

MADRAS RECORD OFFICE.

Government of Madras.

Judicial DEPARTMENT.

G.O. No.	444	Press ~~Mis.~~
	46.48	
Dated	21-4-	1857.

Not to be folded or roughly handled

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Fort St. George, Judicial Consultation, 21st April 1857.

Read the following papers.

- No. 46. From W. ROBINSON, Esq., Acting Magistrate of Malabar; to T. PYCROFT, Esq., Chief Secretary to Government, Judicial Department, dated 27th March 1857, No. 49.

SIR,

I have the honor to report the occurrence of a sad disaster at the Beypoor Iron Works on the 4th Instant about 6 A. M., through the bursting of a Boiler and to submit, for instruction, the accompanying correspondence from which it will appear that I have failed to secure the only available professional assistance in ascertaining the cause of the accident.

To G. H. Fenwick, Esq., dated
6th March 1857, No. 631.
From do do dated 7th
March 1857, No. 64.
To do do dated 7th
March 1857, No. 655.
To A. Sinclair, Esq., dated
7th March 1857, No. 654.
From G. H. Fenwick, Esq.,
dated 8th March 1857.
From A. Sinclair, Esq., dated
8th March 1857.

3 Dead.
1 Dangerously scalded.
2 Severely.
1 Compound fracture of legs.
Fatal and severe consequences.

7

2. Three men have already died from scalding and other injuries, and one lies in a very precarious state being frightfully scalded. Two other (one the native Engineer) are less severely so, and one poor creature has sustained a severe compound fracture. Other lesser injuries were sustained by persons about the premises. Some most wonderful escapes are recorded and had the accident occurred later in the day greater loss of life must have resulted.

3. This is the second fatal accident from the bursting of a boiler that has occurred on the works within 10 months.

4. The explosion on this occasion was tremendous. One portion of the boiler, $2\frac{1}{2}$ tons in weight, was thrown up high in the air and fell at a distance of 180 feet from where it had been in position; the laterite stones, &c., in which the boiler was fixed were thrown to great distances and fire destroyed some sheds.

* Mr. Hopfgartner.
Mr. Wood.

5. I have carefully examined the spot and condition of the burst boiler with a view to ascertaining the cause, and the Superintendent and European Engineer have freely communicated their opinion of the cause of the disaster.* Their Depositions are herewith forwarded.

6. The accident appears to have arisen from the fact that the boiler in question had been permitted to become exceedingly foul and covered with heavy incrustation. On these works they are obliged to use the water of the backwater, which being within tidal influence, is at all times brackish, and now, when little or no fresh water comes down, the river is nearly pure sea water. An incrustation of salt and mud collects on the bottom of the boiler at all times and is removed by manual labor from time to time. While the backwater is only brackish this interval may be longer, but when the water used is, as now, exceedingly salt, this incrustation forms so rapidly that if left unremoved, it increases to a great thickness. This was the case on the recent occasion and at the time this boiler burst, a heavy saline incrustation had formed over its bottom to the thickness of seven-eighths of an inch at the thickest part covering the whole of the bottom of the boiler in immediate contact with the main flue and fire place. Under this incrustation the boiler plates had become red hot. The plates being red hot, frightful accident was inevitable if by any way the water touched the glowing surface in consequence of the incrustation breaking up.

The appearance of the Iron plates clearly indicates that they were in this condition when the boiler burst and the charcoal dust over which the great mass of the boiler fell was ignited by the red hot iron.

The Native Engineer prevails on this point.

7. The condition of the valves of the supply pipes leave no sort of doubt that when the accident took place, the fresh water had been turned on to this boiler and that it was actually flowing into the boiler at the time it blew up. It is surmised that the Native Engineer may have let the water get low in the boiler. The quantity of heated water in the boiler being then insufficient to neutralize the effect of the cold water being introduced, a rapid contraction of the incrustation took place which cracked and broke up the incrustation under which the boiler plates had become red hot, the contact of the water with the red hot surface will suffice to account for the fearful force generated, and the manner in which the boiler has burst, or rather been torn up the centre, where the plates were hot and weak, leaves little reasonable doubt that this has been the cause of the disaster.

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8. The accident took place while the Engine and Boilers were in charge of a Native Engineer and one boy. The Superintendent had not visited the engine, &c., that morning. The accident occurred about 6. A. M.

9. There are two points for consideration in arriving at a just conclusion as to where responsibility lies. 1st, How far the Native Engineer in charge of the boiler is responsible. 2ndly, How far the general superintendence may be deemed to be held responsible.

10. It is surmised that the Native Engineer had let the water get low in the boiler and the consequences give weight to the surmise. He, on the other hand, denies it, and there is no proof of the fact. The steam whistle fitted to the boiler, which would have indicated low water, had been allowed to get out of order and was not repaired, and the only indicator was the ordinary float, which the Native Engineer avers indicated a sufficient quantity of water in the boiler. Be this as it may. There is, I think, no sufficient ground for the belief that he had let the boiler become quite empty and remain so long in which case only would the boiler plates have become red hot which was their condition at the time of the accident and caused the frightful disaster. Had the boiler been reasonably clean, the contraction caused by a supply of cold water might perhaps not have produced the effect it did in this instance.

11. On the other hand I think blame attaches to the management and superintendence. In the first place the management of 3 large boilers in full use and a 25 horse power engine are left, with slender supervision of the European Engineer, to a Mopla Engineer and a boy of 12 or 14 years of age. The European Superintendent of the Engine Department did not visit the engine that morning when a slight * accident occurred about 3 A. M. causing the stoppage of the engine for 2 hours. It may be a question whether this quote of management is a sufficient guarantee for safety of life. 2ndly, The boiler had been allowed to become so foul that incrustation of nearly an inch thick had accumulated, under which the boiler plates became red hot and the occurrence or not of a frightful accident became thus contingent on the circumstance of nothing occurring to produce even a slight fissure in this crust so as to admit of the water touching the red hot surface. The boiler had been in use upwards of 3 weeks and was kept in work even after the right time for having it cleaned. 3rdly, These boilers in which salt water is used are not fitted with the usual appliances found in all, and especially in Marine boilers for the prevention of this accumulation and incrustation of salt, &c. It has been pointed out to me that there is a plug at the bottom which may be used for blowing out deposits, but this is a point for a professional opinion. 4thly, In this particular instance the repair of the steam whistle with which the boiler is fitted had been neglected. Had this been in repair, its warning voice would have given notice of low water in the boiler if this had been the case, all over the premises. For these matters the Native Engineer is clearly not responsible. Mr. Wood is, I believe, the general manager of engines &c., but is not exclusively engaged on the department of the concern.

12. Under these circumstances I consider that an English Jury at an inquest would probably have at least administered a severe reproof in their verdict on these points, the more severe, as this is the second † accident of the description attended with fatal consequences which has occurred within 12 months on the works.

13. It must be at once evident that an enquiry of this description can only be prosecuted with professional aid. As above stated, I have been unsuccessful in obtaining this and therefore submit the papers for the consideration of Government and reference, if necessary, to the Law Officer.

14. It is with extreme regret that I bring forward this matter, for I believe that the management of the works has greatly improved and that there is an anxious wish with all parties to place the matter myself, I will do so by warning the Head of the works to use every endeavour to prevent recurrence of these disasters and I doubt not Mr. Beaumont who was unfortunately absent when the accident took place will take every reasonable precaution for the future. I must add that I trust I may be allowed so to settle the case.

(Signed) W. ROBINSON,
Acting Magistrate.

Fort St. George, Judicial Consultation, 21st April 1857.

From W. ROBINSON, Esq., Acting Magistrate of Malabar; to G. H. FENWICK, Esq., Resident Engineer, Beypoor, dated 6th March 1857, No. 631.

SIR,

A dreadful accident having occurred in the Beypoor Iron Works from the bursting of a boiler, I am in want of professional evidence as to the probable cause of such explosion to enable me to determine to what extent and where blame lies on the persons connected with the establishment and responsible for the superintendence of the engine and boiler and the proper and safe state of the boilers in use.

In the absence of any official person to refer to or a practical Engineer except those on the works, I have the honor to request that you will let me know whether you would feel yourself competent to give such opinion on the causes and whether you would object to examining the boiler and circumstances with reference to such enquiry.

(Signed) W. ROBINSON,
Acting Magistrate.

From G. H. FENWICK, Esq., Resident Engineer; to W. ROBINSON, Esq., Acting Magistrate of Malabar, dated 7th March 1857, No. 60.

SIR,

I have the honor to acknowledge the receipt of your letter of yesterday's date, requesting me to investigate and report to you the cause of the explosion of a boiler by which 2 persons have been killed at the Beypoor Iron Works at Mercat. I regret to inform you that I do not find myself in a position to offer any opinion as to whether the accident was caused by negligence or the working of imperfect machinery, not alone from professional etiquette to the Engineer of the works, but from causes over which I have no control. It is much to be regretted you had not the power to have had a jury empanelled, in that case my position would have been a different one, had I been called on for evidence.

(Signed) G. H. FENWICK,
Resident Engineer.

From W. ROBINSON, Esq., Acting Magistrate of Malabar; to G. H. FENWICK, Esq., Resident Engineer, Beypoor, dated 7th March 1857, No. 655.

SIR,

I have the honor to request that if you see no objection you will kindly allow this letter to be delivered to Mr. Sinclair.

Should you kindly accept my invitation of yesterday, possibly you would allow Mr. Sinclair to accompany you.

(Signed) W. ROBINSON,
Acting Magistrate.

P. S. Since writing the above I have had the honor to receive your letter of this date and beg you will kindly permit me to ask you to reconsider your determination. As the Magistrate examining the case I consider that I am justified in calling for such professional evidence as is available in the country on this point. I am afraid that some obscurity in my letter but it was with a view to your evidence in the enquiry that I asked whether you would kindly consent to examine the boiler &c., to enable me to determine what and where blame lies in the matter.

You will I feel sure excuse this second application and if possible consent to meet me on Monday morning at the works, when I propose prosecuting further the enquiry.

(Signed) W. ROBINSON,
Acting Magistrate.

Fort St. George, Judicial Consultation, 21st April 1857.

From W. ROBINSON, Esq., Acting Magistrate of Malabar; to A. SINCLAIR, Esq., Superintendent of Workshop of Madras Railway Company, Beypoor, dated 7th March 1857, No. 654.

SIR,

I have the honor to request that you will meet me at the Beypoor Iron Works on Monday morning, at 7 A. M., to examine and give an opinion on the cause of the late boiler explosion which took place there, as I have learnt that you have had that experience in this matter as would enable you to give a valuable professional opinion.

(Signed) W. ROBINSON,
Acting Magistrate.

From G. H. FENWICK, Esq., Resident Engineer; to W. ROBINSON, Esq., Acting Magistrate of Malabar, dated 8th March 1857.

SIR,

I am in receipt of your letter of yesterday's date in reply to mine of the same. I regret exceedingly that I cannot comply with your request "to consider my determination," however difficult the position you are placed in to obtain professional evidence in this business, it is not of a nature to justify me in acting unprofessional and discourteous to Mr. Beaumont. I will put the case thus, (and in doing so I feel assured, your sound and discreet judgment will lead you to conclude I am right) I will suppose that during my absence from this, an accident took place on the Railway, and that on my return I learnt, that Mr. Beaumont had at your instigation instituted an enquiry, as to the manner, in which I conducted the works intrusted to my charge. I should without hesitation express to Mr. Beaumont my displeasure, for so unprofessional an interference in that of tendering criticisms on my mode of conducting work; which criticisms, might be used to my detriment, legally, as well as professionally.

As regards Mr. Sinclair's evidence, I have handed him your letter, and the accompanying is his reply.

(Signed) G. H. FENWICK.

From A. SINCLAIR, Esq., to W. ROBINSON, Esq., Acting Magistrate of Malabar; dated 8th March 1857.

DEAR SIR,

Your note of the 7th Instant referring to boiler explosion at Beypoor Iron Works has been handed me through Mr. Fenwick's office. In replying to the same, I must most respectfully beg leave to decline meeting you in the examination of cause to boiler explosion at the works. My agreement with the above Company strictly prohibits me from employing my time and mechanical experience in any way except in their service.

Hoping this explanation will be satisfactory to you.

(Signed) A. SINCLAIR.

(True Copies.)

(Signed) W. ROBINSON,
Acting Magistrate.

Deposition of Charles Wood, aged 21 years, son of Richard Wood, Mechanical Engineer in the Beypoor Iron Works, taken before W. Robinson, Esq., Acting Magistrate of Malabar, on the 7th March 1857.

Question.

What position do you hold in the Beypoor Iron Works? Superintendent of Engines and Machinery and Workshops and of the Saw Mills now under erection at Chaliat.

Answer.

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State your opinion of the cause of the recent accident which took place at the Beypoor Iron Works?

My opinion of the accident is that it was caused by incrustation at the bottom of the boiler and want of a proper supply of water. The incrustation has taken place from the use of salt water in the boiler which causes a hard saline substance to precipitate and form at the bottom of the interior of the boiler, thus allowing the boiler plates to become red hot beneath this incrustation. At the same time the water in the boiler being let low and the temperature reduced by pumping a fresh supply of cold water causes the incrustation to crack, thus bringing the water in contact with red hot plates, the cause would be an excess of generating steam which the safety valves, another means of outlet, would be unable to carry off and an explosion must inevitably take place.

What reasons have you for supposing that a supply of cold water was passing into the boiler?

Because upon examining the valves, after the explosion, I found all other means of outlet except into that one boiler, closed, the water could therefore only be passing into that one boiler.

Do you consider that the incrustation have been allowed to become excessive?

I do, and consider that it accumulates from a general defective arrangement of pipes, pumps and valves.

Have you heard the above read over to you is it agreeably to what you have stated?

Yes.

(Signed) CHARLES WOOD.

(True Copy.)

(Signed) W. ROBINSON,
Acting Magistrate.

No. 47. From W. ROBINSON, Esq., Acting Magistrate of Malabar; to T. PYCROFT, Esq., Chief Secretary to Government, Judicial Department, dated Beypoor, 3rd April 1857, No. 53.

SIR,

1. Adverting to my letter, dated 27th Ultimo, No. 49, I have the honor to forward a copy of Dated 2nd April 1857. a report on the Boiler explosion at Beypoor, by the Resident Engineer of the Madras Railway Company, George Fenwick Esq., of Beypoor.

2. I had, at Mr. Beaumont's request, renewed my application to Mr. Fenwick for an opinion on the subject, and he promised to re-consider his determination. A longer delay however intervening than I had anticipated, I supposed that Mr. Fenwick's reluctance had revived, and consequently forwarded my report of the 27th Ultimo.

3. The opinion of Mr. Fenwick is, that the explosion took place in consequence of the boiler plates becoming red-hot and seems to think that the boiler had been allowed to become empty.

No reliable evidence will be procurable as to whether the boiler had been allowed to become empty, or whether the accident occurred while there was water, from the heating of the plates under the heavy incrustation which 3 weeks neglect to clean the boiler had allowed to accumulate. The main fact of the case must therefore I fear remain uncertain.

4. Mr. Wood is clearly to blame for not getting up when a slight accident stopped the engine, for an hour or two, and perhaps he is answerable, though in no way connected with this occurrence, for letting the boiler be so foul, but it would be difficult to re-but the evidence, that the boiler was not empty when the accident took place, and the general superintendent was probably equally, if not more to blame, for not seeing that the boiler was cleaned.

5. Nothing I fear can be made out of the case, I therefore trust that I may be allowed to dispose of it summarily, and doubt not that care will be taken to secure the works against the recurrence of such an accident.

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6. In England, it is usual I am aware to subpoena a professional gentleman with his fee. Mr. Fenwick has made no claim for such, but I would request the instruction of Government on this point, and beg to recommend its being offered.

(Signed) W. ROBINSON,
Acting Magistrate.

From G. H. FENWICK, Esq., Resident Engineer; to W. ROBINSON, Esq., Acting Collector and Magistrate of Malabar, dated 2nd April 1857.

SIR,

Agreeably to your request, and that of Mr. Beaumont, I beg to inform you that on the 17th Instant, I made an examination of the boiler that burst at the Works of the East India Iron Company at Mercat, on the 4th Instant, by which accident, 2 persons were killed. I think I shall be better understood if I divide my report into 3 parts as follows:

1st. The state in which I found the boiler.

2ndly. The probable cause of the explosion.

3rdly. The measure that ought to have been taken to prevent an explosion.

With reference to the boiler it was one of a cylindrical form with conical ends from 30 to 35 feet in length, and from 4 to 5 feet in diameter, the plates appear to have been well welded together, having the usual lap and thickness three-eighths of an inch, and I am disposed to think the material generally good, judging from the fractured parts, the lower portion I found to be burnt to a great extent, so much so, that the bolts in one place are a perfect mass of calx, on examination of the interior of the boiler I found there was a deposit or incrustation of a semi-saline substance of about three-eighths of an inch (and I am told some had been removed much thicker,) it was in no way vitrified and was of a soft nature, so that it could easily be broken between the fingers, it was not of a kind to produce boiler scales, the engine had been worked without gauge, or blow off cocks, there was a float, and an apparatus for blowing off.

Having described the state in which I found the boiler, I will now speak of what I consider was the cause of the explosion; at the same time I must observe that in all cases of explosions there is a great diversity of opinion more or less, even among the most practical men of the day as to causes; I should therefore wish it to be understood, that what I am about to state is merely an opinion drawn from what I have seen of such cases, and after an examination of all the facts, I arrive at this conclusion.

"That owing to a temporary derangement of the pumps, the fires had been neglected to be damped down during the time, the supply of water not being kept up, the lower portion of the boiler became red-hot, and that when the pumps were again set to work, the cold water thrown in, coming in-contact with the hot-iron, an immense body of hydrogen gas was produced, and hence the explosion."

I am doubly led to believe this was the cause, judging from the lacerated state of the boiler, and distance the fragments were forced.

Having given my opinion as to what I consider was the immediate cause of the explosion, I will now comment on the evidence.

Evidence of Mr. Charles Wood, who had the charge of the Engine.

Question. To what do you attribute the accident to?

Answer. Defective Pumps, and Feed Pipes.

Question. How long have they been so?

Answer. Ever since I have been here.

Question. When the Engine man came and told you that the pump rod was bent, do you not think you ought to have got up and gone down?

Answer. I did not think it a matter of sufficient consequence to go down for.

I regret I cannot but think Mr. Wood greatly to blame in this instance, for by his own admission the pumps and feed-pipes were defective, it was therefore a double reason why he should have given extra attention to the working of the same, instead of which, when he is told of the

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stoppage owing to the pump-rod being bent, he did not think it of a sufficient consequence to get out of bed for, notwithstanding he was well aware, as a practical man, what the result might be, if not immediately attended to.

Question. Do you happen to know what the thickness of the seating walls were?

Answer. No.

Question. Do you ever resort to hard-firing?

Answer. Occasionally.

It is too often the case that the seating walls are made too thick for the purpose of reducing the consumption of fuel, the heating surface in consequence is not only reduced, but the temperature on the plates is uneven, and to get up the power quickly, what is termed "hard-firing," is often resorted to which is detrimental to the boiler; I had not the opportunity of judging what thickness the above mentioned walls were, as they were thrown down by the explosion.

Question. When was the boiler cleaned last?

Answer. Three weeks ago.

Question. Do you never use vegetable or animal matter in the boiler.

Answer. Never.

I must here remark that by the new "Factory Act," it is provided no boiler is to be worked longer than a week, without being cleaned, this clause applies to boilers that are at rest, generally 6 or 8 hours out of the 24. The boiler in question, it must be remembered, was at work without intermission day and night.

Having given my opinion as to what I consider was the cause of the explosion, it only remains for me to state what measures I consider ought to have been taken to have ensured safety. Considering that the boiler in question, had once before met with the same accident, I am disposed to think it would have been better had there been extraplates at the bottom, as well as stays at intermediate distances.

I think no boiler ought to be worked without gauge-cocks, as well as blow-off cocks, but I must here remark that even had these appliances been attached to the boiler, in the present case they would have been of no avail, since the Engineer did not think any thing, going wrong with the Engine was of sufficient importance, for him to get out of bed for; I must further remark, that I think it most reprehensible that an ignorant native should be left a whole night in charge of an Engine, as we know from the indolent habits of natives they will lay down and sleep at the side of danger, and moreover that when a difficulty presents itself, they will too often abandon their charge.

I think therefore it would be a great security, to those employed as well as employers, if it was made imperative that no Engine should be allowed to work without a qualified person being always present.

In concluding this report, I feel that I ought to do Mr. Beaumont the justice to state that I received from him every assistance and information, in carrying out your request; and I must further remark, that he took every precaution, within his reach, to prevent accidents, not only did he provide an extra boiler, so that they might be more often cleaned without detriment to the purposes of the work, but he also gave directions that gauge cocks should be attached to the boilers.

(Signed) G. H. FENWICK,
Resident Engineer.

(True Copy.)

(Signed) W. ROBINSON,
Acting Magistrate.

No. 48.

ORDER THEREON, No. 444; dated 18th April 1857.

The Government do not feel themselves called upon to give any opinion upon the accident at the Bepoor Iron works reported in the above letters. The case should be dealt with by the

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Acting Magistrate in such manner as the circumstances may seem to require. Mr. Fenwick is entitled to remuneration for his examination of the boiler and works. Mr. Robinson will offer him such a fee as appears to him suitable.

(Signed) T. PYCROFT,
Chief Secretary.

Egd. F. Cartledge

REGISTERED No 4

HONBLE EAST INDIA COMPANY'S ELECTRIC TELEGRAPH 50

MESSAGES, (not exceeding 16 words,) can be sent any distance not exceeding 400 Miles, at a charge of 1 R.
Ditto 800 2 ..
Ditto 1,200 3 ..
Ditto 1,600 4 ..
No charge made for delivery within half a mile of the Office; a charge of 1 anna a mile for all distances beyond that.

Message from Calicut to Madras
From Magistrate of Malabar to Chief Secy to Govt

Number of Words 27 Service Repetition Price

To delay orders on my letter dated twenty seven March on the boiler explosion at Beypoor with reference to further report by post.

W. Robinson
Actg Magistrate

Electric Telegraph Office,
Madras
The 21st April 1857

W. Paragawood
Inspector in charge

No inquiry respecting this Message can be attended to without the production of this Paper.
Despatched 8-35 PM N. B.—Please enter time of delivery

6a
Judicial Depart.

N^o 581-548

From the Acting Magistrate of Malabar
Dated 27th March & 3rd April 1837

In Orders

I do not see - that Govt are
called upon to give an opinion
at all respecting this audit -
the investigation is left to the
the ordinary course of law.

Mr. Amwick who has a pen

My th _{ly}
Wm. G. G. G.

for not seeing that the boiler was cleaned.

5.^a Nothing I fear can be made
out of the case, I therefore trust that I
may be allowed to dispose of it summa-
-rily, and doubt not that care will be taken
to secure the works against the recurrence
of such an accident.

In England it is usual I am
aware to subpoena a professional Gentleman
with his fee. Mr. Fenwick has made no
claim for such, but I would request the
instruction of Government on this point
and beg to recommend its being offered.

I have the honor to be,

Dear

Your most Obedt. Servant

Dr. Varnum

Acting Magistrate -

From Mr. H. A. ... 27 March 1857

The fact does not seem to be ...

... when the accident at the Bay ...

... that is that manner as the ...

... of the ...

... 46 @ 46 ...

3rd April 1857

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