

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

Affiliation	JDC Corporation
Location	4-9-9 Akasaka , Minato-ku, Tokyo, 107-8466 Japan
Position:	Twister Business G, Civil Engineering Department ,Civil Engineering Division
Name/Surname	KENJI OHTSUBO
e-mail	kenji.ohtsubo@n-kokudo.co.jp
Title	Twister Method (soil improvement device, rotary crushing and mixing method)
Theme classification	<input type="checkbox"/> Prevention
	<input type="checkbox"/> Re-use
	<input type="radio"/> Recycle
	<input type="checkbox"/> Reduce Co2
	<input type="checkbox"/> Legacy
	<input type="checkbox"/> Business to overseas
	<input type="checkbox"/> Etc.
Technology development stage	<input type="radio"/> Practical use
	<input type="checkbox"/> Scheduled to be put into practical use by 2020
	<input type="checkbox"/> Scheduled to be put into practical use after 2020
Specific content	<p>- The twister method can undertake homogeneous improvement of large amount of wide-ranging excavated soils generated in the site; soft rocks and concrete pieces with the diameter of 25 cm or less, clayey soil containing fine, lump, and high water-containing soils.</p> <p>This method is the soil improvement technology which consists of disentanglement of ground materials by impacting them with several pieces of flexible chains rotating at high speed inside the cylinder as well as homogeneous mixing with additives. Features are as follows:</p> <p>(1)Wider applicable geological range than conventional (2)Capable of homogeneous mixing of clayey soil lump and clayey soil with high water content (3)Capable of crushing of soft rock (grain refining) and grain adjustment (4)Capable of screening wastes, wood chips, and root stocks (with parallel vibration filter) (5)Plant line-up to cover from small-amount production to mass production</p> <p>The features realized by the method enables effective utilization of excavated soils that have been difficult to handle with the conventional method. About 5.45 million m3 have been utilized successfully for restoration works in Tohoku disaster-affected areas, disaster stricken areas and for airport filling project.</p>
Appeal point	- High quality and low cost

Twister Method

(soil improvement device, rotary crushing and mixing method)

1. What is the technology to recycle the excavated soil by “Twister Method”?

Excavated Soils , such as **clayey soil with high moisture content** and **soil mixed with soft rock**, have been difficult to handle according to the conventional method. This new technology **can improve these soils into high-quality banking material**, which is dense and easy to compact, by stirring and mixing them homogeneously.

Utilization of this technology has enabled utilization of wide-variety of excavated soil, which in turn is expected **to reduce the work costs and improve the recyclability and quality.**

[Applicable public works fields]

- 1) **Banking and embankment** works of rivers
(Work to reinforce new and existing dykes)
- 2) **Filled-up ground and roadbed reinforcement** work during road construction
- 3) Improvement of soil from excavation of structures, and backfilling

2. Outline of the Twister Method

A “Twister Method” consists of **crushing and grain refining (shredding)** of two or three types of excavated soils , by means of striking power of multiple flexible chains rotating with high speed inside the cylinder. This is followed by **even dispersion of these soils**. This method has enables **simultaneous execution of crushing and mixing**.

3. Features of the “Twitter Method”

One machine of the twitter method **has the functions of both mixing and crushing**.

This method has superior mixing and crushing, shredding performances, which enables mixing of **wide-variety of ground materials from clayey soil to rocks**.

This method ensures **highly effective dispersion of additives and superior stirring performance**.

The left figure shows comparison of the improved-soil quality between this method and manual mixing. It is evident that improved soil according to this method can attain the required quality by means of **quicklime additive rate similar to the case of manual mixing in the perfect mixing state**.