



POLICIES FOR TREATMENT AND DISPOSAL OF INDUSTRIAL WASTES

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INTRODUCTION

Bangladesh, a new nation, is facing environmental disasters. Water borne disease is a common feature of suffering of this part of the world. Lack of pure water supply and proper environmental sanitation is the major cause responsible for this. Pure drinking water is in less supply and sewerage system is almost non-existent. Waters available in ditches, pools and small streams are mostly contaminated and help generation of germs and diseases. Above all, industrial wastes, fertilizer, toxic chemicals and synthetic detergent also create water pollution (1).

NATURE OF INDUSTRIAL WASTES AND NATURE OF POLLUTION OF ENVIRONMENT

From the industrial survey of our country undertaken by Environmental pollution control cell, we can know the nature of industrial wastes and the nature of pollution they create on environment (2). The industries have been identified and detailed study has been undertaken to find nature of industrial wastes and their pollution effect. It has been found that mostly liquid and gaseous wastes pollute the environment. Effluents of Fertilizer, chemical, paper Mills, TSP (Triple Super-Phosphate), Tanneries, DDT, Chemical Industry and Pulp and Paper Mills etc. are mostly in the form of liquid and gas. As it is not possible to make study of all the industries responsible for pollution, we will try to study a few specific cases which are more prone to undesirable waste and create pollution of environment.

Pollution by Karnaphuli Paper Mills and Rayon Complex

First let us take the case of Karnaphuli Paper Mill (KPM) and Rayon Complex. These two enterprises discharge their effluents into the river Karnaphuli. The per day discharged effluents amount more than 10-12 million gallons of untreated waste liquors. The result is the mortality of fish in the river in

a stretch of five miles down stream and one mile upstream from the mill every year. In the study undertaken by Environmental pollution control cell, to analyse the effluents and to find out economic method of treatment and disposal of the effluents it was found that KPM and Rayon Complex discharge generally : (3)

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|----------------------|----------------------------------|
| a) Waste liquor from | i) Digester House |
| | ii) Pulp bleaching plant |
| | iii) Washing and screening plant |
| | iv) Soda recovery plant |
| | v) Chips washing plant |
| | vi) Blow down |
- b) Black liquor from black liquor tank evaporators and soda recover pits. Quantity of effluents being 8-10 millions gallons per day.
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|-----------------------------|-----------------------------|
| c) Waste bleach liquor from | i) Washing Leakage |
| | ii) Caustic chlorine and |
| | iii) Bleaching liquor pits. |

Further from the analysis of the effluents, it was found that the effluents had high chemical oxygen demand (COD) and therefore reduce the oxygen content of river water quickly, which is responsible for fish killing.

There is also air pollution problem in the mill area. Exhaust gas emitting from the chimney of the mill (SO_2 , marcantan) are responsible for air pollution. The mill authority has been asked to take precautionary measure immediately.

Pollution by Hazaribagh Tanneries

Hazaribagh area, situated on the southwest periphery of Dacca city, is a locality which is both residential and industrial having tannery industries distributed all over it. There are 126 tanneries in the area. In addition to general insanitary condition, the tannery industries are responsible for air pollution because of production of intolerable odour. The liquid waste consisting of waste water, organic

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particles and toxic chemicals used in the process are finally discharged through small individual drains leading to neighbouring river Buriganga (4).

The table below (Table 1) gives statistics of production in ten selected tanneries including quantity of liquid waste. It is apparent that the volume of liquid waste is quite substantial in each of the tannery.

Pollutional aspects of the effluent

(5) Discharge of effluent from tannery wastes into river, streams is the prime cause of pollution. The presence of biologically oxidizable material in wastes exerts a deoxygenating effect in the rivers, streams etc. Odour pollution is created by suspended matter in the wastes which forms sludge banks on the bed of river, streams. Chrome tan wastes are toxic to fish and aquatic life. Vegetable tan wastes colours the water in which "tannins" decompose slowly. Tannery wastes containing chromium and arsenic have rendered drinking water unsuitable for human consumption.

TABLE 1 : Statistics of Production in Selected Tanneries.

Production Name of Tanneries	Wet Blue Leather (cow) in lbs./day	Wet Blue Leather (goat) in lbs./day	Finished Leather in lbs./day	Water consumption in Gallons/day	Liquid Waste in Gallons/day
Bangladesh National Tannery	-	167	-	60,000	48,000
Bangladesh Crome Tannery	-	3,000	-	16,000	13,280
Dilkusha Tannery	200	1,667	-	80,000	64,000
East Bengal Tannery	-	2,000	-	23,000	18,400
Mahtab Tannery	250	-	4,500	13,750	13,000
North East Tannery	500	2,000	-	11,150	8,920
Razzaq Tannery	67	-	1,500	11,950	16,360
Taj Tannery	500	3,000	-	11,400	9,120
Rahmania Tannery	-	3,000	-	14,800	13,840

Source : Year Book, Water Pollution Control Project (September 1973 to June 1975) Government of People's Republic of Bangladesh.

If we consider the type of chemicals used and the process, the particular parameters of pollution can be taken as shown below :

- (1) Physical
 - i. Solids
 - ii. Grease or oil
- (2) Organic
- (3) Toxic Chemicals.

In certain exceptional cases, it was found that 10,471 lbs. of total suspended (organic and inorganic) solids discharged as a waste. Different kinds of oil amounting to 1,700 - 1,800 lbs. used in the industries are likely to be present in the waste every day. The effluent has a high PH value which lies between 7.5 to 10. The variation of temperature recorded as maximum 85°F in March 1975 and minimum 75°F in January, 1975.

Pollution by Urea and Fertilizer Factory, Ghorasal (6)

The Ghorasal Fertilizer Factory is located on the Sitalakhya River about 20 miles north of Dacca. It produces about 3.4 lakh tons of urea annually. The raw materials are natural gas, air water and power. The pollution occurs due to the catalysts, the chemicals used to treat the various kinds of water used in the factory and the ammonia which is an intermediate product in the production of fertilizer. These chemicals such as arsenic, sulphuric acid potassium chromate, chlorine etc. are harmful to fishes.

However the major water pollution occurs in this factory is form ammonia. It has been found from plant laboratory records that on 3.3.1974 the plant effluent had an ammonia content of 7400 mg/L and on 27.3.1974, 940 mg/L on these dates the middle of the river sewer-outlet had 87 and 62 mg/L of ammonia. No fish could survive for any length of time in water containing 87 or 62 mg/L of ammonia. These large ammonia discharges occurred due to accidents, but

ordinary discharge is much less although an objectionable amount.

Pollution by Other Industries (7)

Air pollution caused by TSP factory by emitting SO_2 and SO_3 and acidic gas in air made a problem for neighbouring regions. These gaseous fumes, specially in the winter season, forms a blanket in the atmosphere and creates a suffocating situation for respiratory system particularly in the adjacent Naval base. The DDT Factory and CIB (Chemical Industries of Bangladesh) Factory at Barabkunda, Chittagong are responsible for discharging Chlorine gas and acidic effluent which created dangerous condition for agriculture and surrounding inhabitants. Chattak Pulp and Paper Mills is creating water pollution of Surma river and as a result the aquatic organism are being eliminated from the river. It has been revealed from the monitoring analysis reports that the industry is responsible for polluting the river water. Underground (Deep Tubewell) at Tejgaon industrial areas was contaminated as a result of secretly dumping of condemned insecticide by the insecticide industry. Due to this type of insecticide contamination the water of Dacca Water and Sewerage Authority (WASA) becomes unfit for drinking purpose.

TREATMENT AND DISPOSAL PROCESS : SCIENTIFIC AND ECONOMIC PROCESS

Most of the industries in Bangladesh have no treatment plant and they dispose the wastes into the rivers creating pollution for the neighbouring environment. For detecting pollution of environment there are ten monitoring stations in various places all over Bangladesh.

They collect water samples near, the industries and analyse it twice a month during low flow and once a month during high flow and alerts the industries to take possible remedial measures. To give some examples of treatment and disposal process the KPM complex has no treatment plant for its waste disposal. So, a few monitoring stations have been established along the river and analysis is being carried out to find possible discrepancy. If any discrepancy is found, attention of the authority is drawn to take preventive measures. Environmental pollution control has asked KPM complex authority to construct treatment plant for remedial purposes and to treat their effluents before discharge into river water (8).

In the Hazaribagh Tannery area, no industry has got any treatment plant. As an alternative, the following immediate preventive measures can be adopted (9).

1) With treatment, no effluent of tannery wastes should be discharged into sewer. CO_2 produced during biological decomposition reacts with lime present in the effluent inside sewer to form carbonate and to form hard incrustation which ultimately blocks the sewer.

2) It is essential that good house-keeping is maintained inside the tannery so that the wastage of materials and water is reduced to minimum by proper utilization. Improved manufacturing process and techniques of operation can curtail the quantity and pollution load of waste waters. Salinity in waste water can be minimized by dusting the salted hides, skins before washing.

3) The flesh, hair etc. can be separated from waste streams by passing them through suitable screens. It has been seen that at least 5 per cent of BOD and 5 to 10 per cent of suspended solid can be reduced by this process.

Urea and Fertilizer Factory Ghorasal has got no treatment plant. The major pollution is Ammonia. It was decided that bio-assays be run routinely at the factory to establish the water pollution hazard of the factory to fish. Bio-assays should be carried out both on the factory effluent and on the river itself. On further survey and laboratory test, it was found that the mortality of fishes in Sitalakhya in several times was caused by the high value of the concentration of dissolved ammonia in water. The Urea and Fertilizer Factory, Ghorasal, has been informed by the Environmental Pollution Control to treat the effluents before discharge into the river. It is expected that they will construct proper treatment plant for neutralizing the toxic effluents before discharge (10). Similarly other industries have got no treatment system as discussed below (11). The TSP has no treatment plant to stop air pollution. The Chairman, Bangladesh Chemical Industries Corporation has been asked to take special care for the exhaust gas emission. A plan is being prepared by them. It is hoped that after treatment of the exhaust gas the problem will be minimized. Similarly DDT and CIB factory has no treatment system for its effluents. The plant has been monitored

by Environmental Pollution Control and the factory authority has been asked to instal treatment plant and not to discharge the liquid and gaseous effluents directly into nearby stream and the surrounding atmosphere without further loss of time. Chattack Pulp and Paper Mill is discharging untreated effluents into the Surma river. The mill authority has been cautioned not to discharge their waste directly in the river water. In this regard in investigation was conducted and it was found that the industry is polluting the river water and it was agreed they would treat their effluent before discharging. It is expected that the mill authority will go forward for treatment plant. The insecticide industry at Tejgaon which is responsible for underground water pollution has been asked to remove the pollutants and not to discharge the untreated pollutants in future. Constant pumping out of water from dug well of insecticide factory is continuing. Dacca WASA has been asked to supervise the activities of the factory as the elimination of the pollutant from ground water is a time consuming and difficult job.

In this was industries that are polluting the water courses and environment have been identified and contacted for taking remedial measures by constructing effluent treatment plant and treating their harmful effluent before disposal in the river water. Further, new industries that are to be set up and seeking clearance from Environmental Pollution Control have been asked to construct treatment plant for their effluent.

ALTERNATIVE POLICY MEASURES

The environmental pollution, created by industrial wastes in Bangladesh, is a growing problem because of rapid industrialization which unless checked immediately will make things worse in this overpopulated country. For controlling the pollution of environment in Bangladesh, a high powered sixteen member interministerial Environmental Pollution Control Board has been set up to co-ordinate the various environmental activities. The function of Environmental Pollution Control Board is mainly policy making and supervisory. The executing authority of the policies of the Board is Environmental Pollution Control Cell. The activities of the Environmental Pollution Control Cell have been given

Legislative support through Environment Pollution Control Ordinance of 1977 (12). For carrying out his work to control Pollution of environment, the Director of Environment Pollution control, may, be order in writing "require any person or commercial or industrial undertaking to adopt such measures including construction, modification, extension or alteration of any disposal system, as may be specified therein for the prevention, control and abatement of existing or potential pollution of environment" (13). The Director is also empowered to know about the wastes, sewerage system or treatment works of any undertaking and can depute any officer to inspect and test any waste, air water, soil, plants, materials or disposal system and the officer should be provided with all possible help to perform his duties. It is felt that this law should be strictly enforced and further modified to include a) Any industry which is responsible for creating any sort of pollution should establish economical and scientific treatment plant immediately. b) No industry from henceforth should be established without treatment plant. Further project planning must ensure ancillary treatment facilities in any new undertaking. The comprehensive survey of industries undertaken by Government should be completed immediately to assess present position and to make future policies. The existing network for monitoring pollution caused by effluents be expanded over a wider area and the frequency of monitoring be increased.

The present laboratory facilities be improved and the proposed establishment of 4 laboratories in all the divisional headquarters of the country to carry out survey and investigations in respect surface and ground water be established immediately. Moreover the proposed mobile laboratory (both air and water) be established immediately. The data bank which can help in many ways in abating and curtailing pollution and encouraging research for improving pollution control technology may be made operational immediately with continuous feedback system. Ways and means should be devised to put waste products into best possible economic case.

Finally if any industry is found to violate the provisions of the existing ordinance or modified ordinance as suggested earlier, in other words, to induce the firm to adopt pollution control measures to the point where the discharge is reduced to efficient level, tax may be imposed so that social welfare remains intact and environment remains much clear (14). If all these measures are adopted, it is hoped that treatment and disposal of industrial waste in Bangladesh will have an effective solution in the near future.

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