(1) பக்கங்களின் எண்ணிக்கை 90

(2) புதுக்கித் திருப்பிய நாள் Dec 90

(3) ஆதாரங்குறிப்பவர் சுருக்கொப்பம்

தமிழ்நாடு ஆவணக் காப்பகம்.

தமிழ்நாடு அரசு

P.W.D துறை

அரசாணை எண். —
மு. கோப்புத் தாள் எண். 3660

அச்சகம்
பலவகை

நாள் : 26.12.1889

க்கவோ கண்டபடி கையாளவோ கூடாது

. கா-1—18,006—15-6-87.

3660

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

READ—the following paper :—

From G. McWATTERS, Esq., M.A., C.S., Chairman, Harbour Trust Board, to the Chief Secretary to Government, Marine Department, dated Madras, 30th November 1889, No. 4532.

I have the honor to submit, for the information of Government, the progress report upon the Madras Harbour Works for the quarter ending 30th June 1889, together with statement (in triplicate) showing expenditure to date compared with the sanctioned estimate.

2. It will be observed that several items have already been exceeded ; and the delay in the submission of this report has arisen through the necessity of the Board having—when it was first submitted by their Engineer—to return it with a view to particulars being given for the information of Government. These are now filled in in a separate column showing the revised estimate submitted with the letter from the Board's Engineer, No. 909, dated 1st October 1888, forwarded under cover of this office letter No. 2685, dated 20th idem.

3. The cause of the estimate having been exceeded in some items may be stated, generally, as due to delays unforeseen by Mr. Parkes when it was prepared, and which have unavoidably added considerably to the expense of construction.

4. The Engineer has been directed to submit his monthly and quarterly reports more promptly in future.

ENCLOSURE.

From A. L. POGSON, Esq., Engineer, Harbour Trust Board, to the Chairman, Harbour Trust Board, dated Madras, 20th September 1889, No. 756

I have the honor to submit my report on the progress made on these works during the quarter ending 30th June 1889.

2. Accompanying the report is a lithographed plan showing the state of the Harbour and Beach improvements to 31st March in black, and all new work during the quarter in red.

3. From April to June no block-setting is attempted on account of the sea being too rough for diving, so the work of protecting the new lengths of pier with wave-breakers is left to be completed during April, and by the end of the month all three cranes are run on shore for protection during the south-west monsoon.

4. *Surveys.*—Several cross sections were taken of the piers and rubble base, and the usual record of levels throughout both piers was brought up to date.

5. *North Pier Works.*—Work at the north pier during April was confined to protecting the length of superstructure built to the 31st March with wave-breakers, which as a temporary protection were ordered to be placed in orderly rows instead of being dropped in at random as in the sanctioned design. This protection though being much lighter and requiring fewer blocks was a very difficult and slow undertaking, as the base between the two walls had to be levelled up by divers at a point where the sea was generally too rough for a diver to work without great risk.

6. Two hundred and sixty-six wave-breaker blocks were accordingly "set" by divers, and after all the upper blocks of the superstructure had been clamped together in the usual manner, the Titan crane was run on shore by the 28th of April.

7. During June a capping of concrete was built on the pier, just deep enough to securely build in the Titan rail-roads and other necessary lines, and on the 21st June the Titan crane was travelled out, and turned into a forward position for setting blocks; from which date 26 superstructure blocks were set in position, making an advance of 18½ lineal feet in the quarter under review.

8. *South Pier Works Rubble Base.*—In April the south pier rubble base was extended a short distance towards the old pier head, by adding 2,116¼ tons of material made up of 1,927¼ tons of rubble deposited by boats and 189 tons of base, added by blasting a few of the blocks, which had fallen from the old wall, the removal of which is being carried out either by the Pontoon or by blasting with dynamite.

9. *Superstructure.*—No advance was made to the south pier superstructure above sea level, but as usual at the close of the season's work four of the lower blocks were set on the 6th April to prevent any possible movement in the lower blocks of the last complete course.

10. On the 7th April the Titan crane was lowered down on to its permanent rails, and on the 8th turned round into position for protecting the end of the new work with the wave-breaker.

11. As at the north pier 54 iron cramps were fixed, clamping together all the new courses set during the season.

12. *Wave-breaker.*—The Titan crane deposited wave-breaker blocks to protect the length of pier it stood upon, when the wave-breaker crane carried on the protection towards shore until the 15th of April by which date these two cranes had dropped 164 large wave-breaker blocks.

13. On the 17th of April the cranes were run on shore and all rails, &c., removed from the pier for the south-west monsoon.

14. By the middle of June the usual levelling up of the last season's work, with a thin capping of concrete, was commenced, and on the 26th both the Titan and the wave-breaker cranes were travelled out to commence block-setting early as the weather would permit.

15. *Railways.*—The beach and pier lines of railway were kept in good order, and several extensions were made in connection with the landing of coal iron, &c.

16. A connection between the beach railway and the south pier was made by laying a curved line identical with the north pier, arrangement of lines, with a view to handing over certain ground to the South Indian Railway authorities for their proposed new beach station.

17. *Pallávaram Quarries.*—Fifty-five trains were run from the Pallávaram quarries during the quarter conveying 13,615½ tons of stone to the works; of this quantity, 9,512¾ tons was chips for blockmaking, and the remainder rough stone for the rubble bases.

18. *Concrete Blockmaking.*—Five hundred and sixty-two concrete blocks were made during the quarter, showing an outturn of 9,590½ cubic yards of concrete against an outturn of 9,149 cubic yards during the last quarter.

19. *Cost and progress of works.*—From the foregoing details a summary of the rate and cost of progress compared with the same quarter last year (when little work is possible on account of the rough state of sea) comes out as follows:—

Particulars.	In quarter ending 30th June 1888.		In quarter ending 30th June 1889.	
	Quantity, &c.	Cost.	Quantity, &c.	Cost.
		Rs. A. P.		Rs. A. P.
Length of superstructure built	*Nil.*		18½ feet.	16,454 11 11
Number of wave-breakers placed in position		1,814 9 0	430	96,062 15 0
Cubic yards of concrete made	80	19,888 3 3	9,590 7/27	1,10,354 7 7
Number of concrete blocks made	9,731⅛	1,11,929 12 1	562	
Tons of chips received from quarries for blockmaking	551			
Tons of rubble received from quarries for foundations	8,639	13,469 5 9	9,300¾	14,726 8 3
	502	944 1 4	4,103	6,119 14 8

20. In addition to the above figures will be found submitted with this report a complete statement of the expenditure on the works during the quarter ending June 1889.

21. It will be observed that the expenditure under many of the sub-heads has already exceeded the cost estimated by Mr. Parkes, while the reconstruction of the works is far from completion, this excess is due to the original rates being taken as sufficient for the present design, and no allowance being made for the cranes having to be withdrawn for four months in each year when no progress could be shown which naturally increases the cost of establishment and other heads.

22. The Trustees have before them my estimate of cost for completing the sanctioned design, submitted with my suggestions for a north-east entrance, in which I have shown the probable excess in the sanctioned design as Rs. 3,82,545.

23. These figures I have now placed in the statement of expenditure side by side with the sanctioned estimated rates which, when compared with the actual expenditure to date, will be found to be within my estimate for the eastern entrance.

24. *Stores from England.*—The following vessels arrived during the quarter, bringing stores for the works as below:—

	Tons.	Cwt.	Qrs.	Lbs.
In April.				
By the S.S. *Lindula* 1,100 casks of Portland cement containing	196	8	2	8
By the S.S. *Goorkha* 934 casks of Portland cement containing	166	15	2	24
In May.				
By the S.S. *Duke of Devonshire* 430 casks of Portland cement containing	76	15	2	24
In June.				
By the S.S. *Clan Mathison* with 54 bars and 46 bundles of iron of sizes weighing	5	19	0	0
By the S.S. *Golconda* with 3,135 casks of Portland cement containing	559	16	1	20
And brushes, twine, hemp, tin solder and paints, weighing	1	7	1	25

25. *Beach Improvements.*—Under the heading of "Harbour Trust" in the return of work accompanying this report will be found a list of all the repairs and new works done in connection with the beach improvements. The heaviest work is the thorough renewal of all timber work, and bracing to the iron screw-pile pier, of which 178 feet was renewed in the quarter ending 30th June 1889.

RETURN OF WORK FOR THE QUARTER ENDING 30TH JUNE 1889.

Surveys.—Cross sections were taken of the north and south pier bases and of the wave-breaker at both piers. Some soundings were taken in the Harbour.

Railway Lines.—On the north pier 442 running feet metre-gauge lines were taken up and 300 running feet permanent Titan road, and 1,074 running feet temporary broad-gauge lines were laid.

On the south pier 276 running feet temporary Titan road and 537 running feet temporary broad-gauge lines were taken up; 342 running feet permanent and 72 running feet temporary Titan road lines were laid; and 130 running feet broad-gauge lines were laid on the sand road. A new embankment with culvert, carrying 1,030 running feet broad-gauge lines, was completed, connecting the beach railway with the lines on the south pier for which a broad-gauge siding at the south pier yard was taken up to supply the necessary plant.

Eight hundred and fifty-five running feet broad-gauge lines were laid in connection with the beach improvements to connect the Madras Railway Company's stores with the iron pier to facilitate the landing of State Railway materials. The existing lines at the beach and the quarries were kept in working order.

Quarries.—Fifty-five trains worked between Pallávaram and the beach during the quarter conveying stone.

	Tons.
Rubble.	
Total quantity received up to 30th June 1889	360,322¾
Do. do. 31st March „	356,219¾
Received in the quarter ...	4,103
Chips.	
Total quantity received up to 30th June 1889	141,452¾
Do. do. 31st March „	131,940¼
Received in the quarter ...	9,512½

Ballast.—None received.

North Pier Surf Bank.—Nothing done since 30th November 1888.

North Pier Rubble Base.

—	Foreshore. Large rubble under wave-breaker.	Foreshore. Widening foreshore.	Base.
Total quantity deposited up to 30th June 1889	14,286½	54,051¼	119,425¼
Do. do. 31st March „	13,749½	52,412½	119,425¼
In the quarter ...	537	1,638¾	...

North Pier Superstructure.

	Number.	Contents. C. YDS.
Blocks set up to 30th June 1889	1,210	19,522$\frac{9}{27}$
Do. 31st March „	1,184	19,105$\frac{8}{27}$
In the quarter ...	26	417$\frac{1}{27}$
Running feet of new wall built up to 30th June 1889		793½
Do. do. 31st March „		775
In the quarter ...		18½
Total length of wall completed from B		2,843½
Do. do. from F		793½

North Pier Supplementary Works.—Blocks deposited in wave-breaker.

—	Number of blocks.	Contents, cubic yards.	Distance on pier.	Average breadth from face of pier.
Up to 30th June 1889	2,194	39,807$\frac{1}{2}$$\frac{3}{8}$	..	..
Up to 31st March 1889	1,928	35,019$\frac{1}{2}$$\frac{1}{8}$	..	..
In the quarter ..	* 266	4,788	2,525 to 2,822	18 feet.

* Wave-breaker blocks.

North Pier Capping.—67½ cubic yards capping done.
North Pier Cramps.—49 cramps fixed.
South Pier Surf Bank.—Nothing done since 30th April 1888.

South Pier Rubble Base.

—	Foreshore. Large rubble under wave-breaker.	Foreshore. Widening foreshore.	Base.
Total quantity deposited up to 30th June 1889 ...	12,061½	38,389¾	122,687¼
Do. do. 31st March „ ...	12,061½	38,389¾	120,571
In the quarter ...	...	...	* 2,116¼

* Rubble from the quarries 1,927¼
Seven old blocks at 27 tons per block blown to pieces by dynamite 189
Total .. 2,116¼

3660

South Pier Superstructure.

	Numbers.	Contents. C. YDS.
Blocks set up to 30th June 1889	1,727	28,145½
Do. 31st March „	1,723	28,076$\frac{2}{9}$
In the quarter ...	* 4	68$\frac{8}{9}$

* Two bottoms and 2 middles to complete the season's work.

Running feet of new wall built up to 30th June 1889	1,132
Do. do. 31st March „	1,132
In the quarter ..	*Nil.*
Total length of wall completed from E	3,519
Do. do. from G	1,132

South Pier Supplementary Works.—Blocks deposited in wave-breaker.

—	Number of blocks.	Contents, cubic yards.	Distance on pier.	Average breadth from face of pier.
Up to 30th June 1889	1,689	29,389$\frac{35}{216}$	..	..
Do. 31st March „	1,525	26,437$\frac{35}{216}$	..	..
In the quarter ..	* 164	2,952	2,597 to 3,083	40 feet.

* Wave-breaker blocks.

South Pier Capping.—126½ cubic yards capping done.
South Pier Cramps.—54 cramps fixed.
Protective Works.—Nothing done.

Concrete Blocks.

Description of blocks.	Made up to 31st March 1889.	Made in the quarter ending 30th June 1889.	Made up to 30th June 1889.	Placed in work: Up to 31st March 1889.	Placed in work: Up to 30th June 1889.	In hand.
Old blocks	806	..	806	806	806	..
Wave-breaker blocks	3,098	267	3,365	2,634	3,064	301
Superstructure.						
North pier bottom blocks	227	..	227	212	216	11
Do. middle do.	750	..	750	713	728	22
Do. top do.	248	..	248	233	239	9
South pier bottom do.	423	54	477	338	340	137
Do. middle do.	1,195	148	1,343	946	949	394
Do. top do.	455	68	523	335	335	188
Special blocks	71	..	71	71	71	..
Counterbalance blocks	1	..	1	..	..	1
Special abutment	21	25	46	..	..	46

Nine thousand five hundred and ninety and seven twenty-seventh cubic yards of concrete blocks were made in the quarter. Blockmaking was commenced on the 2nd April and stopped on the 24th April, re-commenced on 30th April and stopped on 5th May, again commenced on 27th May and was stopped on 29th June, on all occasions for want of chips.

Five hundred and eighty-two and a quarter tons cement was the balance on the 30th June.

Two hundred and ninety-one superstructure and 80 wave-breaker blocks were transferred from north to south pier block ground in the quarter.

Miscellaneous.—The south pier Titan was turned in position on the 8th April for depositing wave-breaker blocks. It was brought to its shore standing ground on the 17th April and was travelled out again on the 26th June as far as 2,495 feet on the pier.

The north pier Titan was brought ashore on the 28th April and was again taken out on the 19th June. It was turned in position on the 21st June for setting blocks and stood at 2,825 feet on the 30th June.

The wave-breaker crane was brought to its shore station on the 17th April and was travelled out again to 2,158 feet on pier on the 26th June for block-setting.

The Pontoon was taken to pieces on the 11th April and brought ashore on the 12th April for the monsoon. It was launched again on the 25th June and fitted together on the 27th June.

3

A storm water overflow drain from the main sewer was constructed to the south of the south pier.

A flagstaff was erected for the divers' air-pipes.

Tools and Plant: Stationary Engine No. 2.—Donkey pump and all brass bearings were twice closed.

Stone Crushers.—Two new shoots were made and 29 hooks and a shoot repaired.

No. 1.—New set plates were twice fixed, two new side wedges were supplied, and the shoot and pump rods were repaired.

No. 2.—The brass bearings were closed and two new side wedges were supplied.

No. 3.—A new eccentric jaw, two new chilled jaws and two new side wedges were supplied.

No. 4.—Two new chilled jaws and five new side wedges were supplied and the shoot was removed, repaired and refitted.

No 5.—An old side wedge was refitted and a new key fitted to the fly-wheel.

Elevators.—Ten boxes were repaired.

No 2.—A new shaft was fixed and the platform repaired.

No. 3.—Two new plates were fitted to the uprights.

Concrete Mixers. No. 1.—A new door-catch was supplied and two new pins were made and fitted to the donkey pumps.

No. 2.—Two new door-catches were supplied and a new intermediate spur-wheel was fitted.

No. 3.—A new door-catch, mixer-box and brass bearings were supplied, and a new intermediate spur-wheel and pin also fitted.

No. 4.—A new door-catch was supplied.

No. 5.—The door-catch was repaired and three new ones supplied.

No. 6.—A new door-catch and handle was fitted.

No. 7.—Two new door-catches were supplied.

No 8.—A new door-catch repaired.

Mixing Platform.—No. 1 Crane was supplied with a new stay.

No. 3 Crane was supplied with two new chains.

A new crane was erected and two sand skips and three parah measures were made.

Concrete Skip Trucks.—One new truck was made, and seven skips were repaired. Four pairs of wheels were rekeyed.

Goliath Crane No. 3.—Two new valve seatings, four new valves to two pumps and sixteen new studs and nuts to hydraulic piston, were made and fitted. A new tumbler was fitted to the square shafting. Two new hydraulic piston leathers and two spanners were supplied.

Light Travellers No. 2.—One new travelling wheel and a key to the crab pinion was fitted. All the brackets to the foot-boards were repaired.

Hydraulic Jacks, 100 ton.—Nos. 1 *and* 2 were repaired, cleaned and supplied with new leathers.

North Pier Titan.—The face of a crab travelling wheel was chipped and a new key fitted to pinion. The "East and West" travelling shaft was straightened. Two wrought-iron fire-bars were made. A new key was fitted to the pinion of hand-power travelling gear. The sheaves and chains of the chain blocks were examined and the blocks were repaired. A new travelling wheel was fitted to crab and the Titan painted throughout.

South Pier Titan.—A new driving pulley was made and fitted to the salt-water pump. The traverser was cleaned and tarred. The boiler feed-pump was repaired. A new stay rod was made for the claws and a chain was supplied to secure the crab to the boiler. A portion of the plank flooring and the cabin roof underwent repairs and the Titan was painted.

Wave-breaker Crane.—Two pinch-bars and a shackle-pin were made and supplied.

Pontoon.—The manhole covers of the buoys were removed and refixed with new joints and 36⅜ inch bolts. The buoys were painted inside and new plates were supplied to the hangers.

Crab, 10 ton.—Taken to pieces and fitted with all new spur-wheels and pinions.

Miscellaneous.—The following were made: 2 new block frames, 50 cotters, 350 washers for bolts and 6 1¼-inch bolts for block frames, 2 shunting ropes for Nos. 2 and 3 locomotive engines, one ½-inch, one ⅝-inch, one 1-inch dies and a screw for gas tongs for fitting shop, a keel-plate for boat "Grasmere," 12 bolts, 6 fiddle drills and a hand-bellows repaired for Palláveram quarries, 7 brass nuts, 2 spanners and 5 union nuts for air-pump, 8 pins and cotters for divers. 3 eyes for lewis pins, 12 knee pieces for lewis wedges, a spanner for the lead plug for No. 2 locomotive engine, a cap for the weighing machine in the cement room, 30 plates for wooden lewis moulds and 72 trenails for railway lines.

The following were the minor repairs: 5 dies for fitting shop, 109 1¼-inch bolts for block frames, a lantern, a diving boat and a diver's jolly boat, a ladder for diving boat, 28 pick-axes for block ground a survey boat, a riding trolly, a hood for Smiths' shop; 2 rings were fitted to the divers' barrel buoys, the claws were cleaned and painted; 6 lewis bars were straightened; 31 Titan road-rails were fitted to the special holding-down plates.

Locomotive Engine No. 1.—Waste water-cock gearing was fitted with a lever, bracket, two studs, and a new waste water-cock was set. A new cotter for coupling rod, a new blower pipe, a new nut for brake gear, a new sand-pipe and a new lead plug were supplied. The tyres of the wheels were chipped, the bearings of connecting and coupling rods closed, and cotters lined up. The eccentric straps were closed. The injectors were repaired and their steam-valves refaced. The boiler cocks and the safety and clack-box valves were ground. The regulator valve and fire-box roof stays were examined and the copper stays of the fire-box were caulked. The spark-catcher and ash-pan were repaired.

3660

Locomotive Engine No. 2.—The bearings of connecting and coupling rods and eccentric straps were closed and cotters lined up. A new pinion, a new water regulating valve and two studs were supplied and the steam-valves faced of the injector. The boiler cocks and safety and clack-box valves were ground. The waste water-cocks were ground and regulated and gearing set. The dummy gland joints were made. A new key was fitted to left-hand back gear sheave. The roof stays of fire-box and brake nut and lead plug were examined. The spark-catcher was repaired

Locomotive Engine No. 3.—The left-hand valve spindle was fitted and slide valves reset. The waste water-cocks were set and right-hand dummy gland joints remade.

Block Trucks.—Nos. 2, 3, 5, 6, 7, 8, 10, 11, 12, 15, 16, 18 and 19 brass bearings were eased, the keeps filled with waste and oil and the trucks painted; No. 7, a coupling chain was repaired and fitted; No. 13 was dismantled; Nos. 14 and 18 were supplied with a coupling chain each.

Sand Wagons, No. 1.—Was generally repaired and painted.

No. 5.—A tail-board hinge was repaired and fitted.

Nos. 9 *and* 19.—Were supplied with a coupling chain each.

Harbour Trust.—Iron pier 178 running feet halt width timber work was renewed, and a new pile cap was fixed. Six lamp-posts were fixed and fitted with frames and lamps. A new gangway was fitted and the old one removed and refixed at the shore end of the pier.

A pattern was made of a turn-table for the iron pier and also one for fire-bars for the portable steam crane.

No. "B" portable crane was thoroughly repaired and fitted with a new truck; Nos. 6, 25, 26, 29, and 32 trucks were also repaired

No 4 sentry box was rebuilt.

North and South Goods' Sheds (Tile roof).—Fourteen door-frames and 7 shutters were made and fixed in position. A partition for the Public Works Department was made and fixed in the north shed.

C. Class Cranes.—Extra balance box patterns were made.

Harbour Trust Office.—Twelve writing desks, six benches and two despatch boxes were made and supplied.

Transferred to the Public Works Department. The report for the first quarter of 1889 has not been received in this office.

(Signed) W. S. MEYER,
Ag. Under-Secretary.

FORT ST GEORGE,
7th December 1889.

ORDER—dated 26th December 1889, No. 3660 W., Public Works.

Ordered that the report be forwarded to the Secretary of State for India.

2. It is observed that the report for the first quarter of 1889, promised in the Chairman's letter, No. 1676, dated 10th May 1889, has not been received by the Government, and that the report for the third quarter of 1889 is long overdue. No monthly progress report has been submitted to the Government since the receipt of the report for April embodied in Proceedings of Government, No. 2227 W., dated 19th August 1889.

3. The Government notes that the Chairman has taken steps to have these reports submitted with greater regularity in future.

(True Extract.)

Captain, R.E.,
Under-Secy. to Govt., P.W.D.

To the Chairman, Madras Harbour Trust Board.
" Marine Department.

Exd. J. Moses.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1889} Madras.

PUBLIC WORKS.

Dated December, 26th.

Recd. *Encl.*

G.O., 26th Dec. 1889, No. 3660 W.

DECEMBER.

Progress Report, Madras Harbour Works

Orders on the — for the quarter ending 30th June 1889.

3660

PUBLIC WORKS DEPARTMENT.

LETTER—to

THE RIGHT HONORABLE THE SECRETARY OF STATE FOR INDIA.

MY LORD,

With reference to your Lordship's despatch No. 4, dated 21st March 1889, we have the honor to forward a copy of our Proceedings, No. 3660 W., dated 26th December 1889, embodying a report of the progress of the Madras Harbour Works for the quarter ending 30th June 1889.

2. A plan showing the state of the works at the end of the quarter, and a statement comparing the expenditure with the sanctioned estimate, are also forwarded for information.

We have the honor to be,
My Lord,
Your Lordship's most obedient, humble servants,

(Signed) C. G. ARBUTHNOT.
(„) H. E. STOKES.
(„) J. H. GARSTIN.

FORT ST. GEORGE,
26th December 1889.

Exd. J. Moses.

9

2992

GOVT. OF MADRAS.

PUBLIC WORKS DEPARTMENT.

(Copy.)

LETTER to the Right Honorable the Secretary of State for India.

No. 19 / 3660 W., dated 26th Dec. 1889.

Forwarding Progress Report of the Madras Harbour Works for the quarter ending 30th June 1889, together with a plan of the works and a statement comparing the expenditure with the sanctioned estimate.

3660

19TH AUGUST 1889, No. 2277 W., PUBLIC WORKS.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads
Civil Works.

READ—the following papers:—

From Sir RICHARD BARLOW, *Bart.*, C.S., Chairman, Harbour Trust Board, to the Chief Secretary to Government, Marine Department, dated Madras, 17th July 1889, No. 2524.

I have the honor to forward herewith report (No. 440, dated 10th July 1889) of progress made on the Harbour Works during April 1889, with enclosures, and copy of the Board's resolution thereon passed at their meeting last evening.

2. With reference to the latter, I have the honor to solicit the attention of Government to paras. 3, 4 and 5 of the report, and to request the earliest possible orders by wire, if considered necessary, as regards the wavebreaker protection to the north arm. Should definite instructions not be received before the end of August at latest, protection cannot be afforded according to the sanctioned design before the north-east monsoon, and the spot which suffered most in the cyclone of 1881 will be left without the protection of random blocks as considered necessary by both the late Mr. Parkes and the Board's Engineer.

3. I venture further respectfully to submit that whatever north-east entrance may or may not be decided upon hereafter, it will not be Mr. Parkes' suggested No. 1 A, in reference to which only the deposit of these random blocks at this spot has been delayed; and I may add that the Trustees are very strongly of opinion that full protection, so far as appliances will permit, should be afforded according to the sanctioned design, so as to absolve them from all responsibility for further disaster.

ENCLOSURES.

From A. L. POGSON, Esq., Engineer, Harbour Trust Board, to the Chairman, Harbour Trust Board, dated Madras, 9th July 1889, No. 440.

I have the honor to submit my report on the progress made on these works in April, with a lithographed plan of the harbour (submitted in triplicate) showing the new work in red.

2. With this report I have the pleasure also to forward one mounted and two unmounted copies of a three-plate panoramic photograph of the harbour and beach improvements, &c., taken from the top of the High Court, showing the progress to the 30th April 1889.

3. *North Pier Works.*—Works at the north pier during April was confined to protecting the length of superstructure built to the 31st March with wavebreakers. But owing to an alteration having been ordered by Government in the mode of depositing the wavebreaker blocks (*vide* G.O., No. 821 W., dated 19th March 1889) progress was considerably slower and more difficult, and I trust that before the close of this season or at latest the end of August, this order may be countermanded and the protection ordered to be changed to the random system in *accordance with the sanctioned design*, as the present arrangement of "set" blocks in the place of their being dropped is not in my opinion sufficient protection to the bonded work to stand a first-class cyclone, as the old wall is so much damaged at this point as to be of little or no protection.

4. Under the provisional instructions, 266 wavebreaker blocks were set by divers, and, to enable me to do this, 537 tons of rubble had to be spread over the base and levelled up so as to form a level foundation for these blocks.

5. This temporary protection is only 18 feet wide against a required width of 40 feet of wavebreaker protection, and is lighter, or weakens the stability of the curved length of the

north pier by a dead weight of 5,370 tons of material at one of the points where the works suffered most in the storm of November 1881.

6. By the 28th April 49 of the iron cramps for clamping each course together were fixed in cement and all temporary rails, &c., removed and the titan crane run on shore, closing work at this arm for the rough weather, usual in May.

7. *Concrete-Blockmaking.*—In April blockmaking was carried on for 21 days when 224 blocks were turned out, which is equal to a make of 3,626⅞ cubic yards of concrete; of the 224 blocks, 211 were for the wavebreaker screen and 25 for the abutment, which completed the 46 special abutment blocks ordered to be made under G.O., No. 622 W., dated 2nd March 1889.

8. *South Pier Works—Rubble Base.*—In April the south pier rubble base was extended a short distance by adding 2,116¼ tons of material, made up of 1,927¼ tons of rubble from the quarries and 189 tons of old blocks fallen from the old wall, which were blasted by dynamite to the size of ordinary rubble.

9. *Superstructure.*—For want of old enough blocks no progress could be made at extending the south pier superstructure above sea level, but, as is usual at the close of the season's work, four of the lower blocks were set on the 6th April to prevent any movement in the lower blocks of the last finished course.

10. On the 7th the titan crane was lowered down on to its permanent rails, and on the 8th turned round into position for protecting the end of the new work with the wavebreakers.

11. As at the north pier, 54 iron cramps were fixed, clamping together all the new courses set during the season.

12. *Wavebreaker.*—The titan crane deposited wavebreaker blocks to protect the length of pier it stood upon, where the wavebreaker crane carried on the protection towards shore until the 15th of April, by which date these two cranes had dropped 164 large wavebreaker blocks.

13. The two cranes were run safely on shore by the evening of the 17th, and all temporary rails, sleepers, &c., were taken up, closing work for the season.

14. *Pallávaram Quarries.*—Thirty-six trains brought a supply of 7,660 tons of stone for the works, but only 3,557 tons of this quantity were chips supplied by the contractor for block-making, the remainder being rubble drawn from the stock supplied by the late contractor Mr. Abdoola Badsha Sahib.

15. *Stores from England.*—The following vessels arrived during the month of April with the following casks of cement:—

			Tons.	Cwts.	Qrs.	Lb.
By the S.S. *Lindula*	1,100	casks of Portland cement containing	196	8	2	8
By the S.S. *Goorkha*	934	casks of Portland cement containing	166	15	2	24
Total ...	2,034		363	4	1	4

Return of Work for April 1889.

Surveys.—Some cross sections were taken of the north and south pier bases.

Railway lines.—On the north pier 442 running feet metre gauge lines were taken up. On the south pier 537 running feet broad gauge lines and 276 running feet temporary titan road lines were taken up for the rough weather. The sand line was extended 130 feet and a bridge was commenced to span the new drain for carrying away storm water overflow for the intercepting sewer. 855 running feet broad gauge lines were laid to connect the Madras Railway Company with the iron pier.

Quarries.—Thirty-six trains worked during the month bringing stone from Pallávaram.

Rubble.

	Tons.
Total quantity received up to 30th April 1889	360,322¾
Do. do. 31st March 1889	356,219¾
Received in April ...	4,103

Chips.

	Tons.
Total quantity received up to 30th April 1889	135,497¼
Do. do. 31st March 1889	131,940¼
Received in April ...	3,557

Ballast.—None received.

North Pier surf bank.—Nothing done since 30th November 1888.

North Pier Rubble Base.

—	Foreshore. Large rubble under wave-breaker.	Foreshore. Widening foreshore.	Base.
Total quantity deposited up to 30th April 1889..	14,286½	54,051¼	119,425¼
Do. do. 31st March 1889.	13,749½	52,412⅜	119,425¼
Deposited in April ..	537	1,638¾	..

North Pier superstructure.—Nothing done since 31st March 1889.

North Pier supplementary works—

Blocks deposited in wavebreaker.

—	Number of blocks.	Contents, cubic yards.	Distance on pier.	Average breadth from face of pier.
Up to 30th April 1889	2,194	39,807½	..	..
Up to 31st January 1889	1,928	35,019½	..	..
In April ..	* 266	4,788	2,525 to 2,822	18 feet.

* Wavebreaker blocks.

North Pier capping.—Nothing done since 30th November 1888.

North Pier cramps.—Forty-nine cramps fixed in the month.

South Pier surf bank.—Nothing done since 30th April 1888.

South Pier Rubble Base.

—	Foreshore. Large rubble under wave-breaker.	Foreshore. Widening foreshore.	Base.
Total quantity deposited up to 30th April 1889	12,061½	38,389¾	122,687¼
Total quantity deposited up to 31st March 1889	12,061½	38,389¾	120,571
Deposited in April ..	..	..	† 2,116¼

† 1,927¼ Rubble from quarries.
189 Seven old blocks at 27 tons per block.
2,116¼ Blasted by dynamite.

South Pier Superstructure.

	No.	Contents, cubic yards.
Blocks set up to 30th April 1889	1,727	28,145½
Do. 31st March 1889	1,723	28,076⅝
Set in April ...	‡ 4	68⅝

‡ Two bottoms and two middles to close the season's work.

Running feet of new wall built up to 30th April 1889	1,132
Do. do. 31st March 1889	1,132
Built in April ...	...

	Feet.
Total length of wall completed from E	3,519
Do. do. G	1,132

South Pier supplementary works—

Blocks deposited in wavebreaker.

—	Number of blocks.	Contents, cubic yards.	Distance on pier.	Average breadth from face of pier.
Up to 30th April	1,689	29,389 $\frac{25}{216}$	..	..
Up to 31st March	1,525	26,437 $\frac{25}{216}$	..	..
In April ..	* 164	2,952	2,597 to 3,083	40 feet.

* Wavebreaker blocks.

South Pier capping.—Nothing done since 31st December 1888.
South Pier cramps.—Fifty-four cramps fixed in the month.
Protective works.—Nothing done.

Concrete blocks.

Description of blocks.	Made up to 31st March 1889.	Made in April.	Made up to 30th April 1889.	Placed in work.		In hand.
				Up to 31st March 1889.	Up to 30th April 1889.	
Old blocks	806	..	806	806	806	..
Wavebreaker blocks	3,098	11	3,109	2,634	3,064	45
Superstructure.						
North pier bottom blocks	227	..	227	212	212	15
Do. middle	750	..	750	713	713	37
South pier bottom	248	..	248	233	233	15
Do. middle	423	36	459	338	340	119
Do. top	1,195	97	1,292	946	948	344
Special	455	55	510	335	335	175
Counterbalance	71	..	71	71	71	..
Special abutment	1	..	1	..	..	1
	21	25	46	..	..	46

Three thousand six hundred and twenty-six and seven-ninth cubic yards blocks were made in the month. Blockmaking was commenced on the 2nd and stopped on the 24th and again commenced on the 30th.

Seven hundred and fifty-eight tons cement was the balance at the end of the month.

Seventy-nine superstructure and 64 wavebreaker blocks were transferred from north to south pier block ground.

Miscellaneous.—The south pier titan was turned in position for depositing wavebreaker blocks on the 8th.

The pontoon was taken to pieces on the 11th and was brought ashore on the 12th.

The south pier titan and wavebreaker cranes were brought to their shore stations on the 17th and the north pier titan was brought to its standing ground on the 28th.

Tools and Plant—Stationary Engine No. 2.—Donkey pump brass bearings were closed.

Stonecrushers—No. 1.—New set plates were fixed.

No. 2.—Brass bearings were closed.

No. 3.—A new eccentric jaw was fitted.

No. 4.—Two new side wedges were fitted.

No. 5.—An old side wedge was refitted, six hooks were repaired, and the iron work of a shoot was repaired.

Elevators No. 2.—A new shaft was fixed and four boxes were repaired.

Concrete Mixers—No. 1.—A new door-catch was fitted and two new pins were made and fitted to donkey pump.

No. 2.—A new door-catch and new intermediate spur wheels were fitted.

No. 3.—A new door-catch was fitted.

No. 4.—A new door-catch was fitted.

No. 5.—Two new door-catches were fitted.

No. 6.—A new handle was fitted to door.

No. 7.—Two new door-catches were fitted.

No. 8.—A new door-catch was fitted.

Concrete skips.—Two were repaired.

Cranes on Mixing Platform—No. 1.—A new stay was made.

No. 3.—A new chain supplied.

Goliath Crane No. 3.—A new tumbler was fitted to the square shafts and a new hydraulic piston leather supplied.

100-*ton Hydraulic Jacks, Nos.* 1 *and* 2, were repaired.

Concrete Skip Trucks.—Four pairs of wheels were keyed and fitted.

Light Travellers No. 2.—The brackets of footboard were repaired.

10-*ton Crab.*—Taken to pieces and refitted with new spur wheels and pinions.

North Pier Titan.—A new travelling wheel was fitted to crab.

South Pier Titan.—A new driving pulley was made and fitted to the salt-water pump. The traverser was cleaned and tarred. The boiler feed pump repaired and a new stay rod made for the claws and a chain was supplied to secure crab to boiler when turning the crane.

Wavebreaker Crane.—Two pinch bars and special shackle and pin were made and supplied.

Sundries.—A shunting rope was made for No. 3 Locomotive engine. A hood was made for hearth for smiths' shop. Five dies were repaired and one $\frac{1}{2}$" and one $\frac{7}{8}$" dies were made. Six $1\frac{1}{4}$" bolts were made and 18 repaired for block frames. Two bands were fitted to barrel buoys and eight pins and cotters were made for divers. A keel was made for the survey boat *Grasmere*. The wavebreaker claws were cleaned and painted.

Locomotive Engine No. 1.—Waste water cock gearing was fitted with a lever, a bracket, two studs and a new waste water cock.

No. 2.—Waste water cocks were ground and regulated and a new key was fitted to L.H. back gear sheave.

No. 3.—L.H. new valve spindle was fitted and slide valve reset.

Block Truck—No. 7.—A coupling chain was repaired and fitted.

No. 8.—Brass bearings were eased and keeps filled with grease and waste and the truck painted.

No. 13.—Dismantled.

Sand Wagon—No. 1.—Was generally repaired and painted.

No. 5.—A tail board hinge was repaired and fitted.

No. 19.—Was fitted with a coupling chain.

Harbour Trust—Iron Pier.—Eighty running feet half width timber work was renewed and a new pile cap was fixed. Four lamp-posts were fixed and fitted with frames for lamps.

No. 6 iron pier truck was repaired.

No. 25 iron pier truck was repaired.

A pattern was made of a turn-table for the iron pier.

A pattern was made of the fire bars for the portable steam cranes.

Extract of Proceedings of the Trustees of the Harbour of Madras, at a meeting held at the offices of the Board on Tuesday the 16th day of July 1889.

* * * * *

8. Read letter No. 440, dated 10th July 1889, from the Engineer, Harbour Trust Board, reporting upon the progress made on the Madras Harbour Works during the month of April 1889.

Read note by Chairman.

Resolved,—that this report be submitted to Government and that early orders be solicited in reference to the wavebreaker protection at the north-east corner of the harbour, and that a reply by wire be requested.

* * * *

(True Extract.)

(Signed) C. PINSENT,
Secretary, Harbour Trust Board.

Transferred to the Public Works Department.

(Signed) W. S. MEYER,
Asst. Secretary.

20th July 1889.

From Sir RICHARD BARLOW, *Bart.*, C.S., Chairman, Harbour Trust Board, to the Chief Secretary to Government, Marine Department, dated Madras, 18th July 1889, No. 2613.

I have the honor to acknowledge the receipt of telegram from Public Works Department, dated 12th instant, directing that the abutment be placed in the north

as to the object and intention of the order; you are in no way bound by the details given in my tracing, but you are bound to carry out the order."

* * * * * *

W. PARKES.

Telegram from the Secretary to Government, Public Works Department, to the Chairman, Harbour Trust Board, dated 20th July 1889.

My telegram 12th July ordering abutment to be put in at 2,862 feet is confirmed. Orders follow.

EXTRACT of Proceedings of the Trustees of the Harbour of Madras, at a meeting held at the offices of the Board on Tuesday the 23rd day of July 1889.

* * * * * *

4. Read telegram from the Secretary to Government, Public Works Department, dated 20th instant, confirming his telegram of 12th idem, directing that the abutment blocks be set in the north arm at the spot now reached.

Read again letter from the Board's Engineer, No. 364, dated 22nd June 1889.

Read draft letter to the Chief Secretary to Government, Marine Department, dated 22nd July 1889, submitting, for the consideration of Government, the proposals of the Board's Engineer read above for placing an abutment in either arm of the harbour at any time and at any spot without delaying progress.

Approved.

* * * * *

(True Extract.)

(Signed) C. PINSENT,
Secretary, Harbour Trust Board.

Transferred to the Public Works Department.

(Signed) W. S. MEYER,
Asst. Secretary.

26th July 1889.

Note by the Ag. Joint Secy. to Govt., Public Works Department, dated 1st August 1889.

ORDER—dated 19th August 1889, No. 2277 W., Public Works.

On reconsideration, the Government resolves to withdraw its orders * in which the construction of an abutment in the north arm of the harbour was insisted upon. In accordance with the recommendation in para. 6 of Colonel Mead's note printed with Proceedings, No. 821 W., dated 19th March 1889, the "set" blocks in the wavebreaker of the north arm may now be placed in random, and the work may be proceeded with in accordance with the sanctioned design.

* No. 622 W., dated 2nd March 1889.
" 1995 W., " 24th July "

2. A copy of these Proceedings will be forwarded to the Secretary of State for information.

(Here enter No. $\frac{16}{2277\ W.}$ dated 19th August 1889.)

(True Extract.)

(Signed) R. R. E. DRAKE-BROCKMAN, Lt.-Col., R.E.,
Ag. Joint Secy. to Govt., P.W.D.

To the Chairman, Madras Harbour Trust Board.
" Marine Department.

Exd. J. Henricus.
Spare Copies

3660

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1889} Madras.

PUBLIC WORKS.

Dated April, 18*th*.

Recd. *Encl.*

G.O., 18th April 1889, No. 1062 W.

APRIL.

Madras Harbour Works

Issuing certain instructions for the submission of monthly and quarterly progress reports of the —.

3660

27TH MAY 1889, No. 1396 W., PUBLIC WORKS.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

READ—the following paper :—

From Sir RICHARD BARLOW, *Bart.*, C.S., Chairman, Harbour Trust Board, to the Secretary to Government, Public Works Department, dated Madras, 10th May 1889, No. 1676.

I have the honor to submit, for the information of Government, letter (in original) from the Engineer, Harbour Trust Board, No. 141, dated 2nd May 1889, reporting upon the progress made upon the Madras Harbour Works during the month of March 1889, with a tracing in duplicate.

2. The quarterly report called for in G.O., No. 1062 W., dated 18th April 1889, will follow in due course.

ENCLOSURE.

From A. L. POGSON, Esq., Engineer, Madras Harbour Trust Board, to the Chairman, Harbour Trust Board, dated Madras, 2nd May 1889, No. 141.

I have the honor to submit my report on the progress made on these works during the past month of March 1889.

2. Accompanying this report is a lithographed plan of the harbour (submitted in triplicate) showing the work done during the month in red.

3. *North Pier Works Rubble Base.*—At the north pier 2,544½ tons of rubble stone was tipped which went to make up the base immediately under the pier and widening out the foreshore.

4. *Superstructure.*—The progress at this arm was rapid and regular throughout the month, which is shown by 29½ courses of blocks being set in 26 working days or 294 blocks being set by divers, extending the north pier by 177 running feet, which nearly completes the north pier curve.

5. *Concrete Blockmaking.*—The work of blockmaking was carried on from the 5th to 27th March, which was as long as the supply of stone for this purpose lapsed. During these 20 working days 233 blocks were made containing 3,852½ cubic yards of concrete.

6. *South Pier Works Rubble Base.*—After blasting 18 of the old 27-ton blocks thrown from the old ruined wall and lying in the way of the new work (which adds 486 tons of material to the base), the rubble base was extended a short distance by depositing 1,959 tons of stone by boats; thus the total materials added to the base in March was equal to 2,445 tons.

7. *Superstructure.*—Unfortunately the progress at this arm was limited, owing to the want of blocks, over three months old, caused through the constant stoppages to block making for want of chips.

13

8. From the 1st to the 4th, 40 blocks were set which added a length of 25 feet to the pier, bringing up the total length of the masonry pier to 3,519 feet from the first block set in shore.

9 *Wavebreaker.*—As the titan crane could no longer be supplied with superstructure blocks, the work of protecting the new length of pier built this season was commenced earlier than necessary. By the end of March 276·30 ton blocks had been deposited with the wavebreaker crane to a width of as near 40 feet from the bonded work as possible.

10. *Pallávaram Quarries.*—Thirty-two trains brought a supply of 6,861 tons of stone for the works, but only 2,357½ tons of this quantity were chips supplied by the contractor.

11. *Stores from England.*—The following vessels arrived during the month of March with the following casks of cement :—

					TONS.	CWTS.	QRS.	LB.
By the S.S.	"Rewa"	1,350 casks of Portland cement containing		...	241	1	1	20
Do.	"Golconda"	500	do.	do. ...	89	5	2	24
Do.	"India"	930	do.	do. ...	166	1	1	20
	Total ...	2,780		Total ...	496	8	2	8

MADRAS HARBOUR WORKS.

RETURN OF WORK FOR MARCH 1889.

Railway Lines.—On the north pier 72 running feet titan permanent-way was relaid, 1,172½ running feet single rail for mixed gauge, 442½ running feet temporary metre gauge siding and 184 running feet temporary broad gauge lines were laid. On the south pier 810 running feet permanent titan road and 119 running feet temporary titan road were laid.

Quarries.—Thirty-two trains worked in the month bringing stone from Pallávaram.

Rubble.

	TONS.
Total quantity received up to 31st March 1889	356,219¾
Do. do. 28th February 1889	351,716¼
Received in March ...	4,503½

Chips.

Total quantity received up to 31st March 1889	131,940¼
Do. do. 28th February 1889	129,582¾
Received in March ...	2,357½

Ballast.—None received.

North Pier surf bank.—Nothing done since 30th November 1888.

North Pier Rubble Base.

—	Foreshore. Large rubble under wave-breaker.	Foreshore. Widening foreshore.	Base.
Total quantity deposited up to 31st March 1889	13,749½	52,412½	119,425¼
Total quantity deposited up to 30th April 1887	11,826¾	52,280½	118,935½
In March ...	1,922¾	132	489¾

3660

North Pier Superstructure.

	NO.	Contents. C. YDS.
Blocks set up to 31st March 1889	1,184	19,105 8/27
Do. 28th February 1889	890	14,334⅔
In March ...	294	4,770 20/27
Running feet of new wall built up to 31st March 1889		775
Do. do. 28th February 1889		598
In March ...		177
Total length of wall completed from B		2,825
Do. do. F		775

North Pier supplementary works.—Nothing done since 31st January 1889.
Do. capping.—Nothing done since 30th November 1888.
Do. cramps.— Do. 31st May 1887.
South Pier surf bank.— Do. 30th April 1888.

South Pier Rubble Base.

—	Large rubble under wave-breaker.	Widening foreshore.	Base.
Total quantity deposited up to 31st March 1889	12,061½	38,389¾	120,571
Total quantity deposited up to 28th February 1889	10,102½	38,389¾	120,085
In March ...	1,959	...	* 486

* Eighteen old blocks blasted by dynamite at 27 tons per block.

South Pier Superstructure.

	NO.	Contents. C. YDS.
Blocks set up to 31st March 1889	1,723	28,076⅔
Do. 28th February 1889	1,683	27,416⅔
In March ...	40	659⅓
Running feet of new wall built up to 31st March 1889		1,132
Do. do. 28th February 1889 ...		1,107
In March ...		25
Total length of wall completed from E		3,519
Do. do. G		1,132

South Pier supplementary works.—

Blocks deposited in wavebreaker.

—	Number of blocks.	Contents, cubic yards.	Distance on pier.	Average breadth from face of pier.
Up to 31st March 1889	1,525	26,437 25/216	...	...
Do. 28th February 1889	1,249	21,484 97/216	...	...
In March ...	† 276	4,952⅔	3,179 to 3,465 3,119 to 3,159 3,083 to 3,104	40 feet.

† 273 wavebreaker blocks.
⅔ old blocks. } Picked up by north pier titan from site of work at north pier.
1 do. }
⅔ do. }

14

for the information of Government.
These are now filled in, in a Separate
Column Showing the revised Estimate
Submitted with the letter from the
Board's Engineer, No 909 dated 1st October
1888, forwarded under Cover of this office
letter No 2685, dated 20th idem. × Sent forward Pr Post 24/10/88

3. The Cause of the Estimate having
been exceeded in Some items may be
Stated, generally, as due to delays
unforeseen by Mr Parkes when it was
prepared, and which have unavoid-
-ably added considerably to the expense
of Construction

4. The Engineer has been directed
to Submit his monthly and quarterly
reports more promptly in future.

I have the honor to be
Sir
Your obed.t Servant

Rec

Chairman
Harbour Trust Board

Rec

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17

166A-17-1-19
1824-29-6-19

C. No. 1207

MARINE DEPARTMENT.

FROM

THE CHAIRMAN,

HARBOUR TRUST BOARD,

MADRAS,

TO

THE CHIEF SECRETARY TO GOVERNMENT,

Marine Department.

E.

DATED 30th November 1889

RECEIVED 3rd Dec

ENCLOSURE 4 Plans

No. 4532.

SUBJECT.

Submitting for the information of Government the Progress report upon the Madras Harbour Works for the quarter ending 30th June 1889, together Statement of expenditure to date Compared with the sanctioned estimate.

No. 755 3660

From

THE ENGINEER,

HARBOUR TRUST BOARD,

MADRAS.

20 SEP 89

To

Sir Richard Barlow Bart C.S.I.

Chairman Harbour Trust Board

Madras.

Madras, 20th September 1889

HARBOUR TRUST BOARD 21 SEP 89 Registered No. 5320 MADRAS

HARBOUR TRUST BOARD 22 NOV 89 MADRAS.

Accompaniment Ltr.

1 Plan in triplicate

Statement of Expenditure in Triplicate

I have the honor to submit my report on the Progress made on these Works during the Quarter ending 30th June 1889.

2. Accompanying the report is a Lithographed plan showing the state of the Harbour and Beach Improvements to 31st March in black, and all new work during the Quarter in red.

Surveys.

3. From April to June no blocksetting is attempted on account of the sea being too rough for Diving, so the Work of protecting the new lengths of pier, with Wavebreakers is left to be completed during April; and by the end of the month, all three cranes are run on shore for protection during the South West Monsoon.

4. Several Cross Sections were taken of the Piers and Rubble Base, and the usual record of levels throughout both Piers was

brought

18

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3 EP

brought up to date.

North Pier Works - 5. Work at the North Pier during April was confined to protecting the length of Superstructure built to the 31st March with Wavebreakers, which as a temporary protection were ordered to be placed in orderly rows instead of being dropped in at random as in the Sanctioned Design - This protection though being much lighter and requiring fewer blocks was a very difficult and slow undertaking, as the base between the two walls had to be levelled up by Divers at a point where the sea was generally too rough for a Diver to work without great risk.

6. 266 Wavebreaker blocks were accordingly "set" by Divers and after all the upper blocks of the Superstructure had been clamped together in the usual manner, the Titan Crane was run on shore by the 28th of April.

7. During June a capping of concrete was built on the pier, just deep enough to securely build in the Titan rail roads and other necessary lines, and on the

21st

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21st June the Titan Crane was travelled out, and turned into a forward position for setting blocks; from which date 26 Superstructure blocks were set in position making an advance of 18½ lineal feet in the Quarter under review.

South Pier Works
Rubble Base

8. In April the South Pier Rubble Base was extended a short distance towards the old Pier Head, by adding 2116¼ tons of material made up of 1927¼ tons of rubble deposited by boats and 189 tons of base, added by blasting a few of the blocks, which had fallen from the old wall, the removal of which is being carried out either by the Pontoon or by blasting with Dynamite.

Superstructure. 9. No advance was made to the South Pier Superstructure above Sea level, but as usual at the close of the season's work four of the lower blocks were set on the 16th April to prevent any possible movement in the lower blocks of the last complete course,

On

20

3660 S-SP

10. On the 7th April the Titan Crane was lowered down on to its permanent rails and on the 9th turned round into position for protecting the end of the new work with the wavebreaker.

11. As at the North Pier 54 Iron Cramps were fixed, clamping together all the new courses set during the Season.

Wavebreaker

12. The Titan Crane deposited Wave-breaker blocks to protect the length of Pier it stood upon, when the Wavebreaker crane carried on the protection towards shore until the 15th of April by which date these two cranes had dropped 164 large Wavebreaker blocks.

13. On the 17th of April the cranes were run on shore and all rails removed from the Pier for the South West Monsoon.

14. By the middle of June the usual levelling up of the last season's work, with a thin capping of concrete, was commenced, and on the 26th both the Titan and the Wavebreaker Cranes were travelled out to commence Blockcetting early

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Railways.

early as the weather would permit.

15. The Beach and Pier lines of Railway were kept in good order, and several extensions were made in connection with the landing of Coal Iron &c.

16. A connection between the Beach Railway and the South Pier was made by laying a curved line identical with the North Pier, arrangement of lines, with a view to handing over certain ground to the South Indian Railway authorities for their proposed new Beach Station.

Pallaveram Quarries. 17. Fifty five trains were run from the Pallaveram Quarries during the Quarter, conveying 13615½ tons of stone to the Works, of this quantity 9512½ tons was chips for Blockmaking, and the remainder rough stone for the Rubble Bases.

Concrete Blockmaking 18. 562 Concrete Blocks were made during the Quarter showing an outturn of 9590½ cubic yards of concrete, against an outturn of 9149 cubic

3660

9149 cubic yards during the last Quarter.

Cost and progress of Works

19. From the foregoing details a summary of the rate and cost of Progress, compared with the same Quarter last year - (when little work is possible on account of the rough state of sea) comes out as follows.

Particulars	In quarter ending 30th June '88				In quarter ending 30th June '89				Remarks
	Quantity &c.	Cost			Quantity &c.	Cost			
Length of Superstructure built	Nil	1814	9	0	18½ ft.	16454	11	11	
Number of Wavebreakers placed in position	80	17888	3	3	430	96062	15	0	
Cubic yards of Concrete made	9781 9	111929	12	1	9590 7/27	103354	7	7	
Number of Concrete blocks made	551				562				
Tons of chips received from quarries for blockmaking	8639	13469	5	9	9300½	14726	8	3	
Do. Rubble — do — for foundations	502	9444	1	4	4403	6119	14	8	

20. In addition to the above figures, will be found submitted with this report, a complete Statement of the Expenditure on the Works during the Quarter ending June 1889.

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21. It will be observed that the expenditure under many of the Sub Heads has already exceeded the cost estimated by Mr. Parkes, while the reconstruction of the Works is far from completion, this excess is due to the original rates being taken as sufficient for the present Design and no allowance being made for the Cranes having to be withdrawn for 4 months in each year when no progress could be shown which naturally increases the cost of Establishment and other Heads.

22. The Trustees have before them my Estimate of cost for completing the Sanctioned Design, submitted with my suggestions for a N.E. Entrance, in which I have shown the probable excess in the Sanctioned Design as Rs. 3,82,545.

23 These figures I have now placed in the Statement of Expenditure side by side with the Sanctioned Estimated rates which when compared with the actual expenditure to-date will be found to be within my Estimate for the Eastern Entrance.

Stores from England. 24. The following vessels arrived during the Quarter, bringing Stores for the Works as below.

		Tons. Cwt. Qrs. lb.
In April.	By the S.S. "Sindula" 1100 Casks of Portland Cement containing -----	196 - 8 - 2 - 8
	Do. S.S. "Goorkha" - 934 Casks Portland Cement cont'g	166 - 15 - 2 - 24
In May	By the S.S. "Duke of Devonshire" 430 Casks of Do. Cont'g - - -	76 - 15 - 2 - 24
In June.	By the S.S. "Clan Mathison" - with 54 bars and 46 Bundles of Iron of sizes weighing -	5 - 19 - " - "

24 By

3660 9d

were laid.

On the South Pier, 276 running feet temporary Titan road and 537 running feet temporary broad gauge lines were taken up; 342 running feet permanent and 72 running feet temporary Titan road lines were laid; and 130 running feet broad gauge lines were laid on the sand road. A new embankment with culvert, carrying 1030 running feet broad gauge lines was completed, connecting the Beach Railway with the lines on the South Pier for which a broad gauge siding at the South Pier yard was taken up to supply the necessary plant.

855 running feet broad gauge lines were laid in connection with the Beach Improvements, to connect the Madras Railway Company's Stores with the Iron Pier, to facilitate the landing of State Railway Materials. The existing lines at the Beach and the Quarries were kept in working order.

Quarries.

Fifty five trains worked between Pallaveram and the Beach during the Quarter, conveying stone.

Rubble

26

3660 1/89

Running feet of new wall built up to 30th June '89 -		793 1/2
Do.	31st March '89 -	775
	In the Quarter -	18 1/2
Total length of wall completed from B -		2843 1/2
Do.	F -	793 1/2

North Pier Supplementary Works

Blocks deposited in Wavebreaker

—	Number of Blocks	Contents Cubic yards	Distance on pier	Average breadth from face of Pier
up to 30th June 1889	2194	39007 11/12	—"—	—"—
Do. 31 March 1889	1928	35019 11/12	—"—	—"—
In the Quarter	* 266	4788	25254 to 2822	18 feet

* Wavebreaker blocks

North Pier capping - 67 1/2 cubic yards capping done

North Pier cramps 49 cramps fixed

South Pier surplank - Nothing done since 30th April 1888

South Pier Rubble Base

—	Foreshore		Base
	Large rubble under wave breaker	Widening Foreshore	
Total quantity deposited up to 30th June '89	12061 1/2	38389 3/4	122687 1/4
Do. 31st March 89	12061 1/2	38389 3/4	120571
In the Quarter	—"—	—"—	* 2116 1/4

* 1927 1/4
189
Total 2116 1/4

Rubble from the Quarries
7 old blocks @ 27 tons per block blown to pieces by dynamite

28

3660 /1285

South Pier Superstructure

	Nos	Contents C. yds
Blocks set up to 30th June 1889 -	1727 -	28145 1/9
____do____ 31st March 1889 -	1723 -	28076 2/9
In the Quarter -	x 4 -	68 8/9

x 2 Bottoms and 2 middles to complete the season's work

Running feet of new wall built up to 30th June 1889.	1132
____do____ 31st March 1889 -	1132
In the Quarter .	nil

Total length of wall completed from E.	3519
____do____ G.	1132

South Pier Supplementary Works.

Blocks deposited in Wavebreaker

-	Number of blocks	Contents cubic yards	Distance on Pier	Average breadth from face of Pier
Up to 30th June 1889	1089	29389 25/216	——"——	——"——
___do___ 31st March 1889	1525	26437 25/216	——"——	——"——
In the Quarter	x 164	2952	2597 to 3083	40 feet

x Wavebreaker blocks

South Pier capping - 126½ cubic yards capping done

South Pier cramps - 54 cramps fixed

Protective Works - Nothing done.

Concrete Blocks

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1380

Concrete Blocks

Description of Blocks	Made up to 31st March 1889	Made in the quarter ending 30th June 1889	Made up to 30th June 1889	Placed in Work: up to 31st March 1889	Placed in Work: up to 30th June 1889	In hand	Remarks
Old blocks	806	"	806	806	806	"	
Wavebreaker blocks	3098	267	3365	2634	3064	301	
Superstructure							
North Pier bottom blocks	227	"	227	212	216	11	
Do middle Do	750	"	750	713	728	22	
Do top Do	248	"	248	233	239	9	
South Pier bottom Do	423	54	477	338	340	137	
Do middle Do	1195	148	1343	946	949	394	
Do top Do	455	68	523	335	335	188	
Special Do	71	"	71	71	71	"	
Counterbalance Do	1	"	1	"	"	1	
Special Abutment	21	25	46	"	"	46	

9590 7/27 cubic yards of concrete blocks were made in the Quarter. Blockmaking was commenced on the 2nd April, and stopped on the 24th April, recommenced on 30th April and stopped on 5th May again commenced on 27th May, and was stopped on 29th June on all occasions for want of chips.

582 1/4 Tons cement was the balance on the 30th June.

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291 Superstructure and 80 Wavebreaker blocks were transferred from North to South Pier Block ground in the Quarter.

Miscellaneous. The South Pier Titan, was turned in position on the 8th April for depositing Wavebreaker blocks. It was brought to its shore standing ground on the 17th April and was travelled out again on the 26th June as far as 2+195 feet on the Pier.

The North Pier Titan, was brought ashore on the 28th April and was again taken out on the 19th June. It was turned in position on the 21st June for setting blocks and stood at 2825 feet on the 30th June.

The Wavebreaker Crane, was brought to its shore station on the 17th April and was travelled out again to 2150 feet on Pier on the 26th June for Blocksetting.

The Pontoon was taken to pieces on the 11th April, and brought ashore on the 12th April for the Monsoon. It was launched again on the 25th June and fitted together on the 27th June.

A storm water overflow drain from the Main Sewer was constructed to the South of the South Pier.

A

31

3660 15 Sept

A flagstaff was erected for the Divers air pipes.

Tools and Plant

Stationary Engine. No. 2. Donkey pump and all brass bearings were twice closed.

Stone Crushers - Two new shoots were made and 29 hooks and a shoot repaired

No. 1 - New set plates were twice fixed, two new side wedges were supplied and the shoot, and pump rods were repaired

No. 2 - The brass bearings were closed and two new side wedges were supplied

No. 3 - A new eccentric jaw, two new chilled jaws and two new side wedges were supplied

No. 4 - Two new chilled jaws and five new side wedges were supplied and the shoot was removed, repaired and refitted.

No. 5 - An old side wedge was refitted and a new key fitted to the fly wheel.

Elevators - - Ten boxes were repaired.

No. 2, - A new shaft was fixed and the platform repaired

No. 3 - Two new plates were fitted to the uprights.

Concrete Mixers - No. 1. A new door catch was supplied and two new pins were made and fitted to the donkey pumps.

30 ✓ No. 2

3660 16 8p

Concrete Mixers. No 2. Two new door catches were supplied and a new intermediate spur wheel was fitted.

No 3. A new door catch, mixer box and brass bearings were supplied, and a new intermediate spur wheel and pin also fitted.

No 4. A new door catch was supplied.

No 5. The door catch was repaired and three new ones supplied.

No 6 A new door catch, and handle was fitted

No 7. Two new door catches were supplied.

No 8. A new door catch repaired.

Mixing Platform No 1 Crane was supplied with a new stay

No 3 Crane was supplied with two new chains.

A new crane was erected and two sand skips and three parah measures were made.

Concrete Skip Trucks. One new truck was made, and seven skips were repaired. Four pairs of wheels were pekeyed.

Goliath Crane. No 3. Two new valve seatings, four new values to two pumps and sixteen

new

33

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1785

new studs and nuts to hydraulic piston, were made and fitted. A new tumbler was fitted to the square shafting. Two new hydraulic piston leathers and two spanners were supplied.

Light Travellers- No 2. One new travelling wheel, and a key to the crab pinion was fitted. All the brackets to the foot boards were repaired.

Hydraulic Jacks 100 Ton. Nos 1 & 2 were repaired, cleaned and supplied with new leathers.

North Pier Titan. The face of a crab travelling wheel was chipped and a new key fitted to pinion. The "East and West travelling shaft was straightened. Two wrought-iron fire bars were made. A new key was fitted to the pinion of hand power travelling gear. The sheaves and chains of the chain blocks were examined and the blocks were repaired. A new travelling wheel was fitted to crab and the Titan painted throughout.

South Pier Titan. A new driving pulley was made and fitted to the salt water pump. The traverser was cleaned and tarred. The boiler feed pump was repaired. A

3660 1884

A new stay rod was made for the clawo and a chain was supplied to secure the crab to the bailer. Aportion of the plank flooring and the cabin roof under-went repairs and the Ditan was painted.

Wavebreaker Crane. Two pinch bars and a shackle pin were made and supplied.

Pontoon. The manhole covers of the buoys were removed and refixed with new joints and 36 5/8" bolts. The buoys were painted inside and new plates were supplied to the hangers.

Crab 10 Ton. Taken to pieces and fitted with all new spur wheels and pinions.

Miscellaneous. The following were made; two new block frames, 50 cotters, 350 washers for bolts and 6. 1¼" bolts for block frames, 2 shunting ropes for Nos. 2 and 3 Loco Engines, one 1/2", one 7/8", one 1" dies and a screw for gas tongs for fitting shop, a keel plate for boat "Grasmere", 12 bolts, 6 fiddle drills, and a hand bellows, repaired for Pallaveram Quarries, 7 brass nuts

30

3660 1985

nuts 2 spanners and 5 union nuts for air pump 8 pins and cotters for divers, 3 eyes for lewis pins, 12 knee pieces for lewis wedges, a spanner for the lead plug for No 2 Loco Engine, a cap for the weighing machine in the cement-room, 30 plates for wooden lewis moulds and 72 trenails for railway lines.

The following were the minor repairs 5 dies for fitting shop, 109. 1¼" bolts for block frames, a lantern, a diving boat and a divers jolly boat, a ladder for diving boat 28 pick axes for block ground, a survey boat, a riding scally, a hood for Smiths shop. Two rings were fitted to the Divers barrel buoys, the claws were cleaned and painted; 6 lewis bars were straightened; 31 Titan road nails were fitted to the special holding down plates.

Loco Engine No 1. Waste water cock gearing was fitted with a lever, bracket, two studs, and a new waste water cock was set. A new cotter for coupling rod, a new blower pipe, a new nut for brake gear, a new sand pipe and a new lead plug were

3660

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were supplied. The tyres of the wheels were chipped, the bearings of connecting and coupling rods closed, and cotters lined up. The eccentric straps were closed. The injectors were repaired and their steam valves refaced. The boiler cocks and the safety and clack box valves were ground. The regulator valve and fire box roof stays were examined and the copper stays of the fire box were caulked. The spark catcher and ash pan were repaired.

Loco Engine No 2. The bearings of connecting and coupling rods and eccentric straps were closed and cotters lined up. A new pinion, a new water regulating valve and two studs were supplied and the steam valves faced of the injector. The boiler cocks and safety and clack box valves were ground. The waste water cocks were ground and regulated and gearing set. The dummy gland joints were made. A new key was fitted to left-hand back gear sheave. The roof stays of fire box and brake nut and lead plug were

examined

3660 21.8.

examined. The spark catcher was repaired.

Loco Engine. No. 3. The left hand valve spindle was fitted and slide valves reset. The waste water cocks were set and right hand dummy gland joints remade

Block Trucks. Nos 2, 3, 5, 6, 7, 8, 10, 11, 12, 15, 16, 18 and 19, brass bearings were eased, the keeps filled with waste and oil and the trucks painted. No 7, a coupling chain was repaired and fitted No 13, was dismantled. Nos 14 & 18, were supplied with a coupling chain each.

Sand Wagons. No 1 was generally repaired and painted. No 5 a tail board hinge was repaired and fitted.

Nos 9 & 19 were supplied with a coupling chain each.

Harbour Trust

Iron Pier 178 running feet half width timber work was renewed, and a new pile cap was fixed. Six lamp posts were fixed and fitted with frames and lamps. A new gangway was fitted and the old one removed and refixed at the shore end of the Pier.

A pattern was made of a turntable

38 for

3660 2280

for the Iron Pier and also one for fire bars for the Portable Steam crane.

No 6 B portable crane was thoroughly repaired and fitted with a new truck Nos 6, 25, 26, 29, and 32 trucks were also repaired.

No 4 Sentry box was rebuilt.

North and South Goods Sheds. (Tile roof) 14 door frames and 7 shutters were made and fixed in position. A partition for the Public Works Department was made and fixed in the North shed.

2 Clap's Cranes. Extra balance box patterns were made.

Harbour Trust Office. 12 Writing desks, 6 benches and two despatch boxes were made and supplied.

I have the honour to be,
Sir
Your most obedient Servant,
A. Lee Popham
Engineer, Harbour Trust Board.

39

EXTRACT of Proceedings of the TRUSTEES OF THE HARBOUR OF MADRAS, at a Meeting held at the Offices of the Board on Friday the 29th day of November 1889.

3660

× × ×

Print Proof

4. Read letter from the Board's Engineer, No. 756, dated 20th September 1889, reporting progress upon the Madras Harbour Works for the quarter ending 30th June 1889.

Examined Statement of expenditure to that date, as compared with estimate.

Recorded.

× × ×

/True Extract/

HARBOUR TRUST BOARD. 30 NOV. 89 MADRAS.

Secretary
Harbour Trust Board.

M.C. No. 1207 of 89
/

M.H.W.

Plan accompanying Progress Report for quarter ending June 89.





NOTE - The Contour lines shew the depths below De Havilland's Mean Sea Level in September 1886.

Progress towards the [illegible]

Engineer
Harbour Trust Board

LITHOGRAPHED BY THE LAWRENCE ASYLUM PRESS, MADRAS, 1889.

HARBOUR TRUST BOARD MADRAS. 21 SEP 89 Register No. 533

MADRAS HARBOUR WORKS.

Comparison of Expenditure to date with Sanctioned Estimate for the ~~month of~~ Quarter ending 30 June 1889.

Sub-head of Work.	As per Estimate. Quantity.	Rate.	Per.	Cost.	Remarks.	As Executed. Quantity.	Rate.	Cost. Total up to 31st December 1884.	During the ~~month~~ Quarter	Up to date.	Arrears not paid.	Grand Total as compared with Estimate.	Remarks.
1	2	3	4	5	5A	6	7	8	9	10	11	12	13
		Rs. A. P.		Rs.	Rs.			Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	
As per Old Estimate.													
1 Works				49,15,752				5509324 8 10	- - -	5509324 8 10	- - -	5509324 8 10	
2 Establishment				3,57,612				529904 - -	- - -	529904 - -	- - -	529904 - -	
3 Tools and Plant				4,71,801				515262 6 -	- - -	515262 6 -	- - -	515262 6 -	
	Total			57,45,165				6554490 14 10	- - -	6554490 14 10	- - -	6554490 14 10	
New Estimate.													
4 Alteration and extension of block ground	Prely			8,000	5892			- - -	- - -	3882 3 5	9 13 6	5892 - 11	
North Pier.													
Rubble Stone in Foreshore and Base.													
5 Ordinary deposited from break-water	Tons	5,532	1 8 0 Ton	8,297	4885	2750	1 12 -	- - -	1813 1 1	372727 3 3	8604 2 5	380731 5 8	
6 Do. from boats	"	1,82,260	2 0 0 "	3,64,520	417149	102518 4/5	1 6 8	- - -	- - -	219512 9 -	- - -	19512 9 -	
7 Large ordinary deposited under wave breaker from break-water	"	14,750	1 12 0 "	25,812	19573	11149 3/4	1 12 -	- - -	4869 12 4	2065682 15 4	- - -	206582 15 4	
8 Concrete blocks for building	C. yds.	58,116	9 0 0 C. yd.	5,23,044	480003	49558 5/5	10 8 2	- - -	- - -	5414 11 2	- - -	541411 2	
9 Setting blocks at commencement of new work	"	2,062	2 0 0 "	4,124	5416	2418 3/5	2 1 1	- - -	5557 14 8	37944 12 11	3097 1 6	41041 14 6	
10 Do. from 2,200 to 3,600 feet	"	35,245	2 8 0 "	88,112	13373	16743 4/5	2 8 9	- - -	- - -	- - -	- - -	- - -	
11 Do. at Pier head	"	20,809	3 0 0 "	62,427	58837	- - -	- - -	- - -	- - -	1188 - 7	- - -	1188 - 7	
12 Concrete in mass for filling	"	500	10 0 0 "	5,000	1188	263	4 8 3	- - -	- - -	- - -	- - -	- - -	
Wave Breaker.													
13 Built blocks	C. yds.	288	10 0 0 C. yd.	2,880	2692	285	9 5 7	- - -	- - -	2692 - -	- - -	2692 - -	
14 Ordinary concrete blocks	"	70,849	9 0 0 "	6,37,641	718255	34048 23/33	10 5 4	- - -	5456 4 -	399950 2 8	- - -	399950 2 8	
15 Depositing do.	"	70,849	1 0 0 "	70,849	91871	34274 25/27	1 4 2	- - -	6194 8 9	34702 1 2	36 15 2	34739 - 4	
16 Apron blocks	"	1,667	9 0 0 "	15,003	12080	- - -	- - -	- - -	- - -	- - -	- - -	- - -	
17 Setting do.	"	1,667	4 0 0 "	6,668	4480	- - -	- - -	- - -	- - -	- - -	- - -	- - -	
18 Concrete in bags	"	742	12 0 0 "	8,904	17387	121	2 13 9	- - -	188 12 4	388 12 11	132 2 10	6372 9 9	
19 Cramps	No.	330	10 0 0 Each	3,300	1815	348 4/5	18 4 4	- - -	1488 9 7	6241 6 11	- - -	- - -	
20 Concrete capping	C. yds.	22,400	10 0 0 C. yd.	2,24,000	148982	- - -	- - -	- - -	- - -	- - -	- - -	- - -	
Total for North Pier				20,50,581	2113625			- - -	79642 4 6	1090809 11 11	11870 6 11	1102680 1 10	
South Pier.													
Rubble Stone in Foreshore and Base.													
21 Ordinary deposited from break-water	Tons	675	1 8 0 Ton	1,013	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	
22 Do. from boats	"	1,69,517	2 0 0 "	3,39,034	439063	114088	2 9 2	- - -	9334 7 7	413160 15 6	9290 8 10	422451 8 4	
23 Large, deposited from break-water	"	15,038	1 12 0 "	26,317	15071	8147 3/4	1 12 -	- - -	- - -	16475 13 -	- - -	16475 13 -	
24 Setting blocks at commencement	C. yds.	82,193	9 0 0 C. yd.	4,69,377	488184	28145 5/7	10 7 11	- - -	7 10 -	298281 5 4	- - -	298281 5 4	
25 Do. from 2,550 to 3,700 feet	"	2,062	2 0 0 "	4,124	7912	2586	3 1 6	- - -	- - -	7911 13 3	- - -	7911 13 3	
26 Do. at Pier head	"	29,282	2 8 0 "	73,205	106237	25589 3/5	4 1 2	- - -	5002 12 5	81904 5 1	1496 8 2	83400 13 3	
27 Concrete in mass for filling	"	20,809	3 0 0 "	62,427	58837	- - -	- - -	- - -	- - -	- - -	- - -	- - -	
	"	500	10 0 0 "	5,000	4665	602	7 9 1	- - -	- - -	4564 14 4	- - -	4564 14 4	
Wave Breaker.													
28 Concrete in mass for filling	C. yds.	57,066	9 0 0 C. yd.	5,13,594	41562	29251 2/3	10 3 8	- - -	3364 8 -	317570 13 9	- - -	317570 13 9	
29 Concrete blocks	"	57,066	1 0 0 "	57,066	53477	2938 34/99	1 3 2	- - -	2431 6 11	35036 1 7	106 6 1	36142 7 8	
30 Depositing blocks	"	1,667	9 0 0 "	15,003	10080	- - -	- - -	- - -	- - -	- - -	- - -	- - -	
31 Apron do.	"	1,667	4 0 0 "	6,668	4480	- - -	- - -	- - -	- - -	- - -	- - -	- - -	
32 Setting do.	"	742	12 0 0 "	8,904	10065	- - -	- - -	- - -	188 14 2	493 14 4	- - -	493 14 4	
33 Concrete in bags	No.	275	10 0 0 Each	2,750	1354	143	3 7 3	- - -	2387 7 8	10146 6 -	570 4 7	10715 9 7	
34 Cramps	C. yds.	19,200	10 0 0 C. yd.	1,92,000	140909	575 5/12	20 12 8	- - -	- - -	- - -	- - -	- - -	
35 Concrete capping													
Total for South Pier				17,76,482	1760251			- - -	53750 8 6	1184675 6 2	11463 9 5	1196138 15 10	
				3,19,529	43846			- - -	5286 1 5	385570 15 9	91 6 4	388602 6 1	
36 Tools and Plant				3,19,529				- - -	- - -	- - -	- - -	388602 6 1	
				1,03,865	24989			- - -	4887 7 4	69893 3 8	9580 8 11	69473 12 7	
37 Contingencies at 2½ per cent.				1,03,865				- - -	- - -	- - -	- - -	69473 12 7	
				20,000	2000			- - -	- - -	- - -	- - -	- - -	
38 Lighting entrance				3,11,594	48820			- - -	14671 14 8	319641 4 5	10743 -	319649 1 5	
				3,11,594				- - -	- - -	- - -	- - -	319649 1 5	
39 Establishment								- - -	7733 4 8	178440 8 10	21641 1 1	200101 9 11	
						17439/5	11 7 7	- - -	- - -	4970 14 5	- - -	4970 14 5	
40 Materials at site (concrete blocks in yards)	C. yds.					- - -	- - -	- - -	- - -	51430 - 3	37392 10 -	88822 10 3	
41 Advances to work-people													
42 Other stores													
Total of Estimate and value of work done				45,90,051	5069133			- - -	165951 3 1	3283954 4 10	92177 4 5	3376131 9 3	
								- - -	-4446 15 6	-37541 11 7	- - -	-37541 11 7	
Deduct Probable recoveries due to sales of Tools and Plant.					96537			- - -	- - -	- - -	- - -	- - -	
Total				45,90,051	4972596			- - -	161504 3 6	3246412 9 3	92177 4 5	3338589 13 8	
Deduct Arrears due												92177 4 5	
Total Outlay to date by books												3246412 9 3	
Deduct Total Outlay to end of last year												+3033478 5 7	
Total												212934 3 8	
Deduct Value of Stock												51430 - 3	
Total												+161504 3 5	
Add Net Debits to Suspense Heads during the year												-14165 - 9	
Net Debits of the year												147339 2 8	
Grant for 1889-90, Rupees													

Outlay on Work up to 31st March 1889 — Rs. 33478-5-7
Do. during the Current year (from April to 30th June 1889) — Rs. 1504-3-5
Total Net outlay up to 30th June 1889 — Rs. 34982-9-—

Madras,
20th September 1889.

Accountant
M.H. Works Office.

A.S. 20.9.89

A. du Pontet
Engineer, Harbour Trust Board.

3660
42

(19)

Reference on Rec. 1207 of 1889.

In replying the above should be quoted.

CHIEF SECRETARIAT MADRAS

3660

Marine Department.

Read the following from the Chairman, Harbour Trust Board, No 4532, dated 30 November 1889.

Transferred to the Public Works depart. The report for the first quarter of 1889 has not been received in this office.

2370

Fort St George 7 Decr 89

for Chief Secretary

W3

To The Public Works department.

No. 4729 C1/27-10-87 Pur-
" 46 / 2277 W - 17-8-87 } rch
- 1396 W - 27-5-89 Cho
- 1062 W - 18-4-89 5448
- 42 W - 7-1-89 1890
- 3644-52 W - 17-11-88

13-R
Work.

WORKS DEPARTMENT.

2160

PROCEEDINGS OF THE MADRAS GOVERNMENT.

26 December 1889

READ the following

Letter from the Chairman A. T. Board. A.L. No. 756 dt 20 Septr 1889.
Endorsement on the Marine Depts - - dt 7 December 1889.

Ordered that the report be forwarded to the Secretary of State for India.

2. It is observed that the report for the first quarter of 1889, promised in the Chairman's letter cited 1676 dt 10 May 1889, has not been received by the Board, and that the report for the third quarter of 1889 is long overdue. No monthly progress report has been submitted to the Government since the receipt of the report for April embodied in Proceedings of Board No. 2227 of 19 August 1889

dt. 19 August 1889

3. Government notes that the Chairman has taken steps to have these reports submitted with greater regularity in future.

2410

Secy

19 Dec.

6/11/90

To the Chairman Madras T. Board.
Marine dept.

44

A.L. No. dt To



To

The Right Honble the
Secretary of State
for India

My Lord.

With reference to your
Lordships despatch (Revenue) of 21st
March 1889 we have the honor to
forward a copy of our Proceeding
No. 3660 dated 26 December 1889,
with enclosing a report of the progress
of the Madras Harbour Works
for the quarter ending 30 June 1889.

2. A plan showing the state
of the works at the end of the quarter,
and a statement comparing
the expenditure with the estimates
ed estimate are also forwarded
for information.

I have &c

Works
14.12.89
Perused with (R) 7
Plan &
Statement
31/12/89

3660

45

MADRAS RECORD OFFICE.
Government Records.

_____Department.

E. M. C.

Dated 26 December 1809

No. 3660

Back Nos._____

Diary Date_____