

(1) Number of pages _____

(2) Date of repair _____

(3) Initials of the Referencer _____

MADRAS RECORD OFFICE

Government of Madras

Public Works DEPARTMENT

G.O. No.	551	Press
B.P. No.		-Mis.-
Dated	4-3	276 195

Not to be folded or roughly handled

No. 85. Read the following letter from Lieutenant-Colonel W. FAREWELL, Inspecting Engineer for Ports and Communications, to Colonel G. W. WALKER, R.E., Secretary to Government, Public Works Department, dated Camp at Coimbatore, 3rd February 1874, No. 535-49 :—

With reference to G. O. in the Public Works Department, No. 2,125, dated the 25th of August 1873, having inspected the site, and the work already completed, of the Cortelliar bridge, situated at the 17th mile from Madras on the Great Northern Road in the Chingleput District, I have the honour

- 1 Statement marked A.
- 2 Original Estimates.
- 2 Revised Estimates.
- 2 Comparative Statements.
- 3 Original Plans.
- 2 Revised Plans.

to report that I cannot approve of the design submitted for constructing this bridge of masonry elliptical arches of 50 feet span, the piers at the springings of the arches being below the minimum safe width practically fixed, and the arches too slight; thus if masonry elliptical arches of the correct thickness, etc., etc., are to be constructed, it will be necessary to demolish the present piers, which have been built with a batter of one inch to a foot, and rebuild them straight up with a width of 8 feet at the springing lines of the arches, the estimate for this bridge would then amount to Rupees 1,89,552, including special superintendence, i.e., an Assistant Engineer and his establishment for two years, and after deducting the value of work already executed, the balance required to complete the structure amounts to Rupees 1,21,475.

2. Should it be determined that the present piers remain as they are, and a masonry bridge still be constructed, the only safe form the arches could, I think, take is that of semi-circular ones; the cost of such a bridge, including superintendence, etc., etc., as above would amount to Rupees 1,93,816, or deducting work done, the balance required would be Rupees 1,25,739.

3. In my opinion the chief objection to completing this bridge with masonry arches of any description of the span designed is, that I consider the foundations as constructed to be insufficiently reliable to bear the superincumbent weight of such a structure, which would be somewhere about 27,000 tons; the wells below the foundations, as estimated for, have been built of brick and mud, and are said to be sunk 8 feet, till they reached blue clay; though in former days wells of brick and mud sunk to about 12 feet were extensively used for foundations, in the present day none but wells built with the best hydraulic mortar and filled with hydraulic concrete are thought suitable for foundations of bridge piers, etc., etc.; and it would not be deemed satisfactory merely to sink even such wells till they reached blue clay but necessary to continue sinking them until a good stiff substratum in the clay is met with, while the thickness of the layer, of which in the case under notice there appears to be no record, would be carefully ascertained, etc., etc.; thus as the conditions of the existing foundations are such as to render the permanency of masonry arches constructed thereon very problematical, I can but recommend their abandonment, and that the Cortelliar river be spanned with an iron superstructure, the weight of which, masonry and all, will not amount to half of that of the masonry arches.

*Proceedings of the Madras Government, Public Works Department,
4th March 1874.*

4. I have obtained from the Superintendent of the Public Works Workshops a revised abstract estimate for the requisite iron girders, etc., etc., at the rates now said to exist, including superintendence, etc.—

It amounts to	...	...	...	Rs.
To which is to be added work done	...	...	...	1,45,425
Building piers, etc., etc., full height	...	...	...	68,077
	...	...	...	25,612
				<u>2,39,114</u>

Taking the mean cost of the masonry arches noticed in paragraphs 1 and 2 to be Rupees 1,91,684, the iron bridge would exceed the cost of a masonry bridge by Rupees 47,460, but for the reasons given I hardly think it is fair to compare the estimated cost of a work that would in all probability be destroyed with that of one which is likely to be a useful and lasting structure.

5. I believe but little is known regarding the real durability of iron girder bridges, the fact being that they have not been in general use a sufficient time to allow of any true data being framed on the subject. There can be no doubt, however, that their durability is very materially influenced by their locality; for instance, when close to the sea, oxidation is accelerated, etc., etc., etc.; the site of the Cortelliar bridge, however, is so far inland that I do not apprehend the iron being affected by the sea air, and from the fact that the bridge is one over which much traffic must pass it will be kept in a constant state of vibration, which, according to the best authorities, will tend greatly to preserve it from oxidation, and if well painted and cared for I see no reason to doubt its durability to such an extent at all events as to render it a paying structure.

6. Taking the Traffic Return marked A. enclosed, to be nearly correct, and the average tolls for carts laden and unladen to be 4 annas each, horses at 2 annas each, and all other cattle at 6 pie each in round numbers, the bridge would earn over 50,000 Rupees per annum, and while paying 5 per cent. on the capital sunk to build it would in addition make good that capital in six or seven years.

7. Lastly, I cannot but think that the estimate supplied by the Superintendent of the Public Works Workshops is excessive. I would therefore respectfully recommend that, should the Government decide the question in favour of an iron superstructure for the Cortelliar bridge, tenders should be sought by advertisement for the work being taken up on contract, or that steps be taken to ascertain from the Store Department at Home at what rate they would be prepared to supply the girders, etc., including freight to India; and I would further suggest that it might be more economical in the end to use Mallet's buckled iron plates for flooring in lieu of teakwood, as contemplated in the estimate submitted by the Superintendent of the Public Works Workshops.

P. S.—The enclosures noted below, received with G. O., No. 2,125, dated 25th of August 1873, are herewith returned:—

- 2 Original Estimates.
- 2 Revised Estimates.
- 2 Comparative Statements.
- 3 Original Plans.
- 2 Revised Plans.

*Proceedings of the Madras Government, Public Works Department,
4th March 1874.*

No. 86. ORDER THEREON, 4th March 1874, No. 561.

CIVIL WORKS, No. 7.

COMMUNICATED to Financial Department in continuation of G. O., No. 2,125, dated 25th August 1873.

(True Extract.)

Colonel, R.E.,
Secretary to Government.

To the Financial Department.
.. Inspecting Engineer for Communications.

Exd. S. T. Austin.
Spare Copies

585
49

Inspecting Engineer's Office for
Ports & Communications
Camp Comblator
3rd February 1874

From

The Inspecting Engineer for
Ports & Communications

To

The Chief Engineer and
Secretary to Government.
Public Works Department.

Sir,

With reference to G. O.
in the Public Works Department
No. 2125 dated the 25th of August
1873, having inspected the site
and the work already completed,
of the Coatalhar Bridge, situated
at the 14th mile from Madras
on the Great Northern Road
in the Chingleput District,
I have the honor to report
that I cannot approve of
the design submitted for con-
structing this bridge of masonry
elliptical

elliptical arches of 50 feet span,
the piers at the springings of
the arches being below the
minimum safe width practically
fixed, and the arches too slight,
thus if masonry elliptical arches
of the correct thickness &c &c
are to be constructed, it will
be necessary to demolish the
present piers which have been
built with a batter of one
inch to a foot, and rebuild
them straight up with a width
of eight feet at the springing
lines of the arches; the estimate
for this bridge would then
amount to Rs 189,552 including
special superintendence, i.e.,
an Assistant Engineer and
his establishment for two years,
and after deducting the value
of work already executed
the balance required to com-
plete the structure amounts
to Rs 121,475.

2. Should it be determined
that the present piers remain
as they are and a masonry
bridge still be constructed, the
only safe form the arches could,
I think, take, is that of
semicircular ones. The cost
of such a bridge including
superintendence &c &c as above
would amount to Rs 1,93,816.
or deducting work done, the
balance required would be
Rs 125,739.

3. In my opinion the chief
objection to completing this
bridge with masonry arches
of any description of the
span designed is, that I
consider the foundations
as constructed to be insuffi-
ciently reliable to bear
the superincumbent weight
of such a structure, which
would be somewhere about
24,000 tons; the wells below
the

the foundations, as estimated
for, have been built of
brick and mud and are
said to be sunk 8 feet
till they reached blue clay,
though in former days wells
of brick and mud sunk to
about 12 feet were extensively
used for foundations, in the
present day, none, but wells
built with the best hydraulic
mortar and filled with
hydraulic concrete, are thought
suitable for foundations of
bridge piers &c &c and it
would not be deemed satis-
factory merely to sink
even such wells, till they
reached blue clay but
necessary to continue sinking
them until a good stiff
substratum in the clay
is met with, while the
thickness of the layers,
of which in the case under

notice there appears to be no
record, would be carefully
ascertained &c &c; Thus as
the conditions of the existing
foundations are such as to
render the permanency of
masonry arches constructed
thereon very problematical
I can but recommend
their abandonment and that
the Cortazziat River be spanned
with an iron superstructure
the weight of which, masonry
and all, will not amount to
half of that of the masonry
arches.

4. I have obtained from
the Superintendent of the
Public Works Workshops
a revised abstract estimate
for the requisite iron
girders &c &c at the rates
now laid to exist including
superintendence &c &c It

It amounts to Rs. 1,45,425
 To which is to be added work done
 Building piers & full height } 25,642
 Rs. 239,144

Taking the mean cost of the masonry arches noticed in paras 1 and 2, to be Rs. 1,91,684, the iron bridge would exceed the cost of a masonry bridge by Rs. 47,460 but for the reasons given I hardly think it is fair to compare the estimated cost of a work that would in all probability be destroyed with that of one which is likely to be a useful and lasting structure.

5. I believe but little is known regarding the real durability of iron girder bridges, the fact being that they

they have not been in general use in sufficient time to allow of any true data being framed on the subject. There can be no doubt, however, that their durability is very materially influenced by their locality, for instance, when close to the sea, oxidation is accelerated &c. &c. the site of the Corbellat Bridge, however, is so far inland that I do not apprehend the iron being affected by the sea air, and from the fact that the bridge is one over which much traffic must pass it will be kept in a constant state of vibration which, according to the best authorities, will tend greatly to preserve it from oxidation, and if well painted and cared for, I see no reason to doubt its durability to such an extent

extent at all events as to
render it a paying structure.

b. Taking the traffic
Return marked A enclosed
to be nearly correct and the
average tolls for carts
laden and unladen to
be 4 annas each, horses
at 2 annas each, and all
other cattle at 6 pie each
in round numbers, the
bridge would earn over
50,000 Rs. per annum, and
while paying 5 per cent
on the Capital sunk to
build it, would in addition
make good that Capital
in 6 or 7 years.

7. Lastly, I cannot but
think that the estimate
supplied by the Superintendent
of the Public Works
Workshops is excessive.
I would therefore respectfully

recommend

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the Government decide
the question in favor
of an iron superstructure
for the Cartelliar Bridge,
tenders should be sought
by advertisement for the
work being taken up on
contract, or that steps
be taken to ascertain from
the Shore Department
at home at what rate they
would be prepared to
supply the girders &c
including freight to
India, and, I would
further suggest that
it might be more economical
in the end to use Mallet's
Buckled Iron Plates
for flooring in lieu of
teakwood, as contemplated
in the estimate submitted
by the Superintendent of
the.

The Public Works Workshops

I have the honor to be,

Sir,

Your most Obedt Servt.

Wasson Lieut. Colonel.

Inspecting Engineer for
Ports & Communications.

P. S. The enclosures noted below
received with G. O. No 2125 dated
25th of August 1873 are herewith
returned.

1. Original Estimates.

2. Revised "

2. Comparative Statements

3. Original Plans.

2. Revised "

Wasson

Public Works 1874- Department

80.7211-

From the Inspector General
for Public Improvement
to the Chief Engineer
and Secretary
D.P.W.

Dated 3rd February 1874

Rec^d 7th - 8th -

No. 114. Enclosure 12.

Returning the plans &
Estimates of the
Corollian Bridge
in the Chief Engineer's
District, with his
observations thereon,
as called for in
G.O. No. 125 of 25th August
1873.

With an Order

For

561

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Communicated to Financial Dept^l
in continuation of G.O. No. 2125 dated

25th August 1873 -

Amr

85-86

The Public Works 1874- Department
"Department of Public Works"
Recd with Sec 6/1/74.

1874
Govt. of Madras

PUBLIC WORKS.

no. 234 7/23/74

To The Financial Dep.
Ch. Engrs Memo no. 377 of 10/10/74

Dated

Recd

Encl

4 "Plans" No. 561.

Nos. 85 & 86

Serials Bridge. etc.

From the Prop. for
Road & Communication
showing on the design
for the Bridge & Road
to the Financial Dept.