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Trial Construction of Revetment Backfill Using Dewatered Clay Lumps

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ABSTRACT

To investigate the characteristics of dewatered clay lump ground, a part of revetment backfill was constructed by a trial construction. The dewatered clay lump was the recycle material which was produced from dredged marine clay. In this paper, the construction procedure is outlined, and the density of backfill and compressibility and shear strength behavior of dewatered clay lump ground are described.

KEY WORDS: Dewatered clay lump; Dredged clay; Compressibility; Density; Monitoring

INTRODUCTION

Sea bottom sediment has been and will be continuously dredged along the Japanese coastal area. One of the major purposes of the dredging is to widen and deepen existing navigation channels and anchorage areas to accommodate large ship traffics. To maintain the function of these channels and basins, periodic dredging is also needed to remove sediment brought to sea bottom by current or wave actions. The dredged sediment is discharged into a disposal pond in order to protect the marine environment. Due to huge cost and environmental concern associated with the construction of disposal pond, it is becoming difficult to construct new ones. The long use of existing ponds has become important.

Katagiri and Terashi (2005) showed the flow of dredging process together with the concept for extending the life of disposal pond, and that emphasized that the extension of the life of disposal pond could be undertaken at various stages in the flow of dredging process under different concept. Here, two ways were selected for the extension of disposal pond. One is the reduction of volume of discharged sediment. The other is the increase of capacity of existing pond by additional embankment as shown in Figure 1. In this case, the strength of the soil behind the revetment should be increased for ensuring the stability of both the embankment and revetment. One of the solutions is adding backfill to the existing revetment by stable materials. However, the backfill inevitably reduces the capacity gain of disposal pond when the foreign material such as hill-cut material is used. If the dredged clay can be improved and used for backfill, the full benefit of both volume reduction and capacity increase may be achieved.

Murayama et al. (2004) studied the possible use of dewatered clay lumps as backfill and reported the mechanical characteristics of dewatered clay lump and its aggregate in short term. Ishihara et al. (2006) performed the box shear tests on dewatered clay lumps submerged up to 14 months, and emphasized that the strength of dewatered clay lumps under a constant pressure of 100 kPa up to 14 months did not decrease with time. These studies were performed using small apparatuses in the laboratory. From these results, they proposed a tentative design value.

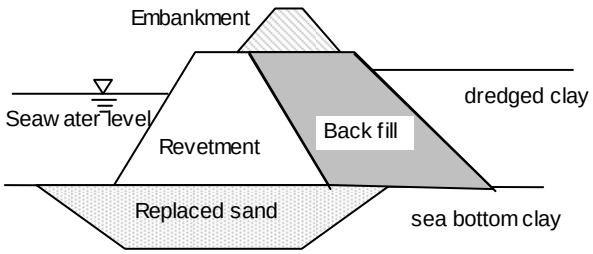

Figure 1 Outline of construction of additional embankment

A trial construction of revetment backfill was planned and performed to investigate the characteristics of dewatered clay lump ground in full scale. In the paper, the outline of this construction is summarized, and physical and mechanical properties of dewatered clay lump ground are