

Single-step production of Compressed Stabilized Sludge Blocks (CSSB) using sludge from water treatment plants as the sole raw material

ABSTRACT

The utilization of sludge derived from water treatment plants as a viable material in Compressed Stabilized Earth Blocks (CSEB) production has attracted significant interest among researchers mainly due to escalating challenges associated with sludge management, which not only pose environmental concerns but also entail substantial financial burdens. Currently, researchers use sludge only as a substitute of raw materials in CSEB manufacturing processes. However, this approach is not only complicated due to mixing ratio of many raw materials but also not fully minimized the production cost. This paper presents a pioneering approach towards Compressed Stabilized Sludge Blocks (CSSB) production utilizing a single-step method involving sludge as the sole raw material. The sludge sourced from the water treatment plant serves as the primary ingredient, blended solely with cement. Initially, the dried sludge undergoes crushing to achieve the desired particle size. Subsequently, it is evenly mixed with cement and a controlled amount of water to form a homogeneous mixture. The resulting blend is then poured into interlocking brick molds and subjected to automated compression. Following the molding process, the CSSB undergo a curing period, during which they are intermittently sprinkled with water twice daily. Finally, the CSSB are subjected to compressive strength test. Remarkably, the findings reveal that the CSSB produced using this single-step method exhibit strength that comply to standard requirement for building construction. This approach not only presents a straight-forward solution for addressing the challenges associated with sludge but also underscores its potential for sustainable sludge management while yielding multiple financial benefits.