# Sustainable management of construction and demolition (C & D) waste

**Introduction**

Construction and demolition waste (C&D waste), refers to the waste generated from the construction, renovation and demolition of buildings and infrastructure. It consists of materials such as concrete, bricks, wood, metal, plastics and glass. The C&D industry generates a significant amount of waste, leading to environmental and sustainability concerns.

Current waste management practices often rely on centralized facilities located far from construction sites. This results in increased transportation costs and carbon emissions. Additionally, these centralized facilities may struggle to handle the sheer volume of waste generated. It leads to inefficiencies and delays in waste disposal, processing and recycling.

Reducing construction waste and recycling it onsite is an important intervention. This is particularly true for demolition waste. However, it will be good to discover more applications of processed construction waste. There is little being done in terms of innovating products and processes to reuse construction waste. Most of it is still going to landfills (or for filling, in general) involving unnecessary transportation costs.

To sustainably manage construction and demolition waste, which is a crucial aspect of green construction, we must consider the following - sensible handling of waste materials generated during the construction, renovation and demolition of buildings, roads and bridges.

The aim is to identify certain construction and demolition materials as commodities. These can then be used in new building projects. This will help in avoiding the need to mine and process virgin materials.

**Let us look at the major causes and factors that lead to the generation of C&D waste:**

Urbanization and construction boom: Rapid urbanization and increased construction activities lead to a higher generation of C&D waste. As cities expand and infrastructure projects are undertaken, the amount of waste produced also increases.

Renovation and demolition: Renovation and demolition activities result in the removal of existing structures, generating a significant amount of waste. These activities include upgrading buildings, replacing old infrastructure, or tearing down structures for redevelopment.

Inefficient construction practices: Inadequate planning and execution during construction projects often lead to excessive waste generation and rework. Inefficient use of materials, improper storage and handling, rework due to design changes, poor quality of execution, and lack of onsite recycling measures contribute to higher waste volumes.

Lack of recycling and waste management infrastructure: Insufficient recycling and waste management facilities and policies (potentially adding a cost component to every ton of C&D waste generated and disposed) result in a significant portion of C&D waste being improperly disposed of in landfills or being dumped illegally. In many cases, the waste could be recycled or reused. However, the lack of infrastructure hinders such practices.

Limited awareness and education: Lack of awareness and education among contractors, builders and

the public about the importance of waste reduction and proper waste management also contributes to the generation of C&D waste. Encouraging responsible practices and promoting recycling can help mitigate the problem.

**How must this be addressed?**

Some key strategies for sustainable construction and demolition waste management are discussed below.

Reduce, Reuse and Recycle (3Rs): This involves reducing raw material consumption, reusing materials, and setting up appropriate recycling mechanisms. A conceptual waste management framework can be used to maximize the 3Rs and minimize the disposal of construction waste by implementing a sustainable and comprehensive strategy throughout the lifecycle of construction projects.

Planning and site management: Addressing waste points throughout the lifecycle of a building, planning, and good site management can lead to significant reductions in waste.

Better demolition techniques: Using better demolition techniques through the lens of the waste hierarchy can lead to greener and more sustainable construction.

Training and education: Training on sustainable construction and demolition waste management can help stakeholders understand the importance of sustainable practices and how to implement them. It can also potentially help in designing for minimum waste generation. For example, designing the sizing based on standard product dimensions, e.g., room dimensions based on standard tile sizes.

There is a need to establish decentralized C&D waste management plants near construction sites to address these challenges. However, to successfully implement such plants, we need to address various technical processes. It also requires determining the appropriate model of C&D waste management plants that can effectively process and recycle waste generated by construction activities.

**Look at the existing practices and conceptualize better and sustainable alternatives that can be implemented for management of C&D waste and share your solutions to improve C&D waste management practices. You can look a few guiding suggestions which are shared below.**

**Decentralized C & D waste management plants that can be adopted, such as on-site recycling facilities or mobile waste management units, etc. Please keep in mind the following, before suggesting a particular model, i.e., its feasibility, cost efficiency, and scalability in managing C&D waste within the local context.**

**Policy level changes in the current C&D waste management rules and regulations that mandate proper handling, disposal and management of C&D waste. This can include guidelines for waste segregation, recycling and reuse.**

**Partnership models which can foster collaborations between construction companies, waste management agencies and local communities to develop effective waste management plans. This can include sharing knowledge, resources and best practices to improve waste management in the construction industry. Along the same lines, an exchange or trading platform to enable localized reuse of construction waste might be helpful in long-term management of C&D waste.**

**Technical processes or technologies which can be used to effectively manage on-site C&D waste in a decentralized C&D waste management plant. You can keep in mind some solutions like magnetic separators or dust collection systems.**

**Development of new applications for processing construction waste (especially for basic materials, which are generated in large quantities), which enhance the opportunities for recycling.**