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MADRAS RECORD OFFICE.

Government of Madras.

Public works **DEPARTMENT.**

G.O. No. 530	Press ~~Mis.~~
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*Proceedings of the Madras Government, Public Works Department,
15th February 1866.*

No. 314. Read the following Proceedings of the Government of India, Public Works Department, (Railway), dated Fort William, 20th January 1866, No. 74 R :—

Cast-iron Pot Sleepers.

From the Secretary to Government of India, Public Works Department, to the Acting Secretary to Government of Bombay, in the Public Works Department, Railway Branch, dated 24th October 1865, No. 954 R.

Referring to your letter No. 2,285, dated 2nd October 1865, and to the recommendation made in Despatch No. 39, dated 28th September 1865, from the Government of Bombay, to the Secretary of State, for doubling the North-Eastern line of the Great Indian Peninsula Railway right through to Jubbulpoor, on the ground that it would not be safe on a single line with the expected heavy goods traffic to send mails and passengers through at "express rates" as they ought to be, I am directed to request full and careful re-consideration by the Government and Railway Engineers, and the Bombay Government, of the advisability of the intended use of cast-iron pot-sleepers on a large scale. Sleepers of this description are not generally approved for lines worked at express speeds, and it is not desirable that, on this particular line on which, of all others, express speeds will be demanded, any but the soundest and safest style of construction should be introduced.

From the Acting Secretary to Government of Bombay, in the Public Works Department, Railway Branch, to the Secretary to Government of India, Public Works Department, dated 27th December 1865, No. 2,849.

1. I am directed by His Excellency the Governor in Council to acknowledge the receipt of your letter No. 954R, dated 24th October 1865, relative to the use of the iron pot-sleepers on the North-Eastern Extension of the Great Indian Peninsula Railway, and in reply to transmit copies of letters on this subject, from the Agent and Government Consulting Engineer who apprehend less danger from the splitting of badly backed pot-sleepers than from the rapid decay on many parts of this line of the wooden sleepers in use.

2. I am to point out that the doubling the line from Callian to Wassind is now being executed with pot-sleepers, and as this is a part of the line on which the heaviest traffic takes place, experience will be gained on the subject before the continuation to Bhosawul is commenced.

3. A Report on these sleepers by the Chief Engineer, Madras Railway, is also furnished for information.

Memo andum from the Consulting Engineer for Railways, to the Acting Secretary to Government of Bombay, in the Public Works Department, Railway Branch, dated 8th December 1865, No. 4,063.

1. The undersigned has the honor to append a letter from Captain Sherard Osborn, C. B., R. N., and Agent, Great Indian Peninsula Railway, on the subject of pot *versus* wooden sleepers

2. A recent visit to Bhosawul has given opportunities of examining the state of the wooden sleepers on the line.

3. Between Julgaum and Bhosawul a carriage attached to a goods train ran off the line, and was brought into Julgaum with its springs and panels destroyed. On examination the accident appeared to be due to rotten sleepers which were then being re-placed.

4. At Coorla an engine had got off the rails at a crossing, and several sleepers were broken up and found to be in a decayed condition. It is clear that the usual test of a sleeper's soundness, that of examining the ends projecting from the ballast, is not a safe one, and cannot be relied on, as the dry ends may be sound, while the intermediate portion buried in ballast may be rotten and liable to be torn asunder in curves, or at high speeds.

5. If well laid and packed with proper material, the pot-sleeper is a durable one. Its brittleness is the chief defect, and this might be obviated if the toughening process can be applied, on which point it is hoped the London Board will make enquiries.

6. Pot sleepers have been adopted on some of the South American Railways, and it is not known there that any just condemnation of their use has been made from actual experience.

7. It may be mentioned that Captain Osborn has given instructions for a careful examination of the sleepers in the line. The doubling of the line from Callian to Wassind, which is being executed with pot-sleepers, will afford some experience on the subject before the continuation to Bhosawul is commenced.

From the Agent, G. I. P. Railway Company, to the Consulting Engineer for Railways, Bombay, dated 30th November 1865, No. 6,236.

With reference to the letter from the Secretary to the Government of India, forwarded to me with yours of the 16th instant, No. 3,755, I have the honor to state that the Chief Engineer of this Railway, who, as a pupil of Mr. Stephenson, has had great experience in the working of pot-sleepers, does not concur with that Officer in having any misgivings about their safety for any speed likely to be attained in India. He says in reply to my question, "I should not fear running high speeds over a well laid pot-sleeper road. The risk in this country being, in my opinion, far less from the splitting of badly packed pot-sleepers than from the decay of wooden sleepers," and I quite agree with him, for I do not believe any one knows the extent to which the present Railway traffic of India is being carried over decayed wooden sleepers hidden under ballast. All the wooden sleepers I have seen removed from our roads, are a mere mass of decomposition, and unsaleable even for firewood. The security therefore in an imperishable article like an iron pot-sleeper is ten-fold greater, in my opinion, than in a log of timber which decays away to powder in eight months, and never shows its weakness until the rails open out under the weight of a Locomotive Engine.

In Egypt, the worse maintained Railway in the world, the pot-sleepers answer admirably under all conditions of soil, in steep gradients, sharp curves, and with trains driven occasionally at the most reckless speed.

Colonel Dickens says that pot-sleepers "are not generally approved for lines worked at express speeds," I should be very grateful if he would recite cases where they have been fairly tested and condemned, for of course in England as in India there are prejudices to be surmounted, and vested interests to be combated where the question of iron versus wood is brought forward. The speed of Indian passenger trains should not, in my opinion, be increased for some years hence. Twenty-five to thirty miles per hour is quite fast enough, yet for a country only just emerging from a condition of transit best represented by a bullock hackery, and where the organization of Railways and discipline of Railway servants is still in its infancy. It is in those imperfections that the real danger lies.

The Express Trains I have proposed for the Overland Mails, need not go at high speed, but they should not stop except for water, except at four places between Jubbulpoor and Bombay, by that means, at a mean speed of 25 miles per hour, the transit of the Mails would be very much accelerated, and not so much risk be incurred as at present by "stopping trains," which have very frequently to make up time lost at stations.

Your proposition to toughen the present iron sleeper is a very fair one, and I will recommend that the Board of Directors desire the Consulting Engineer to go into the subject as quickly as possible.

From the Chief Engineer, Madras, to the Acting Secretary to Government of Bombay, in the Public Works Department, Railway Branch, No. 707.

1. I delayed replying to your letter No. 3,383, dated 3rd instant, until the quarterly reports of Engineers in charge of permanent-way were received, in order that I might furnish you with statements showing cost of maintenance during the past quarter.

2. The South-West Line, 406 miles, was originally laid with country timber sleepers. It was very soon discovered that the deterioration of the wood was so rapid, that unless a more durable material were substituted, a very large sum would have to be expended annually on renewals, and iron sleepers were introduced on the portion east of the Cauvery, (i. e.,) 241 miles. On the Western Division, where timber of a better quality is procurable at moderate prices, the use of wood has been continued.

3. The Bangalore Branch and the North-West Line were originally laid with iron sleepers. The former was opened for public traffic on the 1st August 1864, and the first portion of the latter was opened in 1861.

4. For the purposes of comparison it will be best to take the statements of the cost of maintaining the North-West Line, and the 4th Division of the South-West Line, as one is altogether an iron road, and the other altogether timber, and both have been open for traffic about the same time. You will observe that the average cost of the first has been Rupees 54 per mile per month, and of the latter Rupees 108. The 3rd Division, of which 36 miles are iron, and 59 wood, average Rupees 88. The 1st and 2nd Divisions are still in a transition state. The balance of iron sleepers required to complete the iron road being on the 1st Division 12 per cent. of the total number, and on the second 30 per cent. This circumstance accounts for the higher cost of maintenance.

5. As regards the effect of the iron road on rolling-stock, I subjoin extracts from two letters from the Locomotive Superintendent of this line, in the first dated 12th June 1863, he says:—

"I cannot well send in any Official Report until engines have been running long enough on the North-West Line to show appreciably what the wear and tear is on the tyres, a Report sent in at this early period of its existence would be of little value, and might mislead, because we have not had a sufficient number of engines working solely on that line to enable me to deduce from that wear fair average results.

"My own views are, like yours, decidedly in favor, of the iron pot-sleeper road, and speaking generally, I believe, that our stock has suffered far more from the wooden sleeper road than from the iron road, on account of the sleepers being many of them defective and badly packed. Where the pot-sleepers are well packed, and laterite or sound ballast is used, I have always found the engines and stock to run smoothly, and without jarring, and from our entire freedom from accident on the latter road, I should prefer seeing them in use throughout the line.

"The North-West Line is, as a whole, in my opinion, a less injurious road to rolling-stock, than the South-West Line, and the engines and rolling-stock working on that line have required, if any thing less upholding than the stock generally on the South-West Line."

6. In a subsequent letter Mr. Wright says:—

"No. 38 Engine ran 22,050 miles on the South-West Line, when she came in for repairs, and had her wheels turned up for the first time.

"When turned out of the shops, she was placed on the North-West Line, where she ran 27,348 miles when she came into shed again, and had her wheels turned up.

"This result is in favor of the pot-sleeper road, more especially as engine wheels usually run a less number of miles after having been once turned up, the outer layer of metal generally being the most durable.

"It is however, only fair to the wooden sleeper road to observe that, during the greater part of the time that No. 38 was running on the South-West Line, the road between Madras and Vellore (where she ran) was, generally speaking, in very bad order."

*Proceedings of the Madras Government, Public Works Department,
15th February 1866.*

7. Our rails on the North-West and Bangalore Line weigh 75 lbs. per yard, and the arrangement of sleepers is shown in the accompanying sketch. It is essential that the ballast should be of such a description as not to bind, and broken stones and coarse gravel should be carefully avoided. I find the best ballast to consist of a mixture of coarse sand and laterite gravel or rotten granite, commonly called in this part of the country moorum. Where the road is laid through rock cuttings and over bridges, I always use teak sleepers, as the iron requires a foundation possessing some degree of elasticity.

8. I shall be happy to afford any other information you may desire.

OBSERVATIONS.—The Governor General in Council is given to understand that the general opinion of the profession at present is adverse to the use of cast-iron pot-sleepers, especially for high rates of speed. This may be a prejudice, unsupported by facts, and it seems desirable to collate the experience of Engineers in India and elsewhere regarding them. The Secretary of State will, therefore, be addressed in view to the facts as to their suitability, derived from experience of their use on the Egyptian and South American Railways and elsewhere. The representatives of the various Railway Companies in India should, also, be invited to favor the Government with such experience, as may be available, or as may be possessed by any members of their Engineering Staff of their use on India Railways, or elsewhere. These sleepers are in extensive use on the Madras and Punjab Railways. Their use on the Delhi Railway has been arranged for, and they have been experimentally used on the East Indian Railway.

2. The smoothness of the road, the wear and tear of rolling-stock, the proportionate number of breakages under ordinary and express speeds, with other particulars as to renewals, and the frequency of accidents under different speeds compared with lines laid with good timber sleepers, the ballast and packing used, are the chief points on which information is desirable.

ORDER.—Ordered, that these Observations, with copies of the papers just read, be communicated to the Governments of Madras, Bombay, Bengal, North-Western Provinces, and Punjab, for the purpose indicated.

(Signed) C. H. DICKENS, Lieut.-Colonel, R. A.,
Secretary to the Government of India.

No. 315.

ORDER THEREON, 15th February 1866, No. 530.

RAILWAY, No. 24.

Communicated to the Consulting
Engineer for Railways, who will be
requested to obtain and submit full
information on the several points which are mentioned in paragraph 2.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

To the Consulting Engineer for Railways.

Exd. S. T. Augustin.

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Communicated to the Consulting
Engineer for Railways who will be requested
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on the several points which are men-
tioned in para 2
To
Consulting Engineer
for Railways
Sanj. 16th Feb.
Fort St George
15th Feb. 1866
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Proceedings of the Madras Government, Public Works Department.
15th February 1866.

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GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY.

No. of Govt. for February
To *From the Secy to the*
Govt. of India.

No. 74 R.

Dated January 20, 1866.

Received *July 31*

31. 1/38

Requests information as to the use of cast-iron pot sleepers on Railways.

To

No 314-315

With an order

5th July 1866 (A. 10m)

No. 530-15m July 1866

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