

Public Works (1898) Department.

5000
G.O., No. 343-44 *Hy*

DATED 28th Feb 1898

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[Despatch Abstract.]

Report of Inspection of the Madras Dy.

The Senior Govt. Inspector's — forth half-year ending the 31st Dec 1897, Command to the Dy. Insp., for info and necessary action, and copy of the pros. forwarded to the Govt. of India.

Forwarding copy of ^{the} pros embodying the Govt. Inspector's — forth half-year ending the 31st Dec 1897.

Government { 1898 } of Madras.
PUBLIC WORKS.

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FEBRUARY.

Forwarding copy of the proceedings embodying the Government Inspector's —
for the half-year ending the 31st December 1897.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read the following paper :—

MADRAS RAILWAY.

STANDARD, 5' 6", GAUGE.

Total mileage worked 857.67 Miles.

INSPECTION REPORT for the half-year ending 31st December 1897.

The inspection was made between the 7th and 20th January 1898. The Chief Engineer accompanied the inspection throughout, while the Resident Engineers accompanied the party over their respective divisions.

2. FORMATION.—Banks and cuttings have been maintained to proper section.
3. FENCING.—Calls for no remarks.

4. BRIDGES AND CULVERTS—*Girder strengthening.*—The following table shows the state of this work :—

Span feet.	Number of spans on the railway.	Strengthened prior to Jan. 1896.		Required strengthening, 1st Jan. 1896.		Remarks.	Estimates sanctioned for strengthening since January 1896.	Completed since January 1896.	Remaining to be done.	
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6	297	..	297	..	..	42 nearly strong enough.	..	..	..	..
9	231	..	..	..	211		..	..	..	211
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							28	Nil.	96	17
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121	9	..	..	..	..		..	..	..	..
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The strengthening in column 3 was carried out in 1880 to 1893.

That in column 4 was done in 1894 and 1895.

5. It will be noticed that the 14 spans of weak 50 feet have now all been brought up to the Government of India standard.

6. Of the 96 spans of 64 feet girders, estimates were sanctioned in October and November for strengthening 28 spans, mostly on the Nilgiri branch, by building additional intermediate piers. The foundations had been taken out for the piers of two of the bridges on the *Nilgiri branch*. It is not proposed to go down to rock as scour is said never to occur, and even if it did, the girder is already supported by its original piers.

7. The method of strengthening the *Tungabhadra* girders (58 spans of 64 feet) has not yet been finally decided.

8. *Mile 6/19.*—The 9 feet arch in replacement of a 9 feet girder has been completed and the diversion removed.

9. *Mile 106/6.*—14 spans of 32 feet and 5 of 64 feet. Some longitudinal timbers will shortly require renewal.

10. *Mile 168/10.*—The work of replacing the 30 feet arch by a girder has been completed.

11. *Mile 265/5.*—The 15 feet culvert requires flooring and drop walls.

12. The 121 and 131 feet girders of the *Ferok, Kallāyi, Papaghni, Chitravati* and *Pennér* bridges were carefully examined with a view to ascertain by marks the maximum amount of expansion and contraction; this did not appear to exceed 1 inch in each pair of spans, but free expansion is to some extent at present prevented by the rigidity of the connections. It was agreed, with reference to the remarks in the last inspection report, to cut all sleepers and longitudinal timbers and rails over the roller piers, leave a new expansion joint of 3 inches between the timbers and $\frac{3}{4}$ inch between the rails, and to make all holding down bolt holes for a distance of 10 feet from the new joint, oval. It was subsequently agreed that it would be preferable to substitute C.I. clip plates coach-screwed to the timbers in place of the bolts now used to hold down the rails, so as to permit of free sliding of the rails on the timbers.

13. *Mile 76/14, North-west Line.*—The bed of the stream at this mileage has silted up and floods an adjacent village. It is proposed to throw up a protection bund which, however, can only be a temporary remedy.

14. *Mile 90, North-west Line.*—The re-building of this bridge which was washed away in 1896 is completed. Some revetting round the newels is required.

15. *Mile 107, North-west Line, 5 spans of 50 feet girders.*—The re-building of a pier and an abutment which were washed away in 1896 is completed. I gave permission for the restriction on speed, which was still in force, to be removed. A lot of training work still remains to be done.

16. *Mile 179, North-west Line, 28 spans of 16 feet girders on the Skew.*—The inspection train was run over this bridge at a speed of 50 miles an hour. The oscillation was unquestionably severe over a few of the piers, but not dangerously so. The speed of trains over this bridge is limited to 15 miles an hour.

17. BALLAST AND PERMANENT-WAY.—The following table shows the renewals during the last half-year which appear to have been sufficient :—

2,785 new bull-headed steel rails (= 7.91 miles) laid.

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18. The following table shows the extent to which the stone covering over the sand ballast has progressed. The work was stopped last half-year for want of funds and should now be pushed on to completion :—

Section.	Covered.	Not covered.
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19. *Oscillation*—was very severe in the Chief Engineer's carriage between Katpadi and Jalarpet where the new bull-headed rails have been laid. The Consulting

Engineer's carriage ran over the same section very steadily. A reference to last report will show that this carriage used to oscillate very severely, but it appears that its wheels, which were somewhat worn on the occasion of the last inspection, have since been renewed. On examining the wheels of the Chief Engineer's carriage it was found that the tyres were old and worn into a groove which more or less fitted the comparatively round-topped table of the old 75 lb. rail. The effect of this wear on the flat-topped bull-headed rail is to make the wheel rest on two points instead of bearing along its whole tyre surface. If the Chief Engineer's tyres could now be turned up and the carriage run at 50 to 60 miles an hour at the tail of a train over the Katpadi-Jalarpet section, the cause of the oscillation could be definitely settled.

In the meantime as it is obviously impracticable to keep all the coaching stock tyres up to new section, I would suggest that one rail be given, say, $\frac{1}{2}$ inch super-elevation on the straight; an experimental mile might first be tried, and be afterwards extended if successful in reducing the side swaying movement.

20. With the exception of the oscillation referred to above, the road was in general in excellent order. The noticeable exceptions being in the neighbourhood of mile 285 to 290 south-west line, and mile 90 north-west line.

21. STATIONS AND BUILDINGS—*Arkonam*.—The rearrangement of the yard will be discussed by a committee which will be appointed shortly. The electric lighting installation is being erected. The contractor of the native refreshment-room says he is not paying his way.

22. *Katpadi*.—A cemetery belonging to some Missionaries who live here is in close proximity to the station and is principally used for interments of railway employés; it might be fenced in at the expense of the railway.

23. *Bangalore Cantonment*.—A plan for the proposed remodelling of this yard is being drawn up.

24. *Bangalore City*.—The waiting-shed does not seem to be large enough; the adjoining verandahs space should be included in the waiting-shed area. The two 3rd-class ticket windows for the Madras Railway do not seem to suffice for the rush of passengers which takes place when several trains connect.

25. It now appears that the land which was taken up for coal tranship sidings is not required, as there is no coal traffic; but the Southern Mahratta Railway are opening a new local goods-shed on their land which adjoins, and want the Madras Railway to build a wall round the M.R. portion. I think the land should be transferred to the Southern Mahratta Railway who can then build their own fencing wall round the whole area.

26. The land reserved by the Southern Mahratta Railway on the Madras side of the station is no longer required by them. The Madras Railway want this land transferred to them though they do not immediately require to use it.

27. If it is considered objectionable to house the Railway police amongst the Company's staff, extra land will be required for this purpose; but otherwise room can easily be found for the police quarters.

28. The following principal items of the Bangalore city estimate remain to be done—watering arrangements, station platform, roofing and verandahs.

29. *Bowringpet*.—To complete the gridiron shunting scheme, an inclined shunting neck is required in front of the platform on the branch side. This necessitates alterations in the levels of the yard, the height of the branch side platform becoming 1' 2" above rail level. I am informed that this inclined neck will obviate the necessity of keeping a shunting engine at the station.

30. *Oorgaum, Champion*.—Extension of waiting-shed required. The Mysore Durbar have agreed to defray the cost of rebuilding the cracked buildings as a charge to Capital.

31. *Bisánattam*.—It was agreed that a station building of the permanent moveable type be provided.

32. *Mullanur*.—The proposed extension of sidings may be sanctioned.

33. *Jalarpet*.—Designs for remodelling the yard are in hand.

34. *Erode*.—As it has now been decided to make this the dinner station for the up-mail, more accommodation is required in the refreshment-room. The present room can easily be altered and sufficient accommodation given as pointed out during the inspection.

35. *Mettupálaiyam*.—The platform on the Nilgiri side requires to be ramped and fenced as explained. The waiting accommodation should suffice; for when the Nilgiri Railway is opened all passengers will be travelling through. I do not think an over-bridge exit is required as there are very few trains using the station; a pair of German balanced lever gates might be tried.

36. *Olavakkót*.—Unnecessary delay takes place in hand shunting extra third-class vehicles on and off the mail trains. There is no objection to placing these vehicles in front of the leading guard's van or even next the engine.

37. *Washermenpet and Tondaiyárpéttai*.—The new siding extensions may be opened for traffic.

38. *Siddhavattam*.—A stone coping on the platform round the line-clear stanchion is dangerous and should be removed.

39. *Cuddapah*.—Two long sidings of some 2,000 feet each might be taken up and utilized elsewhere. The whole of the locomotive sidings with the exception of a road leading to the turn-table should also be removed.

40. *Kamalapuram*.—Revised plan approved with the exception of the extension of the lay-byes which appear to be quite unnecessary.

41. *Guntakal*.—A short length of road crossing the railway near the north distant signal and joining in with the goods-shed feeder road would be a convenience to the public.

42. *Adoni*.—Alterations to yard in abeyance pending report of the catch siding committee.

43. SIGNALS, POINTS.—Nearly all the signals on the line have now been counter-weighted, a few homes still remain. I do not think it necessary to counterweight the starters on the single line.

44. Now that bogie stock is being built, it will be necessary to lengthen the locking bars at all stations. A working model designed by the late Mr. G. K. Winter showing the method proposed was examined and appeared to work satisfactorily. A trial will be made of the arrangement before general adoption.

45. *Trivellore*.—Ballast siding starter is hardly required and seems to be in such a position that it might be mistaken by a main line train. A disc signal is the proper signal to be employed here.

46. *Milánúr*.—A home signal exists at the east points. If connected by wire to the station the down arm on the platform signal might be removed and the signalling thereby brought a step further up to date.

47. *Bowringpet*.—Some alterations in the main line signalling have recently been sanctioned, but it is a pity that the opportunity was not taken to bring the branch side into unison.

48. *Washermenpet*.—The Bezwada-Madras Railway north home and distant signals require shifting out consequent on the extension of the siding.

49. *Korukkuppéttai level crossing* requires a signal. The platform signal at *Tangal*, which is quite useless and unnecessary there, can be moved to Korukkuppéttai.

50. *Puttúr*.—Treadle bars have been added to the Dutton interlocking installation. Permission can now be granted for trains to run through this station on the main line without restriction of speed. An ingenious interlocking device whereby it was hoped to prevent a train from either direction being admitted to any line already occupied by another has not been properly worked out at home and gives no protection.

51. I think the obsolete cotter and padlock should be removed from all points fitted with Annett's or other interlocking arrangement.

52. An instance of unsystematic arrangement of signals was noticed at *Nandalur* where a distant (notched and therefore non-stop) signal has just been erected to control the exit of engines from the locomotive yard.

53. *Cuddapah*.—A home signal already exists at the west end of the station yard. The arm on the platform signal is therefore redundant.

54. *Guntakal*.—The so-called north auxiliary distant should have the notched arm replaced by a full arm and be called the home signal. A starting signal controlling the exit from the goods-shed is fixed close to the auxiliary distant just referred to. This starting signal is actually as high as the adjacent main line signal and therefore presumably as important. A dwarf starter should suffice for the goods yard exit and the present high post might advantageously be removed to the south end of the yard as a home, and the obsolete platform signals abolished.

55. *Aspari*.—At this and many other stations on the north-west line locking or treadle bars are still required.

56. **ROLLING STOCK**.—The following table shows the progress made towards fitting the stock with the vacuum brake:—

Class of stock.	Vacuum brake.		Not fitted.
	Fitted with.	Piped for.	
Engines ..	31	..	135
Coaching vehicles including brake vans ..	199	41	581
Goods vehicles ..	..	2	2,870

Fittings for 27 locomotives and 200 carriages have just been received from England.

57. **Gas lighting**.—The following table shows the present extent of the gas lighting. It is not intended to fit any more carriages at present:—

Class of vehicles.	Fitted with gas.		Not fitted.
	During 1897.	To date.	
Saloons			
First class	..	97	53
Second class	..		
Composites.	..		
Third class	..		
Vans	42	304	77
Post office carriages, &c.	..	29	170

I think oil-lit vehicles should be relegated to certain districts on the line, and not run and mixed up with the gas-lit vehicles, an arrangement which presumably means keeping up a double lighting staff. During the inspection I noticed some of the oldest obsolete type of oil-lit third-class carriages running on the mail trains through from Calicut to Madras. The tail and side lights of passenger brake vans might advantageously be fitted with gas.

58. **Locomotive changing stations**.—Nandalur has now been opened as a locomotive station; here I found six engines in shed, but at Renigunta, one of the stations which it was intended to replace, I found seven engines.

59. **WATER-SUPPLY**.—From various causes, probably from failures of supply and altered traffic conditions, a very large number of stations are equipped with locomotive watering arrangements. For instance two water columns and the necessary piping are to be found at Avadi (mile 13), Trivellore (mile 26), Chinnammápet 36, Arkonam 43, Sholinghur 56, Arcot 65, Katpadi 80; also on the West Coast section Olavakkót 332, Ottappalam 341, Shoranur 349. Those at miles 13, 36, 56, 341 are, I believe, not in use. Then again when Jollarpet (mile 132) gets a satisfactory supply as is now anticipated, Tirupattúr (mile 137) will become unnecessary. When Whitefield (mile

204) receives the unfailing supply which it will have when the new watering arrangements now in hand are finished, Malur (mile 192) should not be required. It is proposed to join with the Nilgiri Railway Company in a water-supply for Mettupaliyam (328). This should render the arrangement at Karamadai (321) surplus.

The value of the materials from these disused stations would form a handsome credit to capital, and the materials themselves could be utilized for the new lines now about to be constructed by the company.

60. A considerable quantity of engine-shed roofing from Renigunta, Tirupattúr and Cuddapah, is available for use elsewhere if required.

61. **WORKSHOPS**.—It is proposed to transfer the telegraph workshop to where the engineering shops have been located; this will render supervision easier. Part of the abandoned shops can be utilized as a power station for the electric light, and a portion of them can be converted into staff quarters.

62. **LEVEL CROSSINGS**.—The so-called safety gates on either side of Coimbatore station were found to be out of order. The arrangement requires to be redesigned; in their present condition they are not safe.

63. **GENERAL**.—The Madras Railway has recently gained an unenviable reputation for late running chiefly due to failures of engines and inexperience of drivers working the Bombay mails. It is perhaps worth considering whether a little fresh European blood introduced amongst the driving staff would not tend to smarten things up a bit.

MADRAS,
3rd February 1898.

C. T. R. SCOVELL,
Government Inspector.

Remarks by the Senior Government Inspector.

It is remarked that the line is in excellent running order. The experiment recommended by Mr. Scovell at the end of paragraph 19 should be tried. The arrangement agreed to about the bridge expansion beneath the rails, at end of paragraph 12, ought to serve the purpose if properly arranged. The various references to signalling defects should be seen to at once. It ought not, apparently, to be difficult to arrange to sort out the oil-lit from the gas-lit carriages as suggested in paragraph 57. I invite the Agent's attention to the suggestion in paragraphs 59-60 for utilizing elsewhere considerable quantities of materials not now required in their present positions; this should be borne in mind when indents come in. A full report is now expected on the subject of the Company's proposals for strengthening the remaining weak girders. The Agent is requested to state what instructions he is issuing in regard to the several matters referred to in the report.

MADRAS,
16th February 1898.

FRANCIS J. E. SPRING,
Senior Govt. Inspector of Railways.

ORDER—No. 343 Ry., dated 28th February 1898.

Communicated to the Agent and Manager, Madras Railway, for information and necessary action.

2. A copy of these Proceedings will be forwarded for the information of the Government of India.

[Here enter No. 344 Ry., dated 28th February 1898.]

(True Extract.)

FRANCIS J. E. SPRING,
Joint Secretary.

To the Agent and Manager, Madras Railway.
„ Consulting Engineer for Railways.

ENDORSEMENT—No. 344 Ry., dated 28th February 1898.

Forwarded.

(By order.)

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RAILWAY.

Government {1898} of Madras.
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44. Now that bogie stock is being built, it will be necessary to lengthen the locking bars at all stations. A working model designed by the late Mr. G. K. Winter showing the method proposed was examined and appeared to work satisfactorily. A trial will be made of the arrangement before general adoption.

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49. *Korukkuppéttai level crossing* requires a signal. The platform signal at *Tangal*, which is quite useless and unnecessary there, can be moved to Korukkuppéttai.

50. *Puttúr*.—Treadle bars have been added to the Dutton interlocking installation. Permission can now be granted for trains to run through this station on the main line without restriction of speed. An ingenious interlocking device whereby it was hoped to prevent a train from either direction being admitted to any line already occupied by another has not been properly worked out at home and gives no protection.

51. I think the obsolete cotter and padlock should be removed from all points fitted with Annett's or other interlocking arrangement.

52. An instance of unsystematic arrangement of signals was noticed at *Nandalur* where a distant (notched and therefore non-stop) signal has just been erected to control the exit of engines from the locomotive yard.

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55. *Aspari*.—At this and many other stations on the north-west line locking or treadle bars are still required.

56. **ROLLING STOCK**.—The following table shows the progress made towards fitting the stock with the vacuum brake:—

Class of stock.	Vacuum brake.		Not fitted.
	Fitted with.	Piped for.	
Engines ..	31	..	135
Coaching vehicles including brake vans ..	199	41	581
Goods vehicles ..	..	2	2,870

Fittings for 27 locomotives and 200 carriages have just been received from England.

57. **Gas lighting**.—The following table shows the present extent of the gas lighting. It is not intended to fit any more carriages at present:—

Class of vehicles.	Fitted with gas.		Not fitted.
	During 1897.	To date.	
Saloons	..	97	53
First class	..	..	..
Second class	..	..	..
Composites.	..	..	..
Third class	..	..	..
Vans	42	304	77
Post office carriages, &c.	..	29	170

I think oil-lit vehicles should be relegated to certain districts on the line, and not run and mixed up with the gas-lit vehicles, an arrangement which presumably means keeping up a double lighting staff. During the inspection I noticed some of the oldest obsolete type of oil-lit third-class carriages running on the mail trains through from Calicut to Madras. The tail and side lights of passenger brake vans might advantageously be fitted with gas.

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59. **WATER-SUPPLY**.—From various causes, probably from failures of supply and altered traffic conditions, a very large number of stations are equipped with locomotive watering arrangements. For instance two water columns and the necessary piping are to be found at Avadi (mile 13), Trivellore (mile 26), Chinnammápet 36, Arkonam 43, Sholinghur 56, Arcot 65, Katpadi 80; also on the West Coast section Olavakkót 332, Ottappalam 341, Shoranur 349. Those at miles 13, 36, 56, 341 are, I believe, not in use. Then again when Jollarpet (mile 132) gets a satisfactory supply as is now anticipated, Tirupattúr (mile 137) will become unnecessary. When Whitefield (mile

204) receives the unfailing supply which it will have when the new watering arrangements now in hand are finished, Malur (mile 192) should not be required. It is proposed to join with the Nilgiri Railway Company in a water-supply for Mettupaliyam (328). This should render the arrangement at Karamadai (321) surplus.

The value of the materials from these disused stations would form a handsome credit to capital, and the materials themselves could be utilized for the new lines now about to be constructed by the company.

60. A considerable quantity of engine-shed roofing from Renigunta, Tirupattúr and Cuddapah, is available for use elsewhere if required.

61. **WORKSHOPS**.—It is proposed to transfer the telegraph workshop to where the engineering shops have been located; this will render supervision easier. Part of the abandoned shops can be utilized as a power station for the electric light, and a portion of them can be converted into staff quarters.

62. **LEVEL CROSSINGS**.—The so-called safety gates on either side of Coimbatore station were found to be out of order. The arrangement requires to be redesigned; in their present condition they are not safe.

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MADRAS,
3rd February 1898.

C. T. R. SCOVELL,
Government Inspector.

Remarks by the Senior Government Inspector.

It is remarked that the line is in excellent running order. The experiment recommended by Mr. Scovell at the end of paragraph 19 should be tried. The arrangement agreed to about the bridge expansion beneath the rails, at end of paragraph 12, ought to serve the purpose if properly arranged. The various references to signalling defects should be seen to at once. It ought not, apparently, to be difficult to arrange to sort out the oil-lit from the gas-lit carriages as suggested in paragraph 57. I invite the Agent's attention to the suggestion in paragraphs 59–60 for utilizing elsewhere considerable quantities of materials not now required in their present positions; this should be borne in mind when indents come in. A full report is now expected on the subject of the Company's proposals for strengthening the remaining weak girders. The Agent is requested to state what instructions he is issuing in regard to the several matters referred to in the report.

MADRAS,
16th February 1898.

FRANCIS J. E. SPRING,
Senior Govt. Inspector of Railways.

ORDER—No. 343 Ry., dated 28th February 1898.

Communicated to the Agent and Manager, Madras Railway, for information and necessary action.

2. A copy of these Proceedings will be forwarded for the information of the Government of India.

[Here enter No. 344 Ry., dated 28th February 1898.]

(True Extract.)

Under Secretary.

To the Agent and Manager, Madras Railway.
„ Consulting Engineer for Railways.

Exd. T. K. Narayana Aiyangar.

Government of Madras
Public Works Department
Railway
Read the following paper:—
MADRAS RAILWAY.

STANDARD, 5' 6", GAUGE.

Total mileage worked 857.67 Miles.

INSPECTION REPORT for the half-year ending 31st December 1897.

The inspection was made between the 7th and 20th January 1898. The Chief Engineer accompanied the inspection throughout, while the Resident Engineers accompanied the party over their respective divisions.

- 2. FORMATION.—Banks and cuttings have been maintained to proper section.
- 3. FENCING.—Calls for no remarks.

4. BRIDGES AND CULVERTS—*Girder strengthening*.—The following table shows the state of this work:—

Span feet.	Number of spans on the railway.	Strengthened prior to Jan. 1896.		Required strengthening, 1st Jan. 1896.		Remarks.	Estimates sanctioned for strengthening since January 1896.	Completed since January 1896.	Remaining to be done.	
		Up to Board of Trade requirements.	Up to Government of India requirements.	By Board of Trade Rules.	By Government of India Rules.				By Board of Trade Rules.	By Government of India Rules.
1	2	3	4	5	6	7	8	9	10	11
6	297	..	297	..	..	42 nearly strong enough.	..	..	..	..
9	231	..	..	..	211		..	..	..	211
12	268	..	..	..	208		..	..	..	208
15	37	..	..	..	37		..	..	..	37
18	10	..	..	..	10		..	..	..	10
20	181	91	4	..	177		..	..	..	177
22	38	30	2	..	36		..	..	..	36
23½	4	1	3	..	1		..	..	..	1
24	4	..	4	..	..		..	..	..	Nil.
30	146	26	1	..	139		..	..	..	139
34	6	..	..	..	6	Of these 243, 40 are nearly strong enough, but 147 are weak.	..	..	..	6
39	2	..	..	..	2		..	..	..	2
43½	17	..	..	..	17		..	..	..	17
50	17	..	3	14	14		14	14	Nil.	Nil.
64	243	118	..	96	243		28	Nil.	96	243
121	9	..	..	..	..		..	..	..	..
131	47	..	..	..	..		..	..	..	..

The strengthening in column 3 was carried out in 1880 to 1893. That in column 4 was done in 1894 and 1895.

- 5. It will be noticed that the 14 spans of weak 50 feet have now all been brought up to the Government of India standard.
- 6. Of the 96 spans of 64 feet girders, estimates were sanctioned in October and November for strengthening 28 spans, mostly on the Nilgiri branch, by building additional intermediate piers. The foundations had been taken out for the piers of two of the bridges on the Nilgiri branch. It is not proposed to go down to rock as scour is said never to occur, and even if it did, the girder is already supported by its original piers.
- 7. The method of strengthening the Tungabhadra girders (58 spans of 64 feet) has not yet been finally decided.
- 8. Mile 6/19.—The 9 feet arch in replacement of a 9 feet girder has been completed and the diversion removed.
- 9. Mile 106/6.—14 spans of 32 feet and 5 of 64 feet. Some longitudinal timbers will shortly require renewal.

10. *Mile 168/10.*—The work of replacing the 30 feet arch by a girder has been completed.

11. *Mile 265/5.*—The 15 feet culvert requires flooring and drop walls.

12. The 121 and 131 feet girders of the *Feroke, Kallayi, Papaghni, Chitravati* and *Pennér* bridges were carefully examined with a view to ascertain by marks the maximum amount of expansion and contraction; this did not appear to exceed 1 inch in each pair of spans, but free expansion is to some extent at present prevented by the rigidity of the connections. It was agreed, with reference to the remarks in the last inspection report, to cut all sleepers and longitudinal timbers and rails over the roller piers, leave a new expansion joint of 3 inches between the timbers and $\frac{3}{4}$ inch between the rails, and to make all holding down bolt holes for a distance of 10 feet from the new joint, oval. It was subsequently agreed that it would be preferable to substitute C.I. clip plates coach-screwed to the timbers in place of the bolts now used to hold down the rails, so as to permit of free sliding of the rails on the timbers.

13. *Mile 76/14, North-west Line.*—The bed of the stream at this mileage has silted up and floods an adjacent village. It is proposed to throw up a protection bund which, however, can only be a temporary remedy.

14. *Mile 90, North-west Line.*—The re-building of this bridge which was washed away in 1896 is completed. Some revetting round the newels is required.

15. *Mile 107, North-west Line, 5 spans of 50 feet girders.*—The re-building of a pier and an abutment which were washed away in 1896 is completed. I gave permission for the restriction on speed, which was still in force, to be removed. A lot of training work still remains to be done.

16. *Mile 179, North-west Line, 28 spans of 16 feet girders on the Skew.*—The inspection train was run over this bridge at a speed of 50 miles an hour. The oscillation was unquestionably severe over a few of the piers, but not dangerously so. The speed of trains over this bridge is limited to 15 miles an hour.

17. **BALLAST AND PERMANENT-WAY.**—The following table shows the renewals during the last half-year which appear to have been sufficient:—

2,785 new bull-headed steel rails (= 7.91 miles) laid.
4,042 new and second hand steel double-headed rails (= 7.80 miles) laid.
5,006 second hand double-headed iron rails (= 9.44 miles) laid.
5,614 pot sleepers renewed (= 5.10 per mile of line including sidings).

18. The following table shows the extent to which the stone covering over the sand ballast has progressed. The work was stopped last half-year for want of funds and should now be pushed on to completion:—

Section.	Covered.	Not covered.
Madras-Mettupálaiyam	327	...
Pódanúr-Calicut	8	105
Jalarpet-Bangalore	43	44
Arkonam-Raichur	136	172

19. *Oscillation*—was very severe in the Chief Engineer's carriage between Katpadi and Jalarpet where the new bull-headed rails have been laid. The Consulting Engineer's carriage ran over the same section very steadily. A reference to last report will show that this carriage used to oscillate very severely, but it appears that its wheels, which were somewhat worn on the occasion of the last inspection, have since been renewed. On examining the wheels of the Chief Engineer's carriage it was found that the tyres were old and worn into a groove which more or less fitted the comparatively round-topped table of the old 75 lb. rail. The effect of this wear on the flat-topped bull-headed rail is to make the wheel rest on two points instead of bearing along its whole tyre surface. If the Chief Engineer's tyres could now be turned up and the carriage run at 50 to 60 miles an hour at the tail of a train over the Katpadi-Jalarpet section, the cause of the oscillation could be definitely settled.

In the meantime as it is obviously impracticable to keep all the coaching stock tyres up to new section, I would suggest that one rail be given, say, $\frac{1}{2}$ inch super-elevation on the straight; an experimental mile might first be tried, and be afterwards extended if successful in reducing the side swaying movement.

20. With the exception of the oscillation referred to above, the road was in general in excellent order. The noticeable exceptions being in the neighbourhood of mile 285 to 290 south-west line, and mile 90 north-west line.

21. **STATIONS AND BUILDINGS—Arkonam.**—The rearrangement of the yard will be discussed by a committee which will be appointed shortly. The electric lighting installation is being erected. The contractor of the native refreshment-room says he is not paying his way.

22. *Katpadi.*—A cemetery belonging to some Missionaries who live here is in close proximity to the station and is principally used for interments of railway employés; it might be fenced in at the expense of the railway.

23. *Bangalore Cantonment.*—A plan for the proposed remodelling of this yard is being drawn up.

24. *Bangalore City.*—The waiting-shed does not seem to be large enough; the adjoining verandahs space should be included in the waiting-shed area. The two 3rd-class ticket windows for the Madras Railway do not seem to suffice for the rush of passengers which takes place when several trains connect.

25. It now appears that the land which was taken up for coal tranship sidings is not required, as there is no coal traffic; but the Southern Mahratta Railway are opening a new local goods-shed on their land which adjoins, and want the Madras Railway to build a wall round the M.R. portion. I think the land should be transferred to the Southern Mahratta Railway who can then build their own fencing wall round the whole area.

26. The land reserved by the Southern Mahratta Railway on the Madras side of the station is no longer required by them. The Madras Railway want this land transferred to them though they do not immediately require to use it.

27. If it is considered objectionable to house the Railway police amongst the Company's staff, extra land will be required for this purpose; but otherwise room can easily be found for the police quarters.

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Government Inspector.

Remarks by the Senior Government Inspector.

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Order No 343 By 21 February 1898.

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Order No 344 By 28 February 1898
Forwarded.

FJS

R

24/2/98

By
Agent Manager M.R.
- & Cons. Eng. for Reg. 4/3
By the Agent 4/3

G. O. No 343-44 By 28 Feb.

1. Mr. J. E. Spring

2. Mr. Sir Henry M. K. Esq.

3. Mr. Mr. J. G. Esq.

Report of Inspection into
Madras Railway for the half
year ending 31st Dec 1897

sum. A.H.
6.3.98

Circulated for
perusal.

FJS
R

4/3/98

4.2.4.4.4.4.
4.3.98
29/3/98