M.R.O. 1—77,000—6-6-37.

(1) Number of pages 5

(2) Date of repair 21-12-63

(3) Initials of the Referencer

MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No. 2112—13 Press
~~Mis.~~

650-51-52

Dated 19—6— 1869.

Not to be folded or roughly handled

Proceedings of the Madras Government, Public Works Department,
29th June 1869.

No. 650. Read the following letter from the Consulting Engineer for Railways, to the Secretary to Government, Public Works Department, dated Madras, 3rd June 1869, No. 179 :—

With reference to G. O., No. 1,098, of 5th April 1869, I have the honour to submit letters* from the Agents of the Madras and Great Southern of India Railways, containing reports from their respective Locomotive Superintendents on the subject of testing engine boilers.

* From the Agent, Madras Railway Company, No. 208, 27th April 1869.
Do Great Southern of India Railway, No. 2,298, 23rd April 1869.
No. 3,015, 12th May 1869.

2. Both the Locomotive Superintendents consider that the force-pump is useful as an auxiliary test ; but Mr. Sheward has objections to dismantling an engine, which are not held by the Superintendents of the Madras Railway or the Bombay lines. His system appears to be to examine an engine only when it happens to be brought to the shops for repair, or when it is unfavorably reported on by the Driver. On the Madras Railway, although engines are not all periodically examined, one of each class of engine is occasionally overhauled, the tubes removed, &c. This is taken as a guide as to the state of the boilers of the other engines working on the same division of the line. "I consider that the precautions taken by the Locomotive Superintendent of the Madras Railway are sufficient, but I cannot say that I hold the same opinion regarding the Great Southern. I observe that the Agent of the latter line, in a recent letter to his Board, has requested that Mr. Bruce's opinions be taken on the matter, and I recommend that his instructions to the Locomotive Superintendent be waited for before further steps are taken.

From the Agent and Manager of the Madras Railway Company, to the Consulting Engineer for Railways, dated Madras, 27th April 1869, No. 208.

In accordance with the request contained in your letter of the 10th instant, No. 144, arising out of Order of Government, No. 1,098, dated the 5th instant, on the subject of the practice in force upon this Railway for testing locomotive boilers, I have the honour to submit copy of a report* from the Acting Locomotive Superintendent, furnishing explanation with regard to this important question.

* No. 76, dated 23rd April 1869.

2. Upon receipt of your letter, I had a conference with Mr. Collinson, who explained the various examinations which our locomotives undergo with a view to ascertain their actual condition and their fitness for work ; and from the precautionary measures which are now in force upon this Railway to prevent accident, I am of opinion that no more efficient test can be introduced.

From the Acting Locomotive Superintendent, to the Agent and Manager of the Madras Railway Company, dated Perambore Works, 23rd April 1869, No. 76.

With reference to the Consulting Engineer's letter, No. 144 of the 10th instant, regarding the practice of testing locomotive boilers on this line, I beg to offer the following observations :—

Paragraph 1.—The practice now in force on this line has been dependent not on a certain number of miles run, but on the work done by each engine, the quality of the water used, and other circumstances connected with the running of our locomotives, which have rendered it necessary for the boilers to be examined.

The first examination of our boilers has been on an average after six years' use, and the second examination on an average of three years, when they have had nearly new boilers and fire boxes.

Proceedings of the Madras Government, Public Works Department,
29th June 1869.

From the Acting Agent of the Great Southern of India Railway, to the Consulting Engineer for Railways, dated Negapatam, 12th May 1869, No. 3,015.

I HAVE the honour to attach copy of the Locomotive Superintendent's remarks in answer to your call, (letter No. 147, dated 28th April 1869,) for further information with regard to the manner of examining and testing boilers of engines on this line.

From the Locomotive and Carriage Superintendent, to the Acting Agent of the Great Southern of India Railway, dated Negapatam, 6th May 1869, No. 219.

CONSULTING ENGINEER'S letter No. 147 (returned).

I did not reply directly to the paragraph 4 referred to, as I do not agree with the views expressed by the Superintendents of the Bombay lines, regarding the examination needed or demanded by the fact of the engines having run the number of miles mentioned. The expression "thorough examination" is qualified in the Consulting Engineer's No. 147, as meaning the removal of tubes. I am quite alive to the necessity of constant precaution and careful examination with boilers to ensure immunity from explosion if possible, I quite think that when an engine has run 150,000 miles she should be examined, but, as I said in my former letter, I disagree entirely as to what constitutes needful examination; I think that unless some cause be given, such as suspicion of the engine's state, it is not expedient to dismantle an engine every two years or so. Our engines, Nos. 1 to 9, could not be examined, as the Consulting Engineer proposes, without entirely pulling them to pieces. The steam douse is over the fire box and no one, not a boy, can get inside the boiler without removing longitudinal boiler stay's and fire box roof stays; unless this be done the taking out of the tubes is useless, as nothing at all approaching an examination of the joints can be made from looking through the tube plates at either end; as I explained in my former letter, I have only had the test pump nine months. The system in force here is such as is usually adopted on all English lines. Entries are made by the Drivers in the Shed-books of the general condition of their engines, and if any remarks are made calculated to make the state of the engines suspicious, she is overhauled at once. When tubes leak on the three bottom rows the whole rows are taken out and the boiler cleaned and the engines lagging removed and the boiler examined. When an engine has been running two years she is stripped and examined, if she requires repair; but if she be otherwise in good condition she runs until she comes in for repair. All our engines but three have been examined and overhauled since I have been here, just two years. These three engines I shall endeavour to get into the shops when they require such a repair as will bring them down to Negapatam. These three engines may have run about 100,000 miles. I keep a record of the conditions of our engines and the nature of examination they undergo, so that no care is wanting to ensure their being in good order.

No. 651. ORDER THEREON, 29th June 1869, No. 2,112.

RAILWAY, No. 49.

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

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

No. 652. Docket No. 2,113, dated 29th June 1869.

COPY of the above forwarded to the Government of India with reference to their Proceedings dated 1st March 1869, No. 243-R.

(True Extract.)

Colonel, R. E.,
Secretary to Government.

Exd. S. T. Augustin.

55 p 234

No. 208.

MADRAS RAILWAY.

AGENT AND MANAGER'S OFFICE.

Madras, 27th April 1869.

From

Robert B. Elsmie Esqre.,
Agent and Manager. of the M. R. Co.

To

Major Wm. Shaw Stewart, R.E.,
Consulting Engineer for Railways.

SIR,

1. In accordance with the request contained in your letter of the 10th instant, No. 144, arising out of Order of Government No. 1098 dated the 5th Instant, on the subject of the practice in force upon this Railway for testing Locomotive boilers, I have the honor to submit copy of a report from the acting Locomotive Superintendent, furnishing explanation with regard to this important question.

No. 676 of 23 April 1869.

2. Upon receipt of your letter, I had a conference with Mr Collinson, who explained the various examinations which our Locomotives undergo with a view to ascertain their actual condition and their fitness for work; and from the precautionary measures which are now in force upon this Railway to prevent accidents, I am of opinion that no more efficient test can be introduced.

I have the honor to be,
Sir,
Your most obedient Servt.

Agent & Manager.

Madras Railway Company
Secretaries Superintendents Office
Perambore 23rd April 1869

No 76.

The Agent and Manager

Dear Sir,

With reference to the Consulting Engineers letter No 1444 of the 10th instant regarding the practice of testing locomotive boilers on this Line, I beg to offer the following observations.

Para I. The practice now in force on this Line has been developed, as well as the number of miles run, but, on the whole is done by each Engine - the quality of the water used - and other circumstances connected with the running of our Locomotives which have rendered it necessary for the boilers to be examined -

The first examination of our boilers has been an average after nine years use, and the second examination on an average of three years, when they have had nearly new boilers and fireboxes.

2 as our particular,
we examine by making a thorough examination of the boiler at each class of our Locomotives, by taking the tubes out, the roof bars off, and cleaning and examining the inside and outside plates, which we have found, Ken in a great measure, remedied as a guide as to the state of the boilers after other

1449

MADRAS RAILWAY.

From

The Agent and Manager.

To

The Consulting Engineer

for Railways.

No. 2328/869

Dated 29th April 1869

Recd. 28-

M- No. 308.

Submitting Copy of a Report from the Actg Loco Supts: furnishing an explanation with regard to the proposed increase on the Madras Railway for testing Locomotive boilers -

Engines working on the same division of the Line.

As regards statistics. A record is kept by the Foreman Boiler Smith, and a copy in this office of the date a boiler is examined, and any special circumstance that he may find necessary to note.

Para II. I do not think any more efficient test could be introduced than that now in force. Extra care and precaution have always been taken for the thorough internal and external examination of our boilers.

Para III We make use of Hydraulic pressure, but more as an auxiliary; that is, we do not depend upon it for a thorough test of the boiler, but use it more for testing the tubes; and, after a boiler has been repaired, for testing the efficiency of the work. The pressure used is from 180 to 210 lbs; a little more than pressure and a half.

The practice of testing boilers by Hydraulic pressure is one which has always been a "vexed question", and on this point several discussions and disputes have arisen both as to the necessity or otherwise for this test and the amount of pressure which ought to be used. In 1864 and 1866, this subject seems to have created considerable discussion in England, and in a leading article in the "Engineer"

of the former year, the writer says. "Within the last year a considerable "number of Locomotive boiler explosions "have taken place, and in every case "upon one or other of the great Lines "upon which Locomotives are never "tested by the force pump; on the other "hand we believe that there is no "account of the explosion of any boiler "regularly tested by the pump upon "either of the Lines where that test "is adopted." And in "Engineering" of May 11th of the latter year there is a report of a Paper read at the Meeting of the Mechanical Engineers held at Birmingham on the 3rd of the same month by Mr William Fairbairn of Derby "On the Corrosion of "Locomotive boilers and the means of "Prevention", in which he gives his opinion as follows regarding the use of the test pump.

"In the course of our "own experience we have known "several instances in which the "application of the Hydraulic test has "revealed defects, which, if not "thus discovered and remedied "would in all probability have "led to the most serious results. We "do not consider that the Hydraulic "test is any substitute for a thorough "external and internal examination "of the boiler, but it is a most

"useful ausciliary, and it is a test
"which can be applied at times when
"an internal examination of the boiler
"is impossible"

I quite concur in these opinions; in fact, the same system has all along been adopted on this Line as that advocated by them, and although an internal examination of a Locomotive boiler is a very costly affair, there can be no doubt it is not only the greatest safeguard, but the surest mode of preventing accidents.

Para IV The maximum distance an Engine may safely run, without undergoing thorough examination and repairs, varies on this Line from 100.000 to 134000 Miles.

On examining many of our boilers after running these distances we found the centre bottom plates furrowed, inside, near the lap joint, caused, no doubt, by the sediment and the expansion and contraction of the boilers.

The 20 new Locomotives now under construction in England for this Railway are, I believe, to have the boilers made with "butt joints and bands double rivetted seams," so that the plates will be quite even along the inside of the boiler.

This improvement will greatly remedy the evil experienced with boilers with lap joints, and no doubt considerably increase the mileage these Engines will be able to run safely without undergoing thorough examination and repairs.

The working pressure of our Locomotive boilers is 120 lbs per square inch; but, although, on examining our old boilers, we discovered, in some of them, no signs of wanting repairs, yet, for greater safety we reduced the pressure to 100 lbs

Yours faithfully
(Signed) H. J. Collinson
Ag Loco: Superintendent

(True Copy)
for Agent & Manager

Compositors

No 2988 GREAT SOUTHERN OF INDIA RAILWAY.

AGENT'S OFFICE,

NEGAPATAM, 23rd April 1869

From

THE AGENT,

Great Southern of India Railway,

To The Consulting Engineer
for Railways

SIR,

Your No 119.

I have read over the correspondence embodied in the Government order No 1098 on the subject of testing locomotive boilers, and herewith send you copy of a letter from the Locomotive Superintendent of this Company affording information on all the points in question—

I have the honor to be
Sir
Your most obedient Servant
D and Logan
Acting Agent

No 193.

Great Southern of India Railway

Loco & Carr. Supt^ts. Office

Negapatam 21st April 1869.

My dear Sir

Your No. 4385/2048 & Enclosure

When I arrived in India in 1867 I found there was no means of testing boiler joints or tubes in the Company's workshops & ordered for a hydraulic press which arrived here on July 1868 Since then each Engine as she has come in for repair has been tested and Examined I purposed testing & overhauling all the Engines as they come in I attach a Statement shewing the original working pressure of our Engines and that at which they are now working.

Nos. of Engines	Time they have been working	original working pressure	Present working pressure	Hydraulic test pressure	
1 to 9	6 Years	120 lb.	100 lb	200 lb	Passenger Engines
10 to 11	3 do	100 "	100 "	150 "	Ballast do
12 to 15	2 do	120 "	120 "	200 "	Goods do
16 & 17	6 months	120 "	120 "	200 "	Goods do

Wm Clegg Esq
Locomotive Engineer
Madras Railway
Perambore
Madras

A 1053

Received 6 April 1869
Replied 28 April

There has been but one instance of Corroded plate / Ballast Engine No 11 / and the same detected and repaired. The boiler shell was eaten away at the Angle iron of the smoke box, the plate being reduced from 3/8" to bare 1/8" this was discovered by a hammer tapping test. I do not consider hydraulic pressure a test for Corrosion, it is more useful as a test for joints or new tubes and a check upon Spring balance safety valves. The only means of detecting Corrosion is by tapping the boiler carefully along the joints. There is however no certainty of detection, a bad place may escape through being encrusted and have no appreciable difference in ring from a sound plate. Boilers always get them at the joints whether butt or lap joint in course of time due to the Spring upon the plates by constant vibration causing friction between the angle Iron and the plate and

and also through the obstruction of the collar of the angle iron or plate forming a lodgement for deposit. The most effective and safest Kind of boiler plate in my opinion is that known as "thickedged plate" made at the Lowmoor Iron Works. This gives an extra thickness of metal at the place where plates always weaken. Our Water on the West of Salsette is very bad. I should be glad to adopt any means of preventing incrustation which takes place to a great extent. The Bombay Consulting Engineer / in his letter No 2811 / is evidently not aware of enormous expense which would be entailed if his suggestions were adopted. Engines run say 180 Miles a day every 18 Months therefore each Engine should have to be dismantled. He cannot know the expense of so doing. Removing tubes is a thing to be avoided as much as possible unless imperative. Each removal of tubes enlarges

these clearances

enlarges the holes in the Copper tube plate and in many cases needs new tubes. Tubes removed 8 or 9 times in this way would need a new tube plate or at least renewal to bore out. The expence of this would be enormous and with the indifferent means at our disposal in this Country a work of great time. Railway Companies would need their Engine Stock doubled to do it. I have known Engines run for 5 & 6 years without a tube being touched greatly to the Engines advantage.

Yours faithfully
(Sgd) G. Shenard
Loc. & Carr. Supt.

D. Logan Esqre
Acting Agent

(True Copy)
David Logan
Ag. Agent

No. 3015

GREAT SOUTHERN OF INDIA RAILWAY.
AGENT'S OFFICE,
NEGAPATAM, 12th May 1869

From

THE AGENT,
Great Southern of India Railway,

To

The Consulting Engineer
for Railways
Madras

SIR,

I have the honor to attach copy of the Locomotive Superintendents remarks in answer to your call / letter No. 1147 dated 28th April 69 / for further information with regard to the manner of examining and testing ~~boilers~~ Engines on this line

I have the honor to be
Sir
Your most obedient Servant
David Logan
Acting Agent

Great Southern & Indian Railway

219 Loco & Carr Supts Office

Bangalore 6th May 1869

My dear Sir

Consulting Engineer's letter No 147 returned

I did not reply directly to the para referred to as I do not agree with the views expressed by the Superintendents of the Bombay lines regarding the hydrostatic test needed or demanded by the fact of the Engines having run the number of miles mentioned. The expression thorough Examination" is qualified in the Consulting Engineers No 147 as meaning the removal of tubes. I am quite alive to the necessity of constant precaution and careful Examination with boilers to Ensure immunity from explosion if possible I quite think that when an Engine has run 150,000 miles she should be Examined, but as I stated in my former letter I disagree entirely as to what constitutes useful Examination I think that unless some cause be given, such as suspicion of the Engine State it is not Expedient to dismantle an Engine every two years or so. Our Engines No 1 to 9 could not be Examined

unnecessary

No 3015 2105

From
The Agent
G.I.P.R.
To
The Consulting Engr
for Railways
Bombay

No 388
Dated 12th May 1869
Recd 15th May 1869

Sir,

Attached copy of the Consulting Engineer's letter noted in the margin on the subject of the Examination of the Engines of the Great Southern of the 28th April 1869

as the Consulting Engineer proposes without
Entirely pulling them to pieces. The steam
house is over the fire box and no one, not a boy
can get inside the boiler without removing
longitudinal boiler Stays and fire box roof
Stays, unless this be done the taking out of the
tubes is useless as nothing at all approaching
an Examination of the Joints can be made
from looking through the tube plate at either end:
As I Explained in my former letter I have only
had the last pump 9 months, the system in force
here is such as is usually adopted to make English lines
Entries be made by the Drivers in the Red Books
of the General Condition of their Engines and if
any remarks are made Calculated to make the state
of the Engines Suspicious she is overhauled at once
When tubes leak or the 3 bottom rows the whole rows
are taken out and the boiler cleaned and the Engines
Lagging removed and the boiler Examined.
When an Engine has been running 2 years
She is stripped and Examined, if she requires
repair. But if she otherwise in good Condition
She runs until she comes in for repair. Of
our Engines but 3. Have been Examined and over
hauled Since I have been here just 2 years.
These 3 Engines I shall Endeavour to get into the
Shops when they require such a repair as will
bring them down to Negapatam. These 3 Engines
may have run about 100,000 miles. I keep a
record of the Condition of our Engines and the
nature of Examination they undergo, so that
no Case is wanting to Ensure their being in
good order.

Yours faithfully.
(Signed) E. G. Sheward
Loco & Car. Supt.

S. Logan Esquire
Ag. Agents.

/ True Copy /
Asst. M. D. Nasa Lopa
acting Agent.

25 P

Railway Department.

Consulting Engineer's Office,

No. 179-

From

Major J. H. M. Shaw Stewart M.C.E.
Consulting Engineer for Railways,

To

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

Sir,

With reference to G.O. No. 1098 of 5th April 1869, I have the honour to submit letters* from the Agents of the Madras and Great Southern of India Railways containing reports from their respective Locomotive Superintendents on the subject of testing engine boilers.

2 Both the Locomotive Superintendents consider that the force pump is useful as an auxiliary

*From the Agent M.C. No. 208-27-April 1869.
—do— G.I.P. No. 2288-23-April 1869.
No. 3115-12-May —do—

auxiliary test, but Mr Steward has objections to dismantling an engine which are not held by the Superintendents of the Madras Railway or the Bombay lines. His system appears to be to examine an engine only when it happens to be brought to the shops for repair or when it is unfavourably reported on by the driver. On the Madras Railway although engines are not all periodically examined, one of each class of engine is occasionally overhauled, the tubes removed, &c. This is taken as a guide as to the state of the boilers of the other engines working on the same division of the line. I consider that the precautions taken by the Loco = motive Superintendent of the

Madras Railway are sufficient, but I cannot say that I hold the same opinion regarding the Great Southern. I observe that the Agent of the latter line in a recent letter to his Board has requested that Mr Bruce's opinions be taken on the matter, and I recommend that his instructions to the Locomotive Superintendent be waited for, before further steps are taken.

Madras
3d June
1869

I have the honour to be
Sir,
Your Most Obet: Servt.
Rundlestuart Major RE
Cons: Comptr. for Railways

P. W. Dept.

No. 2112

Proceedings of the Madras Government

Under date the 29th June 1869.

Read the following

From the Com.r of Engineer

for Railways - (Here enter R.O 2338 d/ 3rd June 1869

Ordered that these papers

be forwarded to the Govern-

-ment of India.

The Comg Engr for Railways.

Desp. 30/6/69 Docket. No 2113 d/ 29th June/69.

Copy of the above for-

-warded to the Government

of India with reference to

their Pro: d/ 1st March/69.

No 243 R.

46/2

Desp. 30/6/69

Public Works Dept.
Railway Department.
No. 2338

From

The Consulting Engineer
for Railways.

To

The Secretary to Government,
Public Works Department,
Fort Saint George.

Dated 3rd June 1869.
Received 4th

No. 179-
Enclosure: R.O.

Submitting letters from the Agents to the Madras Railway Co. dated 29th ult. on the subject of testing Equine boilers.

Rd 2/113-29th June/69

Answered by Q. 115

2. Answered by Q. 115

Cue 2338

Govt. of {1869} Madras.

PUBLIC WORKS.

To The Consulting Engr for Railways

Dated

—

Recd. Encl. 6

G. O. 29 June 1869, No. 2112 & 2113

Nos. 650-651 & 652

Engine Boilers (Ry) Papers & orders on the letter from the Consulting Engr on the subject of testing Engine Boilers.

Engine Boilers (Ry) A copy of the Proc. on the subject of testing Engine Boilers, forwarded to the Govt of India.

C-8 June/69. (R). Ha

69.

Letter
the
-Ry
testing

AR TMENT.

rge.

382