

## INDUSTRIAL WASTE MANAGEMENT IN CONSTRUCTION SITE - AN ECOFRIEND GATEWAY FOR DEVELOPING BANGLADESH

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### ABSTRACT

GoB has undertaken the up gradation the Coastal Embankment Improvement with loan assistance of the World Bank (WB) and grant assistance of the Climate Investment Fund's Pilot Program for Climate Resilience (PPCR). The present effort includes maintenance and rehabilitation of the existing structures along with rising of embankment height to high tides and storm surges as caused due to global warming and sea level rise mainly. The construction activities imposed different tasks for establishing temporary storage facilities for industrial waste. In the construction site, about six and half hundred of industrial wastes are generated in each of the months. During the study period, the highest amounts of wastes were recorded in May 2019. Industrial wastes are collected by workers in daily/weekly basis and temporarily stored at the well-developed storage area established at construction sites, which are treated, disposed or recycled by the contractor or sold to waste vendors. A flow chart of the procedure is provided in this article. It includes collection, segregation, record keeping, storage, selling, re-used etc. for build-up sound environment in construction site. All those activities are being assured to fulfill the requirements of Environmental Conservation Rules (ECR) 1997 of DoE and the WB safeguard policy.

**Key words:** Industrial wastes, management, construction site, gateway, Bangladesh.

### Introduction

Since independence in 1971, Bangladesh has made significant strides in its economic sector performance. Although the economy has grown tremendously in the six decades, Bangladesh still suffers from foreign trade in the South Asian region. Despite major obstacles to growth such as inefficiency of state-owned companies, the rapidly expanding labour force that cannot be absorbed into agriculture, inadequate power supply and slow application of economic reforms, has made some progress in promoting climate change and liberalization for foreign investors (BPD, 2012). The particularly severe floods of the 9<sup>th</sup> decades increased the flow of international aid. So far, the global financial crisis has not had a major impact on the economy (New Report, 2013). Export and remittance inflows have shown dramatic growth which has helped the economy to grow at a steady rate (Bdnews24, 2018). Bangladesh has been on the list of UN Least Developed Countries (LDC) since 1975. Bangladesh met the requirements to be recognized as a developing country in March 2018 (Bdnews24, 2018). It straddles the fertile Ganges-Brahmaputra delta and has a cultural heritage that is proudly intertwined with the broader civilization history of the Indian subcontinent. It is a pluralistic nation of considerable religious and ethnic diversity. Bangladesh is the world's eighth-most populous country and is also one of the most densely populated. The elected parliament in Bangladesh' parliamentary electoral system is called the Jatiyo Sangshad. Bangladesh is a founding member of SAARC, the Developing 8 Countries, the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) and the Bangladesh-China-India-Myanmar Forum for Regional Cooperation (BCIM). It is also a member of the Commonwealth of Nations, the Organization of Islamic Cooperation (OIC). Bangladesh is also the world's largest contributor to United Nations peacekeeping missions. Bangladesh retains a deep commitment to social solidarity and to a progressive development agenda. Many MDG targets, in areas ranging from poverty reduction to infant mortality, have been secured. The Government has also shown itself able to recognize delivery weaknesses and marshal resources accordingly. Ongoing government programs have targeted disaster preparedness and recovery, with great success. Bangladesh's vulnerability to disasters is significant, but the country's track record has been exceptional at improving human security and saving lives. While extreme climatic events still

tragically result in some deaths, numbers have fallen drastically. This provides a sound foundation for addressing other pressing questions of environmental sustainability.

The coastal region occupies 20% area of the country. The coastal region is highly susceptible to various natural calamities viz. tidal floods, storm surge, river floods, salinity intrusion which makes livelihoods vulnerable. In order to mitigate the suffering, the GoB with the assistance of donors has built 139 polders in the coastal region since the 60s. The polders in this area are enclosed on all sides by dykes or embankments, separating the land from the main river system and offering protection against tidal floods, salinity intrusion and sedimentation. The polders were designed to keep the land safe from regular tides and to allow agriculture activities. These polders were equipped with flap gates to control the water inside the embanked area. The polders have been dilapidated due to erosion and lack of proper maintenance. In addition to breaching of the embankments due to cyclones and river erosion, siltation of peripheral rivers surrounding the embankment caused coastal polders to suffer from water logging, which lead to large scale environmental and social degradation and economic loses. Besides, the climate change impact has prompted Sea Level Rise (SLR) and the height of the storm surges. Recent cyclones (mainly Sidr and Aila which took place in 2007 and 2009 respectively) caused substantial damage to the embankments and threatened the integrity of the coastal polders. These polders are required to be rehabilitated for proper functioning towards saving the residents of the localities from the disaster and ensure agricultural and other livelihood activities (BAEMR, 2018). With this end in view, the Government of Bangladesh (GoB) has planned to implement the Coastal Embankment Improvement Project, Phase-1 (CEIP-1), under which seventeen polders will be rehabilitated and improved in the coastal area of the country. Amongst them, the rehabilitation work in Polder 41/1 is being conducted at Sadar Upazila of Barguna district. Due to conducting of various construction activities somewhat amount of industrial wastes are generated that are also managed in a good manner. These practices may be followed in other construction sites/yards to be assured of the sound environment of Bangladesh.

### Materials and Methods

The study was conducted during the period of January to May 2019 in Polder 41/1 at Sadar Upazila of Barguna district. Barguna District, having an area of 1831.31 sq km and population of 179968, is bounded by Payra River, Bishkhali River and Baleshwar River (BBS, 2006). It is divided into 5 Upazilas (Amtali, Betagi, Bamna, Barguna Sadar and Patharghata), 38 unions, 238 mouzas and 560 villages (Banglapedia, 2006). Barguna district was chosen as the study area because it is always affected by storm surge, coastal flooding, and other hazards associated with the cyclone. The project activities for rehabilitation and improvement for polder no. 41/1 is as follows:

Type of Work	Specification
Re-sectioning of embankment	33.7km
Bank protection	875m
Construction(Replacement)of Drainage Sluice	10nos.
Construction(Replacement)of Flushing Sluices	19nos.
Re-excavation of Drainage khal (channel)	33.25km
Flood Wall	7.15km
Afforestation	19.81 ha

Chinese CICO is responsible to implement that polder up-gradation work. They are performing different excellent practised in the construction site, amongst them the procedure for good management of industrial wastes are especially investigated, which are also illustrated herewith. A computer program such as SPSS, Microsoft Excel and Microsoft office program of the computer was used to process and present the findings of the study at Polder 41/1 in Barguna district of Bangladesh.

**Results and Discussion**

In the construction site, about six and half hundred of industrial wastes are generated in each of the months. During the study period, the highest amounts of wastes were recorded in May 2019. A summary of the estimated amount of per month waste generation, waste collection/disposal frequency and numbers of people residing in the area is also given in the Tables 1-3. Industrial wastes are collected by workers in daily/weekly basis and temporarily stored at the well-developed storage area, established at construction sites (Fig. 1), which are treated, disposed or recycled by the contractor or sold to waste vendors. A flow chart of the procedure is provided in Fig. 2. Overall the practiced good procedures for assuring sound management of industrial wastes is outline herewith as follows:

- ✓ Installing temporary industrial waste storage area (Fig. 1);
- ✓ The area should is paved, defined and under shade;
- ✓ Erection of cautionary signage such as “**Industrial waste storage area**”, “**No entry**”;
- ✓ Categorization of the wastes;
- ✓ Proper disposal and
- ✓ Record keeping

Table 1. Generation of industrial wastes in Polder 41/1 during March, 2019

Sl. No.	Waste Types	Quantity (kg)	%	Final Disposal at Fortnightly
1	Iron	170	25.91	Sold to vendors
2	Machinery parts	300	45.73	Sold to vendors
3	Sheet/Tin	76	11.59	Sold to vendors
4	Rubber/Polymer	38	5.79	Sold to vendors
5	Rope	27	4.12	Disposed at designated area for solid wastes
6	Others	45	6.86	Sold/Disposed
Total amount =		656	100	

Table 2. Generation of industrial wastes in Polder 41/1 during April, 2019

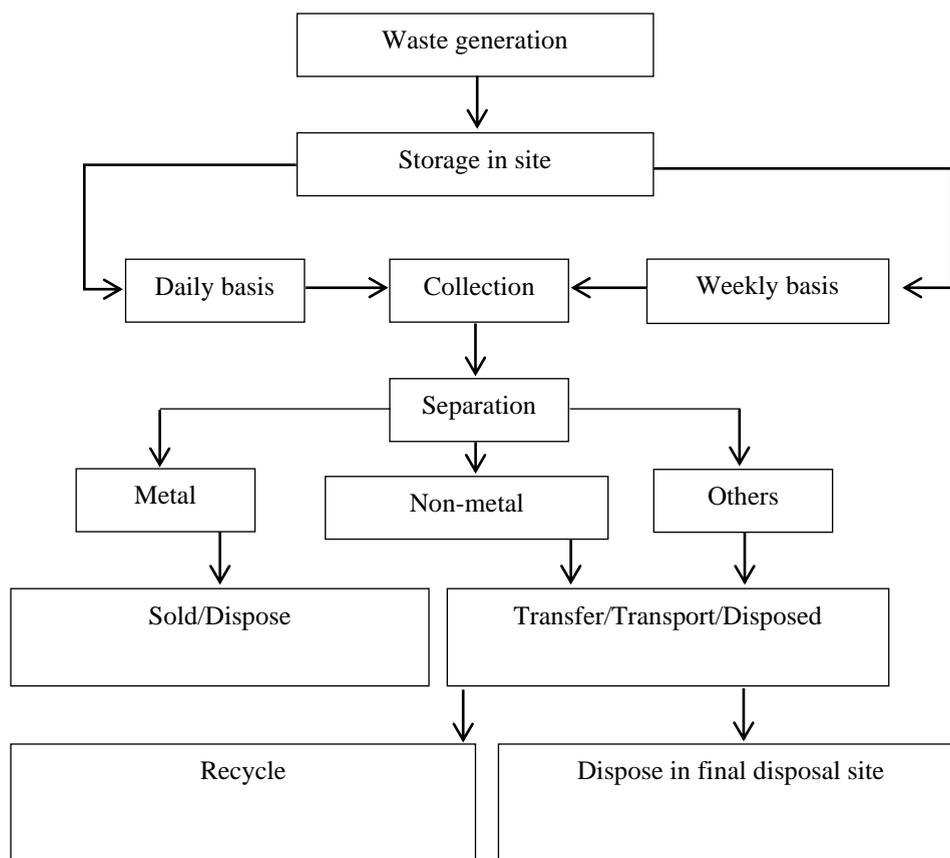
Sl. No.	Waste Types	Quantity (kg)	%	Final Disposal at Fortnightly
1	Iron	175	26.48	Sold to vendors
2	Machinery parts	278	42.06	Sold to vendors
3	Sheet/Tin	77	11.65	Sold to vendors
4	Rubber/Polymer	58	8.77	Sold to vendors
5	Rope	34	5.14	Disposed at designated area for solid wastes
6	Others	39	5.90	Sold/Disposed
Total amount =		661	100	

Table 3. Generation of industrial wastes in Polder 41/1 during May, 2019

Sl. No.	Waste Types	Quantity (kg)	%	Final Disposal at Fortnightly
1	Iron	177	26.58	Sold to vendors
2	Machinery parts	325	48.80	Sold to vendors
3	Sheet/Tin	70	10.51	Sold to vendors
4	Rubber/Polymer	42	6.31	Sold to vendors
5	Rope	17	2.55	Disposed at designated area for solid wastes
6	Others	35	5.26	Sold/Disposed
Total amount =		666	100	



Fig. 1: Sound management of industrial waste in construction site



**Fig. 2. A flow chart for well management of industrial waste in construction site**

### Conclusion and Recommendation

In the construction site, an excellent approach for well management of industrial wastes in construction site are being established which are much out looking and may be adopted in all types of construction work in Bangladesh.

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