

(1) Number of pages.....

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MADRAS RECORD OFFICE

Government of Madras

Public Works DEPARTMENT

G.O. No.	1618	(W)	Press
B.P. No.			Mis.
Dated	26-6-	1876	

Not to be folded or roughly handled

11 May 1876. No 1175-

Form No 18
H. 1876 Department

28-11-22

From
The Chief Engineer for Irrigation,

To
The Secretary to Government,
Public Works Department

Dated 19 June
Despatched 22 " 1876.
Received 28 " "

ENCLOSURE 24

No 78 W

Subject.
Reconstruction of one
mile of 43 feet length
of the Achewank Tank
by the S. Indian Railway.

No 537

Ci. 236-76 P.W. 28-6-76
O. S. 28 June

No 1118

Public Works Department

PROCEEDINGS of the MADRAS GOVERNMENT.

UNDER date the 26 June 1876
READ the following. —

Note by the Chief Engineer for Irrigation } (H. 1876 No 1175 June 1876)

The instructions
of the Chief Engineer
for Irrigation as to
the oblique lines of the
Railway Company
are considered in
by the Government;
and therefore in
all cases in which
a Railway line in-
terferes with works
of irrigation and
renders changes in
their arrangements
necessary, there should
be

be carried out at the
cost of the Railway
Company who must
secure to the work
the hydraulic condi-
-tions, such as full
tank level, main-
-tain water level
and capacity for
discharge of flood
water, which obtain-
-ed before the con-
struction of the pier,
as well as the safety
of the line itself
from any injury
by the tank water.

It is understood
that the similar
work referred to
is being carried
out

at the expense
of the South Indian
Railway Company.

District Engineer ✓
Chunglepant ✓
Collector — do — 5 ✓
Chief Insp. for Irrigation South & Enclad ✓
Cong Insp. for Railways 21 ✓
Examin^r P & Accounts 5 ✓
Revenue Department. 2 ✓

Despd 14/7/16

x^o att^o

*Proceedings of the Madras Government, Public Works Department,
26th June 1876. No. 1,602*

ENCLOSURE No 2

From H W NOTMAN, Esq, Managing Director, South Indian Railway Company, to the Under-Secretary of State for India, dated 2, Leadenhall Street, London, E C, 16th March 1876, No 182

I HAVE the honor to acknowledge receipt of your letter of this day's date, enclosing copy of a further despatch* from the Government of Madras, relative to the alleged defects in the narrow gauge rolling stock supplied for the South Indian Railway, a copy of this communication

* Railway, No 1, dated 8th February 1876 will be immediately forwarded to the Company's Consulting Engineers, in order that they may have an opportunity of offering such further observations on the subject as may appear to them to be called for

It would appear from the remarks in the 5th paragraph of the despatch above referred to that the Government of Madras are under the belief that the terms "unfounded and ungenerous" which occur in the Consulting Engineers' Report, No 48, of 25th October 1875, were applied to the criticisms of their Deputy Consulting Engineer I trust that I may be permitted, without delay, to assure the Secretary of State that the terms in question were intended to apply exclusively to the criticisms of the Company's own Locomotive Superintendent, and that it never was contemplated that they should be understood as applicable to the remarks of Major Smith

The special attention of the Consulting Engineers will be directed to this misapprehension

ENCLOSURE No 3

From H W NOTMAN, Esq, Managing Director, South Indian Railway Company, to the Under-Secretary of State for India, dated 2, Leadenhall Street, London, E C, 8th April 1876, No 192

REFERRING to my letter, No 182, of 16th March, and in further reply to your communication of that date, I am now instructed to forward copy of a Supplementary Report, No 56, 3rd April 1876, received from the Consulting Engineers, relative to the alleged defects in the narrow gauge rolling stock supplied from this country for use upon this Company's line in India

ENCLOSURE 1 IN No 3

Report from Messrs G B BRUCE and C D FOX, Consulting Engineers, to H W. NOTMAN, Esq, Managing Director, South Indian Railway Company, dated 5 Delahay Street, Westminster, London, 3rd April 1876, No 53

We have duly received a copy of the Minutes of the Governor in Council at Madras, dated 8th February 1876, having reference to the complaints which have been forwarded with regard to the narrow gauge rolling stock and locomotives supplied from this country to the Company

The 2nd and 3rd paragraphs deal with a statement which we made with regard to the carriages, viz, that the shrinkage of the panels was an inevitable consequence of having had the carriages built in England and sent out to work in India, instead of adopting the usual plan of sending out merely the ironwork and having the vehicles themselves erected with timber seasoned to the country

We would only further remark in reference to this that that deviation was ordered from India by telegram, and we are not in a position to say whether it was a mistake or not We always understood it to be a balance of difficulties On the one hand, there was the danger of the stock shrinking more than it otherwise would do, but, on the other hand, there was, as we understood, the impossibility of the authorities in India constructing the stock within the time that they had at their disposal, and it is quite possible that to have delayed longer and erected the stock entirely in India would have been a much more serious difficulty than the shrinkage of some of the timber work of the carriages sent from England We have no reason to doubt that

*Proceedings of the Madras Government, Public Works Department,
26th June 1876 No 1,602*

the authorities in India judged wisely in having the stock sent out complete, notwithstanding the difficulty which had arisen with regard to the shrinkage

Paragraph 4 of the Minutes deals with the locomotive engines, and notice is there taken that in our report we simply confined ourselves to stating our belief that the engines would be found generally as effective as the narrowness of the gauge, and the standard dimensions framed by the Government would admit, and notice is further taken that we did not go fully into the details of the complaints as given in Mr Sheward's letters

The fact is that the original draft did contain explanations with regard to the detailed defects as named by Mr Sheward, but the copying clerk by mistake dropped out of the fair copy all this part of the original report, and it was not detected until after it had been sent away This, however, has since been made good in our report, dated 22nd January 1876, where we have referred to the locomotive engines, and given what we believe to be satisfactory explanations regarding them This report was not in the hands of the Madras Government at the date of their Minutes in question

With regard to the observations at the end of clause 5, as to the terms "unfounded and ungenerous" on reference to the report, it will be seen that this had no reference whatever to the officers of the Government

No 528 ORDER THEREON, 26th June 1876, No 1,602

RAILWAY, No 48

COMMUNICATED to the Consulting Engineer for Railways with reference to the undermentioned orders —

G O, No 3,259, dated 13th November 1875

G O, No 188, " 25th January 1876

2 Report will be made whether defects in the engines continue to be observed If there are none, it should be so stated

(True Extract)

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

To the Consulting Engineer for Railways ✓

Exd F R Bantleman

20 Spare Copies

Gobt. of 1876} Madras.
PUBLIC WORKS.

TO CONSULTING ENGINEER
FOR RAILWAYS.

100 D. 200

G. O. 200 J. 1876, No 1, 2

JUNE.
Nos. 527-528.

*Narrow Gauge Locomotive and other Rolling
Stock sent out for the South Indian Railway
Company — Despatch from Secretary of State
transmitting copies of letters from the South
Indian Railway Board replying to the alle-
gations of defects in the —, compared
to the Consulting Engineer for Railways
with remarks.*

India Office,
London, 11th May 1876.

Railway,
No 2

To His Excellency The Right Honourable The Governor
in Council, Fort St George

MY LORD DUKE,

Para 1 In reply to your Excellency's Despatches of the 22nd
November 1875, No 9, and 8th February last, No 1, I transmit here-
with, for your Grace's information, copies of letters from the South
Indian Railway Board, of the dates*

* Dated 14th February, 16th March,
and 8th April 1876, Nos 173, 182, and
192

† Dated 22nd January 7th February,
and Enclosure, and 3rd April 1876

noted in the margin, together with
copies of the Reports† by their Con-
sulting Engineers received therewith,
in which these gentlemen reply to the
allegation of defects in the narrow
gauge locomotives and other rolling stock sent out for the railway,
and also enter into particulars regarding the prices of the engines as
compared with those of the Rajputana State Railway

2 This difference, as exhibited in the contrast of the estimate for the
South Indian Railway, giving an average cost of 2,650l for each engine,
with the average cost of the Rajputana engines, stated at 1,460l,
appeared enormous, and justly attracted the attention of the Govern-
ment of India. But the details afforded by Messrs Bruce and Fox
show that the average cost in England of their engines was really
1,750l, whilst the price per ton weight was not materially higher than
that of the Rajputana engines nearest in type. I consider their ex-
planation on this matter satisfactory. But it does not appear why the
cost set down for the engines in the Agent's estimate should have been
so greatly in excess of the actual prices

I have the honour to be,
My Lord Duke,
Your Grace's most obedient humble Servant,

John Lubbock

11A

ENCLOSURES

No. 1

No 173

South Indian Railway Company,
2, Leadenhall Street, London, E C,
14th February 1876

Sir,

In reply to the reference made to the Board in Lord George Hamilton's letter of 12th January 1876, on the subject of the condition of the narrow-gauge rolling stock recently sent to India by this Company, I am desired to enclose a report from the Consulting Engineers, No 53, dated 22nd January

Special attention having been called, in the letter under reply, to the comparison of cost of the locomotives on the Rajputana State Railway with that of the engines supplied for this Company, and the specifications and other necessary documents relating to the former having been furnished, the Consulting Engineers were called upon to report specially on this subject. A copy of their report, No 54, dated 7th February 1876, together with a copy of the tabular Statement referred to therein, are now forwarded for information, and in explanation of the differences in the relative prices of the locomotives supplied for the two systems of railway

The papers relating to the questions under consideration, which were received on the 12th and 25th January, are returned herewith

I am, &c,
(Signed)

HENRY W. NOTMAN,
Managing Director

The Under Secretary of State
for India

Enclosure 1 in No 1

Report No 53

South Indian Railway Rolling Stock

Westminster,
22nd January 1876

Dear Sir,

We are duly in receipt of your letter of the 13th instant, enclosing a communication dated the 12th instant, from the Secretary of State for India, with further reference to the locomotives and rolling stock recently sent out by the Board to India, which we herewith return

We have already dealt generally in our Report, No 48, dated the 25th day of October 1875, with the letter of the Locomotive and Carriage Superintendent to the Agent, dated the 9th of August 1875 a copy of which was before us at the time and is referred to in such Report

2 We would again express our regret that this officer should have based an official communication of so unusual a tone, and containing expressions—to say the least—much exaggerated, upon so limited an experience of the locomotives and rolling stock, which at that time had but lately arrived in the country

3 Reference is made in this letter to certain private communications forwarded to us and relating to the locomotives, and as time has now

B

4
been given to weigh the criticisms thus conveyed to us by the Locomotive and Carriage Superintendent, we take this opportunity of stating our views upon those which are of the most importance

4 Upon receiving early in 1875 the first instalment of locomotives, from Messrs Neilson & Co., of Glasgow, which were provided with cabs, or coverings over the footplates, of a design frequently adopted for India, the Locomotive Superintendent wrote us that they were a great failure, that he had forthwith altered them by cutting down the front to the level of the rim of the side opening, and that he had taken all the glass out, or the men would have been suffocated, and he requested us to alter all the remaining engines according to a design prepared by himself, and which he endorsed

5 As upon a question of this kind, involving the comfort of the men, and so much a matter of actual trial, we did not desire to oppose the wishes of the Locomotive and Carriage Superintendent, this alteration was made in 33 engines, at a total additional cost of 570l

6 In October 1875, the Locomotive Superintendent again wrote, saying that upon further experience, with a head wind blowing or with no wind at all (his previous complaint having been made after tying the locomotives in a side wind only), he found his amended design so objectionable that he wished us to revert to a very slight modification of the original design, and this has been done in the few remaining locomotives

7 We think it right to call attention to such evident vacillation with special reference to the last clause in the letter of August 9th, where mention is made of "Indian requirements and climate." There is not a single piece from end to end of these engines which has anything about it the arrangement and manufacture of which is in the smallest degree affected by the Indian climate, with the exception of these cabs. Everything else would be the same whether the engines had to run in England or in India, and, with regard to this item, the Locomotive Superintendent has admitted that our original design was better than his own modification of it

8 The Locomotive Superintendent wrote us early in 1875, complaining of the tyres of the locomotives

These tyres are of the best quality of steel of Messrs Vickers' manufacture, whilst the weight of the engines is moderate and well distributed. It appears that this complaint arose from a flat place being found in one tyre, probably caused by a driver reversing his engine when running, and thus skidding the wheels. The Superintendent has since informed us that the tyres are doing well

9 Another point complained of was that the brasses were very quickly These brasses are cast from the same proportion of copper, tin, and zinc that are used by the leading Locomotive Superintendents. We have broken and analyzed brasses taken from the bulk, with the following results —

Copper	-	-	-	-
Tin	-	-	-	86 00
Zinc	-	-	-	10 50
	-	-	-	3 50

} in 100 parts of brass,

and we are quite certain that there is no fault to be found with them

10 It appears, very much to our surprise, that in commencing to work the line on the narrow gauge, these engines with 3-foot wheels were run at the same speed (28 miles an hour) at which the broad-gauge engines with large wheels had been working. This would, no doubt, account for any extra wear in the brasses

We always understood that, in adopting the metric gauge, the Government had made up their minds that the previous speed of trains was

131
unnecessary, and not to be aimed at, and we arranged our designs accordingly. Unless this understanding is carried out, it is quite certain that engines with such small wheels will not answer the purpose

11 Mention is made of excessive wear in the coupling and connecting rod brasses. This may result from fine sand in the atmosphere, from the brasses being cottered too tightly, or from excessive speed, — most probably the last

12 The position of the injectors was carefully considered, and we do not see how, in such small engines it could be well improved

13 Blow-off cocks are not usually specified by us in such small engines, where we studied simplicity as much as possible. There is a growing opinion that they are at all times undesirable, and that the practice of blowing off the boiler is a frequent cause of loosening the tubes by sudden contraction, and that it also tends to form and harden a deposit of scale in the boiler. Some of the largest Railway Companies in England have discontinued the use of blow-off cocks entirely

14 The Locomotive and Carriage Superintendent speaks of damage done to the paint in transit. For this, of course, the manufacturers cannot be responsible, and it is quite possible that the paint of engines sent out with creosoted sleepers may be somewhat injured. All that the manufacturers can be called upon to do here is, to coat the ironwork so that it may be protected from the seawater, and this was most thoroughly carried out, an inspector being also employed to supervise the stowage of goods, to avoid damage as far as possible. It is unreasonable to expect to send a locomotive to so great a distance, to be lifted in and out of the vessel, stowed in the hold, landed, and placed on the railway, without its needing a finishing coat of paint upon its arrival

15 We are glad to observe that the Consulting Engineer for Railways (No 337, para 3) states, "I am led to believe that the engines are working better than they were," and from our intimate knowledge both of the details of their design and of the quality of the materials and workmanship, we feel quite confident that, so soon as the men have had time to overcome their prejudices, and to become accustomed to work in the smaller space and at the lower rates of speed incident to metric-gauge stock, they will be found well adapted for their purpose

16 We trust that the Board will think it right to give instructions to prevent in the future hasty and ill-considered alterations being made in designs which have met with much attention on our part

17 There is an evident misapprehension as to the cost of the locomotives, which has not exceeded an average of 1,900l each, inclusive of freight to India, instead of the estimated cost of 2,650l, as mentioned in Proceedings of Public Works Department of the Madras Government, Nos 505 and 506. We should be happy to institute the comparison of cost suggested by the Secretary of State for India, between the locomotives of this Company and those supplied to the "Rajputana" State Railway, upon being furnished with specifications, dates of contracts, cost, and weights of the latter

We remain, &c.,
(Signed) GEORGE B. BRUCE,
CHARLES D. FOX,
Consulting Engineers

H W Notman, Esq

Report, No 54

Enclosure 2 in No 1

Locomotives

Dear Sir,

South Indian Railway,
Engineers' Office, Westminster,
7th February 1876

In accordance with the wish expressed by the Secretary of State for India conveyed to us in your Letter of the 13th January, and having before us the specifications and other necessary documents we have prepared the accompanying tabular statement, showing the comparative cost of the locomotives ordered for the Rajputana State Railway and for the South Indian Railway, respectively

In considering any such comparison the dates of the contracts become an essential element, as very severe fluctuations have taken place during the periods over which the several contracts were let

Taking the "Rajputana" locomotives as an example, those of Class A ordered in April 1872 were 220% = 25 per cent more expensive than those contracted for in August 1871, those of Class B, ordered in September 1873, were 191% per engine, = 15 per cent more expensive than those contracted for in May 1872

In the case of the South Indian engines, as shown in the Table, the prices ranged from 1,765/ in January 1874, to 1,910/ in March of the same year, and gradually fell to 1,610/ per engine in April 1875, being a difference of 300% per engine, = 18 per cent between the highest and lowest point

From this it will be seen that the orders for South Indian locomotives were given during a period when much higher prices ruled than was the case with the "Rajputana" engines

It is also difficult to institute any satisfactory comparison, as none of the types approach to identity of design, and the South Indian tender engine (comprising the whole, with the exception of four tank engines) is considerably more powerful than any of the "Rajputana" classes, with the exception of Class C, a tank engine, in which the cylinder has a diameter of 13 1/2 inches, against 13 inches in the South Indian engine. The heating surface is, however, considerably less, as also is the total weight of the engine, than the South Indian engines

Taking, however, these two engines as approaching more nearly to identity, than any others, we find that, although the South Indian engine has a separate tender, the lowest price, viz, in April 1875, is 1,610/ being only 55% above the amount at which the "Rajputana" engines were contracted for in January 1873 and that the average price of the South Indian engines over the high price period was but 1,750/

Taking the weight into account, we find that—

	Per For
The lowest price of a South Indian engine was	£ 78
The average price	83
The price of the Rajputana engines, Class C	81 1/2

The contract prices for the South Indian locomotives were the result of competition amongst all the leading locomotive makers, and there can be no doubt that they fairly represent the market value of the day for the class and quality of engine in question

We are, &c,
(Signed) GEORGE B BRUCE,
For Self, and C DOUGLAS FOX
Consulting Engineers

H W Notman, Esq

Enclosure to No 2 in No. 1

Description of Points compared		Rajputana State Railway			
		A	B	C	D
		Light Tank, four wheels coupled with leading wheels	Tank, four wheels coupled with four wheels outside cylinders	Tank, six coupled wheels, 1 in on bogie behind outside cylinders	Four wheels, 1 engine, and separate tender
		1. Light Tank, four wheels coupled with leading wheels	2. Tank, four wheels coupled with four wheels outside cylinders	3. Tank, six coupled wheels, 1 in on bogie behind outside cylinders	4. Six wheels, four coupled, with two trailing wheels, and tender
General Description, ton and Cies		10 square feet 49 square feet 618 square feet 3 feet 13 in diameter by 20 in stroke 1,000 gallons 50 cubic feet	7 square feet 43 square feet 393 square feet 3 feet 6 inches 11 in diameter by 18 in stroke 625 gallons 45 cubic feet	10 square feet 54 square feet 581 square feet 3 feet 13 1/2 in diameter by 20 in stroke 1,000 gallons 50 cubic feet	8 square feet 41 square feet 388 square feet 3 feet 11 1/2 in diameter by 17 in stroke 700 gallons 1 ton, say 30 cubic feet
Area of fire grate		10 square feet	7 square feet	10 square feet	8 square feet
Area of fire box		49 square feet	43 square feet	54 square feet	41 square feet
Area of tubes		618 square feet	393 square feet	581 square feet	388 square feet
Diameter of wheels		3 feet	3 feet 6 inches	3 feet	3 feet
Size of cylinder		13 in diameter by 20 in stroke	11 in diameter by 18 in stroke	13 1/2 in diameter by 20 in stroke	11 1/2 in diameter by 17 in stroke
Capacity of tank		1,000 gallons	625 gallons	1,000 gallons	700 gallons
Space for fuel		50 cubic feet	45 cubic feet	50 cubic feet	1 ton, say 30 cubic feet
Weight of engine and tender, empty		21 09 tons 1,765/ Jan 1874 1,940/ Mar 1874 1,915/ Mar 1874 1,797/ July 1874 1,621/ Oct 1874 1,640/ April 1875 847/ 921/ 911/ 853/ 821/ 781/	16 tons 1,236/ May 1872 1,420/ Sep 1873	19 5 tons 1,585/ Jan 1873	17 20 tons 1,255/ Jan 1873
Cost of engines and tenders		94/	771 10s and 891	817 6s 4d	731
Cost per ton of engine and tender		701/ and 881			761

Average cost of South Indian Railway engine, 1,750/ = 831 per ton

(Signed) GEORGE B BRUCE.

8th February 1876

No 2

No 182

Sir,

I have the honour to acknowledge receipt of your Letter of this day's date, enclosing copy of a further Despatch* from the Government of Madras, relative to the alleged defects in the narrow gauge rolling stock supplied for the South Indian Railway, a copy of this communication will be immediately forwarded to the Company's Consulting Engineers in order that they may have an opportunity of offering such further observations on the subject as may appear to them to be called for

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The special attention of the Consulting Engineers will be directed to this misapprehension

I am, &c,
(Signed) HENRY W NOTMAN,
Managing Director

The Under Secretary of State
for India

No 3

No 192

Sir,

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I am, &c,
(Signed) HENRY W NOTMAN,
Managing Director

The Under Secretary of State
for India

9

Enclosure to No 3

Report No 56

South Indian Railway, Engineer's Office,
5, Delabav Street, Westminster, London,
3rd April 1876

Dear Sir,

We have duly received a copy of the Minutes of the Governor in Council at Madras, dated 8th February 1876, having reference to the complaints which have been forwarded with regard to the narrow gauge rolling stock and locomotives supplied from this country to the Company

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With regard to the observations at the end of Clause 5, as to the terms "unfounded and ungenerous" on reference to the report, it will be seen that this had no reference whatever to the officers of the Government

We are, &c,
(Signed) GEORGE B BRUCE,
For C DOUGLAS FOX & Selt,
Consulting Engineers

H W Notman, Esq

4622

Cost. of 1876

PUBLIC WORKS

The Sup^o Eng^o Chongchut

2.1

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1.1

C. Co. 26 June 1876, P. 1818

2.18.537/3

Sup^o Eng^o
16-1-1876

Chongchut to the
Chongchut to the

Passing orders in note by
the Chief Eng^o for Chongchut
on the subject of the recon-
struction of one weir 74's
feet in length of the —
by the San the machine
Ry