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MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No.	1339	~~Press~~ Mis.
Dated	7-4-	1880 .

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GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

13th March 1880, No. 638 W.

Buildings and Roads.

Civil Works.

Read the following papers :—

No. 67. Endorsement of the Consulting Engineer for Railways, dated Madras, 16th December 1879, No. 482.

From A. M. SAUNDERS, Esq., Agent and Manager, Madras Railway Company, to the Consulting Engineer for Railways, dated Madras, 5th December 1879, No. 1,115.

I HAVE the honor to inform you that, in accordance with the request contained in your letter of the 6th of September last, No. 979, the Locomotive Superintendent has tested the sample of Godáviri coal, and I

* No. 3,590-627, 4th December 1879. now enclose you a copy of his report*

thereon, together with a statement showing the results as compared with those shown by patent fuel. A copy of Mr. Trevithick's report, dated the 1st of August 1878, in which he shows that patent fuel is the most economical fuel, except wood, which we now use, was sent to you with my letter No. 1,056, dated the 3rd of August 1878.

From F. H. TREVITHICK, Esq., Locomotive Superintendent, Madras Railway Company, to the Agent and Manager, dated Perambur, 4th December 1879, No. 3,590-627.

Your endorsement to the Consulting Engineer's letter No. 979, dated 6th September 1879.

Trial of a sample of Godáviri Coal.

In compliance with the request of the Consulting Engineer I have caused the sample of Godáviri coal recently received to be carefully tried with a view to determine its value as a fuel for locomotives.

2. The trial had been made exactly in the same manner, with the same trains, men, and class of engines, and over the same ground as the recent trials of various coals reported in this office letter No. 2,624-484, dated 1st August 1878, so that a fair comparison can be made between the results of the two sets of experiments.

3. Patent fuel is the most economical fuel (except wood) that we now have, and I have added on the annexed form the figures representing the results of the last experiments made with the patent fuel in order to serve as a comparison with the now tried Godáviri coal.

4. The figures show that the cost of patent fuel required to run the mail train 100 miles is, at present prices, Rs. 22-11-9, and to attain the same result with the Godáviri coal its cost should not exceed Rs. 15-4-0 per ton stacked in the Rayapuram yard.

5. There was no difficulty in maintaining steam with the Godáviri coal, but it was found to make a great deal of ashes in the ash-pan ; it did not clinker much, but the accumulation of ashes in the fire-box at times became so thick as to check and almost stop the draught, and it could only be got rid of by raking out from below.

6. The coal is very hard, makes little dust, and leaves very little ash in the smoke-box. It seems to require rather more air space on the fire-bars than other coals we have been using.

7. This coal from the Godáviri District is a good, serviceable fuel, and if the facilities for carriage are such as will admit of its being delivered to consumers at a reasonable rate it should be well worth working.

MADRAS RAILWAY.
LOCOMOTIVE DEPARTMENT.

RESULTS of experiments to ascertain the value as fuel for Locomotives of Godáviri Coal—October and November 1879.

Kind of Coal.	CONDITION OF TRIAL.										COAL.			WATER.*		ASH.				Cost of coal per 100 miles run.
	MILES.	HOURS.	MILES.	MILES PER HOUR.	Average number of Vehicles.	Average gross Weight of Train including Engine and Tender.	Average pressure in Boiler.	Total consumption.	Consumption per Mile.	Consumption per Ton.	Cost of Coal per ton delivered at Rayapuram.	Consumption in Gallon.	Evaporated per lb. of coal.	From Smoke-box.	From Ash-pan.	Total weight in lbs.	Per cent. on weight of Coal consumed.			
Godavari Coal .. Patent Fuel,† (Experiments made in April 1878.)	2,880	52	120	25.41	13	171.63	109	98,440	33.48	196	Not known.	83,846	8.67	3,502	17,385	20,887	21.25	Not known.		
	1,440	22	120	26.49	15	182.78	115	36,174	24.58	134	Cost in Nov. 1879. 19 6 3	39,888	10.79	1,359	2,396	3,755	10.40	Cost in Nov. 1879. 21 4 5		
																			22 11 9	

* All the water that passed through the engine has been here considered as evaporated, no allowance having been made for leakage which could not be accurately estimated.
† These figures, the results of experiments made in April 1878, which showed Patent Fuel to be the most economical fuel at that time, are here recorded to serve as a means of comparing the value of the Godáviri coal.
According to this consumption of Patent Fuel at its present price, viz., Rs. 20-11-6 per ton, the Godáviri coal would now be worth to the Madras Railway Company a maximum rate of Rs. 15-4-0 per ton stacked in Rayapuram yard.

(Signed) F. H. TREVITHICK,
Locomotive Superintendent.

SUBMITTED for the information of Government.

2. The papers now submitted give the results of the trial, at the request of His Grace the Governor, of a sample of Godáviri coal as locomotive fuel.

3. The Locomotive Superintendent of the Madras Railway reports that it is a good, serviceable fuel, the only objection to it being the large quantity of ashes which accumulate in the fire-box. The consumption per mile run was 33.48 lbs. as compared with 24.56 lbs. of patent fuel, which has hitherto been found to give more economical results than other kinds of imported fuel. At the present price of patent fuel, the equivalent value of Godáviri coal, stacked in Rayapuram yard, is Rs. 15-4-0. If it can be delivered at a lower rate than this, economy would apparently result from its use.

4. The results of former trials which established the superiority of patent fuel are printed in Proceedings of Government, dated 17th August 1878, No. 789 R.

(Signed) W. H. COAKER, Captain, R.E.,
for Consulting Engineer for Railways.

No. 67-A. Endorsement of the Consulting Engineer for Railways, dated Madras, 3rd March 1880, No. 55.

NOTE.

ACCORDING to the memoranda from Hyderabad, the cost of the coal sent from the Singareni field to Madras was as follows:—

	RS.	A.	P.
Cost at pit's mouth	8	8	2
Cartage to Bezvada	14	8	8
Boat to Madras	6	6	7
Cost per ton	29	7	5

Had the coal been sent *via* Rajahmundry the cost would have been:—

	RS.	A.	P.
Cost at pit's mouth	8	8	2
Cartage to river	11	0	0
Boat to Rajahmundry	0	0	0
Transshipment	3	12	0
Boat to Bezvada	6	6	7
Boat to Madras	6	6	7
Cost per ton	38	6	9

It is stated that the cost at pit's mouth was excessive, and that Rs. 6 per ton should be sufficient; also that, if a good road were available to Bezvada, the cartage hire would be reduced by Rs. 1-8-0 per ton.

The cost of conveyance by boat from Bezvada to Madras works out to about $4\frac{1}{2}$ pies per ton mile, but, as shown in

2nd May 1873, No. 1,257. Proceedings of Government annexed, the charge for coal conveyed in full boat loads should not exceed 2 pies per ton mile, which for a distance of 274 miles would give Rs. 2-13-8 per ton.

Making these allowances, the cost would stand thus:—

	RS.	A.	P.
Cost at pit's mouth	6	0	0
Cartage to Bezvada	13	0	8
Boat to Madras	2	13	8
	21	14	4

To which must be added the cost of carriage to the Locomotive Department.

In the demi-official letter from the Locomotive Superintendent, it is stated that, at present prices, Godáviri coal of the quality experimented with recently would be worth Rs. 17-13-6, delivered in Ráyapuram yard. For economical use it would be necessary therefore to still further reduce the price as shown above by Rs. 4.

In the rate of Rs. 15-6-7, quoted in His Grace's note for Singareni coal, delivered at Madras, it is assumed that a tramway is made from the coal field to Bezváda, a distance of about 80 miles (72 miles in a direct line). Supposing coal to cost Rs. 6 placed in wagons at the pit's mouth, and to be carried at a rate 8 pies per ton mile, the cost per ton delivered at Bezváda would be Rs. 9-5-4. Taking, as before, the cost of conveyance to Madras by boat at Rs. 2-13-8, the cost at Madras becomes Rs. 12-3-0. If this coal were used extensively it would probably be found desirable to have a depôt on the banks of the canal near the Salt Cotaurs Station, so as to avoid further charges. Allowing for transfer from rail to boat at Bezváda, and for contingencies, it is thought that the total cost of Singareni coal delivered at Madras should not exceed Rs. 13 per ton, which is Rs. 4-13-6 within its comparative value at present prices of English fuel.

The normal annual consumption of the Madras Railway is about 12,000 tons, equivalent to 16,000 tons of Singareni coal, on which the saving would amount to Rs. 77,500. This coal could also be used to a large extent by the South Indian Railway.

Reference is made in the correspondence to a proposal to open out the Dumagudiem coal field on the Godáviri. The cost of supplying Madras from this point is fully dealt with in the Proceedings before quoted; it being shown that coal could probably be delivered in Madras at Rs. 10 per ton, viz., cost on board Rs. 5, conveyance by boat 480 miles at 2 pies, Rs. 5.

MADRAS, (Signed) J. H. M. SHAW-STEWART, Col., R.E.,
3rd March 1880. Consulting Engineer for Railways.

Copy of demi-official letter from M. Wilkinson, Esq., His Highness the Nizam's Government, to His Excellency the Minister, dated 3rd December 1879.

With reference to Major Gough's letter of November 6th, making certain suggestions regarding, and asking for information as to cost of our Godáviri coal, I beg, in reply, to forward a statement showing the actual cost incurred per ton in transporting coal from Singareni to Madras, *via* Bezváda, as well as a statement showing what the cost would have been had the coal been carted in the first instance to the Godáviri and taken from thence by water to Bezváda, *via* Rajahmundry, and from thence to Madras.

On comparing these two statements you will see that a saving of Government Rs. 8-15-4 per ton was effected by adopting the direct Bezváda route. You will also observe that the cost of carriage by water from Naganapole on the banks of the Godáviri to Bezváda would be Government Rs. 9-4-0 per ton, so that if His Grace's proposal to open up the supposed coal field opposite Dumagudiem were to be carried out, taking into consideration this high cost of carriage and the difficulty and uncertainty of the Godáviri navigation, very little benefit would accrue to Madras, although no doubt, as His Grace observes, the coal would be of much value to the river and canal navigation and to the Workshops at Dowlaishweram; but I question whether the demand would be sufficient to warrant the expenditure necessary to open and work the mines, even if coal were found in the locality alluded to in any quantity and capable of being worked at any thing like a reasonable cost.

The cost of coal at the pit's mouth at Singareni should not exceed Rs. 6 per ton, although the cost of that sent to Madras came to H. S. Rs. 8-8-2 per ton without superintendence. This high cost was however due to the very unfavorable circumstances under which the work was carried out. Everything had to be done in a hurry, unskilled labor had to be employed and even that had to be procured from a distance and at an exorbitant rate, as none of the local inhabitants could be persuaded to work under ground, and this, added to the difficulty of obtaining supplies and the fact that that part of the country was more or less affected by the Rampa disturbance, ran up the cost to an amount which under ordinary circumstances would be simply prohibitive. The superintendence also was much in excess of what under the normal state of things would be permitted.

The cost of carriage to Bezváda (Rs. 14-8-8) would be greatly reduced if a regular demand for coal spring up, as no doubt properly constructed carts, which alone would save Rs. 1-0-8 per

ton, and good strong bullocks would then be forthcoming. Both carts and bullocks used during the recent experiments were procured with great difficulty, and had to be made the best of. If there were any great demand for coal, it would be a matter of consideration if it would be advantageous to construct a light tramway from Singareni to Bezváda, which could be eventually improved and converted, as circumstances permitted, into a *light* line of railway. If this were done I feel confident that coal could be delivered at Bezváda at about Rs. 9 per ton for Rs. 15-6-7 at Madras, and this amount could be further reduced when the mines have been for some time open and miners learnt their work. The construction of a tramway however should be dependent, as already stated, on the demand for coal at Bezváda, and the probability of the coal traffic being supplemented by a mixed traffic which, however, would not likely be the case unless the tramway were to be continued to Hyderabad *via* Warrungul, and this suggestion I would most strongly recommend to your Excellency's most earnest consideration, as the question of fuel is daily becoming one of the utmost importance in Hyderabad, and a constant supply of good coal at a reasonable cost (if a light railway were in existence coal could be sold here at Rs. 15 per ton) would confer incalculable benefit on the place.

Cost of carriage for Godáviri route of one Ton of Coal from Singareni Coal Field.

	RS.	A.	P.
Cost of cart-hire per ton of coal, each cart carrying exactly half ton (cannot carry more by this route owing to the bad jungle track and large nullahs that have to be crossed) at the rate of H. S. Rs. 8 per cart, from the Singareni Coal Fields to Naganpole, the point of embarkation on the Godáviri, H. S. Rs. 16, or Government Rupees ...	13	5	4
Cost of bamboo plaiting for carts per ton of coal, H. S. Rs. 1-4-0, equal to Government Rupees ...	1	0	8
Cost of water carriage by river Godáviri of one ton of coal from Naganpole to Rajahmundry (<i>vide</i> Mr. Buchannan's docket No. 6 of 13th May 1879) Government Rupees ...	5	0	0
Water carriage by canal boat from Rajahmundry of one ton of coal to Madras (<i>vide</i> boat-owner Rungasawmy's letter) Government Rs. 15 per ton, distance being 369 miles; it would therefore cost at the above rate Government Rs. 3-12-0 for the carriage of one ton of coal from Rajahmundry to Bezváda a distance of 90 miles ...	3	12	0
Transshipment charges of one ton of coal at Rajahmundry from river boats into canal boats, about per ton ...	0	6	0
Total cost of carriage of one ton of coal to Bezváda, <i>via</i> Godáviri route, Government Rupees ...	23	8	0

Cost of carriage of one Ton of Coal to Bezváda direct by road from Singareni Coal Fields.

	RS.	A.	P.
Cost of carriage by carts of one ton of coal to Bezváda, H. S. Rs. 16-10-8, or Government Rupees ...	13	8	0
(The agreement with the cartmen was that they should carry in each cart 12 cwt. weight, for which they would get H. S. Rs. 10 to Bezváda, but as some of the bullocks were unable to drag this amount they were paid in proportion to the weight they carried, <i>i.e.</i> , at the rate of H. S. Rs. 1-10-8 per 2 cwt. each cart being accurately weighed in.)			
Cost of bamboo plaiting for carts per ton of coal. H. S. Rs. 1-4-0, equal to Government Rupees ...	1	0	8
Total cost to Bezváda direct by road of one ton coal ...	14	8	8
Cost per ton per Godáviri route ...	23	8	0
Cost per ton per Bezváda road direct ...	14	8	8
Saving to Government by adopting Bezváda road direct ...	8	15	4
Cost of water carriage from Bezváda to Madras inclusive of all charges per ton Government Rupees ...	6	6	7
Total cost of carriage of one ton of coal direct <i>via</i> Bezváda route to Madras equals Government Rupees ...	20	0	0

Demi-official from F. H. TREVITHICK, Esq., Locomotive Superintendent, Madras Railway Company, to the Consulting Engineer for Railways, dated Perambúr, 1st March 1880.

SINCE the subject of the enclosed papers was first considered the prices of English coal have risen, and the figures quoted in my official letter, No. 3,590-627, dated 4th December 1879, no longer represent a true statement of the case.

2. Including loss by exchange, patent fuel, the material with which the Godávári coal was compared, now stands us in Rs. [24-5-0 per ton delivered in Ráyapuram yard. Taking this as a standard Godávári coal would be worth Rs. 17-13-6 per ton delivered in Ráyapuram yard.

3. Patent fuel has risen Rs. 1-9-6 per ton, and I have now added Rs. 2 for loss by exchange which was not considered before.

4. These figures point to an improvement in the revenue of the fortunate Rajah who owns the Godávári District.

SUBMITTED for the consideration of His Grace the Governor, with reference to his remarks, dated 16th December 1879, and 16th January 1880.

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

No. 67-B. From the Joint Secretary to Government, Public Works Department,
Railway Branch, dated 11th March 1880, No. 816.

ORDER THEREON, 13th March 1880, No. 638 W.

Superintending Engineer, First Circle, will make immediate efforts to obtain a supply of the Singareni coal for the Dowlaishweram Workshops, and for the Godávári steamers.

2. Should the latter need to have their fire-grates altered to burn coal, the expense of doing so will of course only be incurred when both the certainty of the supply, and the quality of the coal, have been sufficiently assured.

3. Reports as to the action taken should be made as early as possible, the Government attaching much importance to this experiment for obtaining cheap fuel.

4. Ordered that a copy of these Proceedings be sent to the Resident of Hyderabad, with the observation that the results of these experiments undertaken with the object of developing the coal resources of His Highness the Nizam's dominions will be communicated immediately on receipt by this Government, and with the expression of a hope on the part of His Grace the Governor in Council that a tramway may be laid, or other measures taken, to reduce the transit of the coal delivered into the canal boats at Bezváda; this being now the main obstacle to the extensive use of the Singareni coal in Madras.

(Here enter No. 639 W., dated 13th March 1880.)

(True Extract.)

Major, R.E.,
Ag. Under Secy. to Govt., P.W.D.

To the Superintending Engineer, First Circle.
„ Consulting Engineer for Railways.
„ Superintendent, Public Works Workshops.
„ „ Buckingham Canal.
„ Public Department.
„ Revenue Department.
„ Chief Engineer for Irrigation.

Exd. S. T. Austin.

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16 To the Board of Revenue &c, 13-4-80.

Revenue Dept.
N^o 2658.

BUILDINGS AND ROADS.
CIVIL WORKS.

Gobt. of (1880) Madras.

PUBLIC WORKS.

To

THE SUPERINTENDING ENGINEER,
FIRST CIRCLE

&c., &c., &c.

Dated March, 13th.

Issued

Recd.

6 April

Encl.

G. O., 13th March 1880, No. 638 W.

MARCH.

No. 67-68.

Dr. K. S. S.
9. 4. 80

Godavari Coal.—Orders on papers report-
ing upon the results of the trial of the —.