

Public Works (1899) Department.

G.O., No. 2008 W

DATED 28 July 1899.

[Despatch Abstract.]

Report of the Inspector of Steam Boilers & Prime-
movers, Madras:

Pro: L & M Dept, Comtg: to the
Municipal Councils of Madure, Dindigul,
Trichinopoly, Tanjore, Coimbatore, Kurnool
& Cuddapah the G.O. P.W. D on the _____
and requesting them to carry out as far as ^{practicable} ~~possible~~
the recommendations of the Inspector, recorded

CURRENT No. 5720

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From
The Locust Municipal Dept.

Order No. 2008 W d / 28-799

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Dated 17-7-99.

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SUBJECT.

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Report of the Inspector of Steam
-boilers and Prime Movers in Madras
Communicating to the
Municipal Councils of
Madura, Dindigul, Trichinopoly,
Tanjore, Coimbatore, Bangalore
and sending all the GO ORDERS
on the — and requesting them
to carry out as far as possible

BACK PAPERS.

FURTHER PAPERS

Government {1899} of Madras.
PUBLIC WORKS.

} 1899.

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G.O., No. 1607 W., 17th June 1899.

JUNE.

Stating that the portion of the second Annual — containing remarks and suggestions on the inspection of municipal pumping stations be considered in the Local and Municipal Department; and directing, with remarks, the publication in the *Fort St. George Gazette* of the portion relating to inspections under the Act, for the information of owners of boilers.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

READ—the following paper:—

From H. T. WALTERS, Esq., Inspector of Steam-boilers and Prime-movers, to the Secretary to Government, Public Works Department (through the Sanitary Engineer to Government), dated Madras, 16th May 1899, No. 152.

I have the honour to forward, herewith, the annual report of this department for 1898-99.

ENCLOSURE.

The Second Annual Report of the Inspector of Steam-boilers and Prime-movers, 1898-99.

The number of licenses issued during the year 1898-99 was 144, the number during the previous year having been 139.

2. In the appendix to this report are given two statements, A and B, the former of which includes all the boilers licensed in Madras, while in the latter are exhibited those for which licenses have been refused either because they were condemned outright or because the repairs required were not executed.

3. When boilers could not, on account of the peculiarity of construction, be entered for internal examination, they were subjected to stratic test. In cases of Lancashire and Cornish boilers which require testing every three or four years, only those that showed doubtful parts were subjected to hydraulic pressure in view of removing any doubt from the Inspector's mind as to its true condition. This refers more particularly to plates that indicated signs of having become cracked. It is satisfactory to note that the boiler mountings were generally more free from leakage than on previous inspections; this will prove of great value to owners.

4. Metallic zinc having been recommended to arrest corrosion, it was adopted by a large number of owners. Those who renewed it as often as it became absorbed have thereby greatly improved the internal conditions of their boilers as its continued use will save the boilers from early decay. A few of the owners did not take the precaution to renew it after its absorption, and the result was that little or no good was effected by its meagre use. The firms concerned were informed of the necessity for the renewal of zinc from time to time and the objection to using copper or brass wire for suspending it.

5. In boilers which are employed for driving fire engines and do but little work during the course of the year, pitting is most destructive owing to absence of work and exposure to air. To put a stop to this, advice was given to have all joints made air-tight, and before tightening up out and at the same time closing the valve. The burning waste would destroy the destructive gases in the air which is the real cause of the pitting found in boilers so exposed.

6. For the prevention of the grooving of the bottom front end of furnaces in Lancashire and Cornish boilers by the rubbing of fire tools, it was suggested that vertical bars be suspended horizontally underneath the furnace doors and bent to half a circle at bottom for the reception of a furnace plates. In the case of grooving of fire hole rings, shield plates were recommended to be fitted to the top side of the bottom half of fire hole ring extending nearly half of its circle and of sufficient width to cover the rivet seam of back plate of combustion chamber. These were adopted in the case of a large number of boilers.

7. Boilers that were found with a large quantity of scale last year proved to have received proper attention by the fact of their being found much cleaner; this timely attention removes the possibility of the plates becoming burnt, and is conducive to economy in consumption of fuel, as $\frac{1}{8}$ " of scale increases the consumption of fuel about 9 per cent.

8. Fusible plugs were maintained free from scale.

9. It will be observed from statement A in the appendix that several of the boilers have had their pressure reduced, especially those of the vertical type. This was in a large measure due to the weak construction of the furnaces. The owners were informed that the furnaces could be strengthened sufficiently for an economical pressure by putting in from one to four circumferential rows of screwed stays according to the size and thickness of furnaces and the safe pressure that could be allowed on the other scantlings of the boilers. This method was adopted only in a very few instances, the others preferring reduction of pressure. It is stated for general information that this mode of staying the furnaces is easy to accomplish and attended with little expense, while the fitting of bowling rings or rings of like nature cannot be effected conveniently owing to the number and position of cross pipes in the furnaces. In some instances, reduction was due to fair wear and tear and weakness of tube plates, and in others to defective welding. The persons concerned were advised to specify, when ordering new boilers, that the welded seams should be of the same thickness as the plate of which the weld is made.

10. The pressure of a few of the boilers was raised over that sanctioned in the previous year, as the parts which were then found weak had been strengthened or renewed as circumstances demanded. This was done only after the sanction of the Sanitary Engineer to Government was obtained as required by the rules.

11. During this year a boiler was brought into Madras which had not been open to inspection during the period of construction. It was subjected to a reduction in pressure of 50 per cent. which made it worthless for the purpose for which it was intended. This proves the necessity for having boilers inspected prior to purchase, thereby avoiding delay and unnecessary expense.

12. Several boilers required the fitting of additional safety valves, gun metal fulcrum pins in lieu of iron ones and of additional stop valves, the alteration of the position of stop valves and fixing blow-out apparatus flanges with three or four studs instead of two.

13. A few of the owners were refused licenses owing to their boilers requiring new furnaces, patching of shells and renewal of tubes.

14. To the best of the knowledge of the undersigned no accident or failure of any boiler licensed for the year occurred.

15. As several deficiencies were found to exist in the rules in respect to the inspection and examination of boilers, proposals were made to rectify them. The Sanitary Engineer having placed the matter before Government, the proposed rules were published inviting suggestions in regard thereto.

16. In view of giving effect to the suggestion made in paragraphs 13 and 15 of the last annual report for placing the boilers in charge of men certified under the Act, Government desired the Sanitary Engineer to report how he would propose to bring into force sections 14 to 20 and 23 (d) of the Act. In response, the Sanitary Engineer submitted a set of rules which have been published for suggestions to be made thereon.

17. The question of extending the operation of the Act to the mofussil was raised by Government who forwarded draft rules to the Sanitary Engineer for the expression of his views thereon. This officer having replied, Government directed him to furnish certain information respecting the financial aspect of the question. This was done, and the subject is under the consideration of Government.

18. The following are the details of the inspection of the pumping stations of certain district municipalities:—

Kurnool.

Number of times inspected —Two.

Number and description of engines and pumps.—Two vertical compound non-condensing engines and centrifugal duplex pumps.

Number and description of boilers.—Two semi-portable multi-tubular boilers of 9 N.H.P. each.

Remarks.—The consumption of oil for lubricating purposes was high, $4\frac{1}{2}$ pounds being used for every ten hours' work. From actual trial, it was found that two pounds were sufficient for the same period of time, and that, if kerosine oil were used instead of cocoanut oil, a saving of one hundred rupees will be effected. It was also suggested that if sight feed lubricators be fitted, better lubrication and further economy in oil would result.

(i) The wood used for generating steam having been found to be expensive, it was proposed that good Indian coal be purchased, as a saving of Rs. 1,300 a year should follow its use.

(ii) Minor additions to the present stock of tools for the use of the driver were suggested.

(iii) The plant is, in general, in good working order.

Cuddapah.

Number of times visited.—Two.

Number and description of engines and pumps.—Two single cylinder non-condensing engines and centrifugal pumps.

Number and description of boilers.—Two semi-portable multi-tubular boilers of 5 N.H.P. each.

Remarks.—Recommendations were repeatedly made for certain repairs to be executed to both engines and one of the boilers, and it was pointed out that the delay in doing so would be conducive to greater expenditure on account of repair and increase in consumption of fuel. Little or no action was taken and the consequence was that the parts that were in good condition became defective, and the cost of fuel consumed was more than what the proposed repairs would have cost.

(iv) The neglect to carry out the instructions given and the non-attention to repairs necessitated the refusal to grant permission for the working of the boiler above referred to. The serious state of affairs was thereupon reported to the Sanitary Engineer who brought the matter to the notice of Government.

Conjeeveram.

Number of times visited.—Three.

Number and description of engines and pumps.—Two Worthington compound non-condensing engines and Worthington pumps.

Number and description of boilers.—Two semi-portable multi-tubular boilers of 12 N.H.P. each.

Remarks.—As the boiler flues and chimney took up much time and caused much expense for cleaning purposes, and as the draught was not sufficiently strong to produce proper combustion, the Inspector, under the orders of the Sanitary Engineer to Government, designed two chimneys and arranged them to be placed directly upon the top of the boiler smoke boxes extending in a vertical direction above the boiler house-roof which did away with the original flues. The chimneys were manufactured in Madras, and were, under the supervision of the undersigned, put up by the staff at the pumping station. It is presumed that the chimneys will repay their cost in less than twelve months by the saving in fuel and labour.

(v) Various recommendations were made for the good repair and the upkeep of the plant to which the council is devoting its attention.

(vi) The general condition of the plant and the consumption of stores compare favourably with those of other stations.

Tanjore.

Number of times visited.—Three.

Number and description of engines and pumps.—Three triple expansion surface condensing engines and Worthington pumps.

Number and description of boilers.—Three water tube boilers of 16 N.H.P. each.

Remarks.—The boiler combustion chamber walls having fallen into bad repair, their condition was reported to the council, and a thorough repair was carried out. It was shown that much expense could be avoided if they adhered to the old proverb of a stitch in time, but several changes in the appointment of the drivers caused much inconvenience by the neglect of the outgoing drivers to keep the plant in thorough repair. Efforts are being made by the present staff to put the machinery in good condition, and it is anticipated that a better report can be made at the next inspection.

(vii) Attention was called to the necessity for prompt action in attending to indents of the drivers for the working of the plant and the material required for repairs and improvements and the increase of the staff of fitters until the plant is brought to a state of efficiency.

(viii) The consumption of fuel at this station has been and is abnormally high owing to the bad condition of the plant and the bad quality of the fuel used, wood being the fuel. It is under contemplation to recommend coal for fuel in future, which, no doubt, will be readily adopted. This would have been done some months ago had it not been for the rise in its price. Should a reduction not take place at an early date, possibly arrangements will be made for burning liquid fuel, if favorable results are obtained after the experiments which are at present carried on by some of the firms in Madras.

Trichinopoly.

Number of times visited.—Four.

Number and description of engines and pumps.—Five triple expansion surface condensing engines and pumps.

Number and description of boilers.—Three water tubular boilers of 22 N.H.P. each and two semi-portable multi-tubular boilers of 4 N.H.P. each.

Remarks.—Light repairs to engines, boilers and pumps were pointed out as necessary, as also alterations, additions and renewals of a minor kind. The council is giving its attention to the matter.

(ix) Retrenchment in consumption of oil was suggested which should result in a good saving.

(x) The main pumping station is the most economical of all others of the kind in consumption of fuel. This is due to good dry wood, the selection of which is entirely in the hands of the Superintendent in charge who possesses practical experience, and therefore knows the quality that will best suit for steaming purposes and be economical as well.

(xi) The stock of wood fuel at the sub-station is allowed to become almost exhausted before any more is obtained; the result is that, throughout the year, green wood has to be depended upon for generating steam. It is a universal fact that wood, when just cut, is of little value as fuel. It was pointed out that a good stock of wood must be maintained, so that perfectly dry wood would always be available. If this suggestion be carried out, great economy should result at this station also.

(xii) The general condition of the plant at both the stations is good, and the stations are well kept in every way.

Dindigul.

Number of times inspected.—Two.

Number and description of engines and pumps.—Two vertical non-condensing engines with single acting deane pumps.

Number and description of boilers.—Two semi-portable multi-tubular boilers of 5 N.H.P. each.

Remarks.—Several light repairs were recommended, and steps were taken to rectify the parts accordingly and to renew the minor parts of the engines.

(xiii) Light feed lubricators were suggested in view of better lubrication and economy and were purchased.

(xiv) Owing to the bad quality of wood in use, coal was recommended and adopted with favourable result.

(xv) The general condition of engines, boilers and pumps is good.

Madura.

Number of times visited.—Three.

Number and description of engines and pumps.—Three triple expansion compound surface condensing engines with Worthington pumps.

Number and description of boilers.—Three semi-portable multi-tubular boilers of 8 N.H.P. each.

Remarks.—The three engines at this station were subjected to a general over-hauling during the year under review, and several of the parts were renewed as the original ones were worn out through fair wear and tear. Such repairs and renewals have been and are the means of saving 25 per cent. of fuel daily. The cost of repairs and renewals will, therefore, in a short time, be paid back by the reduction in fuel.

(xvi) It having been found expedient to have a supplementary feed pump for boilers, one was obtained, fitted and so arranged that in the case of the failure of the feed pump of any one of the boilers, the former may be worked without delay. Steam traps were also fitted to the steam pipes to obviate water entering into the engine cylinders when under steam.

(xvii) Further retrenchment in the consumption of oil has been suggested.

(xviii) The quality of coal used is worse than that of the coal used on previous inspections, as good coal is not obtainable in the Madras market. The percentage of loss by non-combustible fuel recovered from trials held was 27.46.

(xix) Indicator diagrams were taken from the engines, and the power of the pumps determined.

(xx) The plant proved to be in a state of efficiency.

19. Inventories of valuable stock were maintained.

20. Service registers were duly maintained and kept up to date.

21. The discharge of the duties by the staff was satisfactory.

MADRAS,
16th May 1899.

(Signed) H. T. WALTERS,
Inspector of Steam-boilers and Prime-Movers.

No. 648.

Forwarded.

17th May 1899.

(Signed) J. A. JONES,
Sanitary Engineer to Government.

No. 1607 W., 17TH JUNE 1899.

ORDER—No. 1607 W., dated 17th June 1899.

With his letter read above, the Sanitary Engineer submits the second Annual Report of the Boiler Inspector appointed under Act III of 1893. The report, which is for the period 1898-99, also contains remarks and suggestions made on the inspection of municipal pumping stations. This portion of the report will be considered in the Local and Municipal Department, and the portion relating to inspections under the Act will be published in the *Fort St. George Gazette* for the information of owners who will doubtless derive profit from the useful and practical suggestions made by the Inspector for the preservation and strengthening of boilers.

2. It is satisfactory to learn that, so far as the Inspector is aware, no accident or failure of any boiler duly licensed has occurred.

3. The revised rules for the inspection and licensing of boilers referred to by the Inspector have since been issued, and the proposals for the extension of the Act to the mofussil and for the grant of certificates of competency to persons in charge of boilers are now under the consideration of Government.

(True Extract.)

(Signed) W. B. DEWINTON,
Secretary to Government.

To the Superintendent, Government Press, for the publication
of paragraphs 1 to 17 of the report.

„ Sanitary Engineer.
„ Local and Municipal Department.

Local and Municipal Department.
Order, No 1014 M. Ins., dated 17th July 1899.

*Communicated to the Municipal
Councils of Madurai, Dindigul, Trichinopoly,
Tanjore, Coimbatore, Kurnool and Bellary,
who are requested to carry out, as far as
practicable, the recommendations of the
Inspector. (True Extract)*

For Secretary to Govt.

*To, The Chairman, Municipal Council, Madurai.
Dindigul
Trichinopoly
Tanjore
Coimbatore
Kurnool
Bellary*