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CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT


paryavaran patra

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INTRODUCTION

Development is fundamental to the long-term progress of any nation and must continuously evolve to meet changing socio-economic needs. In recent decades, rapid urbanization, population growth, and industrialization have significantly accelerated infrastructure development, particularly in developing countries like India. Increasing population pressure and migration to urban centres have driven large-scale expansion in housing, transportation networks, and public infrastructure. As a result, India is expected to emerge as one of the leading contributors to the global construction waste sector by 2030, alongside major economies such as the United States and China.



While this growth plays a crucial role in economic development, it also presents considerable environmental challenges.

Considering the growing awareness about sustainable development, there is an increase in emphasis on proper, scientific management, recycling management, recycling, and reuse of C&D waste.

DEFINITION

Construction and Demolition waste refers to the waste generated during construction, renovation, repair and demolition of buildings, roads, transport networks, bridges, and other infrastructural projects. These includes materials such as soil, sand, gravel, concrete, bricks, metals, wood, plastics, and other components associated with building activities.

C and D waste can be broadly characterised into:

- **Inert Waste:** Materials such as concrete, bricks, stones, and soil, which do not undergo significant physical, chemical, or biological transformation.
- **Non-Inert Waste:** Materials such as wood, metals, plastics, and glass, which may decompose, corrode, or otherwise interact with the environment.



CAUSES OF C&D WASTE GENERATION:

The generation of C&D waste is influenced by multiple interconnected factors:

a) Rapid Urbanization and Infrastructure Development

The expansion of cities and the demand for modern infrastructure have led to increased construction activities, resulting in higher waste generation.

b) Demolition of Old Structures

Aging buildings, redevelopment projects, and unsafe structures are frequently demolished, producing large quantities of debris.

c) Poor Construction Practices

Inefficient use of materials, lack of skilled labour, and improper handling during transportation and storage contribute significantly to waste generation.

d) Design Changes and Rework

Frequent modifications in design during construction lead to material wastage.

e) Natural Disasters

Events such as earthquakes, floods, cyclones, and landslides can cause widespread destruction, generating massive volumes of C&D waste.





COMPONENTS OF C&D WASTE

C&D waste is heterogeneous in nature and consists of a wide range of materials:

- **Concrete and Cement Waste:** Broken concrete, cement plaster and mortar are the highest over 50% of the total waste.
- **Bricks and Masonry:** Debris from walls, stone masonry and foundations.
- **Soil, Sand, and Gravel:** Excavated materials from construction sites.
- **Metals:** Further classified into ferrous and non-ferrous metals. Ferrous metals (steel reinforcement, girders) and non-ferrous metals (copper wiring, aluminium pipes).
- **Wood and Timber:** wood from building frames, window frames etc.
- **Plastics:** Pipes, packaging materials, and insulation.
- **Glass:** Windowpanes and fixtures.
- **Bituminous Materials:** Asphalt from road construction.
- **Electrical and Plumbing Waste:** Wires, fittings, and fixtures.
- **Hazardous Materials:** Small amounts of asbestos, paints, or coatings that need careful handling

The proportion of each component varies depending on the type of construction activity.



asphalt



plaster



wood



glass

ENVIRONMENTAL HAZARDS OF CONSTRUCTION AND DEMOLITION (C&D) WASTE

Improper handling, storage, transportation, and disposal of Construction and Demolition (C&D) waste can lead to a wide range of environmental and public health issues. These impacts are often long-term and cumulative, affecting not only urban areas but also surrounding ecosystems

a) Air Pollution

Construction activities like demolition, excavation, transport, and material handling generate significant dust and fine particles (PM10 and PM2.5), which can travel long distances and degrade air quality. Prolonged exposure may cause respiratory issues such as asthma and bronchitis. Hazardous materials like asbestos, silica dust, and paints can also release toxic substances, increasing health risks for workers and nearby residents.

b) Water Pollution

When C&D waste is dumped in open areas or near water bodies, rainwater can wash harmful substances into rivers, lakes, and groundwater systems. Materials such as cement, paints, adhesives, and metals may release toxic chemicals, increasing the alkalinity and contamination levels of water.

c) Soil Degradation

Hazardous components within C&D waste, including heavy metals, chemicals, and non-biodegradable materials, can seep into the soil. This process, known as leaching, reduces soil fertility and disrupts the natural composition of the land.

d) Loss of Land Resources

Unregulated dumping of C&D waste occupies large tracts of land, particularly in urban and peri-urban areas where land is already scarce and valuable. Over time, these dumping sites grow into informal landfills, rendering the land unusable for development, agriculture, or recreational purposes.





EFFORTS TO MANAGE CONSTRUCTION AND DEMOLITION (C&D) WASTE

Across the world, the approach of managing construction and demolition (C&D) waste is steadily shifting from traditional disposal methods, towards more sustainable and circular economy. Globally, the generation of billions of tonnes of C&D waste has driven a shift toward source reduction, reuse, and improved recycling, supported by stronger policies, technological innovation, and greater stakeholder accountability.

Key Strategies Adopted Globally

1. **Regulations & Policy Frameworks for C&D Waste**-Governments have established strict laws and monitoring systems to regulate construction and demolition (C&D) waste and ensure accountability.
2. **Extended Producer Responsibility (EPR)**: Waste generators and material producers are made responsible for the entire lifecycle of materials, promoting efficient use and proper disposal.
3. **Economic Measures**: High landfill taxes and restrictions discourage dumping and encourage recycling and reuse.
4. **Source Segregation**: Separating waste (concrete, metal, wood, plastics) at the site improves recycling efficiency and material recovery.
5. **Use of Recycled Materials**: Policies promote or mandate recycled materials in construction to reduce reliance on natural resources.
6. **Green Building Practices**: Certification systems incentivize waste reduction and recycling through better sustainability ratings.
7. **Pre-Demolition Assessment**: Planned dismantling and material recovery before demolition help reduce overall waste generation.

CONSTRUCTION AND DEMOLITION WASTE RULES 2025

1. **Short Title and Commencement**: These rules may be called the Environment (Construction and Demolition) Waste Management Rules, 2025. They came into force from the 1st of April 2026.
2. **Application** - (1) These rules shall apply to all activities of construction, demolition, remodelling, renovation and repair of any structure.
(2) These rules shall not apply to the waste categories or streams covered under –
 - (a) the Atomic Energy Act, 1962 (33 of 1962) and the rules made thereunder;
 - (b) the defence projects, and other projects of a strategic nature;
 - (c) the Waste generated due to natural disasters or by the act of war; and
 - (d) Waste covered in any other sector specific waste management rules.

MANAGEMENT OF CONSTRUCTION AND DEMOLITION WASTE

- (1) every producer shall be responsible for disposal and management of the construction and demolition waste generated by him in an environmentally sound manner in accordance with these rules. He shall also meet the extended producer responsibility targets set out in the First Schedule. (2) The extended producer responsibility framework shall be implemented and monitored through an online portal, and the following entities shall register on the portal, namely: - (a) Producer; (b) Operator of Intermediate Waste Storage Facility; (c) Recycler; and (d) Collection point established by local or development authority



CHANDIGARH C&D WASTE MANAGEMENT

Chandigarh C&D waste management Around 100 TPD (ranging from 60 to 120 TPD) of C&D Waste is generated daily in Chandigarh, which if not managed, may deplete aesthetics of the city, occupy Landfills, etc. Main generators in Chandigarh are Government authorities (MC Chandigarh, Housing Board Chandigarh, etc.), Private Contractors, Residents, etc.

Chandigarh C&D waste management Policy, 2022: -

- Defines the roles and responsibilities of waste generators and various stakeholders related to C&D waste.
- Gives thrust to segregation, recovery, reuse, recycle at source and address in details the management of C&D waste.
- The public establishments (Government, Semi-Government, autonomous, etc) shall deposit the charges as mentioned in clause 9(i) at the time of submission of building plan to Estate Office, U.T Chandigarh
- Generators/producers of C&D waste other than covered in 9(i) and (ii) i.e. in whose case the approval of building plan is not required or building plan stand already





approved before the notification of this policy, shall be liable to pay processing fees @Rs.220/- per MT + GST as applicable. This fee shall be increased by 5% annually on base rate from 1st April of every year

- Provides an online grievance system (CPGRAMS) for citizens to report issues.
- All reconstruction projects are charged with a C&D waste processing fee of Rs. 170 per square meter of total covered area of all floors to be demolished. For new construction projects, a fee of Rs. 20 is charged per square meter of total proposed covered area of all floors to be constructed, at the time of building plan approval and sanctioning
- Penalties: - Defaulters are charged with a fine for dumping C&D waste. The enforcement team will have an appointed official, such as a sub-divisional engineer or a junior engineer of the Enforcement Wing of the Municipal Corporation, who is authorized to issue penalties.



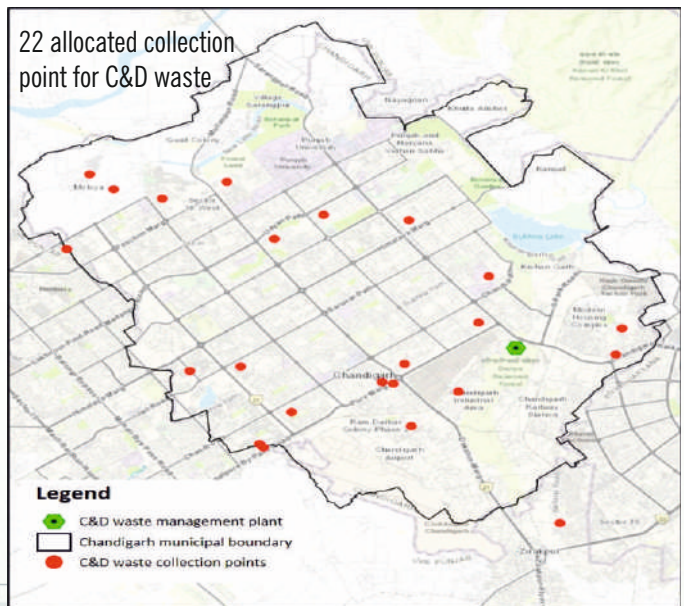
Chandigarh Construction and Demolition Plant

1. Disposal & Transportation of C&D Waste

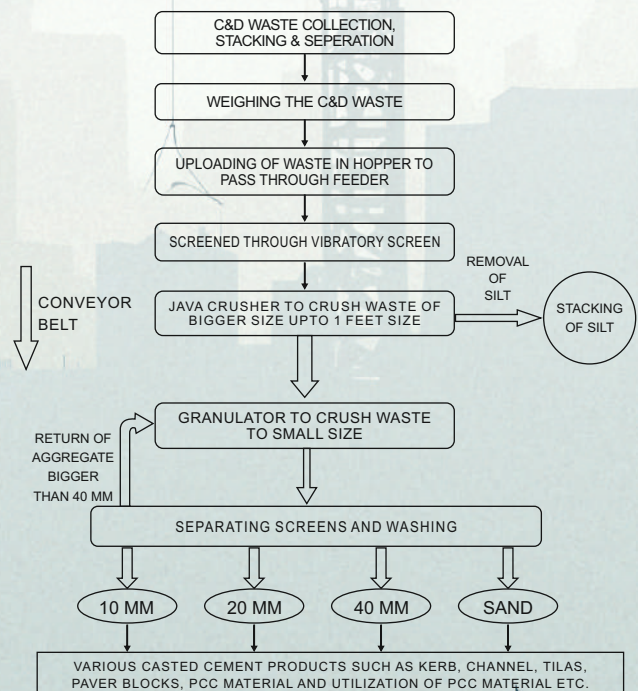
- Every waste generator will dump the C&D waste **only at the designated waste processing plant presently located at Industrial Area Phase-I or other approved locations.**
- Waste can be transported:
 - * By self-arranged vehicles, or
 - * Through Municipal Corporation services (via toll-free number **0172-2787200**) on payment of charges.
- If waste generator intends to transport C&D waste by their own conveyance he will inform the municipal corporation on toll free number with following information:
 - * Name and address
 - * Vehicle number, type, and estimated quantity of waste
 - * Approximate time by which vehicle will reach designated C&D waste location site

2. Waste Handling at Site

- The Municipal Corporation will:
 - * Weigh the waste at the designated site
 - * Issue a receipt indicating quantity received
 - * Specify eligible processed material that can be collected free of cost



Flow chart of Processing of C&D Waste





3. Benefits & Cost Recovery

- Those waste generators who have paid C&D processing charges at time of approval of building plans will be entitled to:
 - * Receive back processed material free of cost amounting to 50% of charges, paid at time of approval of building plans within one year as per clause 9(i).
- Those waste generators who did not pay C&D processing charges at time of building plans or in those cases where C&D waste was generated by an activity not requiring approval of building plan (such as renovation of exiting building/structure etc.) will be entitled free of cost C&D processed material equivalent to 50% of calculated charges and paid in terms of clause 9(iii).



4. Prohibited Activities & Penalties

- Dumping waste on roadsides, open areas, or non-designated sites is strictly prohibited.
- Violators will be fined as per notification No. FII(9)-2022/1533 dated 1st February 2022.
- The authority to issue the challan will be rest with SDE/JE road wing/enforcement inspectors of M.C. Chandigarh.

5. Responsibilities of Waste Generators

- Every waste generators (bulk and non-bulk) shall prima facie be responsible for collection, segregation (into five streams such as concrete, bricks& mortar, soil, steel, wood & plastics) and storage of CD waste so generated
- No hazardous waste coming out of demolition/construction site shall e mixed with C&D waste.

6. Responsibilities of contractors: It is mandatory for Contractors to dump C&D waste at the processing facility.

S. No.	Attributes	Period						Total
		May-19 to Mar-20	Apr-20 to Mar-21	Apr-21 to Mar-22	Apr-22 to Mar-23	Apr-23 to Mar-24	Apr-24 to Mar-25	
1.	Paver Block 80mm (Nos)	439455	142192	118910	104384	4385	6084	815410
2.	Paver Block 60mm (Nos)	107705	259532	210826	131083	83233	34799	827178
3.	PCC Tile 300x300x75mm (Nos)	12163	16357	13684	23310	11658	3174	80346
4.	PCC Tile 300x300x50mm (Nos)	11165	19533	18611	39488	13733	5137	107667
5.	PCC Kerb 600x230x100mm (Nos)	7881	7609	25443	38642	25333	6225	111133
6.	PCC Kerb 300x300x100mm (Nos)	14015	2849	3512	9369	10420	4333	44498
7.	PCC Channel 600x300x75mm (Nos)	25230	2993	15216	26493	11245	4724	85901
8.	Brick 230x110x80mm (Nos)	0	0	0	108455	183817	113662	405934



Ludo game made with C&D plant bricks and tiles



7. Duties of Municipal Corporation Chandigarh: MC Chandigarh has developed major site for storage/stacking and processing of C&D waste wherein screening of C&D waste, crushing of coarse material into different types of aggregates and their separation by screening and washing is being carried out to produce following

- * Washed sand
- * Filling sand/silt
- * Crushed aggregates (10mm, 20mm, 40mm)
- * PCC products (paver blocks, kerbs, tiles, etc.)
- **Recycled materials and its by products are:**
 - * Issued/Sold to public and government organizations at reasonable rates to promote usage of recycled materials.



Garden bench made from C&D waste

8. Transportation Charges

Dedicated vehicle fleet for C&D waste collection, digitally monitored by MCC.

- Call-based door-to-door collection service: A team is dispatched to the location after the generator pays the specified charges.
- Pick up collection points: The generators can deposit their C&D waste at any of the 22 allocated collection points, from which the C&D plant's collection vehicles will collect and transport it to the plant.



Different size i.e. 10mm, 20mm & 40mm
Aggregate stacked separately

Washed Sand

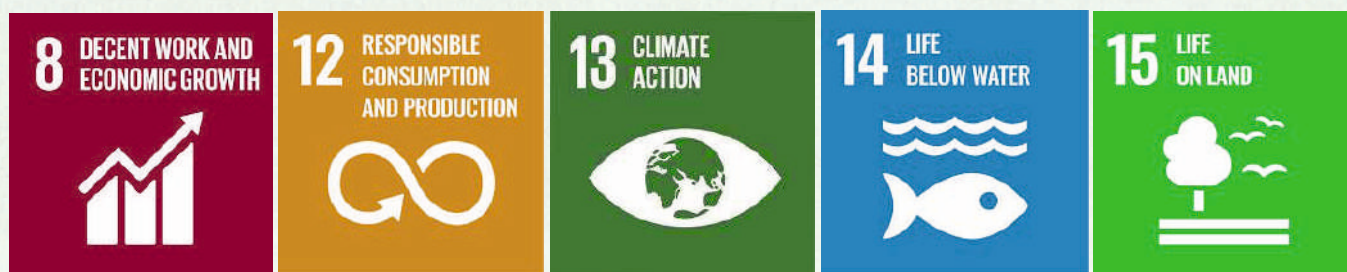
Filling Sand

CONCLUSION

Reducing C&D waste globally is essential for conserving natural resources, minimizing environmental impacts, and promoting sustainable urban development.

Chandigarh is a leading model in C&D waste management, with the first fully government-owned system in India. The ISO-certified plant has processed over 1.42 lakh MT of waste, generated revenue while reducing landfill use, conserving resources, and lowering carbon emissions. High demand for recycled products reflects its success. With plans to expand capacity, improve quality, and increase collection points, the model remains efficient, sustainable, and scalable.

SDG'S RELATED TO AGRICULTURE AND ALLIED SECTORS



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