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Demolition and Construction

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Abstract—*One important solution to these problems is cooperation of the stakeholders in the C&D waste recycling system. High quality recycling of waste is defined as waste recycling within the same product line. The study gives an overview over the composition and disposal routes of construction and demolition waste. The results are accentuated by means of two case studies. In order to complete the picture, the subject of material handling and practices at recycling plants and stations is also touched. Through this process we want to take a step ahead, the idea of stopping illegal sand mining, earth excavation and ultimately save our mother Earth from destruction. Our primary aim is to study in depth about the different properties of construction and demolition waste, perform various tests, so that the recycling processes can be designed accordingly for optimum efficiency. On the basis of these test results and projections we will get a rough estimation about the total quantity of recycled aggregate and recycled sand that can be obtained.*

Keywords— *Results, Waste, Demolition, Construction, Earth etc.*

I. INTRODUCTION

Construction waste is bulky and heavy and is mostly unsuitable for disposal by incineration or composting. The growing population in the country and requirement of land for other uses has reduced the availability of land for waste disposal. Re-utilization or recycling is an important strategy for management of such waste. Waste is generated at different stages of construction process. Waste during construction activity relates to excessive cement mix or concrete left after work is over, rejection/ demolition caused due to change in design or wrong workmanship etc. Estimated waste generation during construction is 40 to 60 Kg. per sq. m. Similarly, waste generation during renovation/ repair work is estimated to be 40 to 50 kg/sq.m. The highest contribution to waste generation is due to demolition of buildings. Demolition of Pucca and Semi-Pucca buildings, on an average generates 500 & 300 kg/ sq.m. of waste respectively. Concrete appears in two forms in the waste. Structural elements of building have reinforced concrete, while foundations have mass non-reinforced concrete. Excavations produce topsoil, clay, sand, and gravel. This may be either re-used as filler at the same site after completion of excavation work or moved to another site. Large quantum of bricks and masonry arise as waste during demolition. These are generally mixed with cement, mortar or lime. Stone arises during excavations or by demolition of old buildings. According to findings of survey, the most dominant reason for not adopting recycling of waste from Construction Industry is "Not aware of the recycling techniques". While 70% of the respondent has cited this as one of the reasons, 30% of the respondent has indicated that they are not even aware of recycling possibilities.

II. TYPES OF CONSTRUCTION AND DEMOLITION WASTE

A. Classification of Waste

- Residential
- Industrial
- Commercial
- Institutional
- Agricultural
- C&D

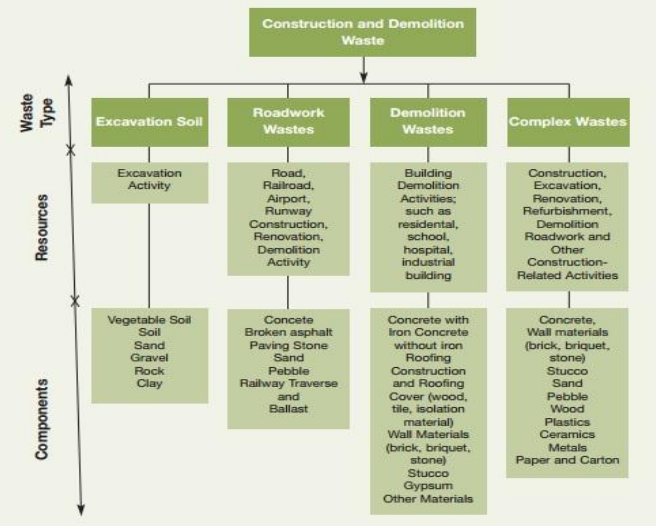

Fig. 1. Types of C&D waste.

III. CONSTRUCTION AND DEMOLITION WASTE – AN OVERVIEW OF CONSTRUCTION INDUSTRY IN INDIA

India has established itself as one of the world's fastest growing economies and this growth has brought with it a significant boost in construction activities. With the rapid growth in construction activities, it is important to assess the amount of construction and demolition waste being generated and analyze the practices needed to handle waste in order to propose a sustainable construction approach. It has become essential to study C & D waste generation and handling to develop accurate data and establish sustainable methods to manage construction waste. Reduce, Reuse and Recycle [3R's] is highly useful in handling of construction and demolition waste. It is estimated that the total solid waste generated in India is about 960 million tonnes of which the construction waste alone is 14.5 million tonnes. Construction and Demolition waste in India during 2010 is estimated as 24 million tonnes. If measures to minimize and handle the construction and demolition wastes are not developed and efficiently adopted, it may have an impact on the environment.

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The paper provides an overview and statistics of construction and demolition waste of the construction industry in India. The paper gives an overview of the current status as well as the future potential for waste minimization, explores how waste management practices can be effectively implemented in construction projects.

IV. Recycling and Reuse of Construction and Demolition Waste for Sustainable Development

As we are living in 21st century, new technologies are being invented in almost every sector to make human life fast and easier. Beside this we are still finding the solutions to problems related to our environment, energy and natural resources. Construction industry produces large amount of waste throughout the year. Most of the time construction and demolition waste ends up in landfills disturbing environmental, economic and social life cycle. Construction and demolition waste is the waste materials that are produced in the process of construction, renovation or demolition of residential or nonresidential structures. Components of construction and demolition waste typically include concrete, asphalt, wood, metals, gypsum wallboard, roofing, paper, plastic, drywall and glass. Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs; and can be considered as one of the solution to solve construction and demolition waste. Recycling of Construction and demolition waste has many benefits such as reduction in transportation cost, it keeps environment clean and reduces natural resource exploitation. To promote recycling and reuse of waste, awareness about its effects and benefits should be communicated with people, contractors, engineers and architects. More numbers of recycling plants should be installed and allowing the use of recycled aggregate instead of natural aggregate for some purpose. In this paper I am going to focus on different recycling techniques and reuse of construction and demolition waste.

V. Method Construction of MFA

The MFA accounts for C&D waste released and processed in the Netherlands in 2012. If data from another year has been used, it has been indicated. The main input for the sizes of the streams was data received from the LMA, "Landelijk Meldpunt Afvalstoffen", the Dutch registering body for waste. LMA follows the LoW (European List of Waste) codes for registration of waste. The accuracy of the data from LMA has been indicated by other researchers (e.g. Corsten et al., 2010) as an area in which opportunities for improvements appear. LMA aims at following C&D waste from its origin (sorting process) to its final stage (end-use). Not all companies that treat C&D waste, e.g. companies that only process metals or plastics, are obliged to register their activities to the LMA, which makes tracking the materials a challenging task. explains the registration process of C&D waste into the LMA. The waste treatment methods included in LMA's database are limited. In order to enlarge the C&D waste treatment processes, other sources of information were consulted. For example, experts were consulted to increase the knowledge on the material flow for wood and stones. For information on export of C&D waste, information is gathered from the EVOA, which stands for "Europese Verordening Overbrenging Afvalstoffen". EVOA is the Dutch body that regulates the EU export waste shipment regulation. The most recent registers on waste are from 2010. Some rules for registration into EVOA have been changed between 2010 and 2012. The main changes do not affect the way the material flow analysis was carried out. For instance, gypsum is at present not allowed to be exported to Germany to be used in mines to prevent collapse, since Germany has decided that this is no useful application anymore. In 2010, a large part of Dutch gypsum waste was exported to Germany. However, at that time it was not mandatory to register export of gypsum, since it was on the Green list. Therefore, data on high gypsum export in 2010 is not included in the MFA for 2012. According to the ministry of Infrastructure and Environment (B. van Huet, Personal communication, 3 March 2013), other changes made into the EVOA registration process are not of high concern for this research.

VI. National Waste Policy: Less Waste, More Resources

Endorsed by Australian environment ministers in November 2009, TheNational Waste Policy: less waste, more resources (National Waste Policy) is a collaborative approach that aims to avoid the generation of waste, reduce the amount of waste for disposal, manage waste as a resource and ensure that waste treatment, disposal, recovery and re-use is undertaken in a safe, scientific and environmentally-sound manner. The National Waste Policy sets a clear direction for Australia for the next 10 years and will update and integrate Australia's policy and regulatory framework. Through the National Waste Policy, the Australian Government aims to support development of best practice across all states and territories. The policy includes a strategy specifically focused on C&D waste, as follows:

Strategy:

All governments continue to encourage best practice waste management and resource recovery for construction and demolition projects.

VII. Collection of C&D Waste

- Collection of the C&DW can be done by the trucks having container of different sizes.
- Size of the container depends upon the demolition area/part.
- For handling very large volumes, front-end loaders in combination with sturdy tipper trucks may be used so that the time taken for loading and unloading is kept to the minimum.
- For small generators of construction debris, e.g., petty repair/maintenance job, there may be two options – (i) specific places for such dumping by the local body and (ii) removal on payment basis.
- In case of small towns where skips and tipping trailers are not available, manual loading and unloading should be permitted.

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- In case of large towns where C&D waste generates in large amount, Zoning of the towns is necessary. By multiple pickup points of C&D waste we can easily do collection of C&D waste in large cities.
- Close co-ordination between the Sanitary Department, Municipal Engineering Department and Town Planning Department is essential if there is no consolidated Solid Waste Management Department to take care of the construction and demolition waste in addition to other municipal garbage.

VIII. Recycling and Reuse of Construction and Demolition Waste for Sustainable Development

As we are living in 21st century, new technologies are being invented in almost every sector to make human life fast and easier. Beside this we are still finding the solutions to problems related to our environment, energy and natural resources. Construction industry produces large amount of waste throughout the year. Most of the time construction and demolition waste ends up in landfills disturbing environmental, economic and social life cycle. Construction and demolition waste is the waste materials that are produced in the process of construction, renovation or demolition of residential or nonresidential structures. Components of construction and demolition waste typically include concrete, asphalt, wood, metals, gypsum wallboard, roofing, paper, plastic, drywall and glass. Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs; and can be considered as one of the solution to solve construction and demolition waste. Recycling of Construction and demolition waste has many benefits such as reduction in transportation cost, it keeps environment clean and reduces natural resource exploitation. To promote recycling and reuse of waste, awareness about its effects and benefits should be communicated with people, contractors, engineers and architects. More numbers of recycling plants should be installed and allowing the use of recycled aggregate instead of natural aggregate for some purpose. In this paper I am going to focus on different recycling techniques and reuse of construction and demolition waste.

IX. Use of Recycled Aggregate Concrete

Use of recycled aggregate in concrete can be useful for environmental protection. Recycled aggregates are the materials for the future. The application of recycled aggregate has been started in a large number of construction projects of many European, American, Russian and Asian countries. Many countries are giving infrastructural laws relaxation for increasing the use of recycled aggregate. This paper reports the basic properties of recycled fine aggregate and recycled coarse aggregate & also compares these properties with natural aggregates. Basic changes in all aggregate properties are determined and their effects on concreting work are discussed at length. Similarly the properties of recycled aggregate concrete are also determined. Basic concrete properties like compressive strength, flexural strength, workability etc. are explained here for different combinations of recycled aggregate with natural aggregate. Codal guidelines of recycled aggregates concrete in various countries are stated here with their effects, on concreting work.

X. Conclusion

In this paper I am going to focus on different recycling techniques and reuse of construction and demolition waste. All governments continue to encourage best practice waste management and resource recovery for construction and demolition projects. The paper gives an overview of the current status as well as the future potential for waste minimization, explores how waste management practices can be effectively implemented in construction projects. As we are living in 21st century, new technologies are being invented in almost every sector to make human life fast and easier. Beside this we are still finding the solutions to problems related to our environment, energy and natural resources. Construction industry produces large amount of waste throughout the year. Recycling of Construction and demolition waste has many benefits such as reduction in transportation cost, it keeps environment clean and reduces natural resource exploitation. To promote recycling and reuse of waste, awareness about its effects and benefits should be communicated with people, contractors, engineers and architects.

References

[1] http://www.gesundbauen.at/BER3BTE.htm
[2] http://de.wikipedia.org/wiki/Teak
[3] http://www.bma.go.th/
[4] http://www.bma.go.th/
[5] http://de.wikipedia.org/
[6] http://en.wikipedia.org/
[7] http://www.suva.ch/
[8] http://www.pic.int/
[9] http://www.admin.ch/ch/d/sr/814_610_1/app1.html
[10] HTTP://WWW.VEVAONLINE.CH
[11] Betoniek, "Oud beton wordt jong beton," Betoniek 15/19. Æneas, Boxtel, 2011
[12] CORDIS, "Advanced technologies for the production of cement and clean aggregates from construction and demolition waste," Retrieved May 20, 2013.

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