Research on the evaluation of the performances in manufacturing water penetrative bricks using recycled sewage		
Whole term	2001. 8~ 2002.3	

(Purpose)

The sewage sludge that is increasing in amount, followed by the rapid progress of sewage projects, has to be disposed of after giving a stable treatment. It is one of the most important tasks in sewage-activities, and an effective usage and recycling of energy are required in the viewpoint of sustained environment.

The dewatered sludge generation rate in Osaka City is 260,000m^3 per year and the total amount of it is incinerated to some extent (partly melted) and then, disposed of in landfills. From 1981 to 1984, research to recycle sewage into water penetrative bricks, using the incinerated coal (3 ton/day) in the sludge incinerator mentioned above, dredged particles, pipe- crumbs together with the digested gas as the combusting fuel, was conducted.

Osaka City opened a brick factory in Ohno Sewage Treatment Plant in 1984 to manufacture water penetrative bricks. The records of manufacture have been rising since 1985. This research of evaluating its performances was conducted from 1981 to 1984 as a model project to utilize sewage resources effectively. The objective was to evaluate the performance of the products, the capacity of the facility, and recycling and economical aspects in the manufacturing technology of water penetrative bricks.

(Results)

In 1988, a joint research confirmed the items mentioned below through an evaluation of the performances.

1) The quality of the products was evaluated by two kinds of tests with different combustion times as 20 hours and 27 hours. In addition, in the utilization research including freeze-resistance test (one dimensional freezing test), the result of the performance test of the manufactured penetrative bricks satisfied the performance standard. It was true when the condition of the incinerated ash got worse too.

2) The capacity of the research on the utilization of the manufacturing facility of the water penetrative bricks was confirmed, and environmental impacts such as air pollution, noise pollution and vibration were satisfied with the standards.

3) The mixing ratio needs to be changed in order to utilize the sewage resource because of the variation of the incinerated ash property and that the bricks of 5 Mpa are highly demanded. Thus, the rate of usage might be a little bit decreased.

4) In order to identify the effects on the economical aspects, a test on the restraint caused by the heat island was conducted. It was confirmed that the presence of water made the surface temperature decrease. The other evaluations of economical aspects were such as: (1) restraint on the effective temperature due to the presence of water, (2) restraint caused by the heat island, (3) restraint due to the landfill disposal cost, (4) effects on the effective usage of resources, (5) reduction of greenhouse gas. In conclusion, it could be predicted that CO_2 would decrease over 8 ton-CO_2 because of the restraint caused by the heat island resulting in reduction of the greenhouse gas. If the unit price for CO_2 reduction is established officially, it may contribute to a quantitative economical effect. However, the constraint caused by the landfill disposal cost is also prevailing. According to the results of the quantitative evaluation of economical aspects, the current selling price (￥120) can be changed to ￥190, and therefore the ratio of the benefit to production cost can be increased to 1.0.

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