Public Works (1898) Department.

RAILWAY BRANCH.

G.O., No. 532 Ry.

DATED 5th April 1898.

prof 100/1

[Despatch Abstract.]

Accident at ~~Failure of the~~ Malur Bridge on the Southern Mahratta ~~Mysore State~~ Railway.

Endorsement from the Senior Government Inspector of Railways, Madras, forwarding copy of his letter to the Govt. of India enclosing his supplementary report to the Govt. of India on the ——— ~~on the Mysore State Railway~~, which occurred on the 23d Septr 1897 recorded.

Indexed. 11/5/98.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

RAILWAY.

Government (1898) of Madras.

PUBLIC WORKS.

Recd. } 1898. *Enclosures*

Regd. } *Spare copies*

G.O., No. 532 Ry., 5th April 1898.

APRIL.

Accident at Malur Bridge on the Southern Mahratta Railway

Endorsement from the Senior Government Inspector of Railways, Madras, forwarding copy of his letter to the Government of India enclosing his supplementary report to the Government of India on the — which occurred on the 23rd September 1897, recorded.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read the following paper :—

G.O., No. 993 R., dated 16th November 1897.

Read the following papers :—

From—The Secretary to the Government of India, Public Works Department.
To—The Senior Government Inspector of Railways, Madras.
Dated—Calcutta, 30th December 1897, No. 2070 R.C.

With reference to your letter, No. 3356/A., dated 28th October 1897, submitting a report upon the serious accident which occurred at the Malur bridge mile 246-12, Mysore State Railway, on the 23rd September 1897, I am directed to request that you will forward, for the information of the Government of India, the result of the investigations by the Agent, Southern Mahratta Railway Company, alluded to in paragraph 1, of the conclusion arrived at by yourself, when they have been made.

From—The Consulting Engineer for Railways, Madras.
To—The Agent, Southern Mahratta Railway.
Dated—Madras, 8th January 1898, No. 73.

The Government of India have called for the result of the investigation, promised by you, to ascertain the cause of failure of the pier of the Malur bridge.

I shall be glad to know if the borings have been taken, and when I may expect the report.

From—The Agent, Southern Mahratta Railway.
To—The Consulting Engineer for Railways, Madras.
Dated—Dharwar, 28th January 1898, No. A. 852/991.

With reference to your letter, No. 73 of the 8th instant, regarding accident at Malur bridge at mile 246-12, Mysore State Railway, on the 23rd September last, I have the honour to inform you that the borings, &c., have been taken. It turns out that the abutment pier, which failed, instead of being founded on wells, was founded on a block of concrete 4½ feet in depth, and only 3½ feet below the bed of the river.

2. I hope to have the report finished by the end of next week.

From—The Senior Government Inspector of Railways, Madras.
To—The Secretary to the Government of India, Public Works Department.
Dated—Madras, 3rd February 1898, No. 345.

In reply to your letter, No. 2070 R.C., dated 30th December 1897, I have the honour to forward a copy of letter, No. A. 852/991, dated 28th January 1898, from the Agent, Southern Mahratta Railway, giving the result of his investigations into the question of the foundations of the pier of the Malur bridge which failed on the 23rd September 1897.

From—The Agent, Southern Mahratta Railway.
To—The Consulting Engineer for Railways, Madras.
Dated—Dharwar, 10th February 1898, No. A. 852/1461.

In continuation of my letter No. A. 852/991, dated the 28th January 1898, on the failure of Malur bridge, I have the honour to forward herewith a drawing showing the bridge as built, the portion that fell, and the result of the recent examination and borings.

2. The plan speaks for itself; little comment is necessary.

3. The collapse of the bridge was, as stated by you, due to the failure of one of the abutment piers, viz., the one shown as No. 2 on the drawing. This pier, you will see, instead of being carried down to rock, was founded at a depth of only 8 feet below the river bed on a doubtful clay bed.

4. This alone is of course more than enough to account for the destruction of the bridge, the only wonder being that, with 8 and 10 ft. floods, the bridge should have lasted so many years.

5. I also invite your attention to the way piers Nos. 3 and 5 were built, and the differences between the line of rock as shown on the original plan and as shown by the recent borings. You have in your own report already noticed on the bad quality of the masonry, more especially of the bricks in one of the square wells under pier No. 3. To this I may now add that I examined some of the so-called concrete in one of these wells and found it to consist of sand and stone with here and there a stray nodule of lime. Several Mysore officials, including a District Engineer, were present at the time.

From—The Agent, Southern Mahratta Railway.
To—The Consulting Engineer for Railways, Madras.
Dated—Dharwar, 10th February 1898 (Demi official).

I have not complicated my letter of date on the Malur bridge by noting that both the Committee and we read the plan in the wrong way, *i.e.*, reversed it end for end. This was hardly our fault, for the old plan, as you will see, has not the words "to Mysore and from Bangalore" shown on the plan, so that the Committee very naturally assumed that the pier that went was the deep founded one,—No. 6 on the present plan.

From—The Senior Government Inspector of Railways, Madras.
To—The Secretary to the Government of India, Public Works Department.
Dated—Madras, 1st March 1898, No. 595.

In continuation of correspondence ending with my letter No. 345, dated the 3rd February 1898, I now have the honour to forward a copy of a letter from the Agent, Southern Mahratta Railway (with a copy of a demi-official of same date which accompanied it) No. A. 852/1461, dated the 10th February 1898, and also a copy of a tracing therewith enclosed.

2. It now clearly appears that the pier which failed was not the pier, shown as No. 6 in the present tracing, which has here to fore been supposed to be the one that failed, but was that shown on the plan as No. 2. This pier No. 2 was built as shown on the plan on an open and shallow foundation and simply got underscoured.

3. The mistake in identifying the pier which failed arose from the fact that the deep stream of the present river at bridge site being found at the south side of the river, and the spans at the north side of the river showing little signs of work, it was taken for granted that the pier shown as founded on wells belonged to the deep or south part of the river. Whereas, as a fact, the contrary was the case; and that this was so, there was nothing on the plans to indicate.

4. I invite attention to the original false borings which doubtless induced the Engineer who made the design to use shallow foundations at the south end of the bridge.

5. If I may be permitted to draw a lesson from this accident, in reference to the engineering of rivers of this sort, I would say that, as I always contend, it is far better to have fewer spans well founded, rather than too many spans, some or all of them deeply founded. The same area as is afforded by the larger number of spans can usually be given by clearing out the river bed down to well top in the smaller number of spans; and the river has thus less excuse for wandering and for thereby changing its contour and the depth of its scour. Thus the very small water discharging area afforded in two spans at each end of the Malur bridge might perfectly well have been given by excavating out the channel, level with well top, in the remaining four spans, and the four spans might thus have been deeply founded, and the river more efficiently engineered, for less money than the straggling structure cost.

Endorsement by the Consg. Engr. for Rys., Madras, dated 1st March 1898, No. 596.

Copy forwarded to the Agent, Southern Mahratta Railway and Consulting Engineer for Railways, Bombay.

From—The Secretary to the Government of India, Public Works Department.
To—The Senior Government Inspector of Railways, Madras.
Dated—Calcutta, 18th March 1898, No. 365 R.C.

With reference to correspondence ending with your letter No. 595, dated 1st March 1898, regarding the failure of the Malur bridge at mile 246-12 on the Mysore State Railway, I am directed to say that it is intended to publish the report received with your letter No. 3356/A., dated 28th October 1897, on the subject and to enquire whether, now that further information has been obtained rendering clear the cause of the failure of the bridge, as surmised by Mr. Fowler in paragraph 4 of his report, dated 8th October 1897, you wish to modify or add anything to the conclusions arrived at by you as set forth in paragraph 1 of your report, dated 28th October 1897, to bring it up to date.

From—The Senior Government Inspector of Railways, Madras.
To—The Secretary to the Government of India, Public Works Department.
Dated—1st April 1898, No. 934.

In reply to your letter No. 365 R.C., dated the 18th March 1898, I have the honour to send you a supplementary report on the accident which occurred at the Malur bridge of the Southern Mahratta Railway on the 23rd September 1897.

ENCLOSURE.

Supplementary report by the Senior Government Inspector of Railways, Madras.

Now that the Agent of the Southern Mahratta Railway has completed the borings referred to in the last part of paragraph 1 of my report dated Bangalore, 28th October 1897, I am in position to come to a definite conclusion as to what actually caused the failure of the split pier. But it is necessary to explain that, at the inspection, the Southern Mahratta Railway officials produced a certain drawing and pointed out certain piers the 5th and the 6th from the right end of the drawing, as the ones which had failed. But it subsequently appeared that, owing to the fact of there being no indication on that drawings as to which was the Mysore end of the bridge and which the Bangalore end, and also to the fact that the deep part of the bed of the river had changed its position since the bridge was built, they had read the drawing wrongly, and that, as a matter of fact, the piers which failed were the 2nd and 3rd and not the 5th and 6th from the right end of the drawing. That this mistake in identification was made by the Southern Mahratta Railway Company's officers is shown in the Agent's letter of the 18th October in which he sends a rough sketch made by his Chief Engineer of what that officer believed to be the split pier, and in this sketch the 6th pier from the right end of the drawing is reproduced. Again in his letter, dated the 10th February 1898, the Agent referring to this fault of diagnosis says "this is hardly our fault as the old plan has not the words 'to Mysore' and 'from Bangalore,' so that the Committee (the Departmental Committee F.J.E.S.) very naturally assumed that the pier was the deep founded one." The mistake was a very natural one, because the bend in the wide river bed has now so changed its position that what was the deep channel originally has now shoaled up and the new deep channel is found where the shallow founded piers are, while the deep founded piers are to be found at the place where the bed has shoaled up.

Mr. Fowler, having no indication to guide him out of this wrong identification on the drawing, of the particular pier which had failed, and foundations of course being all invisible, naturally enough described the pier which split, and which presumably was the prime cause of the failure, as founded on two wells about 11 feet in diameter and about 30 feet deep; and came to the conclusion that one well had heeled over. When I inspected the scene later on, the foundations being still invisible, I could not see my way to concluding that a well founded 30 feet had toppled over, as there had evidently occurred no such scour as to justify such an assumption. I contended myself therefore with opining that it had somehow collapsed, and said that I was disposed to think that this must have been due to the badness of the masonry.

No authoritative conclusion was possible however until borings could be made; and these now clearly show that, as already explained, the map had been read wrong way round, and that what really happened was that, in the course of years, the bends of the river had so changed their position that the deep part found itself at that end of the bridge where the piers instead of being founded on deep wells, were on ordinary shallow open foundations, the bottom of the concrete being only six feet below the level of the top of the wells of the deep founded piers.

MADRAS,
30th March 1898.

FRANCIS J. E. SPRING,
Senior Government Inspector.

No. 935.

Copy forwarded to the Joint Secretary, Public Works Department, Railway Branch, Madras, for information.

FRANCIS J. E. SPRING,
Senior Government Inspector.

ORDER—No. 532 Ry., dated 5th April 1898.

Recorded.

(True Extract.)

FRANCIS J. E. SPRING,
Joint Secretary.

To the Consulting Engineer for Railways.

Exd. Shaik Karim.

SERIAL No. 126

Print

Two Currents

All communications should be addressed to the Secretary.

No. 2070 R.C.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY CONSTRUCTION.

JOINT SECRETARY TO GOVT. OF MADRAS RYS.
RECEIVED
5 JAN. 1898

C. No. 56
Recd. 5.1.98

To

The Senior Government Inspector of Railways,
Madras.

Calcutta, the 30th December 1897.

Sir,

Serial 119/A

With reference to your letter No. $\frac{3356}{A.}$ dated 28th October 1897 submitting a report upon the serious accident which occurred at the Mallur bridge mile 246-12 Mysore State Railway on the 23rd September 1897, I am directed to request that you will forward for the information of the Government of India the result of the investigations by the Agent, Southern Mahratta Railway Company alluded to in paragraph 1 of the conclusion arrived at by yourself when they have been made.

ER 5/1

I have the honour to be,
Sir,
Your most obedient servant,
C. H. Sykes
Offg. Under Secretary.

Documents accompanying:-
Nil.

M.L.M.

For No. 1.

Print 3P

SERIAL No. 127

OFFICE OF THE CONSULTING ENGINEER FOR RAILWAYS,

Madras, 8 January 1898.

To

AGENT ~~AND MANAGER, M. R.~~
SMR

No. 73 Reply No. A.852/991, dated 28/1/98

Reminders.

SIR,

The Govt of India have ~~asked for~~ called for the result of the investigation, promised by you, to ascertain the cause of failure of the Pier of the Mallur Bridge —

I shall be glad to know if the borings have been taken & when I may expect the Report.

E.T.W. 6/1 98

O, 7/1/98

8/1/98

Subject.

F.S. 8/1/98

Southern Mahratta Railway Company, (Ld.)

No: ~~A 852~~ 991

AGENT'S OFFICE.

DHARWAR, 28th January, 1898.

Print 3½ p

SERIAL No. 129

C. No. 571
1.2.98

To

The Consulting Engineer
for Railways,
Madras.

CONSULTING ENGINEER FOR RAILWAYS
RECEIVED
31 JAN 1898
MADRAS.

ER

Sir,

S127 & 126

With reference to your letter No. 73 of the 8th instant, regarding accident at Mallur bridge at mile 246/12, M. S. Railway, on the 23rd September last, I have the honour to inform you that the borings, etc., have been taken. It turns out that the abutment pier, which failed, instead of being founded on wells, was founded on a block of concrete 4½ feet in depth and only 3½ feet below the bed of the river.

2. I hope to have the report finished by the end of next week.

I have the honour to be,
Sir,
Your most obedient servant,

J. Murdoch
Major, R. E.,
Agent.

Copy (from Senior Govt Inspector) to the Govt of India, in reply to their letter No. 2070-R.C. dated the 30th Dec. 97.

F.K.S.
Sen. Govt Inspector
1/2/98

M. N.

FORM No. 7.

MADRAS, 3rd February 1898. No. 130

From The Senior Govt. Inspr of Rys Madras

To

The Secy: to the Govt. of India P.W.D. Calcutta

~~Agent, S. I. R.~~

Print

No. 345 Reply No. , dated

SIR,

In reply to your letter No: 2070 R.C, dated 30th Decr. 1897, I have the honour to forward a copy of letter No. $\frac{4852}{991}$ of 28th January 1898, from the Agent, Southern Mahratta Railway, giving ~~[illegible]~~ the result of his investigations into the question of the ~~[illegible]~~ foundation of the piers of the Malur bridge which failed ~~accident which occurred~~ ~~at the [illegible] Bridge on the~~ on the 23rd Septr 1897.

F.H.

Reminders.

Despat. 3/2/98

Subject.

345 1/2/98

Southern Mahratta Railway Company, (Ld.)

AGENT'S OFFICE,

DHARWAR, 10th February, 1898. ~~188~~

No. A. 852. 1461.

Print

5

SERIAL No. 131

791
14.2.98

CONSULTING ENGINEER FOR RAILWAYS
RECEIVED
14 FEB. 1898
MADRAS.

To

The Consulting Engineer
for Railways,
MADRAS.

Sir,

Failure of Mallur Bridge. S 129.

In continuation of my letter No. A. 852/991, dated the 28th January 1898, on the above, I have the honour to forward herewith a drawing showing the Mallur Bridge as built, the portion that fell and the result of the recent examination and borings.

(2) The plan speaks for itself; little comment is necessary.

(3) The collapse of the Bridge was, as stated by you, due to the failure of one of the abutment piers, viz., the one ~~ske~~ shown as No. 2 on the drawing. This pier, you will see, instead of being carried down to rock, was founded at a depth of only 8 feet below the river bed on a doubtful clay bed.

(4) This alone is of course more than enough to account for the destruction of the Bridge, the only wonder being that with 8 and 10 feet floods the Bridge should have lasted so many years.

(5) I also invite your attention to the way piers Nos. 3 and 5 were built and the differences between the line of rock as shown on the original plan and as shown by the recent borings. You have in your own report already noticed on the bad quality of the masonry, more especially of the bricks in

one

one of the square wells under pier No.3. To this I may now add that I examined some of the so-called concrete in one of these wells and found it to consist of sand and stone with here and there a stray nodule of lime. Several Mysore Officials, including a District Engineer, were present at the time.

(6) In conclusion I would suggest that a meeting be arranged for at Bangalore to discuss the state of the Bridges on the old Mysore line. They were, I see, badly reported on by the Inspecting Officer (Mr. Warden) in August 1886 and his unfavourable remarks were fully borne out by a detailed examination subsequently made by the Superintending Engineer of the Mysore Extension. I have already arranged to meet the Consulting Engineer for Railways, Bombay, at Bangalore on the 11th March next. Perhaps this date would suit you also.

Omit this in copying

I have the honour to be,

Sir,

Your most obedient servant,

J Morn Murdoch

Major, R.E.,

AGENT.

Enclo: 1. (Drawing No. 1/852)

T. K.

By Book Post

Print 7

SERIAL
No. 132.

Dharwar, 10th February, 1898.

My dear Spring,

I haven't complicated my letter of date on the Mallur Bridge by noting that both the Committee and we read the plan in the wrong way, i.e., reversed it end for end. This was hardly our fault, for the old plan, as you will see, has not the words "to Mysore and from Bangalore" shown on the plan, ~~and~~ so that the Committee very naturally assumed that the pier that went was the deep-founded one, No.6 on the present plan.

Yours sincerely,

J Morn Murdoch

Papers
7M
14/2

The mistake in identifying the pier which failed ~~is intimately connected with the cause of the failure.~~ ~~The~~

Subject. ~~The mistake arose~~ arose from the fact that, the deep stream of the present river at bridge site being found at the south side of the river, and the span at the north side of the

Print 8

Form No. 4.

SERIAL No. 135

OFFICE OF THE CONSULTING ENGINEER FOR RAILWAYS,

Madras, 1st March 1898.

From the Senior Govt. Inspector of Ry. Madras

To ~~AGENT AND MANAGER, M. R.~~ The Sec. Govt. of India P. W. Dept.

No. 595 / +596 Reply No. 365 RC, dated 18/3/98 from India

Copy to Agent S. M. Ry. and to Con. Eng. Bombay

SIR,

In continuation of correspondence ending with my letter No. 345 dated the 3rd Feb. 98. I now have the honour to forward a copy of a letter from the Agent S. M. Ry. (with a copy of a demi official of same date which accompanied it) No. A. 852 / 1461 dated the 10th Feb. 98 and also a copy of a tracing therewith enclosed.

Reminders.

It now clearly appears that the pier which failed was not the pier, shown as No. 6. in the present tracing, which has heretofore been supposed to be the one that failed, but was that shown on the plan as No. 2. This pier No. 2. was built as shown on the plan on an open and shallow foundation and simply got undermined.

The mistake in identifying the pier which failed ~~is intimately connected with the cause of the failure.~~ [illegible]

Subject. ~~The mistake arose~~

arose from the fact that, the deep stream of the present river at bridge site being found at the south side of the river, and the spur at the north side of the river showing little signs of work, it was taken for granted that the piers shown as founded on wells belonged to the deep or south part of the river. Whereas, as a fact, the contrary was the case; and that this was so, there was nothing on the plans to indicate.

4 I invite attention to the original plans drawings which doubtless induced the engineer who made the design to use shallow foundations at the south end of the bridge.

5 If I may be permitted to draw a lesson from this accident, in reference to the engineering of rivers of this sort, I would say that, as I always contend, it is far better to have fewer spans well founded rather than too many spans, some or all of them shallowly founded. The same area as is afforded by the larger number of spans can usually be given by ~~[illegible]~~ clearing out the river bed ~~[illegible]~~ down to well tops ~~[illegible]~~ in the smaller number of spans; and the river has thus less excuse for wandering and for thereby changing its contour and the depth of its scour. Thus the very small water discharging area afforded in two spans at each end of the Malur bridge might perfectly well have been given by excavating out the channel bed with well tops in the remaining four spans. and the four spans might then ~~[illegible]~~ have been deeply founded, and the river more efficiently engineered, ~~[illegible]~~ for less money than the struggling structure cost.

I have &c

All communications should be addressed to the Secretary.

Print

CONSULTING ENGINEER RAILWAYS MADRAS. RECEIVED 25 MAR 1898

C. No. 1469 Recd. 25.3.98

No. 365 R.C.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY CONSTRUCTION.

To

The Senior Government Inspector of
Railways Madras.

Calcutta, the 18th March 1898.

Sir,

Serial 135

Serial 119/A

With reference to correspondence ending with your letter No.595 dated 1st March 1898 regarding the failure of the Malur Bridge at mile 246/12 on the Mysore State Railway, I am directed to say that it is intended to publish the report received with your letter No.3356/A dated 28th October 1897, on the subject and to enquire whether, now that further information has been obtained rendering clear the cause of the failure of the bridge, as surmised by Mr.Fowler in paragraph 4 of his report dated 8th October 1897, you wish to modify or add any thing to the conclusions arrived at by you as setforth in paragraph 1 of your report dated 28th October 1897 to bring it up to date.

I have the honour to be,
Sir,
Your most obedient servant.

C Sykes.

Offg.Under Secretary.

Documents accompanying :-
Nil.

J.B.M.

D1

Please say if a copy of Serial 81 & sketch referred to at the end of this page of the report is to go to India. Serial 131 referred to on the next page, was sent to India with tracing on 1st March 1898 (Serial 135.)

V.L.
1/4/98

I don't think it is necessary

F.W.T. 1/4

---

ccident. Southern Mahratta Railway

of 23rd Sept 1897

enior Govt. Inspector of Railways Madras.

M.R. has completed the borings referred to in the
dated Bangalore 28th Oct. 97. Doubt is
as to what actually caused the ~~[illegible]~~ failure of the split piers.
inspection
~~[illegible]~~
of ~~Mr. Fowler's[illegible] on the 24th Sept. and,~~
7th October, the Southern Mahratta Railway officials
d out ~~[illegible]~~ certain piers, the 5th and the 6th from the right ~~[illegible]~~ a
subsequently ~~[illegible]~~ appeared that, owing to the fact of
as to which was the Mysore end of the bridge
also to the fact that the deep part of the bed of the river had
built, they had read ~~[illegible]~~ the drawing wrongly, and
which failed were the 2nd and 3rd and not the 5th and 6th ~~[illegible]~~ 6.
mistake in identification was made by the S.M.R. Co's
18th Oct. in which he sends a rough sketch made by
as to be the split piers, ~~[illegible]~~ sketch ~~[illegible]~~ and in this sketch the 6th pier from
drawing. Again in his ~~[illegible]~~ letter dated the 10th of Feb. 98
says "This is hardly our fault as the old plan
angalore". so that the Committee (the Department
was the deep founded one." The mistake was a very

84

Please say if a copy of
Serial 84 & sketch papers
to at the end of this page
of the report is to go to [illegible]
Serial 1[illegible] referred to on the
next page are not sent to
I was never having on 1st
March 1898 [Serial 1357]

11/4/98

The Mallur Bridge Accident. Southern Mahratta Railway
which occurred on the morning of 23rd Sept 1897

Supplementary Report of the Senior Govt. Inspector of Railways Madras.

Now that the Agent of the S.M.R. has completed the borings referred to in the last part of para 9. of my report dated Bangalore 28th Oct. 97, I am in a position to come to a definite conclusion as to what actually caused the ~~[illegible]~~ failure of the split piers. But it ~~must point~~ is necessary to explain that, at the inspection ~~[illegible]~~ ~~[illegible]~~ first, on the occasion of Mr Fowler's ~~enquiry~~ on the 24th Sept. and, subsequently at my inspection on the 27th October, the Southern Mahratta Railway officials produced a certain drawing and pointed out ~~[illegible]~~ certain piers, the 5th and the 6th from the right end of the drawing, ~~[illegible]~~ ~~[illegible]~~, as the ones which had failed. But it subsequently ~~[illegible]~~ appeared that, owing to the fact of there being no indication on that drawing as to which was the Mysore end of the bridge and which the Bangalore end, and also to the fact that the deep part of the bed of the river had changed its position since the bridge was built, they had ~~[illegible]~~ read the drawing wrongly and that, as a matter of fact, the piers which failed were the 2nd and 3rd and not the 5th and 6th ~~[illegible]~~ from the right end of the drawing. That this mistake in identification was made by the S.M.R. Co's officers is shown in the Agent's letter of the 18th Oct. in which he sends a rough sketch made by his Chief Engineer of what ~~[illegible]~~ that officer believed to be the split piers, and ~~[illegible]~~ in this sketch the 6th pier from the right end of the drawing is reproduced ~~with the 6th from the right end of the drawing~~. Again in his ~~[illegible]~~ letter dated the 10th of Feb. 98 the Agent referring to this fault of diagnosis says "This is hardly our fault as the old plan has not the words 'to Mysore' and 'from Bangalore'. so that the Committee (the Departmental Committee) very naturally assumed that the piers were the deep founded ones." The mistake was a very

F.J.E.S.

natural as. because, whatever may have been the case when the bridge was first built, the bend in the river had been since so changed its position that ~~[illegible]~~ where the deep channel originally was was shoaled ~~silted~~ up and the new deep channel is found where the shallow founded piers are. while the deep founded piers are to be found at the place where the bed has shoaled up.

Mr Fowler having no indication to guide him out of this wrong identification on the drawing, ~~of the [illegible] pier, of those shown on the drawing~~ of the particular pier which had failed, ~~the~~ and foundations of course being all invisible, naturally enough described the pier which split, and which presumably was the prime cause of the failure, as founded on two wells about 11 ft in diameter and about 30 ft deep. and came to the conclusion that one well had heeled over. When I inspected the scene later on, ~~[illegible]~~ the foundations being still invisible, I could not see my way to concluding that a well founded 30 ft ~~[illegible]~~ had toppled over; as ~~[illegible]~~ it was founded 30 ft deep as at first believed, or only 16 ft as afterwards appeared to be the case, ~~there was~~ as there had evidently occurred no such scour as ~~[illegible]~~ to justify ~~[illegible]~~ such an assumption ~~of its having leaned over~~. I contented myself therefore with opining that it had somehow collapsed. and said that I was disposed to think that this must have been due to the badness of the masonry.

No authoritative conclusion was possible however until boring could be ~~were~~ made; and these ~~[illegible]~~ now clearly show that, as already explained, the map had been read wrong way round, and that what really happened was that in the course of years the bends of the river had so changed their position that the deep part found itself at that end of the bridge where the ~~[illegible]~~ piers, instead of being founded on deep wells, were on ordinary shallow open foundations, the bottom of the concrete being only six feet below the level of the tops of the wells of the deep founded piers

Madras 30-3-98

FRANCIS J. E. SPRING.
Senior Government Inspector of Rys. Madras

~~R.~~ Form No. 12.

Print

No. 934

~~Government of Madras.~~

~~PUBLIC WORKS DEPARTMENT,~~

~~RAILWAY BRANCH.~~

From The Senior Govt. Inspector of Ry. Madras

To

The Secy. to the Govt. of India,

P. W. Department.

1st April 1898.

Sir,

In reply to your letter No. 365. R.C. dated the 18th March 1898 I have the honor to send you a supplementary report on the accident which occurred at the Moolan Bridge of the S. M. Ry. on the 23rd Sept. 97.

I have &c

FHS

30/3/98

No. 935 Dated 1st April /98.

Copy forwarded to the Joint Sec. P. W. D. Ry. Madras. for information

FHS

30/3/98

D 1

31/3/98

Despatched on 1/4/98

Madras, 1st April 1898.

6

No. 934

From,

The Senior Government Inspector of Railways,

Madras.

To,

The Secretary to the Government of India,

Public Works Department,

Simla.

Sir,

In reply to your letter No. 365 R. C., dated the 18th March 1898, I have the honour to send you a Supplementary Report on the accident which occurred at the Malur Bridge of the Southern Mahratta Railway on the 23rd September 1897.

I have the honour to be,

Sir,

Your Most Obedient Servant,

(Signed) F. J. E. Spring,

Senior Government Inspector.

P. W. Ryc No. 472

Recd 4. 4. 98.

No. 935 dated 1st April 1898.

Copy forwarded to the Joint Secretary, P. W. D. Railway Branch, Madras, for information.

Francis J. E. Spring

Senior Government Inspector.

5

THE MALLUR BRIDGE ACCIDENT. SOUTHERN MAHRATTA RAILWAY,

which occurred on the morning of 23rd September 1897.

Supplementary Report by the Senior Government Inspector of

Railways, Madras.

Now that the Agent of the Southern Mahratta Railway has completed the borings referred to in the last part of para 1 of my report dated Bangalore 28th October 1897, I am in position to come to a definite conclusion as to what actually caused the failure of the split pier. But it is necessary to explain that, at the inspection, the Southern Mahratta Railway Officials produced a certain drawing and pointed out certain piers, the 5th and the 6th from the right end of the drawing, as the ones which had failed. But it subsequently appeared that, owing to the fact of there being no indication on that drawing as to which was the Mysore end of the bridge and which the Bangalore end, and also to the fact that the deep part of the bed of the river had changed its position since the bridge was built, they had read the drawing wrongly, and that, as a matter of fact, the piers which failed were the 2nd and 3rd and not the 5th and 6th from the right end of the drawing. That this mistake in identification was made by the Southern Mahratta Railway Company's Officers is shewn in the Agent's letter of the 18th October in which he sends a rough sketch made by his Chief Engineer of what that Officer believed to be the split pier, and in this sketch the 6th pier from the right end of the drawing is reproduced. Again in his letter dated the 10th February 1898 the Agent referring to this fault of diagnosis says "this is hardly our fault as the old plan has not the words 'to Mysore' and 'from Bangalore', so that the Committee (the Departmental Committee F.J.E.S.) very naturally assumed that the pier was the deep founded one." The mistake was a very natural one, because the bend in the wide river bed has now so changed its position that what was the deep channel originally has now shoaled up and the new deep channel is found where the shallow founded piers are, while the deep founded piers are to be found at the place where the bed has shoaled up.

[illegible] 131

Mr. Fowler, having no indication to guide him out of this wrong identification on the drawing, of the particular pier which had failed, and foundations of course being all invisible, naturally enough described the pier which split, and which presumably was the prime cause of the failure, as founded on two wells about 11 feet in diameter and about 30 feet deep; and came to the conclusion that one well had heeled over. When I inspected the scene later on, the foundations being still invisible, I could not see my way to concluding that a well founded 30 feet had toppled over, as there had evidently occurred no such scour as to justify such an assumption. I contented myself therefore with opining that it had somehow collapsed, and said that I was disposed to think that this must have

4

been due to the badness of the masonry.

No authoritative conclusion was possible however until borings could be made; and these now clearly show that, as already explained, the map had been read wrong way round, and that what really happened was that, in the course of years, the bends of the river had so changed their position that the deep part found itself at that end of the bridge where the piers, instead of being founded on deep wells, were on ordinary shallow open foundations, the bottom of the concrete being only six feet below the level of the top of the wells of the deep founded piers.

Francis J. E. Spring

Senior Government Inspector.

Madras,

30th March 1898.

Form No. 1.

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH.

A

Papers to be read in Proceedings:—

Again G.O., dated 16th November 1897, No. 993 R.

Again G.O., dated 189 , No.

Current No. 56 of 1898, dated 5.1.98, from the Govt. of India.

Letter from S.G.I. to Agent S.M.R. No 73, d/ 8-1-98.

Consg. Engrs. " " 571 " 189 , " 1-2-98, " Agent S.M.R.

Letter from S.G.I. to India No 345 d 3-2-98.

Consg. Engrs. " " 791 " 189 , " 14-2-98, " Agent S.M.R.

Do. from the Agent S.M.R. d 10-2-98

Letter from the S.G.I. to India No 575-6 d 1-3-98.

C.E. Rs. C.No 1465 of 1898 dated 25.3.98.

Letter from the S.G.I. No 934-5 d 1-4-98.

ORDER.

No 532 Ry of 5/4/98.

Recorded.

5/4/98

R

To,

The Consulting Engineer for Rys.

10/5/98