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Construction and Demolition Waste Management Advantages of Demolition in Construction

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Abstract: ***The construction industry has gained very fast growth in recent decades due to the increase in the population, increase in the IT sector and increase in the industrialization and also introduction of new infrastructure projects resulted in the increase of construction industry drastically. Due to which the demand for construction materials is huge for the construction activities which results in the generation of huge amount of construction waste. Construction material wastage resulted in the huge financial setbacks to builders, contractors, regional's authorities and also to the country. The production of waste due to the demolition of structures is more than the wastage which occurs during construction of structures, so there is need of management of Construction and Demolition (C&D) wastes, as distinct from Municipal Solid wastes, is a relatively new subject in India. To begin with the issue there is no proper estimate regarding the quantity of waste occurs in India. The primary reason is being in disciplinary and less focused in this issue. In this problem there is absence of regulatory framework and strict enforcement. Specific recommendations has made in this report to overcome the loop holes in the issue. In this report current global status of construction and demolition waste management is overviewed and also the sustainable waste management hierarchy is studied so to overcome the waste problem. In this report methods and different construction reuses are discussed so that we can make proper use of waste material generated during demolition.***

Keywords: waste material , reuse, environments and Recycled concrete

1. Introduction

Due to the increase in the economic growth after development and redevelopment projects in the country and subsequent increase in the urbanization in the cities has made construction sector to increase drastically, but also environmental impacts from construction and demolition (C**&D)** waste are increasingly becoming a major issue in urban solid waste management. Environmental issues such as increase in the flood levels due to the illegal dumping of construction and demolition waste into the rivers, resource depletion, shortage of landfill and illegal dumping on hill slopes are evident in the metro cities. For the purpose of management of C&D Wastes in India, Construction and demolition waste has been defined as 'waste which arises from construction, renovation and demolition activities'. Also included within the definition are surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of on-site activities.

2. Problems and Challenges

A. Recycled concrete characteristics

Due to the higher cement content of recycled aggregates, recycled products absorb more water, leading to different curing times and different behavioral traits

B. Contamination of material

Asbestos contamination is an ongoing challenge for the recycling industry. There is currently no alternative to visual inspection at the weighbridge.

C. Perceptions

Negative perceptions by the construction industry of recycled materials include that they are difficult to use and result in inferior constructions. These perceptions are changing as field trials show how to use these materials to their optimum performance and as virgin resources become scarcer

3. Different Waste Material and their Reuse

A. Concrete and brick

Concrete reprocessing involves the use of relatively uncomplicated and well- established crushing techniques. Where high landfill fees exist (including levies), there is a strong incentive to avoid weight-based disposal charges by recovering the heavy components of the C&D waste stream. Diversion also supports significant end markets for the recycled products in some metropolitan locations, where reprocessing sites can produce products that are commercially competitive with quarry products.

Bricks are often presented as 'mixed masonry' or 'builders rubble' mixed with concrete and, like source-separated concrete, this component of the C&D waste stream is relatively simple to process, with similar end markets for aggregate products.

The key markets for crushed concrete and brick include use in all-weather applications (such as low-grade roads), and in pavement sub-bases (such as roads and non-structural applications) as a substitute for virgin crushed rock.

B. Rock and Excavation Stone

This material is recovered when civil or site preparation works are undertaken. Depending on the geology of an area,

a great deal of excavated rock and stone can be produced as a by- product. Excavated rock and stone comes mostly from the construction sector. Again, the level of recovery of these materials and end markets for associated products has much to do with the geography of where the material is generated, the local market outlets for products, and landfill pricing which discourages the disposal of this heavy, voluminous material.

C. Soil and Sand

Soil and sand is generated from site preparation and excavation works associated with construction activities. Large volumes of fine materials are generated through these activities and unless the material can be re-used on site it requires treatment and/or disposal. This includes soil and sand as well as other sub-4.75 mm particles from mixed skip-bin waste.

D. Metal

Scrap metal prices are subject to international forces and during the Global Financial Crisis there were reports of serious disruptions to the market for recovered scrap. While the price that re-processors pay for mixed steel scrap is highly variable, the current ballpark figure is around $250 per tonne. Coupled with the value of avoided landfill disposal costs, there is a strong economic incentive to recover this material stream.

The majority (about 90 per cent) of metals recovered from the C&D sector comes from commercial demolition sites. Of this material, up to 95 per cent is steel and the remaining materials (about 5 per cent) are non-ferrous metals. This non-ferrous component mostly includes aluminium (1 to 2 per cent), stainless steel and copper piping or wire. Ferrous metals like steel can be easily recovered from the waste stream using relatively inexpensive magnets.

4. Integrated Waste Processing

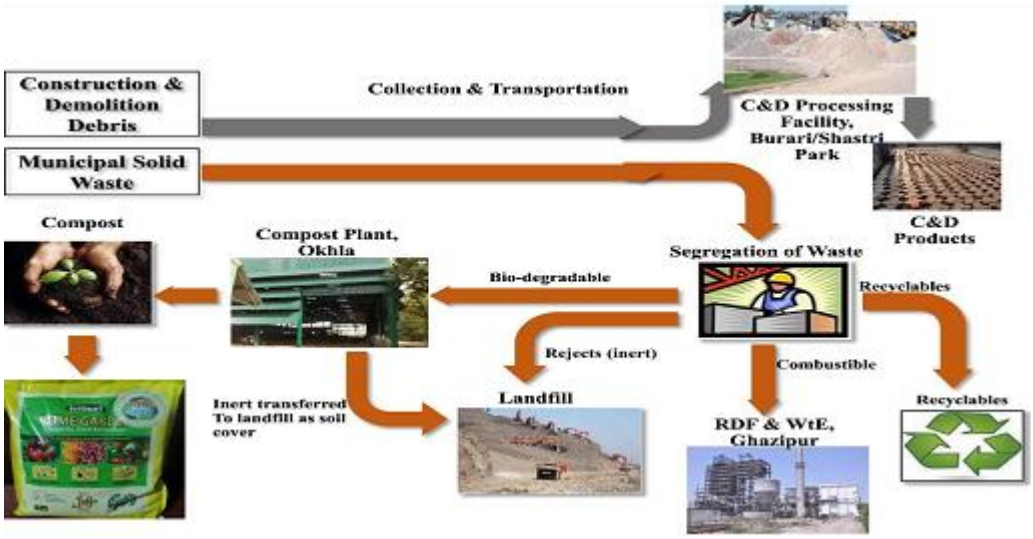

Figure 1: Integrated waste processing Flow Chart

Process Line Flow of C&D Waste In Plant

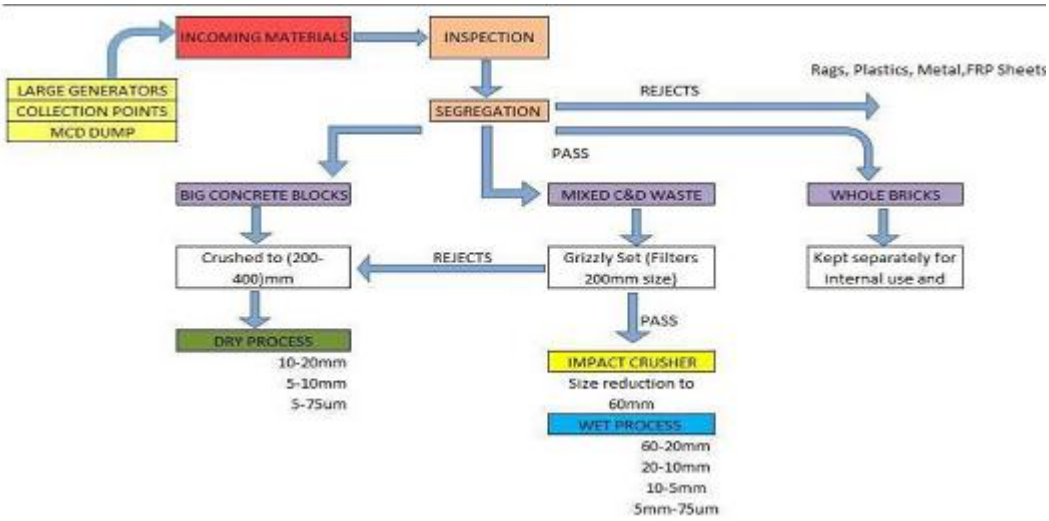

Figure 2: Process line flow of C&D waste in Plant.

5. Effects on Environment

Construction of any infrastructure make a considerable environmental impact through extraction of raw materials, the use of energy in production processes and transport, production of masses by product waste, and the damage to environment and health in all phases of the life cycle of hazardous components. The disposal of C&D wastes has become a major concern in recent year. Some building owners, waste haulers and demolition contractors are disposing of this waste improperly and illegally in order to avoid transportation costs and tipping fees at waste disposal facilities. Illegal disposal sites have been discovered in gravel pits and ground water recharge areas, on farm land, and prime residential property, and in borrow pits and low lying areas. The land disposal of C&D waste presents a threat of ground water contamination because of trace amounts of hazardous constituents, which are sometimes encountered. The potential for ground water contamination results from small amounts of hazardous materials, such has organic compounds or heavy metals that may be present in substances that have been applied to construction materials, or by the improper disposal of residues or bulk chemicals in the waste stream. Degradation of ground water quality may also results from larger amount of generally non-toxic chemicals, such as Chloride, Sodium, Sulphate, and Ammonia that may be present in leachate generated from C&D waste materials (Ex: wood, concrete, metal, drywall, asphalt) when land filled. Therefore the improper disposal of C&D waste does pose a threat to ground water quality. An illegal disposal site may also attract the illegal disposal of other types of waste, including conventional municipal waste, industrial waste and hazardous waste this would further impact the site and increase the future cost for cleaning up an impacted or contaminated site

6. Conclusions

The civic authority should consider the following points and after deliberations get them approved by the competent authority, except those which already exist in their municipal act. The civic authority should notify that no person should dispose of C&D waste on the streets / pavements / storm drainage / open land belonging to the municipality or the government. In case such waste is dumped on a private land, the owner of such land would be accountable for the act and would be held responsible for any degradation of the surrounding environment or causing of any pollution. Such waste should be stored within the premises till they are removed from the site to a place notified/permitted by the body. In case of new construction, the advance is to be deposited with the application for sanction of the building plan. The charges would be notified by the civic authority and would be refundable after due deductions in case of compliance of the stipulated laws. In case of any default, the whole amount would be confiscated. These rules/notifications would also be valid for Government, Semi- Government and Public Sector Departments.

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