**(ACE Paper 30/2003)**
***For discussion***

# Management of Construction and Demolition Materials

## Purpose

This paper reports the progress in implementing the measures to tackle the problem of construction and demolition (C&D) materials.

## Background

2. At the meeting on 13 January 2003, we briefed Members of the problem of C&D materials and the measures taken to tackle the problem through ACE Paper 2/2003. To recap, C&D materials are a mixture of inert materials and waste arising from construction, excavation, renovation, demolition, and roadworks. The composition of C&D materials changes from year to year, as it depends highly on the nature and scale of the construction works that generate the materials. In recent years, the composition of C&D materials is as follows:

(a) *soft inert materials* such as soil, earth and slurry – these materials account for some 70% of all C&D materials, and they can only be reused as fill materials in reclamation and earth filling works;

(b) *hard inert materials* such as rocks and broken concrete – these account for 12 – 15% of all C&D materials. Some can be reused in reclamation works while others can be recycled as aggregates for concrete production or as granular materials for road sub-base and drainage bedding layers;

(c) *non-inert waste* like metals, timber and packaging waste – these account for 15 - 18% of all C&D materials. Some can be recycled if they are not contaminated while the contaminated ones can only be disposed of in landfills.

3. There was an increasing trend in the quantity of C&D materials generated from local construction activities. In 1990, only 6.3 million tonnes of C&D materials were produced. By 1995, the amount reached 11.7 million tonnes, and by 2000, the amount reached 13.8 million tonnes. In 2002, the size of the problem grew further to 15.8 million tonnes. We project that the total volume generated in 2003 would reach a record high of 19.6 million tonnes. This is equivalent to filling up the Happy Valley Racecourse to a height of 26 storeys.

4. In managing this huge volume of C&D materials, our primary objective is to prevent the inert materials from being disposed of in landfills[1], which are designed for the disposal of municipal solid waste. Failure to do so would mean that our valuable landfill space would be depleted much faster than planned, and the lifespan of the landfills would be substantially reduced to only 4 to 6 years.

5. Prior to 2002, we did not have major problems in achieving our objective of diverting the inert materials away from landfills because there were sufficient reclamation projects to absorb them as fill materials. However, the situation began to change in 2002 as many planned reclamation projects were cancelled or deferred. We now project that between late 2002 and the end of 2005, some 73 million tonnes of inert C&D materials would be generated. We informed members then that a whole range of measures would be taken to tackle the problem.

**Measures Taken To Tackle the Problem**

6. The following paragraphs report the updated position of the measures that we have taken to manage C&D materials:

(a) Minimizing C&D Materials

7. Government has been taking the lead in minimizing C&D materials at source. Currently, all contractors of Government works contracts are required to prepare and implement waste management plans in accordance with our specifications. In

[1] The three landfills are located at Tseung Kwan O, Nim Wan in Tuen Mun and Ta Kwu Ling in North District. They occupy a total of 270 hectares of land, cost $6 billion to build and over $400 million a year to operate. When planned in the 1980s, they were expected to serve our waste disposal need until 2020. However, with the increasing volume of municipal solid waste in recent years, we project that the landfills would be filled up by 2015.

particular, they need to carry out on-site sorting and implement a trip-ticket system to ensure that different types of C&D materials go to the appropriate reception sites. We have also included environmental performance in the "Pay for Safety and Environment Scheme" so as to provide the contractors the financial incentive to implement waste management plans and other environmental improvement measures satisfactorily. We will work closely with the Provisional Construction Industry Coordinating Board and the industry in encouraging the private sector to do the same.

(b) Reusing Inert C&D Materials in Reclamation Projects

8. Reclamation projects have for many years been a key outlet for the inert materials, especially for the voluminous soft inert materials that have no alternative use. In June 2001, we estimated that planned reclamation projects would absorb 43.9 million tonnes of C&D materials. With the cancellation and deferral of some planned projects, we had to revise the projection downwards to 34.6 million tonnes in late 2002.

9. The situation has further worsened in recent months because of the legal proceedings related to the Wanchai Development Phase II[2] and Central Reclamation Phase III[3]. Other projects like the Southeast Kowloon Development are also being reviewed. At present, there are only two reclamation sites receiving C&D materials[4]. Our latest estimate is that by end-2005, confirmed reclamation projects may only absorb some 30 million tonnes of C&D materials.

(c) Processing/Recycling Hard Materials

10. We have made arrangements to deliver the high quality hard inert materials to the Lam Tei, Shek O and Anderson Road Quarries for processing into aggregates for concrete and asphalt production. So far, 700,000 tonnes of high quality hard inert materials have been processed in this manner. We are also reusing these materials in seawall construction in reclamation works. We envisage that another 8

---

[2] Wanchai Development Phase II was scheduled to absorb 4.8 million tonnes of C&D materials, which represents about 69% of its fill requirement.

[3] Central Reclamation Phase III was scheduled to absorb 3.5 million tonnes of C&D materials, which represents about 52% of its fill requirement.

[4] They are Tseung Kwan O Area 137 and Penny's Bay Stage 2 Reclamation.

million tonnes of hard materials would be processed/reused in 2004 and 2005.

11. We have set up a temporary C&D materials recycling facility in Tuen Mun[5] since July 2002. So far, the facility has processed 550,000 tonnes of hard inert materials into 200,000 tonnes of recycled aggregates. They are used in public works projects. It must be noted that the facility is now operating only at half of its capacity. This is because only some 13% of the C&D materials received in the Tuen Mun Fill Bank are suitable for recycling, notwithstanding our efforts to divert all hard materials from Government projects to the facility. Nevertheless, we will continue our efforts in this area and will try to make available both the supply of hard materials and the demand for recycled aggregates as far as possible.

12. The recycling facility is due to cease operation in October 2004 under the existing contractual arrangement. We are now examining the possible options – either extend its operation or put in place a replacement facility – to ensure that we will continue to have an outlet for hard inert C&D materials.

(d) Establishing Temporary Fill Banks

13. We have set up two temporary fill banks to stockpile soft inert C&D materials for later use. The fill bank at Tseung Kwan O commenced operation in October 2002 while the one in Tuen Mun commenced operation in June 2003. The total capacity of the two fill banks is about 18 million tonnes. By now, over 8 million tonnes of soft inert C&D materials have been stockpiled in the two fill banks. We estimate that unless there are new outlets available in the coming few months, the two fill banks would be filled to their capacity by late 2004/early 2005.

(e) Using Soft Inert Materials in lieu of Dredged Mud in the Capping Layer of the Contaminated Mud Pits in East Sha Chau

14. As a short-term stop-gap measure, we are planning to use soft inert materials to replace dredged mud in the capping layer of the contaminated mud pits at East Sha Chau. The capping layer is an essential part of the mud pits as it prevents the contaminated mud in the mud pits from dispersing. In the past, clean dredged mud from the sea would be used for capping. As the soft inert materials are excavated soil, which have similar properties as dredged mud, we consider that they could be used to

replace dredged mud for the capping work. Apart from accommodating some 6.3 million tonnes of soft inert materials, this measure would also reduce the need for dredged mud. We plan to commence the operation in late 2003.

15. To ensure that the soft inert materials are clean and that the operation would not lead to other environmental problems, the Civil Engineering Department would carry out a number of measures. For instance, stringent inspection would be carried out at the reception facilities and only clean excavated soil would be delivered to East Sha Chau. The remaining inert C&D materials would continue to be delivered to the fill banks for stockpiling. Floating substances, if any, would be collected. The Environmental Protection Department would also closely monitor the operation under the Dumping At Sea Ordinance.

(f) Introducing Landfill Charging

16. To provide economic incentive for developers and construction contractors to reduce C&D materials, we intend to introduce charging for the disposal of construction waste at landfills, sorting facilities and public fill reception facilities. We intend to introduce the legislative package into the Legislative Council later this year, with a view to implementing the scheme in late 2004/early 2005. While this measure may not help alleviate the imminent crisis that we are facing by late 2004, we believe it would nevertheless help encourage the construction industry to minimize the generation of all types of C&D materials in the long run.

(g) Other Measures

17. It can be seen from the above paragraphs that even with all the measures in place, we still face a huge problem by early 2005 when the two fill banks would both be filled up. As it is extremely difficult to find large pieces of vacant land suitable for use as fill banks, it is highly likely that there would not be any outlets throughout the territory, and the inert C&D materials would have nowhere to go. It is also likely that the situation would continue to deteriorate in the coming years.

18. We are exploring all possible avenues to tackle the problem and to find outlets for inert C&D materials. This include using them to backfill quarries or marine borrow areas, or in reclamation or land formation projects outside Hong Kong.

---

[5] The capital cost of the plant is $26 million. The annual operating cost is $12 million.

We will report to members if there are new developments in this regard.

## Conclusion

19. Members are invited to note the problems encountered in managing C&D materials, as well as the measures taken to tackle them.

**Environment, Transport and Works Bureau**
**October 2003**