MADRAS, D. P. W.,

No. 5005 / F

Chepauk, 26 May 1886.

From,

THE EXECUTIVE ENGINEER,

Presidency Division,

To,

THE *Superintending Engineer,*

Vellore.

SIR,

I had the honor to receive yesterday (25th Instant) the Extract from G. O. No. 1257 W of 18 May 1886 forwarded to me with your Endorsement No. 735 of 20 May 1886, calling upon me to explain my action in the matter of the Coonoor Church Roof.

2. I request you will be so good as to submit the following explanation to Government.

3. When the sum of Rs 781 sanctioned at the end of last year (1885) for the repairs of portions of the roof was found to be totally inadequate, I at once began to consider the best means of thoroughly

thoroughly repairing the whole roof.
I inspected the building on the 26th
of January 1886 and again visited
Cochin and inspected the Church
with the Supg Engineer Nilgiri Circle on
the 17th of February 1886. He saw
and acknowledged that the roof required
much more thorough and extensive
repairs than had been thought
necessary in last year. I then
proposed substituting Trusses and
purlins for the old, heavy kingpost
couple roof, with suitable rafters
and battens to carry the new cor-
rugated Mission tiles – with or
without planking under the tiles,
as funds might or might not
be available.

I selected from a number of designs
a form of truss which I considered
would harmonise best with the
pitch of the roof and the building
generally. There were certain details
connected with this particular
design about which I was in
doubt. I consulted the Supg

Engr

1 – 00 to 6 L. 1 done

Engineer and with his approval
wrote to Mr Chisholm and
Captain Lane R.E. for their
views. On the 18th, 19th, 20th
and 21st of February, during
the voyage from Cochin to
Mangalore by Steamer the R.E.
Cochin Church roof was
a subject frequently dis-
cussed with the Supg
Engineer, who meanwhile
had been good enough to
procure tracings for me
from the Executive Engineer,
Nilgiri Division, of trusses
put up in one of the Churches
at Ootacamund and the
new Church at Wellington.

Subsequently, on my
receiving a reply from
Captain Lane to the questions

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I put him regarding the truss
I proposed to adopt. I
laid the design again before
the Supg Engineer and on
my adopting a certain mo-
dification proposed by
him he finally approved
of the design.

I accepted this as sufficient
authority to go on with the
repairs of the roof. I was
never told not to do so.
On the contrary I understood
the Supg Engineer to be anxious
that the repairs should be
carried out before the
Monsoon.

4— After the form of trusses
had been decided upon, the
only question remaining
unsettled as far as I knew
was

was — whether or not, planking
should be put under the
tiles — and this I understood
would be settled by the
Supg Engineer in accordance
with his being able to
provide funds or not.

5— Being called upon to
make this explanation takes
me completely by surprise.
I have no records to refer
to, and all the demi official
letters I received from the
Supg Engineer on this and
other subject I destroyed
when transferred to the
Presidency District.

I can only state broadly
that I clearly understood
that the repairs of the roof

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doubt. I consulted the Supt Engr

were to be carried out in
the best and quickest way
possible before the Monsoon,
and that money for the
roof I proposed to put on
it, viz: from Rs 15,000 to
Rs 18,000 would be forthcoming.
I also believed that the Supt.
Engineer was as intimately
acquainted with all that
had been and was being
done in the matter as I
was myself.
6— I nurture to express a
hope that in this matter,
the Sub Divisional Officer,
Sergeant MacAlister may
be held clear of all blame.
I accept the responsibility

for all that he may have done
under my orders.

I have the honour to be
Sir
Your most obedient servant

Ron Thompson Colonel R.E.
26.5.86

No. 1981 C of 29th May 1886.

Forwarded to the
Superintending Engineer
IV Circle, for remarks
and return

Pmaddenwar
Col RE.
29-5-86
Chief Engineer P.W.D.

UPR. ENGINEER'S OFFICE
No. 4020
31 MAY 86
P. W. D.
FOURTH CIRCLE

From,

THE EXECUTIVE ENGINEER,

Presidency,

To,

The Sup.g Engineer
V Circle.

No. 5005/5.

Dated 26 } May 1886.
Recd. 26 }

P. W. Dept.
To be returned with reply.

Subject.

Cochin Church-

Submits explanation regarding repairs carried out to the roof of ——.

To
The Supdg: Engr: IV circle

28/5/86

No. 189 / E.M.

Superintending Engr's office, Coimbatore. 2nd June 1886.

From,

The Superintending Engineer,
Fourth Circle.

To,

The Chief Engineer.
P. W. Department.

Sir,

I have the honor to return herewith the letter of the Executive Engineer, Presidency Division, No. 5005 of 6th May 1886 with the following remarks:

2. That officer observes in para 5 of his letter "I have no records to refer to," but he would find if search were made in the Division office at Calicut that the only two documents bearing on the case are:-

(1). Chief Engineer's Memorandum No. 1,916 C of 21st November 1885, giving instructions "to have the building carefully examined and to submit an estimate for placing it in thorough repair"; and

(2) My endorsement No. 634 of 24th November

Enclosure 1.

× Received with No. 1981 C dated 29th May 86.

November 1885 calling for the estimate and observing that the sum of Rs: 781 already sanctioned might be applied in "the thorough repairs of a portion of the roof". At that time entire reconstruction was not supposed to be necessary.

3. The Executive Engineer's mistake appears to have been that of confounding together as one, two totally different operations, viz, "repairs" and "new work". He appears to have quite overlooked the fact that according to the rules of the Department, new work, such as the entire reconstruction of a roof on a new plan, or repairs costing more than a fourth of the value of a building, are not within the powers of sanction of a Superintending Engineer.

4. As soon as I became aware that it was impossible to simply "repair" the roof (i.e. that it must be entirely taken down and renewed at considerable cost), I became urgent for the submission of a plan and estimate, and if the Executive Engineer could refer to any of my demi official letters on the subject, he would find that the only work I considered emergent was the submission of a plan and estimate, that there was not a word in any of them that could be interpreted as authorizing him to commence or push on with the work of reconstruction.

5. The probable cost was never once mentioned to me either orally or demi-officially, and how he could have understood that I as Superintending Engineer, could guarantee that Rs: 15,000 to Rs: 18,000 would be forthcoming, as stated in para 5 of his letter I cannot imagine. The total Budget allotment of the Division for "Repairs Civil Buildings, Provincial is only Rs: 3,000.

officially

6. The latter part of para 3 of the Executive Engineer's letter however

- ever

however appears to afford the clue to the misunderstanding. He there writes, "On my adopting a certain modification, the Supg: Engineer finally approved the design". So far he is quite correct; but then he goes on as follows:—

"I accepted this as sufficient authority to go on with the "repairs" of the roof. I was never told not to do so". But what the Executive Engineer proposed to do was not to "repair" the roof but to re-construct it on a new design, and I never dreamt of his putting such a work in hand without a sanctioned plan and estimate, or I would have forbidden it at once. The mere approval of design, too, is no authority to commence work.

7. He should have remembered the standing rules of the Department,

(1) That no work is to be undertaken, or liability incurred, without a sanctioned

sanctioned plan and estimate.

(2) that if an Executive Engineer considers any work emergent he should apply for written sanction to commence.

8. If it had been possible to "repair" the Lochin Church roof, at a moderate cost before the monsoon, the work might have been considered emergent; but even in that case an estimate should have been submitted, or its approximate cost reported, and written sanction applied for. But nothing of this kind was done.

9. In my experience of the working of the Department, there is no more fruitful source of worry and inconvenience than the improper habit of some Executive Engineers in ignoring these two fundamental rules of the Department that

I

I have quoted above.

I have the honor to be,

Sir.

Your most obt. Sv.

L. Scott. Colonel R.E.

Superintg. Engr. Texas.

Lr 1981 C. 29.5.86
Bkw 1257 W 18.5.86
Lr 1111 / 1112 C. 18.3.86
" 1916 C. 24.11.85
G.O. 83 W. 10.1.83
Lr 2170. 8.2.83.
" 2210. 31.1.83

From

The Superintending Engr.

5th Circle.

To,

The Chief Engineer.

P.W. Department.

Dated 2nd
Received } June 1886.

No. 189
E W.

Enclosure /

Cochin Church—

Returns the letter from the Executive Engineer Presidency Division regarding unauthorized expenditure on the— with certain observations.

Dep. S. 3076. Cir 1076.
G.O. 5.6.86 : 12.6.86

No. 1527 W.

PUBLIC WORKS DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the

again

READ the following

Letter from the Supdg Engr IV Circle No. 138 Ew. dt. May 10. 1886.

G.O. No. 1257 W dated May 18. 1886.

Read also:—

Letter from the Ex. Engr Presy Div (No. 5005/5 dt. May 26. 1886)

" " the S.E. IV Circle (" " 189/Ew. dt. June 2nd ")

In his letter No. 138 Ew. dated 10th May 1886, the Supdg Engineer IV Circle reported that he had received from the Executive Engineer West Coast Division an estimate of

£ 18,000 for reconstructing roof of the church at Cochin, work on which had been commenced without sanction, and that liabilities to the extent of £ 7,900 had been incurred.

2. Colonel Ross Thompson, R.E., Executive Engineer Presidency division, and late Executive Engineer West Coast division, the officer responsible for the irregular outlay, having been called upon for explanation in G.O. No. 1257 W. dated 18th May 1886, now reports that his design for reconstructing the roof of the church having been approved by the Supdg Engineer, he accepted that as sufficient authority to go on with the work, that he was never told not to do so; that he understood that the repairs to the roof were to be carried out in the best and quickest way possible, before the monsoon; and that he believed the Supdg Engr

C was intimately acquainted
with all that was being
done.

3. The Supty Engineer,
on the other hand, remarks
that the Executive Engineer's
mistake appears to have
been that of confounding
together two totally
different operations,
"repairs" and "new work;"
and that he appears
to have overlooked the
fact that, according to
the rules of the dept,
new work such as entire
reconstruction of a roof

C. S. 6.86

or a new floor, or
repairs costing more than
a fourth of the value
of a building, are not
within the powers of
sanction of a Supty
Engineer. Colonel Beatty
states
acknowledges that he
approved the design
submitted by Colonel
Rose Thompson, but
adds
states that, while he was
urgent for the submission
of the plan and estimate,
he gave no authority
either written or verbal
for the commencement

as of the work. He properly
th points out that the
on Executive Engineer "should
"have remembered the
"standing rules of the
"Department:—
"(1) that no work is to
"be undertaken, or
"liability incurred,
"without a sanctioned
"plan and estimate;
"(2) that, if an Executive
"Engineer considers any
"work emergent, he
"should apply for
"written sanction to
"commence."
4 It seems clear from

the Supply Engineer's
letter (copy of which
will be furnished to
Col. Rees Thompson)
that the late Executive
Engineer of the West
Coast division incurred
expenditure on the Cochin
Church without any
authority, and has
apparently committed
the Government to a
large outlay. Even
on his own showing,
his action in this
matter has been highly
irregular and in
contravention of all rule

It is a matter of great surprise to the Govt. that an officer of Colonel Thompson's long standing should have shewn himself to be so ignorant of the fundamental rules governing expenditure in the P.W.D.

5. The particulars of the revised estimate called for in G.O. No 1257 W dy 18th May 1886, should be expedited.

17/6/86

10.6.86

Ord. Sold Cartage

Ex 5-6-86

I.S. 17.6.86

No 152 dy 17/6/86

X

S.E. IV Circle Dated 17/6

S.E. V Circle

for communication to

Col Ross Thompson

Entd in R.R. Dated 17/6

P.W. Department

No 3460 C dy 24th Aug/86

Memorandum

From the Supdg. Engr. IV circle No 321 E.W. dy 24th August 1886 Submitting alternative estimates for repairs and improvements to the Cochin church.

In the report which accompanies the Estimates it is stated that the form of truss which has been prepared ~~& ... &~~ was designed after a pattern given in Carpentry Tredgold's, but ~~the~~ structure does not appear to be ~~like any that can be found~~ any truss resembling it in that book. The scantlings of the trusses over the nave and over the chancel are exactly similar

though the span of the former is 37', and that of the latter 25'-9". It appears therefore that there must either be an excess of timber in one or a deficiency in the other – and it seems desirable that the trusses for the larger span should be carefully tested.

2. It seems probable that the form of truss adopted will bring a considerable thrust on the walls which are 35' high and 3'-6" thick and whether they will be able to stand the thrust is open to question. ~~Buttresses have been provided but they are about~~ ~~20' apart.~~

3. The plans and estimates are therefore returned to the Supdg. Engineer in view to their early resubmission accompanied by ~~some~~ calculations regarding the roof.

4/10/86

4/10/86.

F.B. 4.10.86.

To.

The Supdg. Engr. IV circle with papers Complete } Dated 6-10-86 with 9 Enclosures
O.S.

5TH NOVEMBER 1886, No. 2920 W., PUBLIC WORKS.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

General.
Account.

READ—the following papers :—

From Colonel J. BEATTY, R.E., Superintending Engineer, IV Circle, to the Chief Engineer, Public Works Department, dated Coimbatore, 16th October 1886, No. 396 E.W.

I have the honor to forward the accompanying three statements of savings and demands under Imperial, Provincial, and Excluded Local.

2. Some further saving on the Malapuram barracks is anticipated, which will be reported in statements of savings and demands to be submitted in January 1887.

3. The only item requiring special notice in the Provincial statement is No. 25, "Erecting a fountain for the Adam Memorial, Ootacamund." The estimate for this work will be exceeded by Rs. 1,000 under the sub-head "Carriage and fixing," &c. As the excess is nearly 6 per cent. on the amount of the estimate, Rs. 16,850, the sanction of Government is necessary to admit the excess outlay.

4. The Executive Engineer reports that there is not likely to be any further excess on the estimate for this work.

5. The outlay for the first five months of the official year, April to August, was small for the following reasons :—

(1) The budgets were received as follow :—

1. Imperial, Postal, 30th April 1886.
2. Do. Military, 8th May „
3. Provincial, 8th May 1886.
4. Irrigation, 19th „ „

Until receipt of the budgets, the only works that could be proceeded with were new works in progress in last official year, and emergent repairs.

(2) Large allotments were made to the circle towards end of June * and in July.† No special allotments were made in April or May.

* Rs. 196,677 † Rs. 38,645

Of course, after allotments are received, tenders have to be invited, contracts settled, and time given to the contractors to commence work. After special allotments are made, a period of two to three months is needed before outlay begins to appear in the accounts; and it is to be noted that in this case the budget allotments, which came late, amounted to Rs. 4,21,883 and the special allotments to Rs. 2,35,322.

6. Another great cause of delay which must be taken into account is the fact that the best part of the working season, April, May and June, was lost this year, owing to the delay in receipt of budgets and sanction of special allotments.

7. Every endeavour, however, is now being made to spend the allotments, and further statements of savings and demands will be submitted in January 1887.

From the same officer, dated Salem, 23rd October 1886, No. 407 E.W.

I have the honor to request you will be good enough to include the undermentioned works in the statements of savings and demands submitted with my letter, No. 396, of 16th instant.

	RS.
I. Improvements to a portion of the Lawrence Asylum buildings, estimate Rs. 2,760, sanctioned in G.O., No. 2387 W., of 20th September 1886; amount required for current year	2,000
II. Constructing a well on the site of the new camping ground at Jalárpet, estimate Rs. 495	495
III. Constructing a culvert on the road from the cattle lines to barracks at Cannanore, estimate Rs. 103	94

2. The Military authorities are unable to find funds for the last two works. The last work was completed at an outlay of Rs. 94 under the authority of a letter from the Deputy Assistant Quartermaster-General, Western District, Cannanore.

ORDER—dated 5th November 1886, No. 2920 W., Public Works.

The following sums, surrendered under Provincial, are resumed and credited to the reserve with the Government under that head:—

	RS.
1. Collector's office at Calicut	20,000
2. Residence for the Assistant Superintendent of Police at Malapuram	1,766
3. Additions and improvements to Government House, Ootacamund.	10,000
4. Exercise-yard for European convicts at the Ootacamund jail ...	1,000
5. Extending the Coonoor cemetery	250
6. Bazaar drainage scheme, Ootacamund	4,000
7. Water-supply project, do.	15,000
8. Well in the compound of sub-magistrate's office at Gúdalúr ...	47
9. Miscellaneous Public Improvements, Repairs, Nílgiri division ...	6,585
Total ..	58,648

2. The following appropriations are made from the Provincial reserve:—

	RS.
1. Residence for the Head Assistant Collector at Coondapoor ...	1,265
2. Law courts at Calicut	12,320
3. Re-roofing and repairing the Cochin church	8,000
4. Sub-registrar's office at Kudavayúr	181
5. New Breeks' Memorial School, Ootacamund	10,000
6. Converting the cinchona laboratory at Ootacamund into an herbarium	730
7. Painting the Government offices, Stonehouse Hill	1,070
8. Providing lightning-conductor to the district munsif's court at Tellicherry	360
9. Rest-house with out-houses on the Coonoor ghât	348
10. Constructing a road on Mountstuart, Ootacamund	5,000
11. Do. a rough-stone culvert in front of Oakes' shop on Church Hill, Ootacamund	60
12. Erecting a fountain for the Adam Memorial, Ootacamund ...	1,000
13. Adding an office-room to the upper-storey of Government offices, Stonehouse Hill	1,500
14. Civil Buildings, Repairs, West Coast division	6,576
Total ..	48,410

3. Allotments have not been provided for the new works detailed in the margin, the funds at the disposal of Government to meet other emergent demands being limited.

1. Improvements to the district munsif's court at Tellicherry.
2. Alterations to the fort buildings (old jail) to be used as a Sub-Collector's office at Tellicherry.
3. District munsif's court at Kárúr.
4. Constructing a rough-stone revetment on No. 3 section, 3rd mile, 1st furlong, Kullár-Gúdalúr road.
5. Improving the margin of Ootacamund lake.

4. Explanation should be submitted as to why it is proposed to debit to Provincial funds the cost of alterations to certain buildings in the fort at Tellicherry to fit them for use as municipal offices.

5. The Superintending Engineer will report whether the allotments required under Communications, Repairs, in the Nílgiri division, can be met from the lump sum grant to that division.

6. Under Imperial, Military, the surrenders of grants proposed by the Superintending Engineer amount to Rs. 10,300, and the total additional funds applied for amount to Rs. 18,218, as detailed in the margin. As there are no funds available with the Government under this head, the appropriations proposed by the Superintending Engineer will be reduced to the amount surrendered.

	RS.
Major Works	4,200
Minor do.	12,818
Repairs	1,200
Total ...	18,218

7. The sum of Rs. 300 surrendered from the grant for adding five bath-rooms to the Paymaster Sergeant's quarters, Wellington, will be resumed and added to the Minor Works grant of the West Coast division, and the sanction of the Government of India to the following transfers will be applied for:—

From	RS.	*To*	RS.
Constructing barracks for a detachment of British Infantry at Malapuram	10,000	Bakery at Wellington	1,276
		Converting the Cannanore fort into a defensive post	924
		Improvements to a portion of the Lawrence Asylum buildings, Ootacamund ,, ...	2,000
		Minor Works	4,600
		Repairs	1,200
		Total ..	10,000

The Superintending Engineer will, in the meanwhile, submit a revised statement restricting his demands for Minor Works to Rs. 4,600, which sum will be distributed on receipt of the sanction of the Government of India to the above transfers.

8. As there is no reserve with the Government under Postal, the Superintending Engineer will apply to the Director-General of Post Offices for the sum of Rs. 40 required for additions to the post office at Kotagiri.

9. The sum of Rs. 340 required for the Nílgiri division under Telegraph, Repairs, is allotted from the reserve with the Government under that head. The allotment of Rs. 230 required for the Coimbatore division under Postal, Repairs, cannot be appropriated, no funds being available.

10. The sum of Rs. 40 surrendered from the grant for the Nílgiri division under Postal, Repairs, is resumed and held in reserve with the Government under that head.

11. A sum of Rs. 190 was provided (*vide* G.O., No. 2463 W., dated 23rd September 1886), for dropping stone along the toe of the revetment on the lagoon side of the Cruz Milagre dam. The question of allotting funds for the other works under

Excluded Local, brought forward by the Superintending Engineer, will be considered in the Financial Department. The amount required is shown below :—

	Works.	Establish-ment.	Tools and Plant.	Total.
	Rs.	Rs.	Rs.	Rs.
1. Improvements to the lightning-conductor of the Mangalore light-house ...	135	31	1	167
2. Providing the light-house at Tellicherry with a lightning-conductor	176	40	2	218
Total ...	...	...	...	385

12. With respect to the Superintending Engineer's explanation of short outlay in the first five months of the year, it is remarked that the preliminary issues of the budget estimates for 1886-87 were circulated in December 1885, and, excepting works for which estimates had not been sanctioned, it was open to the Superintending Engineer to make preliminary arrangements for the commencement of other works entered therein. It is not practicable to circulate the final issues of the budgets before the end of April each year, and those for 1886-87 were not issued later than usual. With respect to the special allotments made in June and July, the majority of them were given as applications were received from the Superintending Engineer, and one large allotment granted in compliance with the Superintending Engineer's statement of demands was not included in the budget owing to the failure of the Superintending Engineer to include it in the circle budget (*vide* paragraph 10 of G.O., No. 1594 W., dated 2nd June 1886).

(True Extract.)

(Signed) J. O. HASTED, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintending Engineer, IV Circle.
" Examiner, Public Works Accounts.
" Revenue Department.
" Judicial "
" Ecclesiastical "
" Educational "
" Financial "
" Marine "
" Military "

Exd. E. Fernandez.
Spare Copies

GENERAL.
ACCOUNT.

Govt. of {1886} Madras.

PUBLIC WORKS.

Dated November, 5th.

Recd. *Encl.*

G.O., 5th Nov. 1886, No. 2920 W.

NOVEMBER.

Funds

Orders on the statements of savings and demands under Imperial, Provincial, and Excluded Local, submitted by the Superintending Engineer, IV Circle.

Nov 5

Memo.

The Supdg Engr IV Circle is requested to expedite the resubmission of the estimate for re-roofing the Govt Church at Cochin, accompanied by the information called for in this office memo No. 3460 C/87 6 Oct 1886.

Jcu 24/11/86.

S. E. IV circle 24/11

No. 460
E. W.

Superintending Engr's Office, &c.
Coimbatore, 2nd December 86

From,

The Superintending Engineer
IV Circle.

To,

The Chief Engineer,
P. W. Department

Sir,

With reference to your memorandum No. 4169C of 24th Ultimo I have the honor to explain the cause of delay in resubmitting the estimate for reroofing the Government Church at Cochin.

2. As the present Executive Engineer, who will have to carry out the work, had never visited Cochin, or seen the Church or the work already done, I considered it desirable he should have an opportunity of reporting his opinion after personal inspection.

3. He has quite recently visited Cochin

Cochin and I expect his report
at an early date which will
be submitted with the information
called for.

I have the honor to be,
Sir,
Your most obt Se't,

E. Beatty. Colonel, A.C.
Superintending Engr. 4th Cir.

Recorded—

4.12.56

4/12/86

From

The Supg: Engineer

4th Circle

To,

The Chief Engineer

P.W. Department.

Dated 27th December 1886

Received

No. 460 E.W.

Government Church, at Cochin—

Explains the cause of delay in resubmitting the estimate for reroofing the—

No 4169 C of 24-11-86
" 3460 C " 6-10-86
" 1527 C " 17-6-86
" 1287 W " 18-5-86
" 1987 C " 29-5-86
" 1111/1112 C " 18-3-86
" 2053 C " 4-12-85
" 1916 C " 21-11-85
" 2110 W " 9-9-85
" 83 W " 10-1-83
" 2770 " 8-2-83
" 2210 " 31-1-85
" 827 C " 14-4-82

27th January 1887, No. 242 W., Public Works.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following papers :—

From Colonel J. BEATTY, R.E., Superintending Engineer, IV Circle, to the Chief Engineer, Public Works Department (through the Venerable the Archdeacon of Madras), dated Cannanore, 24th August 1886, No. 321 E.W.

As directed in G.O., No. 1257 W., of 18th May 1886, I have the honor to submit, herewith, a revised estimate for putting in thorough repair the Government church at Cochin.

2. The report accompanying the estimate gives a history of the circumstances under which this estimate was framed, from which it will be seen that the principal work to be done is that of renewing the roof which, through age and decay, had fallen into a dangerous state.

3. Two estimates are submitted—one shows the cost of renewing the roof with cedarwood planking under mission tiles on trusses, purlins, rafters and reepers of teakwood, and amounts to Rs. 21,290; the other estimate for roofing with corrugated iron and mission tiles on teakwood trusses, purlins, stiffeners and reepers, amounts to Rs. 20,000.

4. The more expensive work, with cedar planking, is preferred by the Chaplain and Lay Trustee, who have accordingly countersigned that estimate.

5. The Executive Engineer estimates the weight of the old Dutch roof per running foot to be 3,050 lb., and I estimate the new roof, with mission tiles and cedarwood planking, would weigh about 1,900 lb. per running foot, while the roof covered with iron and mission tiles would weigh about 1,725 lb. per running foot. The proposed new roof will therefore be much lighter than the old one.

6. It will be observed from the report, paragraph 14, that materials have been collected, and payments made to the extent of Rs. 3,228. Of this latter sum, Rs. 1,668 was spent in 1885-86; so that if the work is now sanctioned for execution on the estimate of Rs. 21,290, an allotment of Rs. 19,622 is required, and the Executive Engineer is of opinion that he could complete the repairs and improvements in two months.

7. The estimates are accompanied by a plan of the building and sections of the old roof and of the proposed new work. The walls are found to be of laterite in chunam throughout.

P.S.—The allotment now required, Rs. 19,622, may be met in part to the extent of Rs. 7,545 from savings on the allotment of the Coimbatore close prison, reported with revised estimate through the Inspector-General of Jails in my letter to the address of that officer, No. 257 M., of 18th August 1886.

From the Venerable J. F. BROWNE, B.D., Archdeacon of Madras, to the Chief Engineer and Secretary to Government, Public Works Department, dated Madras, 20th September 1886, No. 119.

I have the honor to forward a letter from the Superintending Engineer, IV Circle, submitting alternative estimates, amounting to Rs. 21,290 and Rs. 20,000, respectively, for re-roofing the Government church at Cochin.

2. In forwarding the above, I would remark upon the large sums asked for for re-roofing a church, in comparison with Government grants towards building churches, taken in connection with the number of members of the Church of England.

From Colonel J. BEATTY, R.E., Superintending Engineer, IV Circle, to the Chief Engineer, Public Works Department, dated Coimbatore, 29th December 1886, No. 482 E.W.

With reference to your memorandum, No. 3460 C., of 6th October 1886, I have now the honor to report further on the proposed restoration of the roof of Cochin church, and to re-submit the plans and estimates, with a letter * from the Executive Engineer, West Coast division, giving information on the points referred to in your memorandum.

* No. 819, of 16th instant.

2. I may first mention, as it was omitted in the original report, that the present Protestant church of Cochin is one of the oldest churches in India, having been built, it is believed, about the year 1505, by the Franciscan Friars who accompanied Vasco da Gama's expedition. And that celebrated man died at Cochin on December 24th or 25th, 1524, and was first buried in this church of St. Francis; but his remains were, fourteen years after, removed to Portugal. It is understood that His Excellency Sir Grant Duff decided that the building should be restored and kept in repair, because of its age and history, though it is many times too large for the present congregation.

3. With regard to the general nature of the design of truss which was to take the place of the old decayed couples and collar beams, I agreed with Colonel Ross Thompson that it should be of the form given at plate XII of Hurst's Tredgold (which is the book in use at Cooper's Hill College, I believe) with some modifications; the principal being that Tredgold's scantlings should, *for appearance sake*, be increased more than was necessary for strength, and that as there was no tie rod, the feet of the trusses should be made to abut against the inner faces of the walls in a better manner than they do in the plate above mentioned, so as to check the tendency to spread. I also sent the Executive Engineer to help him in preparing his design, copies of the plans of trusses in the new churches at Wellington and Ootacamund.

4. As already reported, the Executive Engineer, through some misunderstanding, and believing the work to be emergent, proceeded with it, in anticipation of sanction, and before submitting the plans and estimates; and when these came before me, the whole of the timbers for the trusses had been prepared, so that I had no opportunity of altering the plan, and could only telegraph to stop all work until orders of Government were received. As the span of the chancel was much the same as that of the Wellington and Ootacamund churches, I expected that similar scantlings at least would be adopted; but this was not done, so that the trusses for the chancel will be very much stronger than is necessary.

5. As the whole of the woodwork for the trusses has been prepared but not the ironwork of straps and bolts, I am only now able to propose some trifling modifications which will be seen by reference to appendices 1 and 2 of this letter.

6. You will observe from the Executive Engineer's letter that he is satisfied there is no necessity for tie rods; that the walls are strong enough to bear the thrust, &c. But from information obtained on the spot at a recent inspection I am doubtful—

(1) It is believed the walls are not solid throughout; that there are pockets in them, possibly filled with rubbish; at any rate that they are not thoroughly sound and reliable.

(2) The feet of the trusses, as designed and timber prepared, do not abut against the inner faces of the walls so strongly as in the Wellington and Ootacamund trusses.

(3) It is true the walls have hitherto withstood the thrust of a heavier roof, but the weight of that roof was distributed very evenly over them; whereas in the case of the new roof it will be brought to bear on them at intervals of about 10 feet, and in some places where the wall is not directly supported by the buttresses.

(4) But my chief reason is that I consider the Executive Engineer has not made sufficient allowance in his calculation for wind pressure.

For these reasons I am of opinion that tie rods should be provided.

7. The following are my calculations:—

I take the weight of 10 running feet of roof, including one truss, at 16,000 lb., to which I add, for wind pressure, at 40 lb. per square foot on a vertical plane in line with the ridge of the roof, $26 \times 10 \times 40 = 10{,}400$ lb. This makes a total pressure of $16{,}000 + 10{,}400 = 26{,}400$ lb. $= 11{\cdot}6$ tons; applying this in the formula—

$$H = \frac{W.S.}{4R.}$$

where H = tension of tie rod
S = half the span = $19\frac{1}{2}$ feet
R = rise = 26 feet

$$\text{then } H = \frac{26{,}400 \times 19\frac{1}{2}}{4 \times 26} = 4{,}950 \text{ lb.} = 2\frac{1}{4} \text{ tons nearly.}$$

A tie rod of 1 inch diameter, as proposed by the Executive Engineer, might be sufficient, but I propose one of $1\frac{1}{4}$ inch diameter as it is better to allow an excess of strength; and applying these values of H and W in the formula—

$$T = \sqrt{H^2 + \frac{W^2}{16}}$$

where T = thrust along the principal rafter

$$\text{we get } T = \sqrt{2{\cdot}25^2 + \frac{11{\cdot}6^2}{16}} = \sqrt{5{\cdot}06 + \frac{134{\cdot}56}{16}}$$

$$= \sqrt{5{\cdot}06 + 841} = \sqrt{13{\cdot}47}$$

$$= 3{\cdot}67 \text{ tons} = 8{,}220 \text{ lb.}$$

so that the principal rafter, having a section of 54 square inches, is superabundantly strong. But, as I mentioned above, in these Gothic trusses I believe it is usual, *for appearance sake*, to use scantlings much greater than is actually necessary.

8. Again, to determine the thickness of timber necessary at the weakest point * of the truss, taking, as the Executive Engineer does, half the maximum pressure, which I find to be 13,200 lb., and supposing it distributed over the lower, 16 feet of one side of the truss, supported at one end by the wall and at the other by the circular rib, I use the formula—

* Marked A in red ink on appendix 2.

$$D = \sqrt{\frac{WL}{8KB}}$$

where W = 13,200 lb. = 118 cwt. nearly
L = 192 inches
K = 19 for teak
B = 6 inches

$$\text{then } D = \sqrt{\frac{118 \times 192}{8 \times 19 \times 6}} = \sqrt{\frac{22{,}656}{912}}$$

$$= \sqrt{24{\cdot}84} = 4{\cdot}98$$

$$= 5 \text{ inches nearly,}$$

but the truss will be 15 inches thick at its weakest part, so it should be amply strong.

In the appendices I have given—

(1) The form of truss originally proposed.

(2) The form of truss now proposed.

(3) The form of truss at St. Thomas' church, Ootacamund.
(4) The form of truss at Wellington church.
(5) My calculation of the weight of roofing.
(6) Enlarged plan of stirrup and shoe.

9. As soon as it is finally decided what the truss is to be, and the description of tie rod, &c., I propose to have one of the principal trusses tested on the ground with its ordinary load; but of course this will not be a certain test of its standing the maximum pressure it would have to bear in a first-class storm or cyclone.

10. I have corrected the Executive Engineer's estimate, allowing extra for iron-work of ties and suspending rods, and Rs. 500 for scaffoldings. As the building is so wide and lofty, and the trusses so heavy, I think a provision for scaffolding allowable in this case.

11. As already explained in paragraph 3 of my letter, No. 321, of 24th August 1886, two estimates are submitted; one shows the cost of renewing the roof with cedarwood planking under mission tiles on trusses, purlins, rafters and reepers of teakwood,* and amounts, as revised, to Rs. 22,540; the other estimate provides for roofing with corrugated iron † and mission tiles on teakwood trusses, purlins, stiffeners and reepers, and amounts, as revised, to Rs. 21,250. The more expensive work, with cedar planking throughout, is preferred by the Chaplain and Lay Trustee, and they have countersigned that estimate.

* Malabar teak.

† In the nave, but cedar planking in chancel.

Note by the Chief Engineer, Public Works Department.

The estimates submitted by the Superintending Engineer, IV Circle, provide for renewing the roof of the Government church at Cochin.

2. The circumstances in which the work was commenced without the sanction of Government were noticed in G.O., No. 1527 W., dated 17th June 1886.

3. The Superintending Engineer submits two estimates—

(1) providing for cedar planking under mission tiles for the entire roof, amounting to Rs. 22,540; and

(2) providing for cedar planking for the chancel and corrugated iron under tiling for the nave of the church, the amount being Rs. 21,250.

4. Both estimates are large in amount, but it is desirable to restore the church on account of its historical associations, irrespective of the number of the congregation, for which it is admittedly too large.

5. The Chaplain and Lay Trustee prefer the larger estimate, but the undersigned considers that both on account of economy and durability, it would be preferable to use corrugated iron throughout the roof of the building. The second estimate has therefore been reduced to Rs. 20,680, and is recommended for sanction.

19th January 1887.

(Signed) J. O. HASTED, Colonel, R.E.,
Chief Engineer, P.W.D.

ORDER—dated 27th January 1887, No. 242 W., Public Works.

The estimate, amounting to Rs. 20,680, as amended by the Chief Engineer, for renewing the roof of the Government church at Cochin, is sanctioned.

2. A sum of Rs. 8,000 was allotted to the work in G.O., No. 2920 W., dated 5th November 1886, and a further appropriation of Rs. 9,000 is now made to it from the Provincial reserve with the Government. The balance required to complete the work will be provided in the budget for 1887-88.

3. This sanction has been registered as Provincial, No. 167 W. of 1886-87, and classified as Civil Buildings, Original Works.

(True Extract.)

(Signed) J. O. HASTED, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintending Engineer, IV Circle, with eighteen enclosures.
" Examiner, Public Works Accounts, with duplicate abstract estimate.
" Ecclesiastical Department.

Exd. P. L. Pereira.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1887} Madras.

PUBLIC WORKS.

Dated January, 27th.

Recd. *Encl.*

G.O., 27th Jan. 1887, No. 242 W.

JANUARY.

Government Church at Cochin

Estimate of Rs. 20,680 for renewing the roof of the —, sanctioned and an appropriation of Rs. 9,000 for the work, made.

No. 321
E.W.

Superintending Engr's office, 4th Circle
Cairnp. Coonoor 21st August, 1886.

From,

The Superintending Engineer
IV Circle.

To,

The Chief Engineer,
P. W. Department.

Through the Venerable the Archdeacon
of Madras.

Enclosures.
4. Plans.
2 Estimates
2 abstracts in duplicate
1 Report.

Sir,

As directed in G.O. No. 1257 W of 18th May 1886, I have the honor to submit herewith a revised estimate for putting in thorough repair the Government Church at Cochin.

2. The report accompanying the estimate gives a history of the circumstances under which this estimate was framed from which it will be seen that the principal work to be done is that of renewing the roof which through age and decay had fallen into a dangerous state.

3. Two estimates are submitted.

one

the cost of renewing the roof with cedar wood planking under Mission tiles on trusses purlins rafters and peepers of teak wood, and amounts to Rs: 21,290.

The other estimate for roofing with Corrugated iron and Mission tiles on teakwood trusses, purlins, stiffeners and peepers amounts to Rs: 20,000.

4. The more expensive work, with cedar planking, is preferred by the Chaplain and Lay Trustee, who have accordingly countersigned that estimate.

5. The Executive Engineer estimates the weight of the old Dutch roof per Running foot to be 3050 lbs. And I estimate the new roof with mission tiles and cedar wood planking would weigh about 1900 lbs per Rg: foot, while the roof covered with iron and Mission tiles would weigh about 1725 lbs per Rg: foot. The proposed new roof will therefore be much lighter than the old one.

6. It will be observed from the report para 4 that materials have been collected, and payments made to the extent of Rs: 3228. of this latter sum, Rs: 1668 was spent in 1885/86; so that if the work is now sanctioned for execution on the estimate of Rs. 21,290 an allotment of Rs. 19,622 is required, and the Exe: cutive Engineer is of opinion that he could complete the repairs and improvements in two months.

7. The estimates are accompanied by a plan of the building and sections of the old roof and of the proposed new work. The walls are found to be of laterite in chunam throughout.

I have the honor to be,

Sir,

Your most obt Servt

E. Beatty. Colonel, R.E.

Superintending Engr: 4th Circle

P.T.O.

P.S.

The allotment now required, Rs: 19,622 may be met in part to the extent of Rs: 7545 from savings on the allotment of the Coimbatore Conection, reported with revised estimate through the Inspector General of Jails in my letter to the address of that Office No: 257/m. of 18th August 1886.

P.W.D.
24/8/86

From,

The Supg: Engineer,
IV. Circle.

To,

The Chief Engineer,
P.W. Department.

Thro',

The Venerable Archdeacon
of Madras

Dated 24th August/86
Rec'd
No. 321
C.W.
Enclosures 9

Cochin Church Repairs and improvements.

Submits alternative Estimates amounting to Rupees, 21,290 and Rs: 20,000 for as called for in G.O. No. 1257 of 18th May 1886.

Madras 20th Sept. 1886

No. 119.

To The Chief Engineer and
Secy. to Government P.W.D.

Sir,

I have the honor to forward a letter from the Superintending Engineer IV Circle Submitting Alternative Estimates amounting to Rs 21,290 and Rs 20,000 respectively for re-roofing the Government Church at Cochin.

2. In forwarding the above, I would remark upon the large sums asked for, for re-roofing a Church; in comparison with Government grants towards building Churches, taken in connection with the number of members of the Church of England.

I have the honor to be,
Sir,
Your Most Obed't Servant,

J. J. Browne
Archdeacon of Madras

P.W.C. No. 7376.

Read: 21.9.86

Encl: 10
(4 plans)

No. 1482
E.W.

Supg: Engineer's office IV Circle
Coimbatore 29th December 1886.

From,

Colonel J. Beatty R.E.
Superintending Engineer
IV Circle

To,

The Chief Engineer
P.W. Department

Sir,

Enclosures: 19
Executive Engineer's letter No. 819 of 16th December 1886 with 12 accompaniments.
6 Appendices

× No. 819 of 16th instant.

With reference to your Memorandum No. 3460C of 6th October 1886, I have now the honor to report further on the proposed restoration of the roof of Cochin Church, and to resubmit the plans and estimates, with a letter× from the Executive Engineer West Coast Division giving information, on the points referred to in your memorandum.

2. I may first mention, as it was omitted in the original report, that the present Protestant Church of Cochin is one of the oldest churches in India, having been built, it is believed, about the

the year 1505, by the Franciscan Friars who accompanied Vasco da Gama's expedition. And that celebrated man died at Cochin, on December 24th or 25th 1524, and was first buried in this Church of St. Francis; but his remains were, fourteen years after, removed to Portugal. It is understood that His Excellency Sir Grant Duff decided that the building should be restored and kept in repair, because of its age and history, though it is many times too large for the present Congregation.

3. With regard to the general nature of the design of truss which was to take the place of the old decayed couples and collar beams, I agreed with Colonel Ross Thompson that it should be of the form given at Plate XII of Hurst's Tredgold (which is the book in use at Coopers Hill College, I believe) with some modifications; the principal being that Tredgold's scantlings should, for appearance sake, be increased more than

than was necessary for strength, and that, as there was no tie rod, the feet of the trusses should be made to abut against the inner faces of the walls in a better manner than they do in the Plate above mentioned, so as check the tendency to spread. I also sent the Executive Engineer, to help him in preparing his design, copies of the plans of trusses in the new churches at Wellington and Coty.

4 As already reported, the Executive Engineer, through some misunderstanding, and believing the work to be emergent, proceeded with it, in anticipation of sanction, and before submitting the plans and estimates; and when these came before me the whole of the timbers for the trusses had been prepared, so that I had no opportunity of altering the plan, and could only telegraph to stop all work until orders of Government were received. As the span of the chancel was much the same as that of the Wellington and Coty churches I

expected

expected that similar scantlings at least would be adopted; but this was not done, so that the trusses for the chancel will be very much stronger than is necessary.

5. As the whole of the wood work for the trusses has been prepared but not the iron work of straps and bolts, I am only now able to propose some trifling modifications which will be seen by reference to appendices 1 and 2 of this letter.

6. You will observe from the Executive Engineer's letter that he is satisfied there is no necessity for tie rods; that the walls are strong enough to bear the thrust, &c. But from information obtained on the spot at a recent inspection I am doubtful:—

I. It is believed the walls are not solid throughout; that there are pockets in them, possibly filled with rubbish; at any rate that they are not thoroughly sound and reliable.

II The feet of the trusses, as designed and timber prepared, do not abut against the inner faces of the walls so strongly as in the Wellington and Coty trusses;

III It is true the walls have hitherto withstood the thrust of a heavier roof, but the weight of that roof was distributed very evenly over them; whereas in the case of the new roof, it will be brought to bear on them at intervals of about ten feet, and in some places where the wall is not directly supported by the buttresses.

IV But my chief reason is that I consider the Executive Engineer has not made sufficient allowance in his calculation for wind pressure.

For these reasons I am of opinion that tie rods should be provided.

7. The following are my calculations:—

I take the weight of ten running feet of roof, including one truss, at

16,000 lbs

To which I add for wind pressure at

at 40 lbs per square foot on a vertical plane in line with the ridge of the roof

$$26 \times 10 \times 40 = 10{,}400 \text{ lbs}$$

This makes a total pressure of

$$16{,}000 + 10{,}400 = 26{,}400 \text{ lbs}$$
$$= 11.6 \text{ tons}$$

Applying this in the formula

$$H = \frac{WS}{4R}$$

where H = Tension of tie rod

S = Half the span = 19½ ft.

R = Rise = 26 ft.

then $H = \frac{26400 \times 19\frac{1}{2}}{4 \times 26} = 4{,}950$ lbs = 2¼ tons nearly

A tie rod of 1 inch diameter as proposed by the Executive Engineer might be sufficient, but I propose one of 1¼ inch diameter as it is better to allow an excess of strength.

And applying these values of H & W in the formula

$$T = \sqrt{H^2 + \frac{W^2}{16}}$$

where T = Thrust along the principal rafter

we get $T = \sqrt{2.25^2 + \frac{11.6^2}{16}} = \sqrt{5.06 + \frac{134.56}{16}}$

$$= \sqrt{5.06 + 8.41} = \sqrt{13.47}$$
$$= 3.67 \text{ tons} = 8220 \text{ lbs}$$

so that the principal rafter having a section of 54 sq inches is superabundantly strong. But as I mentioned above in these Gothic trusses I believe it is usual, for appearance sake, to use scantlings much greater than is actually necessary.

8. Again, to determine the thickness of timber necessary at the weakest point× of the truss; taking, as the Executive Engineer does, half the maximum pressure which I find to be 13,200 lbs, and supposing it distributed over the lower, 16 feet of one side of the truss, supported at one end by the wall and at the other by the circular rib,

× Marked A in red ink on appendix 2!

I use the formula

$$D = \sqrt{\frac{WL}{8KB}};$$

where W = 13,200 lbs = 118 cwt nearly

L = 192 inches

K = 19 for teak

B = 6 inches

then $D = \sqrt{\frac{118 \times 192}{8 \times 19 \times 6}} = \sqrt{\frac{22656}{912}}$

$$= \sqrt{24.84} = 4.98$$
$$= 5 \text{ inches nearly}$$

Back

but the truss will be 15 inches thick at its weakest part, so it should be amply strong.

In the Appendices I have given

1. The form of Truss originaly proposed.
2. The form of Truss now proposed.
3. The form of Truss at St. Thomas's church, Cotacamund.
4. The form of Truss at Wellington Church.
5. My calculation of the weight of roofing
6. Enlarged plan of stirrup and shoe.

9. As soon as it is finally decided what the truss is to be, and the description of tie rod &c, I propose to have one of the principal trusses tested on the ground with its ordinary load, but of course this will not be a certain test of its standing the maximum pressure it would have to bear in a first class storm or Cyclone.

10. I have corrected the Executive Engineer's estimate, allowing extra for ironwork of ties and suspending rods, and Rs 500 for scaffoldings. As the building is so wide and lofty, and the trusses so heavy, I think a provision for scaffolding allowable in this case.

11. As already explained in para 3 of my letter No. 321 of 24th August 1886, two estimates are submitted; one shows the cost of renewing the roof with cedar wood planking under Mission tiles on trusses purlins, rafters and reepers of teak wood and amounts as revised to Rs 22,540; the other estimate provides for roofing with corrugated iron and Mission tiles on teak wood trusses purlins stiffeners and reepers and amounts as revised to Rupees 21,250. The more expensive work, with cedar planking throughout, is preferred by the Chaplain and Lay

× Malabar Teak

× in the nave, but cedar planking in chancel

but the truss will be 15 inches thick at its weakest part, so it should be amply strong.

In the Appendices I have given

1. The form of Truss originaly proposed.
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6. Enlarged plan of stirrup and shoe.

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10. I have corrected the Executive Engineer's

Engineer's estimate, allowing extra for ironwork of ties and suspending rods, and Rs 500 for scaffoldings. As the building is so wide and lofty, and the trusses so heavy, I think a provision for scaffolding allowable in this case.

11. As already explained in para 3 of my letter No. 321 of 24th August 1886, two estimates are submitted; one shows the cost of renewing the roof with cedar wood planking under Mission tiles on trusses purlins, rafters and reepers of teak* wood and amounts as revised to Rs 22,540; the other estimate provides for roofing with corrugated iron and Mission tiles on teak wood trusses purlins stiffeners and reepers and amounts as revised to Rupees 21,250. The more expensive work, with cedar planking throughout, is preferred by the Chaplain and Lay

* Malabar teak

* in the nave, but cedar planking in chancel

Lay Trustee and they have
countersigned that estimate.

I have the honor to be
Sir
Your most obd^{t} servant

L. Beatty - Colonel RE
Superintending Engineer
IV Circle

No. 221 B dt 31.1.83.
" 277 D dt 8.2.83
" 836 W dt 10.1.83
" 2110 W dt 9.9.85
" 1916 C dt 21.11.85
" 2053 C dt 4.12.85
" 1111.12 C dt 15.3.86
" 1257 W dt 18.5.86
" 1527 W dt 17.6.86.
" 2920 W dt 5.11.86
" 3460 C dt 6.10.86
" 4357 C dt 8.12.86.

From,
The Superintending Engineer
IV Circle

Dated 29th } December/86
Received }

No. 1482.
E.W.

Enclosures: 19

Cochin Church-

Reports further on the proposed restoration of the ——— and submits revised estimates, one for Rs 22540 for renewing the roof with cedar wood planking under mission tiles on trusses & another of Rs 21250 for providing corrugated iron and mission tiles on trusses, purlins stiffeners &c in the nave but cedar wood planking in the chancel.

Note by the Chief Engineer P.W.D.

The estimates submitted by the Supdg. Engineer IV Circle provide for renewing the roof of the Government Church at Cochin.

2. The circumstances in which the work was commenced without the sanction of Government were noticed in G.O. No. 1527 W dt 17th June 1886.

3. The Supdg. Engineer submits two estimates,

(1) providing for cedar planking under mission tiles for the entire roof, amounting to Rs 22540.0.0

and

and (2) providing for cedar planking for the chancel and corrugated iron under tiling for the nave of the church, the amount being £2,250.

4. Both estimates are large in amount, but it is desirable to restore the church on account of its historical associations, irrespective of the number of the congregation, for which it is admittedly ~~for~~ too large.

5. The Chaplain and Lay Trustee prefer the larger estimate, but the undersigned considers that both on account of economy and durability, it would be preferable to use corrugated iron throughout the roof of the building. The second estimate has therefore been reduced to £20,680, and is recommended for sanction.

Lu
19/11/87. Ew

Cu

New roof for Govt church at Cochin.

W Two Estimates one
Submitter
A provides for roofing with
Mangalore tiles over
Cedar plankings in the
Nave, and over corrugated
iron in the Chancel
Rs 21250
B provides for similar
tiles, but iron over
cedar plankings
throughout. 22540 Rs

I would suggest that
Corrugated iron should
be used throughout in
place of cedar wood;
as it will reduce the
amount of the estimate,
and in my opinion the
roof will last longer, for
if not once set in the
cedar plankings will
rapidly decay & require
renewal -

The tie rods proposed by
the S.E are not unsightly
and as these appear to be
the coordinate (drawn) whether

Public Works Department.

Current No. 1

Letter No. 482 G.W.

Dated the 29th December'86

From the S.E. IV Circle

Note of Remarks.

1. In obedience to E.W.'s Memo No. 3450C of the 6th October/86 S.E. IV. resubmits the following two revised estimates, with plans, for re-roofing the Govt. Protestant church at Cochin —

(a) A revised estimate for re-roofing the church, both nave and chancel, with cedar planking under Mission tiles — Rs. 22,540 —

and (b) an alternative revised estimate for the same purpose which retains planking for the chancel but provides corrugated iron under the tiling over the nave of the church — Rs. 21,250 —

The former estimate (a), is that which is preferred, and has been countersigned by the Lay Trustee and by the Chaplain of the Cochin church.

2. In his enclosing letter No. 482 G.W. of the 29th December/86, S.E. IV. satisfactorily

however, urges that the increased scantlings should be adopted "for appearance sake."

4. S.E.IV. brings forward strong reasons in support of his proposal to provide each truss with a tie rod (and three suspending rods) and it must be admitted that while the carrying into effect of that proposal will probably detract from the beauty of the inside of the church it will at the same time render the stability of the structure so certain that, subject to approval, its non-adoption would be a mistake.

5. It is noted that the woodwork of all the trusses has been already prepared (through a misunderstanding); and is now ready. And S.E.IV. writes:- "I have corrected the Executive Engineer's estimate allowing extra for ironwork of ties and suspending rods, and Rs. 500 for scaffoldings. As the building is so wide and lofty and the trusses so heavy, I think

however, urges that the increased scantlings should be adopted "for appearance sake."

4. S.E.N. brings forward strong reasons in support of his proposal to provide each truss with a tie rod (and three suspending rods) and it must be admitted that while the carrying into effect of that proposal will probably detract from the beauty of the inside of the church it will at the same time render the stability of the structure so certain that, subject to approval, its non-adoption would be a mistake.

5. It is noted that the woodwork of all the trusses has been already prepared (through a misunderstanding); and is now ready. And S.E.N. writes:- "I have corrected the Executive Engineer's estimate allowing extra for ironwork of ties and suspending rods, and Rs. 500 for scaffoldings. As the building is so wide and lofty, and the trusses so heavy, I think

6.

"provision for scaffolding allowed in this case." — If E.W. approve the erection of the roofing on the lines proposed the item — 'Scaffolding — Rs. 500' — may certainly be accepted as a fair charge.

b. The rates are fair. —

Revised estimate (a) has been countersigned by the Chaplain and Lay Trustee of the Roman Church at Cochin — but not by the Archdeacon of Madras — The omission is probably an oversight.

14/11/87

To Dir.
for Orders.
Please see Dy.
3186 CE, 6.10.86.
It was now to be decided which of the two estimates should be sanctioned.
We have already allotted Rs 8000 to cover liabilities incurred in the work — An additional 8 or 10 thousand can be given next year, & the balance will be given in 1887-88.

Ch
16.1.87

C. No. 1 — P. W. Secretariat.

Note by Budget Section.

Work *Reroofing the Govt. Church at Cochin.* — Remarks and References.

Fund *Provincial*

Service Head *Civil Buildings*

Departmental Head *Original Works.*

Amount of Estimate ... ... Rs.

Expenditure in previous year ... „ „

Allotment in current year ... ... „ 8,000

Balance required to complete ... „

Total Rs. ...

Note of available funds.

In addition to Rs. 8,000 provided in the current year, a sum of Rs. 9,000 has been reserved under orders of W for appropriation to this work. The preliminary budget for 1887-88 provides Rs. 4,000 for this work.

17-1-87.

Budget Clerk.

Note by Budget Section.

4200

PUBLIC WORKS DEPARTMENT.

No. 242-W

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 27th January 1887

READ the following

Letter from the S.E. IV Circle (No. 321 Ew. of Aug. 24. 1886)
do from the Archdeacon of Madras (" " 119 of Sept. 20. ")
do from the S.E. IV Circle (" " 482 Ew. of Dec. 29 ")
Note by the Chief Engineer P.W.D. of Jany. 19 1887)

The estimate amounting to Rs 20,680/-, as amended by the Chief Engineer, for renewing the roof of the Gut Church at Cochin, is sanctioned.

2. A sum of Rs 8,000/- was allotted to the work in G.O. No. 2970 W dated 5th November 1886, and a further appropriation of Rs 9,000/- is now made

to it from the Provincial
revenues with the Govt. The
balance required to complete
the work will be provided
in the Budget for 1887-88.

3. This sanction has been
registered as Provincial
No. 167 W of 1886-87, and
classified as Civil
Buildings, Original Works.

Secy
19/1/87.

Secy
24/1/87

Secy
27/1/87

Secy
27/1/87

Secy
19/1/87

Secy
24

7370

Govt. of 1886 Madras.

PUBLIC WORKS.

Dated 27/1/87.

Rect. Encl.

Read 28/1/87 Ans

G.O. 27 January 87 No. 242 W

Fort Church at Cochin

Estimate ~~of Rs~~ 20,680

For renewing the roof of the ——

Sanctioned and an appropriation of ~~Rs~~ 9,000 for the work made.

60

60

4

Supdg. Engrs. Office 4th Circle
Camp Bonnany 2nd Feby 1887

No 40 EW

From

Colonel J. Beatty R.E.,
Supdg Engineer 4th Circle.

To

The Chief Engineer,
P.W. Department.

Sir,

To enable me to make arrangements for putting in hand the works at the Cochin Church, I have the honor to request you will be good enough to return me the estimate and all accompaniments of my letter No 482 EW of 29th December 1886, resubmitting the revised estimate.

I have the honor to be,
Sir,
Your most obedt. servant
J. Beatty Col. RE.
Supdg. Engineer 4th Circle

Recorded
with reference to
G.O. No. 242 dy
27 January 1887.

Recd
5.2.87

From

Lieut. J. Beatty R.E.,
Supg. Engineer,
Fourth Circle.

To

The Chief Engineer,
P.W. Departt.

Dated 2nd Feby: 1887.

No. 40
EW

Cochin Church:—

Requesting to
return the estimates
Ref. of his letter No. 482 EW
of 29th December 1886.

No. 35C

West Coast Division Office,
Camp Pelutthputhiangady,
17th March 1887.

From

H. S. Taylor Esqre,
Executive Engineer,
West Coast Division.

To

The Superintending Engineer,
Fourth Circle.

Sir,

I have the honor to report that a vertical crack has shown itself in the South wall of the Cochin Church near the Gallery.

2. This portion of the wall consists of two walls 2ft & 1foot thick respectively, built against each other, not bonded together.

3. The crack occurs almost immediately under where a truss will come.

4. I request your sanction to build a buttress here, similar to the others, for the safety of this portion of the wall.

The

2nd 27-5-87 2110 9-9-85

The cost will be about Rs 300.

5. I have also to report that on the roof being removed it is found that the gable wall over the arch between the nave & chancel, is as much as 8 inches out of the perpendicular. I have ordered this wall to be immediately dismantled. Sections of the new gable wall to be built will be submitted shortly.

6. Placing the trusses in position will be delayed until these two points are settled.

I have the honor to be,
Sir,
Your most obedt. Servt.,

Executive Engineer.

No. 141
E.W.

Sup.g Engrs Office, 4th circle
Coimbatore 19th March 1887.

Forwarded for the information of the Chief Engineer. The undersigned has sanctioned the construction of buttress, and rebuilding of gable over arch between nave and chancel of the Cochin Church to be charged to contingencies of the estimate.

F. Beatty. Col: R.E.,
Sup.g Engineer, 4th circle

RECEIVED No. 2214/C
18 MAR 87
P. W. D.
FOURTH CIRCLE

From

H. L. Taylor Esqre
Executive Engineer,
West Coast Division

To

The Supg. Engineer,
IV Circle.

Camp Betul Kuttiangady
Dated 17th March 1887.

No. 385

Cochin Church.

Reporting that a vertical crack has shown itself in the South wall of the ____ & requesting sanction to build a trellress for the safety of the portion of the wall.

O.M.C. No 2256

From
Colonel J. Beatty R.E.
Supy: Engineer
4th Circle

Dated 19th March 1887
Received

Code Cr. 2256

No. 141
E&W.

Cochin Church.

Forwards the Executive Engineers' letter No. 35 C dy. 17th March 1887. and informs that he has sanctioned the construction of buttresses for the safety of the walls of—

No. 36 C.

West Coast Division Office,
Camp Betuthpuzhaingady,
17th March 1887.

From

H. S. Taylor Esqre,
Executive Engineer,
West Coast Division.

To

The Superintending Engineer
Fourth Circle.

Sir,

I have the honor to report that in dismantling the top of the South wall of the Cochin Church it is found that the wall is composed of two outer walls each 1 ft. thick with a space between of 1'6" filled in with Rubbish.

2. It is presumed that the old walls were all originally built in this manner, and that the portions examined, when the walls were reported to be solid by the late Sub Divisional Officer, must have

have been where subsequent work was done during the renovation of the Church in 1779.

3. One foot at the top is now to be re-built solid and where the trusses come, solid granite Slabs 3' × 3' are to be laid. This will bind the walls together at top, and with the massive buttresses outside the walls are not likely to fail under a very much lighter Roof than they bore before.

4. Nothing can be done to render these walls solid without a very large expenditure, so the work will proceed according to the estimate unless I am specially ordered to stop it, in which case the project of renovating the roof must be abandoned and the expenditure already incurred thrown away. I trust such orders will not be given. I am under no apprehension of the walls which have stood for over a hundred years under a very heavy Roof, failing now under a comparatively light one.

I have the honor to be,
Sir,
Your most obed.t Servt.

Executive Engineer.

No 139
E W

Supg. Engrs. Office, 4th Circle
Coimbatore 19th March 1887

Forwarded for the information of the Chief Engineer. The Superintending Engineer agrees with the Executive Engineer that the discoveries made need not delay the work in hand. The Report now made only confirms what was previously suspected - vide this Office letter No. 482 EW of 29th December 1886, para 6 (1), which was a reason for providing ties.

L. Beatty. Lt. R.E.
Supg. Engineer, 4th Circle

+ G.R. 83346
1-2-87

SURVEYOR GENERAL'S OFFICE
No. 2264/87
18 MAR 87
P. W. D.
FOURTH CIRCLE

From

H. S. Taylor Esqre
Executive Engineer
West Coast Dn

To

The Supg. Engineer
IV Circle

Camp Betutkpuththiyangudy
Dated 17th March 1887.

No. 36 C

Cochin Church.

Reporting that a certain South space of the walls is filled in with Rubbish.

242 W 27-1-87
#357 C 8-12-86
292 over 5-11-86
3/4 bo C 6-10-86.
148 C 29-5-86.
82-9 C 14-4-82

125 Y 14.10.5.86
1111-12 C 10-3-86.
205-3 C 4-12-85.
1916 C 21-11-85.
2116 over 9.9.85.
83 Y 50.1.83.
27 Y 9-5-2-83.

From

Colonel J Beatty R.E.

Supy: Engineer

4th Circle.

Recorded

Dated 19th March 1887

Received

No 139

E W

Cochin Church.

Submits a letter No 360 of 17th March 1887 respecting the State of the walls of the—

Recorded

23.3.87

Ack
22/3/87

C & H Circle

Dated 24-3-87.

24/3/87

26/3