Research on the evaluation of the performance of the resource recovery as the absorbent clay produced using small scale-direct carbonization of sewage sludge		
Whole term	2001. 4~ 2004.3	

(Purpose)

In Yasuda Town, Nigata Prefecture, dewatered sludge had been disposed of by consigning to a trader since the day the purification center was opened in 1984. However, perpetual stability of sludge treatment was in trouble because of the increase of the cost of disposal by consigning and the problem of ensuring the acquisition of treatment areas. Therefore, an idea of manufacturing absorbent clay pipes that would well match the regional sludge characteristics was to be implemented as an effective treatment method, and the basic investigations were launched. It was confirmed that the carbonized material could be wholly used as the source of the product, and the utilization of this system was the purpose of this research.

The existing technology of the carbonization of sewage sludge focused on the carbon content in the carbonized material, the surface area and the ability to adsorb, and the product was mainly used as a supplemental material for dewatering and as a carbonized deodorant. Finally, it was disposed of as a waste except the cases of being used as a resource of flowerpots and for foundations of tree plantings on slopes. However, the technology of producing absorbent clay pipes, utilizes both organic calories and the condition of volatilization of coal particles.

This study was conducted based on the intermittent operation on small scale (about 200 kg-cake/h). This technology has no desiccation facility to promote the economical construction and operation, and utilizes the widely-used heat-resistant rotary kiln as a carbonizing furnace. Also, a carbonized material was added into the dewatered sludge making it possible to produce homogenous quality clay pipes inducing a variation and control of the water content.

(Results)

1) Sludge dewatering (200 kg/h) was operated regularly without a breakout and trouble.
2) Operational condition of the carbonizing furnace in order to achieve the targeted characteristics of the carbonized material indicated the same result as the research on utilization in 1988.
3) Safety of the carbonized material was expected in terms of purity as 2.0 where the purity of 2.5 was the targeted value for maintenance.
4) An analysis of circumstances indicated that the environmental impact caused by every aspect associated with the facility including the discharged gas was satisfied with regulations.
5) Guidelines for maintenance and operational control such as inspection control, equipment inspection, storage and transportation of the carbonized material were worked out.
6) Total construction cost was almost the same as the predicted cost of the research on utilization.
7) Maintenance cost (fuel + electric power use+ repairing cost + labor cost+ marketing cost) was almost the same as the research on utilization.
8) The whole sludge generated was stably treated and operated safely.
9) Requests by customers (manufacturers of clay pipes) were regularly checked by surveys and the results were applied to the operation of the facility. Until then, the temperature of the carbonization and the control of humidifying water content of the carbonized material and etc. had been corresponded.
10) It was well evaluated for the manufacturer of clay pipes to be able to upgrade the absorbency of the clay pipes and for customers to utilize absorbent clay pipes as a recycled product containing carbonized materials.

(Future task)

Information on this research will be summarized as a document on the evaluation of the

performances and it is expected that this system could be used extensively.

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