

- (1) Number of pages _____
 (2) Date of repair _____
 (3) Initials of the Referencer _____

MADRAS RECORD OFFICE.

Government of Madras.

DEPARTMENT.

G.O. No.	1849	Press Mis.
Dated	13-11-18	

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
13th July 1871.*

Read the following papers:—

No. 215. From the Deputy Consulting Engineer for Railways, to the Secretary to Government, Public Works Department, dated Madras, 17th June 1871, No. 274.

I HAVE the honour, with reference to this Office endorsement No. 251, dated 7th instant, to forward a report received from the Chief Engineer of the Madras Railway through the Agent and Manager on the subject of the bridge in the 287th mile (Bellary branch) which failed as already reported.

2. The drainage basin for the rainfall, of which the bridge in question and the adjoining one provide, is estimated to have an area of 30½ square miles. I find that originally the two bridges provided for in the construction estimate and subsequently built consisted of a three-arched bridge of 30 feet spans and a one-arched bridge of the same span. That, in consequence of the flood of 1868 rising up to or over the springings of the arches, girders were substituted for the arches in both bridges, and that an additional vent was provided for the bridge, which has now failed by building a pier on the foundation of the original abutment, and by adding a fresh abutment, thus converting the waterway from the 30-foot arch into two-girder spans of 30 feet.

2. It was probably in consequence of the observed effects of this same monsoon that the necessity for the further addition of a floor and curtain walls to each of these bridges was recognized by the Chief Engineer, as evidenced in the correspondence with his subordinates quoted by him in his letter* herewith

* No. 305, dated 12th June 1871. forwarded. From this it would appear that as long ago as March 1870, orders were issued for the construction of the extra work, but that owing to the unwillingness of the Contractor to undertake the work or other causes, the recent rains found one only of the bridges duly provided with apron and curtain walls, and the other with only the curtain wall. Having inspected the damaged bridge with the Acting Chief Engineer, I concur in his conclusion that the absence of the apron was the cause of the fall of the pier, and that a further provision of waterway is advisable.

3. The repair of the bridge temporarily is comparatively an easy task, there being a girder of sufficient size to span the opening between the abutments available on the bank of the Huggry, and I hope to be able to report the bridge open for traffic during next week.

From the Acting Chief Engineer, to the Acting Agent and Manager of the Madras Railway Company, dated Madras, 12th June 1871, No. 305.

SINCE reporting to you the damage done by a flood to the bridge of 2-30 feet openings at the 287th mile, 14 T. P., on Bellary branch, as per letter No. 295 of 6th instant, I have visited the locality and find that the pier has been washed away, leaving the girders suspended between the two abutments.

2. The flood had subsided on the 8th instant (the date of my visit) and the space between the abutments was scoured out leaving a hole filled with water to the depth of some 9 or 10

feet. This, however, does not represent the total depth of scour as it had no doubt been partially restored by silt.

3. A portion of the pier was remaining, of which the top was some 4 feet below the surface of the water, but whether this masonry was the lower portion of the pier which had not been washed away, or that it was the upper portion which had subsided, it was not possible to ascertain on account of the quantity of water covering it. Reasoning from the depth of the scour and from other facts, it is most probable the latter was the case. The ground is black cotton soil about 11 feet deep resting on morumboo.

4. Orders had been issued to the Resident Engineer some time past to protect the foundations of this bridge from scour by means of curtain walls up and down stream and a paving between them. Had this work been completed the bridge would have been safe. Unfortunately, however, these protective works were being carried out and only partially finished when the flood came down, and so the mischief was done.

5. The river, one fork of which is spanned by this bridge, divides, at a distance of a few hundred yards above the Railway, into two channels, which unite again below the Railway. It drains an area of about 30½ square miles, and the waterway which we have provided for it, namely, 90 feet wide for the east channel and 60 feet for the west, ought to be ample unless any local causes should give one of the channels an undue proportion of the drainage to carry off. The ground is slightly lower in the eastern channel at the Railway crossing than at the western, and for this reason the larger waterway has been provided there, (namely, 3-30 feet openings, against 2-30 feet openings) still from some cause, probably due to the direction of the channel above the Railway or to the nature of its banks, the west channel appears to have had quite as much water to pass as the east one in the late flood. The water in it was backed up to a height of about 4 feet below bottom of girders and a tank was formed along the Railway embankment, and although the bridge allowed the water to pass through without injury to the abutments, still the rush must have been very great, and I think it will be desirable to increase the width of waterway at this point with a view to reduce the force of scour. On this point I shall report further as soon as I have further information.

6. In the meantime the gap of 65 feet between the two abutments is being spanned as a temporary measure by means of a girder, 73 feet in length, made from sections of one set of the Huggery girders which had not been hitherto put together, and which were consequently available and close at hand for this work. The hole created by scour is being filled up with stone and will be paved over, and a row of sheet-piling will be driven in the channel immediately above the bridge. This is all that can be done till after the present monsoon, and will, I hope, render the work perfectly safe.

P. S.—I append copies of extracts from correspondence on the subject of the foundations of this bridge, from which you will observe that explicit instructions were given from this office for putting in curtain walls and paving, and that these instructions were not carried out at the right time.

Extract of a letter from Mr. J. A. Dewing, No. 178, dated 12th March 1870.

During your late inspection you instructed me to build curtain walls up and down stream at the treble 30 feet bridge at 7 miles 57 chains and double 30 feet bridge at 7 miles 73 chains, and to carry the foundations to the same depth as those of these bridges, respectively. These instructions were at once given to Mr. Ross, but he seems very averse to these jobs on account of the expense of sinking the foundations. With regard to 7-73 bridge, I find the foundations are about 13 feet below present bed of stream and there is water close to the surface. I have had the island in front of the bridge removed and the channel slightly diverted, so as to give more waterway and a fair approach to the bridge, and think the curtain walls might be dispensed with under these circumstances. With regard to 7-57 bridge, water is met with 2 feet below the present surface

and the foundations here also are 9 feet below present bed of stream. I have not, as you are aware, seen this district during a monsoon; but, after giving a fair waterway to and from the openings, I should apprehend no possibility of any scour that could endanger the foundations of bridges so deeply founded as these are.

Please send me your final instructions in reply.

From T. H. GOING, Esq., Deputy Chief Engineer, to E. JOHNSTON, Esq., dated 5th December 1870, No. 216.

I HAVE also to call attention to the recent scour in the bed of the river crossed at 7 miles 73 chains. This will require curtain walls and pitching.

Please let me hear from you at an early date as to the action which is being taken in these matters.

From E. JOHNSTON, Esq., to Deputy Chief Engineer, dated 9th December 1870, No. 459.

With regard to the curtain walls and pitching required at 7 miles 73 chains nothing has yet been done. Instructions I find were sent to him by Mr. Dewing in a letter dated the 18th March last, No. 191, to carry out this work as well as the bridge at 7 miles 57 chains, a copy of which I also enclose, and I have again drawn Mr. Ross' attention to it this morning.

All other protective works called for in this district have been finished.

From T. H. GOING, Esq., Deputy Chief Engineer, to E. JOHNSTON, Esq., dated 12th December 1870, No. 223.

YOUR No. 459 of 9th instant. Be good enough to take early measures for the execution of the works referred to in connection with the bridges at 7 miles 73 chains and 7 miles 57 chains; also the pitching of slopes between 5 miles 65 chains and 6 miles 10 chains.

If the contractor refuses to execute them you should serve him with notice under the terms of his agreement and carry them out by Company's labour.

(True Extract.)

(Signed) T. H. GOING,
Acting Chief Engineer.

No. 216. Endorsement of the Acting Consulting Engineer for Railways, dated Madras, 27th June 1871, No. 290.

From the Acting Agent and Manager of the Madras Railway Company, to the Acting Consulting Engineer for Railways, dated Madras, 26th June 1871, No. 383.

With reference to your endorsement No. 397, dated the 22nd instant, on the memorandum addressed to you by the Secretary to Government in the Public Works Department, I have the honour

*No. 339, dated 24th June 1871.

to state that the Acting Chief Engineer* has every reason to believe that the foundations of the double 30 feet bridge at 7 miles 73 chains of District 12, Bellary branch, were built at a depth of 13 feet, as stated in Mr. Dewing's letter of the 12th March 1870, No. 178, a copy of which was forwarded to you with my communication of the 13th instant, No. 346.

2. With regard to Colonel Carpendale's inquiry in paragraph 2 of his memorandum, I have the honour to enclose you a copy of the Acting Chief Engineer's

*Proceedings of the Madras Government, Public Works Department,
13th July 1871.*

reply to Mr. Dewing's letter above alluded to, which Mr. Going omitted to forward to me with his letter of the 12th instant, No. 305.

From the Acting Chief Engineer of the Madras Railway, to J. A. DEWING, Esq., dated Madras, 15th March 1870, No. 306.

In reply to your No. 178 of 12th instant. The scour at the two bridges in question is very considerable, and I am of opinion that the curtain walls should be founded at the depth of the present masonry.

SUBMITTED to Government.

2. This letter, with its enclosure, gives the information asked for in memorandum No. 156 of the 21st instant.

(Signed) H. L. PRENDERGAST, Major, R.E.,
Acting Consulting Engineer for Railways.

No. 217.

ORDER THEREON, 13th July 1871, No. 1,849.

RAILWAY, No. 21.

THE papers recorded above relate to the destruction of a bridge of two spans of 30 feet in the 287th mile on the Bellary branch, which was carried away by a flood on the night of the 5th June 1871.

2. The Chief Engineer reports that the space between the abutments was scoured out to a depth of more than 9 or 10 feet, and as the foundations of the pier were at the outside 13 feet deep, it seems tolerably certain that they were undermined, and which would most probably not have occurred if the usual flooring and retaining walls, called here paving and curtain walls, and the necessity for which had long been foreseen, had been provided. The necessary instructions were given by the Deputy Chief Engineer early in 1870, and instead of being acted on were remonstrated against by Mr. J. A. Dewing on the 12th March 1870, who was of opinion that these precautions might be dispensed with, and who concluded his letter by asking for final instructions. In reply, he was immediately informed by the Deputy Chief Engineer that the scour at the bridge in question, and at the adjoining one, was very considerable, and that the curtain walls should have their foundations at the same depth as the piers and abutments, but nothing appears to have been done until the 5th December following when the Deputy Chief Engineer called the attention of the Engineer then in executive charge, Mr. E. Johnston, to the evident necessity for the improvements, and renewed his instructions on the 12th idem, adding, that if the Contractor refused to execute the work it should be done departmentally; but so dilatory was the action taken in pursuance of these instructions, that when a flood came down on the 5th June 1871, the necessary work had only been partially done, and the bridge was carried away—a failure and loss that is clearly attributable to neglect or inattention to orders on the part of two Engineers in the Company's service.

3. The Government having in view the repeated accidents which have occurred in consequence of the faulty construction of bridges in this country,

*Proceedings of the Madras Government, Public Works Department,
13th July 1871.*

resolve to call for a return of all the bridges on the lines of Railway under the Madras Railway Company, which are unprovided with the flooring and the retaining walls indicated as indispensable to the safety of the bridge under consideration, with the view of prescribing the construction of such works without delay in every case in which they are considered to be desirable.

(True Extract.)

Colonel, R.E.,
Secretary to Government.

To the Acting Consulting Engineer for Railways.

Exd. E. C. Shunker.

Sp 305

Alcedras Railway Co.
Chief Engineer's Office
Alcedras 12 June 1871.

The Atg. Agent & Managers,

Dear Sir, Since reporting to you the damage done by a flood to the Bridge of 2.30 feet openings at 287 miles 14 P. on Bellamy Branch a few letters Sp 295 of 6th instant, I have visited the locality and find that the Pier has been washed away, leaving the girders suspended between the two abutments.

2. The flood had subsided on the 8th instant (the date of my visit) and the space between the abutments was scoured out leaving a hole filled with water to the depth of some 9 or 10 feet. This however does not represent the total depth of scow and had no doubt been partially restored by silt.

3. A portion of the pier was remaining of which the top was some 4 feet below the surface of the water, but whether this masonry was the lower portion of the pier which had not been washed away, or that it was the upper portion which had subsided it was not possible to ascertain on account of the quantity of water covering it. Reasoning from the depth of the scow and from other facts it is most probable the latter was the case. The ground is black cotton soil about 11 feet deep resting on macumboo.

4. Orders had been issued to the Resident Engineer some time past to protect

the foundations of this Bridge from scows by means of curtain walls up and down stream and a paving between them. Had this work been completed the Bridge would have been safe. Unfortunately however, these protective works were being carried out, and only partially finished when the flood came down and so the mischief was done.

The River, one fork of which is spanned by this Bridge, divides, at a distance of a few hundred yards above the Railway, into two channels, which unite again below the Railway. It drains an area of about 30 square miles and the waterway which we have provided for it, viz 90 feet wide for the East Channel and 60 feet for the West, ought to be ample unless any local causes should give one of the channels an undue proportion of the drainage to carry off. The ground is slightly lower in the Eastern Channel at the Railway crossing than at the Western, and for this reason the larger waterway has been provided there (viz 3.30 feet openings against 2.30 feet openings). Still from some cause, probably due to the direction of the Channel above the Railway on to the nature of its Banks, the West Channel appears to have had quite as much water to pass as the East one in the late flood. The water in it was backed up to a height of about 4 feet below bottom of girders and a bank was formed along the Railway embankment and although the Bridge allowed the water to pass through without

injury to the abutments, still the rush must have been very great and I think it will be desirable to increase the width of waterway at this point with a view to reduce the force of scows. On this point I shall report further as soon as I have further information. In the meantime the gap of 65 feet between the two abutments is being spanned as a temporary measure by means of a girder 73 feet in length made from sections of one set of the Huggrey girders which had not been hitherto put together and which were consequently available and close at hand for this work. The hole created by scow is being filled up with stone and will be paved over and a row of sheet piling will be driven in the Channel immediately above the Bridge. This is all that can be done till after the present monsoon and will I hope render the work perfectly safe.

Yours faithfully
W. H. Goring
Ag. Chief Engineer.

P.S. I append copies of extracts from correspondence on the subject of the foundations of this Bridge from which you will observe that explicit instructions were given from this Office for putting in curtain walls and paving and that these instructions were not carried out at the right time.

W. H. G.
True Copy
Wm. H. Goring
Ag. Agent & Engineer.

Extract of letter from Mr. J. A. Deering
 No. 178 dated 12 March 1870.

During your late Inspection you instructed me to build Curtain walls up and down stream at the Treble 30 feet bridge at 7 miles 57 chains and double 30 feet bridge at 7 miles 73 chains and to carry the foundations to the same depth as those of these bridges respectively. These instructions were at once given to Mr. Ross, but he seems very averse to these jobs on account of the expense of sinking the foundations. With regard to 7-73 Bridge I find the foundations are about 13 feet below present bed of stream and there is water close to the surface. I have had the Island in front of the Bridge removed and the channel slightly diverted so as to give more water-way and a fair approach to the Bridge and think the Curtain walls might be dispensed with under these circumstances. With regard to 7-57 Bridge water is met with 2 feet below the present surface and the foundations here also are 9 feet below present bed of stream. I have not as yet been aware of this district during a monsoon, but after giving a fair water-way to and from the openings I should apprehend no possibility of any scour that could endanger the foundations of Bridges so deeply founded as these are. Please send me your final instructions in reply and oblige.

Yours
 J. H. Paving Esq
 Dy. Ch. Engr
 To
 Col. Johnston Esq
 No 216 of 5 Dec 70

I have also to call attention to the recent scour in the bed of the River across at 7 miles 73 chs. This will require Curtain walls and pitching.

Please let me hear from you at an early date as to the action which is being taken in these matters.

Yours
 Col. Johnston Esq
 Dy. Ch. Engr
 No 459 of 9 Dec 70

With regard to the Curtain walls and pitching required at 7 miles 73 chs. nothing has yet been done. Instructions I find were sent to him by Mr. Deering in a letter dated the 18th March last, No 191, to carry out this work, as well as the Bridge at 7 miles 57 chs. a copy of which I also enclose, and I have again drawn Mr. Ross' attention to it this morning.

All other protective works called for on this District have been finished.

Yours
 J. H. Paving Esq
 Dy. Ch. Engr
 To
 Col. Johnston Esq
 No 223 of 12 Dec 70

Yours No. 459 of 9th instant.

Be good enough to take early measures for the execution of the works referred to in connection with the Bridges at 7 miles 73 chs and 7 miles 57 chs. also the pitching of slopes between 5 miles 65 chains and 6 miles 10 chs.

If the Contractor refuses to execute them you should serve him with notice under the terms of his agreement and carry them out by Company's labor.

Yours Copy/
 Useful Annexes
 19. agent & Harbinger
 1/2/71 J. H. Paving
 Dy. Chief Engineer

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CONSULTING ENGINEER'S OFFICE.

Railway Department.

No. 274

From

Captain C. J. Smith R.E.
Consulting Engineer for Railways,

To

Colonel J. Carpendale R.E.
Secretary to Government,
Public Works Department,
Fort Saint George.

Sir,

I have the honour, with reference to the office Endorsement No. 281, dated 7th instant, to forward a report received from the Chief Engineer of the Madras Railway through the Agent and Manager on the subject of the bridge in the 287 mile (Bellary Branch) which failed as already reported.

The drainage basin for the rainfall of which the bridge in question and the adjoining one provide, is estimated

No 305 of 12th June 71.

to have an area of $30\frac{1}{2}$ square miles.
I find that originally the two bridges
provided for in the construction estimate
and subsequently built consisted
of a three arched bridge of 30 feet
spans and a one-arched bridge of the
same span. That in consequence
of the flood of 1868 rising up to or
over the springings of the arches.
Girders were substituted for the arches
in both bridges and that an additional
vent was provided for the bridge
which has now failed by building
a pier on the foundation of the original
abutment, and by adding a fresh
abutment, thus converting the waterway
from ~~the~~ 30 feet arch into two girder
spans of 30 feet.

2. It was probably
in consequence of the observed effects

* 305.12 $\frac{1}{2}$
June/71.

of this same monsoon that the necessity
for the further addition of a floor
and curtain walls to each of these bridges
was recognised by the Chief Engineer,
as evidenced in the correspondence
with his Subordinates quoted by him
in his letter herewith forwarded.
From this it would appear, that
as long ago as March 1870, orders
were issued for the construction of
the extra work, but that owing to the
unwillingness of the Contractor to
undertake the work or other causes.
The recent rains found one only of the
bridges duly provided with apron
and curtain walls, and the other with
only the curtain wall. Having
inspected the damaged bridge with the
Acting Chief Engineer, I come in his
conclusion that the absence of the apron
was the cause of the fall of the pier, and

that a further provision of waterway is advisable.

The repair of the bridge temporarily is comparatively an easy task, there being a girder of sufficient size to span the opening between the abutments available on the bank of the Muggay and I hope to be able to report the bridge open for traffic during next week.

I have the honor to be,

Your most obedient Servant

W. H. Smith Captain R.E.

Dy Commr. Eng^g for Railways

Dated 17th June 1871
Received 19

No. 274-
Recd 17th

The Secretary to Government,
P. W. Department,
Fort St. George.

The Consulting Engineer
for Railways,

From

RAILWAY DEPARTMENT.

1871. 2829.

W. H. Smith

No. 383.

MADRAS RAILWAY.

AGENT AND MANAGERS' OFFICE.

Madras, 26th June 1871.

From

Peresford Anderson Esq
Agent and Manager. M. B. Co.

To

Major H. D. Prendergast, R.E.
Consulting Engineer for Railways.

SIR,

With reference to your endorsement of 397 dated the 22nd instant, on the memorandum addressed to you by the Secretary to Government in the Public Works Department, I have the honor to state that the acting Chief Engineer has every reason to believe that the foundations of the double 30 feet Bridge at Chikkar 73 chains of District 12. Bellary Branch, were built at a depth of 13 feet, as stated in Mr Deming's letter of the 12th March 1870. of 178, a copy of which was forwarded to you with my communication of the 13th instant of 346. With regard to Colonel Carpenter's enquiry in paragraph 2 of his memorandum, I have the honor to enclose you a copy of the acting Chief Engineer's reply to Mr Deming's letter above alluded to, which Mr Young omitted to forward to me with his letter of the

12

12th instant, N^o 305.

I have the honor to be
Sir
Your most Obedient Servant,
Respectful Ancestor.
Acting Agent & Manager.

508
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Madras Railway
Chief Engineer's Office
Madras 15th March 1870

to 306
J. A. Dewing Esq

My dear Sir

In reply to yours of 17th of 12th instant. The views at the two Bridges in question is very considerable and I am of opinion that the Curtain walls should be founded at the depth of the present masonry.

Yours very truly
Signed J. H. Goring
Acting Chief Engineer

1 True Copy /
J. H. Goring
Acting Chief Engineer

1 True Copy /
W. H. Anderson -
Acting Agent & Manager

Comptroller

21369

MADRAS RAILWAY.

From

The Agent and Manager.

To

The Consulting Engineer

for Railways.

Dated 26th Dec 1871.
Recd. 27th "

No. 383

Reference to the views of the Secretary to Comm. Inst. Public Works Dept in reference to the depth of foundations of the walls 30 feet below 3 miles 35 chains of District 12 Bellary Branch.

P. N. 3042/71

Nº 290.

Submitted to Government.

This letter, with its enco-
-sure give the information asked
for in Memorandum Nº 156 of
the 21st instant.

Charles Lundy ^{Major} ^{Ag. Cons. Engrt. for Railways}

Madras
14 June 1871

To,
The Secretary to Government
Public Works Department
Fort Saint George.

Copy furnished to the
Colonel of the Garrison
19th June 1871

For information of the
Colonel of the Garrison
the following is a copy of the
letter of the 14th June 1871
from the Major of the Garrison
to the Secretary to Government
Public Works Department
Fort Saint George.

For information of the
Colonel of the Garrison
the following is a copy of the
letter of the 14th June 1871
from the Major of the Garrison
to the Secretary to Government
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letter of the 14th June 1871
from the Major of the Garrison
to the Secretary to Government
Public Works Department
Fort Saint George.

Comptroller

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*From the Engineer for R.R.
from the Chief Engineer
for Railways }*

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1857. 1871. 1872. 1873. 1874. 1875. 1876. 1877. 1878. 1879. 1880. 1881. 1882. 1883. 1884. 1885. 1886. 1887. 1888. 1889. 1890. 1891. 1892. 1893. 1894. 1895. 1896. 1897. 1898. 1899. 1900. 1901. 1902. 1903. 1904. 1905. 1906. 1907. 1908. 1909. 1910. 1911. 1912. 1913. 1914. 1915. 1916. 1917. 1918. 1919. 1920. 1921. 1922. 1923. 1924. 1925. 1926. 1927. 1928. 1929. 1930. 1931. 1932. 1933. 1934. 1935. 1936. 1937. 1938. 1939. 1940. 1941. 1942. 1943. 1944. 1945. 1946. 1947. 1948. 1949. 1950. 1951. 1952. 1953. 1954. 1955. 1956. 1957. 1958. 1959. 1960. 1961. 1962. 1963. 1964. 1965. 1966. 1967. 1968. 1969. 1970. 1971. 1972. 1973. 1974. 1975. 1976. 1977. 1978. 1979. 1980. 1981. 1982. 1983. 1984. 1985. 1986. 1987. 1988. 1989. 1990. 1991. 1992. 1993. 1994. 1995. 1996. 1997. 1998. 1999. 2000. 2001. 2002. 2003. 2004. 2005. 2006. 2007. 2008. 2009. 2010. 2011. 2012. 2013. 2014. 2015. 2016. 2017. 2018. 2019. 2020. 2021. 2022. 2023. 2024. 2025. 2026. 2027. 2028. 2029. 2030. 2031. 2032. 2033. 2034. 2035. 2036. 2037. 2038. 2039. 2040. 2041. 2042. 2043. 2044. 2045. 2046. 2047. 2048. 2049. 2050. 2051. 2052. 2053. 2054. 2055. 2056. 2057. 2058. 2059. 2060. 2061. 2062. 2063. 2064. 2065. 2066. 2067. 2068. 2069. 2070. 2071. 2072. 2073. 2074. 2075. 2076. 2077. 2078. 2079. 2080. 2081. 2082. 2083. 2084. 2085. 2086. 2087. 2088. 2089. 2090. 2091. 2092. 2093. 2094. 2095. 2096. 2097. 2098. 2099. 2100. 2101. 2102. 2103. 2104. 2105. 2106. 2107. 2108. 2109. 2110. 2111. 2112. 2113. 2114. 2115. 2116. 2117. 2118. 2119. 2120. 2121. 2122. 2123. 2124. 2125. 2126. 2127. 2128. 2129. 2130. 2131. 2132. 2133. 2134. 2135. 2136. 2137. 2138. 2139. 2140. 2141. 2142. 2143. 2144. 2145. 2146. 2147. 2148. 2149. 2150. 2151. 2152. 2153. 2154. 2155. 2156. 2157. 2158. 2159. 2160. 2161. 2162. 2163. 2164. 2165. 2166. 2167. 2168. 2169. 2170. 2171. 2172. 2173. 2174. 2175. 2176. 2177. 2178. 2179. 2180. 2181. 2182. 2183. 2184. 2185. 2186. 2187. 2188. 2189. 2190. 2191. 2192. 2193. 2194. 2195. 2196. 2197. 2198. 2199. 2200. 2201. 2202. 2203. 2204. 2205. 2206. 2207. 2208. 2209. 2210. 2211. 2212. 2213. 2214. 2215. 2216. 2217. 2218. 2219. 2220. 2221. 2222. 2223. 2224. 2225. 2226. 2227. 2228. 2229. 2230. 2231. 2232. 2233. 2234. 2235. 2236. 2237. 2238. 2239. 2240. 2241. 2242. 2243. 2244. 2245. 2246. 2247. 2248. 2249. 2250. 2251. 2252. 2253. 2254. 2255. 2256. 2257. 2258. 2259. 2260. 2261. 2262. 2263. 2264. 2265. 2266. 2267. 2268. 2269. 2270. 2271. 2272. 2273. 2274. 2275. 2276. 2277. 2278. 2279. 2280. 2281. 2282. 2283. 2284. 2285. 2286. 2287. 2288. 2289. 2290. 2291. 2292. 2293. 2294. 2295. 2296. 2297. 2298. 2299. 2300. 2301. 2302. 2303. 2304. 2305. 2306. 2307. 2308. 2309. 2310. 2311. 2312. 2313. 2314. 2315. 2316. 2317. 2318. 2319. 2320. 2321. 2322. 2323. 2324. 2325. 2326. 2327. 2328. 2329. 2330. 2331. 2332. 2333. 2334. 2335. 2336. 2337. 2338. 2339. 2340. 2341. 2342. 2343. 2344. 2345. 2346. 2347. 2348. 2349. 2350. 2351. 2352. 2353. 2354. 2355. 2356. 2357. 2358. 2359. 2360. 2361. 2362. 2363. 2364. 2365. 2366. 2367. 2368. 2369. 2370. 2371. 2372. 2373. 2374. 2375. 2376. 2377. 2378. 2379. 2380. 2381. 2382. 2383. 2384. 2385. 2386. 2387. 2388. 2389. 2390. 2391. 2392. 2393. 2394. 2395. 2396. 2397. 2398. 2399. 2400. 2401. 2402. 2403. 2404. 2405. 2406. 2407. 2408. 2409. 2410. 2411. 2412. 2413. 2414. 2415. 2416. 2417. 2418. 2419. 2420. 2421. 2422. 2423. 2424. 2425. 2426. 2427. 2428. 2429. 2430. 2431. 2432. 2433. 2434. 2435. 2436. 2437. 2438. 2439. 2440. 2441. 2442. 2443. 2444. 2445. 2446. 2447. 2448. 2449. 2450. 2451. 2452. 2453. 2454. 2455. 2456. 2457. 2458. 2459. 2460. 2461. 2462. 2463. 2464. 2465. 2466. 2467. 2468. 2469. 2470. 2471. 2472. 2473. 2474. 2475. 2476. 2477. 2478. 2479. 2480. 2481. 2482. 2483. 2484. 2485. 2486. 2487. 2488. 2489. 2490. 2491. 2492. 2493. 2494. 2495. 2496. 2497. 2498. 2499. 2500. 2501. 2502. 2503. 2504. 2505. 2506. 2507. 2508. 2509. 2510. 2511. 2512. 2513. 2514. 2515. 2516. 2517. 2518. 2519. 2520. 2521. 2522. 2523. 2524. 2525. 2526. 2527. 2528. 2529. 2530. 2531. 2532. 2533. 2534. 2535. 2536. 2537. 2538. 2539. 2540. 2541. 2542. 2543. 2544. 2545. 2546. 2547. 2548. 2549. 2550. 2551. 25

To the Secretary to Govt
P. W. Copley
for Railways.

Date 24th
 Rec'd 29th

Aug 29 -
1894-15 July 11

nothing
a letter received from
the agent. W. R. Cough
promising to explain a
few regarding the
four stations of the
double 30 ft bridge at
7 miles 73 above 3212
Holly Brook.

Ch 216
185 July 17 n. 7.

it seems tolerably certain
that they were undermined
and which would most
probably not have oc-
curred if the normal
flooring and retaining
walls called here paving
and curtain walls and
the necessity for which
had long been foreseen
had been provided. The
necessary instructions were
given by the Deputy Chief
Engineer early in 1870
and instead of being acted
on were remonstrated
against by Mr. J. A. Downing
on the 12 March 1870, who
was of opinion that these
precautions might be
dispensed with, and who
concluded his letter by
asking

asking for final instruc-
tions. In reply, he was
immediately informed
by the Deputy Chief
Engineer that the scour
at the bridge in question
and at the adjoining
one was very considerable
and that the curtain
walls should have
their foundations at the
same depth as the piers
and abutments, but nothing
appears to have ^{been} done until
the 5 December following
when the Deputy Chief
Engineer called the
attention of the Engineer
then in Ex-
ecutive charge
Mr. E. Johnston to the
evident necessity for the

improvements and reviewed
his instructions on the
13th inst, adding that
if the Contractor refused
to execute the work it
should be done separat-
mentally; but so dilatory
was the action taken in
pursuance of these instruc-
tions that when a flood
came down on the 5th June
1871 the necessary work
had only been partially
done, and the bridge
was carried away. A
failure and loss that is
clearly attributable to neglect
or inattention to orders on
the part of two Engineers
in the Company's service.

I would add,

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For Engrs for Railway
Dept 14/7/71

The Engrs leaving in view the repeated accidents which have
occurred in consequence of the faulty construction of bridges
in this country resolve to call for a return of all the

Bridges on the lines of Railway under the Indian Railway

Company which are unpurged with the flooring and the

retaining walls indicated or indicated all of the safety of the

Bridge under consideration with the view of preserving the construction
of such works in the delay in view and in which they are considered to be small

65 July 11/71

3042
Govt. of Madras.

PUBLIC WORKS.

To The Consulting Engrs
for Railways

Date

Recd.

G. O. 13th July 1849.

Nos. 215 @ 217

Received of the
Consulting Engrs
for Railways
the sum of Rs. 100/-
being the amount
of the bill for
the work done
on the
B. & C. Railway