Case studies of Advanced Construction and Demolition waste(CDW) Recycling initiatives and technologies In JAPAN

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Position:	
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Title	Policy on excavated soil generated Tokyo Outer Ring Road (Kanetsu~Tomei) construction
Theme classification	Prevention
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	Etc.
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Specific content	- The Tokyo Outer Ring Road Tunnel Excavated Soil Conference chaired by Honorary Professor Kamon of Kyoto University developed a "Manual to Manage Soil Excavated during Tokyo Outer Ring Tunneling," summarizing the policies for management of shield excavated soil. And, we plan to make effective use of shield tunnel generated soil of about 20,000 m 3 per day.
Appeal point	 Shield tunnel generated soil from the muddy pressure shield construction method has been often handled as construction sludge (industrial waste) in many cases. In this project, by devise shield excavation method and additives etc. taking advantage of the characteristics of the hard drilling strata distributed in the deep underground, we effectively utilize shielded tunnel generated soil as excavated soil for embankment material etc.

Policy on excavated soil generated Tokyo Outer Ring Road (Kanetsu \sim Tomei) construction.

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ABSTRACT: This paper addresses the policy on excavated soil generated Tokyo Outer Ring Road (Kanetsu \sim Tomei)construction by shield tunneling. From Tokyo Outer Ring Road (Kanetsu \sim Tomei) construction site, a maximum of 20,000 m 3 of excavated soil per day is generated at maximum.so it is necessary to consider proper management of such a huge amount of soils.

1. INTRODUCTION

Three metropolitan ring roads play vital role as a social capital to support economic activities and daily life of Tokyo, a heart of Japan, while contributing to mitigation of chronic traffic congestion and to environmental improvement of central Tokyo.

One of these ring roads, Tokyo Outer Ring Road, has the length of about 85 km, connecting, like a loop, the areas at about 15 km from central Tokyo. For the dedicated motorway portion (the expressway), the section of about 49 km has been opened for service up to now, which runs from the Oizumi Junction connecting to Kanetsu Expressway and the Takaya Interchange connecting to Higashi Kanto Expressway.

For the section of about 16 km (or the Tokyo Outer Ring) from Kanetsu Expressway to Tomei Expressway, Ministry of Land, Infrastructure, Transport and Tourism (MLIT), East Nippon Expressway Company Limited, and Central Nippon Expressway Company Limited are jointly undertaking the project.



Fig. 1 Outlines of the metropolitan area three-ring road

2. ROAD CONSTRUCTION

The Section runs mostly through the deep underground tunnel structure, the greatest shield tunnel of Japan with three lanes each way, having the diameter of about 16 m.



Fig. 2 Outline of the plan of the Tokyo Outer Ring (Kanetsu ~ Tomei)



Photo.1 Shielded machine with a diameter of about 16 m

3. POLICY ON EXCAVATED SOIL GENERATED SHIELD TUNNEL CONSTRUCTION

A total of four 16-m diameter shield machines were employed for tunnel excavation; two northbound and two southbound respectively from the Oizumi Shaft and the Tomei Shaft. These shield machines produced excavated soil of maximum about 20,000 m³ daily.

Since large amount of soil generated within short periods is to be removed, as needed, to the outside of the work site, the Tokyo Outer Ring Road Tunnel Excavated Soil Conference chaired by Honorary Professor Kamon of Kyoto University developed a "Manual to Manage Soil Excavated during Tokyo Outer Ring Tunneling," summarizing the policies for management of shield excavated soil.

This manual summarizes the flow of handling and management of shield excavated soil, temporary storage method, judgement method, transportation control, the concept of additives mixing, etc. The manual describes the policies for effective and efficient utilization of shield excavated soil for other projects outside the work site.

For soil excavated with mud slurry shield, the project is intended basically for effective utilization of such soil for embankment, etc. as soil generated from construction, by exploiting merits of hard excavation formation distributed in the deep underground and by improving the shield method and additives. In order to enable effective utilization of large amount of construction byproducts as invaluable resources, efforts are done to achieve the objective through promotion of discussions with various receiving parties while referring to this manual.



Fig. 3 Flow of management of shield generated soil

Excerpt from "Manual to Manage Soil Excavated during Tokyo Outer Ring Tunneling,"

4. CONCLUSIONS

Transport of shield excavated soil and transport of materials and equipment of other projects are expected to cause congestion. Besides, it is important to ensure traceability of shield excavated soil from the source of generation to the destination. In this context, the transport management is currently under consideration. The Tokyo Outer Ring Road is a project requiring highly-developed technical power mainly on underground structures. With the aim of making this project a model in large cities, we will proceed with the project with cooperation extended from authorities concerned, experts, and local residents while paying due attention on the safety and surrounding environment.