

MT LAJPATRAI BLOW-OUT STUDIES AT BOMBAY HARBOUR

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ABSTRACT

The area around the tanker MT *Lajpatrai* was monitored for oil pollution studies. Measurements were carried out on the concentration of petroleum hydrocarbons in water and sediment samples along with visual observations on oil slicks in the surrounding areas. Petroleum hydrocarbons in the waters ranged between 17 and 105 $\mu\text{g/l}$ and in sediments, from 40 to 512 $\mu\text{g/l}$ (dry wt.).

Key-words: MT *Lajpatrai*, tanker oil, pollution, Bombay High.

On 24 October 1984, the oil tanker MT *Lajpatrai* waiting to unload her cargo of 29,000 tonnes of crude and having 800 tonnes of bunker oil caught fire in Bombay harbour. As a result it began to leak endangering the surrounding marine environment. Monitoring was therefore carried out in this area to find out the magnitude of damage to the marine environment, if any.

Figure 1 gives the sampling locations around the oil tanker in the Bombay harbour area. The first sampling was done on 31 October, 1984, six days after the accident. Thereafter, monitoring was continued till 13 November with weekly observations.

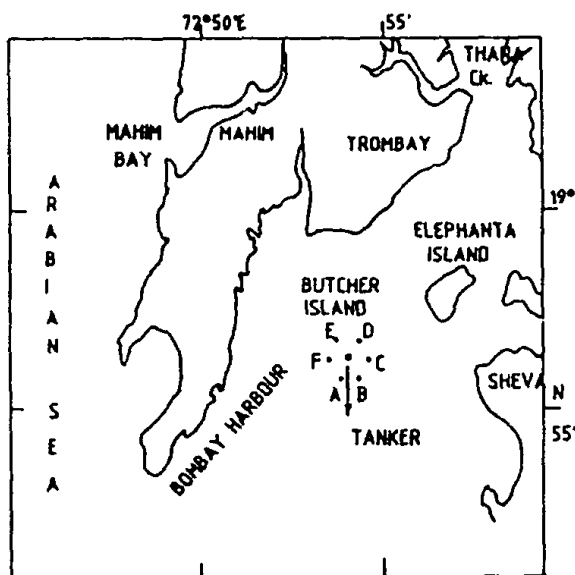


Fig.1.

Map of Bombay harbour showing locations of the tanker and sampling.

Oil samples were collected by the surface skimming while water and sediment samples were collected by Niskin bottles and LaFond Dietz snapper respectively. All the samples were kept frozen till analysis. On reaching the shore laboratory, separation, extraction and pre-treatment of the samples were carried out as described by Sen Gupta, Qasim, Fondekar and Topgi (1980) and Fondekar, Topgi and Noronha (1980). The analysis were performed on Turner model 430 scanning spectrofluorometer (UNESCO, 1976). The bunker oil was used as a reference standard.

Table I presents petroleum hydrocarbon data on water and sediments samples along with the sediment texture.

Table I - Petroleum hydrocarbon concentrations in water and sediment samples (equivalents of bunker oil).

Observations	Date	Station Location	Water ($\mu\text{g/l}$)		Sediment texture $\mu\text{g/g}$ (dry weight)	
			0 m	5 m		
1.	31.10.84	A	50	-	-	-
		B	54	-	-	-
		C	59	-	-	-
		D	73	-	-	-
2.	4.11.84	A	105	54	S.C	65
		B	59	41	S.C	512
		C	59	36	S.C	42
		D	54	54	S.C	40
		E	54	50	S.C	128
		F	27	59	S.C	153
3.	13.11.84	A	32	20	-	-
		B	26	15	-	-
		C	28	12	-	-
		D	38	22	-	-
		E	18	7	-	-
		F	17	8	-	-

S.C - Silty Clay.

During the first observation, only one small patch of oil of about 1 m^2 and roughly 1 mm thickness was sighted at location A while the rest of the area was clear. Dissolved petroleum hydrocarbons in these surface waters ranged from 50 to 73 $\mu\text{g/l}$ (av 59.0 $\mu\text{g/l}$). These concentrations were not high around the port areas where oil inputs from different sources such as effluent or refinery discharges, shipping traffic, etc. could be significant.

The second observation did not show any oil patches. Since the oil might have undergone different processes such as evaporation, dissolution, biodegradation, sedimentation, etc. or carried away with the currents.

In surface waters, the concentrations ranged from 27 to 105 $\mu\text{g/l}$ (av. 59.6 $\mu\text{g/l}$) and in bottom waters (5 m), the concentrations were between 36 and 59 $\mu\text{g/l}$ (av. 49.0 $\mu\text{g/l}$). Not much difference was observed between concentrations at the surface and at the bottom waters which indicated that petroleum hydrocarbons were fairly well dispersed in the water columns.

Sediments were mainly of silty-clay texture. The concentrations in them varied from 40 to 512 $\mu\text{g/g}$ (dry wt.) with a mean value of 156.6 $\mu\text{g/g}$.

It has been reported that the unpolluted open ocean sediments contain 1-4 $\mu\text{g/g}$ (dry wt.); <100 $\mu\text{g/g}$ (dry wt.) in coastal sediments and upto 12,000 $\mu\text{g/g}$ (dry wt.) in highly polluted areas (Goldberg, 1976). This shows that the present values were much lower than the limits for the polluted environment.

The third observation showed that dissolved petroleum hydrocarbons were very low ranging between 7 and 38 $\mu\text{g/l}$ (av. 20.0 $\mu\text{g/l}$). These concentrations showed a gradient with depth, the highest concentration (38 $\mu\text{g/l}$) being at the surface and the lowest concentration (7 $\mu\text{g/l}$) in the bottom waters. Thus, a gradual decrease in petroleum hydrocarbon content of waters was observed which was due to weathering and sedimentation processes.

In general, there was not much damage to the marine environment due to this accident.

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