

ADVANCING ECOLOGICAL CONSCIOUSNESS IN THE CONSTRUCTION INDUSTRY: UTILISING ENVIRONMENTALLY SUSTAINABLE BRICKS TO PROMOTE A SUSTAINABLE FUTURE

I.L.M. Sabri^{1*#}, M.H.F. Sabrina², and A.N.F. Thahyeena³

¹Central Engineering Consultancy Bureau, Sri Lanka

²Ministry of Education, Sri Lanka

³South Eastern University of Sri Lanka, Sri Lanka

*Correspondence E-mail: cemsabri@gmail.com, Phone: +94715542212

#Presenting Author

Abstract: The production of conventional bricks has historically been a fundamental aspect of the construction industry. The clay mining in Thaula area of village tanks have some devastating impacts on the sustainability of the tank cascade systems. This study aimed to identify alternative materials that can serve as substitutes for sustainable brick production. This investigation focused on waste materials, including industrial, sludge, coal ash, plastic, and glass wastes. These materials are being studied because of the potential to reduce the environmental impact of brick manufacturing. A comprehensive review was conducted, research from academic journals on sustainable bricks from previous five decades to 2023. An essential component of the study focuses on analysing the proportions of various waste materials in the manufacturing process. The analysis revealed considerable variation in the optimal ratios of waste materials, likely influenced by their distinct chemical compositions. The essential characteristics of these sustainable bricks are their compressive strength and water absorption. The firing methods continue to be the main approach in brick manufacturing. The study also investigates alternative techniques such as calcium-silicate-hydrate (CSH) and geopolymer-based bricks. These alternatives have the capacity to decrease energy usage, thereby aligning with the necessity to diminish the construction sector's carbon footprint. Sustainable bricks have the potential to tackle the urgent environmental concerns associated with the production of traditional bricks. By studying alternative manufacturing techniques, particularly those that eliminate the use of cement or lime in the production of calcium silicate hydrate (CSH) bricks, the sustainability of the brick industry can be further improved. The shift towards integrating sustainable bricks into large-scale industrial operations is a complex undertaking, requiring meticulous deliberation and cooperation among all parties involved. It functions as a vital endeavour that fosters an environmentally conscious and responsible construction sector.

Keywords: Brick manufacturing; Carbon footprint reduction; Environmental impact; Green construction; Sustainable bricks; Waste materials