

Soil Stabilization toward Carbon Neutrality "SUSMICS-G"

Ground Improvement Method Using Melt-Solidified Slag and Biochar



SUSMICS-G : **S**ustainable + **SMI** ("Charcoal" in Japanese) + **C**arbon **S**torage - **G**round improvement method

Summary

SUSMICS-G is a ground improvement method in which biochar and melt-solidified slag are mixed into materials for shallow soil stabilization. This method reduces CO₂ emissions from the production and transportation of cement to virtually zero, contributing to the realization of carbon neutrality.

Surface soil stabilization requires a large amount of cement as a stabilizer, which emits a lot of CO₂ during its manufacturing process. Therefore, melt-solidified slag is mixed with the soil before adding cement to improve soil properties and reduce the amount of cement needed. Additionally, by mixing biochar, carbon components equivalent to the CO₂ emissions from the cement used are stored under ground, achieving carbon neutrality of a ground improvement using cement. This method was applied to a construction site and confirmed to be carried out in the same way as conventional methods.

Working Procedure

1. Evenly spread slag, biochar and stabilizers with specific components and particle size adjustments based on cement over the soil to be improved.
2. Mix the above materials with the soil using construction equipment such as excavators and stabilizers.
3. Compact the mixture by rolling ensures the strength and stability of the improved ground.



This construction method was jointly developed SHIMIZU CORPORATION and TOYO SUTABI CO.,Ltd..

Advantages of Using Materials with Special Features

Use of Melt-Solidified Slag

Melt-solidified slag is a sand-like substance made by melting municipal waste at a high temperature of over 1,300°C, followed by cooling and solidifying. This process utilizes waste as a resource. When mixed with soil, melt-solidified slag improves soil properties by reducing water content and increasing sand content, thereby enhancing ground strength. This allows for a reduction in the amount of cement used, which in turn decreases CO₂ emissions associated with cement production. Another important advantage is that melt-solidified slag is more cost-effective than cement.

Use of Biochar

Biochar is a material made from sawdust, byproduct of wood sawing, and contains a significant amount of carbon derived from the CO₂ absorbed by trees through photosynthesis. By using biochar, it is possible to store carbon in the ground in an amount equivalent to the CO₂ emissions generated by cement.

