

Public Works (1899) Department.

RAILWAY BRANCH.

G.O., No. 1208 Ry

DATED 25th Oct-1899

[Despatch Abstract.]

Softness of rails

A letter from the Govt of India
re forwarding for information a
selection of papers re complaints
of the — and opinions thereon,
Communicated to the Agents, Madras,
and S. I. Ry's

[illegible]

24/10/2017

FURTHER PAPERS.

GOVERNMENT OF INDIA.
PUBLIC WORKS DEPARTMENT.
RAILWAY STORES.

THE SECRETARIES TO THE GOVERNMENTS OF MADRAS, BOMBAY AND BURMA, PUBLIC WORKS DEPARTMENT, RAILWAY BRANCH.

THE RESIDENT AT HYDERABAD.

THE AGENTS TO THE GOVERNOR GENERAL FOR CENTRAL INDIA AND RAJPUTANA.

THE CONSULTING ENGINEERS TO THE GOVERNMENT OF INDIA FOR RAILWAYS, CALCUTTA, LUCKNOW AND ASSAM.

THE MANAGERS, NORTH WESTERN, OUDH AND ROHILKHAND, EAST COAST AND EASTERN BENGAL STATE RAILWAYS.

THE ENGINEERS-IN-CHIEF, HARDWAR-DEHRA RAILWAY AND GHAZIABAD-MORAD-ABAD RAILWAY.

THE ENGINEER-IN-CHIEF, INDUS BRIDGE WORKS AND BRITISH SECTION, SHADIPALI-BALOTRA RAILWAY.

Softness of rails.

I AM directed to forward, herewith, for information a selection of papers regarding complaints of the softness of rails and opinions thereon.

Your most obedient servant,

C. J. W.
Under Secretary.

Documents accompanying.
Selection of papers about softness of rails.

G. C. Press, Simla.—N. 834 P. W. D. —16.10.99.—390.

To The Secretary to the Govt. of Madras
Public Works Department
Railway Branch

Enclosure to Govt. of India, P. W. D. letter No. 1995 R. S. of October 1899.

No. I. *Extract paragraph 4 from notes from the inspection report, by Colonel C. E. Shepherd, I.S.C., Deputy Consulting Engineer for railways, Lahore, on the Southern Punjab Railway on the 13th—15th May 1897.*

Whilst on the subject of crossings, it was observed that many of the noses of crossings show excessive sign of wear considering the small amount of traffic, only that for material trains and ballast trains, that had taken place over them. This points to the metal being soft, and as these crossings were all made of pieces of rail cut and bolted together, if the other rails are of similar quality, they will be found to be unduly soft. In places, evidence of the metal being soft was apparent. This more particularly in the rails lately laid in. The rails at the Samasata end, that were laid some months ago, shewed no signs yet of wear, whereas some at the Delhi end did.

Extract paragraph from the inspection report, by Colonel C. E. Shepherd, I.S.C., Deputy Consulting Engineer for Railways, Lahore, on the Southern Punjab Railway for the 2nd-half of 1897.

Rails and sleepers.—These require no special mention. The line was for the most part travelled over at speed to allow of the inspection to be completed in two days and no detailed examination of the rails could be made. Only in two or three cases was it noticed that the heads of the rails had become beaten down more than usual, and the sharp edge below the side of the table which had previously been noticed was not so much in evidence.

- (a) The noses of the crossings, however, appear to be wearing badly. With about three exceptions, all of those which were examined, over a dozen in number, were much beaten down.

No. II. Demi-official from—HORACE BELL, Esq.,
To—J. MANSON, ESQ., Agent and Chief Engineer, Southern Punjab Railway.

I have to acknowledge your letter No. 9385 of the 29th September last covering copies of correspondence on the subject of "soft" rails, more particularly in the noses of crossings. The crossings have been made of the usual type, and on a similar design to those provided for Indian State Railways. The rails from which they were made were supplied by the Dowlais Company from the same specification as the rails for the main line. This specification has been in force for many years now on Indian State Railways and other lines in India, and is similar, as regards percentages of carbon, sulphur, etc., and physical tests, to what is now specified for most of the leading lines in the United Kingdom. No English Engineer is as yet prepared in fact to go materially beyond 45 per cent. in carbon with a maximum of 1 per cent. of manganese. Seeing that such an immense tonnage of rails has been sent out to India under the same specification and tests as those supplied to the Southern Punjab Railway, and hitherto without objections being made, it seems difficult to account for the alleged "softness" of some of your rails. I have discussed this with Messrs. A. Rendel & Son, and am led to the opinion that, assuming the road to be laid to gauge, any indication of unusual wear of the rails and of the flattening down of the noses of crossings must be largely due to the section and state of the tyres of the engines used for construction purposes, and also, as regards crossings, to the fact that these have not so far been laid with through timbers but with sleepers of ordinary length (see notes of inspection, 13th to 15th May 1897). The adoption of a section for rail heads, such, for instance, as is now, and I think properly, adopted for State and other railways in India, necessarily implies that tyre sections, especially of engines, should be of a section to suit the rail. But the information given me as yet in this matter is very meagre. I know nothing more than that one Inspecting Officer has asserted that there was to his mind "evidence" of our rails being "soft." I should be glad to have an accurate section of our rail showing where the "softness" is supposed to be evident, and also an accurate section of the tyres of engines, if possible, as they were when used on construction, and any further information to the point.

No. III. *Extract paragraph 9 from letter No. 389 M. G. R., dated 6th February 1899, from the Engineer-in-Chief, North Western Railway, to the Manager, North Western Railway.*

9. As regards the softness of the rails, they are of standard State type section, and as I gather from the papers of the same specification as for State rails, I do not think they will wear worse than the rails we now get of 1892 type, which is of undoubtedly softer metal than rails sent out previous to that year. The 1892 type rails are not wearing so well as the older rails, but the excessive wear reported on in correspondence ending with No. 2120 W. W., dated 28th September 1896, is not increasing unduly now that top table has adapted itself to profile of wheel flanges.

No. IV. East Indian Railway.

5' 6" Gauge.

Extract paragraph 6 from inspection report for the half-year ended 31st December 1898, by Mr. R. C. Dyson, F. C. H., officiating Senior Government Inspector of Railways, Calcutta.

Permanent-way.—The old steel rails seem to be wearing very well; it is a pity the same cannot be said of the new 85-lb. steel rails now being put in. Two places were examined at mile 52½, where they have been in about two years, and at mile 117 where they have been in only two months. In both cases it was found that they are beginning to spread over at the ends; if this continues, the joints will soon be as bad as an old road. The steel employed appears too soft. I may mention that besides this a thin shaving peels off the top of many of the rails: but I do not attach much importance to this as it is probably purely superficial.

East Indian Railway.

LOOP LINE.

Length 250.32 miles.

Extract paragraph 42 from inspection report for the half-year ended 31st December 1898, by Mr. R. C. Dyson, F. C. H., officiating Senior Government Inspector of Railways, Calcutta.

As on the main line, the new steel rails are not doing well; some were examined that were put in in March 1897, and already show signs of spreading over at the ends. They are of probably the same specification as the 85-lb. steel, and it would appear to be a faulty one as the steel seems too soft.

No. V. *Extract paragraph 2 from letter No. 621 R. S., dated 3rd May 1899.*

From—The Director of Railway Construction,

To—The Director General of Stores, India Office, London.

2. The rails on the Southern Punjab Railway complained of are of the pattern adopted by the Government of India in May 1892, known as steel flat-footed rails, 75 lbs. per yard, with foot 4 inches wide (new standard). The specification for this description of rail was prepared by the India Office, and this is the specification on which steel rails are now received.

No. S. 5955, dated 1st June 1899.

From—The Director General of Stores, India Office, London,

To—The Secretary to the Government of India, Public Works Department.

With reference to a letter from the Director of Railway Construction, No. 621 R. S. of 3rd May 1899, furnishing a copy of correspondence regarding a

complaint of the softness of the rails on the Southern Punjab Railway, I have the honour to enclose for your information a copy of a report, dated 29th May 1899, by the Consulting Engineer.

Report by the Consulting Engineer at the India Office, dated 29th May 1899.

There is not yet sufficient evidence in this case to form an opinion one way or the other, nor has any positive evidence been adduced in support of the opinion that rails recently sent out are softer than those of former years.

It would be desirable to verify this impression by actual test of the mark made by a hardened steel point under a given load, for though chemical composition of the rails may be same as before, it is possible that the heat treatment during rolling modifies the hardness.

I have looked over the analyses of these rails, which were sent me by Mr. H. Bell, and find that while in one or two instances the carbon is a minimum, yet it holds a fair average, and the only peculiarity in the rails is their remarkable purity from phosphorus which would have admitted of a higher carbon. But, on the whole, the analysis is as near as practice admits the same as that of some rails taken out of an English road after 30 years' life which I had analysed on account of the excellent service they had given. These rails indeed are, in the matter of manganese, considerably softer than the Southern Punjab rails.

The analyses compare as follows:—

	C.	Si.	Su.	P.	M.
Southern Punjab — one make.	.406	.045	.055	.053	.979
" " another make.	.400	.034	.041	.044	.927
Taff Vale.	.374	.034	.047	.057	.333

I am of opinion that it is not proved that the Southern Punjab rails are abnormally soft, and if they are, that the cause must be sought elsewhere than in their chemistry.

If the authorities in India would like to try rails as high in carbon and phosphorus as are used in America, where the rails are chiefly made by the Basic process, I do not see why they should not make the experiment, but I hesitate to thrust it on them, as it is probable that the percentage of broken rails, at present extremely low in India, will increase.

No. VI. *Extract paragraph 9 from East Indian Railway Company's Board's letter No. 131, dated the 16th June 1899.*

9. *Wear of 85lb. rails.*—Your No. 81 of 1899, paragraph 3. I am instructed to hand to you, herewith, for your information and for any remarks you may have to make thereon, copy of a letter No. 212, dated 29th May, 1899, from Sir A. M. Rendel and Company with reference to the wear of the 85lb. rails.

No. 212, dated 29th May 1899.

From—SIR A. M. RENDEL AND COMPANY,

To—The Secretary, East Indian Railway Company.

Wear of 85lb. Rails.

We beg to return the enclosures to your letter of 13th May and to report thereon, after analysis of the samples at Cooper's Hill. There is nothing in the result to indicate any special softness in the metal of these rails, as indeed might be expected, judging by the analysis during manufacture.

The stripping of these flakes is attributable to the action on the outer edge of a flat-topped rail of tyres worn hollow on a rounder topped rail, and the same thing has happened under similar circumstances on the State lines.

As it has been ascertained by measurement that the old rails which started with a top radius of 5 inches, wear down to 8 inches, while the new rails have a top radius of 12 inches, it appears probable that the best course would be to roll in future both the old and the new section rails to a radius of 8 inches.

The question of increasing the carbon in the heavier rails has been often before us, but we have hesitated to do so, as we found on analysing some rails that had done specially good service for 30 years in an English road, that their chemical constitution was precisely that of our standard. This is an indication that it is not the chemistry of the rails which is in fault, and we have never yet seen any proof that rails as now supplied are softer than those sent out in former years.

We have noted, however, that the material used by one of the firms from whom we have bought largely of late (the Dowlais Company) is peculiarly free from phosphorus, and it is a question with us whether with low phosphorus there should not be higher carbon. The difficulty is in practice to know beforehand how the phosphorus is likely to turn out. We propose, however, to prepare a clause in the specification which will meet the case.