Information Note 1/2005 **March 2005**

Rubbersoil

Key message: **Rubbersoil is a new construction material made of rubber crumbs/chips derived from scrap rubber tyres and has been proposed to be used in slope upgrading works. The Civil Engineering and Development Department always welcomes and keeps an open-mind on the development and use of new materials in geotechnical engineering works. We are actively studying its suitability for use in slope upgrading works.**

Introduction

Rubbersoil is a lightweight and porous geo-construction material, which is mainly composed of rubber crumbs/chips derived from waste rubber tyres, cementitious materials and water. Rubbersoil is a new construction material and study is in progress to examine its suitability for application in slope improvement works.

Merits of Rubbersoil

The most prominent advantage of rubbersoil is that it provides permanent solution for massive utilization of scrap rubber tires, with the result of (1) saving in landfill spaces and (2) reduction in environmental hazards of illegal dumping of scrap tires. Design with rubbersoil can take advantage of its ability to be made light or heavy, its free draining property, and its high cemented strength. According to the manufacturer, rubbersoil is also chemically and physically stable under both short and long-term conditions in the laboratory for normal applications in civil and geotechnical engineering works.

Limitations of Rubbersoil

Based on the assessment so far, there are a number of issues that we need considering on the wider use of rubbersoil in upgrading loose fill slopes:

- The unit cost of rubbersoil is generally higher than other replacement materials used for loose fill slope recompaction, e.g. soft backfill and no-fines concrete.

- When using rubbersoil to upgrade a loose fill slope, the top few metres of existing loose fill needs to be removed and the existing trees on the slope need to be felled, as with conventional recompaction of loose fill slope. Felling of trees, albeit provision of compensatory tree planting, is not readily accepted by the public and often attract objection and complaint from the green groups. The use of rubbersoil to upgrade loose fill slope, as with other conventional loose fill slope upgrading works, is to be considered on a case-by-case basis.

- The excavated fill materials, which are to be replaced by rubbersoil, will eventually be dumped in Public Fill Area or Landfill Site. The associated construction waste disposal problem still needs to be addressed.

- A thin layer of protective soil cover will be provided on the surface of rubbersoil slope, in order to protect the rubbersoil against fire hazard. On this slope surface only ground cover plants like grasses or ferns can grow, but not mature trees nor big shrubs. The planting option and the landscape effect are therefore restricted.

- The drainage characteristics of some of the rubbersoil components still require further and more rigorous examination.

Trial Use of Rubbersoil under the LPM Programme

Based on the above considerations, wider application of rubbersoil in major fill slopes under the LPM Programme may not be implemented in the near future. Nevertheless, we are keen to adopt new technology and the use of new materials in slope upgrading works. Rubbersoil has therefore been used on a trial basis to upgrade some fill slopes of small size and low consequence-to-life. A trial case in Shau Kei Wan was completed in mid 2003. Trial use of rubbersoil has commenced on another slope in Tuen Mun early 2005.

In the Shau Kei Wan site, the performance of the rubbersoil slope is being monitored, which includes ground movement, surface erosion and change in groundwater level. So far, the monitoring results satisfy the design requirements and its performance is considered satisfactory.

Apart from upgrading loose fill slopes, other applications of rubbersoil may be possible, e.g. gabion wall, debris flow barrier, and subsurface drainage filter. We are happy to look into these possible applications in conjunction with manufacturer.

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