

Educational (1898) Department.

ORDINARY MS.

G.O., No. 453

Dated 26-7-98

INDEXED.

3-4

[Despatch Abstract.]

Recording from P.W.D., on
letter from the Consulting Architect
to fort, & note thereon by the Chief Engr, regarding
the actual condition ^{of the brickwork &c} found to exist during
the demolition of the Tower of the Condamara
Public Library, Madras.

BACK PAPERS.

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FURTHER PAPERS.

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CURRENT No. 904 (2nd.)

BUILDINGS AND ROADS.
CIVIL WORKS.

Government {1898} of Madras.
PUBLIC WORKS.

Order No 453 of 26-7-98
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To The Supd. Govt. Mus. Sec.

G.O., No. 1781 W., 13th July 1898.

JULY.

Tower of the Connemara Library at Madras

Recording, with remark, letter from the Consulting Architect, with note thereon by the Chief Engineer, showing the actual condition found to exist during the demolition of the —, and observing that the superior officers of the department concerned cannot escape responsibility and blame for passing the faulty design of the building.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

READ—the following papers :—

From G. S. T. HARRIS, Esq., Consulting Architect to Government, to the Chief Engineer, Public Works Department, dated Chépâk, 6th May 1898, No. 346.

With reference to your memo., No. 2266 C., dated 20th April 1898, I have the honour to state that with my No. 1446, dated 20th August 1897, I submitted you a very full report, indeed, on the demolition to the 2nd storey of the tower and of the storeys, and find that I cannot add much to what was written in the above report about the materials, their bedding and the workmanship there shown. I would wish to put on record the actual condition the brickwork in the piers was found to be in: and how far it justified the *fat* of the committee, which advised the demolition of the tower.

2. As it was practically the conditions of the two staircase piers which influenced the decision of this committee, I shall now refer only to them though the condition of the others was by no means satisfactory.

3. The brickwork showed, as a matter of course, the greatest signs of failure immediately beneath the porch arches; these arches I had carefully removed and I then examined the brickwork on to which they were turned. The work in that portion hatched in blue * was shattered, hardly a whole brick was taken out, many were crushed, the mortar was dust, and it was easy to pick the work to pieces by the hand: that portion hatched in red was in a very similar condition, but not quite so bad. Every tread of the staircase was broken.

* See plan sent with this.

(Initld.) G. S. T. H..

4. It should be stated that gauged bricks were not employed in the construction of the stair wells, so as to form voussoirs accurately radiating to the centres, and laid to break bond layer by layer; instead of this bricks and bats were used and were coarsely laid, naturally leaving with this small radius wide gaping joints at the extrados, which joints were roughly filled in with chips and mortar; the bricks, too, were of different thicknesses, thereby entailing very thick bed mortar joints to level up the beds.

5. Not only was the brickwork in a shattered state in the several layers, but in three places cracks had occurred downwards and through portions of the brickwork under the cornice; this can be seen in photographs Nos. 1, 2, 3 and 4.

6. It seems to me obvious, taking into consideration the size, shape and the top— heavy nature of this tower—that the four piers on which it stood should have been designed with a view to great rigidity and balance. In nearly all structures the maximum stresses are confined to very limited portions of the structure. In this tower it was evident that the shafts of the four piers below the porch arches were by far the most heavily loaded portions, but the section shows how much weaker were the piers on the library side than those on the museum side, owing to the stairway voids. It looks as if the staircases were forgotten and then provided for by inserting circles within the piers. I do not agree with Colonel Pennycuik that there was no defect in the original design. At p p p the brickwork was found to be 14 to 15 inches thick and on to the springing plane which slightly widened towards extremities (hatched blue) were turned arches four bricks thick (20 inches). At the springing line, at these points the haunches of the arches lay bare within the staircase wells. It was not possible at these points to complete any ring to encase the wells and travelling along the haunches upward, the steining could have been of no strength; it could not in fact have been complete till the horizontal distance of the haunch was equal to the width of the steining. In actual construction the arch was turned, and the well built in at these places anyhow. It may be said that the staircase treads would offer resistance; they possibly might if strong enough, but were broken to pieces.

7. The crushing strength of the best mortars is from 150 to 200 lb. per square inch, say 9 to 13 tons per square foot; what the strength of the kind of mortar in the tower is I do not know, but the mischief began undoubtedly when its yield point was reached. Brickwork at its best must be treated as a heterogeneous, not as a homogeneous substance—the results obtained from experiments as to the strengths of brickwork are very fallacious. It is not likely that in the columns built for experiment that either inferior bricks or mortar are used, nor would the work be scamped; the joints will be clean struck, and the bond perfect. Moreover, these experiments are all made upon low masses, and strength decreases with the proportion of the height to the thickness. Failure in brickwork starts at about half of its ultimate crushing strength, and I am inclined to urge a factor of safety of at least one-eighth.

Note by the Chief Engineer, Public Works Department.

I submit, herewith, a report from the Consulting Architect of the actual conditions found to exist during the demolition of the tower of the Connemara Library.

2. I inspected the tower twice in company with the Consulting Architect, during the demolition of the two lowest stories, and can fully endorse all he says about the condition of the materials:

- (1) Bricks of all sizes and shapes were used.
- (2) Mortar joints were of all thicknesses.
- (3) At the point of greatest pressure, marked blue in plan, nearly every brick was cracked or shattered, and all the mortar was crushed to powder.

It would be impossible to obtain more conclusive evidence, both of faulty design and unskilful execution. I consider that the decision arrived at by the committee and endorsed by Government to at once demolish the tower has been amply justified by the conditions disclosed during demolition.

(Signed) W. B. DEWINTON,
Chief Engineer.

18th June 1898.

ORDER—No. 1781 W., dated 13th July 1898.

The letter from the Consulting Architect and the final note by the Chief Engineer read above, will be recorded in continuation of G.O., No. 3527 W., dated 16th December 1897, and copy will be forwarded to the Secretary of State.

No. 1781 W., 13TH JULY 1898.

2. His Excellency the Governor in Council observes that from the present report it appears that not only were the materials bad but the design also, inasmuch as the section of the staircase piers was entirely inadequate to withstand the heavy pressure to which it was exposed. For passing this faulty design, the superior officers of the department concerned cannot escape responsibility and blame.

[Here enter No. ³₁₇₈₁ W., dated 13th July 1898.]

(True Extract.)

A. K. M. S.

Under Secretary to Government.

To the Consulting Architect to Government.
 „ H. Irwin, Esq., C.I.E.
 „ Superintending Engineers.
 „ the Chief Engineer for Irrigation.
 „ the Consulting Engineer for Railways.
 „ the Superintendent of Works, Lighthouse division.
 „ the Educational Department.

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READ AGAIN G.O., No.
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DATED

CURRENT No.

ENCLOSURES TO G. No.

ORDER OF GOVERNMENT A A A A A A A

LETTER OF GOVERNMENT.

STATEMENT WITH DITTO.

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