

Demolished Construction Material Waste Management: Review

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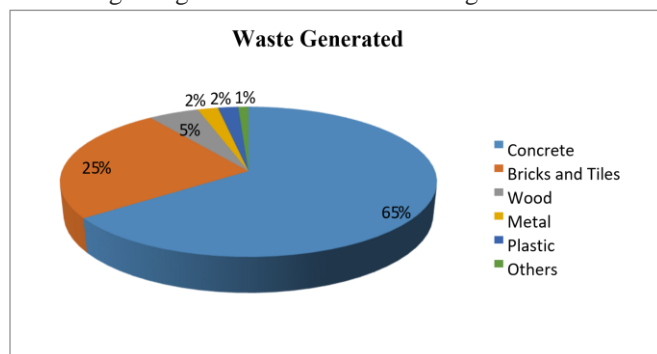
Abstract Huge quantities of construction resources are obligatory in budding countries directly to nonstop infrastructural escalation and in addition enormous quantities of construction and annihilation wastes are generated every day in rising countries like India. The disposal of this desecrate is a fantastically genuine obstacle as on one quality it requires giant interval for its disposal despite the fact that on the other segment it pollutes the environment. In this research Recycling of crushed material and reuse of reused coarse aggregate as a total substitution of normal total. As viewed above, the experiment is to know about the strength water absorption, specific gravity, impact strength test, crushing and abrasion strength test while on concrete workability test, compressive strength test, split tensile strength test and flexural strength test.

Keywords — Waste management, Demolition, Sustainable, Recycling, demolition techniques, Reduce Waste

I. INTRODUCTION

India is one of the fastest developing countries. Infrastructure is the one of the pillar of the development model. An investigation revealed that total waste from India's construction industry could reach 12-14 metric ton per year. It is important to know about construction and demolition waste and how it can be properly disposed. They may have more rigorous requirements. C&D waste is defined as waste that results from land clearing; the demolition of buildings, roads, or other structures; or construction projects. C&D waste includes:

1. Fill materials
2. Glass, plastic
3. Carpeting
4. Electrical wiring
5. Pipe and metals, plumbing fixtures.
6. Roofing shingles and other roof coverings



7. Land clearing debris other than yard waste
8. Wood (including painted and treated wood

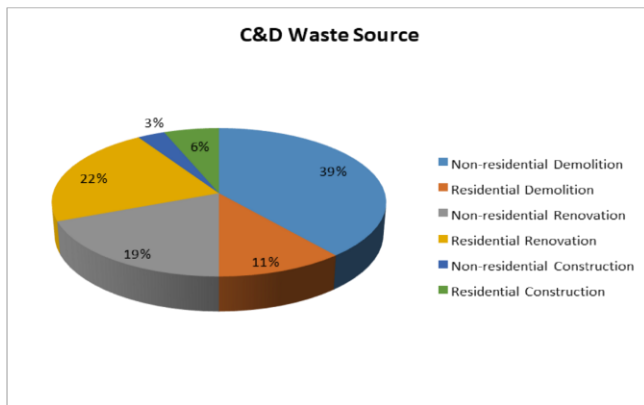
9. Drywall, plaster, and non-asbestos insulation

10. Wall coverings (including wallpapers, paneling, and tile)

The plan of recycling construction and destruction ravage was conceived after humanity War II, correct to bombarding during the dot 1939-45. The cities engage in befall lots of construction and knocking down waste.

II. OVERVIEW OF CONSTRUCTION WASTE

While construction and demolition wastes are usually grouped together under the title "C&D waste", these waste streams are produced by two different processes and the volume and type of materials produced can differ greatly (Jeffrey, 2011). Demolition projects often produce 20-30 times as much waste material per square meter as construction projects. Construction waste normally contains more modern building materials than demolition waste since new buildings are rarely torn down. In addition, demolition waste is often contaminated with paint, adhesives and dirt and the materials can be securely fastened together making separation more difficult. The two cases shown below tell us the difference between the waste stream generated in case of new construction and in case of demolition



Composition of waste depends on the source from which it has been produced. For example, the waste generated from new construction is mostly clean, can be sorted easily and reprocessed or reused with ease. However, in case of demolition and renovation work, the waste generated is generally mixed unless selected demolition process is adopted for demolition. Separating mixed debris waste demands technical knowledge, machinery and proper management. The composition of demolition waste also depends upon the building type from which it has been generated. Therefore, it is necessary to understand the source of waste before executing any waste management plan.

III. OBJECTIVE

1. To study, investigate and plan about the methods and pattern of demolition and their techniques that are adopted in the project work and
2. Collect the demolished aggregate separate from the conventional concrete.

IV. LITERATURE REVIEW

1. Jayasmita Mahakud, Siba Prasad Mishra, Ramesh Chandra Mohanty and Sagarika Panda, Management of Construction and Demolished Waste as an Aggregate Substitute in Cement Concrete, 2021, July-

The current study aims to determine the strength characteristics of recycled C&D wastes and compare them to the strength behaviour of natural coarse aggregate for use as coarse aggregate in structural concrete. The basic properties of coarse aggregate were studied, such as water absorption, specific gravity, mechanical properties such as abrasion resistance, and crushing value.

2. Bhanu Chaudhary, Sourabh Dhiman, Rajneesh Talwar, Syed Mohd Arif, Vikas Verma, Experimental investigation of strength of concrete using recycled demolished construction materials as coarse aggregate, August 2021-

The purpose of this study is to examine the performance of recycled demolished construction material by analysing its

compressive strength for non-load bearing structural components such as boundary walls and non-load bearing walls. The properties of concrete with natural aggregate and concrete with varying amounts of recycled aggregates were tested for strength estimation at 7 and 28 days in the current study. CTM applies a load to the sample concrete at a rate of 14 N/mm²/minute.

The compressive and tensile strength of recycled demolished aggregate was discovered to be greater than that of normal aggregate. According to the current study, extensive use of waste material can significantly reduce the use of natural resources.

3. Aeron Meckwan¹, Prof. Dixit Patel, Construction & Demolition Waste Management Practices in Construction Industry in Vadodara, April 2019-

Construction is an important link in India's infrastructural and industrial development. Building roads, bridges, and other physical amenities is critical to the country's future development. As a result, the building industry generates a large amount of garbage, which is both environmentally unfriendly and costly to project budgets and expected costs. This thesis attempted to determine how much construction waste affects construction project budgets, as well as make recommendations to the industry on how profits can be maximised and waste can be minimised, as well as implement methods for reducing and recycling waste due to construction industry material wastage, which resulted in significant financial losses to builders, contractors, regional governments, and the country.

4. Mr. A. R. Makegaonkar, Dr. P. S. Dange, Mr. R. B. Waghmode, Study of Construction and Demolition waste for reuse and recycle, July 2018-

The purpose of this paper is to investigate the various strategies for reusing and recycling C & D waste. The paper also focuses on the recycling of aggregate for reutilization in construction activities, so that by using recycled aggregate, the project cost is reduced. Surveys, discussions, interviews, and questionnaires are all part of the methodology.

By running tests on those samples, we can determine whether or not the recycled aggregate is in usable condition. We can also determine the feasibility and properties of the recycled aggregate.

5. Reshma V Chafale, Waste Management of Construction and Demolition Materials towards Sustainable Growth of Nagpur City, July 2019-

This paper finds a broader understanding of the socioeconomic implications of waste management over time and the positive effects of these policies in the

recycled to achieve the goal of C&D waste. 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.

6. Kamlesh V. Madavi, Ramesh D. Dod, Management of Construction & Demolition Waste In Pune City ,August 2019-

This paper focuses on the quantity and source of Construction and Demolition CDW waste, as well as the current disposal scenario and its effects. Construction and demolition waste was collected from various locations. All materials were broken down to the desired size and shape and sieved through various sizes. Recycled Concrete Aggregate replaces the 100 percent aggregate. Pune generates 250 MT per year. A proper CDW management can aid in the solution's discovery..

7. Mr.M.KalilurRahman1, Mr.S.S.Janagan, Construction Waste Minimization and Reuse Management, November 2015-

This paper identifies and detects factors that contribute to construction waste generation. For identification purposes, a mapping technique was used, and interviews were conducted to detect physical and non-physical waste. These elements were classified into seven groups: design, handling, worker, management, site condition, procurement, and external factor. Each waste category's significant factors were identified. The findings will assist construction companies in avoiding, reducing, and recycling physical and non-physical waste. Furthermore, the paper makes some recommendations for better construction improvements.

8. Sidam Gangaram, Vankadothu Bhikshma, Maganti Janardhana,, Development of M20 and M30 grade of recycled aggregate concrete by replacing 100% virgin aggregates with recycled aggregates, March -2018 reported that 100% supplanting of common total with reused coarse totals gives agreeable outcomes for M20&M30. So the substitution is of much advantage and will be urged to accomplish higher evaluations of cement .

9. Sung Kin Pun, Chunlu Liu, Craig Langston, Graham Treloar & Yoshito Itoh, Promoting the reuse and recycling of building demolition materials,2006 reported that, environmentally, building material reuse after destruction enables the business to continue its material inventory, just as to bring down common asset utilization. Vitality utilization by the business is additionally directed.

Circumstances should be improved so as to encourage building waste material R&R, including government support, auxiliary structure material market, modern normalization, building destruction strategies and the board draws near, and expanded network consciousness of the business.

10. Avindana John & Dr. Suhil Kumar Mittal , N.K Dhapekar, Applicability of Construction and Demolition Waste Concrete in Construction Sector – Review,2017

In this research paper, construction and demolition waste administration is recommended to advance development for sustainability, environmental protection, and optimum use of existing resources. The demolition of buildings, arch supports, airport runways, and accurate roadbeds could result in recycled aggregate (RA). Authorities should devise a strategy for imposing nominal penalties on agencies responsible for construction and demolition

11. Ar. Gaurav, Ar. Amit Varma, Ar. Uzair Khan, Overview of Construction and Demolition waste and challenges identified to tackle the issue,September 2019-

The purpose of this paper is to provide an overview of current construction and demolition waste management practises in India. It discusses the current waste generation in the construction industry as well as the challenges in implementing construction and demolition waste management strategies. The increased production of construction and demolition waste has a negative impact on public health and poses a threat to the environment. To address this issue, the government and private sector in India have established a number of construction and demolition waste recycling plants. In recent years, government bodies such as state development authorities have also announced the establishment of upcoming construction and demolition waste recycling plants in a few cities.

12. Shishir Bansal1, S K Singh, A Sustainable Approach towards the Construction and Demolition Waste February 2014

As natural construction resources are limited, it is vital for the construction sector to reduce C&D waste creation and improve reuse/recycling. Due to foreign experiences and the discovery of a shortage of aggregate from natural sources in many regions of the country, recycled aggregate can now be used in construction operations. Municipal garbage laws must be modified and effective plans must be prepared, and stringent rules and regulations must be followed to avoid this problem. Furthermore, it is critical to promote the usage of recycled materials.

13. Harish. P. Gayakwad1, Neha. B. Sasane2, Construction and Demolition Waste Management in India,June 2015-

In this paper, the current global status of construction and demolition waste management is examined, as well as the sustainable waste management hierarchy, in order to solve the waste problem. In the near future, managing C&D waste will be a huge challenge. Data on C&D waste generation and characteristics should be collected.

•Separation of C&D waste should be encouraged at the source, and an institutional waste collection mechanism should be established that includes the informal sector, which can be trained to separate waste into categories while also doing some use, reuse, and reprocessing, such as making tiles from crushed construction debris.

14. Reusability of Construction & Demolition waste in bricks Mohit Agarwal, Amit Krishan, December 2017-

Construction and Demolition (C&D) waste, a major component of the solid waste is defined as a waste resulting from the construction, renovation and demolition of structures of solid waste. Developing a sustainable construction material (brick) from construction and demolition (C&D) waste by diverting C&D waste from the main waste stream can aid in the acquisition of a significant amount of land. The current study aims to create C&D waste bricks with dimensions of 225 mm 115 mm 75 mm for two different compositions (F-type & C-type). As a replacement for natural coarse and fine aggregates, cement and fly ash were used as a binder, along with C&D waste. For the desired composition, physical and mechanical testing (compressive strength and water absorption) were performed in accordance with Indian Standards. The results were compared to the industry standard values for clay bricks.

15. Construction Waste Minimization and Reuse Management Mr.M.KalilurRahman, Mr.S.S.Janagan, November 2015-

This paper identifies and detects factors that contribute to construction waste generation.

For identification purposes, a mapping technique was used, and interviews were conducted to detect physical and non-physical waste. These elements were classified into seven groups: design, handling, worker, management, site condition, procurement, and external factor. Each waste category's significant factors were identified. The findings will assist construction companies in avoiding, reducing, and recycling physical and non-physical waste. Furthermore, the paper has made some recommendations for better construction improvements.

V. Method of Demolition

1. Non-explosive demolition

1.Top Down- Manual Method

2.Top Down- By Machines

3.Wrecking Ball Method

4.Excavators and Bulldozers

5.High Reach Excavators

2. Explosive demolition.

1.Implosion Method

1.1 Demolition Sequence

Demolition sequence shall be determined according to actual site conditions, restraints, the building layout, the structural layout and its construction. In general, the following sequence shall apply:

1. All cantilevered structures, canopies, verandahs and features attached to the external walls shall first be demolished prior to demolition of main building and its internal structures on each floor;
2. When demolishing the roof structure, all lift machine rooms and water tanks at high level shall be demolished in "top down" sequence to the main roof level. In demolishing the external wall or parapet wall, the procedure as stated in 4.2.4 shall apply;
3. Demolition of the floor slabs shall begin at mid span and work towards the supporting beams;
4. Floor beams shall be demolished in the order as follows:
 - (1) cantilevered beams;
 - (2) Secondary beams; then
 - (3) Main beams.

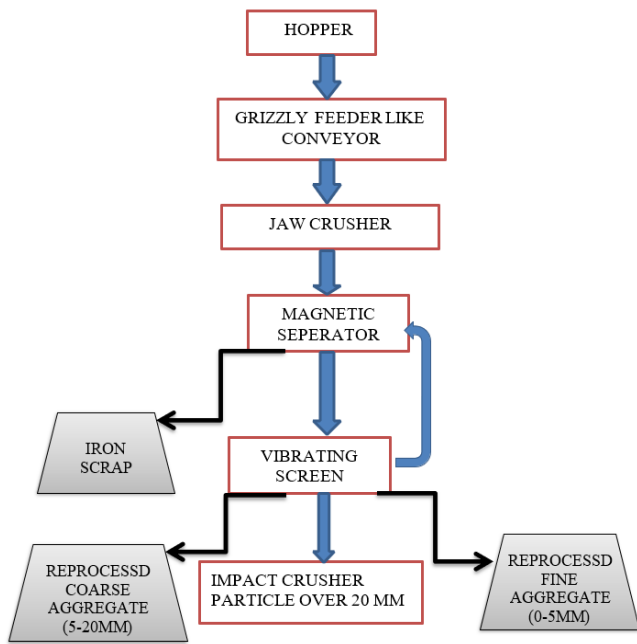
In the case when structural stability of beams are affected, e.g., due to loss of restraints, the affected beams shall be propped prior to loss of support or restraint;

5. Non-load bearing walls shall be removed prior to demolition of load bearing walls;
6. Columns and load bearing walls shall be demolished after removal of beams on top; and
7. If site conditions permit, the first floor slab directly above the ground floor may be demolished by machine sitting on ground level and mounted with demolition accessories

1.2 Process of Recycling Aggregate by Jaw Crusher

The jaw crusher used on site utilizes 1000x650mm jaw power by a 168 kw(225hp) engine. This means that while the machine is compact it retains a high level of power and productivity. The jaw itself is adjustable allowing ensuring your output is always at its optimum level. The

mobile jaw crusher is ideal solution for recycling sites, yet equally productive for a number of other applications.



V. CONCLUSION

Construction waste management is necessary for a country's long-term development. It aids in the resolution of environmental, social, and economic challenges. Based on the above research, we can use recycled aggregate in place of natural coarse aggregate if it meets the requirements of the Indian standard. It safeguards natural resources. The rate of construction waste will also decrease. It helps in Sustainable development. Which is nowadays primary concern of the world. Recycled aggregate has a enough strength which allows to used in the new developing construction. Waste gets reduced and proper management of waste can be done by these recycling construction project.

VI. ACKNOWLEDGEMENT

I would like to express my profound gratitude to Dr . Deepa Joshi, Head of Civil Department , Dr .D.Y. Patil Institute of Technology, Pimpri. Dr .Pramod D Patil, Principal, D.Y. Patil Institute of Technology, Pimpri for their contributions to the completion of my project. I would like to express my special thanks to our mentor Dr. Shruti Wadalkar, PG Coordinator, D.Y. Patil Institute of Technology, Pimpri for her time and efforts she provided throughout the year. Your useful advice and suggestions were really helpful to me during the project's completion. In this aspect, I am eternally grateful to you.

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