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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No.	76-97	Press
		Mis.
Dated	11/11/18	

Not to be folded or roughly handled

No. 186. Read the following letter from the Consulting Engineer for Railways, to the Secretary to Government, Public Works Department, dated Madras, 16th December 1867, No. 351 :—

1. With reference to the Order of Government, No. 2,956, dated the 23rd September 1867, communicating a Circular from the Government of India for report, I have the honor to forward letters, with their enclosures, received from the Agents of the Madras Railway and the Great Southern of India Railway on the character of the wagon stock upon the two lines.

2. The Locomotive Superintendent of the Madras Railway has entered most fully into this important subject, and I concur in the opinion expressed by the Agent that it would be very impolitic to attempt to reduce the weight of the Rolling Stock at present in use, or of that which may hereafter be constructed.

3. Mr. Wright has given a table of the weights of the several parts of the High-Sided Open Goods Wagon, that being the description of vehicle in general use on the Madras Railway, and it will be seen that the "under-frame," or main portion of the vehicle, including the wheels, axles, springs, and other necessary appendages, with the wooden platform, represents about 85 per cent. of the total weight, leaving only 15 per cent. for the upper part. Mr. Wright says, that any attempt to reduce the weight of the lower frame must, in his opinion, be attended with a diminution of its strength and durability; and the weight of the upper-frame does not appear to be more than what is actually required in strength to support the loads put on.

4. Looking at the list appended to Mr. Wright's report of the vehicles with which the lines have been already equipped, and taking into consideration the number* for which supplies of iron-work are to be received from England, I consider it more than doubtful whether the expense which would have to be incurred in modifying any part of the works, supposing that it were possible to do so without impairing the strength of the wagons, would be compensated by the addition of their weight-carrying capacity.

5. Mr. Wright shows that the bulk-carrying capacity of the High-Sided Open Goods Wagons in use on the Madras Railway is 25 per cent. greater than that of similar vehicles on narrow-gauge Railways in England.

6. The heat of the climate, the nature of the ballast, and other difficulties peculiar to the country, stand at present in the way of any considerable increase to the paying load of wagons on Indian Railways, but there is every hope that these difficulties will be in time partially at least overcome by means of improved appliances.

7. The following Statement shows the weight of three kinds of wagons used for general purposes, with the weight of different kinds of goods they are capable of carrying, and the proportion of load to weight of wagons :—

* 6 Composite carriages.

25 Second class do

500 High-Sided Open Goods Wagons

Sanctioned in G O No. 1,415, dated 13th May 1867.

are to be received from England, I consider it more than doubtful whether the expense which would have to be incurred in modifying any part of the

MATERIALS CONVEYED.																			
Description of wagons.	Weight of wagon.		Salt, grain of all kinds, iron, cotton full pressed, oil, ghee, and tamarind	Proportion of load to weight of wagon	Cotton loose, light goods, and baggages	Proportion of load to weight of wagon.	Hay and straw, furniture, &c	Proportion of load to weight of wagon	Cotton half pressed, coffee, and betelnuts	Proportion of load to weight of wagon	Fire-wood.	Proportion of load to weight of wagon.	Red-wood and jungle posts	Proportion of load to weight of wagon	Bamboos.	Proportion of load to weight of wagon	Coal, straw, bricks, and similar goods	Tons.	Proportion of load to weight of wagon
	Tons.	Tons.																	
Coke	5 55	6 25	112 61	3 00	54 05	2 00	36 03	{ 6 00 5 00 }	108 10 } 90 08 }	4 75	85 58	6 0	108 1	4 50	81 08	6 25	112 61	Tons.	Proportion of load to weight of wagon
High-Sided Open Goods	{ 5 25	6 25	119 05	2 75	52 38	1 25	23 81	5 00	95 24	3 25	61 90	{ 5 50 4 75 3 75 }	104 76 } 90 18 } 71 43 }	3 25	61 9	6 25	119 05	Tons.	Proportion of load to weight of wagon
Open-Sided Goods ..	5 05	6 25	123 76	2 25	44 55	...	...	...	...	...	...	...	...	...	...	6 25	123 76	Tons.	Proportion of load to weight of wagon

8. The covered goods wagons of the Great Southern of India Railway weigh $5\frac{1}{2}$ tons, being a quarter of a ton heavier than the High-Sided Open Goods Wagons of the Madras Railway; but the other two descriptions of wagons are lighter, and the Locomotive Superintendent believes that, by additional strength to the springs, he can load to nearly double their weight. The length of this line is not, however, equal to that of the Madras Railway, and Mr. Sheward has yet to experience the effect of long journeys upon the working parts of a vehicle.

9. Referring to the statement in the Government of India's Circular now under reply, to the effect that great progress has been lately made in England in improving the weight-carrying capacity of the Rolling Stock in use there, I would observe that an accurate knowledge of the dimensions and weights of the vehicles alluded to, and of their capacity for carrying both bulk and weight, would be of great assistance in forming correct conclusions upon this very important question. So far as I am at present informed, I am of opinion that little or no practical advantage would be gained by reducing the dead-weight of the Rolling Stock in use in this Presidency.

From the Agent and Manager of the Madras Railway Company, to the Consulting Engineer for Railways, dated Madras, 24th October 1867, No 381.

1. With reference to Order of Government, No 2,956, dated the 23rd ultimo, passed upon a Circular from the Secretary to the Government of India, Public Works Department, and to your endorsement thereon, I have the honor to enclose copy of a very full report* from the Locomotive Superintendent, as well as of one† from the Traffic Manager, regarding the carrying capacity of our Rolling Stock.

2 In paragraph 7, in speaking of High-Sided Open Goods Wagons, which is the description of vehicle in general use on this Railway, Mr Wright observes, "its gross weight is 5 tons, 3 cwt., 3 qrs. Of this, 15 cwt, 2 qrs, 9 lbs is the weight of the upper work, that is to say "that portion of the wagon above the under-frame, exclusive of the flooring boards 8 cwt, 1 qr, 9 lbs of this is the weight of the wood-work, and the remaining 7 cwt, 1 qr, is "that of the iron-work. It would, I think, be almost impossible to make any sensible diminution "in the weight of this part of the wagon without greatly impairing its strength and usefulness. "By subtracting the weight of the superstructure, 15 cwt, 2 qrs, 9 lbs from the gross weight of "the wagon, the weight of the under-frame, 4 tons, 8 cwt, 0 qr 19 lbs is arrived at, and "this it is which constitutes the heavy portion of the vehicle. The wood-work in the under-frame, "exclusive of flooring boards, weighs 1 ton, 1 cwt, 2 qrs, 19 lbs which deducted from the "gross weight of under-frame (4 tons, 8 cwt, 0 qrs 19 lbs) shows the total weight of the iron- "work in the under-frame to be 3 tons, 6 cwt, 2 qrs. The greater portion of this weight "is made up by the wheels, buffing and draw-bar apparatus, and bearing-springs, and I will proceed "to show that few of these important parts admit of any great reduction of weight without a "corresponding decrease of strength"

3. Mr Wright, you will observe, in his concluding remarks in paragraph 7, shows that the carrying capacity of our wagons is about 25 per cent. greater than that of similar wagons in England.

4. The Traffic Manager's report states, that our High-Sided Open Goods Wagons carry a maximum load of heavy goods equal to 6½ tons, and of light and bulky goods to three tons.

5. After discussing the subject in all its bearings with the Locomotive Superintendent and Traffic Manager, I am of opinion that it would be very impolitic to attempt to reduce the weight of our Rolling Stock, that is, stock which is now under construction, or that which we may build by and by, because, as shown by Mr. Wright, it would be almost impossible to make any sensible

*Proceedings of the Madras Government, Public Works Department,
11th January 1868*

diminution in the weight of the wood-work of the vehicle, without greatly impairing its strength and usefulness, besides it would never do to run heavy and light goods vehicles together.

6 A fair comparison can hardly be made between the load which a wagon is capable of carrying in this country, and that of a wagon in England, because we have difficulties to contend with, say excessive heat, dusty ballast, and want of skilled labor in looking after the axle boxes of wagons, &c., &c, which are unknown in England

From the Locomotive Superintendent, Madras Railway, to the Agent and Manager, Madras Railway, dated Perambore Works, 3rd October 1867, No 186

1. With reference to the Order of Government, No 2,956, dated 23rd ultimo, forwarding copy of a Circular from the Secretary to the Government of India, Public Works Department, calling for a report, "showing the loads of different kinds of goods which the existing wagons are now capable of carrying, and the proportion these loads bear to the weight of the wagons, and what arrangements can at once be made for improving the carrying capacity of the existing wagon stock," I have the honor to submit the following report, which embodies such information as I possess, together with my observations on the important subject referred to by the Supreme Government

2 I am not in a position to give this question the full consideration that it deserves, because I am not in possession of detailed or definite information regarding the great progress said to have been made in these matters in England and on European Railways

3 The extreme desirability of carrying, if practicable, loads of ten tons in wagons weighing only five tons, or in other words as large a weight as possible in as light a vehicle as can be constructed, admits of no question.

4 The Traffic Manager will be able to furnish data regarding the loads carried on this line, and will, no doubt, be able to explain why a very large amount of dead-weight must of necessity be carried backwards and forwards, so long as inequality exists in the traffic inwards and outwards, quite irrespective of the carrying power or capacity of the wagons. It must however, be admitted that the greater this inequality, the greater the necessity for reducing, if possible, the weight of the vehicles used for its conveyance

5 The question resolves itself into this—Can the weight of our present wagon be safely reduced? or, can it be so modified as to carry with advantage a much greater load than it does at present?

6 In the early days of Indian Railways, at a meeting of the Consulting Engineers of the several lines, it was resolved that there should be uniformity in the dimensions of certain parts of the Rolling Stock, &c. The maximum distance between centres of wheels for carriages and wagons was fixed at eleven feet, and many of our goods sheds being worked with turntables, which limit us to this dimension, no great scope is available for adopting any material change in our description of wagon, such as the American system of enormously large and roomy wagons carried on eight wheels by means of bogies. We have made some wagons twenty feet in length for cotton, but though well suited for such traffic they are not so well adapted as the wagons sixteen feet in length for ordinary or general traffic, in consequence of their greater tendency to twist and hog when heavily loaded, and they have the further disadvantage that their increased weight due to their greater size, whilst it adds to their capacity for containing bulk, decreases, as a matter of course, their weight-carrying capability.

7. The wagon in general use on this line is of the description called "High-Sided Open Goods" This and the ordinary coke wagon are almost exclusively used. I forward a tracing of the former wagon, together with a list of every description of vehicle in use on this line. As we now construct no other kind of wagon but the High-Sided Open Goods Wagon, it may be taken as the standard, as far as this line is concerned, upon which to treat of the question now raised.

See letter from the Honorable Court, to Governor General of India in Council, No 8, 5th March 1866

*Proceedings of the Madras Government, Public Works Department,
11th January 1868*

Its gross weight is 5 tons, 3 cwt, 3 qrs. Of this, 15 cwt, 2 qrs, 9 lbs is the weight of the upper work, that is to say, that portion of the wagon above the under-frame, exclusive of the flooring boards. 8 cwt, 1 qr, 9 lbs of this is the weight of the wood-work, and the remaining 7 cwt, 1 qr is that of the iron-work. It would, I think, be almost impossible to make any sensible diminution in the weight of this part of the wagon without greatly impairing its strength and usefulness. By subtracting the weight of the superstructure, 15 cwt, 2 qrs, 9 lbs from the gross weight of the wagon, the weight of the under-frame 4 tons, 8 cwt, 0 qr, 19 lbs is arrived at, and this it is which constitutes the heavy portion of the vehicle. The wood-work in the under-frame, inclusive of flooring boards, weighs 1 ton, 1 cwt, 2 qrs, 19 lbs, which deducted from the gross weight of under-frame (4 tons, 8 cwt, 0 qr, 19 lbs) shows the total weight of the iron-work in the under-frame to be 3 tons, 6 cwt, 2 qrs. The greater portion of this weight is made up by the wheels, buffing and draw-bar apparatus, and bearing-springs, and I will proceed to show that few of these important parts admit of any great reduction of weight without a corresponding decrease of strength. I give hereunder a table showing the various weights of the most important parts of wagon.—

	Tons	cwt	qrs	lbs	Tons	cwt	qrs	lbs
Upper-work								
Weight of wood-work in upper part of wagon (exclusive of flooring boards)	0	8	1	9				
Iron-work for do	0	7	1	0	0	15	2	9
Under-frame								
Weight of wood in under-frame and flooring boards	1	1	2	19				
Two pairs 3 feet 6 inch wheels and axles	1	12	2	0				
Buffing and draw-bar apparatus complete, springs, guides, striking-blocks, &c &c	0	15	1	9				
Bearing-springs	0	4	1	0				
Axle-boxes and bushes	0	3	0	0				
Axle-guards and bindle-rods	0	3	2	16				
Brake work	0	1	3	18				
Coupling and safety chains	0	1	2	6				
Rocker-knees, diagonal-knees, tie-rods, head-stock, straps, screws, nails, &c	0	4	1	7	4	8	0	19
Total weight of wagon					5	3	3	0

The carrying capacity of these wagons is considerable as regards bulk, and is greater than that usual on narrow-gauge Railways in England. The standard size for wagons of this class in England is 15 feet long x 7 feet 6 inches wide *over all*, whilst our wagons are 16 feet long x 8 feet 8 inches wide. The English wagon measures *inside* 14 feet 8 inches x 7 feet, and our wagon 15 feet 8 inches x 8 feet 2 inches, the superficial area in the one case being 102 feet 8 inches, and in the other 127 feet 11 inches; showing that the *bulk*-carrying capacity of our wagons is about 25 per cent greater than that of similar wagons in England

8. Regarding the *weight*-carrying capacity of our wagons, their usual load, when the bulk of the goods to be carried admits of it, is six tons, but heavier loads may safely be carried in our High-Sided Open Goods Wagons. I found some twelve years ago, by experiment, that 10 tons gross weight upon the journals of the wheels was about the maximum weight under which they could run without risk of getting hot, and I advised the Traffic Manager that he might load up all wagons to such extent as would bring the weight of each vehicle to 11 tons, 10 cwt, which, estimating the wheels to weigh 30 cwt, would give 10 tons as the maximum load upon the wheels for every description of vehicle. Thus, a High-Sided Open Goods, the tare of which is 5 tons, 3 cwt., 3 qrs, when loaded up to the standard would give—

Standard weight	Tare of High Sided Open Goods	Load carried
Tons Cwt Qrs lbs.	Tons Cwt Qrs lbs	Tons Cwt Qrs lbs.
11 10 0 0	5 3 3 0	6 6 1 0

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11th January 1868.

or a cattle wagon, the tare of which is 6 tons, 1 cwt, 2 qrs, would give—

Standard weight.				Tare of Cattle wagon				Load carried			
Tons	Cwt	Qrs	Lbs	Tons	Cwt	Qrs	Lbs	Tons	Cwt	Qrs	Lbs
11	10	0	0	6	1	2	0	5	8	2	0

or exactly so much less weight of goods, as its tare is greater than that of High-Sided Open Goods.

9. I believe that the *maximum* weight fixed as the load for a four-wheeled wagon on English Railways is eight tons, and there is no reason why our wagons should not carry a similar load, provided the risk of hot-bearings can be overcome. In this country we have to contend with, first, the very high temperature; secondly, the greater tendency to get grit and dust into the bearings, from the sandy and dusty nature of the ballast in many parts of the line, and thirdly, the inferior intelligence and want of care of the employes entrusted with the greasing of our vehicles. The use of Carr's patent oil axle boxes has been adopted for all passenger stock and vans, and they have proved not only a great source of economy, but also allow of the conveyance of heavier loads without the same risk of getting hot-bearings that attends the running with ordinary grease boxes. The adoption of these throughout the line for wagons as well as for passenger stock would, I believe, enable us to carry safely loads of eleven tons upon the journals, so that our High-Sided Open Goods should carry

Weight on journals		Weight of High-Sided Open Goods, less weight of wheels and axles				Load that may be carried			
Tons.		Tons	Cwt	Qrs	Lbs	Tons	Cwt	Qrs	Lbs
11		3	11	3	0	7	8	1	0

or say 7½ tons. I would have proposed the adoption of this oil box for the whole of our stock, believing that the saving it would effect would soon pay the expense of the alteration; but Mr. Anderson, the late Locomotive Superintendent of the Bombay, Baroda, and Central India Railway, having informed me that he had been obliged to do away with all oil boxes on the wagons of that line, because he could not ensure their getting the attention they required, I naturally hesitated to recommend a change to a system which had already been condemned in practice; but on further consideration, based upon my experience of the working of the oil boxes on this line, I have come to the conclusion that, although there is some difficulty in looking properly after wagons so fitted, a slight modification in the axle box would remove this objection, and I should have no hesitation in recommending its general adoption were it not for the contemplated connection of our line with other lines, which renders it undesirable to adopt any particular system or radical change, without such system or change is made general for all Railways in India, or at least for all lines interchanging traffic and Rolling Stock. Since the receipt of the Government Order on the subject herein treated of, I have arranged to put a set of oil axle boxes under one of our High-Sided Open Goods Wagons, for the purpose of testing the weight of load with which it will safely run, and I will communicate the result of the experiment, as I think it a matter requiring the consideration of the Railway Companies generally, especially if it is found as I believe will be the case, that the weight-carrying capability of our wagons will be increased 15 or 20 per cent. by this simple alteration.

10. Our High-Sided Open Goods Wagons can at present, as I have before said, carry with safety from 6 to 6½ tons, their own weight averaging about 5 tons, 3 cwt, 3 qrs, *when new*; but as the tyres of the wheels wear down and are turned up their weight is materially decreased, so much so that a set of wheels (two pairs) weighs from 6 to 7 cwt less when they come in for new tyres than their original weight. This gives the wagon an average weight of about five tons only, so that if the adoption of the oil axle box enables them to carry a load of 7½ tons, the wagon will have a weight-carrying capability equal to 1½ times its own tare. Something may fairly be allowed also to our wagon as a set off for the advantage it possesses over the English wagon of the same class in its *bull-carrying* capacity, which I have already shown to be as 127 feet 11 inches against 102 feet 8 inches, so that the average tare of our wagon being taken at five tons, the tare of the English wagon should be only four tons, to enable it to carry light or bulky goods on equal terms.

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11th January 1868

11. I have already stated that I do not see any possibility of reducing the weight of the upper work of our standard wagon, which only weighs about 15½ cwt. The doors often have heavy weights rolled over them, and must be made strong enough to bear a good deal of rough usage.

12. As regards the under-frame work (the heaviest part of which consists of the wheels and axles) and buffing and drawing apparatus, I see no great room for improvement. None of these parts are found too strong in practice, but some slight reduction might be made in the buffer castings which are heavier than they need be, and in the spring-wearing plates or shoes and other minor matters, which would probably lessen the weight of the iron-work of the wagon about 2 cwt.

13. The wood-work could not, in my opinion, be made lighter, especially if heavier loads are to be carried. Iron-framing is a good deal used in England, and its adoption might lead to a diminution of weight in our stock, but in that case we should have to get this out from England, and it would be introducing an element into our Rolling Stock which would much increase the difficulty in the execution of repairs, as the natives, though excellent workmen in wood, cannot compete in iron-work with the European labor market, and the very high price of coal greatly enhances the cost of all iron-work manufactured or executed in this country.

14. In conclusion, I much regret that I have no data of the weights of Rolling Stock *recently* constructed for English and European Railways, and have therefore no means at present of making comparisons which would be very valuable in dealing with the question of the loads carried as compared with the tare of wagons.

List of Vehicles in use on the Madras Railway

	No.
1st Class Carriages	15
1st Do do with sleeping berths	4
2nd Do do	40
3rd Do do	121
3rd Do do with brakes	30
3rd Do do upper-storied	2
Composite Carriages	18
Ballast Wagons	244
Open-Sided Goods Wagons	344
Horse-boxes	30
High-Sided Open Goods Wagons	1,220
High Open Goods Wagons	5
Passenger Luggage Vans	25
Open Goods Wagons	50
Timber Trucks	114
Platform do	6
Carriage do	8
Coke Wagons	435
Gun-powder Vans	3
Cattle Wagons	35
Road do	7
Road Brake Wagons	22
Covered Goods Wagons	28
Goods Brake Vans	35
Oil-store Vans	3
Water Trucks with tanks	2
Trucks with travelling cranes	4
Engineer's Inspection Carriage with Brake	1

(Signed) W. B. WRIGHT,
Locomotive Superintendent.

3rd October 1867.

(True Copies.)

(Signed) R. B. ELWIN,
Agent and Manager.

*Proceedings of the Madras Government, Public Works Department,
11th January 1868*

From the Traffic Manager, Madras Railway, to the Agent and Manager of the Madras Railway Company, dated Madras, 23rd October 1867, No 306

1. With reference to the Circular from the Government of India, No 9 R, dated 2nd September last, I beg to inform you that on the Madras Railway the description of wagon used for general purposes called "High-Sided Open Goods" weighs $5\frac{1}{2}$ tons and is capable of carrying a maximum load of $6\frac{1}{2}$ tons of heavy goods and three tons of light and bulky goods. This form of wagon is peculiarly suited to the character of the bulk of the traffic carried on this Railway.

2. During the last five half years the proportion of heavy traffic was 90 per cent of the gross tonnage, and this may be taken as a fair criterion of the character of the traffic. Salt and grain alone formed 42 per cent of the tonnage, and both are invariably conveyed in full wagon loads of $6\frac{1}{2}$ tons.

3. Looking at the certain increase of this kind of traffic as the line extends, the question of the "weight-carrying" capacity of the wagons is clearly of more importance in our case than the "bulk-carrying" capacity.

4. It would be exceedingly inexpedient in my opinion to reduce the strength, and consequently the weight of the existing Rolling Stock on this line, for even with the present loads carried, viz, $6\frac{1}{2}$ tons, the wear and tear is considerable. The Locomotive Superintendent will be able to advise you whether by any new appliances the wagons can be made to carry a heavier weight, but under the most favorable conditions, it is not reasonable to suppose that, in an Indian climate (particularly in the hot season), and on single lines of Railway where a part at least of the good, traffic must necessarily be hauled at comparatively high speeds, the relative paying and dead-weight will compare favorably with those in a cold climate like England, where heavy goods trains are run at much lower speeds, and a much more intelligent and experienced subordinate staff is obtainable.

5. The question is a very important one, but no action should be taken to effect any alteration in the Rolling Stock of lines likely hereafter to interchange stock, until the circumstances of each and all the Railways have been well considered.

(True Copy)

(Signed) R. B. ELWIN,
Agent and Manager.

From the Agent of the Great Southern of India Railway, to the Consulting Engineer for Railways, Madras, dated Negapatam, 13th November 1867, No 2,447

In reply to the Circular from the Secretary to the Government of India, Public Works Department, (Railway,) dated Simla, 2nd September 1867, No 9 R, I have the honor to attach copy of a report from the Locomotive Superintendent of this Railway upon the carrying capacity of our trucks and the arrangements he proposes to make for improving their carrying capacity. Mr Sheward, in referring to the absence of weigh-bridges, alludes to truck weigh-bridges. Goods are weighed on the platform weigh-machines before being passed into the trucks.

From the Locomotive Superintendent of the Great Southern of India Railway, to the Agent of the Great Southern of India Railway, dated Negapatam, 30th October 1867, No. 416
Your No 4,650 with enclosure.

I am quite of opinion that the relative proportion of allowed load to weight of truck is small, as referring to the vehicles in use upon our line. I expressed that opinion to my predecessor, Mr. Crighton, on my arrival in this country, remarking upon the lightness of the springs, as compared with the solid construction of the wagons.

I shall be prepared to strengthen the existing springs so as to admit of a greater load being carried, say eight tons, instead of six tons as now allowed. The wagons are in themselves quite capable of carrying ten tons, with a trifling alteration of a comparatively inexpensive nature, Rupees 60 or 80 per truck perhaps; but as the centre of gravity is nearly four inches higher than

*Proceedings of the Madras Government, Public Works Department,
11th January 1868.*

in the wagons used at Home, I should hesitate to fix the load at more than eight tons, because with such a top weight the tendency to oscillate would be both dangerous to the truck and destructive to the road, and also because of the want of care on the part of the Natives in loading wagons being *well loaded*. The internal capacity of the covered goods is such as to admit of "quantity" being carried when the article loaded is "light," and this is often taken advantage of when the article is "weighty," the Station Masters not having weigh-bridges to check the loads. I give you the information asked for in paragraph 4 of the Government paper —

Description of Vehicle.	Weight		Allowed load	Internal capacity.
	Tons.	Cwt.	Tons.	Cubic feet.
Covered goods	5	10	6	585½
Open trucks	4	10	6	138
Ballast wagons	4	12	6	158

(True Copy)

(Signed) W. S. BETTS,
Agent.

No. 187.

ORDER THEREON, 11th January 1868, No. 96.

RAILWAY, No. 15.

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

(Here enter No. 97, dated 11th January 1868.)

(True Extract.)

Colonel, R. E.,

Secretary to Government.

To the Consulting Engineer for Railways.

Exd. T. O'Connor.

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PUBLIC WORKS DEPARTMENT,
FORT ST. GEORGE,
11th January 1868.

No. 97.

No. 188.

To

THE SECRETARY TO THE GOVERNMENT OF INDIA.

SIR,

RAILWAY, No. 16.

1. In compliance with the request in paragraph 4 of your Circular of the 2nd September 1867, No 9 R, I am

directed to forward herewith a letter from the Consulting Engineer for Railways, with the reports of the Agents of the Madras and Great Southern of India Railways, regarding the character of the wagons in use upon those lines with their carrying capacity, and with the required particulars of the loads of different kinds of goods which the wagons are capable of carrying, and the proportion which those loads bear to the weight of the wagons.

2. It will be observed that, in the opinion of the Railway Officers and the Consulting Engineer, the present weight of the wagons cannot be sensibly reduced without diminishing their strength and durability, and that seeing that the proportion of heavy traffic on the Madras line during the last five half years was 90 per cent. upon the gross tonnage carried, there seems reasonable ground for attaching greater importance to the weight than to the bulk-carrying capacity of the wagons. It is further shown that the very high temperature, the dust creating nature of the ballast usually employed, and other difficulties which have to be contended with in this country, prevent more than a certain gross weight being run upon a set of four wheels without inducing a dangerous degree of heating, and that, seeing how the dead weight of the wagons cannot be reduced, it is impossible to increase the paying load with safety or advantage except by providing the wagons with improved means of lubrication, as noticed by the Locomotive Superintendent, and at present under trial by him.

I have the honor to be,

Sir,

Your most obedient servant,

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

Exd. T. O'Connor.

Madras, October 24th 1867.

From

R. B. Edwin Esq.
Agent and Manager of the M.R.C.

To

Major A. H. M. Shaw Stewart, R.E.
Consulting Engineer for Railways.

SIR

With reference to Order of Government No 2956, dated the 23rd ultimo, passed upon a circular from the Secretary to the Government of India, Public Works Department, and to your endorsement thereon, I have the honor to enclose copy of a very full report from the Locomotive Superintendent, as well as of one from the Traffic Manager, regarding the carrying capacity of our Rolling Stock.

In paragraph 7, in speaking of High Sided Open Goods Waggon, which is the description of vehicle in general use on the Railway, Mr Wright observes "its gross weight is 5-3-3-0." ^{At 2nd 2nd}
"Of this 15-2-7 is the weight of the upper work - ^{At 2nd}
"that is to say - that portion of the Waggon above the under frame exclusive of the flooring boards: 8-1-9 ^{At 2nd}
"of this is the weight of the Wood work, and the remaining 7-1 is that of the Iron-work. It would
"I think, be almost impossible to make any
"sensible diminution in the weight of this part of
"the Waggon without greatly impairing its strength
and

* No 186, 3rd
October.

* No 306, 23rd
October.

and usefulness. By subtracting the weight of
 the Superstructure, ¹⁵⁻²⁻⁹, from the gross weight
 of the Waggon, the weight of the under frame
 4-8-0-19 is arrived at, and this it is which
 constitutes the heavy portion of the Vehicle. The
 road-work in the under frame, inclusive of flooring
 boards, weighs ²⁻²⁻²⁻¹⁹, which deducted from
 the gross weight of under frame (4-8-0-19) it leaves
 the total weight of the iron-work in the under frame
 to be 3-6-2-0. The greater portion of this weight
 is made up by the wheels, buffering and draw-bar
 apparatus and bearing Springs, and I will
 proceed to show that few of these important
 parts admit of any great reduction of weight
 without a corresponding decrease of strength.

3. Mr Wright, you will observe
 in his concluding remarks in paragraph 7, states
 that the carrying capacity of our Waggon is about
 25 per cent greater than that of similar Waggon
 in England.

4. The Traffic Manager's Report states
 that our High Sided Open Goods Waggon carry
 a maximum load of heavy goods equal to 17 1/2 tons,
 and of light and bulky goods to 3 tons.

5. After discussing the subject
 in all its bearings with the ^{Locomotive Superintendent} Traffic Manager, I am of opinion, that it
 would be very unwise to attempt to reduce
 the weight of our Rolling Stock, that is,
 Stock which is now under construction, or
 that

158
 that which we may build by and by, because
 as shown by Mr Wright it would be almost
 impossible to make any sensible diminution
 in the height of the woodwork of the vehicle,
 without greatly impairing its strength and
 usefulness, besides it would never do to run
 heavy and light goods vehicles together.

6. A fair Comparison can hardly
 be made between the load which a Waggon
 is capable of carrying in this Country, and that
 of a Waggon in England, because we have difficulties
 to contend with, say excessive heat, dusty ballast,
 and want of skilled labor, in looking after the
 axle boxes of Waggon, &c. &c, which are
 unknown in England.

I have the honor to be,
 Sir,
 Your most obedient servant,
 Wm. J. Ashman
 Agent and Manager

No 306.

175
Madras Railway
Traffic Manager's Office
Madras, 23rd October 1867.

Dear Sir,

With reference to the Circular from the Government of India to G. R. dated 2nd September last, I beg to inform you that on the Madras Railway the description of Wagon used for general purposes called "High-sided Open Goods" weighs Tons $5\frac{1}{4}$, and is capable of carrying a maximum load of Tons $6\frac{1}{4}$ of heavy Goods and 3 Tons of light and bulky Goods. This form of Wagon is peculiarly suited to the character of the bulk of the Traffic carried on this Railway.

2. During the last five half years the proportion of heavy Traffic was 90 per cent of the Gross Tonnage, and this may be taken as a fair criterion of the character of the Traffic. Salt and Grain alone formed 42 per cent. of the Tonnage, and both are invariably conveyed in full Wagon loads of $6\frac{1}{4}$ Tons.

3. Looking at the certain increase of this kind of Traffic as the Line extends, the question of the "weight carrying" capacity of the Wagons is clearly of more importance in our case than the "bulk carrying" capacity.

4. It would be exceedingly

MADRAS RAILWAY.

From

The Agent and Manager

To

The Consulting Engineer

for Railways

Dated October 24th 1867
Recd 25.

No. 381

Submitting his order, as also that of the Agents and Traffic Manager, with reference to the carrying capacity of the Rolling Stock of the R.R.

inexpedient in my opinion to reduce the strength and consequently the weight of the existing Rolling Stock, on this line, for even with the present loads carried, viz $6\frac{1}{4}$ tons, the wear and tear is considerable. The Locomotive Superintendent will be able to advise you whether by any new appliances the waggon can be made to carry a heavier weight, but under the most favorable conditions it is not reasonable to suppose that, in an Indian climate (particularly in the hot season) and on single lines of railway where a great deal of the Goods Traffic must necessarily be hauled at comparatively high speeds - the relative paying and dead weight will compare favorably with those in a cold climate like England, where heavy Goods Trains are run at much lower speeds, and a much more intelligent and experienced subordinate staff is obtainable -

5. The question is a very important one, but no action should be taken to effect any alteration in the Rolling Stock of Lines likely hereafter to interchange stock until the circumstances of each and all the Railways have been well considered.

To
The Agent & Managers

Yours faithfully
Signed H. C. Church
Traffic Manager

1 True Copy

W. J. Smith
Agent & Manager

Comptroller

6 195
Madras Railway Company
Locomotive Superintendent's Office
Percumbore Works, 3rd October 1867

No 186

Dear Sir,

With reference to the order of Government No 2956 dated 23rd ultimo, forwarding copy of a circular from the Secretary to the Government of India, Public Works Department, calling for a report "showing the loads of different kinds of goods which the existing waggon are now capable of carrying, and the proportion these loads bear to the weight of the waggon, and what arrangements can at once be made for improving the carrying capacity of the existing waggon stock", I have the honor to submit the following report, which embodies such information as I possess, together with my observations on the important subject referred to by the Supreme Government.

2. I am not in a position to give this question the full consideration that it deserves, because I am not in possession of detailed or definite information regarding the great progress said to have been made in these matters in England and on European Railways.

3. The extreme desirability of carrying, if practicable, loads of ten tons in waggon weighing only five tons, or in other words as large a weight as possible in as light a vehicle as can be constructed, admits of no question.

4. The Traffic Manager will be able to furnish data regarding the loads carried on this line, and will no doubt be able to explain why a very large amount of dead weight must of necessity be carried backwards and forwards, so long as inequality exists in the traffic inwards and outwards, quite irrespective of the carrying power or capacity of the waggon. It must however be admitted that the greater this inequality the greater the necessity for reducing, if possible, the weight of the vehicles used for its conveyance.

5. The question resolves itself into this. Can the weight of our present wagon be safely reduced? or, can it be so modified as to carry with advantage a much greater load than it does at present?

6. In the early days of Indian Railways, at a meeting of the Consulting Engineers of the several lines, it was resolved that there should be uniformity in the dimensions of certain parts of the rolling stock &c. The maximum distance between centres of wheels for carriages and waggon was fixed at 11 feet, and many of our Goods sheds being worked with trolleys, which limit us to this dimension, no great scope is available for adopting any material change in our description of wagon, such as the

See letter from the Honble. Court to Governor General of India in Council 21st 5th March 1856

7. American system of enormously large and roomy waggon carried on 8 wheels by means of bogies. We have made some waggon 20 feet in length for Cotton, but though well suited for such traffic they are not so well adapted as the waggon 16 feet in length for ordinary or general traffic, in consequence of their greater tendency to twist and hog when heavily loaded, and they have the further disadvantage that their increased weight due to their greater size, whilst it adds to their capacity for containing bulk, decreases, as a matter of course, their weight carrying capability.

The wagon in general use on this line is of the description called "High-sided Open Goods". This and the ordinary box wagon are almost exclusively used. I forward a tracing of the former wagon, together with a list of every description of vehicles in use on this line. As we now construct no other kind of wagon but the H & C G wagon, it may be taken as the standard, as far as this line is concerned, upon which to treat of the question now raised. Its gross weight is $\frac{15}{2} = 7\frac{1}{2}$ tons. Of this $\frac{3}{2} = 1\frac{1}{2}$ is the weight of the upper work - that is to say that portion of the wagon above the underframe exclusive of the flooring boards: $\frac{8}{9}$ of this is the weight of the wood work, and the remaining $\frac{1}{9}$ is that of the ironwork. It would, I think, be almost impossible to make any sensible diminution in the weight of this part of the wagon without

greatly improving its strength and usefulness. By subtracting the weight of the Super-structure $\frac{15}{2} - 9$, from the gross weight of the Wagon, the weight of the underframe $\frac{7}{4} - 8 - 0 - 19$, is arrived at, and this it is which constitutes the heavy portion of the vehicle. The woodwork in the underframe, inclusive of flooring boards, weighs $\frac{7}{1} - 1 - 2 - 19$, which deducted from the gross weight of underframe ($\frac{7}{4} - 8 - 0 - 19$) shows the total weight of the ironwork in the underframe to be $3 - 6 - 2 - 0$. The greater portion of this weight is made up by the wheels, buffing and draw bar apparatus and bearing springs, and I will proceed to show that few of these important parts admit of any great reduction of weight without a corresponding decrease of strength. I give hereunder a table showing the various weights of the most important parts of Wagon.

Upper work	Weight of Woodwork in upper part of wagon (exclusive of flooring boards)	$\frac{1}{2} \text{ cwt } \& \frac{1}{2} \text{ lbs}$	$\frac{1}{2} \text{ cwt } \& \frac{1}{2} \text{ lbs}$
	Iron work for do	$0 - 8 - 1 - 9$	
	Weight of wood in under-frame and flooring boards	$0 - 7 - 1 - 0$	$0 - 15 - 2 - 9$
Under frame	Two pairs 3 ft 6 in. wheels and axles	$1 - 1 - 2 - 19$	
	Buffing and draw bar apparatus complete, springs, guides, struts, blocks &c.	$1 - 12 - 2 - 0$	
	Bearing Springs	$0 - 15 - 1 - 9$	
	Steel boxes and braxes	$0 - 4 - 1 - 0$	
	Steel guards and bridle rods	$0 - 3 - 0 - 0$	
	Brake work	$0 - 3 - 2 - 16$	
	Coupling and safety chains	$0 - 1 - 3 - 18$	
	Rockers knees, Diagonal knees, tie rods, head stock, straps, screws, nails, &c.	$0 - 1 - 2 - 6$	
		$0 - 4 - 1 - 7$	
	Total Weight of Wagon	$4 - 8 - 0 - 19$	
		$5 - 3 - 3 - 0$	

The carrying capacity of these Wagons is considerable as regards bulk, and is greater than that usual on narrow-gauge Railways in England. The standard size for Wagons of this class in England is 15 feet long x 7' 6" wide over all, whilst our Wagons are 16 ft long x 8' 8" wide. The English Wagon measures inside 14' 8" x 7', and our Wagon 15' 8" x 8' 2"; the superficial area in the one case being 102' 8" and in the other 127' 11"; showing that the bulk-carrying capacity of our Wagons is about 25 per cent greater than that of similar Wagons in England.

Regarding the weight-carrying capacity of our Wagons, their usual load, when the bulk of the goods to be carried admits of it is 6 Tons, but heavier loads may safely be carried in our H S O G Wagons. I found some 12 years ago, by experiment, that 10 Tons gross weight upon the journals of the wheels was about the maximum weight under which they could run without risk of getting hot, and I advised the Traffic Manager that he might load up all wagons to such extent as would bring the weight of each vehicle to $\frac{1}{2} \text{ cwt } \& \frac{1}{2} \text{ lbs}$ 11-10-0-0, which, estimating the wheels to weigh 30 cwt, would give 10 Tons as the maximum load upon the wheels for every description of vehicle. Thus a H S O Goods, the tare of which is $\frac{1}{2} \text{ cwt } \& \frac{1}{2} \text{ lbs}$ 5-3-3-0, when loaded up to the standard would

give -

Standard Height	Load of H & O. G.	Load carried
Tons cwt lbs	Tons cwt lbs	Tons cwt lbs
11 10 0 0	5 3 3 0 =	6 6 1 0

or a cattle waggon, the load of which is 6 - 1 - 2 - 0, would give.

Standard Height	Load of cattle Waggon	Load carried
Tons cwt lbs	Tons cwt lbs	Tons cwt lbs
11 10 0 0	6 1 2 0 =	5 8 2 0

or exactly so much less weight of goods, as its load is greater than that of H & O. G.

I believe that the maximum weight fixed as the load for a 4 wheeled Waggon on English Railways is 8. Tons and there is no reason, why our waggons should not carry a similar load, provided the risk of hot bearings can be overcome. In this country we have to contend with, 1st the very high temperature; 2nd the greater tendency to get grit and dust into the bearings, from the sandy and dusty nature of the ballast in many parts of the line; and 3rd the inferior intelligence and want of care of the employes entrusted with the greasing of our vehicles. The use of Lard's patent oil axle boxes has been adopted for all passenger stock and vans, and they have proved not only a great source of economy but also allow of the conveyance of heavier loads without the same risk of getting hot bearings that attends the running with ordinary grease boxes. The

adoption

adoption of these throughout the line for waggons as well as for passenger stock would, I believe, enable us to carry safely loads of 11 Tons upon the journals, so that our H & O. Goods should carry -

Height on Journals	Weight of H & O. G. less weight of wheels and axles	Load that may be carried
T. cwt lbs	T. cwt lbs	T. cwt lbs

11 Tons 3 11 3 0 = 7 - 8 - 1 - 0,

or say 7 1/2 Tons. I would have proposed the adoption of this oil - box for the whole of our stock, believing that the saving it would effect would soon pay the expense of the alteration; but Mr. Anderson the late Locomotive Superintendent of the Bombay, Baroda and Central India Railway, having informed me that he had been obliged to do away with all oil boxes on the waggons of that line, because he could not ensure their getting the attention they required, I naturally hesitated to recommend a change to a system which had already been condemned in practice; but on further consideration based upon my experience of the working of the oil - boxes on this line, I have come to the conclusion that, although there is some difficulty in looking properly after waggons so fitted, a slight modification in the axle box would remove this objection; and I should have no hesitation in recommending its general adoption were it not for the contemplated connection of our line with other lines, which

renders it undesirable to adopt any particular system or radical change without such system or change is made general for all Railways in India, or at least for all Lines interchanging Traffic and Rolling Stock. Since the receipt of the Government order on the subject herein treated of, I have arranged to put a set of oil axle-boxes under one of our H. S. O. G. waggons, for the purpose of testing the weight of load with which it will safely run, and I will communicate the result of the experiment; as I think it a matter requiring the consideration of the Railway Companies generally, especially if it is found, as I believe will be the case, that the weight-carrying capacity of our waggons will be increased 15 or 20 per cent by this simple alteration.

10. Our H. S. O. Goods Waggon can at present, as I have before said, carry with safety from 6 to $6\frac{1}{2}$ Tons, their own weight averaging about $5\frac{1}{2}$ Tons ^{5 cwt 3 lb} _{3 - 0}, when new; but as the types of the wheels wear down and are turned up their weight is materially decreased, so much so that a set of wheels (2 pairs) weighs from 6 to 7 cwt. less when they come in for new types wagon an average weight of about 5 Tons only, so that if the adoption of the oil axle-box enables them to carry a load of $7\frac{1}{2}$ tons, the wagon will have a weight-carrying

10 ✓ 15
capability equal to $1\frac{1}{2}$ times its own Tons. Something may fairly be allowed also to our wagon as a set off for the advantage it possesses over the English wagon of the same class in its bulk-carrying capacity, which I have already shown to be as 127' 11" against 102' 8"; so that the average Tare of our wagon being taken at 5 Tons, the Tare of the English wagon should be only 4 Tons, to enable it to carry light or bulky goods on equal terms.

11. I have already stated that I do not see any possibility of reducing the weight of the upper work of our Standard Wagon, which only weighs about $15\frac{1}{2}$ Cwt. The doors often have heavy weights rolled over them, and must be made strong enough to bear a good deal of rough usage.

12. As regards the under frame work (the heaviest part of which consists of the wheels and axles) and buffing and drawing apparatus, I see no great room for improvement. Some of these points are found too strong in practice, but some slight reduction might be made in the buffer castings which are heavier than they need be, and in the spring-wearing plates or shoes and other minor matters, which would probably lessen the weight of the Ironwork of the Wagon about 2 cwt.

13. The Woodwork could not in

my opinion be made lighter, especially if heavier loads are to be carried. Iron-framing is a good deal used in England, and its adoption might lead to a diminution of weight in our stock, but in that case we should have to get the iron from England, and it would be introducing an element into our Rolling-stock which would much increase the difficulty in the execution of repairs, as the natives though excellent workmen in wood, cannot compete in iron-work with the Europeans labor market, and the very high price of Coal greatly enhances the cost of all ironwork manufactured or executed in this country.

14. In conclusion I much regret that I have no data of the weights of Rolling Stock recently constructed for English and European Railways, and have therefore no means at present of making comparisons which would be very valuable in dealing with the question of the loads carried as compared with the tare of Waggon

Yours faithfully
Signed W. D. Wright
Loco-Superintendent

To The Agent and Manager

List

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List of Vehicles in use on the Madras Railway

	No.
1st Class Carriages	15
2nd Class Carriages	4
3rd Class Carriages	40
4th Class Carriages	121
5th Class Carriages	30
6th Class Carriages	2
7th Class Carriages	18
Composite Carriages	244
Ballast Waggon	344
Open sided Goods Waggon	30
Horse Boxes	1220
High sided Open Goods Waggon	5
High Open Goods Waggon	25
Passenger Luggage Vans	50
Open Goods Waggon	114
Timber Trucks	6
Platform Trucks	8
Carriage Trucks	435
Coke Waggon	3
Gun Powder Vans	35
Battle Waggon	7
Road Waggon	22
Road Brake Waggon	28
Covered Goods Waggon	35
Goods Brake Van	3
Oil Stone Vans	2
Water Trucks with Tanks	4
Trucks with Travelling Cranes	1
Engineers' Inspection Carriage with Brake	

3rd October 1867.

W. D. Wright
Loco-Superintendent
(Type Copies)
Agent and Manager

No. 2647

13

GREAT SOUTHERN OF INDIA RAILWAY.

AGENT'S OFFICE,

NEGAPATAM.

13th November

1867

From

THE AGENT

Great Southern of India Railway,

To

The Consulting Engineer for Railways
Madras.

SIR,

In reply to the Circular from the Secretary
to the Government of India, Public Works Department
(Railways) dated Simla 2nd September 1867 N. G. R.
I have the honor to attach copy of a report from the
Locomotive Superintendent of this Railway upon the
carrying capacity of our trucks, and ~~what~~ ^{the} arrange-
ments he proposes to make for improving their
carrying capacity. Mr Sheppard in referring to the
absence of weigh bridges, alludes to truck weigh
bridges. Goods are weighed on the platform weigh
machines before being packed into the trucks.

I have the honor to be

Sir
Yours most Obedt Servt

William Betts

Agent

69/46/482

Railway Department

Consulting Engineer's office
N^o. 357. 35

From Major J. H. M. Shaw Stewart R.E.
Consulting Engineer for Railways

To

Colonel C. A. Orr. R.E.
Secretary to Government
Public Works Department
Fort Saint George.

Sir,

With reference to the order of Govern-
ment N^o. 2956 dated the 23rd September 1867, com-
municating a Circular from the Government of
India for report, I have the honour to forward
letters, with their enclosures, received from the Agents
of the Madras Railway and ^{the} Great Southern of India
Railway on the character of the waggon stock upon
the two lines.

2 The Locomotive Superintendent of
the Madras Railway has entered most fully into
this important subject, and I concur in the opinion
expressed by the Agent that it would be very im-
-politic to attempt to reduce the weight of the rolling
stock at present in use or of that which may
hereafter be constructed.

3. Mr Wright has given a table of the
weights

Enclosures
Letter from Agent
Madras Railway
N^o 3887, 14th October 1867
with 2 enclosures.
Letter from Agent G. S. of
I Railway N^o 2447
dated 26th November 1867
with enclosure

1867 6/13/6
From
The Agent
G. S. of
I Railway
N^o 2447
dated 26th November 1867
with enclosure
The Consulting Engineer
for Railways
N^o 357
Received 10th November
1867
A true copy of a
report from Mr. Wright
the Superintendent of
the Railway at our
consulting office of our
tracks.

weights of the several parts of the high-sided open goods waggon, that being the description of vehicle in general use on the Madras Railway, and it will be seen that the "under frame" or main portion of the vehicle, including the wheels, ~~axles~~, axles, springs, and other necessary appendages, with the wooden platform, represents about 85 percent of the total weight, leaving only 15 percent for the upper part. Mr Wright says that any attempt to reduce the weight of the lower frame must in his opinion be attended with a diminution of its strength and durability; and the weight of the upper frame does not appear to be more than what is actually required in strength to support the loads put on.

4. Looking at the list appended to Mr Wright's report of the vehicles with which the lines have been already equipped, and taking into consideration the number for which supplies of ironwork are to be received from England, I consider it more than doubtful whether the expense which would have to be incurred in modifying any part of the works, supposing that it were possible to do so without impairing the strength of the waggons, would be compensated by the addition of their weight carrying capacity.

5. Mr Wright shows that the bulk-carrying capacity of the high-sided open goods waggons in use on the Madras Railway is 25 percent

greater

greater than that of similar vehicles on narrow gauge railways in England. 355

6. The heat of the climate, the nature of the ballast, and other difficulties peculiar to the country, stand at present in the way of any considerable increase to the paying load of waggons on Indian railways, but there is every hope that these difficulties will be in time partially at least overcome by means of improved appliances.

7. The following statement shows the weight of three kinds of waggons used for general purposes with the weight of different kinds of goods they are capable of carrying and the proportion of load to weight of waggons.

Statement of comparative weights of waggons and loads

Description of Waggons	Weight of waggons	Salt, grain, fall, &c. (waggons)	Light goods and baggage (waggons)	Proportion of load to weight of waggons	Wheat and straw (waggons)	Proportion of load to weight of waggons	Cotton bales (waggons)	Proportion of load to weight of waggons	Firewood (waggons)	Proportion of load to weight of waggons	Red wood and jungle produce (waggons)	Proportion of load to weight of waggons	Coal (waggons)	Proportion of load to weight of waggons	Grain (waggons)	Proportion of load to weight of waggons
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Coke	5.55	6.25	112.61	3.00	54.05	200.36	6.00	108.10	4.75	85.58	6.0	108.1	4.50	81.08	6.25	112.61
High-sided open goods	5.25	6.25	119.05	2.75	52.38	125.23	5.00	95.24	3.25	61.90	5.50	104.76	4.75	90.48	6.25	119.05
Open-sided goods	5.05	6.25	123.76	2.25	44.55	"	"	"	"	"	"	"	"	"	6.25	123.76

8. The covered goods waggons of the Great Southern of India Railway weigh 5½

tons

tons, being a quarter of a ton heavier than the high-sided open goods waggons of the Madras Railway; but the other two descriptions of waggons are lighter, and the Locomotive Superintendent believes that, by additional strength to the springs, he can load to nearly double their weight. The length of this line is not however equal to that of the Madras Railway, and Mr. Sheward has yet to experience the effect of long journeys upon the working parts of a vehicle.

Referring to the statement in the Government of India's Circular now under reply, to the effect that great progress has been lately made in England in improving the weight carrying capacity of the rolling stock in use there, I would observe that an accurate knowledge of the dimensions and weights of the vehicles alluded to, and of their capacity for carrying both bulk and weight, would be of great assistance in forming correct conclusions upon this very important question. So far as I am at present informed, I am of opinion that

Public Works Department
No. 15
Proceedings of the Madras Government
Under date 11th ~~December~~ ^{January} 1868
Read the following

that little or no practical advantage would be gained by reducing the dead weight of the rolling stock in use in this Presidency.

I have the honour to be,
Sir,

Madras
16th December
1867

Your most obedient servant
Major R. E.
Consulting Engineer for
Railways.

Agents of
the Madras and Great
Southern of India Railway;
regarding the character of
the

tons, being a quarter of a ton heavier than the high-sided open goods waggons of the Madras Railway; but the other two descriptions of waggons are lighter, and the locomotive Superintendence

Pro. of 1867 Summary
RAILWAY DEPARTMENT.

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

Dated 16th Dec 1867.
Received 18th December 1867.
No. 357.
Enclosures, No. 4

Forwarded as duty to the
received from the Agents
of the Madras & G. S. R.
S. Railways on the
character of the wagon
stock upon the two lines.

vehicles also
carrying by 20th Dec 1867

great assistance in forming correct conclusions upon this very important question. So far as I am at present informed, I am of opinion

Public Works Department
1867 15
Proceedings of the Madras Government
Under date 11th Dec 1867
Read the following

From The Consulting Engineer for Railways. } A.E. No. 357 Dated 16th Dec 1867

Ordered that the papers be forwarded to the Govt. of India.
To Cons. Engr. for Railways
To Secy. to the Govt. of India.

N.
WON
L

Sir,
In compliance with the request in Para 4 of your Circular of the 2nd Sept 1867, No. 9 R, I am directed to forward herewith a letter from the Consulting Engineer for Railways, with the reports of the Agents of the Madras and Great Southern of India Railways, regarding the character of the

the wagons in use upon
those lines with their carrying
capacity, and with the
required particulars of the
kinds of different kinds of
goods which the wagons are
capable of carrying, and the
proportion which these loads
bear to the weight of the
wagons.

It will be observed
that, in the opinion of the
Railway Officers and the
Consulting Engineer, the pre-
sent weight of the wagons
cannot be sensibly reduced
without diminishing their
strength and durability,
and that seeing that the
proportion of heavy
traffic on the Madras
line during the last 5 half
years was 90 per cent upon
the gross tonnage carried,

there

10 438

there seems reasonable
ground for attaching greater
importance to the weight
than to the bulk carry-
ing capacity of the wagons.
It is further shown that
the very high temperature
the dust creating nature
of the ballast usually
employed, ~~the weight of the~~
~~weight of the~~ ~~character of the~~
~~ballast~~, and other diffi-
culties which have to be
contended with in this
country, prevent more
than a certain gross
weight being run upon
a set of four wheels,
without inducing a
dangerous degree of
heating, and that,
seeing how the dead
weight of the wagons
cannot be reduced, it
is impossible to increase

the

45A

the paying load with
the safety or advantage
the except by providing
in the ^{means} with improved
new means of lubrication,
as noticed by the lo-
gos Comatone Superinten-
dent, and at present
is under trial by him.

the
Ran
for
Fort St George
Dec 11th Jan 1868

W

Recd 13/1/68 at the
of Gen 96 of 1867

where

6675
Pub: Works 1868 Dec 1st

Re: of Govt for January

No 96897

Re: of the Madras Govt

19/11th January 1868

Passing orders on certain reports
submitted by the Agents regarding the
wagon stock upon the Madras &
Great Southern of India Railway -

Furnishing the Govt of
India with the papers referred
above.

No 186-187 & 188

P. 20th Dec 1867 R. 26th