

# Rethinking Plastic Waste into Fabric and Concrete Production and its Distribution

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## 1. Executive Summary

Plastic waste has emerged as a critical environmental issue, severely contaminating not only landfills but also oceans and natural ecosystems.[6] In response to this global challenge, we have come up with a way to address the issue while turning it into a profitable venture. Our approach is to transform plastic waste into valuable products through a sustainable supply chain. The collection of plastic waste along with the segregation of biodegradables may be the first but the most important step to initialize our venture. The core operations involve processing plastic waste through machinery to produce granules, which serve as essential raw materials for two main businesses: fabric manufacturing and concrete slab production. Additionally, surplus granules are sold in the market to enhance profitability. The sustainable supply chain approach employed by this business model not only benefits the environment but also positively impacts society. By actively contributing to plastic waste reduction, the business serves as an agent of change, inspiring other businesses to adopt similar sustainable practices. [1]

## **2. Problem Statement**

Plastic waste control is of utmost importance in today's world, considering the severe environmental and social impacts caused by improper disposal and pollution. So, it is high time effective plastic mitigation strategies should be made and implemented correspondingly. Our business plan to transform waste into resources will actively contribute to plastic waste reduction. It will positively affect both the environment and the economy. But difficulties emerge as we try to actualize our plan.

The current plastic waste collection system lacks efficiency and reliability, resulting in irregular and insufficient raw material supply. Inconsistent waste collection leads to production bottlenecks and affects the overall productivity of granule manufacturing. [2] In addition, the sorting and separation of waste is not done primarily. That is why we have to pay more for segregated plastic waste.

## **3. Methodology**

### **3.1 Fabric and Concrete Production**

The plastic wastes are sorted and cleaned before they are converted into plastic granules using the Scrap Grinder Machine. The granules are the main raw materials for synthetic fibre and concrete slab.

To get rid of any remaining moisture, the plastic granules are dried after being tossed in hot air. They are fed into the injection molding machine and melted there. To convert the molten plastic into continuous synthetic fiber, air is blown using an air compressor. The synthetic fiber is transformed into polyester yarn at a spinning mill, where it is then ready to be woven into polyester apparel. [5]

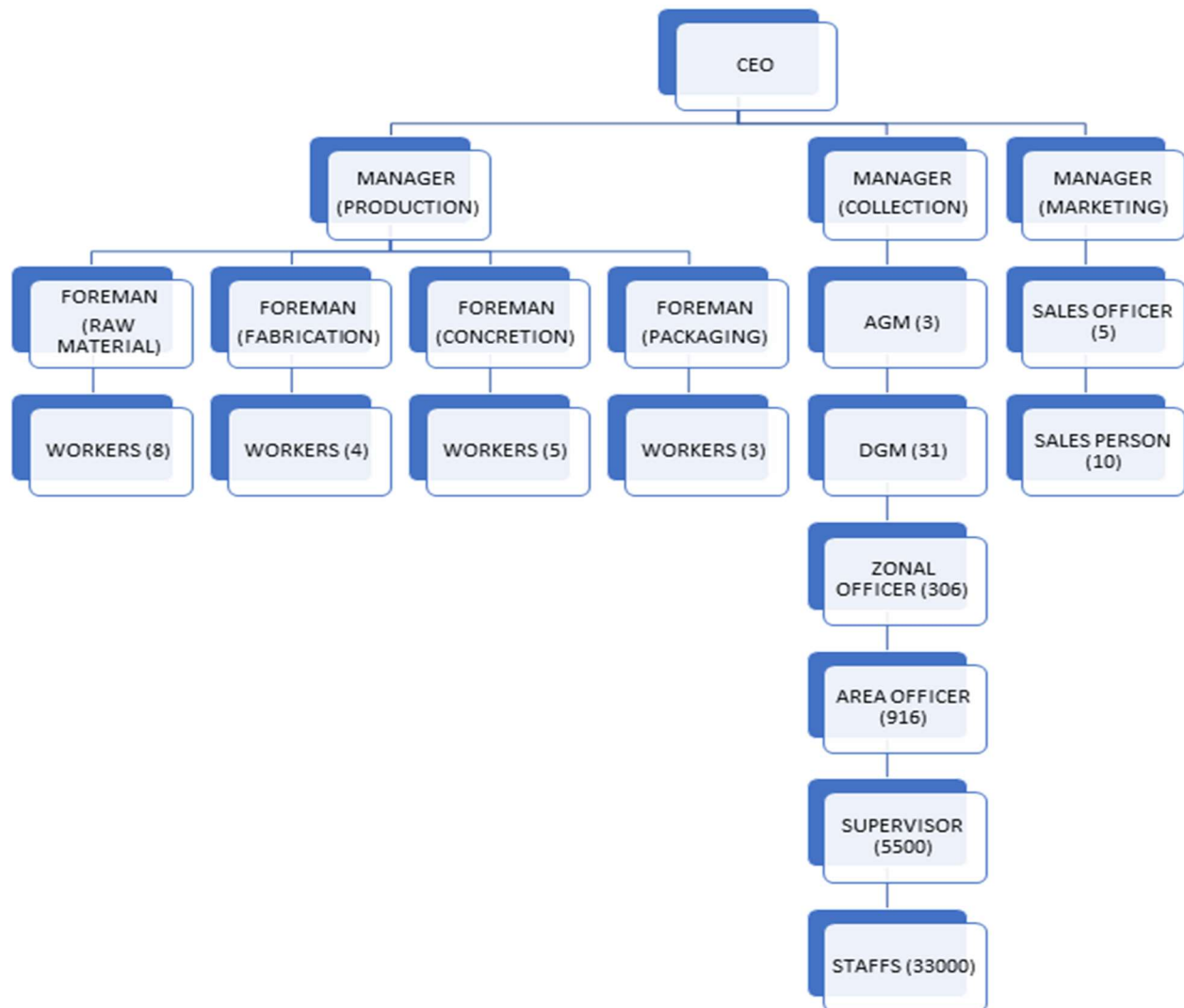
To create concrete, the molten plastic is put into molds.

### **3.2 Organogram of Faberge**

An organogram, also known as an organizational chart or org chart, is a visual representation of the hierarchical structure of a company or organization. It outlines the relationships and reporting lines between different organizational roles, positions, and departments.

Our company comprises three managers, three AGMs, 31 DGMs, and 3 foremen. The organogram of Faberge is given below:

This is our company's organogram. From the organogram, we can notice that our company has almost 41000 employers, employees and workers.



**Figure 1: Organogram of Faberge**

In the collection department, staffs are recruited depending on the number of flats in Dhaka. We estimated there are 2 Cr people in Dhaka and every family has 3 members. Therefore, there are 66 lac families. If each family lives in a flat, there are 66 lac flats. For every 200 flats, 1 staff is recruited. Therefore,  $66 \text{ lac} / 200 = 33000$  staff are recruited. For every 6 staff, one supervisor is assigned; for every 60 supervisors, one area officer is assigned; for every 3 area officers, one zonal officer is recruited; for 10 zonal officers, one DGM is assigned and for every 10 DGMs, one AGM is assigned.

### 3.3 The estimated amount of plastic and approximate collection cost

The main goal of the collection department of Faberge is to motivate people to segregate biodegradable waste and plastic waste on their own, to remove the third-party organization of collecting plastic for saving money, and to modernize the plastic collection process by developing an application to find interested people to work as a collector. Through this process, unemployment can be reduced as well.

#### The Estimated Amount of Plastic

Our targeted areas for collecting plastics are:

- Flats
- Educational institutes
- Hotels or restaurants
- Hospitals
- Stations or terminals
- Shopping malls
- Stadiums

These are the main areas from where we can collect the most number of plastic materials. The amount of plastic we can collect from the unit area and their price are as follows (estimating the cost of plastic is tk6 per kg):

**Table 1: Estimated amount of plastic per zone per week**

| Zones (per)           | Amount (kg) | Price (tk) |
|-----------------------|-------------|------------|
| Flat                  | 2           | $2*6=12$   |
| Educational institute | 30          | $30*6=180$ |
| Hotels or restaurants | 10          | $10*6=60$  |
| Hospitals             | 70          | $70*6=420$ |
| Stations or terminals | 90          | $90*6=540$ |

|                |    |                     |
|----------------|----|---------------------|
| Shopping malls | 15 | $15 \times 6 = 90$  |
| Stadiums       | 60 | $60 \times 6 = 360$ |
| Others         | 40 | $40 \times 6 = 240$ |

These are the costs of plastic materials per zone per week. After estimating the total number of customers, we can calculate the total cost of plastic material per week.

### 3.4 Estimated Number of Initial Customers

Bangladesh imported 78,208 tonnes of polyester staple fibre in 2016, up 11.39 percent from 70,209 tonnes in 2015 and 35.72 percent from 51,729 tonnes in 2014, according to data from Bangladesh Textile Mills Association (BTMA). “The import of man-made fibre is increasing every year,” said Monsoor Ahmed, secretary of the BTMA. The number of consumers in the demand for artificial fibres is increasing overwhelmingly throughout the country.

Unfortunately, until now almost all of the fabric and fibres have to be imported from overseas driving the manufacturing cost up. Razeed Haider, managing director of Outpace Spinning Mills Ltd, said the demand for any kind of yarn and fabrics depends on buyers' choice. Recently, the demand for man-made fibres has increased from the buyers' end. “So, there is a rise in import,” he said. According to the spinner, the durability and longevity of artificial fibres are higher than cotton-made yarn and fabrics. “That's why the demand for man-made items is going up.”

The skyrocketing demand for artificial fibres indicate a large customer base. Not only for fabric in the fashion industry but also home goods, furniture, hospitals, packaging and various other industries. These consumer allocations have been considered to create this model of the initial customer base.

Market research has led us to various different consumers. They all are end users of artificial fibers and processed fabric in some use and others.

The general public is the first consumer. In a family, there are various use cases for recycled materials. Using them in clothes, home goods, upholstery, gardening, and cleaning supplies.

Schools and universities use artificial fabrics all the time in arts and craft projects, banners and decoration for various festivals and events.

Restaurants and hotels use a vast amount of artificial fibres and recycled plastic products. In tableware, cutlery, and bedsheets or curtains. These products generally are preferred with cotton or natural fibres. Which means the consumers are huge in number.

Hospitals use recycled fibres in cleaning supplies and curtains and various other medical products including packaging. Personal hygiene products and Personal Protective Equipment are excellent field for recycled plastic.

Interior Decorations are another wide use case for repurposed plastic in malls, stores, stations or terminals and stadiums.

Expecting 10% of the entire customer base to initially come aboard and use our product we have a consumer model described below:

| Consumer                                 | Size of Market | Actual Customer |
|------------------------------------------|----------------|-----------------|
| Families                                 | 6600000        | 660000          |
| Hotels and Restaurants                   | 250000         | 25000           |
| Educational Institutions                 | 6450           | 645             |
| Hospitals                                | 250            | 25              |
| Furniture Manufactures                   | 400            | 40              |
| Malls                                    | 70             | 7               |
| Stations, Stadiums and Public Structures | 9              | 1               |
| <b>Total:</b>                            |                | 685,718         |

With a total of almost seven hundred thousand acquirable customers, we can start our calculations.

### 3.5 Initial Investment

The requirement for expensive machinery in this industry is a necessity. For reliability and the quality of results the initial investment has to be quite a bit more than expected. It is critical to

develop a detailed business strategy in order to precisely estimate early investment requirements. This strategy should include the company's goals, target market, revenue predictions, and planned costs. Also, we have to consider creating a contingency fund to cover any unforeseen expenditures that may emerge.

There are no obvious manufacturers for plastic recycling machinery in the country. Almost all that exist are custom made in engineering shops. These machines are not up to any international standards and are a hassle to run in manufacturing plant. Furthermore, they give subpar results that leaves a lot to be desired. This is why a lot of the machineries have to be imported from others countries to ensure a smooth and efficient manufacturing that will give us outstanding results which will make the products sell themselves.

The initial investment of a new venture can be tricky to calculate. There are many variables like custom duty, installation costs and transport costs which can vary with seasons.

These estimations have been done with the most accurate data from the quotes of different manufacturers and suppliers.

| No. | Item                                                  | Cost (Taka)    |
|-----|-------------------------------------------------------|----------------|
| 1   | Dust Cleaner                                          | 300000         |
| 2   | 100 Kilograms/hour Plastic Scrap Grinder              | 220000         |
| 3   | Washing Machine with Conveyor                         | 320000         |
| 4   | Fine Dryer                                            | 400000         |
| 5   | Agglomerator                                          | 420000         |
| 6   | Plastic Recycling Machine(Heater, Water tank, Cutter) | 1500000        |
| 7   | Injection Molding Machine                             | 1400000        |
| 8   | Plant and Warehouse (3600 sqft)                       | 720000         |
| 9   | Marketing and Sales                                   | 50000          |
| 10  | 30 Trucks for Transport and Shipping                  | 1500000        |
|     | <b>Total</b>                                          | <b>6780000</b> |

Investments in the recycling industry always come with benefits that complement other industries. Additionally reaching out for guidance and advice might also reduce or refine our initial investment estimates. This step will jump-start the manufacturing process and start shipping to customers.

#### **4. Environmental issues with plastic waste:**

From the recent report by OECD, it is seen that a person wastes about 100 kg of plastic every year where on average only around 9% of plastic is recycled. Between 2000 and 2019, the amount of plastic garbage generated worldwide more than doubled to 353 million tonnes. Again, every ton of plastic waste is capable to produce upto 3ton CO<sub>2</sub> equivalent greenhouse gas that contributes to climate change in an enormous amount. By rethinking plastic as fabric and concrete, greenhouse gas emissions can be decreased to up to 4% of the present amount. [3] [4]

#### **5. Limitations of the study:**

Being in the early stage of development, this study has some potential limitations. The production of a fabric of 100% equivalent to cotton is still in research but it is possible with the proper mechanism. However, the concrete production and surplus granule business stands poised to embark upon a journey to saving the environment by rethinking plastic waste.

#### **6. Conclusion:**

The study aims to investigate the opportunity to recycle plastic into useful fabric and concrete and also sell the granules for better sustainability. Recycling plastic will be an irreplaceable solution for the environment as well as mankind. According to IUCN, more than 4% of this plastic ends up in the ocean ruining marine life where the marine life gets entangled by this plastic and sometimes ends up eating it. The strategic reconceptualization of plastic waste as a raw material for fabric and concrete production not only precipitates a reduction in the quantum of plastic waste but also exercises a transformative influence upon the dominion of fast fashion, rendering it more

conscientious and sustainable. The confluence of meticulous preparation, innovative stratagem, and proper resource utilization, the idea of rethinking plastic waste will have a great impact on mankind. [7]

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