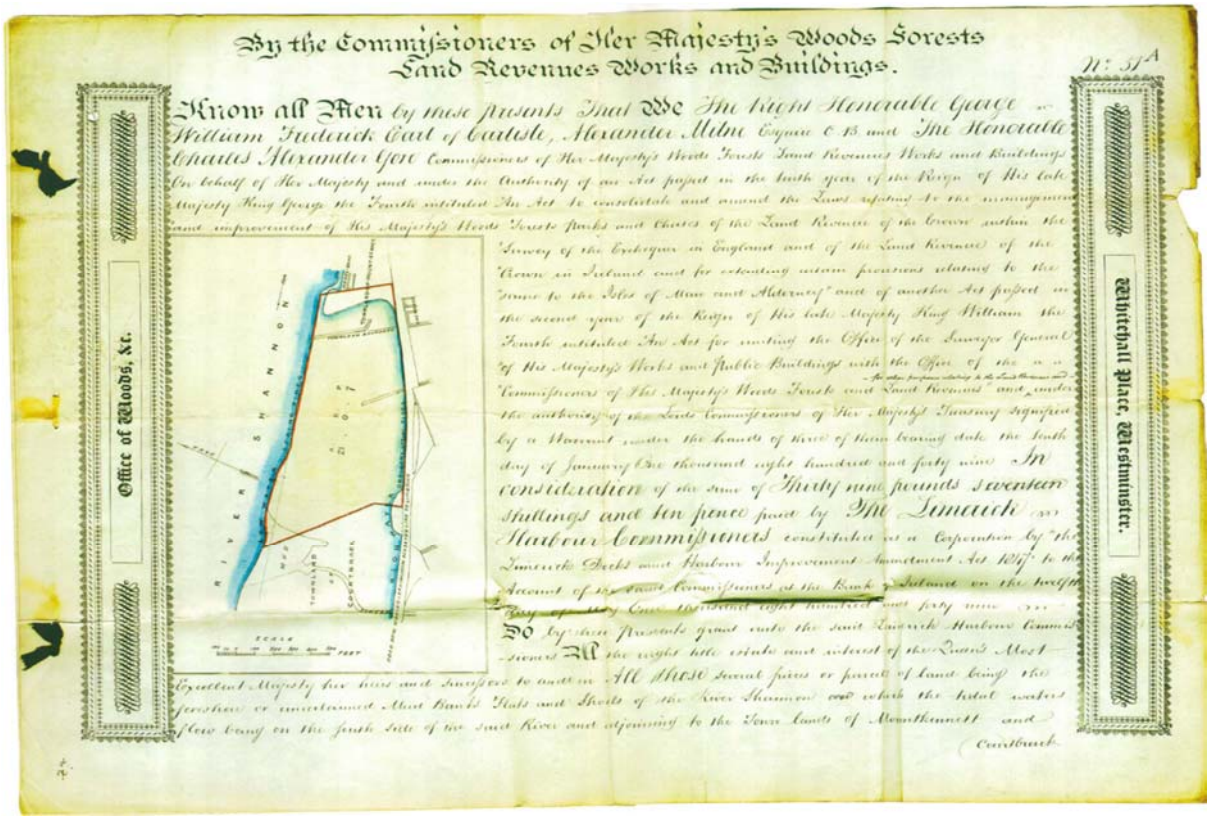
LIMERICK DOCKS

Limerick Docks are a tidal dock located in the heart of the city on the River Shannon. Limerick has been a sea trading centre for over a thousand years, dating back to the times of the Vikings. In early times the ships used to travel up to the site of the Custom House Quay (The Hunt Museum) and berth on the quays, taking the bottom at low tide. Later in the 1820's Wellesly Bridge (Sarsfield Bridge) and the Quays west of the bridge were constructed, however the ships here still took the bottom at low tide. This caused problems when ship sizes and steel constructed ships were leading to damage and delays. In the 1850's it was decided to build a floating dock which would allow ships enter at high tide and once inside the lock gates would close keeping the water deep enough for the ships to stay afloat.

Limerick Harbour Commissioners were constituted under an Act of Parliament in 1847 to complete this Dock and they set about purchasing land from the Queen of England copy of this deed below.

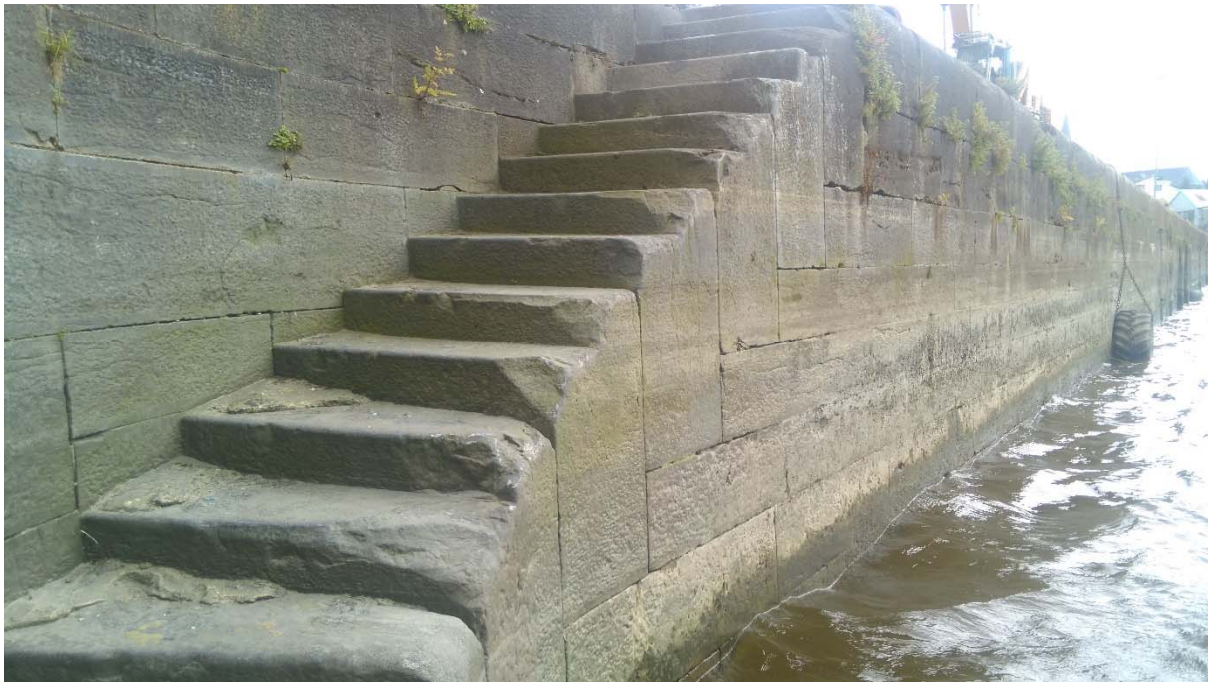

By the Commissioners of Her Majesty's Woods Forests Land Revenues Works and Buildings.

Office of Woods, &c.

Whitehall Place, Westminster.

Know all Men by these Presents That We The Right Honorable George William Frederick Earl of Carlisle, Alexander Milne Esquire C.B. and The Honorable Charles Alexander Gore Commissioners of Her Majesty's Woods Forests Land Revenues Works and Buildings On behalf of Her Majesty and under the Authority of an Act passed in the tenth year of the Reign of His late Majesty King George the Fourth intituled An Act to consolidate and amend the Laws relating to the management and improvement of His Majesty's Woods Forests parks and Chases of the Land Revenues of the Crown within the Survey of the Exchequer in England and of the Land Revenues of the Crown in Ireland and for extending certain provisions relating to the same to the Isles of Man and Alderney" and of another Act passed in the second year of the Reign of His late Majesty King William the Fourth intituled An Act for uniting the Office of the Surveyor General of His Majesty's Works and Public Buildings with the Office of the [illegible] Commissioners of His Majesty's Woods Forests and Land Revenues" and under the authority of the said Commissioners of Her Majesty Treasury signified by a Warrant under the hands of three of them bearing date the tenth day of January One thousand eight hundred and forty nine In consideration of the sum of Thirty nine pounds Seventeen Shillings and ten pence paid by The Limerick Harbour Commissioners constituted as a Corporation by "the Limerick Docks and Harbour Improvement Amendment Act 1847" to the Account of the said Commissioners at the Bank of Ireland on the [illegible] Day of [illegible] One thousand eight hundred and forty nine [illegible] Do by these Presents grant unto the said Limerick Harbour Commissioners All the right title estate and interest of the Queens Most Excellent Majesty her heirs and Successors to and in All those Canal pairs or parcels of land being the foreshore or mainstream Mud Banks Flats and Shoals of the River Shannon and where the tidal waters flow being on the South Side of the said River and adjoining to the Town Lands of Monthamett and Courtbrack

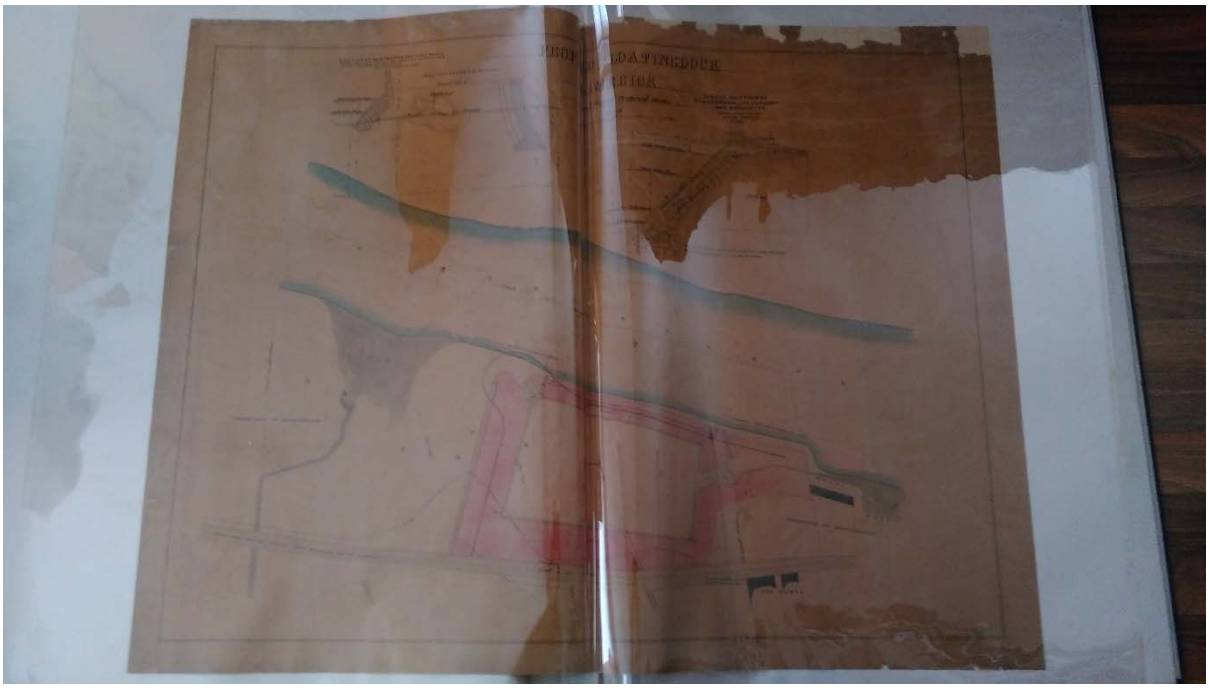
The Harbour Engineer Mr. John Long drew plans of the proposed Dock, which consisted of limestone walls built at a slight slope, filled with rubble. The coping stones are as large as 2m x 2m x 1m and weigh as much as 5 tonnes each. The South walls were built on to the limestone bedrock which sloped down from the city. The North Quay and Lock basin were built on timber piles driven into the mud and then limestone blocks backfilled with rubble. The area of water within the Dock was 7 acres and the Lock gates were located on the East side as shown on the original plan below. There was also a Western Entrance also shown on this plan and this was eventually constructed in the 1950's some one hundred years later.

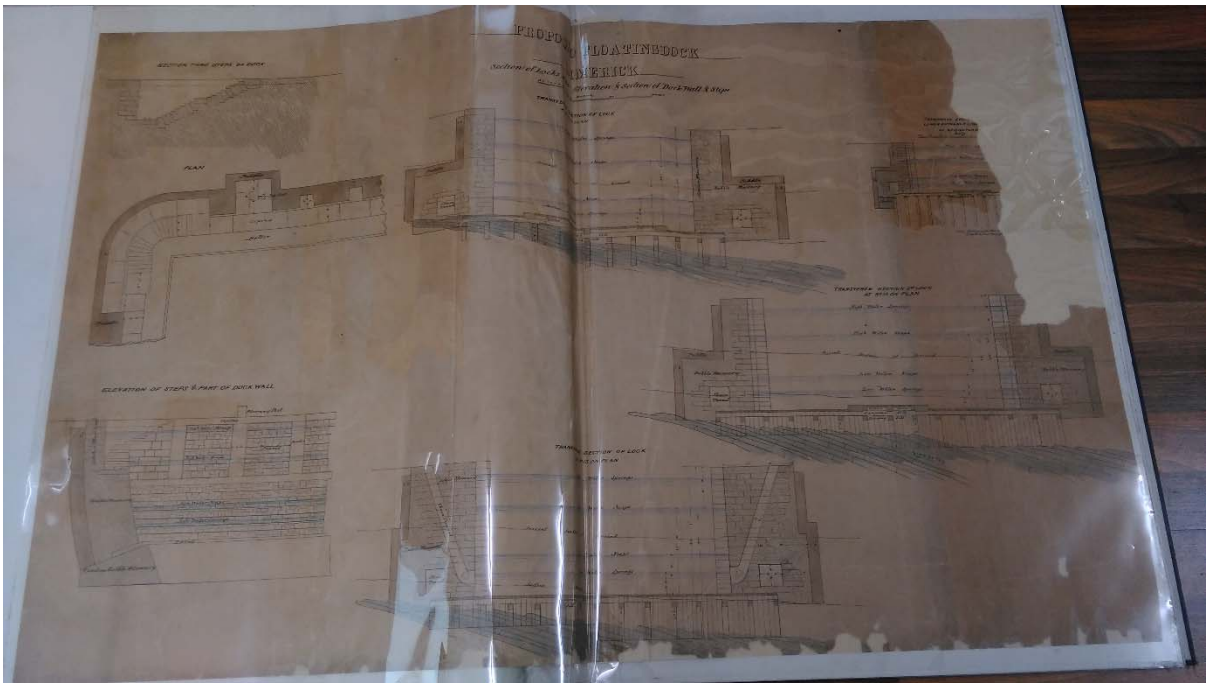


Large limestone blocks with steps cut out placed to provide access from decks of small vessels to the quay.

Large Limestone blocks used to build the Dock walls in the 1850’s still in excellent condition today.

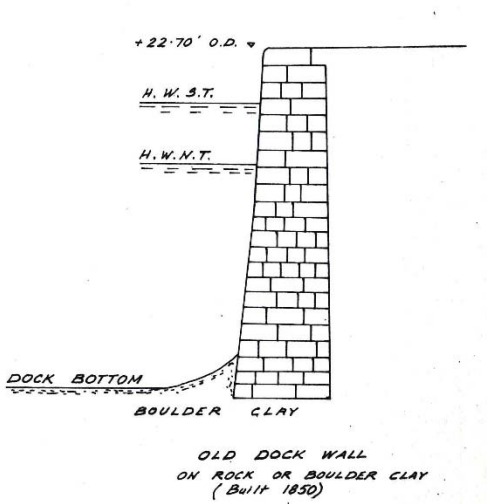
The Commissioners also in their wisdom decided to make the entrance gates 70 feet wide to admit the largest class of Transatlantic Steamers, should it be chosen as the Transatlantic Mail and Packet Station and to this day still admits all modern coaster vessels. This Station was eventually located at Southampton.



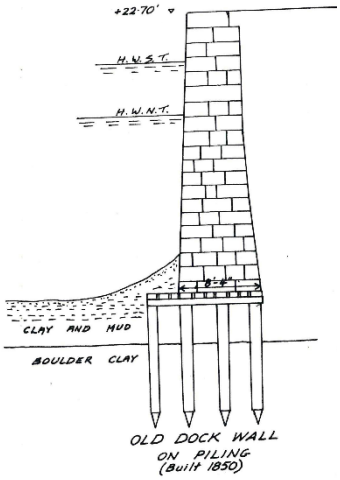


There was 3,000 feet of berthage within the Dock and a depth of 20 feet.

During the construction of the Dock there were 300 labourers and 50 mechanics employed, a huge undertaking. The contractors were Messers Laurenson and the final cost was £54,000, £4,000 over budget.

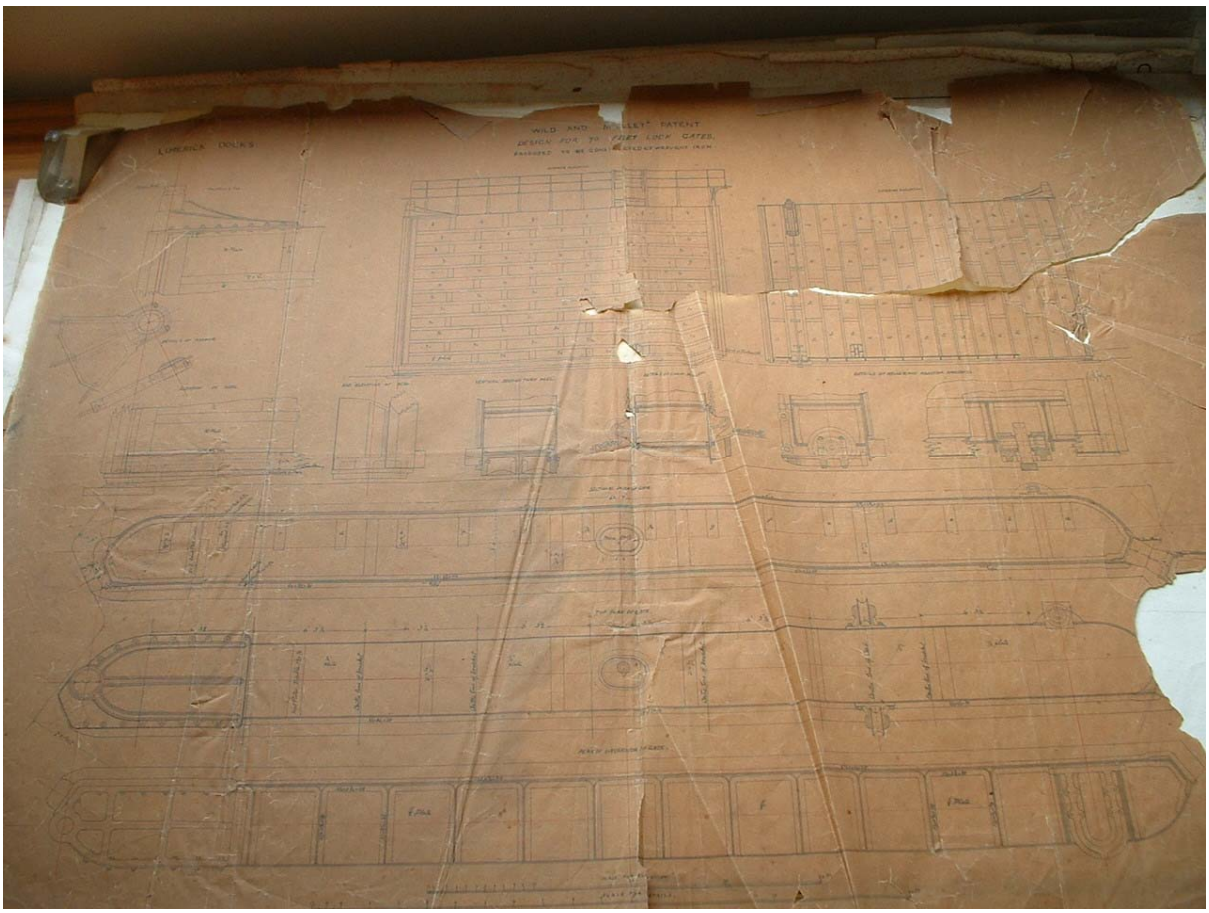


South Quay – Limestone Blocks on clay and rock



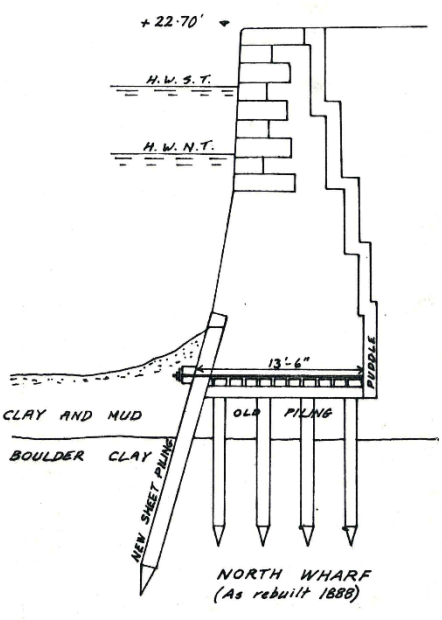
North Quay – Limestone Blocks on Timber Piles

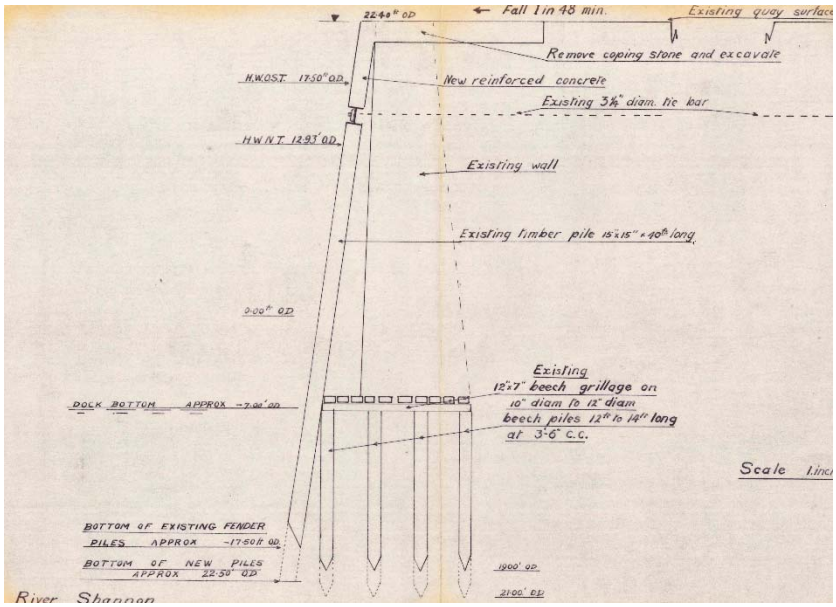
The entrance gates were built according to Wilde and Mallet's new patent, being made on the tubular or cellular principle of boiler plate iron riveted in the same manner as the boilers on steamers. This type of construction can still be seen on the gate or caisson of the Graving Dock.



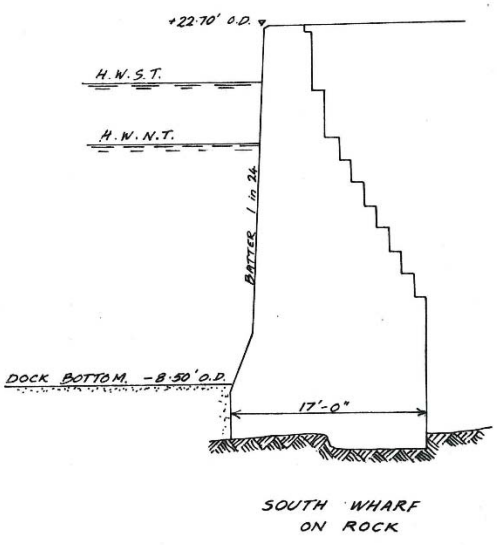
These gates were operated by chains on a pulley and were operated using a manual winch.

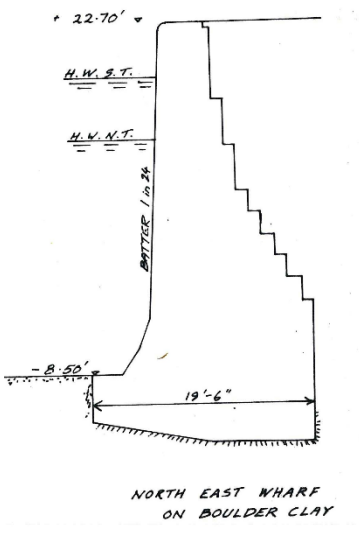
In 1887 the North Wall of the Dock collapsed while there was a considerable quantity of coal stored there. The walls were rebuilt and strengthened using tie rods, and new piling to hold the weight. The limestone blocks were reused and the pier was widened. See below left. Also in the 1960's the North East berth was strengthened with steel piles. See below right.





In the 1930's it became apparent that with ship sizes and numbers increasing substantially, creating a necessity to extend the Dock to the west to create extra berthage. It was also hoped to construct the Western Entrance at this time but this had to be postponed. The method of construction used here was solid concrete walls cast in-situ and backfilled with rubble and capped off with a concrete slab. The contract was awarded to T.J. Moran & company and was designed and supervised by the Harbour Engineer T.F. O'Sullivan.

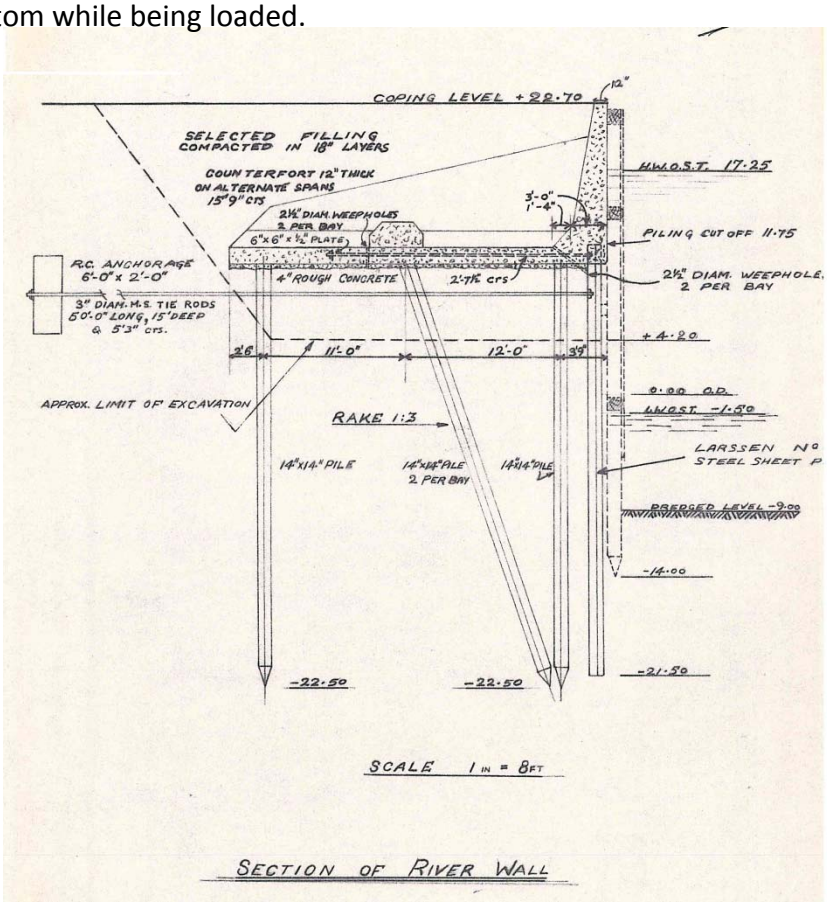




South Quay on Rock

North East Quay on Boulder Clay

In the 1950's the new Western Entrance was constructed and a new set of lock gates installed by Sir William Arroll of Glasgow. These gates and sluices are hydraulic/electric operated. The quay walls constructed in this phase were concrete piles and a sheet pile face with filling and concrete cap. The contractor was Irish Engineering & Harbour Construction Company and all the works were designed and supervised by the Harbour Engineer, T.F. O'Sullivan. This is very strong construction and can carry great weight. An extra berth was also provided here, known as the long wall. This berth is used by ships which are designed to take the bottom while being loaded.



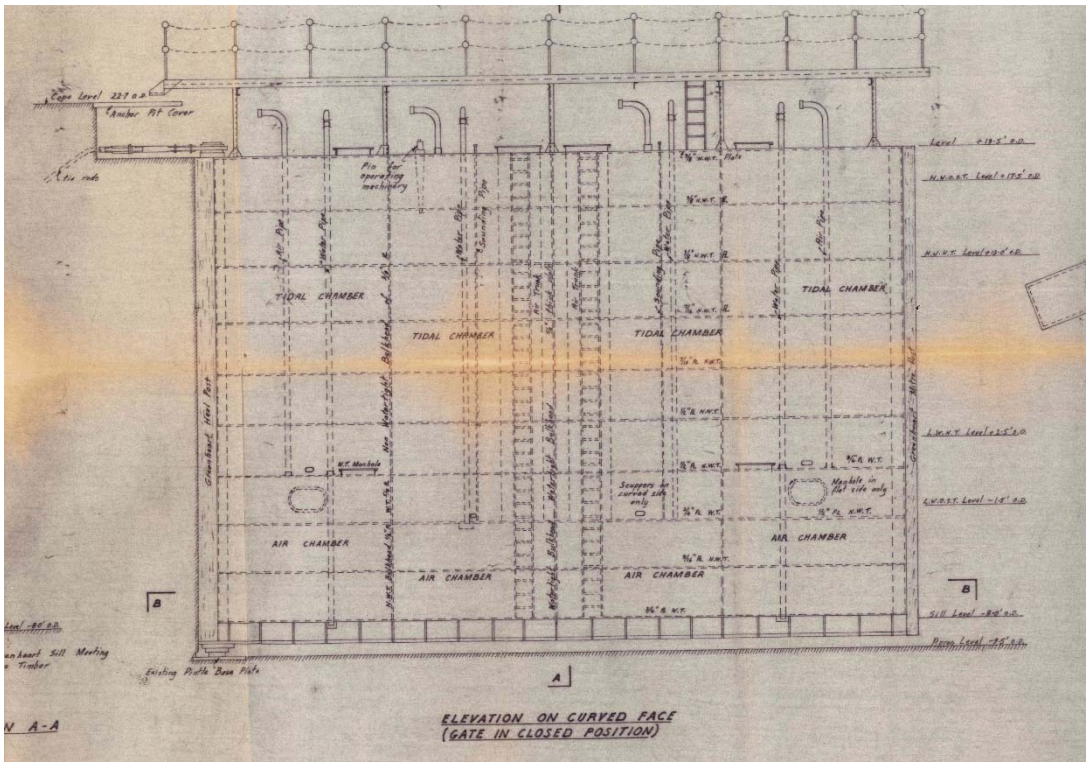
Longwall berth and North Knuckle on the River Side, Concrete piling and sheet piling face, with deck beams and filling on top with a concrete slab deck.

The new Dock Gates are constructed of steel plate and consist of a series of chambers, Air chambers at the bottom and tidal chambers in the middle. This makes the gates buoyant and makes it easier to open and close them.

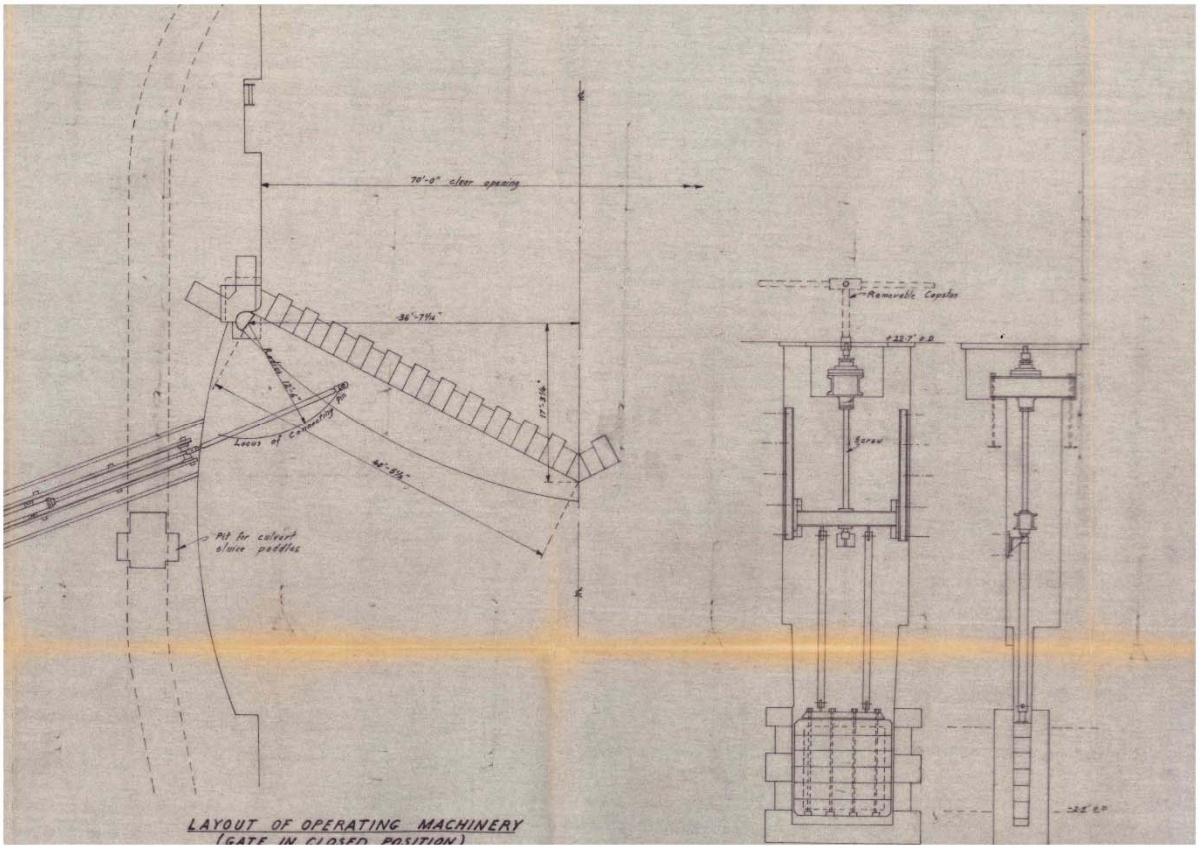
The gates open about 1 hour before High Tide when the water level outside is equal to that inside allowing the water depth to increase and as soon as High Tide has passed they are closed keeping the water inside enabling ships to remain afloat at all times.

At certain times, if the gates are required to open early then sluicing operations are required to let water pass out of the dock. There are two sluices, one on the north side and one on

the north side and these are opened by electric/hydraulic ram. If the two sluices are fully opened then the water level in the dock will drop by 1m in 1 hour.



Sectional elevation of one leaf of the Steel Gate



Plan of one section of the gate in the closed position and a view of the sluice gate.

To give a flavour of the number of ships, sizes and cargo throughput figures please see the table below.

Year	No. of Ships	Max. Size	Cargo Throughput
1825	440	600 tonnes	47,000 tonnes
1845	585	600 tonnes	76,000 tonnes
1870	600	1,000 tonnes	140,000 tonnes
1890	600	1,000 tonnes	270,000 tonnes
1928	650	2,000 tonnes	413,384 tonnes
1941	100	2,000 tonnes	51,000 tonnes[1]
1949	250	2,000 tonnes	227,000 tonnes
1959	300	2,500 tonnes	286,000 tonnes
1962	400	2,500 tonnes	436,000 tonnes
2007	181	5,000 tonnes	609,000 tonnes
2010	124	5,000 tonnes	375,700 tonnes
2016	250	6,000 tonnes	775,000 tonnes[2]

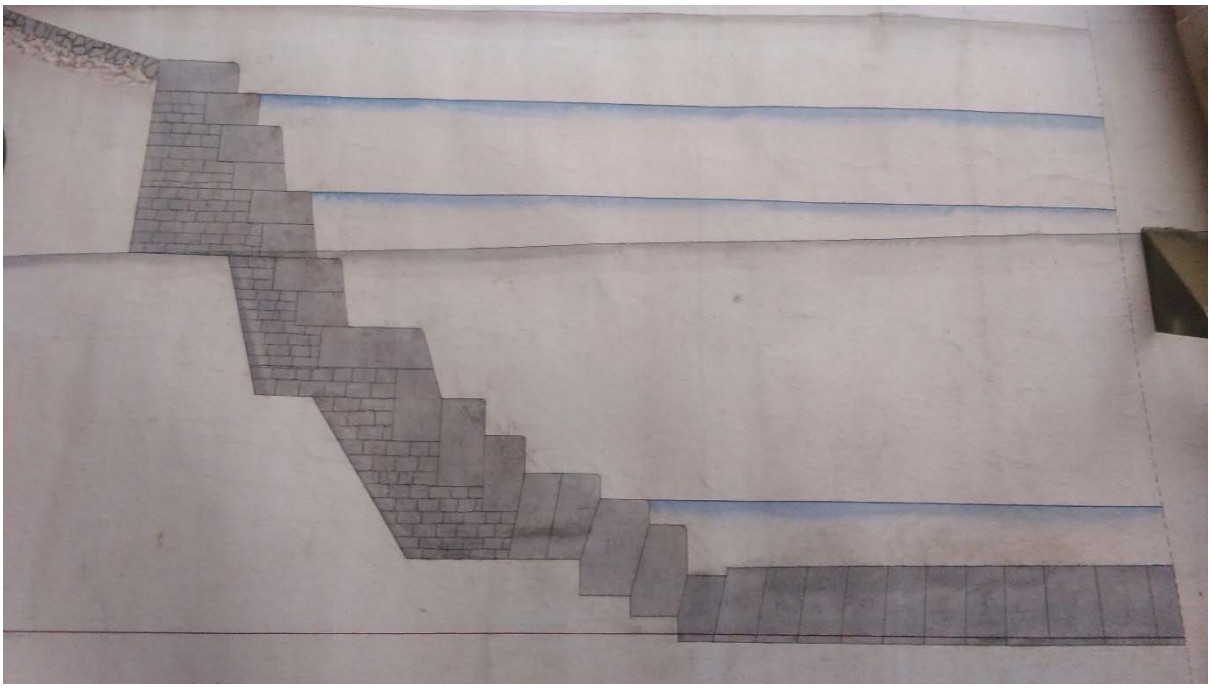
1 World War II

2 Projected Figures

LIMERICK GRAVING DOCK

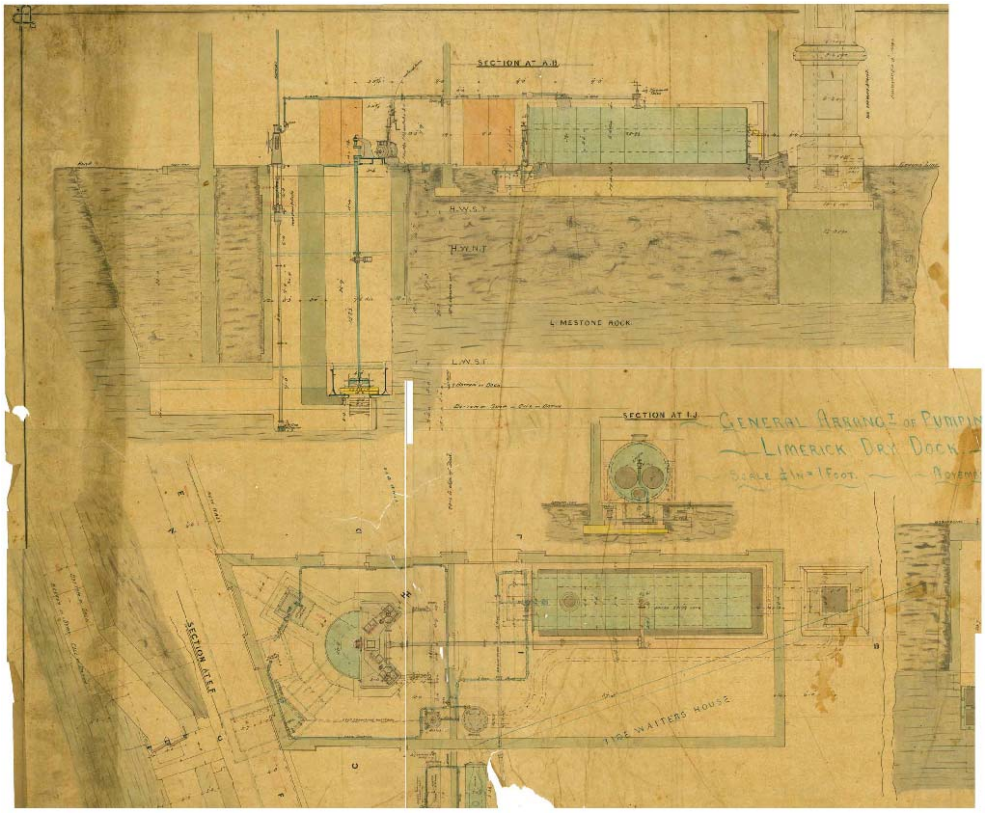
Once the Harbour Commissioners had completed the building of the Limerick Docks they deemed it necessary to construct a Graving Dock. The basis for this was due to the number of timber hulled sailing vessels arriving from America and Canada. These ships suffered during their voyages and required repairs prior to making the return voyage. In 1867 work commenced and progress was slow due to labour unrest but was eventually completed in 1873.

The construction used was large limestone blocks cut and stepped out from the bottom up with the floor being of solid limestone see photo below.



The entrance to the Graving Dock is by a gate closed by a Caisson. The Caisson is pumped dry enabling it to float, then it is towed to one side the vessel enters from the Wet Dock through the gate. Once the vessel is in position, the Caisson is towed back to close off the entrance, water pumped into it to sink it thereby sealing and closing the Graving Dock. The Graving Dock is then pumped out to place the vessel on the supporting blocks. See photos below.

The pumping machinery for emptying the Graving Dock is a large centrifugal pump as per the details on the drawing below.



Once the caisson was sealed, a sluice gate was opened at the rear of the Graving Dock during ebb tide to drain off water from it. This would reduce the depth to about 16 feet at half tide. The remaining water about 1,600,000 gallons would be pumped out with the large pump and had to be completed in 3 hours by the time of low water. Once emptied the sluice would be closed keeping the Graving Dock dry.

The pump is still in place today and originally was powered by a steam engine and boiler heated by solid fuel. The smoke from the boiler was emitted through a 50 foot high brick chimney on top of the cut limestone base, now with the inscriptions of the opening of the Floating Dock and Graving Dock. It was converted to electric power in the 1950's.

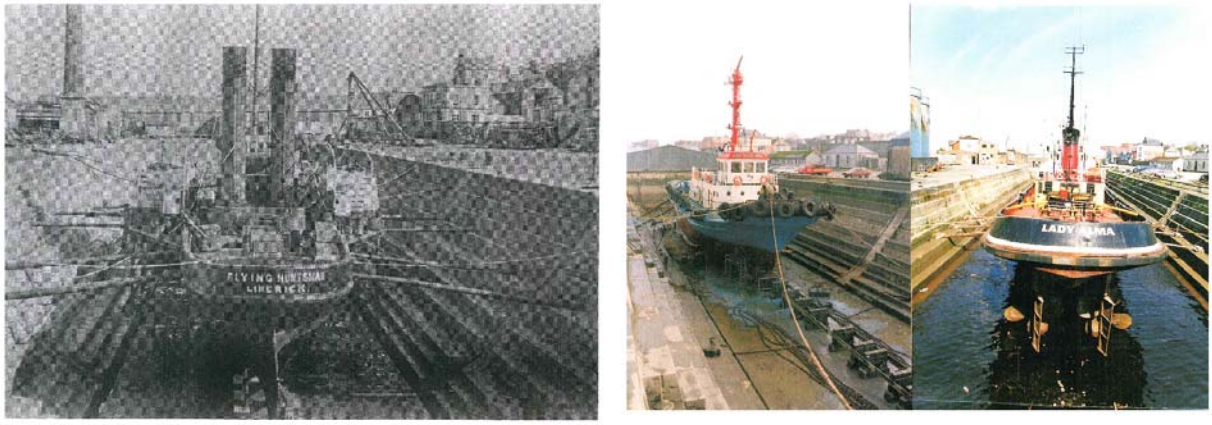


Photo of Paddle Steamer in the early years with chimney in background and tugs in the 1990's.

THE DOCK CLOCK

The Dock Clock located inside in Limerick Docks is one of four 4 faced clocks in Limerick. The structure was built in 1880 and is built of cut limestone.

Freestanding square-plan three-stage clock tower, built in 1880, restored in 1996. Replacement metal weather vane with model ship mounted on a possibly lead pyramidal roof c. 1996. Limestone cyma recta profiled cornice with corbels beneath. Channel rusticated limestone ashlar third stage with a square recessed panel having glazed oculi to corners and a blue metal clock face with gilded roman numerals and hands on all sides. Decorative cast iron cresting delineates the third stage standing on the entablature surmounting second stage, with trefoil motif on all four elevations. The first and second stage are articulated by smooth superimposed squared and carved limestone ashlar corner piers with simple stringcourse delineating ground second stage and entablature over second stage; and a canted plinth course at ground level. Tooled squared random limestone ashlar elevations to first and second stages. Limestone ashlar plat bands to east and west elevations of first stage. Round-arched lancet window to all four elevations of second stage, with smooth raised limestone surrounds, limestone sill, aprons labels and limestone louvres. Bipartite square-headed window openings to north and south elevations of first stage, with smooth raised lintel blocks and shared sill. Segmental-arched door opening to north side with smooth limestone surround terminating at plinth course and relieving arch above. Double-leaf plank timber door with stop-chamfer moulding, opening onto limestone step. Inscribed plaque above reads: 'Erected for the Benefit of this Port by the Limerick Harbour Commissioners 1880 William J. Hall B.E. Harbour Engineer William Carroll Secretary M. Fitzmaurice Harbour Master.' Stone to plinth reads: 'Foundation Stone, laid by Miss O'Gorman, Daughter of The Right Worshipful Mayor of Limerick 1879-80.' Plaque to east reads: 'Lund & Blockley 42 Pall Mall London Makers of the Clock.'

A substantial carved limestone clock tower or campanile designed by the Harbour Engineer William J. Hall in a Renaissance style. This well-crafted tower is a landmark, visible from many parts of the city.

The photos above shows the various plaques on the structure.

Specification:

Designed in the Italian style and its object is to combine utility with economy and simplicity of architecture. It will be 60 feet high from the base to the pinnacle of the roof, on which there will be a weather gauge 5 feet in height. It will be 38 feet to the base of the clock chamber and 45 feet to the centre of the dial plates. It is being erected on a foundation 11 feet deep, laid on a concrete bed. The foundation contains over 300 tons of masonry, most of the lower stones of which are from two to three tons in weight. The walls are about 5 feet thick, reducing to 3½ feet at the surface and will gradually reduce to about 2 feet in the thickness at the summit.

How it operated originally:

The clock goes for eight days, striking the hours on a bell of nearly 10 cwt, and chiming the quarters on two bells of 4 cwt and 2½ cwt respectively. The time is shown on four copper dials, each 6 feet 3 inches in diameter, printed on black and gold. Each minute hand with counter-poise weights, 4lbs and 3 feet long. The motive power is given by weights, weighing

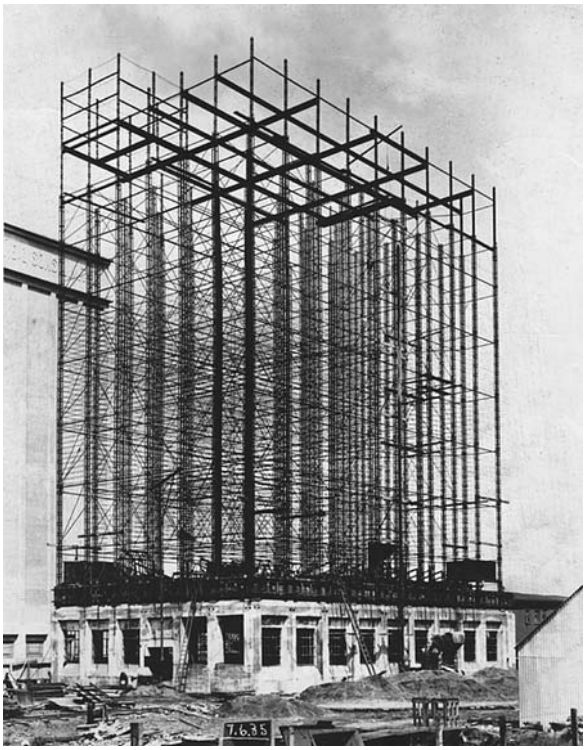
over half a ton, suspended from three iron barrels by patent iron wire cord, carried over block pulleys fixed on the floor of the clock chamber at the top of the tower. These weights, which fall a distance of 45 feet, are enclosed in boxes or 'wells' at the bottom of which is a thick layer of saw dust, so as to prevent accident in case the lines should break. The large going wheel is 12 inches diameter, and is furnished with maintaining power for keeping the clock going during the time of winding; it has also the 'Dead Beat' escapement with a 1 &1/4 seconds compensated pendulum, the weight of the bob being 1½ cwt. The rod is made of drawn zinc and iron tubes. All the bushes are of hardened gun-metal, screwed into the cast iron frame, so that each wheel can be taken out separately if required. The large or main striking wheel is 12½ inches diameter, with 28 cams fixed on it faced with steel, and raises a hammer of 1/4 cwt to the height of 9 inches from the large 10 cwt bell upon which it strikes. The quarter main wheel has a complete set of cams attached to it which raises two hammers to strike the quarter chimes, with all the necessary cranks, levers etc. required.

Automation of the Operation:

In 1997 the contractors maintaining the Clock, Smith of Derby, suggested to the Harbour Commissioners that they should consider automating the workings of the Clock.
They suggested the following:
This could be achieved by fitting one of our heavy duty movements, Type T 300D, to the time side of the mechanism. This movement would drive via chains and sprockets into the hour arbor and would be controlled in the event of a power failure by one of our Auto Restart Units, which has been designed to avoid having to restart the hands of any self starting synchronous electric clock after a power failure. Following a mains failure lasting more than twelve seconds the unit cuts off the power to the clock for precisely twelve hours less twelve seconds. The clock is then automatically restarted without any need for adjustment of the hands. Alterations between summer and winter time also occur automatically and the unit is fitted with a rechargeable battery system. The strike and quarters would be driven by an electric motor connected into the fly arbors and controlled by one of our automatic self correcting electronic programmers, Type C 170, which can also be programmed for a night silencer should this be required. This work would not entail the dismantling of the clock mechanism but the overhaul of the hammers and connecting wires would be required.

RANKS SILO

Ranks Silo located inside in Limerick Docks is the only remaining structure of what was once one of the largest flour mills in the British Isles. The structure was built in the late 1920's and is cast in-situ concrete on a steel frame similar to the photo below.



Freestanding multiple-storey reinforced concrete former silo, built c. 1920's, with an eight-bay east and west elevation and six-bay north and south elevation. Each bay expressed by a window opening to ground floor level, and an oculus to parapet level on the east and west elevation (except for the third and sixth bays), and vertical concrete piers which articulate each elevation. Further two-storey upshot rises from behind the parapet to the northwest corner. The parapet on the south elevation reads in raised concrete lettering: 'J. Bannatyne & Sons Limited'. Flat-roofed structure hidden behind parapet wall. Square-profile cast-iron rainwater goods. Reinforced concrete walls with eight vertical bays articulated by concrete piers. Square headed window openings, one to each bay at ground floor level and illuminating stair hall on north elevation, otherwise elevations are unfenestrated. Each opening has rendered reveals, no sills, and retaining multiple pane steel windows with centrally-hung pivoting upper casements. Rendered reveals also to oculi with Centrally-hung pivoting metal windows. Some openings boarded and blocked-up. Square-headed door opening to south elevation with plank timber door. A further door opening to north with double-leaf plank timber door.

A striking silo of great significance to the industrial (and maritime) heritage of Limerick City and the employment of concrete as a building material to quite breathtaking effects. The vertical emphasis articulated by the bay piers and the lack of fenestration reinforces the presence of the structure on the Dock Road. It, along with Bannatyne's Italianate corn store further west, are among the most important industrial buildings to survive in Limerick City. The building has not been used since Ranks closed in the 1980's.

The photo above shows the scale of the milling operation that Ranks had on the Dock Road from the 1930's to the 1980's and some 400 people worked there.

How it operated:

The ship carrying the cargo of wheat would berth on the quayside with the grain elevator "GARRYOWEN" between her and the quay like below. A flexible hose was lowered into the ship and connected to the quay. The grain was sucked through the pipe and dropped onto a conveyor underground and up through steel shutes to the top of the Silo. Once the grain reached the top, it was distributed to the steel storage bins by machines like the photo below. Once this silo was full then the grain was taken across the Dock Road on a bridge at the top of the building.

1. Above left – Steel elevating chutes
2. Top right – Machine for distributing grain on top floor
3. Middle centre – Steel Storage Bins
4. Middle right – Steel Milling rollers
5. Bottom right – Hopper for filling processed bags

BANNATYNE MILL

Bannatyne Mill located inside in Limerick Docks was the first mill constructed within the Docks and was the first phase in what was later to become Ranks, one of the largest flour mills in the British Isles. The structure was built in the late 1873.

Detached eight-bay five-storey over vaulted ground floor limestone former corn store, built between 1873-74. Built facing north with breakfront gabled end bays having battered bases, and a square-plan tower to the northeast corner. M-profile natural slate roof, hipped to southwest corner, pitched to southeast forming a further gable to east side elevation. Cast iron rainwater goods, with gutters supported on limestone eaves. Carved limestone coping to gables with smooth limestone kneelers, and dressed limestone quoins. Large ashlar limestone chimneystack to southwest corner with octagonal capping. Squared and snecked ashlar limestone walls with several cast-iron lateral tension support plates.
Limestone sill course delineates first and third floors. Localised red brick repairs. Yellow brick segmental-arch window openings with flush limestone sills with one-over-one pivoting metal windows. To the gabled breakfronts at fifth and sixth floor level white Scotch fire brick round-arched recess contains the window openings, with a round-arched window opening at sixth floor level. Corresponding openings on west breakfront blocked-up.
Northeast tower capped by truncated pyramidal Killaloe slate roof with fishscale patterned slate courses and lead ridging, rising from a corbelled eaves. Profiled cast-iron rainwater goods. To east elevation of tower at ground floor level there is an elaborate limestone ashlar doorcase comprising plain uprights with angular corbels supporting cornice, enclosing a segmental-arched opening with chamfered lintel reveal. Timber doorframe with saw tooth detailed lintel, double-leaf tongued and grooved timber door and boarded up overlight. Heavy cast-iron bar closes the doors. Segmental-arched opening south of tower bears inscribed date: 1873.

A most imposing and rare industrial building with a larger than life expression of Victorian industrial architecture, erected to the designs of William Sidney Cox. The builders were McCarthy and Guerin. It was built for Mssrs. Bannatyne. The Bannatyne Mill is technically significant as the building's frame is made of cast-iron and is encased in cut stone and rubble.
There are allocations for lift machinery in the basement and the hoisting machinery is hidden behind the gables. The tower, influenced by the Gothic of northern continental Europe, adds architectural presence over the Docks and is a landmark sight from the northern banks of the River Shannon. The high degree of detailing and the attention paid to the architectural composition of this structure is extraordinary when viewed through the rationalised approach to aesthetics today. This structure, together with the later reinforced concrete silo further east are significant industrial architectural landmarks in the Dock Road area of Limerick City.
Shannon Foynes Port Company put a new roof on the building in 2012 and carried out repairs to roof trusses and beams supporting the tower.

How it operated:

The ship carrying the cargo of wheat would berth on the quayside with the grain elevator between her and the quay like below. A flexible hose was lowered into the ship and connected to the quay. The grain was sucked through the pipe and dropped onto a conveyor underground and up through steel shutes to the top of the Silo. Once the grain reached the top, it was dropped down through chutes in the floors during which it went through the milling process on steel rollers. The bags were then filled and loaded on to horse and car.