

Abstract

Greenhouse Gas (GHG) emissions from human anthropogenic activities are significant in climate change, which is currently known around the world. The carbon footprint (CF) is a technique for identifying or quantifying the direct or indirect GHG effects of each individual activity in each process. Sri Lanka contributes 0.08% of GHG emissions from global emissions. The cement industry and construction/manufacturing industries in Sri Lanka are key areas for climate action, which emit 1.84% and 5% respectively.

The most commonly used composite material for construction is concrete, which emits CO₂ equivalents into the atmosphere during raw material production and transport, concrete manufacturing and transportation. Most of the concrete used in construction is produced in concrete ready mixed plants and transported to the construction site. The objective of this study is to estimate the CF of concrete production from cradle to gate. In order to achieve the objective data was collected through questionnaires from staff, project managers, site engineers and workers at the ready mix concrete plant and construction site. GHG emission during the cradle-to-gate of concrete was calculated using the emission factors of each greenhouse gas.

Cement production was the main contributor to the carbon emission in concrete production which emits 0.4128 tons of CO₂-e for one-meter cube of concrete. Though the river sand emits zero carbon during manufacturing it produces considerable amount of carbon during transportation (12.0622 kg of CO₂-e for one-meter cube of concrete). When more developments happen in the country production of cement and transportation of material will be more. It is important to identify the emissions in each activity and stakeholders should make decisions in developing green concept to every construction activity. It is important to find suitable alternatives for cement. Further the contribution due to fossil fuel burn during transportation of materials can be minimize by using different transport mode such as trains and to build ready mix plants in the site itself.