Code Class. DS

INDIAN TELEGRAPHS.

04492

Monthly Number.

To (Office) Madras

From (Office) Simla

Words.	Day.	Hour.	Minute.	Official Instructions.
40/2	12	18	2	Dg/d.

To (Person) Works.

From (Person) Works.

C 94 Springs supplementary report on Kistna bridge girders stated by him to have been sent to you by engineer in Chief E. Coast Railway last month not yet received here please expedite and wire reply

Lr. 13/8/90

(Secretary's note: Papers put up - The supplementary report has not yet been received - the Endorsements forwarded - the Endorsements to E C S 1220 04-14-7-90 to have not yet been received - 17/8/90)

Rcd. from LN. Hrs. Mts. by

Sent to LN. At MADRAS 12-8-90 Hrs. Mts. by

Telegraph Master.

report by M. F. I. E. Springs Executive Engineer on the a revised design for a 300 feet girder for the

PW Cdo 7597

Rd 13-8-90.

TELEGRAM ~~Ordinary~~ URGENT / DEFERRED, Referred.

FROM Works E.R. Madras

To Works Simla

Yesterday Supplementary report on Kistna Bridge despatched today.-

Ls 13/8/90

D.R 13/8

Despd 13/8.

No. 3388C

Government of Madras.

PUBLIC WORKS DEPARTMENT.

To

The Secretary to the Govt of India
P.W.D.
Simla

13th August 1890.

SIR,

In compliance with your
the request contained in
your telegram No C.94 dt-
12th instant and in con-
tinuation of my Telegram
of date as per margin
I am directed to forward
herewith supplementary
report by M. F. I. E. Sprunt
Executive Engineer on
the
a revised design for
a 300 feet girder for
the

x " your C.94. Supplementary
" report on Kistna
" Bridge despatched
" today "

the Kistna Bridge -

2. The Engr-in-Chief East Coast Rly. under whose Endorsement No. 1220/4A dt. 14th July 1890 the above report was received was requested by wire on 27th ultimo to instruct Mr. Spring to take the plans referred to in this report with him to Simla. -

No. 3388C dt 13th Augt 1890

Recd 13/8/90

Ld. 13/8

D.R

No. 1220
4A

From

WALTAIR. 14th July 1890.

THE ENGINEER-IN-CHIEF, EAST COAST RAILWAY.

To The Consulting Engineer
For Railways
Madras

The following is forwarded with reference to this Office No. 1689/4 dated 25th June 1890.

Recd 21.7.90

Ltr. in a separate parcel. (not rec'd)

F B Walker
Engineer-in-Chief E. C. Ry.

4E 14/7

Kistna Bridge

Revised Design for a 300 ft girder

By F. J. E. Spring Esqre Mem: Inst C. E. Executive Engineer Kistna Bridge.

New design offered.

1 Since sending up the Kistna Bridge plans and estimates I have had more leisure to go carefully again into the girder design. I now therefore submit a revised design which in several of its principal features is a distinct improvement on the previous one. I mentioned in para 61 of the report that the girder drawing then submitted did not pretend to greater accuracy of design than was needed for rough purposes of draughtsmanship. The present girder has been designed with greater care and will I think be found in Sir A Rendel's office to be fairly correct in its dimensions.

Differences between and old design

2 This design differs in one very essential particular from the previous one, in this, that it is a double

8666. RC
1

double and not a triple system of triangulation, with 45 degree bracing. From this it results that the vertical struts and the cross girders are 15 ft apart instead of 10. This has of course led to the strengthening of the cross girders, and of the rail bearers. I have also spaced the main girders 20 ft apart between centres, instead of 18, & the effect of this increased spacing upon the wind stresses has been that less metal is required in the boom to meet wind stresses than was previously needed. This increased spacing will not necessitate the alteration of the piers, which were already sufficiently long, it gives me a very much more satisfactory girder, and particularly so for road traffic.

Booms

3 _____ Instead of making the boom side plates and angles uniform throughout and altering only the main plates, I have given heavier side plates and bottom angle bars towards the middle of the span and this has allowed me to avoid the use of too heavy main plates, which for a breadth of 3'6" and a length of 30 ft, are, I understand difficult to procure

End pillars

4 _____ The present end pillars differ from the previous ones in having open lattice bracings on one face, to allow of better access to the rivet connections of the special end cross girders.

Special end cross girders.

5 _____ I have omitted the upper gussets or but-tresses that stood in the special end cross girders in the former design, and have found more room for the connection with the boom, to allow of the use of fourteen 1¼" rivets for the connection. As these rivets will have to carry 100 Tons in the event of the girder ever having to be lifted, they will of course receive special attention when being driven. The design of the special end cross girder is more practicable than the former one, which would have given trouble in the manufacture, and had not been carefully thought out.

Trimmers

6. _____ As the rail bearers for the broad gauge are so much deeper than in the previous design they cannot well

Roadway

well be of channel iron. They must therefore be built, as shown on the present drawing; they are a little too strong, but in rail bearers this is a fault on the right side. The rail bearer of the metre rail may be of channel as previously designed, and as shown on the present drawing.

7 _____ The 2 ft extra width of roadway now given is a great advantage as it will allow of two opposite streams of road traffic. I dont think that the original quadrant section of road kerb would have kept the loads of country carts sufficiently far from the bracings. I have therefore carried the Weston plates right through the road from side to side, and have laid down two old metre gauge rails as guards, about 2'6" inches from the sides of the girder. This will allow of the side walks being used by foot passengers. These kerb rails will be bolted down through the Weston plates by little hook bolts about 3 ft apart at alternate sides of the rail.

Rail Guards

8 _____ A design of Mr J R Bells for an improved form of rail guard has suggested a modification which I think is a further improvement on Mr Bells. I have shown a sketch of Mr Bells, and along side of it my modification, and I would press that the latter be adopted. The guard rail of a long bridge may be called upon to serve such very important functions that it ought I think to be scientifically designed. Instead of Mr Bells trough, which is heavy and expensive, I have designed two similar Z bars of special section, on the lower flanges of, and between which the rail stands. To give the usual cant to the rail Mr Bell canted the surface of the timber, this is a difficult thing to do satisfactorily as the long timbers warp very much in the sun, so I have canted the rail by the use of a specially designed bearing plate, which serves the purpose also of fishing the rail guards together.

Rail fastenings

9 _____ In the foot of the flat footed rail at intervals of three feet on both sides, a nick is milled out. In this nick

lie

lie the holding down bolts which hold together the rail, the bearing plate, the timber and the trimmer. The rail gaurds of course have their lower flanges holed at the same 3 ft intervals, so that the bolts may pass through them. Mr Bell had passed these bolts down through the timber and through two holes in the cross plate on which the timber rested, and then through the screwed holes in a double nut below. The disadvantage of this was that if, as with the greatest care may always happen, a joint of the main girder was slightly out of line, the rails had to follow its crookedness. To allow of the absolute straightening of the rails I have altered Mr Bell's design as follows. Instead of two holes in the plate connecting the two sides of the trimmer, on which the timber rests. I have a slot through which the two bolts pass to the double nut below. The slot is managed thus - Instead of putting one short 12" piece of channel bar across the trimmer at 3 ft intervals for the timber to rest on, I have put two 6" pieces with an interval of one inch between them. This interval is the desired slot. The road can now be straightened as accurately as necessary, and the auger passing down through the timber from the holes in the bearing plate and rail guards will emerge below in the slot. The chase between the guards and the rail may with advantage be filled with asphalt as shown. The specially designed washers, which allow of the holding down bolt taking a fair bearing on the rail and on the cant plate, serve the secondary purpose of forming a box for the head of the bolt, in the asphalt filled chase, keeping it clear for the wrench that tightens it. These washers, as will be seen on Mr Bell's sketch, are his and not mine. The design for the rail guard is I think a good one in every way. There will never be any anxiety about the guards getting detached by the accidents of road traffic.

19 _____ I have inserted light wind bracing across vertically between the middle and top cross girders. Wind bracings

This

This will facilitate erection. 6RP

Weight 20 _____ The weight of the new girder comes out 450 Tons instead of 442 which was the weight of the original one. The 8 tons difference is nearly all due to the additional section of the improved guard rail, which however is, I consider, well worth the extra expense for maintenance purposes in the future. The new girder offers the very great advantage of increased breadth, and as it has some 30 less in number of heavy pieces to be handled and 40 or 50 fewer main joints to be made, it will undoubtedly be easier and cheaper of erection.

as

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REGISTERED
No. 526
FILE
No.

All communications should be addressed to the Secretary.

No. 149 R. S.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY Stores

To

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

Simla, the 30th September 1890

Sir,

In continuation of Government of India Public Works Department letter No. 141 R.S. dated the 20th September 1890, I am directed to return herewith the supplementary report by Mr. F.J.E. Spring, Executive Engineer on the revised design for a 300 feet girder for the Kistna Bridge together with the tracing for the girder which were received in original under cover of your letter No. 3388 C, dated the 13th August 1890.

2. Copies of the documents, now returned

returned, have been retained in this office for record.

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

J. B. Hebbert

Offg: Under Secretary

Documents accompanying
Mr. Springs Report and tracing
regarding Krishna Bridge

No. 1620R

A

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 27th Oct 90.

READ the following

Telegram from the Govt: of India P.W.D. } H.O. No. C 94 of 12th Augt 90

Telegram to do — — — — of 13th do —

Letter to — do — — — 338 C of 13th do —

Letter from the Govt. of India P.W.D. } — " — " — 149-R.S of 30th do —

H.S. 17/10/90
Communicated to the Consulting Engineer for Railways for information.

Dh 27/10 — Ys: R

To the Consg Engr for Rys with 1 tracing.

No. 1620 Cal 8.10.90
" 338 Cal 13.8.90

P.Q

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No. 1620 R dy 27 Oct 90.

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Mus. 11 + 60
Rs 20/-

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Govt. of 18 Madras.

PUBLIC WORKS.

Dated

Recd. Encl.

G.O., 27th Oct. 90 No. 1525R.

Krishna Bridge.

Letter from the Govt
returning Mr Springs
report and tracing
regarding — Calls for the
Report Rpt for
information.