System and Process for Producing Construction Materials Using Contaminated Soft Clay and Clay-like Wastes through Geopolymerization

Abstract

The present invention is directed to an intelligent system and method for processing and treating soft clay and clay-like wastes, including freshwater sludge, industrial wastewater treatment sludge, and wet municipal solid waste incineration fly ash. The key issues of handling and treating soft clay and clay-like wastes lie in the high viscosity of soft clay and clay-like wastes and the presence of stones, making mixing or dispersion of such wastes difficult. The process and system disclosed herein employs innovative mixing, geopolymerization, heavy metal stabilization, and microwave curing techniques to transform soft clay and clay-like wastes into construction materials. The system and method are enhanced with the use of artificial intelligence technology to improve effectiveness and efficiency of processing and treatment. Treating soft clay and clay-like wastes according to the process and system described herein enables the person skilled in the art to meet waste disposal or utilization standards, or both. Practical outcomes may include curtailment of environmental contamination, transformation of wastes into resources, space saving, and extension of landfill lifespan.

Figure 1