

Research on the Effective Utilization Plan of Sewage Sludge

Whole term

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(Purpose)

The regional sewerage system on the right bank of Kiso River is the only regional sewerage system in Gifu prefecture, which covers four cities and nine towns of the prefecture. In this regional sewerage system landfill disposal of dewatered cakes has been carried out. However, landfill disposal is not an optimal method in terms of effective utilization and recycling, since it is expected to have economical and social disadvantages in permanent securement of disposal sites, the rising cost of trader commission and reinforced regulations by the Waste Disposal and Public Cleaning Law, and so on. Consequently, this research is conducted to examine sludge treatment/disposal of the regional sewerage system and to propose a sludge treatment plan suitable for the sewerage system on the assumption that sewage sludge is effectively and stably utilized.

(Results)

This research examines effective sludge utilization methods and sludge treatment systems. The system is examined on the following aspects;(1) compilation of the basal conditions, (2) discussion on effective sludge utilization, (3) discussion on sludge treatment systems, (4) formulation of a sludge treatment plan, (5) discussion on area-wide treatment systems.

In the discussion of effective sludge utilization methods, characteristics and problems of the following items are examined: cement material, dried sludge fertilizer, solid fuel and carbonization for the utilization of dewatered cakes; horticultural soil, cement material, soil stabilizer, roadbed material, light weight aggregate, asphalt filler, paving block, thick earthenware pipe, sludge brick and sludge tile for utilization of incineration ash; roadbed material, concrete aggregate and paving block for utilization of molten slag. Furthermore, the possibility of public consumption of the products is investigated by a questionnaire survey throughout the municipalities in the prefecture.

Based on the results, courses of action that should be taken for the effective utilization of sewage sludge in the prefecture were suggested as follows:

For effective utilization of dewatered cakes, it is suitable to use it for agricultural land after composting, while continuing to create the demand at the same time.

For effective utilization of incineration ash, it is suitable to keep some enterprises receiving it as a material of effective utilization products or to utilize it for roadbed material or light-weight aggregates, both of which are expected to be relatively in demand.

For effective utilization of molten slag, it is suitable to use it as roadbed material or concrete aggregates.

The following method is suggested as the sludge treatment system of the regional sewerage: in the initial period when there is little sludge generation, a sludge composting facility (used for one series of water treatment) is established, afterwards a sludge incineration and melting (ash melting) facilities are established. By processing sludge up to the melting treatment, sludge amount can be reduced. Moreover, dual effective utilization can be expected at the incineration ash and molten slag phases.

Based on the examination of the sludge treatment system, this research finally proposes a plan for sludge composting, sludge incineration and melting facilities. In addition, for a reference, it also examines the optimal facility scale in a case where an area-wide sludge treatment is required.

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Keywords

effective utilization of sewage sludge, sludge incineration/melting (ash melting)