

Public Works. (1895) Department.

RAILWAY BRANCH.

G.O., No. 353 R

DATED 15th May

[Despatch Abstract.]

Bridges.— The sanction of the Govt of India to the Estimate of Rs 42,888 for strengthening the weak girders— on the South Indian Railway, Communicated to the agent.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.
	628	R	24-11-94				

FURTHER PAPERS.

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

15TH MAY 1895, No. 353 R., PUBLIC WORKS.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read the following papers:—

From the Joint Secretary to the Government of Madras, Public Works Department,
Railway Branch, to the Secretary to the Government of India, Public Works
Department, dated 22nd September 1894, No. 2942 C.

I am directed to forward, for the sanction of the Government of India, an estimate amounting to Rs. 79,868, chargeable in the proportion of Rs. 74,904 to Capital and Rs. 4,934 to Revenue, for strengthening the weak girder bridges on the South Indian Railway.

2. The work included in this estimate comprises the strengthening of such bridges as were found to be weak by Sir George Bruce, the Company's Consulting Engineer. A copy of this gentleman's investigations was sent to you with letter No. 32/(), dated 30th May 1894, from the Senior Government Inspector of Railways, Madras. It will be remembered that Sir George Bruce's calculations are based on the Board of Trade rules, but the estimate now submitted provides for the girders being strengthened to the standard recently laid down by the Government of India, and with the adjusted wheel weights of the "O" class engine as given in Sir G. Bruce's report. A tabular statement showing in detail the programme embodied in the present estimate is attached.

3. As it has been ruled that the strengths of Indian railway bridges are to be investigated under the rules laid down in the enclosure to Government of India, No. 1369 R.C., dated 13th December 1892, the estimate now submitted will not be final, and a supplementary estimate including the bridges which are weak under the new rules will be prepared hereafter.

ENCLOSURE.

STATEMENT showing in detail the programme embodied in the estimate submitted to the Government of India with letter No. 2942 C, dated 22nd September 1894.

15TH MAY 1895, No. 353 R., PUBLIC WORKS.

Mileage of bridge.	Number of spans.	Span in feet and type of girder.	Portion of bridge to be strengthened.	Method of strengthening.	Main girder.				Cross girder.				Remarks.
					Flange area square inches.		Flange stress tons per square inch.		Flange area square inches.		Flange stress tons per square inch.		
					Before strengthening.	After strengthening.	Before strengthening.	After strengthening.	Before strengthening.	After strengthening.	Before strengthening.	After strengthening.	
231/16	3	30 B	Cross girder	Addition of plates 12 feet long (on both flanges centrally placed on the cross girder length of 14' 6". The section of the plates will vary, the following sizes being added:— 9" x 1/2" iron. 8" x 1/2" iron. 8" x 1/2" steel.	5.25	9.76	10.68	5.76	3.89	6.60	12.23	7.00	For section 9" x 1/2" steel. For section 8" x 1/2" steel. For section 8" x 1/2" (steel).
232/11	4	30 B	Do.		4.38	10.01	9.62	4.21	3.89	7.78	12.21	6.13	
233/3	4	30 B	Do.		4.38	6.49	9.62	6.39	3.75	7.26	12.23	6.66	
234/4	4	30 B	Do.		4.38	6.49	9.62	6.39	3.75	6.42	12.23	7.61	
235/2	8	30 B	Do.		4.38	6.68	9.62	6.39	3.75	..	12.23	..	
236/10 N	5	30 B	Do.		4.38	6.68	9.62	6.39	3.75	..	12.23	..	
237/2 N	5	30 B	Do.		4.38	6.68	9.62	6.39	3.75	..	12.23	..	
238/3 N	9	30 B	Do.		4.38	6.68	9.62	6.39	3.75	..	12.23	..	
239/2 N	2	30 B	Do.		4.38	6.68	9.62	6.39	3.75	..	12.23	..	
240/4 N	3	30 B	Do.		4.38	6.68	9.62	6.39	3.75	..	12.23	..	
241/8	2	20 A	Main girder	Addition of plates 12' x 1/2" iron. Addition of plates 12' x 1/2" steel. Do. Do. Do. Do. Do. Do. Do. Do.	5.25	9.76	10.68	5.76	3.89	6.60	12.23	7.00	The decking of these bridges forms part of the upper flanges of the cross girders.
242/9	10	20 A	Do.		4.38	10.01	9.62	4.21	3.75	6.42	12.21	6.67	
243/6	1	20 A	Do.		4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67	
244/5	3	20 A	Do.		4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67	
245/8	1	20 A	Do.		4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67	
246/8	1	20 A	Do.		4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67	
247/7 A	1	20 A	Do.		4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67	
248/16 N	3	20 A	Do.		4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67	
249/16	4	20 D	Do.		4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67	
250/10	1	20 D	Do.		4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67	
251/6	1	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
252/6	4	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
253/11	3	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
254/6	3	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
255/4	1	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
256/13	1	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
257/3	1	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
258/12	1	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
259/4	1	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
260/2	1	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
261/6	1	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
262/10	1	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
263/10	3	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
264/10	3	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
265/2	4	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
266/4	3	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		
267/17	3	20 D	Do.	4.38	6.49	9.62	6.39	3.75	6.42	12.21	6.67		

The decking of these bridges forms part of the upper flanges of the cross girders.

15TH MAY 1895, No. 353 R., PUBLIC WORKS.

3

267/19	3	20 D	Do.	Addition of steel plates 6" x 1/2" to the bottom flanges.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
268/4	3	20 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
269/10	2	20 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
270/12	1	20 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
271/4 T	1	20 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
272/14 T	1	20 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
273/13 T	1	20 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
274/8	2	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
275/12	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
276/16	2	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
277/10	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
278/14	2	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
279/14	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
280/9	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
281/13	3	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
282/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
283/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
284/16	2	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
285/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
286/16	2	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
287/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
288/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
289/16	2	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
290/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
291/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
292/16	2	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
293/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
294/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
295/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
296/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
297/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
298/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
299/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
300/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
301/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
302/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
303/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
304/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
305/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
306/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
307/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
308/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
309/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	
310/16	1	16 D	Do.	Do.	2.65	4.33	4.33	4.33	2.65	4.33	12.38	7.29	

Statement showing in detail the programme embodied in the estimate submitted to the Government of India, &c.—cont.

Mileage of bridge.	Number of spans.	Span in feet and type of girder	Portion of bridge to be strengthened.	Method of strengthening.	Main girder.				Cross girder.				Remarks.
					Flange area square inches.		Flange stresses tons per square inch.		Flange area square inches.		Flange stresses tons per square inch.		
					Before strengthening.	After strengthening.	Before strengthening.	After strengthening.	Before strengthening.	After strengthening.	Before strengthening.	After strengthening.	
397/4	1	12 B	Cross girder	Addition of steel plates 6" X 12" to the bottom flanges.	..	..	..	..	256	433	1236	729	
398/1	1	12 B			..	..	266	433	1236	729			
401/1	1	12 B			..	..	266	433	1236	729			
406/4	2	12 B			..	..	266	433	1236	729			
407/16	1	12 B			..	..	266	433	1236	729			
410/9	1	12 B			..	..	266	433	1236	729			
412/7	4	12 B			..	..	266	433	1236	729			
422/14	1	12 B			..	..	266	433	1236	729			
440/3	1	12 B			..	..	266	433	1236	729			
442/4	1	12 B			..	..	266	433	1236	729			
446/8 T	2	12 B			..	..	266	433	1236	729			
436/1 T	1	12 B			..	..	266	433	1236	729			
436/7 T	1	12 B			..	..	266	433	1236	729			
437/16 T	1	12 B			..	..	266	433	1236	729			
438/2 T	2	12 B			..	..	266	433	1236	729			
438/11 T	1	12 B			..	..	266	433	1236	729			
441/6 T	2	12 B			..	..	266	433	1236	729			
443/2 T	1	12 B			..	..	266	433	1236	729			
443/11 T	1	12 B			..	..	266	433	1236	729			

From the Secretary to the Government of India, Public Works Department (Railway Construction), to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, the 16th October 1894, No. 1015 R.C.

With reference to your letter No. 2942 C., dated 22nd September 1894, submitting for sanction an estimate amounting to Rs. 79,888 of the cost of strengthening the weak girder bridges on the South Indian Railway, I am directed to request, in the first instance, that a copy of the Board of Directors' orders on the subject may be furnished for the information of the Government of India.

From the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, to the Secretary to the Government of India, Public Works Department, dated Madras, 24th November 1894, No. 628 R.

With reference to your letter No. 1015 R.C., dated 16th October 1894, I am directed to forward herewith an extract from letter from the Board of Directors, South Indian Railway, No. 139, dated 26th October 1894, regarding the estimate amounting to Rs. 79,888 of the cost of strengthening the weak girder bridges on the South Indian Railway.

ENCLOSURES.

EXTRACT from letter from the Board of Directors, South Indian Railway, to the Agent, dated London, the 26th October 1894, No. 139.

[Strengthening Girders.]

The Board sanctions the expenditure, estimated at Rs. 79,888, as detailed in the papers accompanying your No. 354 of 4th September 1894.

The Consulting Engineer, to whom the matter was referred, states in his report, dated 9th October 1894, of which copy is enclosed, that the sum named, Rs. 79,888, may be taken as fairly representing the cost of carrying out the work specified in the estimate.

From the Consulting Engineer, South Indian Railway Company, Limited, to the Managing Director, 55, Grace Church Street, E.C., dated 3, Victoria Street, S.W., 9th October 1894.

[Strengthening Girders.]

I have carefully examined the estimates for the strengthening of girder bridges which, together with three tracings and an extract from the Agent's letter No. 354, accompanied yours of the 24th ultimo, and am of opinion that the sum of Rs. 79,888 may be taken as fairly representing the cost of carrying out the work specified.

I note that of this total expenditure Rs. 74,904 is chargeable to Capital and Rs. 4,984 to Revenue but the principle upon which this allocation is based not being stated, I regret that I am unable to criticise it.

The estimates, tracings, and extract from Agent's letter are returned herewith.

From the Secretary to the Government of India, Public Works Department (Railway Construction), to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, the 16th April 1895, No. 443 R.C.

I am directed to acknowledge the receipt of your letter No. 628 R., dated the 24th November 1894, forwarding copy of the sanction of the Board of Directors of the South Indian Railway Company, to the estimate amounting to Rs. 79,888 of the cost of strengthening the weak girder bridges on that railway submitted with your letter No. 2942 C., dated 22nd September 1894.

2. With reference thereto I am to communicate the sanction of the Government of India to the estimate in question.

3. The question of allocation is still under consideration, and orders will issue on the subject later.

From the Under Secretary to the Government of India, Public Works Department (Railway Construction), to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, the 8th May 1895, No. 535 R.C.

In continuation of Government of India letter No. 413 R.C., dated 16th April 1895, communicating the sanction of the Government of India to the estimate amounting to Rs. 79,888 of the cost of strengthening the weak girder bridges on the South Indian Railway, I am directed to observe that the cost of the temporary diversion required in connection with the bridge of 5 spans of 30 feet (Rs. 1,050) has been allocated to Revenue.

2. This, I am to remark, is not in accordance with the accepted practice in such cases, viz., that the incidence of cost of temporary works should follow that of the main works in connection with which they were required, or, where the necessity for temporary works arises in connection with works debitable partly to Capital and partly to Revenue, their cost should be divided between the two in rateable proportions.

3. The cost of the temporary diversion above referred to should therefore be debited to Capital, the cost of the alterations to the 5-30 feet span bridge for which it is required being charged to that head. With this alteration the allocation of the estimate for Rs. 79,888 will stand as follows:—

To Capital	...	...	...	...	...	...	...	Rs.
To Revenue	...	...	...	...	...	...	...	75,954
								3,934

4. The sanction accorded in Government of India letter No. 443 R.C., dated 16th April 1895, has been registered as No. 2, South Indian Railway, of 1895.

ORDER—dated 15th May 1895, No. 353 R., Public Works.

Communicated to the Agent, South Indian Railway, for information.

2. This sanction has been registered as No. 1 R. of 1895-96.

(True Extract.)

(Signed) F. R. UPCOTT,
Joint Secy. to Govt., P.W.D.,
Railway Branch.

To the Agent, South Indian Railway.
„ Examiner, Guaranteed Railway Accounts.

RAILWAY.

Govt. of {1895} Madras.
PUBLIC WORKS.

Dated May, 15th.

Recd.

Encl.

G.O., 15th May 1895, No. 353 R.

MAY.

Bridges

The sanction of the Government of India to the estimate of Rs. 79,888 for strengthening the weak girder — on the South Indian Railway, communicated to the Agent.

APRIL 1895, No.

R., PUBLIC WORKS.

GOVERNMENT OF MADRAS.
PUBLIC WORKS DEPARTMENT.

Railway.

Read the following papers:—

From the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, to the Secretary to the Government of India, Public Works Department, dated 22nd September 1894, No. 2942 C.

I am directed to forward, for the sanction of the Government of India, an estimate amounting to Rs. 79,888 chargeable in the proportion of Rs. 74,904 to capital and Rs. 4,984 to Revenue, for strengthening the weak girder bridges on the South Indian Railway.

2. The work included in this estimate comprises the strengthening of such bridges as were found to be weak by Sir George Bruce, the Company's Consulting Engineer. A copy of this gentleman's investigations was sent to you with letter No. 32/O., dated 30th May 1894, from the Senior Government Inspector of Railways, Madras. It will be remembered that Sir George Bruce's calculations are based on the Board of Trade rules, but the estimate now submitted provides for the girders being strengthened to the standard recently laid down by the Government of India, and with the adjusted wheel weights of the "O" class engine as given in Sir G. Bruce's report. A tabular statement showing in detail the programme embodied in the present estimate is attached.

3. As it has been ruled that the strengths of Indian railway bridges are to be investigated under the rules laid down in the enclosure to Government of India, No. 1369 R.C., dated 13th December 1892, the estimate now submitted will not be final, and a supplementary estimate including the bridges which are weak under the new rules will be prepared hereafter.

From the Under Secretary to the Government of India, Public Works Department (Railway Construction), to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, the 16th October 1894, No. 1015 R.C.

With reference to your letter No. 2942 C., dated 22nd September 1894, submitting for sanction an estimate amounting to Rs. 79,888 of the cost of strengthening the weak girder bridges on the South Indian Railway, I am directed to request, in the first instance, that a copy of the Board of Directors' orders on the subject may be furnished for the information of the Government of India.

From the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, to the Secretary to the Government of India, Public Works Department, dated Calcutta, 24th November 1894, No. 628 R.

With reference to your letter No. 1015 R.C., dated 16th October 1894, I am directed to forward herewith an extract from letter from the Board of Directors, South Indian Railway, No. 139, dated 26th October 1894, regarding the estimate amounting to Rs. 79,888 of the cost of strengthening the weak girder bridges on the South Indian Railway.

Here print extract from Board of Directors copy attached.

Statement showing in detail the proposed iron bridge in the estimate submitted to the Port of India with letter No 2742 C dated 22nd September 1894.

Mileage of bridge.	Number of spans.	Span in feet and type of girder.	Portion of bridge to be strengthened.	Method of strengthening.	Main girder.				Cross girder.				Remarks.
					Flange area square inches.	Before strengthening.	After strengthening.	Flange stress tons per square inch.	Flange area square inches.	Before strengthening.	After strengthening.	Flange stress tons per square inch.	
231.16	3	20 D	Cross girder	Addition of plates 12 feet long on both flanges centrally placed on the cross girder length of 14' 6". The proportion of the plates will vary, the following sizes being added:— 9" x 1" iron. 9" x 1" " 9" x 1" " 9" x 1" " Addition of plates 12' x 1" (iron). Addition of plates 12' x 1" (steel). Substitution of stringers (Japan). Do. Do. Do. Do. Addition of plates 12' x 1" (iron). Do.	..	..	..	..	..	..	..	For section 9" x 1" : For section 8" x 1" : For section 8" x 1" : (total).	
232.11	4	20 H	Do.		6.25	10.68	5.76	..	3.89	12.23	7.00	7.00	
233.3	4	20 H	Do.		4.38	10.01	4.21	..	3.89	12.23	6.12	6.12	
234.4	4	20 H	Do.		4.38	8.59	6.39	..	3.89	12.23	6.42	6.42	
235.2	6	20 H	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
236.10 N	6	20 H	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
237.2 N	6	20 H	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
238.3 N	6	20 H	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
239.2 N	6	20 H	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
240.3 N	6	20 H	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
241.4	7	20 H	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
242.5	7	20 H	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
243.6	8	20 A	Main girder	Addition of steel plates 8' x 1" to the bottom flanges.	6.25	10.68	5.76	..	3.89	12.23	..	..	The decking of these bridges forms part of the upper flanges of the cross girders.
244.7	8	20 A	Do.		4.38	10.01	4.21	..	3.89	12.23	..	..	
245.8	8	20 A	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
246.9	8	20 A	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
247.10	8	20 A	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
248.2	1	20 A	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
249.3	1	20 A	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
250.4	1	20 A	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
251.5	3	20 A	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
252.6	4	20 D	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
253.7	1	20 D	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
254.8	1	20 D	Do.		4.38	8.59	6.39	..	3.89	12.23	..	..	
255.9	4	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
256.10	4	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
257.11	3	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
258.12	6	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
259.13	2	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
260.14	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
261.15	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
262.16	2	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
263.17	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
264.18	2	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
265.19	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
266.20	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
267.21	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
268.22	2	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
269.23	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
270.24	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
271.25	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
272.26	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
273.27	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
274.28	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
275.29	2	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
276.30	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
277.31	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
278.32	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
279.33	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
280.34	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
281.35	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
282.36	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
283.37	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
284.38	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
285.39	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
286.40	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
287.41	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
288.42	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
289.43	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
290.44	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
291.45	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
292.46	2	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
293.47	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
294.48	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
295.49	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
296.50	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
297.51	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
298.52	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
299.53	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
300.54	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
301.55	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
302.56	2	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
303.57	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
304.58	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
305.59	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
306.60	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
307.61	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
308.62	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
309.63	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
310.64	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
311.65	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
312.66	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
313.67	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
314.68	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
315.69	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
316.70	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
317.71	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
318.72	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
319.73	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
320.74	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
321.75	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
322.76	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
323.77	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
324.78	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
325.79	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
326.80	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
327.81	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
328.82	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
329.83	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
330.84	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
331.85	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
332.86	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
333.87	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
334.88	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
335.89	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
336.90	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
337.91	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
338.92	1	20 D	Do.	4.38	8.59	6.39	..	3.89	12.23	..	..		
339.93	1	20 D	Do.	4.38	8.59	6.39							

Mileage of bridge.	Number of spans.	Span in feet and type of girder.	Portion of bridge to be strengthened.	Method of strengthening.	Main girder.				Cross girder.				Remarks.	
					Flange areas square inches.		Flange stresses tons per square inch.		Flange areas square inches.		Flange stresses tons per square inch.			
					Before strengthening.	After strengthening.	Before strengthening.	After strengthening.	Before strengthening.	After strengthening.	Before strengthening.	After strengthening.		
893/19	3	20 D	Cross girder	Addition of steel plates 6" x 1" to the bottom flanges.	..	..	..	..	2.55	4.33	12.38	7.29		
414/6	3	20 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
415/10	3	20 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
426/10	3	20 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
431/13	1	20 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
429/4 T	1	20 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
429/6 T	1	20 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
430/15 T	3	20 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
442/13 T	1	20 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
218/8	3	16 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
271/12	1	16 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
286/16	3	16 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
314/9	1	16 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
321/14	2	16 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
323/3	1	16 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
325/17	1	16 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
326/5	2	16 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
339/6	1	16 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
357/14	1	15 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
361/14	2	16 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
364/9	3	16 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
370/1	1	15 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
371/6	3	15 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
379/14	1	15 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
380/9	1	15 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
383/13	2	16 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
387/15	1	16 D			Do.	..	..	..	..	2.55	4.33	12.38	7.29	
413/14	1	15 D	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
414/2	3	15 D	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
431/8	3	15 D	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
430/14	1	15 D	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
431/16 T	2	15 D	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
434/10 T	3	15 D	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
439/1 T	3	15 D	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
213/64	1	12 B	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
317/4	1	12 B	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
317/16	1	12 B	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
318/7	1	12 B	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
322/7	2	12 B	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
323/10	3	12 B	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
324/14	3	12 B	Do.	..	..	..	..	2.55	4.33	12.38	7.29			
324/17	3	12 B	Do.	..	..	..	..	2.55	4.33	12.38	7.29			

Addition of steel plates 6" x 1/2" to the bottom flanges.

332/10	1	19 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
342/10	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
346/13	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
348/5	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
349/13	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
351/11	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
350/13	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
358/3	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
360/9	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
366/7	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
367/10	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
369/15	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
372/4	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
399/1	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
408/4	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
407/16	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
410/9	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
412/7	4	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
423/16	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
440/8	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
442/4	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
426/8 T	3	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
435/1 T	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
437/15 T	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
438/2 T	3	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
438/11 T	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
441/6 T	3	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
443/2 T	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	
443/11 T	1	12 B	Do.		..	..	..	..	2.55	4.33	12.38	7.29	

6. The railway authorities do not propose to strengthen the main girders of the bridges at mileages 231/16, 232/11, 233/3, 234/4, 235/2, 236/10 N., 237/2 N., 238/3 N., 247/2 N., 262/2 N., 266/5 N. The Company's Consulting Engineer, in taking out the stresses, arrived at the conclusion that, under Board of Trade rules, the main girders were sufficiently strong. As far as I can make out he has treated these bridges as having non-continuous spans of 30 feet, whereas, with the exception of the bridge at 247/2 N., the girders are continuous and in all cases the clear span should be taken as 35 feet. Making these corrections I find that, under the Board of Trade rules, there is a deficiency of nearly half a square inch in the flanges of the continuous girders, and about $1\frac{1}{2}$ square inches in those of the discontinuous spans. Under the Government of India rules the continuous girders are deficient 3.84 square inches in the top and 3.90 square inches in the bottom flange, while the non-continuous flanges are short to the extent of 5 square inches approximately. The areas of metal in the top and bottom flanges are 11.75 and 11.5 square inches, or, deducting rivet holes 9.31 and 9.25 square inches respectively.

7. Some of the plate girder bridges of 70, 50 and 30 feet spans have tee iron cross girders on the upper flanges. The web of the tee is secured by one or three rivets to angle iron chubs which are either bolted or rivetted to the main girder flanges. All these cross girders are theoretically very weak, particularly some of those on the 70 feet spans, whose section is stated by the railway authorities to be $4" \times 4" \times \frac{1}{2}"$. The smallest section I could find during inspection was $4" \times 4" \times \frac{1}{4}"$, but of course I was unable to measure every cross girder, and the lighter type may be in the road. In my opinion all these cross girders are unsafe and should be thrown out of use either by lifting the road and putting in a stronger section or by substituting cross sleepers. The former seems to me the better method as the stronger cross girders, of which I understand there is a considerable spare stock, could be easily inserted, and, moreover, the longitudinals are generally in good condition with several years' life left in them. Sir George Bruce, the Company's Consulting Engineer, does not consider the condition of these cross girders to be dangerous, and is of opinion that the weakest section, viz., $4" \times 4" \times \frac{1}{4}"$ is practically safe though strained to a greater extent than desirable. He has also tested a similar section of girder under conditions which he considered the same as those actually obtaining on these spans, and found that, in the worst case, failure commenced under 17 tons dead load. As Sir George Bruce arranged for the testing span to be the distance between the inner edges of the main girder flanges, or 4 feet, while the span in reality is $5\frac{1}{2}$ feet or the distance between the main girder centres, his experiments give a more favorable result than ought to be taken. It was doubtless intended when the girders were designed that a fair bearing should be obtained on the flanges of the main girders, but owing to the latter being sometimes bent and to imperfections in fitting, about 50 per cent. of the cross girders are suspended from the angle iron chubs quite clear of the main girders. I found on examination that all the tee iron cross girders were weakened by the boring of numerous holes, of which fact Sir George Bruce was of course ignorant. I also noticed that nearly every alternate cross girder is supported on the rivet head of the horizontal diagonal bracings which intersect immediately under the web of the tee. The cross girders were carefully examined for signs of failure, but nothing was found except on two spans of the bridge of 7×70 feet spans at mileage 553/8. On this bridge 5 spans have cross girders $4" \times 5" \times \frac{1}{2}"$ and 2 have cross girders $4" \times 4" \times \frac{1}{4}"$; the former showed no indications of weakness, but on the latter the web of the tee iron and the girder flange had in several cases slightly cut into each other. Knowing the theoretical weakness of these cross girders I can only regard this as incipient failure and a warning that collapse is but a matter of time. I think that immediate steps should be taken to secure the longer bearing of the cross on the main girders, and to give the former a broader bearing than the bottom edge of the tee iron. This action should be taken in anticipation of the measures to be adopted in connection with the replacement of the cross girders, and can easily be effected by the insertion of thin packings.

8. In connection with this type of girder it was noticed that frequently the angle iron chubs do not rest fairly on the flanges; in a few cases one end was so much raised that the finger could be inserted in the opening. I am unable to say whether this is due to the wrenching action of the weak cross girder, or to original faulty construction, but I incline dubiously to the latter alternative. These chubs are some-

From the Under Secretary to the Government of India, Public Works Department (Railway Construction), to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, the 16th April 1895, No. 443 R.C. *the*

I am directed to acknowledge the receipt of your letter No. 628 R., dated the 24th November 1894, forwarding copy of the sanction of the Board of Directors of the South Indian Railway Company, to the estimate amounting to Rs. 79,888 of the cost of strengthening the weak girder bridges — that railway submitted with your letter No. 2942 C., dated 22nd September 1894. *orv/-*

2. With reference thereto I am to communicate the sanction of the Government of India to the estimate in question.

3. The question of allocation is still under consideration, and orders will issue on the subject later.

ORDER—dated April 1895, No. R., Public Works.

Communicated to the Agent, South Indian Railway, for information.

2. This sanction has been registered as No. R. of 1895-96.

(True Extract.)

Captain, R.E.,
Under Secy. to Govt., P.W.D.,
Railway Branch.

To the Agent, South Indian Railway.

„ Examiner, Guaranteed Railway Accounts.

Encl. Shait Karim.
Spare Copies

RAILWAY. Bridges

The sanction of the Government of India to the estimate of Rs. 79,888 for strengthening the weak girder — on the South Indian Railway, communicated to the Agent.

Please state number of copies

No. 2942 C.

Government of Madras.

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

To

THE SECY. TO THE GOVT. OF INDIA,
P. W. DEPARTMENT.

Dated 22nd Sept: 1894.

Sir,

I am directed to forward for -
the sanction of the Government of --
India an estimate amounting to Ru -
pees 79,888 chargeable in the propor-
tion of Rs. 74,904 to Capital and Rs.
4,984 to Revenue, for strengthening
the weak girder bridges on the South
Indian Railway.

2. The work included in this estimate
comprises the strengthening of such
bridges as were found to be weak by
Sir George Bruce the Company's Consul
-ting Engineer. A copy of this gentle
-man's investigations was sent to you
with letter No. 32 dated 30th May 94
from the Senior Government Inspector
of Railways, Madras. It will be remen

to
5 Nov

7/11
6/11

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bered that Sir George Bruce's calculations are based on the Board of Trade Rules, but the estimate now submitted provides for the girders being strengthened to the standard recently laid down by the Government of India, and with the adjusted wheel weights of the "O" class engine as given in Sir G. Bruce's report. A tabular statement shewing in detail the programme embodied in the present estimate is attached.

3. As it has been ruled that the strengths of Indian Railway bridges are to be investigated under the rules laid down in the enclosure to Government of India No. 1369 R.C. dated 13th December 1892 the estimate now submitted will not be final and a supplementary estimate including the bridges which are weak under the new rules will be prepared hereafter.

(F.R.U.)

All communications
should be addressed to
the Secretary.

No. 101520.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

Railway Construction.

To

The Joint Secretary to the Government of India,
Public Works Department, Railway Branch.

Sir, the 16th October 1894.

Sir,

With reference to your letter No. 943 C dated 11th September 1894 and relating to an estimate amounting to Rs. 79,888 for the cost of strengthening the weak girder bridges on the South Indian railway, I am directed to request, in the first instance, that a copy of the Board of Directors' orders on the subject may be furnished for the information of the Government of India.

I have the honour to be,

Sir,

Your most obedient servant,

J. N. K. M. S.

Joint Secretary.

Documents accompanying :-

Nil.

A. D.

Copy

South Indian Railway Company Ltd

Engineers Office
3. Victoria Street S.W.
9th October 1894

A. H. Notman Esq.

My dear Sir

Strengthening Girders

I have carefully examined the estimates for the strengthening of Girders Bridges which together with 3 tracings and an extract from the Agent's letter N:354 accompanied yours of the 24th ultimo and am of opinion that the sum of Rs 79,888 may be taken as fairly representing the cost of carrying out the work specified.

I note that of this total expenditure Rs 74,904 is chargeable to Capital and Rs 4,984 to Revenue, but the principle upon which this allocation is based not being stated, I regret that I am unable to criticise it.

The estimates, tracings, and extract from Agent's letter, are returned herewith.

Yours faithfully
1894. George B. Bruce

55. Gracechurch St. E.C.

Agent's Office
Trichinopoly
22nd November 1894
442

1 True Copy of a Copy/
Choppoooyappa
Chief Clerk

Recd: 22.10.94

FROM	TO	DATE
1	E. P. S. G. No. 5722	1894
LETTER NO. 1159	C	22-11-94
FROM	A	

Extract from letter No. 129 dated London the
26th October 1894, from the Board of Directors
S.D. Ry, to the Agent.

Strengthening Girders

The Board sanctions the expenditure,
estimated at Rs. 79,888, as detailed in
the papers accompanying your No. 254
of 4th September, 1894.

The Consulting Engineer, to whom the
matter was referred, states in his report,
dated 9th October, 1894, of which copy
is enclosed, that the sum named, ~
Rs. 79,888, may be taken as fairly repre-
-senting the cost of carrying out the
work specified in the Estimate.

No. 628.R.

Government of Madras.

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

To

THE SECY. TO THE GOVT. OF INDIA,

P. W. DEPARTMENT.

Calcutta

24th November 1894.

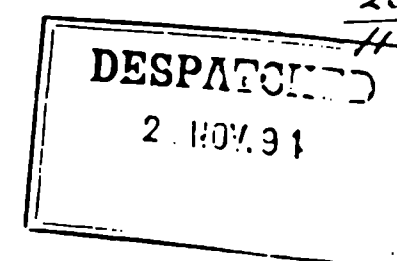
SIR,

With reference to
your letter No. 1015 R. C.
dated 16th October 1894,
I am directed to forward
herewith an extract from
letter from the Board of
Directors S. I. Railway No.
139 of 26th Oct 1894 regarding
the estimate amounting
to Rs 79,888 of the cost
of strengthening the weak
joints bridges on the S. I. Ry.

F. M. C.

23

11/94



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21/4/95

happ

No. 443 R.C.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

Railway Construction.

All communications
should be addressed to
the Secretary.

To

The Joint Secretary to the Government of Madras,
Public Works Department, Railway Branch.

Simla, the 16th April 1895.

Sir,

I am directed to acknowledge the receipt of your letter No. 628 R., dated the 24th November 1894, forwarding copy of the sanction of the Board of Directors of the South Indian Railway Company, to the estimate amounting to Rs. 79,838 of the cost of strengthening the weak girder bridges on that railway, submitted with your letter No. 2942 C., dated 22nd September 1894.

2. With reference thereto I am to communicate the sanction of the Government of India to the estimate in question.
3. The question of allocation is still under consideration and orders will issue on the subject later.

I have the honour to be,

Sir,

Your most obedient servant,

J. A. H. H. H.

Under Secretary.

Documents accompanying :-

Nil.

628 R. 17 24 - 11-94

J. C. C.
27/4

11/4

P. W. CURRIER No. 3169

Q. 23. 4. 5.

(R) Form No. 3.

No. 353. Received 15.5.95

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Read the following

Letter to the Govt. of } H.C. no. 2942 C of 22nd Sept 94
India P.W. Dept. — }

Letter from — do — — — — 1075 R.C. of 16. orig.

Letter to R. T. 1894 628 R 7 24 Nov 94

Letter from W. J. R. 443 R.C. 7/16/98

Communicated

to the Agent, South Indian
Railway for information.

Print 2. This sanction has
been registered as No. 1. A
of 1895-96.

DEC 21 1995

21 MAY 95

To
The Agent S. J. Ry
- 2. Ex G. & Ry. Assets

DESPATCHED
24 MAY. 95

Nov
22/4/95
on

A

No. 353. R dated 15.5.95

No. 535 R.C.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

Railway Construction.

All communications
should be addressed to
the Secretary.

To

The Joint Secretary to the Government of Madras,
Public Works Department, Railway Branch.

Simla, the 8th May 1895.

Sir,

In continuation of Government of India letter No. 413 R.C., dated 16th April 1895, communicating the sanction of the Government of India to the estimate amounting to Rs. 79,828 of the cost of strengthening the weak girder bridges on the South Indian railway, I am directed to observe that the cost of the temporary diversion required in connection with the bridge of 5 spans of 30 feet (Rs. 1,050) has been allocated to revenue.

2. This, I am to remark, is not in accordance with the accepted practice in such cases, viz., that the incidence of cost of temporary works should follow that of the main works in connection with which they were required or, where, the necessity for temporary works arises in connection with works debitable partly to capital and partly to revenue their cost should be divided between the two in rateable proportions.

3. The cost of the temporary diversion above referred to should therefore be debited to Capital, the

cost

3771

cost of the alterations to the 5-30 feet span bridge for which it is required being charged to that head. With this alteration the allocation of the estimate for Rs. 72,898 will stand as follows :-

	Rs.
To Capital	75,954
To Revenue	3,934

4. The sanction accorded in Government of India letter No. 443 R.C., dated 16th April 1895 has been registered as No. 2 South Indian Railway of 1895.

I have the honour to be,

Sir,

Your most obedient servant,

A. S. Rev...

Under Secretary.

R
CUH 16/5

Documents accompanying :-

Nil.

Recd: 16.5.95

Ad