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# MADRAS RECORD OFFICE

Government of Madras

*Public Works* DEPARTMENT

|          |        |      |       |
|----------|--------|------|-------|
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| Dated    | 24-1-  | 1876 |       |

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,  
24th January 1876.*

No 391 Read the following endorsement of the Consulting Engineer for Railways,  
dated Madras, 7th January 1876, No 11 —

From R B ELWIN, Esq., Agent and Manager of the Madras Railway Company,  
to Lieutenant-Colonel J H M SHAW-STEWART, R E, Consulting  
Engineer for Railways, dated Madras, 4th January 1876, No 2

In accordance with the request contained in your letter of the 10th of March last,  
I have the honor to forward herewith a copy of the Acting Chief Engineer's letter,  
No 918, of the 7th ultimo, and a copy of Mr Winter's report alluded to therein

2. The latter contains the results of the testing of Mr Winter's system of  
inter-communication in trains during heavy rain.

From W R ROBINSON, Esq, Acting Chief Engineer, to R B ELWIN, Esq, Agent and  
Manager of the Madras Railway Company, dated Madras, 7th December 1875, No 918

I HAVE the pleasure to forward, for your information, an eminently satisfactory report from  
Mr Winter on the testing of his system of inter-communication in trains during the late heavy  
rains

From G K WINTER, Esq, Telegraph Engineer, to W R ROBINSON, Esq, Acting Chief  
Engineer of the Madras Railway Company, dated Arcotum, 3rd December 1875, No 322

On the 14th of November last, Mr Anderson, in company with the Agent and Manager,  
Mr Melhuish, Mr Craik, and myself had an opportunity of seeing and testing practically the  
working of my system of inter-communication in trains during heavy rain I now beg to  
forward, for your information, and for transmission to the Agent, a brief account of the general  
results obtained from the tests that have been made during the past monsoons

2 The insulator in fine weather is very high, and is represented by a resistance of nearly two  
million Ohms per carriage, equivalent to a length of nearly 200,000 miles of telegraph wire This  
number has to be divided by the number of carriages in order to obtain the insulation resistance  
of an entire train; thus with twenty carriages the insulation resistance would be equivalent to  
the resistance of 10,000 miles of our telegraph wire The leakage, therefore, would be no greater  
than if the two ends of a perfectly insulated telegraph wire, 10,000 miles in length, were joined  
one end to the chains on one side and the other end to the chains on the other side

3 In rainy weather this insulation resistance decreases, at first quickly, but afterwards very  
slowly, until it appears to reach a minimum of about 13,000 Ohms per carriage, or 650 Ohms for  
a train of twenty carriages This is equivalent to the resistance of about 65 miles of our telegraph  
wire

4 That the effect of this amount of leakage on the signals would be practically unobservable  
will easily be understood when I mention that the resistance of the connecting wires for twenty  
carriages is about equal to one-fourth of a mile while the chains are clean, and might rise to a  
mile when the chains are tarnished, the bells have a resistance of less than 2 miles, so that  
altogether we may say that the resistance of a train circuit of twenty carriages would be equiva-  
lent to less than 3 miles, while the resistance to leakage would be equivalent as a minimum to  
65 miles of our telegraph wire

5 The tests on which the calculations given above have been founded were taken at Beypore,  
where the train was fully exposed during the whole monsoon not only to the rain, but also to the  
effect of the diffused spray from the sea, which is well known to act prejudicially upon the  
insulation

Proceedings of the Madras Government, Public Works Department,  
24th January 1876.

6 At Madras, Mr Melhuish's tests gave as minimum nearly 20,000 Ohms per carriage during the heavy rain of the 14th ultimo, after the return of the train from Avady. The insulation was again tested at 4 P.M., when it was found to be scarcely altered.

This would give the resistance of 100 miles of our telegraph wire as the equivalent insulation resistance of twenty carriages.

During the night of the 13th and up to 4 P.M. on the 14th the rainfall as registered at the Observatory was 5.16 inches.

7 With regard to the trial trip itself, I may explain that the train was composed of twenty-three carriages and wagons and the engine. During the journey from Madras to Avady the train was stopped and started several times by signal, and the communication was further tested by sending and receiving messages between the brake-vans, which messages, in spite of the noise of the train, and the difficulty of reading by a bell, were fairly received. On the return journey the wagons were left behind, the train was thus diminished to thirteen carriages and the engine. During this part of the trip the continuity of the conductor and the insulation of the wires were simultaneously tested in the following manner —

At the rear brake-van a battery, and, at a carriage next but one to the engine, a recording instrument were connected with the communication wires, and the tape was allowed to run continuously during the entire journey. The resulting unbroken line on the tape clearly showed that the continuity of the contact at the chains was perfect at the speed we were running, viz., about 35 miles an hour, and also that the effect of leakage might be practically disregarded.

8 Mr Melhuish of the Government Telegraph Department, who at the request of the Director-General has taken great pains in testing the system in a variety of ways, appeared perfectly satisfied with the results, and expressed himself so to Mr Anderson when questioned on the subject.

SUBMITTED to Government with reference to their Proceedings, No 658, dated 8th March 1875.

(Signed) J. H. M. SHAW-STEWART, Lt-Col, R.E.,  
Consulting Engineer for Railways.

Nos 392 & 393 ORDER THEREON, 24th January 1876, No. 178

RAILWAY, No 33.

THE report records a satisfactory result of the tests as to insulation and continuity of the communication during the experimental trips described, and will be forwarded to the Government of India

(True Extract)

(Signed) G. W. WALKER, Major-General, R.E.,  
Secretary to Government.

No 394. (DOCKET, No. 179, dated 24th January 1876)

COPY of the above forwarded to the Government of India with reference to their letter No. 433 R, dated 18th February 1875

(True Extract)

Major-General, R.E.,  
Secretary to Government

Exd S T. Austin.

Spare Copies

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the

Read the following —

From

The Consulting Engineer  
for Railways

(H.R. No 11 dated 7<sup>th</sup> Jan'y 1876)

We are not called upon  
to congratulate I think - I  
have thought modified the  
off. minute for

The report records a satisfactory  
result of the tests as to insulation  
& continuity of the communication  
in several congratulatory  
during the experimental trips  
Mr Walker on the successful  
described  
Results of his invention for  
effecting intercommunication  
between passengers and  
guards in moving trains.

2. The report will be for-  
warded to the Government  
of India.

H.R. No 179 of 24<sup>th</sup> Jan'y 76

Copy of the above for-  
warded to the Government  
of India with reference to  
their letter No 433 R dated

21<sup>st</sup> Dec. 1875

Copies for Dept

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21<sup>st</sup> Dec. 1875

