the early 1890s and that it had no turntable at that time. The rails on the patent slip turned through a broad curve at the top, with a radius of about thirty metres, turning the alignment of the rails from south-south-west through to south-south-east.

Then, as quoted above, the commissioners' annual report in 1913 recorded that:

The Yacht Slip was altered and improved, with a turntable being erected and the lines of rail straightened, to avoid the risks attending the haulage of yachts round a curve. This work had become necessary owing to the increase in the size of yachts requiring to use the slip and storage ground.

It is clear from this that the yacht slip referred to was the patent slip. The Ordnance Survey map of 1920 reproduced in Figure 5 above shows the turntable, with a siding leading to the south-south-east in place of the curved rails shown in the previous map. The eastern siding is not depicted on that map, nor on the final iteration of the Ordnance Survey's six-inch maps, published in 1936, and it is not clear whether this is an omission or whether this shorter siding was added later to increase the capacity and facilitate movement and storage of boats in the boatyard.

The 1907 map, in showing the patent slip as it was originally, prior to the construction of the turntable, indicates that the patent slip did not just involve putting rails down on the existing surface of the slipway. The way in which the slip is shown suggests that the patent slip was shorter than the original slipway. While this is likely to have been a result of the mapmakers only showing the bits that were above water level rather than showing the true length, it is strong evidence that the slope of the patent slip was greater than that of the original slipway as a result of reconstruction.

Analysis of built fabric

What the Ordnance Survey maps do not show is whether the original patent slip was on raised ramps, as it is today. Many patent slips are not raised up in this way and raising the level, with a lower space between the rails, only becomes necessary if there is a change in slope, as there is in this instance. To ensure a clear pathway for the cable that is pulling the carriage up the slope the cable must either be passed over a roller at the point where the rising slope change to a horizontal path or else there must be a valley between the rails so that the cable can run in a straight line despite the change in slope of the rails.

The evidence for the rails being raised on ramps in the initial design prior to the addition of the turntable comes from examination of the space between the eastern ramp and the quay wall at the top of the slope. Plate 33 and Plate 34 above show the small shelf that projects from the bottom of the ramp and the granite steps adjacent. This shelf is a remnant of the original alignment of the patent slip, where it began to turn through the curve into the boatyard. The concrete sections of the lower steps follow the line of that curve. This shows that the rail was on a raised ramp and that the five granite steps indicate the original height of that ramp. The concrete at the sides of the steps and the four concrete steps above show the additional height that was added when the turntable was introduced in 1912.

Arising from this observation and the quantity of mass concrete in the two ramps it is clear that the works carried out as part of the introduction of the turntable were for the most part executed in mass concrete, while the original patent slip appears to have been entirely of granite.

The addition of the turntable involved the construction of the cylindrical structure for the turntable itself and the dismantling of the original ramps of the patent slip and their reconstruction at the higher level needed to connect with the turntable. Many of the cut granite stones of the original ramps would have been reused, including the large blocks on the top surfaces, while the additional masonry needed to raise the height was added with mass concrete. Not all of the present top layers of blocks can be original, as the upper part of the original ramps was curved, while the present ramps are straight. At the very least, the original blocks would have been recut.

As noted in the survey, the two sidings have been constructed mainly of concrete, while beyond them are aprons formed with granite flagstones and it is assumed that the two granite aprons are retained from the earlier period.

It is noted that the 1920 Ordnance Survey map shows a winch at the top of the original slipway. This is in a direct line with the space between the two ramps and it is probable that this winch was the means of hauling the carriages up the slope, using a steel cable run over rollers at either side of the turntable and from there down the slope to the water.

Turntable

As has been seen above, the turntable was constructed in 1912 and noted in the annual report of the Commissioners of Public Works for the year ending 31st March 1913. The date on the hub cover in the centre of the turntable platform identifies the manufacturers as Cowans, Sheldon & Co Ltd of Carlisle.

The company Cowans, Sheldon & Co. was established at the Woodbank Iron Works in Carlisle in 1847 making a wide variety of iron objects. By the 1860s the firm had established a reputation for the construction of cranes, including some substantial examples for lifting railway locomotives and goods loading or unloading at ports and harbours. They also constructed railway turntables, including one at Connolly Station in Dublin, and it was this side of the business that facilitated the company in manufacturing the turntable for the patent slip at Dun Laoghaire.

The company was subsumed into other enterprises in the 1960s and 1980s and ceased manufacturing in 1987.