

No 246 C. 872-2-84
 " 288 C. " 7-2-84
 946 No 4 30 W " 16-2-84
 " " 1131 W " 16- " -"
 " " 1056 W " 25- 4-84

No 14622 a/4th June/84

PO

Recorded

Cel.
 11/6

No 1439

Buildings & Roads

From The Superintendent
 Mathias Fairbairn Works

No 246 Dated 15 Feb, 1884

15/2/84

No 14622 a/4th June/84

Enclosure 1

*Albion Works
 Mathias Fairbairn Works
 The Works of
 Mathias Fairbairn Works*

15/2-84

Pillar Cranes

Submits descriptions of
 for restoring the ruined Piers
 of the Harbour
 with Disposal
 Submits description of

12/6

17/6

Resubmitted 6-6-84 2-11-84
 2-22/4/84 2-25/4/84

No. 421V.

FROM

THE SUPERINTENDENT,

MADRAS HARBOUR WORKS,

TO

The Hon: Colonel J. H. M. Shaw-Stewart, R. E.
Chief Engineer
Public Works Department
MADRAS, 15 February 1884.

Sir,

Enclosure

In reply to your Memorandum of the 7th instant No. 285 C, I have the honour to submit descriptions of the cranes that would be required for restoring the breakwaters of this Harbour.

2. It should however be borne in mind that Mr. Parkes, in consultation with Messrs. Atkirt & Pitt of Bath, has his own ideas about the cranes required and that they do not correspond with the suggestions I have made.

I have the honour to be,

Sir,

Your most obedient servant

J. H. M. Shaw-Stewart
Superintendent
Madras Harbour Works

beneath the superstructure of the crane and the rails and no cross bracing can be allowed between the rails - The crane must be simply a large jib crane, with a horizontal jib capable of holding 30 tons at a distance of 50 feet from the centre of the jibbing circle. The load must be capable of being travelled out along the jib by means of a "monkey traveller" to a clear distance of 50 feet from the centre.

The jib should be prolonged right across the lower portion of the crane so as to form one continuous girder, and on the back or rear portion of the jib the engine and crab and counterpoise should be fastened. -

The trussing of the jib girders must all be above the girders. -

The scope of chain should be the same as in the previous description of cranes, namely to reach 40 feet below the level of the rails on which the crane travels. -

Madras,

1897

1897

J. H. HERRINGSON.
Superintendent
Madras Harbour Works

The crane is to be put together at the makers and each part marked so that it may again be put together more easily in India. —

Second. Cranes for setting blocks in Wavebreakers. —

Two cranes are required for this work, to be of wrought iron. The general construction of the lower portion of these cranes should be similar to those mentioned above. The gauge of their ground wheels to be 20 feet centre to centre, the wheels similar to those of the other cranes. The clear height to be 14 feet between rails and superstructure. —

The "overhang" of these cranes is to be at right angles to the pier on which the rails of 20 feet gauge are laid, ~~so that~~ ~~the crab~~ so that the crab may pick up a block off the pier and travel out to the side to deposit it. The top girders and "overhang" must be long enough to

allow

Memorandum on the general requirements for cranes to be used in rebuilding the Breakwaters. —

First. — If the suggestion of the Home Committee be followed of building a regular bonded work, protecting the outer foreshores with large wave breakers of random blocks, it will be necessary to have two cranes at each pier, one for building the regular work ahead, and another to follow behind forming the wave breaker as it advances. Much time will be saved by this arrangement. —

Cranes for setting regular work.

These two cranes should be of wrought iron framing. The gauge of the ground wheels to be 20 feet from centre to centre. A clear height of 14 feet from the rails to the underside of the lowest portion of the superstructure between the rails should be left to allow convenient management of a Locomotive and block on truck below. The crane should be carried by eight wheels, four

Four on a side, not less than 3 feet diameter, with rolled iron or steel tyres flanged on both sides. There should be about $\frac{3}{4}$ inch lateral play of the wheels in the bearings of the axle. A load of 30 tons should be provided for in fixing the dimensions of the working parts. The superstructure must be such as to allow the crab to run out in the direction in which the crane itself travels not less than 25 feet in advance of the centre the foremost ground wheel, and with the crab in this position carrying a load of 30 tons, the crane must be secure and stable. The counterpoise to this overhanging weight in the cranes formerly used, was formed by a tank of salt water, into which the exhaust steam of the engine was turned. It is difficult to imagine an improvement upon this plan. The crab must also be able to travel back at least 2 feet within the plane of the centre of the foremost ground wheel to allow of a block being picked up off the pier. In other words the crab must be able to travel over a distance of at least 27 feet,

25 of which will be overhanging the line of the front ground wheels. -

In a direction at right angles to the movement above described there must be scope for the crab to travel a distance of $12\frac{1}{2}$ feet on each side of the centre line at the extreme limit of the "overhang". As the wheel base of the crane is limited to 20 feet it will be for the manufacturer to determine whether the superstructure shall overhang the base sufficiently to allow the crab to traverse this 25 feet, or whether it would not be better to make the whole superstructure to turn partly round, each way on a circular girder carried by the side frames. It is imperative that by some means there should be scope for the chain from the crab to be suspended $12\frac{1}{2}$ feet on each side of the centre line of the pier while overhanging the end. -

The crane must be worked by a

Steam

steam engine on the superstructure which will be capable (1) of moving the whole machine bodily forward or backward on the ground wheels, (2) moving the crab out and in parallel to the centre line of the pier, (3) either moving the crab at right angles to the centre line, or else causing the top girders to jib each way a distance $12\frac{1}{2}$ feet on each side of the centre line, and (4) of making the gearing of the crab so as to lower and raise a load of 30 tons. -

The gearing of the crab should be for a chain barrel, and friction cone gearing is the best for throwing in and out of gear. There must be double and single purchase to the gear of the crab and the chain should pass through two sheaves $\therefore$ At Lower Block carrying the load. The scope of chain to be sufficient to reach from the crab to 40 feet below the rails on which the whole crane travels

Dur

Mr. Thoroughgood
having gone to England
to consult with Mr.
Parker respecting
machinery for re-
construction of the
Harbour, for
orders whether any
action ^{need} be taken
on the accy. letter
from Mr. Thoroughgood
No 42 W of 15.5.84.

The final report
of the House Committee
is at present at
Aol.

C.

5/6/84

No action need be taken, I think.

W.

C.A.
5/6

9.6.84

BUILDINGS AND ROADS,
CIVIL WORKS.

Govt. of (1884) Madras.
PUBLIC WORKS.

Dated April, 25th.

Recd.

Encl.

G.O., 25th April 1884, No. 1056 W.

APRIL.

Madras Harbour

Letter from the Government of India author-
ising an expenditure of Rs. 1,25,000 in the
collection and deposit of rubble in connection
with the restoration and completion of the —,
communicated to the Superintendent, Madras
Harbour Works.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

READ—the following letter from R. B. BUCKLEY, Esq., Officiating Under Secretary to the Government of India, Public Works Department (Civil Works—Miscellaneous), to the Secretary to the Government of Madras, Public Works Department, dated Simla, 16th April 1884, No. 153 M.:—

I am directed to acknowledge the receipt of your letter, No. 431 W., of the 16th February 1884, on the subject of the restoration and completion of the Madras Harbour; and, in reply, to communicate the sanction of the Government of India to the collection and deposit of rubble stone, which is estimated by Mr. Thorowgood to cost about Rs. 1,25,000. The expenditure now authorised must be met from the sum of Rs. 1,79,900 advanced by the Government of India for expenditure in connection with the Harbour Works during the year 1884-85, *vide* Public Works Department resolution, No. 104 A.G., dated 14th March 1884. I am to impress upon the Madras Government the imperative necessity of confining expenditure within this sum.

2. Orders on the remaining points touched upon in your letter under reference will form the subject of a further communication, which will be addressed to you hereafter.

ORDER—dated 25th April 1884, No. 1056 W., Public Works.

Communicated to the Superintendent, Madras Harbour Works, for information and guidance, with reference to Proceedings of Government, No. 430 W., dated 16th February 1884.

(True Extract.)

(Signed) J. SHAW-STEWART, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintendent, Madras Harbour Works.
" Examiner, Public Works Accounts.
" Marine Department.

Exd. E. Fernandez.
Spare Copies

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

READ—the following letter from F. N. THOROWGOOD, Esq., M.Inst. C.E., Superintendent, Madras Harbour Works, to the Chief Engineer and Secretary to Government, Public Works Department, dated Madras, 4th February 1884, No. 40 W.:—

In reply to the letter from the Under Secretary, No. 244 C., of the 2nd February, I have the honor to state that I have carefully gone into the subject of the two proposals for restoring the harbour piers; and I submit, herewith, a memorandum on the subject, as directed, accompanied by a small plan and two sections on which is shown in red the work that may be done at once.

ENCLOSURE.

MEMORANDUM by Superintendent of the Madras Harbour Works, showing what work can be at once commenced as being in common to the proposals of the Home Committee and Local Committee for the restoration of the Piers.

The most important work to put in hand, which will be essential to any system of repair, is the construction of a crane or Titan for setting concrete blocks; for without this no block-work of any description can be carried on. The detailed design of this machine must be left to the manufacturer in England; but it would be quite possible to prepare a general description of the scope required in order to be used either as a crane for setting regular work (as designed by the Home Committee for their sections Nos. 3 and 4) or for setting the blocks in the "wave-breakers," or else for constructing the random section of breakwater. It will, however, be essential that so important a machine be constructed in consultation with the Engineer-in-Chief of the works.

2. The absence, in the meantime, of any appliance for manipulating on the piers heavier weights than 10 tons, reduces the field of work to two subjects, namely, making concrete blocks and depositing rubble. With regard to the first of these, there is no actual dimension given either for the blocks in regular work of the restored section nor for those in the random mound or wave-breaker; but as there now is room for 450 blocks in the yard, it would be a very good thing if a suitable shape for the blocks in the "wave-breaker" could be settled upon. This, however, should be done in connection with the Engineer-in-Chief. There are already a great many blocks on stock which are not very suitable for either alternative of restoration, some of them being what were originally made for completing the two pier-heads, and the remainder were made for Mr. Parkes' design for restoration as given in his letter to Government, March 9th, 1882. It is not desirable to add to this stock of blocks of doubtful utility, although it would be a good thing to fill up the yard with blocks more suitable for random work.

3. There remains still the item of extra rubble, and of this there is only a small quantity which is absolutely common to both designs. The first 2,200 feet of the north pier (sea-side), edged with red on the plan and section, requires a considerable quantity of extra rubble (about 60,000 tons) and this might be deposited from the pier and from boats, according to position, at once, being absolutely essential to each alternative design for restoration. The cost of this work would be about Rs. 1,25,000 at the outside, and it could be commenced in 10 days after my receiving orders to begin.

MADRAS,
4th February 1884.

(Signed) F. N. THOROWGOOD, M.Inst.C.E.,
Superintendent, Madras Harbour Works.

ORDER—dated 16th February 1884, No. 430 W., Public Works.

Ordered that the Government of India be addressed.

(Here enter No. 431 W., dated 16th February 1884.)

(True Extract.)

(Signed) J. SHAW-STEWART, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintendent, Madras Harbour Works.

Exd. E. Fernandez.
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BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of 1884 Madras.

PUBLIC WORKS.

Dated February, 16th.

Recd.

Encl.

G.O., 16th Feb. 1884, No. 430 W.

FEBRUARY.

Madras Harbour

The Government of India addressed re-
garding the resumption of work on the —

16TH FEBRUARY 1884, No. 431 W., PUBLIC WORKS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

LETTER—from

COLONEL J. SHAW-STEWART, R.E.,

Secretary to the Government of Madras,

Public Works Department,

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,

PUBLIC WORKS DEPARTMENT.

SIR,

I am directed to invite the attention of the Government of India to the present position of matters connected with the restoration and completion of the Madras Harbour.

The storm by which the works were damaged occurred on the 12th November 1881. On the 8th July 1882, a Committee, consisting of Sir John Hawkshaw, Sir John Coode, and Professor Stokes, was appointed by the Secretary of State to advise upon the measures to be adopted for restoring the harbour. That Committee reported on the 23rd January 1883.

On the 30th April 1883, a Committee was appointed by the Madras Government to submit detailed proposals and estimates for carrying out the restoration on the principles recommended by Sir John Hawkshaw's Committee. The report called for was submitted on the 20th June 1883.

On the 6th September 1883, some further notes on the subject were referred by the Government of India for remarks by the Madras Committee. A reply was transmitted to the Government of India on the 11th October 1883.

2. It is now understood that the Secretary of State proposes to again refer the matter for consideration by Sir John Hawkshaw's Committee; and it appears by no means unlikely that the best part of a third year from the date of the storm will have elapsed before a final decision is arrived at.

3. Assuming that the completion of the harbour works has been determined on, —none of the authorities consulted having expressed a doubt on this point,—the questions still at issue refer merely to details in the design. This being so, His Excellency the Governor in Council is of opinion that, with a view to avoid, so far as possible, further delay in carrying out the work, it is highly desirable that sanction should be accorded to commence, at once, any portion of the restoration scheme which is common to the recommendations of both Committees, and the execution of which will not interfere with the final decision on the points at issue.

4. On this subject, I am to invite attention to the accompanying note, which has been drawn up by the Superintendent of the Harbour Works. Mr. Thorowgood points to three directions in which work can at once be commenced:—

- (1.) Provision of a powerful crane for manipulating the blocks on the piers.
- (2.) Construction of concrete blocks for the piers and wave-breakers.
- (3.) Deposit of rubble stone.
- (1.) Whatever be the details of the scheme adopted for completing the harbour, the provision of a suitable crane is essential, the two "Titans" previously at work having disappeared during the storm of November

1881. Even after the order for the crane has been given, considerable delay must occur before it can be made available on the works; and, to minimise such delay, His Excellency the Governor in Council would strongly urge that sanction be accorded for the early construction of a powerful crane in England, in communication with the Secretary of State. The Superintendent of the Harbour Works has been directed to draw up a general description of what will be required.

- (2.) The construction of concrete blocks, to the full storage capacity of the yard, is much to be desired. If, in accordance with the view of this Government, it be decided to terminate Mr. Parkes' connection with the work, the dimensions to be given to the blocks for the wave-breakers can readily be determined by local experience, in accordance with the recommendations of Sir John Hawkshaw's Committee. But if Mr. Parkes' connection with the work is to be continued, the dimensions of the blocks can be referred to him for early report. In any case, I am directed to strongly urge the necessity for commencing the construction of blocks as soon as possible.

- (3.) The deposit of rubble along the outer face of the north pier is a work which should be no longer delayed. Not only is it essential to each of the alternative designs, as a foundation for the wave-breakers, but it is also urgently necessary for the protection of the pier, which has been much shaken by recent storms. The cost will be within Rs. 1,25,000; and if sanction be at once accorded, any expenditure that may be incurred during the current official year can be met from the grant of Rs. 2,80,000.

5. In accordance with the instructions conveyed in letter from the Government of India, under date 7th November 1882, No. 360 A.G., expenditure upon the harbour has been restricted to the preparation of materials; and, owing to uncertainty respecting the design to be followed, such expenditure has been on a very limited scale.

The Right Honorable the Governor in Council trusts that those instructions may now be modified so far as to allow of work being put in hand to the extent above specified; and, as the deposit of rubble stone is essential to the protection of the existing structure, I am to solicit the favor of a reply by wire.

I have the honor to be,

Sir,

Your most obedient servant,

(Signed) J. SHAW-STEWART, Colonel, R.E.,
Secretary to Govt., P.W.D.

FORT ST. GEORGE,
16th February 1884.

Exd. E. Fernandez.
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BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of 1884 Madras.

PUBLIC WORKS.

Dated February, 16th.

Recd.

Encl.

G.O., 16th Feb. 1884, No. 431 W.

FEBRUARY.

Madras Harbour

Requesting sanction for the resumption of
work on the —