

Judicial (1895) Department.

ORDINARY MS.

G.O., No. 929

Dated 6th May 1895

INDEXED.

2-511
6-497

[Despatch Abstract.]

NEW PETROLEUM TANK AT RAYAPURAM.

Sanctioning, subject to certain condition, the erection by Messrs. Best & Co., of a new petroleum tank within the present enclosure of the petroleum installation at Rayapuram, and stating that a license for the use of the installation will be issued on Messrs. Best & Co's., furnishing a complete description of the new installation.

2500 tons tank
Abandoned

BACK PAPERS.

[illegible]

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.
2258			95				
C1075	97						
Cuo 2221	97						

Cno 2548/97

Handwritten: 115/2492

NOTE FOR THE *Under Secretary.*

8. of 6 may 95, no 929 7002
has as ordered been issued ^(in the)
without ref. to H.M. But
should not ~~col~~ the C.E.'s
reply be now subd. to H.M.
for perusal with ref. to his
remarks "I should like to know etc",
please?

I don't think it is
necessary
D
101.15

10-5-95

NOTE FOR THE CHIEF SECRETARY. ²

May the order issue without
ref. to B.H.M. From the
Chief Engineer's note it is evident
that the suspected objection
does not exist.

2
1.5.55

to Mr
S. G. B.
2/5

[6]
2,000-23-1-95.

Current No. 867

DEPARTMENT.

From

Messrs. Best & Co.
Madras

Petroleum Rules.

329/93 } 50

1169/93 }

No. 10 1. 4 Jan 93 hrs
H. H. H.

Dated 20. 2. 95

Received 22/2

Enclosures 1 new plan
+ a plan incl to
Inst. C. No. 5489.

SUBJECT.

Reqⁿ sanction for the erection
of a new tank within the
enclosure of the
present Petroleum installation
at Royapuram.

To The Public Works Dept.

M. 26/2/95

Acco: 28. 2. 95

Encls 2 plans.

1506

1921: 10. 8. 94 hrs
Co. 1443: 13. 6. 94 hrs
No 2688 23. 12. 93
1629: 12. 8. 93 } Le
1168: 19. 6. 93 }
779: 18. 4. 93 hrs
349: 15. 2. 93
1874: 24. 1. 93 hrs
1. 4. 1. 93

Endorsement. 27. 2. 95
No. 406

Referred to the Public Works
Department for favor of early sanction.

Attested by

Under Secretary.

CH 782

Madras 20th February 1896.

CHIEF SECRETARY
22 FEB 1896
GOVERNMENT OF

The Chief Secretary
to the Government of Madras,
Fort St. George.

Sir,

We have the honor to enclose herewith a plan of our Petroleum Installation at Madras, upon which is indicated the position of another storage tank we wish to erect, the dimensions of which are, 64 feet diameter by 34 feet 10 inches high and designed to hold 2500 tons of Petroleum, or approximately 700,361 Imperial gallons. (The net capacity is 699,972.5 Imperial gallons.)

From the plan it will be observed that the tanks already erected are enclosed in a corrugated iron shed, and upon the advisability of dispensing with a shed over the new tank, we beg to quote the opinion of Mr Robertson Redwood, F.R.S.E., etc., etc., London, a recognized authority on Petroleum, and one who has had a large experience of its transport and storage in bulk.

"It is not unnatural that the introduction into tropical countries of the system of importing, storing and distributing Petroleum in bulk, should in the first instance have been viewed by the authorities with some apprehensions; and that exceptional precautions, not adopted in temperate climates, should have been enforced in the interest of public safety. Obviously the particular conditions in
respect.

2 5
respect to which special arrangements for storage were held to be essential were (1) the generally prevailing higher atmospheric temperature, and (2) the greater heating effect of the sun. Accordingly some of the storage installations were designed to maintain the oil at the lowest temperature which the circumstances of the case rendered possible, the tanks being with this view covered with a shed roof or constructed with a flat roof forming a receptacle for water. These systems have not however been carried out in all cases, and now that considerable experience has been gained, there is an opportunity of comparing the various principles, and of forming an opinion in respect to their relative merits from the point of view of safety, and deducing therefrom a conclusion as to whether the exceptional methods referred to should still be insisted upon or advocated.

"During the past quarter of a century I have had ample opportunity of observing the conditions under which the Petroleum industry is conducted in many parts of the world, including India, and I am distinctly of opinion that although the action taken in the first instance by the authorities of Eastern ports in prescribing unusual conditions of storage may have been justified by the novelty of bulk storage in tropical countries, the covering of the tanks with a shed roof should no longer be required. I consider that the results which have attended the employment of unsheltered tanks in Yokohama, Kobe, Nagasaki, Singapore, Penang

Penang and Bangkok, as well as of a large number of similarly unprotected tanks in the Railway compounds in India, satisfactorily demonstrate that a shed roof is not necessary; and I may add that the adoption of the shed roof system may introduce a risk which the ordinary arrangement is free from. Neither Petroleum as a liquid, nor Petroleum vapour, is explosive per se, and it is only when mixed with a considerable proportion of air that Petroleum vapour becomes explosive. If vapour is generated in the part of a tank unfilled with the liquid, in consequence of the heating of the oil, the introduction of a flame through an opening in the top of the tank may cause an explosion if the proportion of vapour to air is comparatively small, but if the space were filled with vapour to the exclusion of air, as would be the case if the oil were much heated, the vapour would simply ignite at the opening on the approach of a flame and continue to burn quietly, just as coal-gas burns at a gas-burner, until the opening was closed. The risk of ignition of the vaporous contents of a Petroleum storage tank is, however, one which need not be seriously considered, the possibility to which attention has to be directed being that of the ignition of vapour escaping from the tank. From this point of view it will be clear from what has been already stated, that the diffusion and dispersion of the escaping vapour should not be interfered with, and it is evident that the use of a shed roof would tend to prevent this.

The vapour
will escape if
the tank is
shed is kept
open. It is
lighter than
air.

WMS 8/95

As regards the alternative system under which the tanks are furnished with a receptacle for water at the top I may remark that my experience of such tanks (which have not infrequently been erected in temperate climates) is not such as to induce me to think that there would be any advantage in the general adoption of such a principle of construction in tropical countries. The cooling effect on the oil exercised by the water is inconsiderable, and it is not an uncommon experience for the whole of the water to be swept out of the shallow receptacle by high winds.

"On the whole, therefore, it appears to me that there are not sufficient grounds for interfering with the erection in tropical countries of unsheltered Petroleum storage tanks such as are employed in temperate climates."

Our own experience of the past two years confirms the above opinion and we think special attention should be directed to the likelihood of Petroleum vapour accumulating inside the shed, more particularly during the operation of refilling the tanks. Petroleum vapour is heavier than air and a ventilator in the roof of the shed is of little practical value in carrying off the gas emitting from the tanks, while the oil is being taken in. The natural diffusion of the gas is a question of greater importance than maintaining the oil at a slightly lower temperature, and in our opinion a strong reason for the shed being dispensed with.

We may mention that in addition to the unsheltered tanks.

Keep the sides open

therefore it can be seen to the roof

We can do both by keeping the sides of the shed open

cutting 8.95

New to shed in shed poor app

86
banks erected in the East at the places specified by Mr. Robertson. It might be said that our friends in Calcutta have received permission to erect one at Budge Budge of 2500 tons capacity without a covering shed, although the first four erected, have it.

I hope not. We trust therefore that Government will be pleased to sanction the erection of this tank without asking us to go to the expense of building a shed over it.

2. A bund or retaining embankment has been constructed around the present tanks capable of holding their full contents should an explosion or other accident occur whereby the tanks would be partially or wholly destroyed.

So far as we know an accident of this nature has never occurred, and while not denying the possibility of an explosion being caused inside a Petroleum tank we have good grounds for stating, that such an explosion would not result in wrecking the structure to the extent of making it incapable of retaining its contents.

The ends of a hollow cylinder subjected to internal pressure are the weakest parts of it, in as much as the surfaces are flat and exposed to greater strain than the cylindrical portion. If then, as is the case in a Petroleum tank one end - the roof - is made of considerably lighter material than the rest, the result of an explosion would be a removal of the roof plates to allow the accumulated pressure inside to exhaust itself into the atmosphere.

The roof of these Petroleum tanks as will be seen from the

8/4/95

It seems
to them
beyond
doubt
because
they do
not want
to be put
down
superior
to a tank.

6 9
the plan is supported on principals fixed to the top of the side plates and has no direct connection with the bottom. The plates are very thin and lightly riveted, sufficient to keep them from being removed by the wind and no more, and it seems to us beyond doubt that the roof only, would be the part to suffer, as well from its being the weaker end of the cylinder as its extremely light construction.

It might be argued, that in the event of the roof being blown off by an explosion there would be an escape of oil were the tank to sag in one direction due to its not being a perfect cylinder; but the principals for carrying the roof, which also form the stays to bind the sides together at the top, and keep the structure rigid, are much more securely fixed to the sides of the tank than the roof plates are to the principals or to one another, and if an explosion did take place it would simply be the plates that would suffer, leaving the principals intact.

We have considered what is to our minds the most serious accident that could happen to a Petroleum tank and although so far as we are aware the point has never been practically demonstrated we have every reason to believe that our estimate of the damage is a reasonable one.

The possibility of such an accident ever happening need not be seriously considered as the tank we propose to erect has only three openings in the roof; a manhole, a ventilator, and a sounding hole, all capable of being securely locked. Should any damage be sustained to the valves or pipes

7 10
pipes outside, to the danger of flooding the place with Petroleum,
the internal pipe, shown on the plan of the tank can be immediately
hoisted clear of the oil and all communication with the outside
stopped.

In bringing the foregoing to the notice of Government
we are desirous of showing as clearly as possible that the erection
of another tank within the present enclosure does not necessitate
increasing the capacity inside the bund from the point of view
of safety, as the chance of it ever being required for the
purpose for which it was constructed seems to us very remote.

We shall be much obliged if early orders are passed
on the above, as all the material has to be ordered from
England and we are experiencing much difficulty in keeping
a sufficient stock of oil, with the limited storage accommo-
dation at our disposal.

We have the honor to be

Sir,

Your obedient servants,

Sept 4/80

Enclosures.

1. Plan of Installation and
surrounding land
2. Plan of Tank.

Twel

E

[9]
2,000-23-1-00

Current No. 2013

Judicial DEPARTMENT.

From the P. W. Sept

E

Issue No. 378.

Dated 23^d } apl's
Received 23^d }

Enclosures C No 867 with rules, etc.

SUBJECT.

Stating that the Chief Engineer
Sees no objection to the erection
of the proposed new tank by
Messrs. Best & Co.

MR 23/A

1500: 19.6.94 mis
1431: 12.6.94 "
1264: 24.5.94 "

Refers to 406195 papers

80 1921: 10.8.94 mis.
1443: 13.6.94 "
1629: 12.8.93 sc
1168: 9.6.93 sc
779: 18.4.93 mis
2349: 15.2.93 sc
233: 1.2.93 mis
184: 24.1.93 "
1: 4.1.93 "

For orders.

As to whether the plans may
be approved subject to the remarks
of the Chief Engineer? The applⁿ for
license must be made thro' the President
Madras Mun. Comⁿ - vide Rule 15 of P.O.
12 June 1894 No 1431, Judl, mis.

Government of Madras.

PUBLIC WORKS DEPARTMENT.

MEMORANDUM.

ostacammund,
Dated Madras, 23rd April 1895.

Letter from Messrs Best & Co. dated 20 July 1895.
Endt in Judicial Dept. No. 406 d/27 " "

Note by the Chief Engineer P.W.D.
dated 18 April 1895:—

The Chief Engineer sees no objection to the erection of the new tank inside the present bund and agrees with Messrs Best & Co. in thinking that no addition to the capacity of the latter is required, but he thinks it very inadvisable to dispense with the shed over the tank, the value of which in protecting the tank from the direct rays of the sun, cannot be over-estimated. The disadvantages anticipated by Messrs Best & Co. will disappear by keeping the shed open at the sides.

(S.) John Pennycook. C.E.
Chief Engineer P.W.D.

13/

Urgent

transferred to the Judicial
Department.

Amos — Samuel H. E.

Secretary to Government, P. W. &

Ref. to
Ref. to

D
23h

To

The Judicial Dept.
with papers.

23h

Note for the Secretary to
Gov. P. W. & D.

This to honour to submit the
accompanying file with the
request that a reply to H. M.'s
over against the note for order may
be obtained from the Chief
Engineer

David Davidson
y under Sec.

27.4.95

on the draft

Again G.O., dated

189 , No.

Again G.O., dated

19 , No.

Current No.

867

of 1895, dated 20 Feb'y. from

1. Meero Bst 4 (9 Madras

Current No.

2013

of 1895, dated 22nd April from the P. W. D.

ORDER. 6 May 1895, No. 929.

Personally, I should have thought that it wd. require safety, without the covering sheet, but I am not prepared to go against the opinion of the C.E. So far as that goes, therefore, the ~~old~~ order may issue -

I should like to know, however, whose property the site of these tanks is, & whether it will not be affected by the claims for the canal from the harbour to the Breckin Canal basin. I have an idea that the land ~~now~~ ^{now} will have to be taken up in order to make room for the canal or some of the subsidiary works. I see, it is not so wise to allow of the erection now of this tank, for the removal of which Govt may have to pay a few months wages - Please ask the C.E. - He will know.

28

26/4/95

I do not know where present
the Canal is, but it will not
be in the canal with the Canal
which passes to the South of
it - D. W.

* not until the Refractor
has been approved.

The proposed erection of a new ^{petroleum} tank
thru the present bund is approved subject
to the condition that ^{a shed open at} the ~~necessary~~
^{the sides} ~~is~~ ^{be} constructed over the tank
as advised by the Chief Engineer.

2. A license for the use of the ^{new installation} issued on ^{12.5.1911} furnishing ^{three} ~~two~~ installations will be ~~forwarded~~ ^{sent} to the President of the Madras Municipal Commⁿ; complete description of the new installation view to its being entered in the license & payment of the necessary fee to the municipality.

$$\frac{2}{25} = 4.95\%$$

10
2574195

Messrs Brost & Co. Madrid. 9 Jan. 1873
 A. . . 20135
 with plans returned
 signed by the U.S.
 The President, Madrid. Com. M. P. 10.

Note. Write the U.S. kindly sign both the plane
5th refer to para-3 of go 99me93 n.o.16 D. T. 11/6/66

Handwritten notes at top of left page, including "16" and "17 at Page 1".

Large handwritten letter 'E' in the center of the left page.

Marked E is Messrs. Beate
Co. requested orders on
20.2.95 of the P.W.D. reply to a
ref. the note is only received
(2 days ago) D

I don't mind the paper being
marked urgent. That was right enough.
But if it was urgent, why did the
despatcher or Clerk take
the paper to my house, knowing
perfectly well that it should not
be there when the cart arrived, but
at the Govt. office? He should have
some sense rubbed into him.

Handwritten signature and date: 26/4/95

in given for copying _____
in copied _____
on examined _____
on signed _____

189

IS AGAIN G.O., No. _____
189

DATED

CURRENT No. _____

ENCLOSURES TO C. No. _____

ORDER OF GOVERNMENT

A A A A A A A

LETTER OF GOVERNMENT.

STATEMENT WITH DITTO.

PAPERS NOT FILED UP, BEING MEANT FOR DESPATCH
IN ORIGINAL.

N.B.-
A = Copy in full.
B = Not to be copied.
F = Copy abstract only.
Q = Copy heading only.