

GUIDELINES FOR THE FORMULATION OF INDIAN CODE OF PRACTICE FOR CONSTRUCTION AND DEMOLITION WASTES

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ABSTRACT

In context to India, the present approach of Architects and designers towards sustainability is focusing on creating green and environmentally friendly buildings, by various aspects like minimizing the use of energy, reducing carbon footprint, etc. It is necessary to understand that, every building has a confined age or living period. Here comes the contradiction to the sustainable concept. Is sustainability achieved in India, even after the death of buildings? If not, this scenario leads only to unsustainable or partial sustainable developments. In practical terms, finding a solution “with implementation” is the effective way to eradicate a problem. So, the entire research goes through the process of possible case studies, comparative estimations for the use of reused materials and new materials, study on techniques of recycling and reuse, study of Indian Standard building codes and the conclusion shall be of formulating a standard building code for reuse and recycle.

KEYWORDS: Construction and Demolition Wastes, Indian Standard Code, Guideline Formulation, Recycle, Reuse

INTRODUCTION

Statement of Problem & Motivation

The term construction and demolition waste, or “C&D waste” is commonly used to describe a large number of waste materials generated from the construction and demolition of buildings and civil infrastructure. While many waste materials from construction and demolition projects are the same, the quantities produced will vary greatly with demolition projects often creating 20 to 30 times as much waste as construction projects¹. In addition, construction waste consists primarily of off-cuts from new construction materials while many demolition waste materials are worn and have been painted, fastened together or otherwise modified from their original state.

In Indian context, the present approach of architects and designers towards sustainability is towards creating the buildings green and environment friendly, by various aspects such as minimize the use of energy, reduce carbon footprint etc. But, it is important to understand that every building has a confined age or living period.

What Happens After the Life of a Building?

In most parts of the world, the cheapest and most convenient ways to landfill is with C&D waste. However, within the last two decades, many regions have seen the development of several factors which combined together have made the land-filling of C&D waste, less desirable. These factors include the arrival of many current landfills at full capacity, the

¹Recycling Council of Ontario, 2006

high cost of building landfills with adequate environmental protection, public resistance to the construction of local landfills and an increased interest in reducing demand for natural resources while creating a sustainable construction industry. Construction and demolition wastes are generated whenever any demolition activity takes place. (Example - concrete, metal, plastics etc) In small scale demolition, these wastes find its way into the nearby Corporation bin, making the corporation trash heavy and degrading its quality for further treatment like energy recovery or composting. Hence, this research paper tries to create a better pathway for recycling and reusing the demolition wastes and in to achieve sustainability

Present Scenario in India

The Indian construction industry is highly labour intensive and has accounted for approximately 50% of the country's capital outlay in successive Five Year Plans, and projected investment continues to show a growing trend. Out of 48 million tonnes of solid waste generated in India, C&D waste makes up 25% annually. The percentage of India's population living in cities and urban areas increased from 14% at the time of independence to 27.8%. Projections for building material requirement by the housing sector indicate a shortage of aggregates to the extent of about 55, 000 million Cu.m. An additional 750 million Cu. m of aggregates would be required to achieve the targets of the road sector. There is also a huge demand for aggregates in the housing and road sectors, but there is a significant gap in demand and supply. As per CPWD "Indian Laws" permit the use of only naturally sourced construction material. IS: 323-1970 Indian standards related to aggregates for concrete, laid down by the BIS say that concrete can be made only with naturally accessed materials to avoid the use of recycling thus restricting the concept of recycle and reuse.

Approach towards Solution

In practical terms, not only finding a solution but also implementing the solution is the effective way to eradicate a problem. Hence forth, the entire 'GUIDELINE FORMULATION' goes through the study of construction and demolition processing facility operations, study on techniques of recycling and reuse and study of Indian Standard building codes and the below result is the formulated guidelines for 'Indian Code of Practice for Construction and Demolition wastes'. This could be made possible by passing a national level law on waste management and developing an authority to regulate and implement the guidelines as per law passed.

PURPOSE OF GUIDELINES

The purpose of guidelines for Indian Code of Practice for Construction and Demolition wastes is to provide minimum requirements for the practice of demolition and reuse of the demolition wastes.

The GDP of India is growing at an annual rate of 10% over recent 10 years and world average of 5.5% every year, due to the field of construction. About 70% of the built forms in India is in initiative stage. The built-up area is expected to increase almost 5 times from 21 billion sq ft in 2005 to 104 billion sq ft by 2030 (approx)². **It is expected in India, the decade 2020 to 2030 will be a demolition phase.**

²Source-2012 report by the World Bank

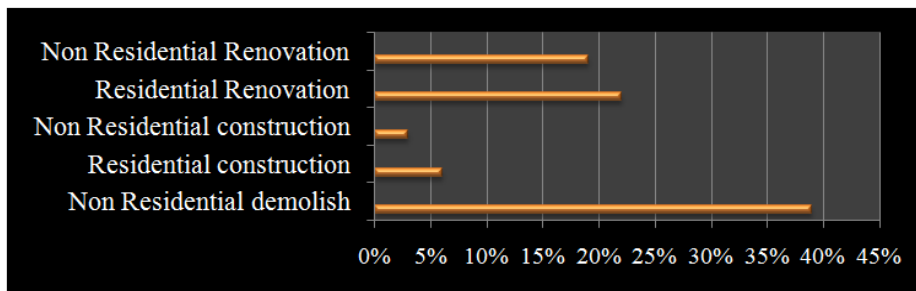


Figure 1: Amount of Waste Generation in Various Sectors

It is analyzed that the formulation of code by Government of India and Nationwide mandatory enforcement of the code will provide a sustainable development of construction industry in the decade of 2020 and in future.

The guidelines for ‘Indian Code of Practice for Construction and Demolition wastes’ is developed to provide detailed guidance to sustainable developers and Government of India to frame a Nationwide Code.

INDIAN POLICY & LEGISLATION REQUIRED ON WASTE MANAGEMENT

“The Waste Management Act” and the related regulations should be passed by Government to create a responsibility for the management of waste. Under this act, an authority is required to take over any waste management related activities. The framed authority should provide the following opportunities:

- Specific body of authority is required to overview both the collection of waste and its recovery/disposal under every local authority.
- Act should impose general obligation on any contractor/person (except local authority) to obtain a waste collection permit, where they are engaged in the collection of waste on a commercial basis.
- The authority should govern the process of licensing of specified waste recovery and disposal activities. The authority should issue license under the regulations of Ministry of environment and forests.
- Certain waste disposal activities, basically those of less volume and which are perceived to have a low impact on the environment, do not need a waste licence and instead require a permit from a local authority.

STRATEGIES TO BE FOLLOWED FOR C&D MANAGEMENT

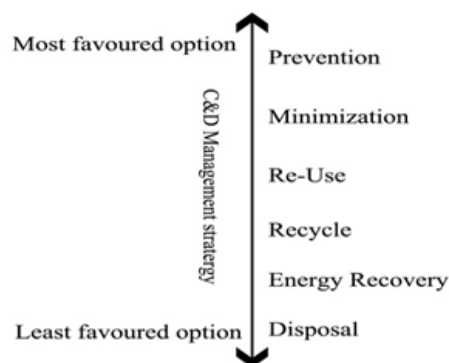


Figure 2: Waste Management Hierarchy

Methods to Practice

The Construction and waste management should follow the hierarchy of waste management, with waste prevention and minimisation, being the first priority followed by reuse, recycling and disposal. During site cleaning & restoration works, one can find number of opportunities for the effective reuse and recycling of the demolition materials. The subsequent use of recycled materials in reconstruction works also reduces the quantities of waste which finally turns out to be landfill site.

Waste Prevention

The base effort should be to engage in prevention of waste and reduce the amount of waste generated in the primary place (i.e.) minimise the resources consumed to execute the job. Prevention is economically most preferred option as it minimises the purchase of construction materials and obviates the need to remove wastes from site.

It is mandatory to implement the potential for certain purchasable procedures to contribute to a reduction in excessive material wastage on site. Some Examples are

- Ensuring materials are ordered based on the requirement basis to prevent over supply to site.
- Purchasing of covers, panelling or similar materials in shape, dimensions and form to minimise the creation of excessive scrap waste on site.
- Ensuring proper storage and handling of construction materials to minimise generation of damaged materials/waste
- Ensuring recommended sequencing of operations.

Waste Recycling

The authority for the enhanced use of construction and demolition wastes should establish numerous markets retails. Few examples are

- RCC wastes can be used as filling material for roads or in the manufacture of new RCC structures.
- The technology for the segregation and recovery of stone should be established. For instance, readily accessible and large reuse market for aggregates as filling material for roads and other infrastructure construction projects. Asphalt and Bitumen could also be recycled in road construction projects.
- Timber/lumber wastes shall be recycled as medium density fibreboards.

Reuse of Waste

Materials that are generated as a waste would be reused on site or preserved for subsequent reuse in future to the greatest possible extent and disposal should only be considered as a last strategy.

Initiatives should be put by the framed authority to maximise the efficient use/reuse of materials. Creative initiatives by authority, to avoid the need for disposal should be investigated as follows:

- Excavated topsoil should be carefully stored aside and used as landscaping fertilizing material in the complex developments.
- Architectural elements should ideally be reused in the restoration of retained structures on the same or similar site.
- Architectural salvage sales might promote the public to acquire material resources that have been removed from decommissioned buildings of high architectural values.

SCOPE OF THE CODE & AUTHORITY

The code should be applicable on a mandatory basis at least for the following field criteria.

- New constructions or restoration activities including institutional, educational, health and public facilities, with an average built-up area exceeding of 1,250 sq.m.
- New residential or township development of 10 or more housing units.
- Demolition or refurbishment or renovation projects which may generate waste more than of 100 Cu.m. in volume.
- Infrastructure development projects producing in excess of 500 Cu.m. of C&D waste, excluding the reuse of waste materials used for development works on the same site.

GUIDELINES TO BE IMPOSED BY AUTHORITY

Construction and Demolition Waste Management Plan of the above mentioned projects should address the following guidelines:

(A) Objectives of project's specific waste management (B) Analysis of the surplus waste produced/material, (C) Material handling procedures. (D) Proposed methods of prevention, recycling and reuse of wastes.

DETAILS TO BE ACQUIRED BY THE AUTHORITY

- Details of the project (location, area, approval plans etc)
- Estimate of different types of waste expected to be generated and an account of C&D waste surpluses or deficits produced.
- Amount of wastes produced including proposals for minimisation, recycling and reuse.
- Plan of demolition.
- Ensuring maximum segregation at source, by documenting the procedure followed.

AUDITING THE WASTES

The self-audit must contain the following criteria:

The self-audit document should contain a systematic documentation of various waste management practices which have been adopted onsite and offsite. Details of raw material inputs and the quantity, type and composition of all waste from the site should be identified and recorded. Special attention should be dedicated to opportunities for waste

reduction, and stages within the project should be reviewed. The audit findings should highlight corrective actions that may be taken in relation to management policies or site practices in order to bring about further waste reductions. The data can be used to assist designers in the reduction of waste on future projects.

CONCLUSIONS

By the implementation of the various strategies like prevention, recycle and reuse of C&D wastes with the mandatory implementation on the construction industry by the formation of Indian Law, Control body and CODE standard could reduce the 50% impact of the C&D wastes on the environment in India.

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