Management of construction and demolition waste in India

Working Sub-Group on construction and demolition waste

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Construction and Demolition Waste

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C&D waste scenario in India

- Presence of C&D waste and other inert material (e.g. drain silt, dust and grit from road sweeping) is significant – about a third of the total municipal solid waste generated.
- C&D waste needs to be focused upon in view of (i) the potential to save natural resources (stone, river sand, soil etc.) and energy, (ii) its bulk which is carried over long distances for just dumping, (iii) its occupying significant space at landfill sites and (iv) its presence spoils processing of bio-degradable as well recyclable waste.
- C&D waste has potential use after processing and grading.
- Utilization of C&D waste is quite common in industrialized countries but in India so far no organized effort has been made.
What is required to be done for sustainability of SWM system and proper management of C&D waste

- Plan a separate line of collection and transportation of C&D waste
- Separate storage of C&D waste for different categories of generators (household, institutional, infrastructure)
- Processing for better utilization (even fine material can be used as inert daily cover at sanitary landfill)
- Disposal of only the portion which can not be gainfully used and
- A mechanism to identify and locate generators of C&D waste
Appropriate management of C&D waste

- With its growing quantum a comprehensive management plan for C&D waste is essential comprising (a) hierarchy and (b) plan
- Hierarchy – the principle of ‘3R’ – reduction, reuse and recycle is applicable for C&D waste
- Plan – with a good plan during construction or demolition, it is possible to minimize waste generation by reducing wastage (reduction), followed by reuse or salvage of the materials or even some items like door / window frame, panes and shutters etc.
- The last in the list of priority – recycle – is possible by way of segregation of the components, crushing the large aggregates and using the different size grades
Government and ULB Initiatives

- The SWM Cell of the Govt. of Maharashtra has given a prominent place to C&D waste in their action plan.
- Action point 1 states ‘Separate collection of debris and bulk waste. Each city needs to have its own mechanism for collection and disposal of waste from bulk waste producers and construction debris’ (prescribed time – 30th November, 2006).
- Municipal Corporation of Greater Mumbai has notified the ‘Construction and Demolition and Desilting Waste (Management and Handling) Rules, 2006’
- C&D waste along with silt was used as cover material in the closure project of old dump-site at Gorai in Mumbai.
The bulk of C&D waste generated in Delhi does not get into the municipal solid waste stream as MCD has certain intermediate points for C&D waste but proper disposal is a problem because the debris is dumped in the existing landfills, eating into their space.

MCD was instrumental in getting a feasibility study done in collaboration with IL&FS. The study “Feasibility study on use of C&D waste in road works” was carried out by the CRRI.

The study found potential feasibility for application in (a) embankment and sub-grade construction, (b) sub-base construction, (c) stabilized base course construction and (d) rigid pavement construction.
Government and ULB Initiatives

MCD has allocated a DBOT project for proper storage and collection of 500 TPD C&D waste from 3 MCD zones, transportation to an identified site where the material would be processed and utilized. The rejects would be landfilled at the same site.

The DBOT partner – IL&FS Waste Management and Urban Services Ltd. would also build a ‘test’ road using processed C&D waste with technical assistance of CRRI which would then be monitored for more than a year.

Efforts would be made for market development of processed C&D waste.

Work has already started and is likely to be commissioned in 3-4 months.
Relevant rules and guidelines

- C&D is briefly included in the ‘Municipal Solid Waste (Management and Handling) Rules, 2000’ but there is no detail except a brief mention in Schedule II of the rule for its separate collection.
- This brief mention does not appear to be sufficient in view of its growing quantum and the way it affects the overall management of municipal solid waste.
- Greater details and more teeth is required for (a) controlling the situation and (b) management of C&D waste in a comprehensive manner which is likely to have significantly positive impact on the overall scenario of waste management and cleanliness.
Selected international experience has been outlined here which have relevance for the Indian situation:

- **Scotland** – About 63% was recycled in 2000, remaining 37% being disposed in landfill and exempt sites.

- The Government is working out specifications and code of practice

- Attempts are being made for establishing links with the planning system, computerizing transfer note system to facilitate data analysis and facilitating dialogue between agencies for adoption of secondary aggregates by consultants and contractors
What is happening internationally

- **Denmark** – According to the Danish Environmental Protection Agency (DEPA), in 2003, 30% of the total waste generated was C&D waste.
- According to DEPA around 70-75% waste is generated from demolition activity, 20-25% from renovation and the remaining 5-10% from new building developments.
- Because of constraints of landfill site, recycling is a key issue for the country.
- Statutory orders, action plan and voluntary agreements have been carried out, e.g., reuse of asphalt (1985), sorting of C&D waste (1995) etc.
What is happening internationally

- **Netherlands** – More than 40 million C&D waste is being generated of which 80% is brick and concrete.
- A number of initiatives taken since 1993, such as prevention of waste, stimulate recycling, promoting building material which have a longer life, products which can be easily disassembled, separation at source and prohibition of C&D waste at landfills.
- Factors which led to high recycling rates are:
  - Separation at source
  - Good market for recycled products
  - Ban on landfills
  - Guidelines for using C&D waste in place of fresh aggregates
What is happening internationally

- USA – C&D waste accounts for about 22% of the total waste generated in the USA
- Reuse and recycling of C&D waste is one component of a larger holistic practice called sustainable or green building practice
- Green building construction practices may include salvaging dimensional lumber, using reclaimed aggregates from crushed concrete, grinding drywall scraps for use as soil amendment at the site
- Promoting ‘deconstruction’ in place of ‘demolition’
- Deconstruction means planned breaking of a building with reuse being the main motive
What is happening internationally

**Japan** – Much of the R&D in Japan is focused on materials which can withstand earthquake and pre-fabrication.

85 million tons of C&D waste was generated in 2000, of which 95% of concrete was crushed and reused as road bed and backfilling material, 98% of asphalt + concrete and 35% sludge was recycled.

**Singapore** – C&D waste is separately collected and recycled. A private company (Sembwaste) has built an automated facility with 3,00,000 ton per annum capacity.

**Hong Kong** – Concrete bricks and paving blocks have been successfully produced, impregnation of photocatalyst for controlling Nox in ambient air.

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Lessons for India

In the international experiences sited above there is considerable emphasis on recycling of C&D waste. The important initiatives sited are:

1. Promoting separation of C&D waste at source
2. Promoting recycling
3. Ban on landfilling of C&D waste
4. Developing market for recycled products
5. Production of concrete bricks and paving blocks
6. Guidelines for using C&D waste
7. Developing designs which facilitate ‘deconstruction’ instead of outright demolition
8. Promoting building materials having longer life

Points 1-6 important at present, 7-8 for future
Technical and regulatory requirements

Policy is required for mandating the following:

- Each ULB should keep track of construction and demolition activity and generate data regarding quantity and characteristics continuously for at least one year and then repeat once in every 3 years.
- This data should be collated by the Nodal Agency (may be the UD / Mun. Admn. Deptt. of the concerned State Govt.)
- Expert organizations / institutions should analyze the data and evolve ways to use the material in the best possible way.
- Pilot demonstration projects in each state.
- Change in the relevant regulations and by-laws etc.
C&D generators to pay for sustainability

- Unlike MSW, C&D waste is not generated at regular interval and the quantity varies with the work.
- Therefore it would be difficult to incorporate it in the property tax.
- A system has to be evolved in which charges can be levied in proportion of the waste generated / disposed.
- Different payment terms may be worked out depending upon the nature of the waste and the extent of generation and the affordability level of the generator.
- The slums and squatter settlements may be cross subsidized by posh localities and the ULB.
What can be done with C&D waste

- C&D waste can be effectively used in several ways:
- As inert fill material for low-lying areas, landscaping
- Processed C&D waste can be used for road and embankment construction
- Finer grade can be molded into blocks and slabs with appropriate binder
- The finer grade can also be used as daily cover for SLF
- Has been used for closure of Gorai dump site (inert cover, LFG dissipating layer etc.)
- Low cost housing and ILCS program
- Government buildings and civil structures can show the way
Institutional mechanism for collection

- The ULBs should work out an institutional mechanism for collection of C&D waste
- Storage bins and collection equipment can be procured by the ULB and rent out to the generators as on demand for a charge (with full cost recovery for goods and services)
- The processing part can be allocated to BOT / DBOT partners, who would also help in developing market
- Alternatively, the whole activity from storage to processing and disposal can be allocated to BOT / DBOT partners
- Outline of alternative PPP project has been given in the report
Importance of IEC

- One crucial factor for success of C&D waste management program is IEC (Information, Education and Communication)
- Since this is a new area in our country, information and education would be necessary to garner public support and to change the mindset and attitude of the public as well as the municipal staff
- The summary of the analytical data and R&D results from expert institutions should be put in the public domain so that they can be convinced about the necessity of the management protocol as well as the utility of the C&D waste
Draft Guidelines for C&D waste

- Definitions
- Responsibilities
- Roles
- Appropriate management
- Typical use of C&D waste
- Cost recovery
- Pilot demonstration project in each state
- Conclusion
Road map

- Generation of data by the ULB (time frame for all activities, expected generation, proposal for salvage / reuse, disposal quantity, requirement of services etc.), time frame 6 months start up time
- Detailed Guidelines, approved by the Central as well as the State Govts. – time frame 6 months
- Pilot projects for demonstration, time frame 2 years, the first set of result from Delhi is expected in about one year
- R&D projects for supplementing the pilot projects, time frame – routine activity but first set of results may be available in one year
- BIS standards and modification in Building Byelaws, construction manuals etc. for safe use of C&D waste, time frame – one year
Thank you