

Groundsill made by Sabo-CSG Method

The case of the 9th groundsill in the lower reach of Marusawa valley

Fujigawa Sabo Office

1. Outline of the Sabo-CSG method

The Sabo-CSG method is characterized by the use, instead of ordinary concrete, of a mixture of in-situ excavated materials, cement and water.

All the substances are carried by dumper truck, spread by bulldozer and compacted by vibration roller in order to build a structure.

[Specific characteristics of the Sabo-CSG method]

Low cost:

Cost can be reduced by reducing the volume of ready-mixed concrete and using mold forms made of soil.

Reduction in waste soil:

In-situ excavated materials are the major resource material for structures.

Laborsaving:

Construction cost can also be reduced by mechanizing the works.

Shorter work period:

Placement work of the mixture can be carried out everyday.

Higher safety:

Unlike ordinary concrete placement work, placement work of the mixture requires neither mold form nor steel pipe scaffolding.

2. Needs for the Sabo-CSG method

The project areas of Fuji-river Sabo Project Office are rich in good sand and gravel materials because of quantity of sediment yield and transportation in the catchment areas. The unit weight of the materials is large enough and organic and clay contents are less. But, although boulders and cobbles have been used for erosion prevention and garden stone, smaller-sized materials such as gravel and sand have been wasted.

On the other hand, due to recent environmental concerns such as global warming and deterioration of landscape, we are requested to save natural resources and, at the same time, to make the most use of by-products as well as to reduce in waste soil.

The Sabo-CSG method was therefore developed aiming at using in-situ excavated materials for Sabo structures.

Efforts have been made to improve the technology since 1988.

3. Lower Marusawa valley 9th groundsill built employing the Sabo-CSG method

3.1 Project period

from July 2005 to March 2006

3.2 Location of the project

Aoki, Seitetu, Nirasaki City, Yamanashi Prefecture,

In the upper Koumu river, the right branch of Kamanashi river of the Fuji River

3.3 The part of structures completed using the technology

Since in-situ excavated materials, though the ones exceed the specified maximum size are removed, consist of earth materials which have variety of sizes, the quality of the mixture in terms of strength, freeze-thaw durability and erosion durability varies from time to time. Furthermore, specific endurance to freeze-thaw and erosion is rather low.

The method is therefore applied to the specific parts of the structures on which neither impacts of debris flow and freeze-thaw work as illustrated in Figure 2.

In the case of the 9th groundsill, foundation of the main sill and secondary sill and inner part of the apron were build using this method.

Repeat ~



Sift of materials



Mixture of materials



Unloading soil



Spread and smooth



Compact



Treatment of construction joint

4. Achievements by the use of the technology

The method had been employed since 2000 at as many as 28 sites. The volume of the mixture accounted for as much as 67,000 m³.

Monitoring practices and analysis on the changes in strength, erosion durability and freeze-thaw durability have been conducted since 2003. As a result, the effects and efficiency of the method can be verified.

5. Future Program

Monitoring practices on the effects, efficiency and durability will be conducted further. The criteria for design and implementation will be improved based on data acquired in the fields and work places aiming at wider application of the method.



Completion

Translated from Journal of Japan Sabo Association, Sabou to Chisui, Vol.168, pp.25-27, 2005