

(1) Number of pages _____

(2) Date of repair _____

(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 19-6-1969.	

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 1,038, 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 1 in the number of miles mentioned. The expression "thorough examination" is quoted 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.

No. 208

MADRAS RAILWAY.

AGENT AND MANAGER'S OFFICE

Madras, 27th April 1869.

From

Robert B. Clennell Esq.,
Agent and Manager. of the M. R. Co.

To

Major J. H. Shaw Stewart, Esq.,
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 now 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.

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 were 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 Servant.
R. B. Clennell
Agent & Manager.

Madras Railway Company
Locomotive Superintendents Office
Percambore works, 23 April/09

To
The Agent and Manager

Dear Sir,

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 fireboxes.

For our own satisfaction,
we occasionally make a thorough
examination of a boiler of 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, here,
in a great measure, served as a guide
as to the state of the boilers of the other

MADRAS RAILWAY.

From

The Agent and Manager.

To

The Consulting Engineer

for Railway's

100/1-2338/09

Dated 29 April 1899
Recd 18.

M - No. 208.

Consulting Eng. of a
report from the only
man who is familiar
with the application of
the practice to the
boilers of the Madras
Railway for testing
the condition of the

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 circumstances 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. Extreme care and precaution have always been taken for the thorough internal and external examination of our boilers.

Para III. We make use of the 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 "mixed 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"

C3

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 Thirlby 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 auxiliary, 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 examina-
-tion of a Locomotive boiler is a
"very costly affair, there can be no
doubt it is not only the greatest safe-
-guard, but the surest mode of
preventing accidents."

Paragraph IV The maximum distance
an Engine may safely run, without
undergoing thorough examination
and repairs, varies on this Line
from 100,000 to 134,000 miles.

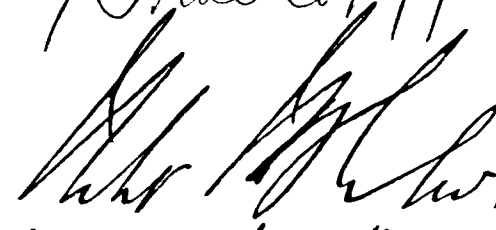
On examining many of our boilers
after running these distances we
found the Centre bottom plates
furrowed, inside, near the lap
joint, caused, no doubt, by the
sediment and the expansion and
contraction of the boilers.

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 consi-
-derably 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. Hollinson
Chg Loco. Superintendent

/ True Copy /

for agent &ellanagere

No 2988

13
GREAT SOUTHERN OF INDIA RAILWAY.

AGENT'S OFFICE,

NEGAPATAM, 23 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
David Logan
Acting Agent

Ms. 2988/69

N. 193
 Great Southern of India Railway
 Secy & Genl Supt. Office
 Negapatam 21 April 1869

My dear Sir
 Your No. 4388 & enclosure

When I arrived in India in 1867 I found there was no means of testing boiler joints or tubes in the Company's works. I ordered for a hydraulic press which arrived here on July 1868. Since then each engine as it 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 showing the original working pressure of our engines and that at which they are now working.

No. of engines	Time they have been working	original working pressure	Present working pressure	Hydraulic test pressure	
1 to 9	8 years	120 lb.	100 lb.	200 lb.	Coppage's engine
10 to 11	3 do	100 "	100 "	150 "	Ballant's do
12 to 15	2 do	120 "	120 "	200 "	Good's do
16 & 17	6 months	120 "	120 "	200 "	Good's do

Now
 The Comd.
 W. B. D.
 The Consulting Eng.
 Secy & Genl Supt.
 Negapatam
 21 April 1869
 Enclosure
 2048
 2038/69
 The Comd.
 Secy & Genl Supt.
 Negapatam
 21 April 1869
 Enclosure
 2048
 2038/69

It is noted that the original working pressure of our engines was 120 lb. per sq. inch. The present working pressure is 100 lb. per sq. inch. The hydraulic test pressure is 200 lb. per sq. inch. The engines are now working at 100 lb. per sq. inch.

There has been but one instance of
Corroded plate Ballant engine No 11
and this was detected and repaired.
The boiler shell was eaten away at
the angle iron of the smoke box, the
plate being reduced from $\frac{3}{8}$ " to $\frac{1}{8}$ "
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 balanced 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 joints in course of
time due to the spring upon the plates
by constant vibration causing friction
between the angle iron and the plate
and

17
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 plates in my opinion is that
known as "thick edged 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 Lichinopoly 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, from his letter No 211/
is evidently not aware of enormous
expense which would be entailed if his
suggestions were adopted. Engines run
say 180 miles a day every 16 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

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17
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forming a lodgement for deposit. The
most effective and safest kind of
boiler plates in my opinion is that
known as "thick edged 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 Lichinopoly 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, from his letter No 211/
is evidently not aware of enormous
expense which would be entailed if his
suggestions were adopted. Engines run
say 180 miles a day every 16 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

enlarges the holes in the Copper tube
plates and in many cases needs new
tubes. Tubes removed 8 or 9 times in
the way would need a new tube plate
or at least removal to hold out the
expense of the would be enormous and
with the indifferent means at our
disposal in the Country a work
of great time. Railway Companies should
not their Locomotive stock disabled by
it. I have known engines run for
5 & 6 years without a tube being
touched greatly to the engine's
advantage.

Yours faithfully

Geo. H. Sheward

Secy. Genl. Suptt.

D. S. S. S. S.

Acting Agent

(True Copy)

David S. S.

Ag. Agent

No. 3015

GREAT SOUTHERN OF INDIA RAILWAY.

AGENT'S OFFICE,

NEGAPATAM,

12 May 1869

From

THE AGENT,

Great Southern of India Railway,

To

The Consulting Engineer
for Railways

SIR,

Madras

I have the honor to attach copy
of the Locomotive Superintendent's remarks
in answer to your call letter No. 147
dated 28 April /69 for further information
with regard to the manner of ex-
amining and testing ^{boilers of} ~~locomotives~~ Engines
on this line

I have the honor to be

Yours most obedient servant
David S. S.
Acting Agent

Great Southern Indian Railway
 219
 Madras 6 May 1869

My dear Sir ...

Consulting Engineer letter No 147 returned.
 I did not reply directly to the point
 referred to as I do not agree with the views expressed
 by the Superintendent of the Bombay line
 regarding the examination made or desired
 due by the fact of the engine having run the
 number of miles mentioned. The Engineer then
 says '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 boiler
 to ensure immunity from explosion if possible
 I quite think that when an engine has run
 150,000 miles the boiler is examined but as I
 said 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 so
 prudent to dismantle an engine every two years
 or so. The engines No 1 to 9 could not be examined

accordingly

No 3015 2105

The Locals
 W. L. P. R.

The Consulting Engineer
 Great Southern Indian Railway
 Madras 15 May 1869

Attached copy of the
 Despatch to the
 Secretary for the
 Consulting Engineer
 of the 23 April 1869

to the ~~convenient~~ Engineer's ~~propose~~ without
substantially pulling them to pieces. The steam
couse 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
boiler 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 hot pump 9 months. The system in force
here is such as is usually adopted on all English lines
unless we make by the driver in the shed both
of the general condition of their engines and of
any remarks are made calculated to make the state
of the engine suspicious. She is overhauled at once.
When butts leak on the 3 bottom rods the whole men
are taken out and the boiler cleaned and the engine
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When an engine has been running 2 years
she is stripped and examined, if she requires
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our engines but 3 have been examined and over-
hauled since I have been here just 2 years.
These 3 engines I shall endeavor to get into the

23 127
shop when they require such a repair as will
bring them down to Nagasaki. These 3 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 one is wanting to ensure their being in
good order.

Yours faithfully,
Signed/ E. G. Sheward
Loco & Car Dept.

J. Logan Esquire
of Agents

1 Envelope
D. M. Lopez
acting Agent.

unusually

[Faint, mostly illegible handwritten text at the top of the left page.]

[Handwritten notes and signatures in the middle of the left page.]

[Handwritten notes and signatures at the bottom of the left page.]

CONSULTING ENGINEER'S OFFICE,

Railway Department

No 179-

From

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

To

Colonel L. A. Orr M.E.

Secretary to Government,

Public Works Department,
Fort Saint George

Sir,

With reference to L. O.

No 1098 of 5th April 1869, I have

[Marginal note:]
From the Agent M.E.C.
No 208-27 April 1869.

[Marginal note:]
—No— 4 Sept 1869
No 2288-22 April 1869.
No 3115-12 May—

the honour to submit letters from
the Agents of the Madras and Great
Southern of India Railways containing
reports from their respective Loc-
omotive Superintendents on the subject
of testing engine boilers.

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

[Faint, mostly illegible handwritten text at the top of the left page.]

[Handwritten notes and signatures on the left page, including a date '1869' and a signature 'J. H. Stewart'.]

[Handwritten notes and signatures at the bottom of the left page.]

CONSULTING ENGINEER'S OFFICE,

Railway Department

No 179-

From

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

To

Colonel L. A. Orr M.E.

Secretary to Government,

Public Works Department,
Fort Saint George

Sir,

With reference to L. O.

No 1098 of 5th April 1869, I have

[Marginal note:]
From the Agent M.E.C.
No 208-27 April 1869.

[Marginal note:]
—No— 2 of 1869
No 2288-22 April 1869.
No 3115-12 May—

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auxiliary test, but Mr. Sheward
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superintendents of the Madras
Railway or the Bombay line. 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

Madras Railways are sufficient;
but I cannot say that I hold the
same opinion regarding the Great
Northern. 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
3^d June
1869

I have the honour to be
Sir,
Your most Obedt. Servt.
Mantleworth Major R.E.
Comd. Engrs. for Railway,

26th Sept.
No 2112

Proceedings of the Madras Government
Under date the 29th June 1869.
Read the following

From the Cons Engineer
for Railways - (Here enter No 2338) 13 June
1869

Ordered that these papers
be forwarded to the Govern-
ment of India.

The Cons Engineer for
Railways.

Recd 20/6/69 Docket No 2113 d/ 29 June 69.

Copy of the above for-
warded to the Government
of India with reference to
their Pro: d/ 1 March 69.
No 243 R.

1084

46

Recd 20/6/69

1084

1084
No 2338
RAILWAY DEPARTMENT
for June

From

The Consulting Engineer
for Railways,

To

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

Dated 29 June 1869
Received 29

No. 179-
Serial: 1. 61

Substituting letters
from the Agents of the
Madras & G. I. R. Co.
on the subject of taking
Rapid Boilers.

2. 2112-2113-29 June 69

2. 2112-2113-29 June 69

1084

Cue 2338

Govt. of 1869 Madras.

PUBLIC WORKS.

The Consulting Eng^r
for Railways

Dated

1869

G O 29 June 1869 No 2112 &
2113

Nos. 650-6517-652

Engine Rules (Reg) Paper orders
on the letter from the Consulting
on the subject of testing Engine
Rules.

Engine Rules (Reg) A copy of
the P.O. on the subject of test-
ing Engine Rules, forwarded
to the Gov^t of India.

C-8 June 1869. H
the
2-11-69
copy
letters

65

69

1869

2338

ATTENT

C 4/11