

Construction And Demolition Waste

- Construction and demolition waste means the waste comprising of building materials, debris and rubble resulting from construction, remodeling, repair and demolition of any civil structure.
- C&D waste includes bricks, tiles, stone, soil, rubble, plaster, drywall or gypsum board, wood, plumbing fixtures, non-hazardous insulating material, plastics, wall paper, glass, metal (e.g., steel, aluminium), asphalt, etc.
- However, C&D waste does not include any hazardous waste as defined under the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

Composition of Construction and Demolition Waste

- Construction and demolition (C&D) waste is complex due to the different types of building materials being used.
- In general, C&D waste may comprise the following materials:
 - a) **Major components** : Cement and concrete; bricks; cement plaster; steel (from reinforced concrete, door or window frames, roofing support, railings of staircase, etc.); rubble; stone (marble, granite, sand stone); timber or wood (especially demolition of old buildings)
 - b) **Minor components** : Conduits (iron, plastic); pipes (GI, iron, plastic); electrical fixtures (copper or aluminum wiring, wooden baton, Bakelite or plastic switches, wire insulation); panels (wooden, laminated); glazed tiles; glass panes; etc.

SOLID WASTE MANAGEMENT RULES, 2016 – REQUIREMENTS ON CONSTRUCTION AND DEMOLITION WASTE

- **Clause 4: Duties of waste generators:**
(c) store separately construction and demolition waste, as and when generated, in his own premises and shall dispose off as per the Construction and Demolition Waste Management Rules, 2016;
- **Clause 15: Duties and responsibilities of local authorities:**
(s) transport construction and demolition waste as per the provisions of the Construction and Demolition Waste management Rules, 2016;

CONSTRUCTION AND DEMOLITION WASTE RULE

- The C&D Waste Rules have introduced the concept of “**Deconstruction**,” which means that a planned selective demolition in which salvage, reuse, and recycling of the demolished structure is maximized.
- This is made possible by a planned regime of construction so that demolition is facilitated when desired.
- In a way, de-construction is “**construction in reverse**.”
- De-construction leads to less wastage and higher environmental sustainability.

- It is estimated that 25–30 million tonne of C&D waste is generated annually in India.
- It has been further estimated that 40–60 kilogram per cubic meter (kg/m³) of C&D waste is generated during construction and minor repair or renovation.
- During demolition of proper concrete and masonry buildings (locally called pucca building), about 500 kg/m³ of C&D waste is generated whereas 300 kg/m³ is generated for structures with partial concreting and masonry.
- Even in metro cities like Delhi and Mumbai, where C&D waste is collected separately, waste is mixed containing about 50% of soil and silt.
- Natural calamities like earthquakes, landslides, etc. result in generation of large quantities of C&D waste
- C&D wastes are heavy (due to high density), often bulky, and occupy considerable storage space.
- C&D wastes stored outside construction sites and along road sides are a cause of both traffic congestion and mishaps.

RESPONSIBILITIES OF VARIOUS STAKEHOLDERS FOR CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

- The waste generator, service provider, urban local body (ULB), and State Pollution Control Board (SPCB) and Pollution Control Committee (PCC) are the most important stakeholders for appropriate management of C&D waste.
- Construction and demolition waste rules, 2016 details out the duties of waste generator, service provider, ULBs, etc., and Schedule I explicitly describes the management of C&D waste.
- Smaller ULBs should designate specific locations in each zone for separate collection of small and large quantities of C&D waste.
- Small quantities of C&D waste should be periodically transported to bulk storage areas.

MANAGEMENT OF CONSTRUCTION

AND DEMOLITION WASTE

- **Schedule I** of the construction and demolition waste management rules, specifies the management of construction and demolition waste.
- It details out guidance on storage, collection, transportation, processing, and disposal and also the use of the recycled products.
- Reuse, processing, and recycling have been emphasized.
- Large generators have to be incentivized for setting up in-situ processing facility.
- For large facilities, say for million plus cities, processing should be done through appropriate technology which minimizes process residues for landfilling, e.g., "wet" process, which can retrieve sand grade material (4.75 mm to 75 μ) from soil and other fine inert materia

- **Schedule II** provides for further use of processed C&D products in operation of sanitary landfill.
- It must be clarified that while processed C&D waste shall be utilized in sanitary landfill for MSW of the city or region, residues from C&D waste processing or recycling industries shall be landfilled in the sanitary landfill for MSW.

BENEFITS OF PROCESSING CONSTRUCTION AND DEMOLITION WASTE

- C&D waste can be put to a profitable use, given the scarcity of sand and stone for construction, thereby saving natural resources.
- It prevents public nuisance and traffic congestion issues arising from indiscriminate dumping of C&D waste.
- It saves valuable space at landfill sites.
- It reduces cost of bulk transportation if recycled close to source of generation.

Use of Construction and Demolition Waste for Road Works and Construction

- Experiments by Central Road Research Institute (CRRRI) have shown that it is possible to use construction and demolition (C&D) waste for road and embankment construction such as embankment and sub-grade, sub-base, stabilised base course, rigid pavement, etc.
- The Government of National Capital Territory (Delhi) has accorded exemption of VAT for tiles and curbstones made from C&D waste or "malba".

PROPOSED USE FOR PROCESSED CONSTRUCTION AND DEMOLITION WASTE

- Recycled aggregate (RA) may be used in making concrete for nonstructural purpose.
- The RA shall be free from deleterious material, such as, organic content, vegetable matter, coal, clay lumps, external substances such as, soft fragments like pieces of plastics, paper etc.
- Percentage of replacement of natural aggregates by RA can be up to 20% for any type of plain concrete work. The percentage can be increased up to 30% for road sub-base / base / other road related applications except wearing course.
- Recycled concrete aggregate (RCA) can be used in all grades of PCC (non-structural and structural).
- Recycled concrete aggregates have to be pre-wetted near to SSD (saturated surface dry) conditions before use to avoid rapid slump loss due to its high water absorption rate. Admixtures with better slump retention effect would be useful.
- Fine washed aggregates in the range of 4.75 mm to 0.075 mm (75 μ) separated from C&D waste using 'wet' process may be used as 'manufactured sand' for non-load bearing structures.
- C&D waste processing or recycling facilities should be located at least 500 m away from the boundary of residential areas, preferably in industrial zones or adjacent to landfill sites.

ENVIRONMENTAL CONSIDERATIONS

- Dust and noise are usually the main issues with processing facilities for C&D waste.
- For prevention of pollution from processing or recycling operations, certain provisions have been mandated such as storm water drain and paving or concreting of selected areas in the processing or recycling facility.

SL. NO	PARAMETERS	ACCEPTABLE LEVEL
1	Suspended Particulate Matter	500 $\mu\text{g}/\text{m}^3$ (24 hours)
2	Respirable Suspended Particulate Matter (RSPM) or Particulate Matter (PM10) 10 Micron	100 $\mu\text{g}/\text{m}^3$ (24 hourly) 60 $\mu\text{g}/\text{m}^3$ (annual)
3	Particulate Matter \geq size (PM2.5)	60 $\mu\text{g}/\text{m}^3$ (24 Hourly) 40 $\mu\text{g}/\text{m}^3$ (Annual)

The ambient air quality monitoring shall be carried out at processing or recycling sites by the concerned authority as per the following schedule:

- a) six times a year for cities having a population of more than 5 million
- b) four times a year for cities having a population between 1 million and 5 million
- c) two times a year for town or cities having a population between 100,000 and 1 million
- d) once a year for all towns (including census towns) having a population below 100,000

For noise levels, the noise standards recommended by Central Pollution Control Board (CPCB) and notified in the Environment (Protection) Rules, 1986 for industrial area shall be applicable (daytime 75 dB ALeq and night time 70 dB ALeq).



Thank You...