KARJAT MUNICIPAL COUNCIL
KARJAT

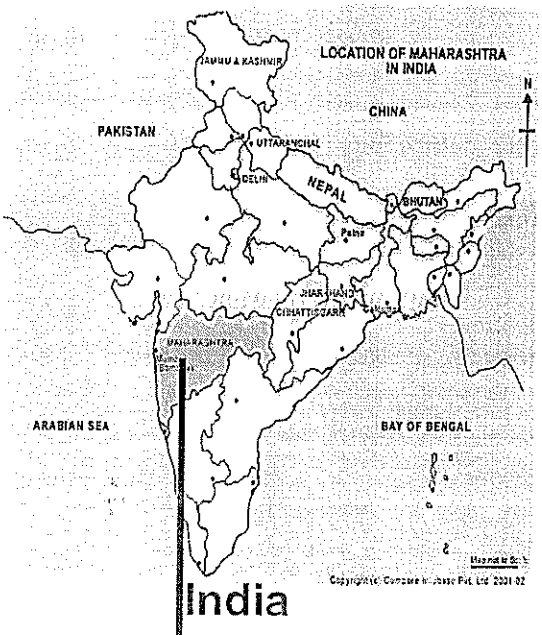
DIST – RAIGAD, MAHARASHTRA

Instalation of Gas Cremator at – Mouje Dahivali, Karjat

PROJECT FINANCED BY

MMR – Environment Improvement Society
&
Karjat Municipal Council

Location of karjat City



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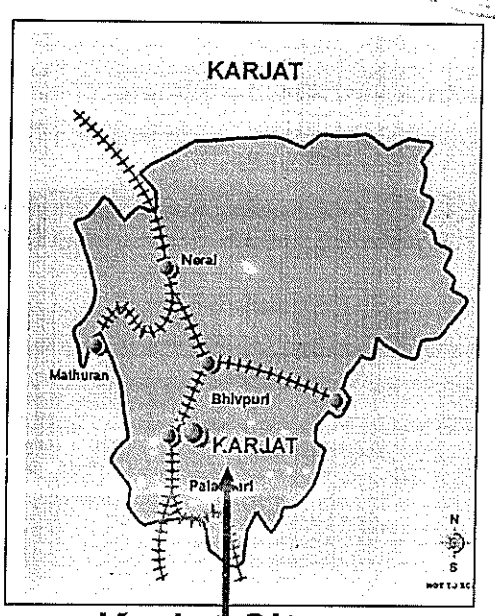
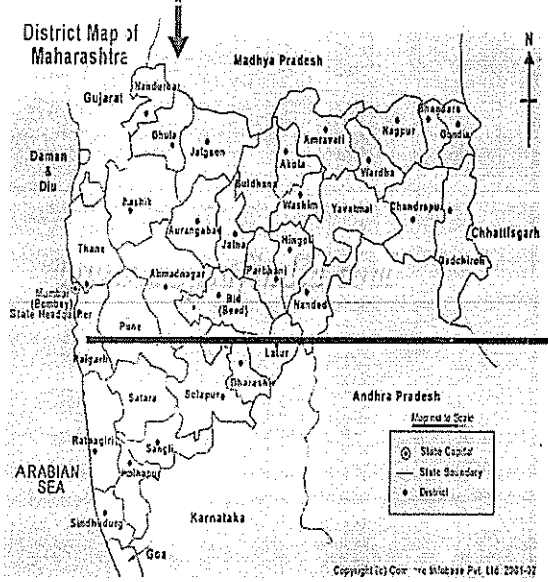


Karjat City



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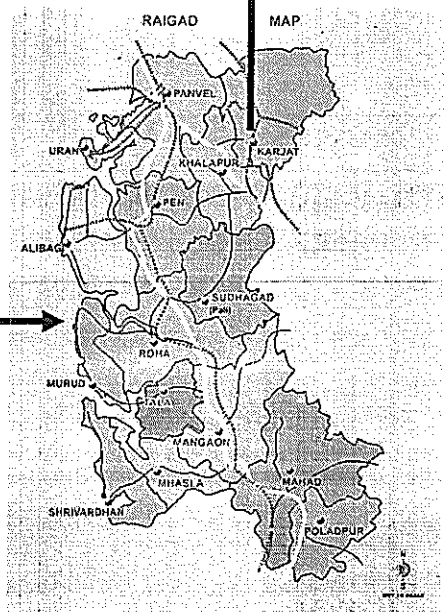


MMRDA Region

Raigad District

INTRODUCTION

In Karjat Municipal Council, Dahivali Smashanbhoomi, only traditional wood pyre system was used to cremate dead human body.

One Hindu cremation means felling down one fully-grown tree. With the rise in population and reduction in forest cover the ecological balance is disturbed.

The tracitional cremation system gives out lot of foul smell, flying Ash and smoke. All said and done the old system is very clumsy, painful and polluting. The shortage of firewood and Non-availability of dry wood is also a problem.

With the rise in population and reduction in forest cover the ecological balance is disturbed. The traditional cremation generates nearly 45 kgs. of ash which in turn pollutes water resources, nallahs etc. Also nearly 212 Kgs of CO_2 is released in the atmosphere after the each cremation carried out on woo. The shortage of fire wood and Non-availability of dry wood is also a problem, which leads to use of rubber tyres or rubber powder in cremation which is hazardous to human life. Normally at every cremation on wood minimum quantity of 5 ltrs of Kerosene is used to get rid of wet wood.

After careful study of Hindu cremations and its adverse effects on environment by Karjat Municipal Council, alternatives of Electric, Diesel and LPG cremator, such as installation cost, operating and maintenance cost, area required and functioning were Compared and under the guidance of MMR – Environment Improvement Society. It was observed that LPG cremator will be more suitable as the number of cremations

per day will be less, functioning of the LPG cremator found to be less complicated and LPG cremator can be operated by comparatively less trained staff. Considering above points Karjat Municipal Council decided to install the LPG cremator with S. S. scrubber & 30 M tall chimney. The estimate was prepared for Rs. 59,51,201/- (Rs. Fifty nine lacs fifty one thousand two hundred one only) and the tender was called. The lowest – rate tender of M/s Chirantan Udyog 8 – Basement, Swarlata Apartment, Gokhale Road, Thane was accepted & the work order No 2067/10-11, date 30/12/2010 was issued to them.

M/s Chirantan Udyog has completed the work of construction the RCC foundation, LPG cylinder shed & cremator hall as per the drawings approved by Karjat Municipal Council.

M/s Chirantan Udyog completed the installation work complete with the civil work required to house the LPG cremator on 01-02-2013. The trials were taken on unclaimed bodies & the LPG Cremator was commissioned on 01-03-2013 was put into the use for public.

BENEFITS:

Till today we have carried out 62 cremations on LPG and thus we have saved 9052 sq.ft of forest land, 2752 Kgs of ash and 13156 Kgs of CO_2 from being generated and released in to the atmosphere. In the cremation on LPG no kerosene is required and therefore 310 liters of Kerosene is saved from being used.

(The table is attached)

FUNCTIONING OF LPG CREMATOR:

LPG cremator functions on the bottom hearth furnace principle. Before putting the furnace in to actual use for the dead human body cremation, the cremator needs to be pre heated up to 350^0 C. For the pre heating, the operator should turn on the regulators of 24 cylinders. Open the cremator door to full. Start the air blower for three minutes. After the cremator is purged with the fresh air the burner is fired with auto ignition system. The pre heating takes hardly 10 minutes. With this the furnace gets ready for the cremation. This is absolutely necessary, as this is also the test to check if all the other operations of the furnace are working properly. After the pre heating the cadaver should be put on the roller conveyer. And the roller conveyer will oad the body on to the already heated hearth. After the cadaver is loaded on hearth, the door will be closed and the gas burners fitted on the back of the cremator will be fired. At the same time, the ½ HP water pump of the water scrubber will be put on. The hot air will be passed through the water scrubber and while doing so the flue gases will get scrubbed by sprinkling the water. From water scrubber gases will be released to the atmosphere at the height of 30 Meters. After approximately one hour the cadaver will be completely cremated and the bones will be left, just sufficient for the last rituals, which will be raked out and handed over to the relatives.

The water used in the water scrubber is collected back and re circulated after settling down. Coagulates are used to help the settlement. The top water becomes clean and is re circulated. Sedimentation is removed periodically.

COMPARATIVE STATEMENT BETWEEN L. P. G. CREMATOR, ELECTRIC CREMATOR & CREMATION ON WOOD

Sr. No.		LPG Cremator	Electric Cremator	Diesel Cremator	Cremation on Wood
1)	Capital Cost	Capital Cost of LPG Cremator is Rs.60,00,000/- (Sixty Lacs)	Capital Cost of Electric Cremator is Rs.130,00,000/- (One Crore thirty Lacs)	Capital Cost of Diesel Cremator is Rs.57,00,000/- (Fifty Seven Lacs only)	Cremation grounds are available. Stone or Surat pattern pyres are installed at every place. Rs. 1,50,000/- (Rs. One Lac Fifty thousand only
2)	Time Frame for manufacturing and installation at site	LPG Cremator super structure fabrication will be made in factory Installation on site requires 4 to 6 weeks. Total time required is 6 months	Erection of the electric Cremator is complicated. Chimney needs special flue ways & Electric Connections are High Tensions Connections, leading to the extended period of 18 months or more.	Diesel Cremator super structure fabrication will be made in factory. Installation on site requires 4 to 6 weeks. Total time required is 6 months	4 weeks on site.
3)	Internal Construction	LPG Cremator has very simple internal construction. The burners are fitted from outside. If the need arises, burners can be serviced from outside without	Maintenance of the Electric Cremator is very time consuming & complicated process needing highly skilled workmen. The heating elements get	Diesel Cremator has very simple internal construction. The burners are fitted from outside. If the need arises, burners can be serviced from outside without	Simple construction.

		shutting down the Cremator for long periods. A semiskilled workman can replace the burners in 30 minutes. The down time is as low as1 %	short frequently & bricks are broken to reach at these elements, resulting in delay in putting the Cremator to work again.	shutting down the Cremator for long periods. A semiskilled workman can replace the burners in 30 minutes. The down time is as low as1 %	
4)	Power Requirement	LPG Cremator works on power of 7.5 KVA 3 phase AC supply. Does not need any kind of transformer. 10 HP power is sufficient. LT connection	Electric Cremator needs 90 KVA power & a separate transformer & High Tension connections. 15 HP blowers are used.	Diesel Cremator works on power of 7 5 KVA 3 phase AC supply. Does not need any kind of transformer. 10 HP power is sufficient. LT connection	No power is required.
5)	Civil Work	A simple shed of 35' x 20' x 15' height is required.	Basement or mezzanine type civil structure is needed.	A simple shed of 35' x 20' x 15' height is required.	N. A.
6)	Combustion Process	For smokeless and complete combustion and conversion of carbon to carbon dioxide, heat and fresh air containing Oxygen in ample quantity are needed. All these things are provided in the LPG Cremator. The air supply does not harm the cremator.	If fresh air is supplied to Cremator, the cold air reduces the life of the heating elements and less supply of fresh air gives rise to pollution.	For smokeless and complete combustion and conversion of carbon to carbon dioxide, heat and fresh air containing Oxygen in ample quantity are needed. All these things are provided in the Diesel Cremator. The air supply does not harm the	Combustion is not controlled. Wind condition, rain and wood quality decides the rate, quality & time of combustion. The heat loss is abundant. People throw in rubber tyres, powder in the pyre, which causes air pollution.

				cremator.	
7)	Pre Heating Time	The pre heating temperature of 500% C is reached in 25 minutes. The Cremator can be switched off when not required.	It takes 6 to 10 hours to reach the pre heat temperature. It is, therefore, required to keep on, even if the cremation is not in process.	The pre heating temperature of 500% C is reached in 25 minutes. The Cremator can be switched off when not required.	No pre heating
8)	Area Required	70 Sq. Meter simple shed.	225 Sq. Meter structure with basement or mezzanine is required	70 Sq. Meter simple shed.	70 Sq. Meter
9)	Weight	Approx 9 M.T.	Approx 15 M.T.	Approx 9 M.T.	Approx 0.6 M.T.
10)	Workforce & approx. Annual Expenditure	1 semi skilled Worker for each shift is required	3 Workmen (skilled men) are required per shift.	1 semi skilled Worker for each shift is required	2 Workmen for each shift are required
11)	Cremation Time	60 Minutes (Approx.)	60 Minutes (Approx.)	60 Minutes (Approx.)	120 Minutes (Approx.)
12)	Maintenance	Burners & blowers are fitted outside of the Cremator case and so are easily accessible for cleaning and replacement. Hence very short time is required for repairs.	Heating elements are imported and are fitted along the bricks. Any maintenance is possible only after the furnace cools down. It requires minimum 2 weeks period for repairs.	Burners & blowers are fitted outside of the Cremator case and so are easily accessible for cleaning and replacement. Hence very short time is required for repairs.	Cast iron grates need periodical replacements.
13)	Fuel consumption per cremation	16-18 KG. LPG is required for one	Cremator is to be kept switched on for	25 – 27 Liters of Diesel required for	450 to 500 Kgs. of wood with 5 litters of

		cremation.	24 hrs. 365 days.	one cremation	kerosene required.
14)	Stand by power	A 7.5 KVA Diesel Generator set can generate required power supply in case of emergency.	A huge generator of 150 KVA will be required. This will raise the capital cost further. No standby power is provided.	A 7.5 KVA Diesel Generator set can generate required power supply in case of emergency.	Not required.
15)	Ash Generated	1 Kg. of bones are left.	1 Kg. of bones are left.	1 Kg. of bones are left.	50 Kgs. of ash containing bone particles is left.
16)	Water Pollution	No water is used in process except for the Scrubber which is treated before leaving to drain.	No water is used in process except for the Scrubber which is treated before leaving to drain..	No water is used in process except for the Scrubber which is treated before leaving to drain.	Ash is thrown in water and the water is polluted to great extent.
17)	Air Emissions	Since Combustion is complete, no odor or smoke is emitted.	Combustion is not complete. Give foul smell.	Since Combustion is complete, no odor or smoke is emitted.	Heat, flying ash, smoke & odors are left to air. Approximately 65 CM smoke, containing carbon Monoxide on large scale, is emitted in the air during first 15 minutes.

WOOD PYRE:

CONSUMABLES: The woo pyre consumes about 450 Kgs of wood , 5 liters of Kerosene per cremation

COST: Cremation costs 450 X Rs.6 = Rs. 2700

WASTE GENERATED: Ash generated 45 Kgs per cremation

CARBON RELEASED TO ATMOSPHERE 225Kgs per cremation

LPG CREMATION:

COSUMABLES: 16 Kgs of LPG is required per cremation.

COST: 16 Kgs X Rs.106 = Rs.1696

WASTE GENERATED : No Ash is generated.

CARBON RELEASED TO ATMOSPHERE 12.8 Kgs per cremation

From the above it can be seen that each cremation carried out on LPG saves Rs. 1004 directly and indirectly saves on Carbon pollution of about 212.2 Kgs. Along with that each cremation on LPG also saves 212.2 Kgs of CO_2 and 44.39 Kgs of ash from being generated.

In Dahiwali Smashanbhumi Karjat, where the Gas cremator is installed with the funding from MMR – Environment Improvement Society, we have, since 1st March 2013, till date carried out 62 cremations on LPG and thus We have saved Rs. 62248/- along with 9052 Sqft of forest land, 2752 Kgs of ash and 13156 Kgs of CO_2 from being generated.

PROCEDURES FOR THE OPERATING OF LPG CREMATOR

- Open the LPG valves. Start from the cylinders. Please note that at a time only 24 cylinders are to be connected and put on.
- Open the furnace doors completely and fire the pilot burner
- Then fire the main burner
- After the burner and the flame is settled slowly shut the furnace door
- Pre heat the furnace for about 10 minutes prior to actual cremation process starts
- The furnace should be heated to 300^{0} C
- Put off the main burner
- Do not close the pilot burner
- Open the furnace door and load the cadaver in to the furnace
- Keep the furnace door half open
- Fire the main burner
- Start the water scrubber pump motor
- After the burner and the flame is settled slowly shut the furnace door
- Raise the temperature of the furnace up to 750^{0} C
- Be alert near the furnace for 60 minutes
- After 60 minutes put off the main burner. Cadaver will turn to ashes
- When the cremation complete put off the LPG cylinder valve for all 24 cylinders one by one
- Put off the main valve near the separator
- Put off the burner valve of main burner
- Now finally put off the pilot burner
- Rake the bones out after the furnace is cooled down

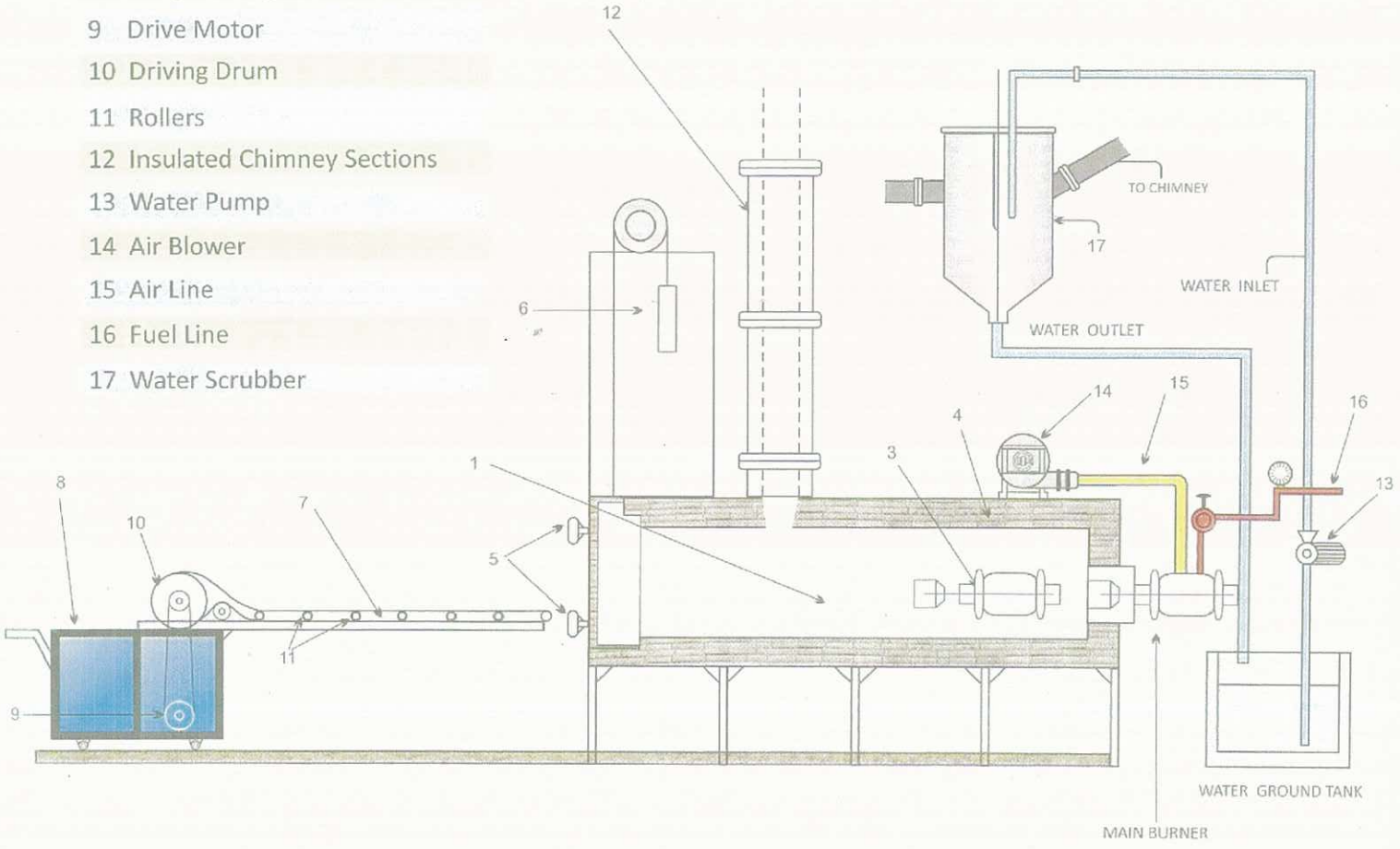
Water scrubber

- The capacity of the water tank is 200 liters per hour.

- The water used in the water scrubber is collected back and re circulated after settling down. Coagulates are used to help the settlement. The top water becomes clean and is re circulated. Sedimentation is removed periodically.

Schematic drawing of the chirantan cremator

1 Combustion chamber
2 Main Burner
3 Auxilary Burner
4 Refrectory Lining
5 Door & Locking
6 Counter weight balanced door
7 Metal Mesh Belt
8 Body Loading Mechanism
9 Drive Motor
10 Driving Drum
11 Rollers
12 Insulated Chimney Sections
13 Water Pump
14 Air Blower
15 Air Line
16 Fuel Line
17 Water Scrubber

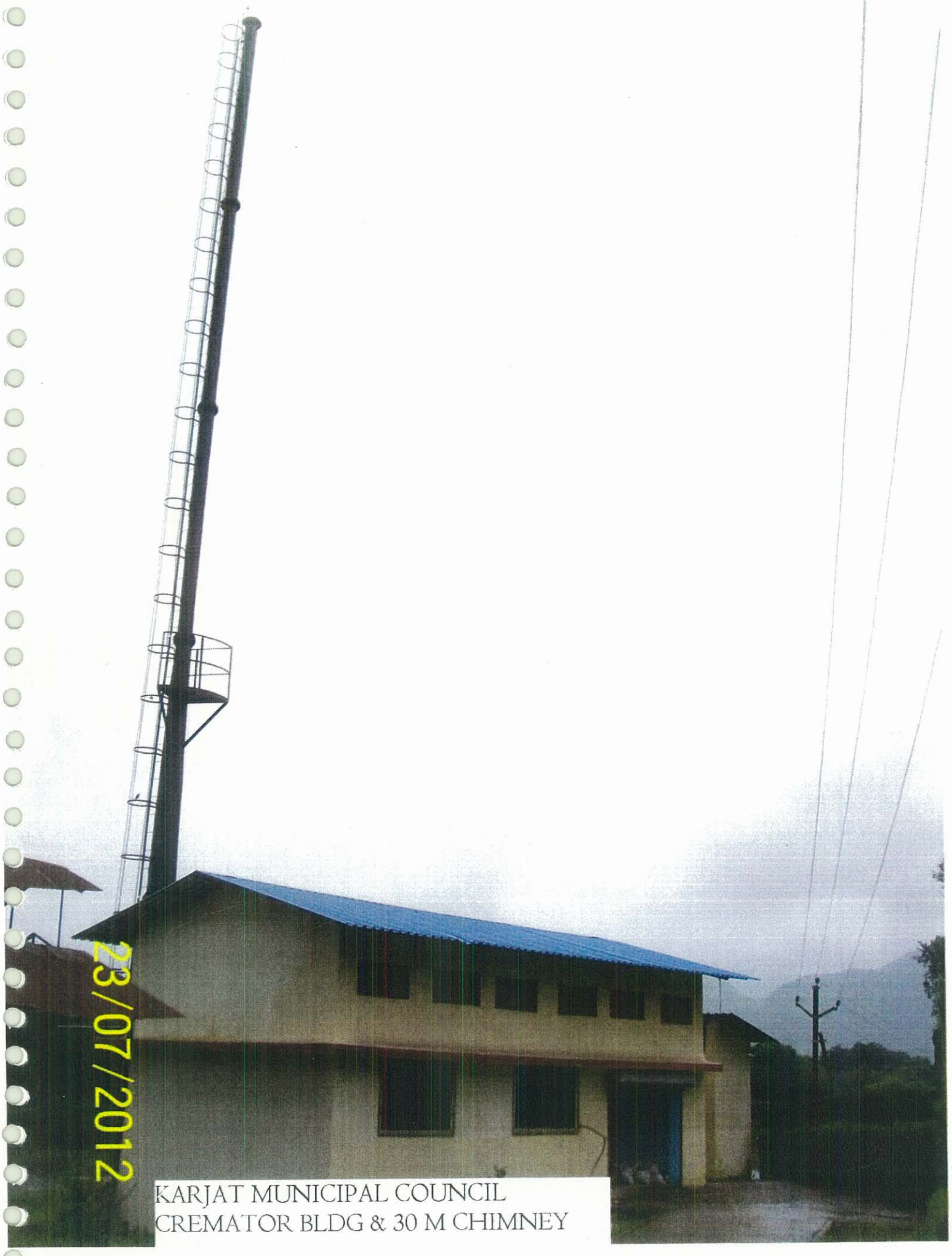


karjat Nagar Parishad

Dahiwali Smashanbhumi LPG Cremator

Total Cremations till 31/01/2014 - 62 Nos

Sr No	Particulars	Wood	LPG	No of cremations	Total per cremations on wood	Total per cremations on LPG	Saving
1	Cost per cremation in Rs.	2700	1696	62	167400	105152	**62248**
2	Kerosin used per cremation in Ltrs	5	0	62	310	0	**310**
3	Forest Area Destroyed per cremation in Sqft	146	0	62	9052	0	**9052**
4	Ash generated per cremation in Kgs	45	0.61	62	2790	37.82	**2752**
5	CO_2 emitted per cremation in Kgs	225	12.8	62	13950	793.6	**13156**



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CREMATOR BLDG & 30 M CHIMNEY


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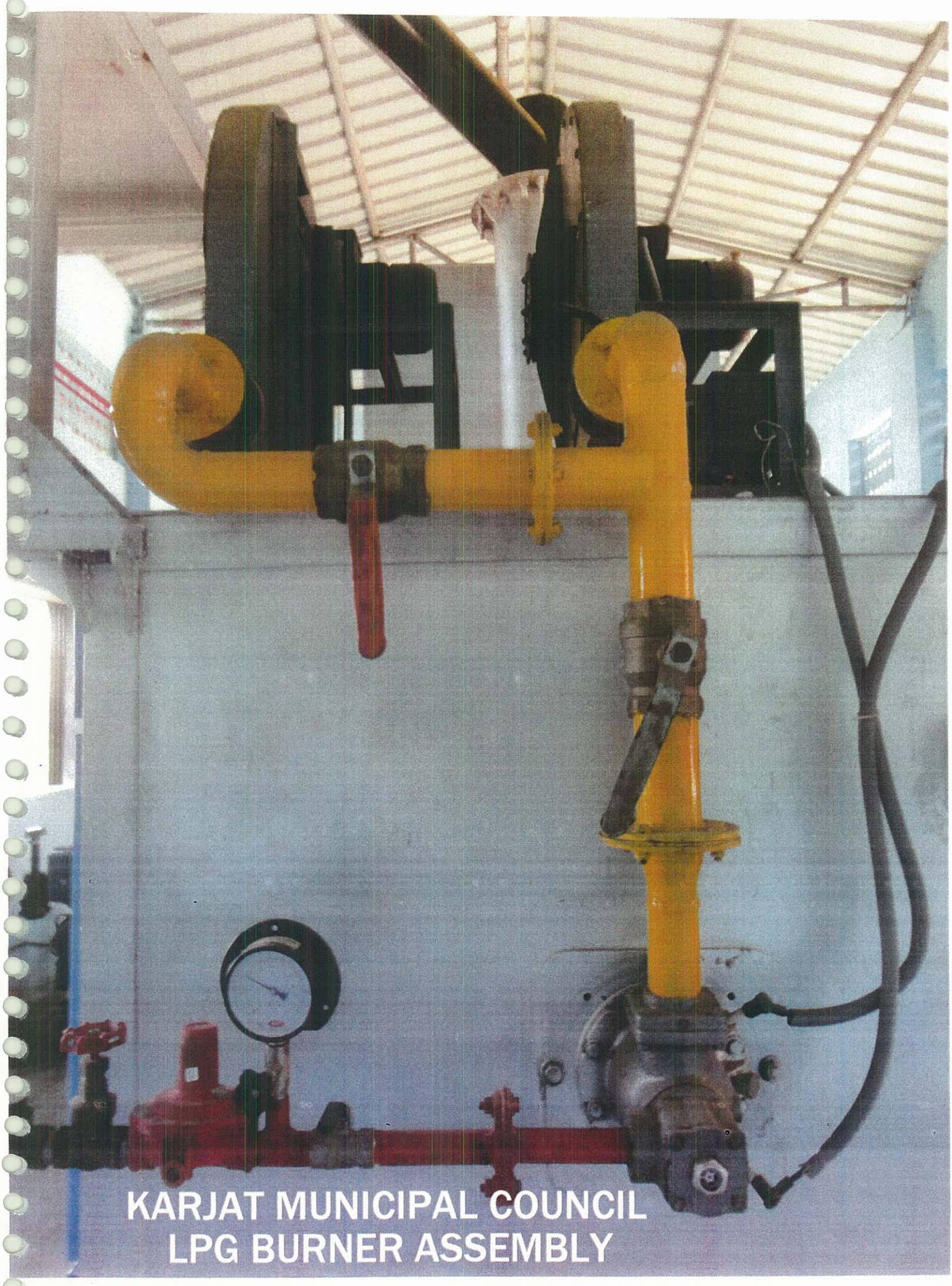
S. S. WATER SCRUBBER



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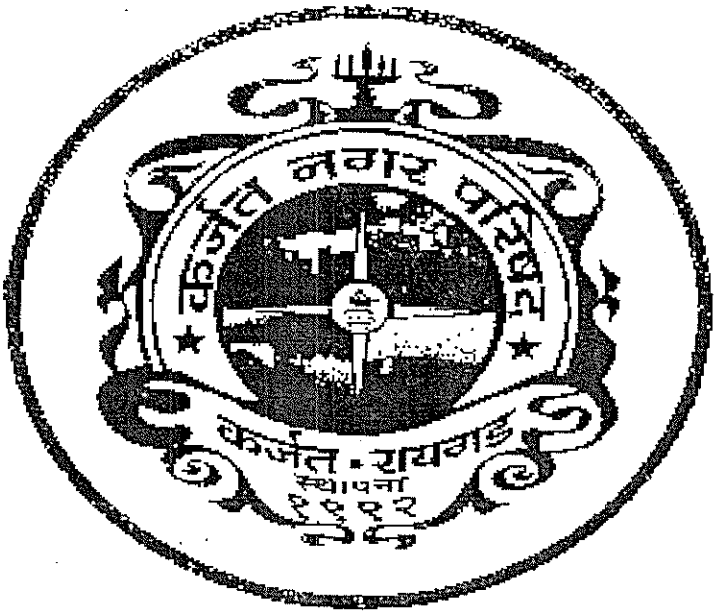
LPG BURNER ASSEMBLY

KARJAT MUN COUNCIL
LPG CREMATOR COMPLETE VIEW

KARJAT MUN COUNCIL
FIRE EXTINGUISHER

KARJAT MUN COUNCIL
ELECTRIC PANEL

KARJAT MUNICIPAL COUNCIL
INSIDE VIEW OF THE LPG CREMATOR



THANK YOU