Public Works (1897) Department.

RAILWAY BRANCH.

G.O., No. 595 Ry.

DATED 22nd May

Includes.

G.O. No. 1032 Ry dy 11-12-96
do 161 Ry dy 15-3-97
do 250 Ry dy 12-4-97
do 597 Ry dy 26-8-97
do 812-13 Ry dy 24-2-98
do 943-44 Ry dy 20-7-98
do 176 Ry dy 14-2-99
do 445 Ry dy 20-4-99.

[Despatch Abstract.]

Schemes for strengthening the bridges on the Madras Railway.— Communicating to the agent & Managers, Madras Railway, letters from the Govt of India passing orders on the subject of the allocation of the proposed expenditures on account of the— with the request that the estimate for the work may be furnished as early as possible.

[P. W. Ry. 760—26-9-99.]

Indexed.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.
	1032	Ry.	11-12-96				
	161	— " —	15-3-97				
	250	— " —	12-4-97				
	597	— " —	26-8-97				
	312-13	— " —	24-2-98				
943-	944	— " —	20-7-98				
	176	— " —	14-2-99				
	445	— " —	20-4-99				

FURTHER PAPERS.

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

SERIAL No. 445

Public Works (1896) Department.

CURRENT No. 10146

Ry 1032R.

Order no 3577 8/12/96.

From The Govt of India

Copy forwarded to A.M. for early attention with reference to Ry No. 831R 30.5.96 — J.F.E. Wilson for Secy

No. 1664 Rc.

Dated 2.11.96

Received 10.11.96

Enclosures

Spare copies

Despatched on 12/11/96.

SUBJECT.

Inspection report on Mysore for Half year ended 30th June 1896 including Madras Connur & Kolar Gold Fields Rys.

Asking that the attention of the Mys. Management may be drawn to the matter of the 125 spans of 64 feet Girders which are under the strength prescribed by the Board of

vessy that the matter is under the consideration of the Board and that a reply will be sent as soon as possible. Board's 944 of 6/11/96 and that an early reply may be expected shortly

J.F.E. 9/12

BACK PAPERS.

G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.

SERIAL
No. 44

No. 1664 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 2nd November 1896.

Sir,

I am directed to acknowledge the receipt of your No. 832 R., dated 30th September 1896 forwarding, for information, the Inspection Report of the Madras railway including the Kolar Gold Fields railway and the Madras Ennur section of the Bezwada Madras railway, for the half year ending 30th June 1896.

2. With reference to paragraph 20 of the report, I am to say that the Government of India desire that the attention of the railway management may be drawn to the matter of the 125 spans of 64 feet girders which are under the strength prescribed by the Board of Trade rules.

I have the honour to be,

Sir,

Your most obedient servant,

G. A. Anderson

Offg. Under Secretary.

Documents accompanying :-

Nil.

B. Form No. 12.

No. 1032. R

Government of Madras.

PUBLIC WORKS DEPARTMENT.

RAILWAY BRANCH.

SERIAL No. 46

To

The Secy. to the Govt. of India,

P. W. Department.

Calcutta

Madras, the 11th December 1896.

Sir,

I am directed to acknowledge the receipt of your letter No. 1664 R.C. of 2nd November 1896 regarding the action of the Railway Management may be drawn to the matter of the 125 spans 64 feet girders which are under the strength prescribed by the Board of Trade rules.

2. In reply I am to state that the subject is under

SERIAL

SERIAL
No. 4

under letter consideration of the Board's office Agent-Vide Para 6 of Board's letter No. 944-T 6 November 1896, copy enclosed and that analytical maybe expected shortly.

Com. 12/12 [illegible] 9/12

B/
No 1032 R dated 11.12.96

Documents accompanying:-
Board's letter No. 944
of 6.11.96 referred to

Extract from Inspector's Report of Madras Railway for the half year ending 30th June 1896

20. **Bridges** (Strengthening of girders).—The list appendix B. shows the girders which have been strengthened during the half-year either by the addition of plates or by halving the spans. If every girder on the line were to be strengthened up to the Government of India rules, the cost would be about 25 lakhs of rupees, but as the girders up to 43 feet span are strong enough (as calculated by Board of Trade rules) to carry the heaviest engines on the line; there seems no need to deal with them at any rate for the present. There are, however, 125 spans of 64 feet, which are considerably under the Board of Trade standard and barely half strong enough as calculated by Government of India rules, and these should I think be taken in hand as soon as possible. The Tungabhadra, 58 spans, might conveniently be dealt with first. It would I think be quite feasible to arch 22 of the land spans by building additional piers and turning 30 feet arches (or even to block up some of them) without unduly restricting the water-way and to replace the old girders of the remaining spans with new ones from England. The girders thus released could be utilised on other bridges by using two in place of one.

2/20′ and 1/50′ at mile 95/14. The packing pieces should be removed from under the chairs.

5/50′ at mile 107/11. This bridge was strengthened up to Government of India rules during the past half year by using 64 feet spans cut short, and strengthened with additional plates on top and bottom booms, and by adding wind-bracing. A retaining wall on north-west side was washed away last December: a new one and a drop wall are being put in.

Cheyar bridge, mile 136/3. A good many of the longitudinal sleepers require renewal.

5/50′ at mile 179/1. This is being strengthened up to Government of India rules by building new piers midway between the existing ones. The girders want painting.

5/64′ at mile 387/11 should be strengthened as soon as possible; the plan adopted at mile 395/6 of halving the span by a cross girder supported on screw piles would be convenient.

ENDORSEMENT—No. 832 R., dated 30th September 1896.

Forwarded.

(By order.)

(Signed) F. D. FOWLER,
Offg. Joint Secy. to Govt.,
Railway Branch.

SERIAL
47
No. 48

Public Works (1897) Department.

CURRENT No. 2556

Order No: 935-9 11 March 97

Copy forwarded to
A.M. for favour of report.

11/3/97
for ER

From
The Govt of India
P.W.D.

No. 373 Re.

Dated 4th March 1897

Received 10.3.97

Enclosures

Spare copies

SUBJECT.

Estimate of the cost of
strengthening the bridg
on the M. Ry.

Enquiring when the
may be expected

Despatched on 11/3/97

11/3/97

BACK PAPERS.

G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.

SERIAL
No. 47

No. 373 R.C.

All communications should be addressed to the Secretary.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY CONSTRUCTION.

To

The Joint Secretary to the Government of Madras,

Public Works Department, Railway Branch.

Calcutta, the 4th March 1897.

Sir,

With reference to correspondence ending with your letter No.1032 R., dated 11th December 1896, I am directed to enquire when the Government of India may expect to receive the estimate of the cost of strengthening the bridges on the Madras railway.

I have the honour to be,

Sir,

Your most obedient servant,

G D Anderson

Under Secretary.

Documents accompanying:-

Nil.

M.L.M.

(No. II.)

No. 7559
229

SERIAL
No. 49

MADRAS RAILWAY.

AGENT AND MANAGER'S OFFICE,

Madras, 12th March 1897.

From

The Ag: Agent and Manager.
Madras Railway.

To

The Consulting Engineer for Railways.
Madras.

SIR,

With reference to your endorsement No. 935 of the 11th instant, I have the honor to inform you the Ag Chief Engineer explains that in consequence of the drawing office having been fully occupied with current and emergent work the preparation of the detailed plans and estimates for the strengthening of girder bridges, which involves much time and labour, have been delayed.

It is, however, hoped that it will be possible to complete the plans and estimates by the end of this month.

I have the honor to be,
Sir
Your most obedient Servant,

for Ag Agent & Manag

With Encl of nil.

G. No. 1164
Recd. 13/3/97

MADRAS RAILWAY.

From

The Agent and Manager.

To

The Consulting Engineer
for Railways.

Dated 188

Recd.

No.

R. Form No. 12.

No. 164 R

Government of Madras.

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

SERIAL
No. 50

To

The Secy. to the Govt. of India,

P. W. Department.

Madras, the 15th March 1897 Calcutta

Sir,

With reference to your letter No: 373 R.C. 7 4th March 1897, I am directed to inform you that the Agent & Manager, Madras Railway, hopes to have the necessary estimate for strengthening the girder bridges on his line ready by the end of this month. The Government of India may therefore expect to receive them next month.

x Flag N

1643/97

Documents accompanying:-

B/.

No. 161. Dated 15/3/97

No. C $\frac{450}{438}$

MADRAS RAILWAY COMPANY,
CHIEF ENGINEER'S OFFICE,
MADRAS, 31*st March* 1897.

THE ACTING AGENT AND MANAGER.

DEAR SIR,

Strengthening of Girder Bridges.

1. Your No. $\frac{7759}{12,022}$ of the 3rd December last, forwarding copy of the Board's letter, No. 944, of 6th November 1896, and Mr. Hayter's letter, dated 8th October 1896.

I have given much and very careful consideration to the question of strengthening girder bridges on this Railway in the cheapest and most efficient manner without interfering with traffic, and my proposals are shewn in the accompanying tabular statement **A**.

2. The method proposed by me for dealing with the Tungabhadra bridge possesses the following advantages:—

1*st*.—It allows of an entirely new superstructure being made ready for use on the spare half of the existing piers, without in any way interfering with the present road, and avoids all risk of interruption to traffic on the main Railway mail route to Bombay.

2*nd*.—64 feet openings No. 1 to 8 and 45 to 58 now spanned by girders which need constant care and expense to maintain, will be replaced by stone masonry arches, which can be efficiently maintained with very little trouble or expense.

3*rd*.—58-64 feet spans of girders, all of the same type, will be released and be available for use in strengthening the Cheyair, Bassanapally, and Kadalundi bridges, as shewn in the accompanying statement **A**.

3. The weak girders on the cylinder portions of the Cheyair and Kadalundi bridges will be replaced by the girders removed from the Tungabhadra bridge doubled, without using diversions or interruption to traffic, in the manner shewn in the accompanying drawings, Nos. 337 and 376.

4. In connection with those portions of the Cheyair and Kadalundi bridges which have cylinder piers, I desire to point out that the 6′ cylinders of these piers are placed 24 feet apart centre to centre to form piers for a double line of Railway, and are connected on top by cross girders which were apparently designed originally according to Board of Trade rules to carry a single line of Railway only,—*vide* accompanying calculations; the load these cross girders had originally to carry is estimated for a single line at 146·43 tons, which requires a nett flange area at 5 tons per square inch, of 26·24 square inches, as against 35·12 square inches provided, so that these are strong enough for a single line.

5. According to the Government of India rules for a single line including wind pressure, they would have to carry when the girders are doubled 326·60 tons each, and would need 41·81 square inches section; and for a double line the load would amount to tons 653·20, requiring at 7 tons a square inch, a nett flange area of 83·62 square inches; so that for a single line 6·69 square inches, and for a double line 48·50 square inches *extra* flange area would be needed on the existing cylinder pier cross girders.

6. The extra area 48·50 square inches required by Government of India rules for a double line of Railway cannot be added to the existing girders in a satisfactory manner, which would allow of the work being examined and painted.

7. It will be seen by the tabular statement **B**, that according to Board of Trade rules, the existing cross girders are quite strong enough to support Tungabhadra girders doubled for a single line of Railway. I have had the actual deflection taken at the centre of the cross girders of the Cheyair and Kadalundi with the following results :—

Table of Deflections of Cylinder Pier Cross Girders, Kadalundi and Cheyair Bridges.

Particulars of Testing Train.			Name of Bridge.	No. of pier and position of cross girder.	Deflection of cross girders at centre. 1st Test.—Inches	2nd Test.—Inches	3rd Test.—Inches	Remarks.
1st Test.	2nd Test.	3rd Test.						
No. 14, Mail ...	No. 39, Passenger ...	No. 32, Passenger ...	Cheyair.	No. 19 { North	·05	·06	·08	
,, ...	,, ...	,, ...		South	·07	·07	·07	
No. 37, Passenger ...	No. 4, Passenger ...	No. 81, Mail ...		No. 36 { North	·07	·06	·06	
No. 14, Mail ...	No. 39, Passenger ...	No. 32, Passenger ...		South	·04	·05	·06	
No. 37, Passenger ...	No. 4, Passenger ...	No. 81, Mail ...		No. 40 { North	·06	·05	·06	
,, ...	,, ...	,, ...		South	·05	·05	·04	
,, ...	,, ...	,, ...		No. 44 { North	05	·03	·03	
,, ...	,, ...	,, ...		South	·05	·04	·05	
				Average...	·06	·05	·06	Speed of train for 3rd test 15 miles per hour.
1st Test by S.10 Mail Engine No. S.B. 119 with 14 vehicles.	2nd Test by 3 A.M. Mixed Engine No. K. B_3 7 with 29 vehicles.	3rd Test by 11·45 Mixed Engine No. K. B_3 156 with 18 vehicles.	Kadalundi.	No. 2 { 1/2	·12	·13	·12	
					·10	·08	·08	
				No. 5 { 1	·10	·08	·04	
				2	·04	·07	·06	
				No. 7 { 1	·06	·06	·07	
				2	·06	·09	·06	
				No. 10 { 1	·08	·08	·08	
				2	·08	·07	·07	
				Average...	·08	·08	·07	

SPEED.
1st test 8¼ miles per hour.
2nd ,, 11½ ,, ,,
3rd ,, 12½ ,, ,,

These it will be seen are very small and insignificant, averaging ·07 inches, or only $\frac{1}{370}$ of the effective span 22 feet, and as the Railway over these bridges is never likely to be doubled, I consider the present cross girders quite strong enough for a single line, and recommend their retention subject to Mr. Hayter's confirmation of my opinion.

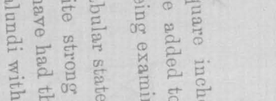
If he considers they should be replaced by girders strong enough to carry a double line according to Government of India rules, then I think new steel cross girders of enclosed cross section should be used.

8. The estimated cost of carrying out these alterations amounts to Rs. 5,80,224 as shewn in tabular statement **C**, Rs. 1,75,653 being allocated to Capital and the balance Rs. 4,04,571 to Revenue in accordance with the instructions conveyed in the Board's letter, No. 944, of 6th November 1896, para. 7.

Yours faithfully
E. W. STONEY,
M.E., M.I.C.E.
Ag. Chief Engineer.

A.

Statement showing list of Bridges that are weak by the English Board of Trade Rules and the method proposed for strengthening them.

Type of Girders.	No. of Bridge.	Position.	Particulars.	Description of Piers.	Number of openings to be strengthened.	Proposed mode of strengthening.
		Miles.	**20-feet spans.**			
A	386	216/7 B. B. L.	Two 20-feet opening ...	.....	2	These have already been replaced by girders strengthened in accordance with Government of India requirements. Work completed 1895.
A	192	275/8-9 N. W. L.	Single 20-feet ,, ...	.....	1	
B	102	244/9 ,,	Do. do.	.....	1	
			22-feet spans.			
A	604	182/3 N. W. L.	Two 21-feet opening (skew)	.....	2	Do. do. do. do. 1895.
			64-feet spans.			
New Cheyer	393	135/8 to 136/3 N.W.L.	New Cheyer. (No. 28 spans from 5 to 20 & 35 to 46 have already been doubled.)	4 spans masonry 18 spans cylinder ...	22	4 spans, Nos. 1 to 4, to have masonry piers founded on rock built in the centre of each span. 18 spans, Nos. 21 to 34 and 47 to 50, to be replaced by 18 doubled girders from Tungabhadra as per marginal sketch. 
Tungabhadra.	1018	333/12 N. W. L.	Tungabhadra ...	Masonry ...	58	8 spans, Nos. 1 to 8 and 14 Spans Nos. 45 to 58 to be converted into 30-feet arches. Remaining 36 spans, Nos. 9 to 44, to be replaced by new steel girders 5 feet deep.
	9	0/14 S. W. L.	Cochrane's Canal (Double Lines.)	,, ...	4	4 spans up line to be replaced by 4 doubled girders from Tungabhadra as per sketch A. 4 spans released from the up line to be used for doubling the girders on the down line as per sketch A.
	28	307/17 ,,	Nilgiri Branch * ...	,, ...	2	
	29	308/17 ,,	Do. * ...	Screw pile ...	4	All these to have masonry piers built in the centre of each span.
	49	312/13 ,,	Do. * ...	Masonry ...	2	
	52	313/12 ,,	Do. * ...	Screw pile ...	4	
	60	314/10 ,,	Do. * ...	Masonry ...	2	
	89	321/13 ,,	Do. * ...	,, ...	4	

Those marked * are a proposed metre gauge section.

Statement showing list of Bridges that are weak by the English Board of Trade Rules and the method proposed for strengthening them—(concluded).

Type of Girders.	No. of Bridge.	Position.	Particulars.	Description of Piers.	Number of openings to be strengthened.	Proposed mode of strengthening.
Old Penner.	413 & 414	Miles. 403 / 5 & 11 S. W. L.	Kadalundi	12 spans cylinder, 8 spans screw pile ...	20	12 cylinder spans to be replaced by 9 doubled girders from Cheyer, 3 „ „ from Tungabhadra as per sketch A. 8 screw pile spans to have screw pile piers with new cross girders built in centre of each span.
	743	232 / 3 N. W. L.	Jootoor	Masonry ...	4	All these to have masonry piers built in the centre of each span.
	744	232 / 10 „	.....	„ ...	2	
	794	248 / 9 „	Conavonka	„ ...	4	
	795	248 / 15 „	Chinnavonka	„ ..	2	
	825	258 / 11 „	Basanapallivonka ...	1 span masonry, 3 spans cylinder ..	4	To be replaced by 4 doubled girders from Tungabhadra as per sketch A.
	835	263 / 3 „	Lingalavonka	Masonry ...	4	To have masonry piers built in the centre of each span.
Old Cheyer.	362	387 / 12 S. W. L.	Tirur	Screw pile ...	5	3 river spans to have screw pile piers with new cross girders built in the centre of each span. 2 Land spans to have masonry piers built in the centre of each span.
	426	142 / 10 N. W. L.	...	Masonry ...	2	To have masonry piers built in the centre of each span.

Those marked * are on proposed route entire.

B.

Statement showing calculated strength of cross girders over cylinder piers of the Cheyar, Kadalundi and Pasanapalli Bridges.

English Board of Trade Rules.
Load Heaviest Engine (M. R.) K A. Calculations as per English Rule excluding wind pressure. Stress 5 tons per sq. inch.

Government of India New Rules.
Load Harviest Engine (M. R.) K A. Calculations as per Government of India Rule including wind pressure as per technical paper No. 44 stress for iron 7 tons per sq. inch. for steel 9 „ „

	Description of load, &c.	Total Load.	Calculated bending moment at centre.	Effective depth.	Total stress.	Required flange area for *iron* girder.	Available net area in each flange.	Required flange area for *steel* girder.	Calculated stress per square inch in existing cross girders.	Remarks.
		Tons.	Ft. Tons.	Feet.	Tons.	Sq. Inch.	Sq. Inch.	Sq. Inch.	Tons.	Effective length taken as 22 feet.
I	(a) Cross girders to carry pair of 10″ flange single girders as originally designed with old permanent way for single line of railway	146·43	366·08	2·79	131·21	26·24	35·12		3·74	
	(b) Do. do. for double line ...	292·86	732·20	2·79	262·43	52·48	35·12		7·47	
II	(a) Cross girders to carry pair of 12″ flange single girders new type with new permanent way for single line	159·14	397·87	2·79	142·60	28·52	35 12		4·06	
	(b) Do. do. for double line ...	318·28	795·70	2·79	285·20	57·04	35·12		8·12	
III	(a) Cross girders to carry pair of doubled girders already in bridge with new permanent way for single line	185·02	462·55	2·79	165·79	33·16	35·12		4·72	
	(b) Do. do. for double line ...	370·04	925·10	2·79	331·58	66 32	35·12		9·44	
IV	(a) Cross girders to carry pair of 10″ flange single girders as originally designed with old permanent way for single line of railway	291·25	728·09	2·79	260·96	37·28	35 12		7·43	
	(b) Do. do. for double line ...	582·50	1,456·25	2·79	521·95	74·56	35·12		14·86	
V	(a) Cross girders to carry pair of 12″ flange single girders new type with new permanent way for single line	306·65	766·48	2·79	274·72	39·25	35·12		7·82	
	(b) Do. do. for double line ...	613·30	1,532·96	2·79	549·44	78·50	35·12		15·64	
VI	(a) Cross girders to carry pair of doubled girders already in bridge with new permanent way for single line	326·60	816·53	2·79	292·66	41·81	35·12	32·52	8·33	
	(b) Do. do. for double line ...	653·20	1,633·06	2·79	585·32	83·62	35·12	65·03	16·67	

C.

Statement shewing the estimated cost of strengthening Girder Bridges of 64-feet spans.

Type of girders.	No. of bridge.	Position.		Particulars.	No. of openings to be strengthened.	Proposed mode of strengthening.	Total Estimated cost.	Allocation of cost.	
								Capital.	Revenue.
		Miles.					Rs.	Rs.	Rs.
New Cheyair.	393	$\frac{135}{8}$ to $\frac{136}{3}$	N.W.L.	New Cheyair ... (28 spans have already been doubled.) ...	22	4 spans to have central masonry piers ... ... 18 spans to be replaced by doubled girders from Tungabhadra	1,06,201	14,568	91,633
Tungabhadra.	1018	$\frac{333}{12}$	N. W. L.	Tungabhadra ...	58	22 land spans to be converted into 30 feet arches. 36 remaining spans to be replaced by new steel girders 5 feet deep	2,38,273	33,253	2,05,020
	9	$\frac{0}{14}$	S. W. L.	Cochrane's Canal (double lines) ...	4	4 spans up line to be replaced by doubled girders from Tungabhdra ... ... 4 spans to be doubled with existing girders and that of girders released from up line ...	36,799	27,253	9,546
	28	$\frac{307}{17}$	,,	Nilgiri Branch ...	2	To have central masonry piers	2,023	2,023	...
	29	$\frac{308}{17}$	,,	Do. do. ...	4	Do. do.	6,949	6,949	...
	49	$\frac{312}{13}$	,,	Do. do. ...	2	Do. do.	2,335	2,335	...
	52	$\frac{313}{12}$	,,	Do. do. ...	4	Do. do.	5,022	5,022	...
	60	$\frac{314}{10}$	,,	Do. do. ...	2	Do. do.	2,417	2,417	...
	89	$\frac{321}{13}$	,,	Do. do. ...	4	Do. do.	5,536	5,536	...
Old Penner.	413 & 414	$\frac{403}{5\&11}$	S. W. L.	Kadalundi ...	20	12 cylinder spans to be replaced by {9 double girders from Cheyair. 3 do. from Tungabhadra.} 8 screw pile spans to have screw pile piers at centre of each span with cross girders.	1,09,762	41,363	68,399
	743	$\frac{232}{3}$	N. W. L.	Jootoor ...	4	To have central masonry piers	4,537	4,537	...
	744	$\frac{232}{10}$	,,	.....	2	Do. do.	1,984	1,984	...
	794	$\frac{248}{9}$	,,	Conavonka ...	4	Do. do.	4,562	4,562	...
	795	$\frac{248}{15}$	,,	Chinnavonka ...	2	Do. do.	2,318	2,318	...
	825	$\frac{258}{11}$	,,	Basanapallivonka ...	4	To be replaced by doubled girders from Tungabhadra.	27,921	1,413	26,508
	835	$\frac{263}{3}$	,,	Lingalavonka ...	4	To have central masonry piers	4,085	4,085	...
Old Cheyair.	362	$\frac{387}{12}$	S. W. L.	Tirur ...	5	{3 river spans to have screw pile piers at centre. 2 land spans to have central masonry piers.}	17,774	14,309	3,465
	426	$\frac{142}{10}$	N. W. L.	.....	2	To have central masonry piers	1,726	1,726	...
						Total ...	5,80,224	1,75,653	4,04,571

E. W. STONEY,
M.E., M.I.C.E.,
Acting Chief Engineer.

31*st March* 1897.

CALCULATIONS

FOR

STRENGTH OF CROSS GIRDERS OVER CYLINDER PIERS. (CHEYER BRIDGE.)

I. Cross girders to carry a pair of single girders 10 flange as originally designed. Load heaviest engine M. R. as per English Rule excluding wind pressure. Stress 5 tons per square inch.

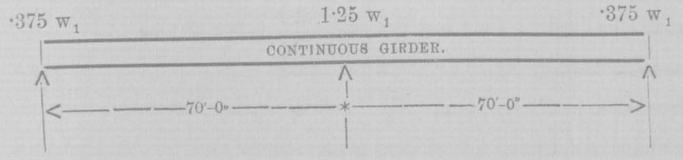
Particulars of Live Load on two spans (girders continuous).

	Tons.	Cwt.
M. R. Engine K.A_2	41	— 7
Do.	41	— 7
K. A_2 Tender	31	— 6
K. A_2 Tender	31	— 6
R. O. G. Wagon	22	— 9
R. O. G. Wagon	22	— 9
	190	— 4 or 190·2 tons.

Particulars of Dead Load.

	Tons.
Weight of one set of girders 140 feet	32·00
Weight of old permanent way 140 @ 193 lbs. per foot = 27,020 lbs. or ...	12·07
	44·07 Tons.

Total live and dead load = (190·20 + 44·07,) = 234·27 tons on two spans.



W = 234·27 tons total load on continuous girders on two spans.

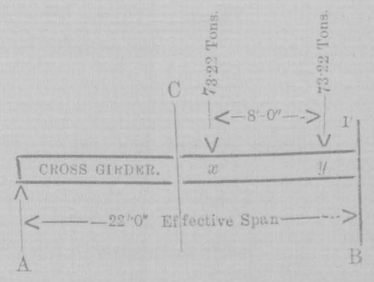
W_1 = load on one span = $\frac{234·27}{2}$ = 117·14 tons.

∴ load at centre pier 1·25 W_1 = (1·25 × 117·14) = 146·43 tons.

(*a*) *For single line of Railway.*

Total Load = 146·43.

∴ load at x or y = $\frac{146·43}{2}$ = 73·22 tons.



Reaction R_A = $\frac{1}{22}$ × 73·22 + $\frac{9}{22}$ × 73·22 = 33·28 tons.

Do. R_B = $\frac{13}{22}$ × 73·22 + $\frac{21}{22}$ × 73·22 = 113·16 tons.

Bending moment at centre C = 33·28 × 11 = 366·08 foot tons.

Taking effective depth of girder as 2'-9½" or 2·79 feet.

Total stress due to dead and live load $\frac{366·08}{2·79}$ = 131·21 tons.

Allowing working stress at 5 tons per square inch.

Required area in each flange = $\frac{131·21}{5}$ = 26·24 square inches.

Available nett area in each flange of one girder.

Flange 2 (12" × ⅝") ....=15·0

Two angle irons 3½" × 3½" × ½"=2 (6½" × ½")= 6·5

—21·50 square inches.

Less rivet holes—

in flanges 4 × ⅞" × ⅝" =2·19

in angle irons 4 × ⅞" × ½"=1·75

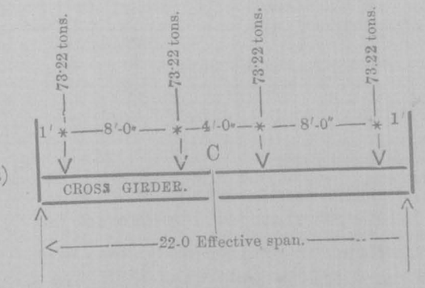
3·94

17·56 square inches.

For two girders 17·56 × 2 = 35·12 square inches.

(*b*) *For double line of Railway.*

Particulars of load, *vide* calculations for I(*a*)



Reaction $R_A = R_B$ = ½ (73·22 + 73·22 + 73·22 + 73·22) = 146·44 tons.

Bending moment at C = 146·44 × 11 − 73,22 × 2 + 73·22 × 10 = 732·20 foot tons.

Taking effective depth as 2·79 feet.

Total stress due to dead and live load $\frac{732·20}{2·79}$ = 262·43 tons.

Allowing working stress @ 5 tons per square inch.

Required area in each flange $\frac{262·43}{5}$ = 52·48 square inches.

Available nett area in two girders as per calculation I (*a*) = 35·12 square inches.

II. Cross girders to carry a pair of single girders 12" flange new type. Load Heaviest Engine M. R. as per English Rule excluding wind pressure, stress 5 tons per sq. inch.

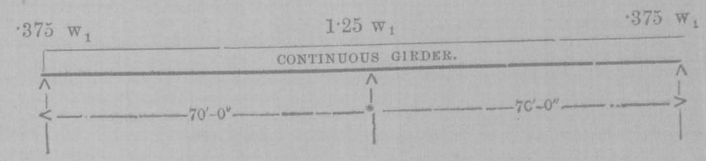
Particulars of Live Load on two spans (girders continuous)

vide calculation I ... ... = 190·2 Tons.

Particulars of dead load

Weight of one set of girder 140 ft. ...	41·42	,,
,, new permanent way 140 ft. ...	23·00	,,
	64·42	,,

Total live and dead load = (190·2 + 64·42) = 254·62 tons. for two spans.



W = 254·62 tons total load on continuous girders on two spans.

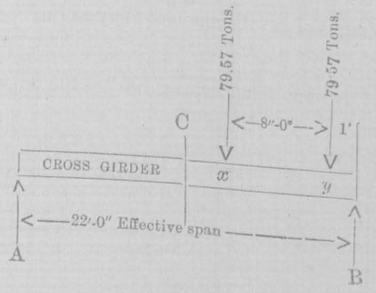
W_1 = load on one span = $\frac{254.62}{2}$ = 127·31 tons.

∴ Load at centre pier 1·25 W_1 = (1·25 × 127·31) = 159·14 tons.

(a) *For single line of Railway*

Total load 159·14 tons.

∴ Load at x or y = $\frac{159.14}{2}$ = 79·57 tons.



Reaction $R_A = \frac{1}{22} \times 79.57 + \frac{9}{22} \times 79.57 = 36.17$ tons.

$R_B = \frac{13}{22} \times 79.57 + \frac{21}{22} \times 79.57 = 122.97$ tons.

Bending moment at centre C = 36.17 × 11 = 397·87 foot tons.

Taking effective depth of girder as 2·79 feet.

Total stress due to dead and live load = $\frac{397.87}{2.79}$ = 142·60 tons.

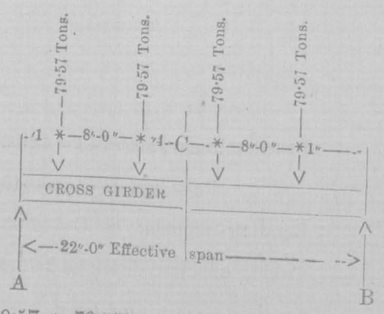
Allowing working stress @ 5 tons per sqr. inch.

Required area in each flange $\frac{142.60}{5}$ = 28·52 sq. inches.

Available nett area in two girders as per Calculations I (*a*) = 35·12 sq. inches.

(b) *For double line of Railway*

Particulars of load *vide* calculation II (*a*)



Reaction $R_A = R_B = \frac{1}{2}(79.57 + 79.57 + 79.57 + 79.57) = 159.14$ tons.

Bending moment at centre C = 159·14 × 11 − 79·57 × 2 + 79·57 × 10

= 795·70 foot tons.

Taking effective depth on 2·79 feet.

Total stress due to dead and live load $\frac{795.70}{2.79}$ = 285·20 tons.

Allowing working stress @ 5 tons per sq. inch.

Required area in each flange $\frac{285.20}{5}$ = 57·04 sq. inches.

Available nett area in two girders as per Calculations I (*a*) = 35·12 sq inches.

III. Cross girders to carry a pair of doubled girders already in Bridge. Load Heaviest Engine M. R. as per English rule. Stress 5 tons per square inch.

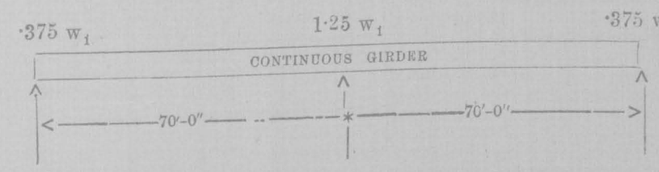
Particulars of Live Load on two spans (girders continuous).

Vide Calculations I = 190·2 Tons.

Particulars of dead Load—

Weight of 1 set of girder 140 ft.	41·42	Tons.
Add another set extra for duplicating girders to allow extra plates, &c.	41·42	,,
Weight of new Permanent Way as in No. II	23·00	,,
	105·84	over two spans.

Total live and dead load = (190·2 + 105·84) = 296·04 Tons ,,



W = 296·04 tons total load on continuous girders on two spans.

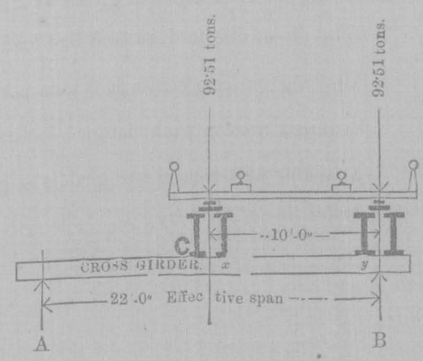
W_1 = Load on one span $\frac{296.04}{2}$ = 148·02 tons.

∴ Load at centre pier 1·25 W_1 = (1·25 × 148·02) = 185·02 tons.

(a) *For single line of Railway*—

Total load 185·02 tons.

∴ Load at x or y = $\frac{185.02}{2}$ = 92·51 tons.



Reaction $R_A = \frac{10}{22} \times 92.51 = 42.05$ tons.

$R_B = \frac{12}{22} \times 92.51 = 50.46$ tons.

Bending moment at C = 42·05 × 11 = 462·55 ft. tons.

Taking effective depth as 2·79 ft.

Total stress due to dead and live load = $\frac{462.55}{2.79}$ = 165·79 tons.

Allowing working stress @ 5 tons per sq. inch.

Required area in each flange = $\frac{165.79}{5}$ = 33·16 sq. inches.

Available nett area in two girders as per Calculations I (*a*) = 35·12 sq. inch.

(b) *For double line of Railway.*

Area required would be 2 × 33·16 = 66·32 sq. inches.

IV. Cross girders to carry a pair of single girders 10″ flanges as originally designed—Load Heaviest Engine M. R. as per Government of India Rule including wind pressure as per Technical paper No. 44. Stress 7 tons per sq. inch.

Particulars of Live Load on two spans (girders continuous) as per calculations I actual live load = 190·2 tons.

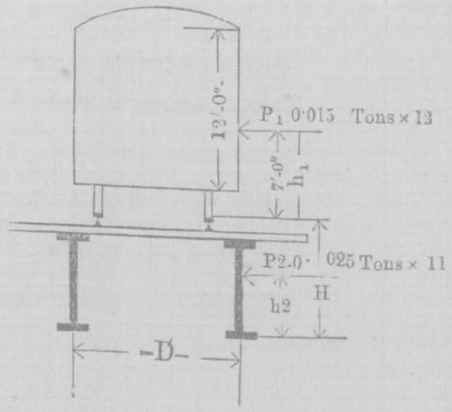
Coeff. for double load $2 \times 190{\cdot}2 = 380{\cdot}4$ tons.

Wind pressure as per Technical paper No. 44.

Height of girder 4′—0″
Height of old P. W. above girder 1—1

5—1 or 5·08 = H.

$D = 8$ ft. $h_2 = \frac{5{\cdot}08}{2} = 2{\cdot}54$ ft.



Vertical force due to live load per unit of length

$$= \frac{P_1 \times (h_1 + H)}{D} = \frac{0{\cdot}015 \times 12 \times (7{\cdot}0 \times 5{\cdot}08)}{8} = 0{\cdot}27 \text{ tons.}$$

For 134 ft. $= 134 \times 0{\cdot}27 = 36{\cdot}18$ tons.

Total live load $= (380{\cdot}40 + 36{\cdot}18) = \underline{416{\cdot}58}$ tons over two spans.

Particulars of dead load—

One set of girder as per calculations I.................. = 32·00 tons.

Weight of old Permanent Way as per Calculations I = 12·07

———44·07 tons.

Wind pressure as per Technical paper No. 44.

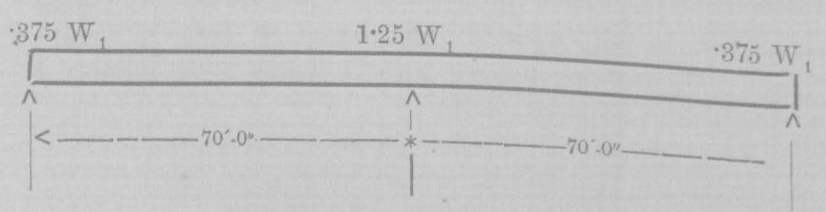
Vertical force due to dead load per unit of length $= \frac{P_2 \times h_2}{D} = \frac{0{\cdot}025 \times 5{\cdot}08 \times 2{\cdot}54}{8}$

$= 0{\cdot}040$ tons.

For 134 ft. $= 134 \times 0{\cdot}040 = 5{\cdot}36$ tons.

Total dead load $(44{\cdot}07 + 5{\cdot}36) = 49\ 43$ tons over two spans.

Total live and dead load $= (416{\cdot}58 + 49{\cdot}43) = 466{\cdot}01$ tons on two spans.



$W = 466{\cdot}01$ tons total load on continuous girders on two spans

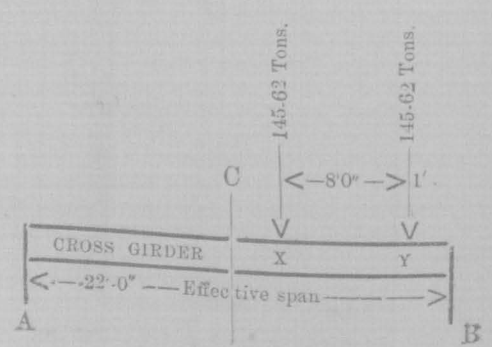
W_1 = Load on one span $= \frac{466{\cdot}01}{2} = 233{\cdot}00$ tons.

$\therefore$ Load at centre pier $1{\cdot}25\ W_1 = (1{\cdot}25 \times 233{\cdot}0) = 291{\cdot}25$ tons.

(a) *For single line of Railway.*

Total load = 291·25 tons.

Load at × or y $= \frac{291{\cdot}25}{2} = 145{\cdot}62$ tons.



Reaction $R_A = \frac{1}{22} \times 145{\cdot}62 + \frac{9}{22} \times 145{\cdot}62 = 66{\cdot}19$ tons.

" $R_B = \frac{13}{22} \times 145{\cdot}62 + \frac{21}{22} \times 145{\cdot}62 = 225{\cdot}05$ tons.

Bending moment at centre $C = 66{\cdot}19 \times 11 = 728{\cdot}09$ foot tons.

Taking effective depth as 2·79 feet.

Total stress due to live and dead load $= \frac{728{\cdot}09}{2{\cdot}79} = 260{\cdot}96$ tons.

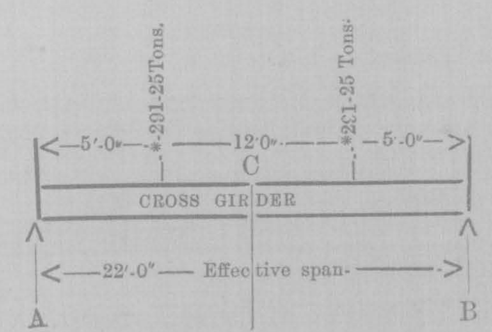
Allowing working stress at 7 tons per spuare inch.

Required area in each flange $\frac{260{\cdot}96}{7} = \underline{37{\cdot}28}$ square inches

Available nett area in two girders as per Calculations I (*a*) = $\underline{35{\cdot}12}$ square inches.

(b) *For double line of Railway.*

Particulars of load as above



Reaction $R = R_B = \frac{1}{2}(291{\cdot}25 + 291{\cdot}25) = 291{\cdot}25$ tons.

Bending moment at centre $C = 291{\cdot}25 \times 11 - (291{\cdot}25 \times 6) = 3{,}203{\cdot}75$ $- 1747{\cdot}50 = 1456{\cdot}25$ foot tons.

Taking effective depth of girder as 2·79 feet.

Total stress due to live and dead load $\frac{1456{\cdot}25}{2{\cdot}79} = 521{\cdot}95$ tons.

Allowing working stress at 7 tons per square inch.

Required area in each flange $= \frac{521{\cdot}95}{7} = \underline{74{\cdot}56}$ square inches.

Available nett area in two girders as per Calculations I *(a)* = $\underline{35{\cdot}12}$ square inches.

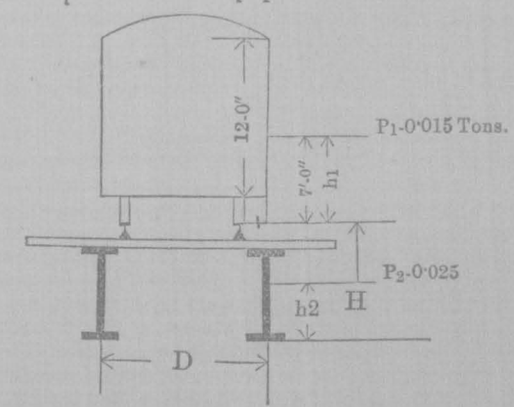
V. Cross girders to carry a pair of single girders 12″ flange new type. Load heaviest Engine M. R. as per Government of India Rule including wind pressure as per technical paper No. 44, stress 7 tons per square inch.

Particulars of live load on two spans (girder continuous)

As per calculation I, actual live load = 190·2 tons.

Coeff. for double load $= 2 \times 190{\cdot}2 = 380{\cdot}4$ tons.

Wind pressure as per Technical paper No. 44.



Height of girder ... ... 4′—0″

Height of new permanent way above girder 1′—9″

H = 5′—9″ or 5·75 feet.

D = 8 feet

$h_2 = \frac{5{\cdot}75}{2} = 2{\cdot}87$ feet.

Vertical force due to live load per unit of length $= \frac{P_1 \times (h_1 + H)}{D}$

$= \frac{0{\cdot}015 \times 12 \times (7{\cdot}0 + 5{\cdot}75)}{8} = 0{\cdot}29$ tons. For 134 feet $= 134 \times 0{\cdot}29 = 38{\cdot}86$ tons.

Total live load = (380·4 + 38·86) = 419·26 tons on two spans.

Particulars of dead load—

One set of girder and new permanent way. *Vide* calculations No. II. 64·42 tons.
Wind pressure as per technical paper No. 44.

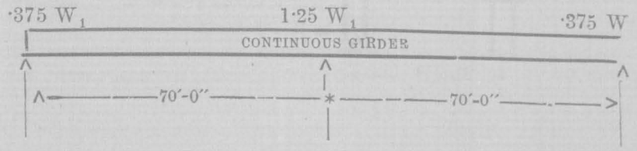
Vertical force due to dead load per unit of length $= \frac{P_2 \times h_2}{D} = \frac{0{\cdot}025 \times 5{\cdot}75 \times 2{\cdot}87}{8}$

$= 0{\cdot}052$ tons.

For 134 feet = 134 × 0·052 = 6·97 tons.

Total dead load (64·42 + 6·97) = 71·39 tons on two spans.

Total live and dead load = (419·26 + 71·39) = 490·65 tons over two spans.



W = 490·65 tons total load on continuous girders on two spans.

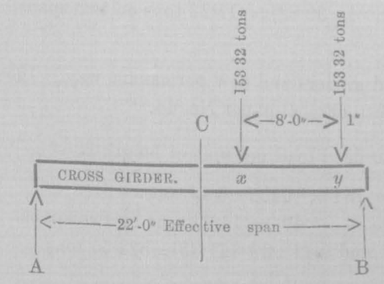
W_1 = load on one span $= \frac{490{\cdot}65}{2} = 245{\cdot}32$ tons.

∴ Load at centre pier 1·25 W_1 = (1·25 × 245·32) = 306·65 tons.

(a) *For single line of Railway.*

Total load 306·65 tons.

∴ Load at x or $y = \frac{306\,65}{2} = 153{\cdot}32$ tons



Reaction $R_A = \frac{1}{22} \times 153{\cdot}32 + \frac{9}{22} \times 153{\cdot}32 = 69{\cdot}68$ tons.

,, $R_B = \frac{13}{22} \times 153{\cdot}32 + \frac{21}{22} \times 153{\cdot}32 = 236{\cdot}94$ tons.

Bending moment at centre C = $R_A \times 11 = 69{\cdot}68 \times 11 = 766{\cdot}48$ foot tons.
Taking effective depth as 2 79 feet.

Total stress due to dead and live load $= \frac{766{\cdot}48}{2{\cdot}79} = 274{\cdot}72$ tons.

Allowing working stress at 7 tons per square inch.

Required area in each flange $= \frac{274{\cdot}72}{7} = 39{\cdot}25$ square inches.

Available nett area in two girders as per calcutation No. I (*a*) = 35·12 square inches.

(*b*) *For double line of Railway.*

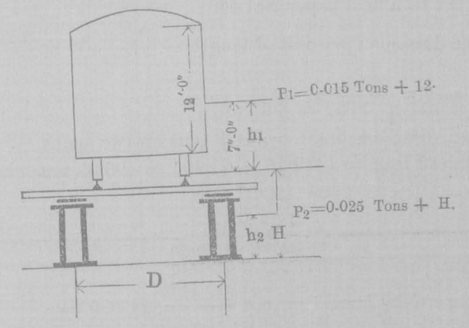
Required area = 39·25 × 2 = 78·50 square inches.

VI. Cross girders to carry a pair of doubled girders already in bridge. Load heaviest Engine M. R. as per Government of India Rule including wind pressure as per Technical paper No. 44.

Particulars of live load on two spans (girders continuous) as per calculation I, actual live load 190·2 tons.

Coeff. for double load 2 × 190·2 = 380·4 tons.

Wind pressure as per technical paper No. 44.



Height of girder ... ... 4′—0″
Height of new P. W. above girder... 1—9
5—9 or 5·75 feet = H.

D = 10 feet.

$h_2 = \frac{5{\cdot}75}{2} = 2{\cdot}87$ feet.

Vertical force due to live load per unit of length $= \frac{P_1 \times (h_1 + H)}{D} = 0{\cdot}015 \times 12 + (7{\cdot}0 + 5{\cdot}75) = 0{\cdot}23$ tons. For 134 feet = 134 × 0·23 = 30·82 tons.

Total live load = (380·4 + 30·82) = 411·22 tons on two spans.

Particulars of dead load.

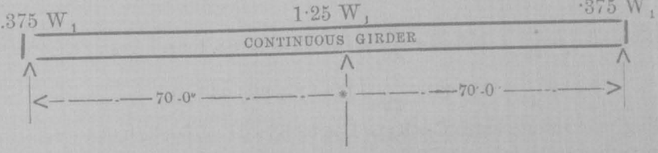
weight of duplicated girders and new permanent way. 105·84 tons *vide* calculation No. III, wind pressure as per technical paper No. 44.

Vertical force due to dead load per unit of length $= \frac{P_2 \times h_2}{D} = \frac{0{\cdot}025 \times 5{\cdot}75 \times 2{\cdot}87}{10}$

= .041 tons. For 134 feet = 134 × .041 = 5·49 tons.

Total dead load (105·84 + 5·49) = 111·33 tons on two spans.

Total live and dead load (411·22 + 111·33) = 522·55 tons.



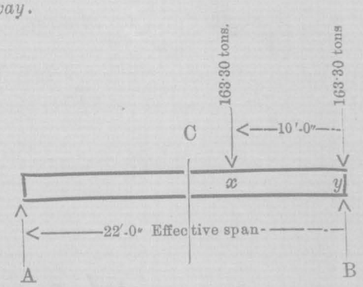
W = 522·55 = total load on two spans.

W_1 = load on one span $\frac{522{\cdot}55}{2} = 261{\cdot}28$ tons.

∴ Load at centre pier 1·25 W_1 = 1·25 × 261·28 = 326·60 tons.

1723 1.7
1. 376 14/4/97
Rym.

(a) For single line of Railway.



Total load 326·60 tons.

$\therefore$ load at x or $y = \frac{326{\cdot}60}{2} = 163{\cdot}30$ tons.

Reaction $R_A = \frac{10}{22} \times 163{\cdot}30 = 74{\cdot}23$ tons.

$R_B = \frac{12}{22} \times 163{\cdot}30 = 89{\cdot}07$ tons.

Bending moment at centre C $= R_A \times 11 = 74{\cdot}23 \times 11 = 816{\cdot}53$ foot tons.
Taking effective depth of girder as 2.79 feet.

Total stress due to dead and live load $\frac{816{\cdot}53}{2{\cdot}79} = 292{\cdot}66$ tons.

Allowing working stress at 7 tons per square inch.

Required area in each flange $\frac{292{\cdot}66}{7} = 41{\cdot}81$ square inches.

Available nett area in two girders as per Calculations No. I (*a*) = 35·12 square inches

(b) For double line of Railway.

Required area = $2 \times 41{\cdot}81 = 83{\cdot}62$ square inches.

E. W. STONEY,
M.E., M.I.C.E.,
Ag. Chief Engineer.

31*st March* 1897.

SERIAL
No. 51

Form No. 4.

OFFICE OF THE CONSULTING ENGINEER FOR RAILWAYS,
Madras, 6th April 1897.

To

AGENT AND MANAGER, M. R.

No. 1268 Reply No. 346 , dated 8/4/97

SIR,

With reference to your letter No. 7559/229 of 12th March 1897, I have the honour to request that you will be so good as to furnish especially the Calculations for the Estimates and plans also for the proposed therein.

6/4/97

Despatched on 6/4/97

Reminders.

Subject.

(A. & M. 1.)

No 7759

346

SERIAL No. 52

MADRAS RAILWAY

AGENT AND MANAGER'S OFFICE,

Madras, 8th April 1897.

From

The Ag. Agent and Manager.
M. R. C.

To

The Consulting Engineer for Railways.
Madras.

SIR,

With reference to your letter No. 1265 dated 6th April 1897, I have the honour to inform you that the Ag. Chief Engineer has prepared plans embodying his proposals for Strengthening the weak girders on this Railway and I am forwarding these to the Board with a view to obtaining the approval of the Company's Consulting Engineer. As soon as the plans have been returned to me approved by the Board I shall have the necessary estimates prepared and submitted for the sanction of Government.

I enclose for your information copy of the Ag: Chief Engineer's letter No. C 450/438 dated 31st March 1897.

I have the honor to be,
Sir,
your most obedt. Servant,

Ag: Agent & manager.

Enc/1

R Form No. 12.

B. No. 250 R

Government of Madras.

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH.

SERIAL No. 53

To

The Secy. to the Govt. of India,

P. W. Department.

Simla

Madras 12th April 1897.

Sir,

In continuation of my letter No: 161 R dt 15 March 1897, I am directed to forward herewith, for the information of the Govt. of India, a copy of letter No: C 450/438 dt 31/3/97 March 1897, from the Chief Engineer Madras Ry to the Agent & Manager regarding the strengthening of girder bridges on state railway & to state that the Company has forwarded plans embodying the

Chief

Engineers proposals to the Board of D. whose approval is awaited.-

9/4/97

Documents accompg:
Copy of C.E. no: 1450/438 & 31.3.97

13/4/97

SERIAL No. 56

Public Works (1897) Department.

CURRENT No. 8094

From Govt of India

Order

No. 1294 R.C

Dated 6th August 1897.

Received

Registered 14.8.97

Enclosures

Spare copies

In reply say that the matter is receiving attention, & is part of the subject of correspondence between the Govt of Madras & the Chief Engineer & the Engineer's Consulting Engineer in London. Say that it is not being lost sight of by the Govt Engr London, & that a report will be submitted in due course when a conclusion has been arrived at.

7/8

20/8/97

SUBJECT.

Strengthening of girder bridges on the Madras Railway.

Enquiring when the views of the Board of Directors may be received on the subject of the

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

1418

No. 1294 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 6th August 1897.

Sir,

S, 5-3

With reference to your letter No.250 R., dated the 12th April 1897, I am directed to enquire when the Government of India may expect to receive the views of the Board of Directors on the subject of the strengthening of girder bridges on the Madras Railway.

I have the honour to be,

Sir,

Your most obedient servant,

P A Anderson

Under-Secretary.

Documents accompanying.

Nil.

for R

B.L.

R Form No. 12.

B/-

SERIAL
No. 57

No. 597. R

Government of Madras.

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH.

To

The Secy. to the Govt. of India,

P. W. Department.

Simla

Ootacamund, the 26th Sept 1897.

Sir,

With reference to your letter No 1294 R.C. dated the 6 August 1897, enquiring when the Government of India may expect to receive the views of the Board of Directors on the subject of the strengthening of girder bridges on the Madras Ry, I am directed to state that the matter is receiving attention, and is at present the subject of correspondence between the Company's Agent and his Chief Engineer and the Company's Consg: Engr: in London. The matter is not being lost sight of by the Consg: Engr: Madras, and a

report

report will be submitted
in due course when a conclusion
has been arrived at.

23/8/97
DR

Nil 26.8.97

Public Works (1898) Department.

Railway

CURRENT No. 178

No. 62

From The Govt of India

Order
No 350 of 3rd Feby 1898

No. 142 R.C

Copy forwarded
to the Agent and Manager,
Madras Railway for favour
of report

Dated 28th January 1898

Received } 2-2-98.

Registered }

Enclosures

Spare copies

CWF
for EIC

FWS
1/2/98

SUBJECT.

Strengthening of Girder bridges on the M. Ry.

Inquiring whether the views of the M. Ry Board on the subject of the —— have been received & if so requesting that a copy may be furnished.

Despatched on 3/2/98

Ltr. 2/2/98

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

All communications should be addressed to the Secretary.

No. 142 R.C.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY CONSTRUCTION.

To

The Joint Secretary to the Government of Madras,

Public Works Department, Railway Branch.

JOINT SECRETARY TO GOVT. OF MADRAS
RECEIVED 4 FEB 1898
No. 57

Calcutta, the 28th January 1898.

Sir,

With reference to your letter No.597 R., dated 26th August 1897, I am directed to enquire whether the views of the Board of Directors, Madras Railway Company, on the subject of the strengthening of girder bridges on the line have been received, and if so to request that the Government of India may be furnished with a copy.

I have the honour to be,

Sir,

Your most obedient servant.

Offg. Under Secretary.

Documents accompanying.

Nil.

K.P.G.

P. W. Ry C N° 266

Read 21. 2. 98.

No. 142 / 1 R. C.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY CONSTRUCTION.

To THE Jt. Secy. to the Govt. of Madras, Rlwd. Ry. Br.

Calcutta, the 17th *Feby.* 1898.

The undersigned is directed to invite attention to the letter noted below, and to request that the reply may be expedited.

Ch. Cuttr

Assistant Secretary.

File

No. 142 *R. C., dated the* 28th *Jany.* 1898.

Requesting to be furnished with the views of the Board of Directors, Madras Ry. Co., on the subject of the strengthening of girder bridges on the line.

G. I. C. P. O.—No. 1559 P. W. D.—2-3-96.—100.

5,000—14-11-85.

(No. II.)

No. 7759
87/143

MADRAS RAILWAY.

G.R. No. 904
Rec'd 21.2.98

AGENT AND MANAGER'S OFFICE,

MADRAS, 18th February 1898.

RECEIVED
18 FEB 1898

2 Covers

From

The *Agent and Manager,* M.R. Corp,

To

The *Consulting Engineer for Railways,* Madras.

SIR,

In reply to your endorsement
No. 350 dated the 3d instant on a copy of a letter
from the Government of India No. 142 R.C. dated
28th January last, I have the honour to inform
you that the views of the Company's Board on the
question of the strengthening of girder bridges
on the Madras Railway are recorded in their
letter No. 944 dated the 6th November 1896. Two copies
of this letter with the enclosure were forwarded
direct to the Secretary to the Government
of India, Public Works Department, with my
letter No. 8234/11938 dated the 1st December 1896.

SNo 61

SNo 61

SNo 42

E/2
India has been reminded as
since Nov. 1896. We had better
send them a further copy of the
Encl'd. above date. H.F.

Attd.

I have the honour to be,
Sir,
Your most obedt Servant,

Agent & Manager.

MADRAS RAILWAY.

From

The Agent and Manager.

To

The Consulting Engineer

for Railways.

Dated

Recd. 188

No.

Form No. 1.

187

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH.

Papers to be read in Proceedings:—

Again G.O., dated 189 , No.

Again G.O., dated 189 , No.

Current No. 178 of 1898, dated 28.1.98 , from The Govt of Madras

" " 266 " 1898, " 17.2.98 , " —— do ——

2/R " " 904 " 189 , " 18.2.98 , " etc.

ORDER. No. 312. Ry. dated 24/2/98.

The Government of Madras will be addressed

No. 313. Ry. dated 24/2/98. &c. Letter to the Govt.

To The Engineer-in-Chief

24/2/98

R Form No. 12.

No. 313. Rly.

Government of Madras.

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH.

To

The Secy. to the Govt. of India,

P. W. Department.

Calcutta

Madras, the 24th Febry 1898.

Sir,

In reply to your letter No. 142. R.C. dated the 28th Jan. 97. I am directed to refer you to Agent Southern R. Co letter No. 8234/11938 dated the 1st Dec. 96 forwarding to the Govt of India two copies of his Board's letter No. 944. dated the 6th Nov. 96, which contained an expression of their views on the subject of the strengthening of the girders of that Ry.

2.- This Govt. now await the receipt from the Agent of definite plans and estimates based on his Board's instructions, and these shall in due course be considered in the Public Works Dept.

3.- This letter duly disposes also of your routine reminder No. 142/1. R.C. dated the 17th Feb. 98.

I have &c

[illegible] 22/2/98

Despatched on 24/2/98

Public Works (1898) Department.

Railways Branch

CURRENT No. 854

From The Govt. of India

Order

No. 943 Ry
Dated 20th July 1898.

The Govt. of India will be addressed.

No. 938 R.C
Dated 5th July 1898.
Received 13th ——"——
Registered
Enclosures
Spare copies

7/8/98 Ry.
18/7/98

SUBJECT.

Strengthening of the girders of the Madras Railway.

Enquiring when the definite plans & estimates in connection with the —— may be expected to receive

T. S. R.
Draft sent to Secretary Ry
21/7/98

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

All communications should be addressed to the Secretary.

No. 938 R.C.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY CONSTRUCTION.

To

The Joint Secretary to the Government of Madras

Public Works Department Railway Branch

Simla, the 5th July 1898.

Sir,

With reference to the correspondence ending with your letter No. 313 R. dated 24th February 1898, I am directed to enquire when the Government of India may expect to receive the definite plans and estimates in connection with the strengthening of the girders of the Madras Railway.

SN° 65

I have the honour to be,

Sir,

Your most obedient servant,

Ed. Cotton

Assistant Secretary.

Documents accompanying:.

Nil.

K.B.

R. Form No. 12.

No. 944. Ry

Government of Madras.

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH.

To

The Secy. to the Govt. of India,

P. W. Department.

Simla

Coty, the 20th July 1898.

Sir,

In reply to your letter No. 938. R.C. dated the 5th July 98, I am directed to inform you that the final elaboration of the scheme for replacing the weak girders on the Madura N. & other lines has been somewhat delayed pending an enquiry whether it will not be economical, if permissible, to utilise the rejected girders for the metre gauge extension and connected sections which are just now forming the subject of correspondence with the Govt. of India.

2. It appears probable that new 60 ft. M. G. girders at West Coast Ports would be about Rs 1000 per span more expensive than the old ones

Railway weak girders cannot bear with. On the other hand rough figures appear to show that if the Madras R. receive credit for Rs 3500 for each span of old girders transferred to the projected extensions, it will only cost Rs 1800 net for span to replace them by modern strong L.G. girders.

3.— When rough figures are now being worked, the old girders are being checked for strength for the metre gauge, and a scheme of replacement shall be submitted as soon as things are forward enough.

Yours
[illegible]
8/2

Documents accompanying:-

-Nil-

[illegible]tched on 20/2/98

(No. I.)

No. 11501.

139

MADRAS RAILWAY.

SPECIAL
5,000—14-11-85.
152

AGENT AND MANAGER'S OFFICE,

MADRAS, 4th February, 188/99.

692.
6.2.99

From

The *Agent and Manager.*

To

M. R. C.

The *Consulting Engineer for Railways.*

SIR,

Madras.

With reference to the correspondence ending with your letter No.175/0 dated the 23rd September 1898, I have the honor to enclose copy of a letter No.W.12751 dated the 18th October 1898 which I received from the Agent, Bombay Baroda and Central India Railway, in reply to my reference on the question of allocation to Capital and Revenue of the cost of renewing girders of bridges. I also enclose an extract, para 7 from a letter from the Secretary No.987 dated the 16th Decem-ber 1898, in which the authority of the Board is accorded to my applying for the sanction of Government to the allocation of the Tungabudra bridge estimate in accordance with the prin-ciple adopted on the Bombay Baroda and Central India Railway, viz one third to Capital and two thirds to Revenue, the value of old girders &c returned from the works being entirely credited to Revenue, and I shall be obliged if you will com-municate to me the sanction of Government accordingly.

The estimate in duplicate with the allocation revised as above is resubmitted herewith.

I have the honor to be,

Sir,

Your most Obedient Servant,

Agent and Manager.

Enclos[illegible]

MADRAS RAILWAY.

From

The Agent and Manager.

To

The Consulting Engineer

for Railways.

Dated 188

Recd.

No.

Bombay Baroda and Central India Railway,

including

Rajputana- Malwa Railway,

Agent's Office,

Bombay, 18th October 1898.

No. W
12751 of 1898.

To,

The Agent and Manager,

Madras Railway,

Madras.

Sir,

I have the honor to acknowledge receipt of your letter No. 11501/9378 dated 27th September 1898, and to state that final orders have not as yet been received in regard to the allocation of charges incurred in the renewal of Warren girders on this system. The expenditure is being provisionally divided between Capital and Revenue in the proportion of one-thid and two-thirds respectively, and it is understood that the Secretary of State has agreed to accept this as the final allocation and to allow Revenue the entire credit for the value of the old girders and other materials returned from the works.

I have &c,

(Sd) A. C. Owen.

for Agent.

(True Copy)

Alfred Blake

Chief Clerk.

ENG. 2 692 '99
137 4.2.99
FROM Am.

MADRAS RAILWAY.

From The Agent and Manage

To

The Consulting Engineer
for Railwa

Dated 188

Recd.

No.

Extract from a letter from the Secretary No.987 dated
16th December 1898.

Allocation of expenditure - for strengthen--ing Bridges.

7. With advertence to para 11 of No.964, and to the correspondence referred to in para 16 of your 2,385, which has passed between the Government Consulting Engineer and yourself on the subject of the allocation of the estimate for strengthening the girders of the Tungabhadra Bridge, you enclose copy of a let--ter from the Agent of the Bombay, Baroda and Central India Rail--way in which he states, in reply to your enquiry as to the prin--ciples on which the allocation to Capital and Revenue was order--ed on that Railway in cases of similar estimates, that final orders have not yet been received, and that expenditure is being provisionally divided between Capital and Revenue in the propor--tion of one-third and two-thirds respectively, Revenue being allowed the entire credit for the value of the old girders and other materials returned from the works. In reply to your re--quest to be favoured with instructions on the subject, I am to inform you that the Board authorize you to propose for the sanc--tion of Government an allocation based upon the principle which is being acted upon in the case of the Bombay, Baroda and Central India Railway.

(True Extract)

Chief Clerk.

3 137 692 '99 4.2.'99
Aun

(No. 1.)

No.

MADRAS RAILWAY.

AGENT AND MANAGER'S OFFICE,

MADRAS, _____ 188

From

Agent and Manager.

To

Consulting Engineer for Railways.

SIR,

8,000—14-11-86.

R. FORM No. 12.

No. 176 Rg

Government of Madras,

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH.

To

THE SECY. TO THE GOVT. OF INDIA,

P. W. DEPARTMENT

14th February 1899.

SIR,

With reference to correspondence ending with
8135
my letter No. 944 Rg. dated the 20th July 98, I am
instructed to enquire whether the Govt. of India concur in the
allocation, as between capital and revenue, of proposed expenditure
on new works and renewals
as well as credit for old materials, on account of the scheme for
strengthening the bridges of the Madras Rg. being settled on
the same principle as which it will be seen, as
may yet be agreed to settle the similar question on the B.B & C.I. Rg.

2. The Committee of Enquiry has received the accompanying letter,
with its enclosures, from the Agent M. Rg. Co. from which it
appears that the Company would accept such a settlement.

3. In view of all the circumstances it appears to this
Government to be an equitable method of settlement and I am
instructed to recommend that it be sanctioned. Once this
question is settled the entire scheme for giving strengthening
to the Madras Rg. can go to the Govt. of India for sanction.

I have &
for Secy.

Dated on 14/2/99

Documents accompanying

Letter from Agent, No 137 dated 4.2.99
3 Enclosures [including estimate]

SERIAL 156

Public Works (1899) Department.

Railways

CURRENT No. 275

From The Govt of India.

Order

Awaiting reply from the Govt of India to No 155 vide Last para

Yes, await the letters have crossed JH 20/3/99

No. 277 R.c

Dated 17th February 1899.

Received

Registered } 23-2-99.

Enclosures

Spare copies

SUBJECT.

Replacing of the weak Girders on the Ry by stronger ones.

Enquiring when the Scheme regarding the promised in para 3 of the Madras Govt's letter No 944 Ry of 20/7/98, may be expected.

BACK PAPERS.

G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.

All communications should be addressed to the Secretary.

JOINT SECRETARY TO GOVT. OF MADRAS RYS. RECEIVED 23 FEB. 1899

PLEASE REPLY TO SIMLA.

No. 277 R.C.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY CONSTRUCTION.

To

The Joint Secretary to the Government of Madras,

Public Works Department, Railway Branch.

Simla, the 17th February 1899.

Sir,

With reference to correspondence ending with your letter No.944 Railway, dated the 20th July 1898, regarding the replacing of the weak girders on the Madras Railway by stronger ones, I am directed to enquire when the Government of India may expect to receive the scheme of replacement promised in paragraph 3 of the same.

I have the honour to be,

Sir,

Your most obedient servant,

C.J.W.

Offg. Under Secretary.

Documents accompanying.

Nil.

K.P.G.

R. Form No. 12.

No. 445 Rly

Government of Madras.

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH. 160

To

The Secy. to the Govt. of India,

P. W. Department.

20th April 1899.

Sir,

I am directed to enquire when a reply may be expected to my No. 176 R. dt. 14.2.99. This letter crossed your No. 277 R. C dt. 17.2.99 and this Govt. awaits the decision of the Govt. of I as to the allocation between Revenue & Capital of the cost of replacing the weak girders on the M. R. by stronger ones before replying to your letter.

J.H.
18.4.99.

Serial 155

Serial 156

Despatched on 20/4/99

Documents accompanying.
Nil.

Current Res called for 6/5

Public Works (1899) Department.

CURRENT No. 646

From The Govt of India

Order

No. 744 RC

Dated 25th April 1899

Received 9.5.99

Registered

Enclosures

Spare copies

SUBJECT.

Scheme for strengthening the bridges of the M. Ry

Passing orders on the subject of the allocation of proposed expenditure on a/c of the —

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

No. 744 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 25th April 1899.

Sir,

I am directed to acknowledge the receipt of your letter No.176 R. dated the 14th February 1899 in which you enquire whether the Government of India consent to the allocation, as between Capital and Revenue, of proposed expenditure on new work and material as well as credit for old material, on account of the scheme for strengthening the bridges of the Madras Railway, being settled on the same principles on which it has been agreed to settle the similar question on the Bombay Baroda and Central India Railway.

2. In reply, I am to say that the allocation that has been agreed upon as regards the cost of replacing the Warren Girders on the Bombay Baroda and Central India Railway was proposed as an equitable compromise under the conditions of that particular case, and not as a strictly correct allocation based on generally accepted principles, and therefore cannot properly be applied in the case of the scheme for strengthening the bridges of the Madras Railway, unless it can be shown that the allocation as worked out in accordance with the principle set forth in paragraph 7 of letter No.944 of 6th November 1896 from the Board of

the

the Madras Railway Company (copy received with your letter No.1032 R.dated 11th December 1896) gives the same or nearly the same proportions, viz. 1rd to Capital and 2rds to Revenue.

3. I am to add that in the meanwhile the allocation of the estimates for Girder strengthening on the Madras Railway will be provisionally accepted,subject to adjustment hereafter,at 1rd and 2rds to Capital and Revenue,respectively,so as to obviate any delay in sending forward the proposals for the whole scheme. This should not however prevent the calculation of the true allocation on the generally accepted principle above quoted.

I have the honour to be,

Sir,

Your most obedient servant.

C. J. Wells.

Under Secretary.

Documents accompanying.

Nil.

ABER.

A.C.B.

Form No. 33.

OFFICE OF THE CONSULTING ENGINEER FOR RAILWAYS,

Madras, 8th May 1899.

EXAMINED. Dept. No. 266. 8 - MAY. 1899 Enclosures..... RAILWAY ACCOUNTS, MADRAS.

No. 1458.

OFFICE NOTE.

Letter from the ~~Agent,~~ Govt. of India Railway, No. 744 R.C, dated 25th April 1899, forwarded to the Examiner of Railway Accounts, for favour of remarks.

for E. R.
8/5/99.

EXAMINER'S REPLY.

Copy of Govt. of India letter No 744 R.C. to AM cite refer to this 11301/401.

10.5.99.

A copy of the letter from the Govt. of India may be furnished to the Agent & Manager, and estimates for the scheme of strengthening weak girders called for. These should, if the Govt. accepts the opinions expressed by the Govt of India, be allocated to Capital and Revenue on generally accepted principles, as laid down in the Board's letter referred to by the Govt of India, and as worked out in the case of the Tungabhadra bridge estimate on your Office notes 2290 (Serial 140) and 405 (Serial 153)

[500—1-12-98.]

If the Agent and Manager is not prepared to adopt these views, the estimates may be provisionally apportioned between Capital and Rev: in the ratio of $\frac{1}{3}$ and $\frac{2}{3}$ respectively.

It is presumed the Agent and Manager will refer the question of allocation again to his Board.

J.G.K. 9/5/99

C.R. 9-5-99.

9.5.99

Form No. (2).

B

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH

PROCEEDINGS OF THE MADRAS GOVERNMENT.

READ the following,

G.O N: 831-2 R/ 30 Sept 1876
G.I. N: 1664 RC/ 2 Nov "
Letter N: 1032 R: / 11 Dec "
G.I. N: 373 dc / 4 March 1877
Letter N: 161 R/ 15 " "
Letter N: 250 R/ 12 April 1877
G.I. N: 1294 RC/ 6 August "
Letter N: 597 R/ 26 " "
G.O. N: 312-13 R/ 24 Feby 1878
G.I. N: 938 RC/ 5 July 1878
Letter N: 944 R: / 20 " "
" N: 176 R: / 14 Feby 1879
G.I. N: 744 RC/ 25 April 99.

Order thereon N: 595. R: / 22 Feby 1879

Communicated to AM with reference to his letter N: 11301/137 / 4 February 1879 and the request that the estimate for the scheme of strengthening weak girders may be furnished as early as possible.

3 AM ✓
CR ✓
ER ✓

27/5/99

17.5.99.