

SOLID WASTE RECYCLING INDUSTRY

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Abstract—

From the developed to the under development countries, everywhere solid waste is a concern for the environmental stability. One of the most promising sector for business as well as serving the country to survive the latest archenemy of the world "Global Warming" is the solid waste recycling industries. Unorganized management of solid waste recycling industries can eventually lead to failure of waste generation and reproduction. This paper is intended to provide the information about the present solid waste recycling management system and existing legislation in Bangladesh. It also focuses on the solid waste recycling management practices at public and private sectors. Through an extensive review of literature and on ground survey with limited research, this paper attempts to shed light on the management of solid waste recycling industries between public and private sectors at all levels. The study will be helpful for policy maker, planner, implementer and other stakeholders towards adopting more effective strategy for management of solid waste recycling industries in Bangladesh.

Index Terms—Solid waste, Recycling, Process, Collection, Consumer, Production, Database, Transport, Gross, Industries, DoE.

I. INTRODUCTION

Bangladesh is a densely populated country and due to that generation of waste is high at stake. The Capital is one of the most polluted cities in the world. On the other hand, recycling waste is still in pioneering stage here, though it's a huge arena to explore. Recycling industries are stepping up and including private, public and international investors. Most of the domestic wastes and organic wastes are publicly managed and recycled by governmental organizations but solid wastes are difficult to handle for them due to lack of infrastructure. As there is no top notch management for the recycling of solid waste, this paper introduces a pilot project and management system for the solid waste recycling management system.

Recycling is the recuperation and reuse of products from wastes. Solid waste recycling refers to the reuse of products from which materials such as steel/aluminum, copper, plastics, rubber, furnish oil or plastics can be recuperated and reused. Solid waste recycling also includes composting , incinerating, and land-filling.The process of recycling includes collection, separation, preparing the material to buyer's specifications, sale to markets, processing, and the eventual reuse of materials. The management of this recycling process is vacant in our country.

The paper is intended to illustrate and introduce a simple management system for the recycling of solid waste system for our country. This will also include the total recycling process

and end products and the overview that will allure the business minds to explore this sector.

The paper contains following sections: Section II reflecting the previous works and reviews, section III briefly presents the existing scenario while IV elaborates the features, conceptual design and implementation along with the work flow of our introduced management system. The over all discussion has been added in Section V. Section VI discusses the limitation and future possibilities of expansion of our system. Finally, Section VII concludes the paper.

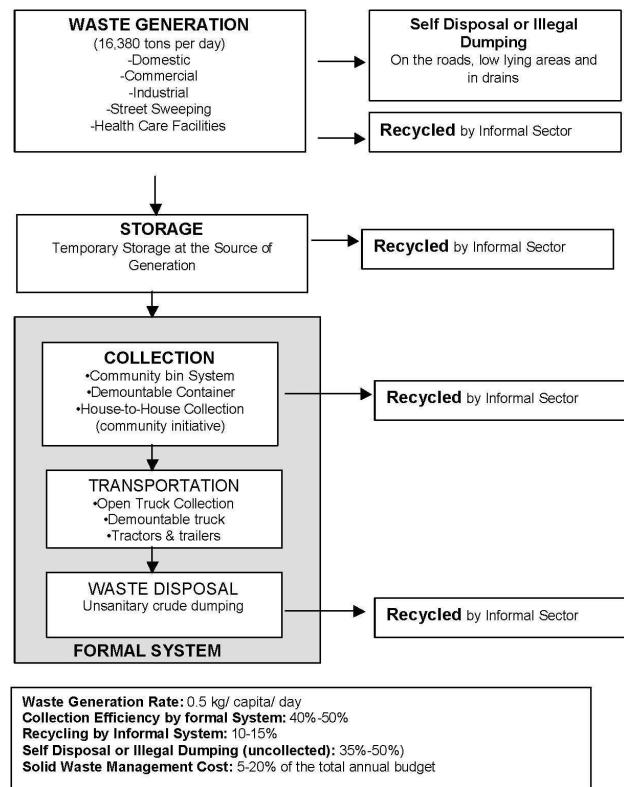


Fig. 1: Solid waste management process in Bangladesh, The Department of Environment (DOE), 2004

II. LITERATURE REVIEW

For the development of the paper studying various publications was necessary as this field is enormous. From the DoE K.M. Bahauddin has a great contribution in this regard.In

his publication ***Prospect of solid waste situation and an approach of Environmental Management Measure (EMM) model for sustainable solid waste management: case study of Dhaka city***[6] he focused on Environment and waste management barely mentioning any opportunities regarding recycling management. From the Department of Public Administration, Chittagong University **Farjana Nasrin** published her paper ***Waste Management in Bangladesh: current situation and suggestions for action***[7] focusing on the present scenario of waste generation and limited suggestions on recycling only. There is no mentioning about the management regarding the detailed recycling process. **Suraiya Yasmin** a scholar from the Institute of Disaster Management and Vulnerability Studies, University of Dhaka in her paper ***A Review of Solid Waste Management Practice in Dhaka City, Bangladesh***[8] focused on the existing waste management in general. Previous publications only focused on the generation and recycling but there is almost zero indication about the management of recycling and management inside and outside recycling industries. From the development of the paper various websites were also discussed which are referenced in applicable discussions later in the paper. But this paper varies these publications as the paper is based on analytic study along with on ground limited research and survey. Currently individual industries are maintaining their own databases related to their own production. This paper and the system developed under it introduces the management system of the solid waste recycling which can be embedded to any organization as well as will beneficiary in national level also.

III. PRESENT SYSTEM

- Currently in Bangladesh Solid Waste Recycling is growing situation. Mostly management of waste is being the prime concern. Worldwide, the recycling industry generates about 200 billion Dollar in revenue, according to the Bureau of International Recycling. The solid waste and recycling market is largest in developed nations, but growing fastest in developing countries with rising incomes and rapid urbanization, such as China and India.[1]. In Bangladesh 44.30 - 76.47 percent of solid waste is collected in major urban cities sole which is referred by ZICA.[3] Nevertheless, it is generating scopes for new dimension in the economy.[4]
- A statistical study from various year is shown below depending on the above discussion:

Material	a) Estimated generation of recyclable waste (ton/day)	b) Estimated recycled waste (ton/day)	c) Recycle rate (%)	d) Contribution to waste reduction (0.3,200)
Plastic	124	103	83%	3.2%
Paper	260	168	65%	5.3%
Glass	46	24	52%	0.8%
Metal	27	41	0	1.3%
Compostable	2211	6	0%	0.2%
Others	99	94	95%	2.9%
Total	2767	436		13.6%

Fig. 2: Comparative Study on Solid waste recycling

- There are different organizations in developed countries like USA have wastewateronline[5] but in Bangladesh there is no automated system using to manage the process.

- The problems faced in the system are :-

- Firstly, no track of recycling process.
- Secondly only handling problems related to collection.
- Finally not handling all types of solid waste recycling process.

So, these are slight references on the context of the title topic.

IV. PROPOSED SYSTEM

A. Conceptual Design

The Database is plain and simple provided to run any queries and fetch information as per the requirement of the users. It is designed simply to store all the information starting from the collection with details about the collectors, providers, transports of the collected items, industries who ought to buy them, employees of the industries, the process of recycling, end product produced of the recycle, consumer level reach all information could also be fetched via queries.

Various parts of the schema are shown as below:

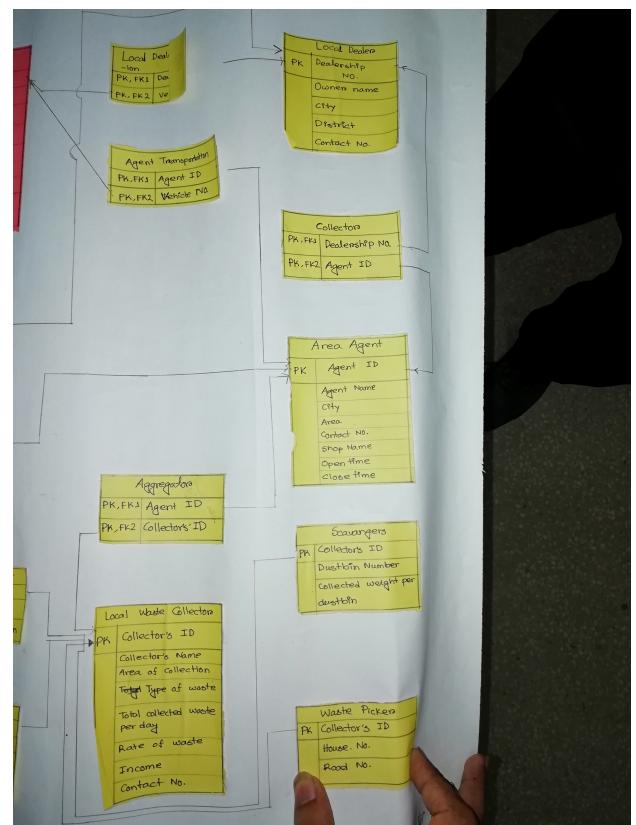


Fig. 3: Schema part-01

The database is designed keeping the recycling cycle in mind. It works as proposed full recycling cycle information view and store.

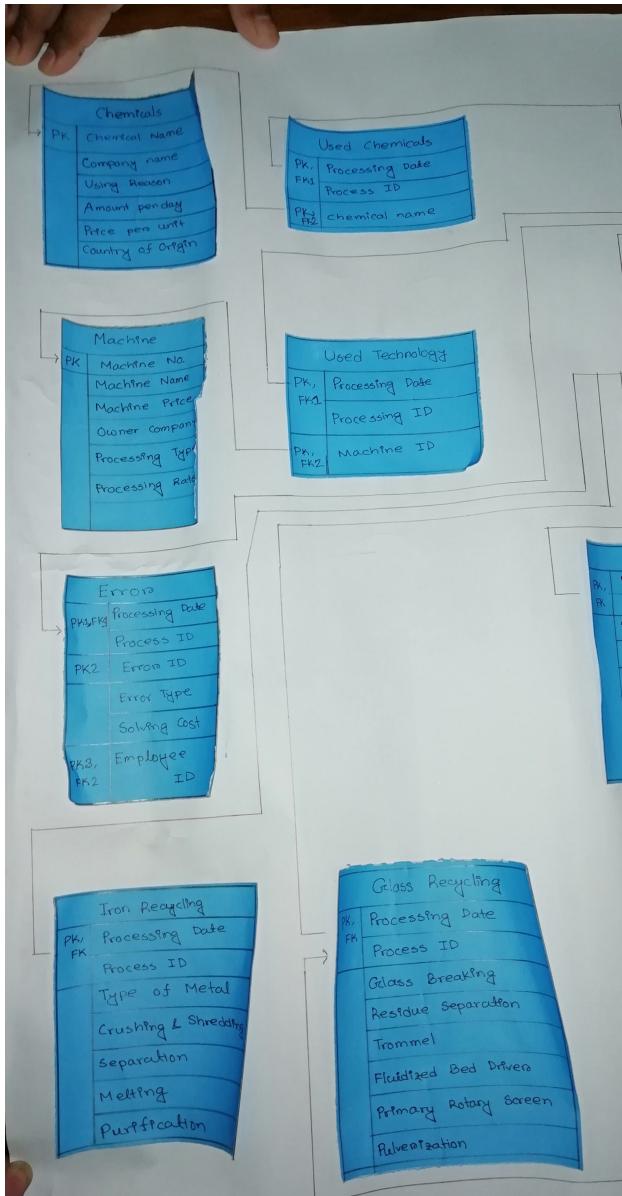


Fig. 4: Schema part-02

B. Development of the System

The database is kept simple and clean. all the queries and sub-queries are written in sql and linked later on to fetch data or insert it in particular field via both ends as administrator. Other users access can be specified via admin. The front page of the project is given a simple look of a web page which will be convenient for any user. Available tables can be shown under admin or any user as follows: Even the users will be able to contact the supporting team as well. And all of this is designed in web view.

C. System Requirement

The project2 is developed in **oracle 11g** in the back end and java as the linker between front end and back end whereas

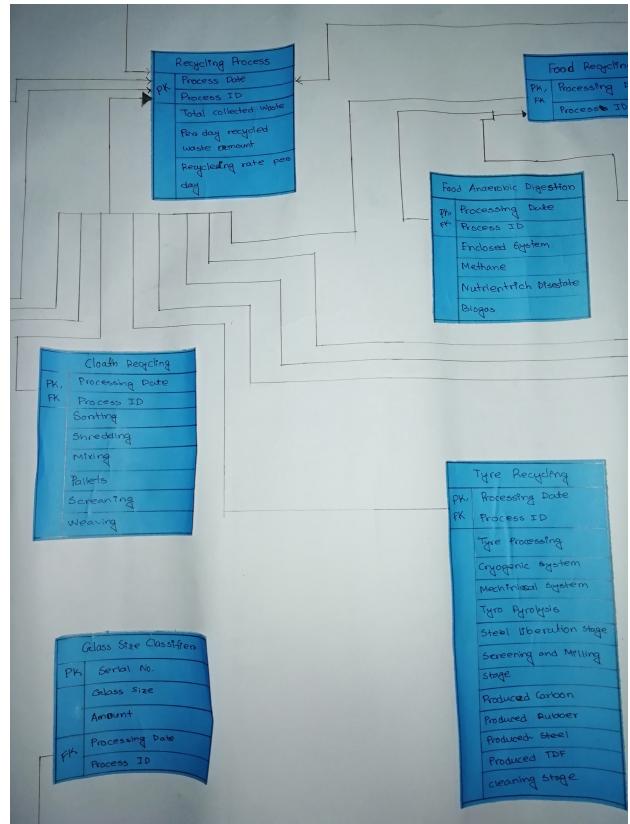


Fig. 5: Schema part-03

front end is designed based on **HTML5 CSS3** under **windows OS**.

V. DISCUSSION

The system that are present currently are all about management of waste recycling. There is no dealings of how the wastes are being collected.Rather methods for disposal are given and actions are taken on basis of type of solid waste.In Bangladesh, recycling industry is still in a growing aspect.The general mass had no idea how this industry is growing rapidly creating employments ,reuse of objects,disposal.Government is taking steps for disposals and thinking about the recycling process. Some private companies like 'Bengal Glass works Ltd.' are recycling glass material into differnt products. Then collection process steps are having clarity on the process of employments.All these factors are creating huge employment facilities and restoring the damage of nature for a better future.

VI. LIMITATIONS AND FUTURE EXPANSION

The system we have developed have many flaws

- Firstly the system can not handle any old records of management company alumni.
- Secondly it can't handle multiple insertion from a section.
- Thirdly it can't take handle all dynamic changes in the system.

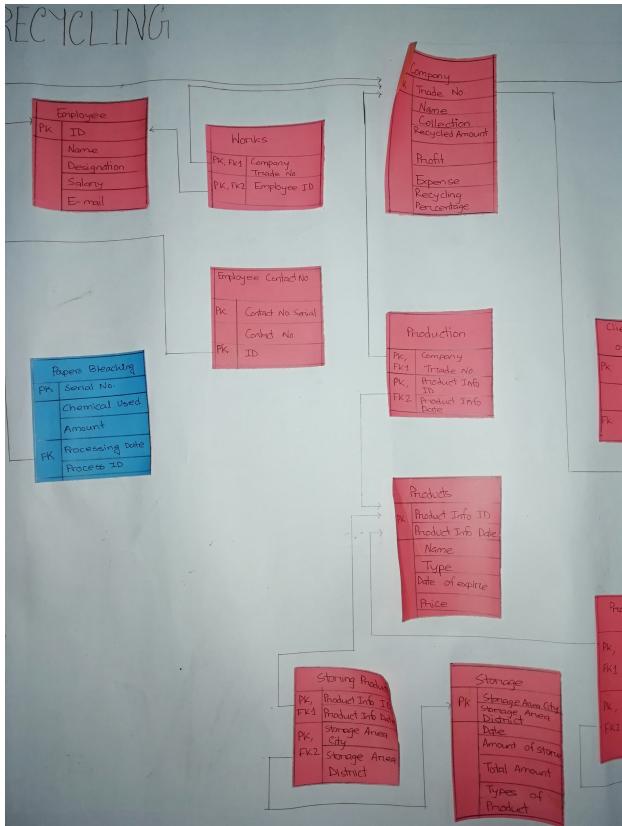


Fig. 6: Schema part-04

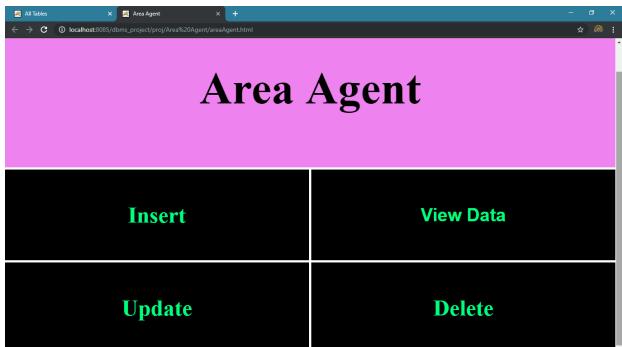


Fig. 7: Data Page

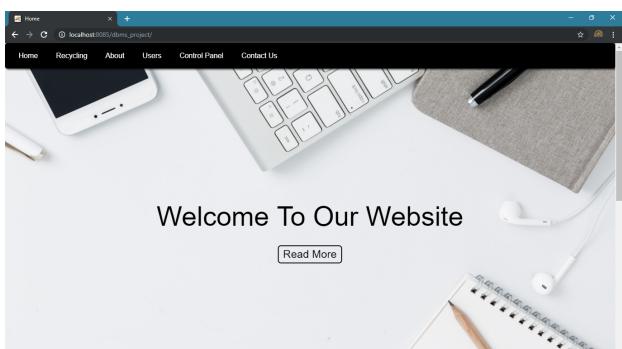


Fig. 8: Front Page

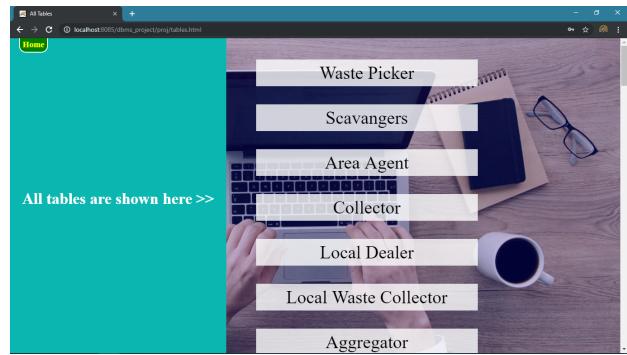


Fig. 9: available tables within the database

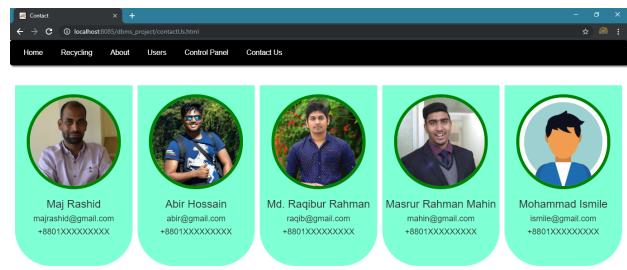


Fig. 10: Contact us Page

- Fourthly, the major flaw of the system is more search based rather than not more applicable
 - Finally the system has less transparency to general users
- Anyone is free to take any action to make more efficient application to handle errors in our system.

VII. CONCLUSION

Solid waste recycling is a vast arena consisting of the process, various industries, collectors, consumers, recycled products, transportation and the management. It can handle various data dynamically but managing old record needs extra space and hence not incorporated within our project. It can be beneficiary for each and every entity connected to solid waste recycling system and can open efficient data handling door for them. This project can be practically incorporated in City Corporation to develop accounting system for the solid waste recycling management system. This project is based on practical data handling and on the requirement of advanced data handling system hence we believe it is the one of a kind pilot project on this regard. Hopefully, it will be included in present private and national sectors of solid waste recycling industries to mange the system more efficiently and smoothly.

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