Evaluation of Rules and regulation of Construction and Demolition Waste Management (CDWM) in India

R.Rema, Nalanth.N

Abstract: ***The rules and regulations on waste management in the construction and demolition sector are analyzed corresponding to the present scenario of C&DW in India. C&D waste from construction sites has emerged as a significant threat to India because of its severe footprint on the environment. Vast quantities of construction waste will have unfavorable consequences on the surroundings if they are not properly managed. Therefore it is necessary to manage the development of C&DW by the experts within the construction industry. The approach represented is specialized in rules and regulations on waste management so that the environmental impact of construction activities can be minimized.***

Keywords: Construction and demolition, Waste management, Environmental hazards, Health hazards, Rules and regulation, Framework for implementing the rule.

I. INTRODUCTION

A major amount of the solid waste generated by humans consists of C&DW. The recycle and reuse of solid waste provides a sustainable solution, by building highways, bridges, fly-overs, industrial structures and by the renovation of homes and residents. But there is no enough focus on C&DW generation (bricks, concrete, masonry, topsoil, wood, glass, gypsum, pottery and plastics as well). These cause major human health issue and environmental issues. The National Building Construction Company (NBCC) and the Central Public Works Department (CPWD) have urged recycled parts of C&DW to be utilized in the construction works to compact the usage of C&DW. The sectors generating more than 20 tons to 300tons in one day or month are referred to as bulk C&D waste generators according to the C&D Waste Management Rules 2016.

The work is sub-divided into the following section. Review of the literature included in section 2. For this, limited paper, guidelines toolkits have been reviewed. CDWM rules are discussed in section 3. Several factors are addressed under this segment, such as; Forms and Schedules in the Rules, Framework implementing C&D Rule-2016 are addressed in chapter 4. C&D (reuse & recycle) waste in chapter 5. In section 6, identified CDWM Rules in other countries and conclusion in section 7.

II. LITERATURE REVIEW

The rules and regulations of CDWM that are currently practiced is being analyzed from articles such as Science Direct, Book reviews and engineering journals, but few works are made to evaluate waste management rules and regulations. This work allows for the identity of loopholes in the management of waste framework for C&D currently in practice. The standard definition of C&D waste is based on the renovation, C&D of roads, bridges, and dams provided in the CDWM Rules of 2016. C&DW consists of concrete, soil, steel, wood, plastics and other materials such as brick and mortar. Based on the aspect of construction or demolition operations, the composition of waste differs. In India, the major constituents of C&DW are concrete, soil, bricks, wood, metal, and asphalt. During demolition, the most important components of waste and its approximate percentage are: bricks & masonry (31%), Concretes (23%), soil, sand, and gravel (26%), metal (5%), Bitumen (2%), wood (2%) (Source: TIFAC2001). The Indian Express (2019) published that in 2010 the Environment, Forests and Climate Change Minister estimated that 10 to 12 million tons of C&DW would be generated. The Central Pollution Control Board (CPCB) settled that 12 million tonnes produced in 2011, but according to the guidelines documented in 2017 that is based on the Urban Development Minister, has estimated to be 25-30 million tons.

The Building Materials & Technology Promotion Council and Fly Ash Research & Management provide an annual estimate of 165-175 million tons of C&DW in Indian towns from a period of 2005-13. (Sakshi Gupta and Malik, 2018) in India, the level of observation of C&DW reuse and recycling technology needs to be improved to achieve a sustainable revolution. The products that are recycled or reused must be carefully formulated, and the quality must be supervised to meet the standards by the Bureau of Indian Standards. Minister of State, Shri. Prakash Javadekar reported that massive waste generators would have to pay the appropriate collection, transport, processing of waste and disposal charges as advised by the local authorities.

III. FORMS & SCHEDULES IN THE RULES & RESULTS

The summary of the forms attached to the rules is shown in the table: 1 and three schedules in the rules that are listed in the table: 2

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R.Rema, Research scholar, Noorul Islam University, Kumarakovil, Tamil Nadu, India.

Nalanth.N, Professor, Noorul Islam University, Kumarakovil, Tamil Nadu, India.

Table 1: Forms attached to the rules

Forms	Rules	Information
Form-I	Rule 2 of 7	Application for obtaining: Authorities detail, Strategies used and Accident Precaution.
Form-II	Rule 3 of 7	Authorization format for the operator: Authorization validity
Form-III	Rule 2 of 8	Yearly report format must be presented to the State Pollution Control Board (SPCB) by local authorities: Quantity and composition of C&D waste, Storage and transport information.
Form-IV	Rule 3 of 8	Yearly report format must be presented by the SPCB & CPCB: A statement of the authority's progress.
Form-V	Rule 14	Accident report: Measures that are taken to avoid the accident in assessing the impacts of the accident.

Table 2: schedules in the rules

Schedule	Information
Schedule- I(schedule applies to Rule 7(1))	Storage and recycling facilities (Site selection).
Schedule-II (Rule7(3))	Processed C&D waste in a landfill.
Schedule-III(Rule 13)	Plans and execution of CDWM rules.

3.1 Framework for implementing C&D Rule- 2016

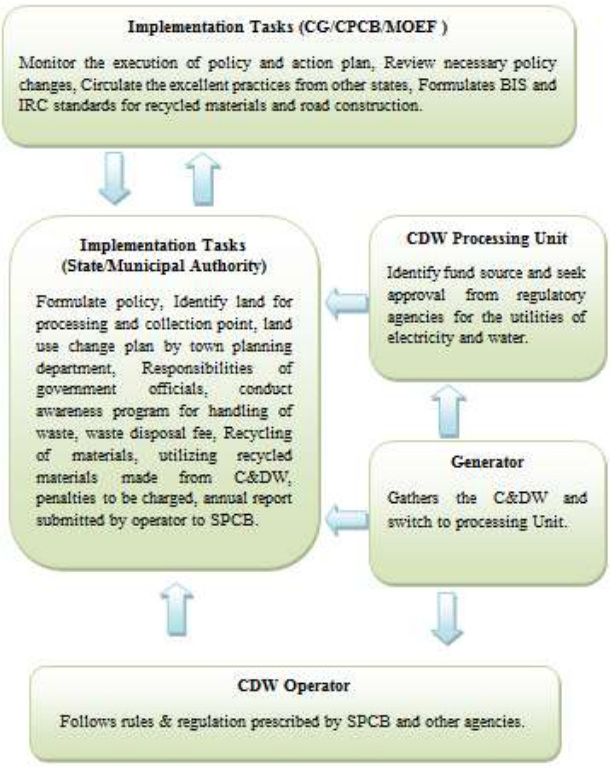

Fig: 1 shows the Framework for implementing C&D Rule- 2016

This section is intended to provide a structure for the implementation of C&D Rule 2016 to appreciate public & private sector, central (CG)& state government (SG), and other stakeholders ' activities within a specified time under the rules. The flow chart consists of the following information: operations to be performed by stakeholders, information flow from one stakeholder to another by indicating arrows. Figure: 1 (source: C&DWM rules-2016) demonstrates the framework for the implementation of the C&D rule-2016.Private/public industries have to estimate waste generation in each region and therefore, must design the processing/recycling plant. The amount of waste generation may differ; it is impossible to promote standard bin sizes. C&DW should be stored at the collection point through a facility organized as per the rules by the local public / private sector. The waste which desires cautionary storage must not cause littering, drain blocking, blown off to the surrounding area, and should not be an obstacle to the traffic.

IV. REUSE & RECYCLE OF CDW CONTROL INITIATIVES

In India, some initiatives on C & DW control have been stated. The Urban Development Ministry (MoUD), 2012, states that the C&DW treatment facility has to offer environmentally friendly solutions for cities having a population of over ten lakhs. In Delhi, the C&DW processing facility was initially engaged in the Burari model. Secondly, in East Delhi, near Shastri Park, C&D Waste processing facility. In 2016, the mission initiated by Swatch Bharat also recognized the need for CDWM in the report ' Technical Aspects of Municipal Solid Waste Processing and Treatment '. The Environment, Forest & Climate Change Ministry (MoEF&CC) in 2016 notified guidelines such as plastic and e-waste. 'A Road Map on Waste Management in India (2010) ' indicates issues with C&D. According to the CDWM rules-2016, the Bureau of Indian Standards (BIS) and Congress for Indian Roads are accountable for instruction on code practices and specifications for recycled materials and CDW products for construction works. The Building Material & Technology Promoting Council (BMTPC) estimates that the requirement for construction materials for 2021-22 as 380 million tons of cement, 50 million tons of steel, numbers of bricks as 600 billion, aggregate building materials as 400 million cubic meters and 40 million cubic meters of timber. According to the 2016 Rules on CDWM, the Indian Road Congress (IRC) appreciates the provision of code and necessities for utilizing recycled products and C&DW products in road works.

V. THE CDWM RULES IN OTHER COUNTRIES

For an extensive study of C&DWM rules is made by a simple evaluation of the regulation and information of other countries. The CDWM rules in countries across Asia are listed below in the table: 1. Including India, most of the rules of other countries are promoting reuse, recycling of CDW, secure disposal of waste, prohibiting disposal of waste and penalizing for illegal dumping such as landfilling, flytipping, etc. Therefore, the policies and regulations are efficiently implemented and adequately supervised and documented by the concerned authorities.

Table 3: CDWM Rules in various countries

Country	Regulation	Information
India	The CDWM Rules, 2016	Recover, recycle and reuse of waste, Segregating and depositing it to the recycling facilities, for collection and disposal paying appropriate charges, as stated by the local authorities.
Romania	Second National waste management plan(2014-2020). (source: CDWM in ROMANIA V2 – September 2015)	Developing recycling technology, waste reduction in landfills, Encouraging reuse of resources, prioritizing the efforts of waste management, separate the collection of waste.
Egypt	The Egyptian Environmental Law No.4 (1994). (Marwa, Salah &Taha, 2004)	Article 41: Segregation and Transporting of C&D Waste. Article 37: Restrict in throwing of any solid wastes except in licensed places. Article 87: Penalty of throwing CDW
China	Recycling Regulation and Disposal of electrical & electronic equipment waste (2011). (source: Chenyu et.al., 2015)	Realization of the responsibility of the extended producer, to assist e-waste recycling the organization for a special fund.
Turkey	The Environment and Forestry Ministry 2004. (source: Hakan, Nilay&Burcu, 2012)	Administrative for waste reduction, and C&DW collection, storage, recovery, disposal of
South Africa	National waste management (2011). (Source: Llewellyn van Wyk, 2014)	Ensuring efficient services for waste delivery, Achieving a plan for integrated waste management.

VI. CONCLUSION

In past years India has reported poor management of CDW since the C&D waste was not segregated from solid waste generated by the municipality (MSW). “The Management and Handling Rules-2000” of MSW stated that C&DW is gathering, separation and dispose of concerning state legal guidelines”. In 2016, by notifying the significant growth in the volume of C&DW in urban regions and the differences in the origin of waste and the methods of recycling and reuse, the CDWM Rules 2016 were separated from Solid Waste Management Rules (2000) by the Minister of State (Environment, and Forests). This reflected the growing reputation for separate management of C&DW from MSW. Besides, proper CDWM facilitates excessive natural resource consumption and thereby contributing to sustainable development. River sand is generally used for construction activities in India. Recently, the legal Court has issued a warning for damaging the environment that causes impacts by riparian mining of sand. Increased demands, ease of availability and limited supervision by authorities have led to illicit sand trading. Sand manufactured from C&DW provides an environmentally sustainable alternative. From the above, it is suggested that CDWM's existing rules can not satisfy the need for environmental protection. There are loopholes in many places that include less attention to reuse, recycle of waste from C&D, no punishment for illegally disposing of waste, and no penalty for throwing waste illegally. These offer major problems in managing C&DW. So the enforcement of laws to be adequate, well-monitored, documented and necessary to make orderly C&DW management in India to ensure a harmonious development of society.

REFERENCES

1. Chenyu Lu, Lin Zhang, Yongguang Zhong, Wanxia Ren, Mario Tobias, Zhilin Mu, Zhixiao Ma, Yong Geng, Bing Xue, (2015). An overview of e-waste management in China". Journal of Material Cycles and Waste Management. January 2015:1-12 DOI 10.1007/s10163-014-0256-81.
2. C&D Waste management in ROMANIA V2 - (September 2015).
3. Guidelines on Environmental Management of C & D Wastes (2017). CPCB (ministry of environment, forests & climate change)
4. Guidelines on Environmental Management of C&D Waste Management in India (CPCB's Draft February 2017).
5. Hakan Arslan, Nilaycosgum and burcusalgn, (2012). Construction and demolition waste management in turkey DOI: 10.5772/46110. Construction and Demolition Waste Manage
6. Javadekar 'Rules are an Initiative to Effectively Tackle Pollution and Waste Management'.
7. Llewellyn van Wyk, (2014). Towards Net-Zero Construction and Demolition Waste, Principal Researcher, CSIR.
8. Marwa S. Al-Ansary, Salah M. El-Haggar and Mahmoud A. Taha, (2004). "Sustainable guidelines for managing demolition waste in Egypt". International RILEM Conference on the Use of Recycled Materials in Buildings and structures.
9. Mayank Aggarwal (Mar 2017). Guidelines to manage construction and demolition waste.
10. Ministry of Environment and Forest (MOEF). (2000).www.envfor.nic.in/legis/hsm/mswmhr.html.
11. Sakshi Gupta, Malik RK, (2018). The Impact of C & D Waste on Indian Environment: A Critical Review. Civil engineering research journal, Volume 5, Issue 2 - May 2018DOI: 10.19080/CERJ.2018.05.555658.
12. The Indian Express, Tuesday, February 19, 2019.
13. Tool kit on construction & demolition waste management rules-2016. September (2017).