

Utilization Technology of Coal Ash produced from Pulverized Coal Firing Boiler as a Hardened Substance for Civil Works

1. Outline of Project

In Japan, utilization of coal ash in the cement industry has almost reached its limit in amount, however, if we developing a new technology on massive utilization of coal ash, we would be able to enlarge effective use of the ashes. At the same time, it is important to develop an environmentally proofed technology to use coal ash, effectively. In this regard, the project intends to develop a massive and effective coal ash utilization technology by manufacturing a high value added hardened substance materials to be used in civil works. In which, a small amount of lime and gypsum is mixed and kneaded with the pulverized coal firing boiler ash and water to make some roadbeds, as well as, back filling materials, etc. It is important to use coal ash effectively in a way free from environmental problems. The technology allows to produce a hardened material with a compressive strength of around 10N/mm^2 (100kg/mm^2) for roadbeds and back filling materials, and another higher value added hardened substance, after increasing the said additives, with compressive strength of 20N/mm^2 (20kg/cm^2) for using as a roadbed improving material.

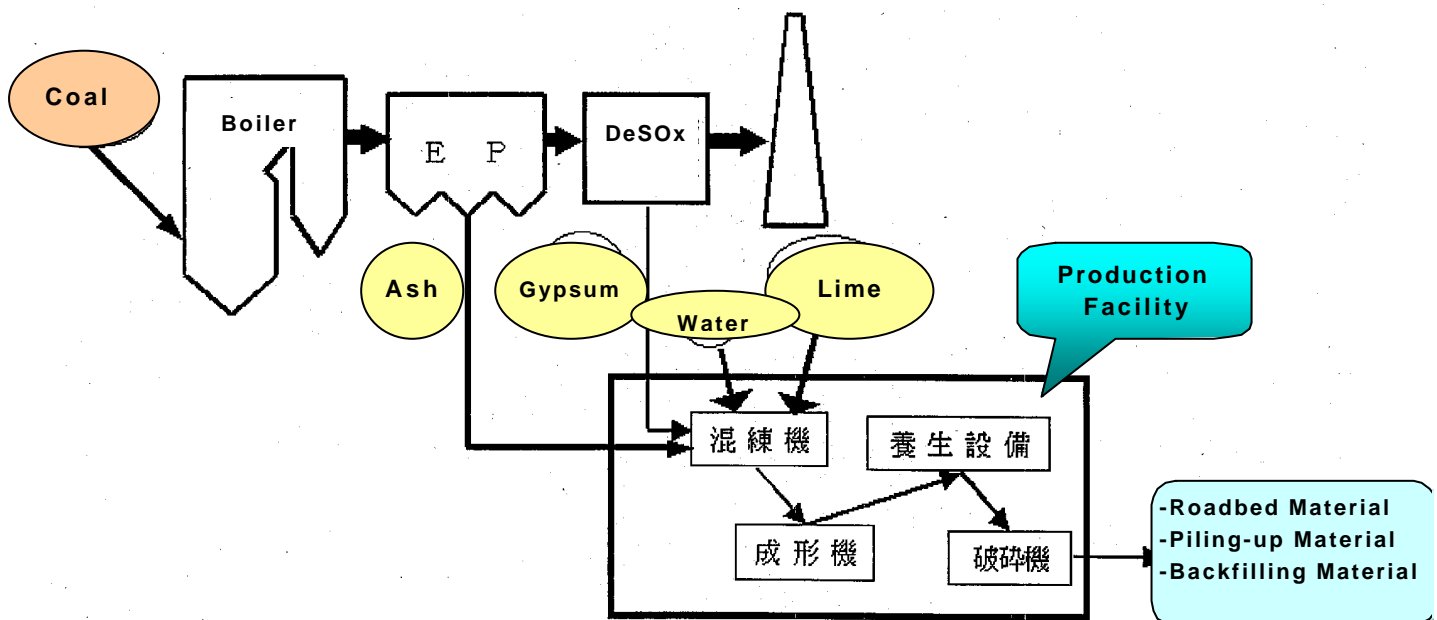


Fig.1 Flow Chart of Production of the Hardened Substance Ballast

2. Results

The technology development has been under implementation with a plan for four years from FY1999 until FY2002, and the results in FY2000 is introduced as follows;

(1) Confirmation of Safety and Storability of the Hardened Substance Ballast

Regarding its long term conservation, it has been proved that **the hardened substance satisfies the Environment Soil standard in running a leaching test on some heavy metals contained in the ballast**, and by splashing water during the long term preservation test to keep it wet all through, **a long term storage has been also confirmed to be practically available.**

(2) Implementation of Laboratory Evaluation Test

The evaluation test of the solidified body as for the road basement material was done based on the manual of Road Pavement Test. And from the results of those tests on grain size, abrasion decrease and corrected CBR, we obtained good prospects on the use of the Hardened Substance for roadbed material.

(3) Implementation of Field Test

Field tests were undertaken both at Gushikawa thermal Power Station of Okinawa Electric Power Co., Inc. and Hitachi Naka thermal Power Station construction site of Tokyo Electric Power Co., Inc. At Gushikawa, the hardened ballast was used as an upper roadbed material, and at Hitachi Naka, it was directly used for the roadbed to ascertain their adaptability, respectively. At both sites, it was found that there had been no problem of workability during construction time and after in-service.

Accordingly **it was confirmed that the hardened substance ballast made of coal ash has necessary and sufficient qualities as a roadbed material.**



Fig.2 Sample of the hardened substance made of coal ash

