STRENGTHENING OF CONTRACTUAL PROVISIONS FOR CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

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Construction and demolition (C&D) waste has risen to the forefront of environmental debate, posing major environmental and human concerns. Due to the daunting issue of managing emissions from the construction sector, large harmful dust particles from debris pollute the air, making it difficult for rural and urban areas to achieve the National Ambient Air Quality Standards (NAAQS). The lack of stringent contractual conditions, ambiguity in defining the agency responsible for transporting the waste, and concern about quality of products made from C&D waste, are some of the problem areas in C&D waste management. Since construction usually involves a client and a contractor, bound by contract conditions, the different agencies formulating the contract conditions play an important role in ensuring effective C&D waste management.

This study discusses some of the existing contractual conditions and then analyses C&D waste management in both the global and Indian contexts, with the goal of identifying the necessary adjustments to the construction contracts. While highlighting some of the lacunae in Indian contracts studied, it is proposed that a definite framework of laws fixing responsibilities of stakeholders including contractors in the contract conditions along with critical monitoring and vigilance at appropriate level would go a long way in efficient management of construction waste.

Keywords: Environment, Disposal, Contract, Sustainable.

1 INTRODUCTION

Construction and demolition (C&D) waste is a primary concern for the environment for various reasons. Construction detritus such as concrete, bricks, and steel clogs waterways, public spaces, and cities' interior and exterior green spaces. Enormous toxic waste and dust arising from the construction debris pollute the air manifold making it nearly impossible for major cities to keep up the National Ambient Air Quality Standards (NAAQS). All Clean Air Action Goals of cities participating in the continuing National Clean Air Program (NCAP) must now include practical strategies and plans to reduce pollution. A lot of construction debris can be reduced, reused and recycled as a main construction material through a sustainable circular economy. This process needs to be facilitated by contractual provisions governing the relationship between the different stakeholders and the prevailing standards from professional bodies. For example, IS:383-1970 stated that concrete can only be manufactured using "naturally accessed material," which made it difficult for the building industry to use any recycled materials. It was only the revision in 2016 that enabled use of recycled concrete and other materials as a part of concrete (Somvanshi and Verma 2000).
This paper briefly discusses some of the current international regulations before looking at C&D waste management in the global and Indian contexts, with the goal of identifying the necessary changes to construction contracts, especially in India. The results presented here could be valuable in developing a more relevant framework for effective C&D waste management.

2 EXISTING GLOBAL PROVISIONS

Though C&D waste in the society would be as old as civilization, it is only recently that with an increasing awareness towards environmental issues has led to efforts being made to streamline their management through appropriate regulations. The following summary shows that developed nations have progressed substantially towards creating a more relevant regulatory framework in this regard.

2.1 European Union

The EU waste catalogue has been created as a result of various legislations, and the recycling of the waste has been made mandatory after 1990. In 2004, the European Union approved new requirements for natural and recycled aggregates. In 2008, Waste Framework Directive (WFD) was issued for enhancing use of recycled waste. The Construction and Demolition Waste Protocol was published by the European Commission in 2016, to increase the trust and confidence in recycled material quality in construction. This was achieved through recognising all means of collection points until final processing and use of the recycled product (Rao et al. 2007).

2.2 United States

As early as 1970, the Resource Conservation and Recovery Act (RCRA 1970), amended in 1976, was adopted making the use of recycled construction materials in federal procurements mandatory. It may be noted that even without this Act, the United States reported a 70% recycling rate in 2019, which has only grown over time. Various benefits were provided to the contractors and the constructions agencies for transporting the waste to recycling plants and bringing in maximum use of recycle aggregate during construction. (Rao et al. 2007). USA have been forthcoming since ages due to such measures being taken. A constant progression towards effective management of C&D waste has given huge economic as well as environmental benefits to the country (Gilpin et al. 2004).

2.3 Japan

Though extensive research work on the reuse of C&D waste has been carried out in Japan, recycled concrete could not be used because of its non-compliance with JIS A-5308, which laid down the specifications for ready mixed concrete (Rao et al. 2007). However, the rate of recycling sub-base material in road construction increased from from 48% in 1990 to 96% in 2000 as a result of the adoption of the recycling regulations in 1991. The Ministry of Construction at Japan made the demolition waste to be considered as a construction by-product thereby recycling most of the demolished concrete, steel, wood and soil (Kawano 2003).

2.4 Hong Kong and Taiwan

Both the countries have promoted the use of C&D waste materials over the past many years. In 2002, Hong Kong established a C&D recycling facility with a yearly capacity of 2,400 tonnes which produced material for rockfill and also recycled aggregates for concrete. By 2003, over
22,700 m³ of recycled aggregate concrete was used to make reinforced pile caps, beams, slabs, walls, and mass concrete. On the other hand, Taiwan had initiated the C&D waste management plan in 1999 after various incidents of earthquake produced about 30 million tons of construction waste due to damaged structures. The plant established recycled approximately eighty percent of the material which was used in landfills and thirty percent of the material was used as road base.

3 CONTRACTUAL PROVISIONS IN INDIAN CONTEXT

Keeping in mind the fact that the construction industry has several stakeholders, whose mutual relationships are defined by specific contract (for each project) and whose interests need always converge, it is important to keep in mind that contractual provisions are specific to a particular project whereas the regulatory framework applies to the entire construction industry, and the latter provides the contours within which the former should be laid down. Thus, in the context of C&D waste management, both these need to be such that the overall C&D waste management strategy can be implemented in letter and spirit. Given that C&D waste is generated during both the construction and the demolition processes, this paper addresses relevant contractual provisions for both.

In the Indian context most contracts between the client/owner and the contractor are based on the framework provided by the contract conditions laid down by the Central Public Works Department (CPWD). Thus, the present study focuses on the relevant contract conditions of CPWD, and includes the documents of the Military Engineering Service (MES)/Border Roads Organization (BRO) for completeness. As an illustrative example, the following is the text from these two documents relating to C&D waste management at site:

a) Contract condition Clause 8 of the CPWD provides that “no final certificate of completion shall be issued, nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the work shall be executed all scaffolding, surplus materials, rubbish and all huts and sanitary arrangements”

b) In the case of MES/BRO, the general conditions of contract IAFW-2249, Clause 49 states that “the site of works will be cleared of rubbish and all waste materials by the contractor, at his own expense and delivered up clean and tidy to the satisfaction of the Engineer-in-Charge on or before the date for completion.”

The above examples clearly show that, though the onus for clearing the construction site upon completion of work is clearly that of the contractor, and the cost involved in such clearance is to be borne by the contractor, and, there is no mention of where and/or how the waste is to be disposed of. These provisions also do not lay down details of utilization or recycling of C&D waste which is generated during the construction process.

4 LACUNAE IN CONTRACT CONDITIONS IN INDIA

It is clear from the above that there is an urgent need to better define the roles and responsibilities of the parties to ensure better management of C&D waste at construction sites. Existing contract conditions only show that these provisions do not incorporate the requirements of the C&D Waste Management Rules 2016 (Ministry of Environment, Forest and Climate Change 2016). Such problem have aggravated over a long time and contributed towards mismanagement of the C&D waste. It is pertinent to understand these issues in depth and then suggest remedial measures for each of these. Some of the more specific problem areas in C&D waste management in the Indian context are briefly discussed in the following paragraphs.
4.1 Governance Structure and C&D Waste Management

Though there could be some justifications for it, in a large and diverse country such as India, there are several bodies which are involved in formulating and implementing provisions relating to C&D waste management, beginning with Urban Local Body (ULBs), including city development authorities, State and Central Public Works departments, various government and other departments, and other public sector undertakings and organizations such as the Bureau of Indian Standards. Obviously, this multiplicity leads to confusion in scope and jurisdiction, mismatch in provisions, and differences in strategies for implementation and provisions of penalties for non-compliance. As an illustration, the government launched Swachh Survekshan, a pan-India annual competition to encourage cities to improve C&D waste management, but the initiative was a non-starter on the ground due to the lack of real data feed by the ULBs (Somvanshi and Verma 2000). Lack of dissemination and awareness of policies and rules supplementing the 2016 rules because of the complex governance structure is another area of concern in effective management of C&D waste.

4.2 Difficulty in Finding Sites for Locating C&D Waste Recycling Plants

Setting up of any type of recycling plant for recycling waste requires substantial amount of land. Identification and allocation of such land often runs into difficulty by the mindset of people in terms of not letting such plants to set up in their neighbourhood, and the belief that land allocated for such a facility could be ‘better utilized’ with another more profitable (commercial) allocation. Cities need to consider making no-development zones and identify appropriate sites to locate the C&D waste recycling facilities. Such measures will not only ensure that the C&D waste is properly dumped at a recycling plant but also ensure that the waste is not being simply discarded unauthorisedly.

4.3 Financial Concerns Relating to Collection and Transportation of C&D Waste

The collection and transportation of C&D waste meets a great deal of resistance from the ULBs as well as the transporters due to the fee often levied, without which the entire initiative could become financially unviable. In cases when the ULBs provide for pick-up of C&D waste on call, there is lack of awareness of the collection points. Measures such as sharing the profit of the recycling plant with the transporters, defining a tipping fee for disposal of the waste in the contract along with location of disposal could possibly help the contractors in ensuring more effective management of C&D waste.

4.4 Weak Accountability Model

Though, in principle, the wastage generator should also be accountable for waste management, but in most cases the client subcontracts the building or construction function to a contractor or builder, and therefore it is not clear if the accountability for the waste generated at the site (and its management) rests with the client or the contractor. It is clear from the examples cited above that the matter can easily be resolved with a little more clarity in contract provisions, and the client organizations playing a more proactive role in understanding and discharging their responsibility.

4.5 Lack of Confidence in Recycled Material Quality

Any C&D waste recycling plant can function effectively only if the products (made from the waste) can find market, which requires willingness on the part of potential buyers on the one hand and quality of the products on the other. In the Indian context, even though the BIS provisions
mention that these products (recycled coarse or fine aggregate) can be tested and used as ‘normal’ materials, within the given stipulations, there is a great deal of lack of confidence amongst the most clients, except some well-known examples. For instance, CPWD has used recycled aggregates in the Supreme Court of India building (DG CPWD 2018). Highlighting such instances through different media could go a long way in instilling confidence in the small and mid-scale buyers towards the use of recycled aggregates and contribute towards the sustainable management of C&D waste.

5 STRENGTHENING OF CONTRACT CONDITIONS

Given the problems of the contract conditions, the following paragraphs briefly discuss some possibilities that need to be incorporated in the contract document for more effective C&D waste management. These problems in the existing contract conditions in Indian context can be divided into two parts – first being the specific amendment in the contract clauses, and, the second being the indirect way of making the management of C&D waste effective in the construction industry.

5.1 Specific Suggestions For Amendments in Contract Conditions

- **Mandatory periodic inspection** should be carried out by the clients at each stage in the construction/ demolition process to ensure compliance with the provisions. The continuance of the work should made conditional to compliance with respect to work completed.
- **Penalties** should be provided for lapses relating to management of C&D waste.
- **On-Site Waste Design & Management** with a fixed percentage, say 20%, as notified by the ULB should be specified for reuse during demolition and construction projects on-site by weight. These activities could be monitored and recorded by a State Govt appointed C&D waste manager to ensure strict implementation of C&D waste management rules.
- A minimum of 2% of C&D recycled products should be used for building works.
- 10% of C&D products should be reused for road works.
- Construction contracts should mandate 5% use of C&D recycled products for non-structural applications. Such mandate will incorporate necessary inclusion of recycle material in construction as per the contract clauses.
- For Govt projects above a certain value, contract clause should mandate the installation of onsite C&D waste processing plant to ensure its reuse on the site itself.

5.2 Indirect Measures For More Effective C&D Waste Management

- **Strategies on financial pull and supporting market for construction industry** like reducing GST, fixed discount, waiver of royalty fee, 100% buyback assurance for bulk generators on sending their waste back to recycling plant and compulsorily recycling plant to accept small purchase orders will go a long way in promoting the recycle material use.
- **Design specifications and appropriate test methods** must be developed in order to establish the credibility of C&D waste reuse in new construction. These test methods should be incorporated in the contractual provisions itself of the C&D projects. The designers have to be more accommodating and understanding of the fact that the C&D waste (at least a part of it) can be used efficiently in the new construction to pave the way towards reuse-recycle-sustainable economy.
• In accordance with BIS revised specification IS383:2016, for load bearing structures, up to a maximum of 25% of coarse and fine RCA can be mixed with PCC and up to 20% of coarse and fine RCA can be mixed with RCC. For lighter, non-load bearing structures using lean concrete, the entire amount (100%) of coarse and fine aggregates of both RCA and RA may be used.

• The maximum retail price of recycled products should be issued by concessionaire and the same should be negotiable (below MRP) depending upon quantum of material to be used by the contractors. The rate should in no case be higher than the open market rates.

### 6 CONCLUSIONS

C&D waste management not only involves efficient clearance of the debris on site but also involves huge economic benefit in terms of the reuse of the recycled product in the construction process. This lowers the overall cost of the project as also instil the confidence in the construction agency about the recycle products as a future of construction. A proper monitoring agency in each department with legal powers to clear the project on adherence of the rules for C&D waste will go a long way in ensuring minimal malpractices and maximum efficient reuse of the recycled product. The contract conditions need to incorporate these directions thus making it obligatory for all parties to abide by the rules. This would also include fines for illegal dumping which shall set the deterrent for any such wrong practices. Such measures will not only bring down the illegal dumping but also solve the bigger problem of mismanagement of the construction and demolition waste. This has to be done collectively as part of the international responsibility thereby achieving a circular and sustainable economy.

### References


