Abstract

The term recycling is an important for the environmental benefits; in addition to environmental benefits the recycling can have economic benefit also. It plays an important role. Growing demands of economy, population, and development for any country, they all needs to recycling or demolition of old outdated structures or building. Recycling of construction material is the separation of recoverable waste material which generated during the construction and remodeling. Due to recycling methods it reduce the demand up on new resources. In day today life renovation and renewal projects are very common and it’s obvious all these projects generate waste. Recycling on site can reduce material handling and disposal costs. The recycling of construction material is an important attempt in reducing the cost of production of new material and also useful in reducing the consumption of natural resources and as well as reduce usage of landfills. This paper is mostly based on, importance of recycling, we proposed to how to recycling process is done in efficient manner waste material to convert useful raw materials and every organization follows their particular strategies and profitable resources.

I. INTRODUCTION

It is well known that economy and technological developments are the triggers for environmental problems. More production means more waste and it creates environmental concerns threat. Recycling is an important term which is used to produce a useful source of
aggregate for the construction industry. The construction industry can take advantage of the benefits of using waste and recycled materials. Studies have investigated the use of acceptable waste, recycled and reusable materials and methods. The use of swine manure, animal fat, silica fume, roofing shingles, empty palm fruit bunch, citrus peels, cement kiln dust, fly ash, foundry sand, slag, glass, plastic, carpet, tire scraps, asphalt pavement and concrete aggregate in construction is becoming increasingly popular due to the shortage and increasing cost of raw materials. For years, scientists and researchers have been searching for possible solutions to environmental concerns of waste production and pollution. Many have found that replacing raw materials with recycled materials reduces our dependency on raw materials in the construction industries, Indian code regarding practice for construction and demolition waste and management system.

II. OBJECTIVES

The main objectives of this paper are:
1. Investigating the waste management system in the construction;
2. Examining the importance on materials recycling;
3. The status of construction and demolition waste in Asian countries.
4. Existing Waste Recycling Methods
5. Indian code regarding practice for construction and demolition waste and management system.

III. WASTE MANAGEMENT SYSTEM IN INDIA

Waste management is all the activities and actions required to manage waste from its inception to its final disposal. This includes amongst other things, collection, transport, treatment and disposal of waste together with monitoring and regulation. It also encompasses the legal and regulatory framework that relates to waste management encompassing guidance on recycling etc. India’s rapid economic growth has resulted in a substantial increase in solid waste generation in urban centers. Urban areas in India alone generate more than 100,000 metric tonnes of solid waste per day, which is higher than many countries’ total daily waste generation. Large metropoles such as Mumbai and Delhi generate around 9000 metric tonnes and 8300 metric tonnes per day respectively. Due to sustained rapid economic growth, Indian cities are expected to only intensify their consumption patterns. However, India’s per capita waste generation is significantly lower compared to that of developed world. In India, a proper waste management system is urgent necessary for the following reasons:
(a) To control different types of pollution, i.e., air pollution, soil pollution, water pollution etc.;
(b) To stop the spread of infectious diseases.
(c) To conserve all our environmental resources, including forest, minerals water etc.
IV. RECYCLED CONTENT

A product featuring recycled content has been partially or entirely produced from post-industrial or post-consumer waste. The incorporation of waste materials from industrial processes or households into usable building products reduces the waste stream and the demand on virgin natural resources. By recycling materials, the embodied energy they contain is preserved. The energy used in the recycling process for most materials is far less than the energy used in the original manufacturing. Aluminum, for example, can be recycled for 10–20% of the energy required to transform raw ore into finished goods. Key building materials that have potential for recycling include glass, plastics, metals, concrete or brick, and wood. These generally make up the bulk of a building’s fabric. The manufacturing process for all of these materials can easily incorporate waste products. Glass, plastics, and metal can be reformed through heat. Concrete or brick can be ground up and used as aggregate in new masonry. Lumber can be resawn for use as dimensional lumber, or chipped for use in composite materials such as strand board.

Components of Benefits

The benefits of recycling are comprised of:
- Market values of the materials collected
- The avoided costs of collection and disposal
- Avoided external costs of landfill disposal
- Direct consumer benefits.

V. THE STATUS OF CONSTRUCTION AND DEMOLITION WASTE IN ASIAN COUNTRIES

As reported by the MoEF (Ministry of Environment and Forest) in 2008 estimated that 0.53 million tonnes/day of waste is generated in the country. On that basis the 210 million tonnes of MSW is produced annually, table 1 shows the estimate prepared by central government of India. But as per the world bank report says Asian countries produces around about 1000kg per capita per year, it means the figure which stated by the MoEF is very less than the world bank report figure. This show in India is underestimating the construction and demolition waste handling. The figure 2 with graphical representation shows construction and demolition waste production per day in Indian cities. The study includes Asian countries like Bhutan, Japan, Hong-Kong SAR, China, Thailand and others including India[2]. The following 2 chart shows the status of construction and demolition waste in Asian countries. Figure 1 shows the status of construction waste in Asian countries.
VI. EXISTING WASTE RECYCLING METHODS

The economic and environmental benefits to be gained from waste minimization and recycling are enormous, since it will benefit both the environment and the construction firms in terms of cost reduction. The economic benefits of waste minimization and recycling include the possibilities of selling specific waste materials and the removal from site of other wastes at no charge or reduced cost, with a subsequent reduction in materials going to landfill at a higher cost. Therefore, it can increase contractors’ competitiveness through lower production costs and a better public image. However, very few contractors have spent efforts in considering the environment and developing the concept of recycling building materials. Because contractors rank timing as their top priority, their effort is always focused on completing the project in the shortest time, rather than the environment. Their account books cannot reveal the potential savings resulted from reduction in construction wastes. Managing building material waste can in fact achieve higher construction productivity, save in time and improvement in safety while extra wastes take extra time and resources for disposal that may slow down the construction progress.

6.1. Indian code regarding practice for construction and demolition waste and management system.

Whereas the Municipal Solid Wastes (Management and Handling) Rules, 2000 published vide notification number S.O. 908(E), dated the 25th September, 2000 by the Government of India in the erstwhile Ministry of Environment and Forests, provided a regulatory frame work for management of Municipal Solid Waste generated in the urban area of the country; And whereas, to make these rules more effective and to improve the collection, segregation, recycling, treatment and disposal of solid waste in an environmentally sound manner, the Central Government reviewed the existing rules and it was considered necessary to revise the existing rules with a emphasis on the roles and accountability of waste generators and various stakeholders, give thrust to segregation, recovery, reuse, recycle at source, address in detail the management of construction and demolition waste. And whereas, the draft rules, namely, the Solid Waste Management Rules, 2015 with a separate chapter on construction and demolition waste were published by the Central Government in the Ministry of Environment, Forest and Climate Change vide G.S.R. 451 (E), dated the 3 rd June, 2015 inviting objections or suggestions from the public within sixty days from the date of publication of the said notification; And Whereas, the objections or suggestions received within the stipulated period were duly considered by the Central Government; Now, therefore, in exercise of the powers conferred by sections 6, 25 of the Environment (Protection) Act, 1986 (29 of 1986), and in supersession of the Municipal Solid Wastes (Management and Handling) Rules, 2000, except as respect things done or omitted to be
6.2 Utilization of Recycled and Waste Materials in Various Construction Applications

More production equals more waste, more waste creates environmental concerns of toxic threat. An economical viable solution to this problem should include utilization of waste materials for new products which in turn minimize the heavy burden on the nation's landfills. Recycling of waste construction materials saves natural resources, saves energy, reduces solid waste, reduces air and water pollutants and reduces greenhouse gases. The construction industry can start being aware of and take advantage of the benefits of using waste and recycled materials. Studies have investigated the use of acceptable waste, recycled and reusable materials and methods. The use of swine manure, animal fat, silica fume, roofing shingles, empty palm fruit bunch, citrus peels, cement kiln dust, fly ash, foundry sand, slag, glass, plastic, carpet, tire scraps, asphalt pavement and concrete aggregate in construction is becoming increasingly popular due to the shortage and increasing cost of raw materials. In this study a questionnaire survey targeting experts from the construction industry was conducted in order to investigate the current practices of the uses of waste and recycled materials in the construction industry. This study presents an initial understanding of the current strengths and weaknesses of the practice intended to support the construction industry in developing effective policies regarding uses of waste and recycled materials as construction materials.

VII. CONCLUSION

As environmental protection had been pressing hardly in all over the world, the pollution generation from construction activities seems difficult to control; while waste problem is the major element in the pollution generation. For controlling the waste generation in India, reuse, recycling and reduce the construction materials had been encouraged. However, the existing waste recycling methods did not encourage the various recycling parties and encountered difficulties from various directions. Therefore, some recommendations are suggested: i) proposing a higher landfill charging scheme; ii) setting up a centralized center for recycling the materials; iii) examining the Indian government should be supported in the provision of land for recycling plants; iv) implementing innovative demolition methods; v) allowing some locations in town for residents’ easy access to drop-off recyclable materials; vi) allowing flexible demolition periods; vii) setting up recycling plant in town or in the form of mobile installations; viii) reusing the reusable components as donations to the charity organization; ix) and balancing the supply and demand of recycled materials through legislations or incentive schemes.

VIII. REFERENCES

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