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MADRAS RECORD OFFICE.

Government of Madras.

Public works DEPARTMENT.

G.O. No. 1434-35	Press
288-90	Mis.
Dated 11. 5	1867.

Not to be folded or roughly handled

[Handwritten mark]

No. 288. Read the following Endorsement of the Consulting Engineer for Railways, dated 1st May 1867, No. 134 :—

Read the following letter from the Deputy Consulting Engineer for Railways, to the Consulting Engineer for Railways, dated Madras, 14th March, 1867, No. 3.

1. With reference to your Memorandum, dated 2nd March 1867, ordering me to report on the relative advantages of the several varieties of permanent-way which have been adopted on the Great Southern of India Railway, I have the honour to point out that, as some of these varieties have only been used for a few months, it would be unfair to accept, as final, the opinions formed after so short a trial.

2. The systems of permanent-way in use are—

1st.—Creosoted wooden sleepers, with ordinary chairs and fish joints.

2nd.—Carr's patent iron-wood sleepers, with and without fish joints.

3rd.—Griffin's patent corrugated iron sleeper.

4th.—Greaves' patent iron pot sleepers. The rails weigh 66 lbs. the running yard and are double headed, the keys are of teak and are steeped in tar.

3. The creosoted wooden sleepers form an excellent elastic road, but the timber is soon destroyed in this country, and it is proposed to remove them and substitute Greaves' iron sleepers.

4. Carr's patent sleepers are of iron-wood, each sleeper is nine feet long, ten inches wide, and six inches deep. The rails are keyed into notches cut in the sleepers; on the main line the joints are fished in the ordinary way; in sidings no fish plates need be used, the joints are simply placed on the sleepers and the keys driven. The road thus formed is very elastic, smooth, and economical; some sleepers that were laid more than two years ago do not appear to have suffered. In places where iron-wood can be obtained, and where the ballast is not suitable for iron sleepers, I think that Carr's patent sleepers might advantageously be used.

5. Griffin's patent sleepers are of corrugated iron, each pot is about two feet three inches long, and each pair of pots is tied together by two wrought-iron ties, square in section, the joints are fished between the sleepers. These sleepers have not given satisfaction, the rectangular plan of the pots causes difficulty in packing them, the square tie-rods being weak, sometimes break and sometimes bend so as to nip the gauge when they are laid on new banks. It is probable that Griffin's sleepers would form an excellent road if used in rock cuttings, or places where there is no chance of settlement.

6. Greaves' sleepers consist of pairs of ribbed iron pots, each pair or alternate pair of pots is connected by a wrought-iron rectangular tie-bar. Every pot supports a chair into which the rail is keyed, the lower flange of the rail is not however supported by the chair, but it rests on wooden cushions which lie in beds provided for them on the pots. There are two cushions on each pot. The supposed advantages of this system are—

1st.—That the rails have more frequent supports.

2nd.—That the road is more elastic, because the rails rest on wood instead of iron.

*Proceedings of the Madras Government, Public Works Department,
11th May 1867.*

3rd.—That the lower flange does not become notched at the chairs as, do rails supported by iron chairs; hence rails may be turned when the upper flange is worn out.

7. An apparent disadvantage is that the cushions being of wood are likely to deteriorate. On the Great Southern of India Railway the cushions are made of teakwood, cut with the grain and tarred. It would be better to cut them across the grain, so that they might stand the pressure more effectually, or perhaps cushions of compressed wood might be advantageously introduced. All cushions that have been taken out show a dent caused by the pressure of the rail; if the cushion were so much compressed that the rail when weighted by a passing train would touch the bed, it seems probable that the pot would break; hence great care must be taken that every cushion is in good order. To remove any cushion it is necessary to take up a whole rail.

8. Although the lower flange of the rail does not suffer from notches, it is very doubtful whether a turned rail would be of much service, as it is well known that a girder which is turned after having been subject to severe strains is not nearly equal in strength to a new girder.

9. On the Great Southern of India Railway only four out of seven pairs of pots are tied together; experience on that line, as well as on the Madras Railway, shows that a tie-bar should be used for each pair of pots.

10. Every tie-pot used on the Madras Railway has two holes, each three inches in diameter in it, through which the sleeper may be packed. On the Great Southern of India Railway the pots are smaller, and the holes are only three fourths of an inch in diameter, so that beaters cannot be worked through them, and it is very difficult to pack the sleepers properly.

11. After so short a trial it is impossible to say whether the renewals of cushions will prove a serious drawback. Greaves' method of supporting the rails is theoretically good, and practically has worked well. I think, in future, pots should be made large enough to have two three-inch ramming holes in each.

12. All iron roads have this disadvantage, that the sleeper is only made strong enough to carry the rail first laid down; if a heavier rail is substituted, new sleepers must be obtained, whereas if wooden sleepers form the substructure, chairs only need be adapted to the new rails.

1. Submitted for the information of Government with reference to G. O. Nos. 1,901 and 2,800, dated 18th June and 3rd September 1866. The report has been detained in this Office until drawings of the pot-sleepers were obtained.

2. The sleepers most generally used on the Great Southern of India Line are of Greaves' system. They differ from those in use on the Madras Railway in being smaller, in being furnished with ribs, and in having a small wooden cushion to bear the rail. They are also lighter, weighing only 75 lbs., while the Madras Railway sleepers weigh 84 lbs. each.

3. They are probably stronger than the latter in proportion to the weight, owing to their being ribbed, but their smaller surface renders them more liable to be dislodged.

*Proceedings of the Madras Government, Public Works Department,
11th May 1867.*

4. The wooden cushions are of questionable utility. They are too small to have an appreciable effect in modifying the shock communicated from the rail to the sleepers, while their comparative want of durability must be objectionable.

(Signed) J. C. ANDERSON, Lieut.-Colonel, R. E.,
Consulting Engineer for Railways.

No. 289.

ORDER THEREON, 11th May 1867, No. 1,434.

RAILWAY, No. 15.

Ordered that these papers be communicated to the Government of India.

(Here enter No. 1,435 dated 11th May 1867.)

(True Extract.)

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

To the Consulting Engineer for Railways.

Exd. S. T. Augustin.

PUBLIC WORKS DEPARTMENT.
FORT SAINT GEORGE,
11th May 1867.

No. 1,435

No. 290.

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,

PUBLIC WORKS DEPARTMENT.

SIR,

RAILWAY, No. 16.

In continuation of my letter of the 12th March last, No. 737, I have the honour, under the orders of the Right Honourable the Governor in Council, to forward for the information of the Government of India copies of the papers noted in the margin having reference to the relative advantages of the several varieties of permanent-way which are adopted in this Presidency.

From Consulting Engineer for Railways, No. 134,
dated 1st May 1867.
From Deputy do. do., No. 3, dated 14th March
1867.

I have the honour to be,

Sir,

Your most obedient servant,

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

Exd. S. T. Augustin.

with and without fish joints.

Railway Department

Consulting Engineer's office

No. 3.

From

Major H. N. D. Prendergast V.C. R.E.
Deputy Consulting Eng^r for Ry.

To

Lieut Col. J. C. Anderson R. E.
Consulting Eng^r for Railways.

Sir,

With reference to your Memo dated 2^d March 1867 ordering me to report on the relative advantages of the ~~several~~ varieties of permanent way which have been adopted on the Great Southern of India Railway I have the honor to point out that as some of these varieties have only been used for a few months it would be unfair to accept as final the opinions formed after so short a trial.

2. The Systems of permanent way in use are

1st Crossed wooden sleepers with ordinary chairs and fish joints.

2^d Carr's patent ironwood sleepers with and without fish joints.

3. Griffin's patent corrugated iron sleepers.

4. Greaves' patent iron pot sleepers
The rails weigh 66 lbs the running yard and are double headed, the keys are of oak and are steeped in tar.

5. The Creosoted wooden sleepers form an excellent, elastic road but the timber is soon destroyed in this country and it is proposed to remove them and substitute Greaves' iron sleepers.

6. Carr's patent sleepers are of iron wood each sleeper is 9 feet long, 10 inches wide and 6 inches deep. The rails are keyed into notches cut in the sleepers, on the main line the joints are fished in the ordinary way, in sidings no fish plates need be used the joints are simply placed on the sleepers and the keys driven. The road thus formed is very elastic, smooth and economical, some sleepers that were laid more than two years ago do not appear to have suffered. In places where iron wood can be obtained and where the ballast is not suitable for iron sleepers I think that Carr's patent sleepers

2
sleepers might advantageously be used. 7

5. Griffin's patent sleepers are of corrugated iron each pot is about 2'-3" long and each pair of pots is tied together by two wrought iron ties square in section. The joints are fished between the sleepers. These sleepers have not given satisfaction, the rectangular plan of the pots causes difficulty in packing them, the square tie rods being weak, sometimes break and sometimes bend so as to rip the gauge, when they are laid on new banks. It is probable

that Griffin's sleepers would form an excellent road if used in rock cuttings or places where there is no chance of settlement.

6. Greaves' sleepers consist of pairs of ribbed iron pots, each pair or alternate pair of pots is connected by a wrought iron rectangular tie bar. Every pot supports a chair into which the rail is keyed the lower flange of the rail is not however supported by the chair but it rests on wooden cushions which lie in beds provided for them on the pots. There are two cushions on each

each pot. The supposed advantages of this system are

- 1st That the rails have more frequent supports
- 2^d That the road is more elastic because the rails rest on wood instead of iron.
- 3^d That the lower flange does not become notched at the chairs and rails supported by iron chairs hence rails may be turned when the upper flange is worn out.

7. An apparent disadvantage is that the cushions being of wood are likely to deteriorate. On the Great Southern of India Railway the cushions are made of teakwood cut with the grain and tarred. It would be better to cut them across the grain so that they might stand the pressure more effectually or perhaps cushions of compressed wood might be advantageously introduced. All cushions that have been taken out show a dent caused by the pressure of the rail, if the cushion were so much compressed that the rail when weighted by a passing train would touch the bed it seems probable that the pot would break, hence great care must be taken that every cushion is

3 11
is in good order. To remove any cushion it is necessary to take up a whole rail.

8. Altho' the lower flange of the rail does not suffer from notches, it is very doubtful whether a turned rail would be of much service as it is well known that a girder which is turned after having been subject to severe strains is not nearly equal in strength to a new girder.

9. On the Great Southern of India Railway only four out of seven pairs of pots are tied together experience on that line as well as on the Madras Railway shows that a tie bar should be used for each pair of pots.

10. Every tie pot used on the Madras Railway has two holes each 3" in diameter in it thro' which the sleepers may be packed. On the Great Southern of India Railway the pots are smaller and the holes are only $\frac{3}{4}$ inch in diameter so that beaters cannot be worked thro' them and it is very difficult to pack the sleepers properly.

11. After so short a trial it is impossible to say whether the renewal of cushions

cushions will prove a serious drawback,
Greaves' method of supporting the rails is
theoretically good and practically has worked
well. I think in future pots should be
made large enough to have two three such
ramming holes in each.

12. All iron roads have this dis-
-advantage that the sleeper is only made
strong enough to carry the rail first laid
down if a heavier rail is substituted new
sleepers must be obtained whereas if wooden
sleepers form the substructure chairs only
need be adapted to the new rails.

I have the honor to be,

Sir,

Your most obedient Servant

W. D. Hendry
Major V.C.R.E.

Deputy Consulting Eng^r for Ry.

Madras
14 March
1867

A^c 134.

13

Submitted for the information
of Government with reference to G.O. Nos.
1901 and 2800 dated 18 June & 8 September 1866.
The report has been detained in this Office
until drawings of the pot sleepers were
obtained.

The sleepers most generally used on
the Great Southern of India line, are of
Greaves system. They differ from those in
use on the Madras Railway in being smaller,
in being furnished with ribs, and in having
a small wooden cushion to bear the rail.
They are also lighter weighing only ⁶⁶₇₅ lbs. while
the Madras Railway sleepers weigh ⁷⁵₈₄ lbs
each.

They are probably stronger than the
latter in proportion to the weight owing to
their being ribbed, but their smaller surface
renders them more liable to be dislodged.

The wooden cushions are of questionable
utility. They are too small to have an appreci-
able effect in modifying the shock commu-
nicated from the rail to the sleepers, while
their comparative want of durability must
be objectionable.

Madras
1st May 1867

To

W. D. Hendry
Consulting Engineer for Railways
The Secretary to Government
Public Works Department
Fort Saint George.

P. W. Dept.
1867. A 1012
RAILWAY DEPARTMENT.

From
The Consgr. Engineer for Railways,
To
The Secretary to Government,
P. W. Dept.

Dated *1st* May 1867.
Received *2d*

No. 134 - 1-2-18

Enclosures, No. *Two*
18. *from the Consgr. Eng.*
Observations on
a letter from Major
Bendergast, reporting
upon the relative ad-
vantages of the several
varieties of Permanent
way.

No 1434-1435-11th May 1867

No 288
6th May 1867. A. B. M.

Printed

1434
No 1434
Public Works Department.

PROCEEDINGS of the MADRAS GOVERNMENT.
Under date the 11th May 1867
Read the following

From the Consulting Engineer
for Railways

(Here enter No. *134* dated *1st May*
1867)

Ordered that
these papers be com-
municated to the Govern-
ment of India

To

The Consgr. Eng. for Rail.
13/5/67

21
No 1435

The Secretary to the
Government of India

Sir

In continuation
of my letter of the 12th
March last, No 737,

I have the honor, under
 the orders of the Right
 Honourable the Governor
 in Council, to forward
 for the information of
 the Government of India
 copies of the papers noted
 in the Margin having re. From Bone's Inq^r for Railways
 ference to the relative ad- N^o 134 dated 2 Aug 167
 vantages of the several From Dept^r D^o — D^o
 varieties of Permanent N^o 3 dated 14 March 167
 Way which are adopted
 in this Presidency.

[Signature]

Recd 13/5/67 with cp^y of
 G^o 1434 & a tracing of
 Bot sleepers.

Pub. Works 1867 Dep. art.

Pro. of Govt for May

No. 1434 & 1435

Pro. of the Madras Govt.
Of 11th May 1867

Passing orders on
certain correspondence relative
to the advantages of the several
varieties of Permanent way
which have been adopted on
the Railways in this Presidency

No 288-289 @ 290

6th May 1867 Q. 82