

# Sustainable utilisation of quarry dust waste in concrete: Strength performance

## Abstract

Each year, a large amount of quarry dust (QD) waste is disposed into landfills. This waste material was obtained as a by-product during the production of aggregates through the crushing process of rocks at the quarry site. The increasing value of waste will have a significant impact on health and the environment. Reusing such wastes by including them into building materials is a practical answer for the pollution problem. Therefore, this research was to observe the possibility of quarry dust to be included in a concrete mix. The quarry dust has been used as a partial replacement for cement proportion at different levels of replacement (25%, 30% and 35%). Quarry dust was used as the main material in this project to measure the effectiveness of concrete performance. In this research, the quarry dust composition was determined by using X-Ray Fluorescence Spectrometer (XRF). From the x-ray fluorescent spectrometry test result, the quarry dust displays some similar characteristics with the Ordinary Portland Cement (OPC) where it comprises a high composition of Calcium Oxide (CaO). Research were done to determine the optimum percentage of quarry dust in concrete. The result shows that 25% of quarry dust and 75% of cement is the best percentage that can be used in concrete mixture to reach the standard strength. From an economic point of view, the proposed optimum concrete mix was found to be the most economical with the reducing of RM 33 per 1 m<sup>3</sup> of the concrete mixture. The results indicated that the quarry dust waste could be utilised as cement replacement to produce durable and resilient concrete. These materials could be an alternative low-cost material for concrete and at the same time provide a new disposal method for the waste.