

The life cycle greenhouse gas emissions assessment of a reinforced embankment structure

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Abstract

The increasing emission of greenhouse gases is widely recognized as the main contributor to global warming that people ultimately are aware of. To obtain information of the GHG emission, the product life cycle assessment must be carried out. However, data collection could be a very challenging task for it involves the entire supply chain. And when it comes to defining the system boundary and carbon inventory of a product or process, there are many questions and considerations. Consequently, the complexity to execute the assessment could be a discouragement to applicants.

The concept of carbon footprint is rarely used in civil engineering or geosynthetic materials although there is a need to evaluate the objects by this imperative indicator. The assessment result of one civil engineering object can vary with the construction procedures, construction methods, machinery used and laboring hours, which are not easy to determine. Although geosynthetic materials involves with complex manufacturing procedures, they are designed to construct structures with less impacts to the environment and high energy efficiency. During a construction, the focus is always on the output, but the GHG emission is often ignored to study. Accordingly, this article is to disclose the approach of a verified assessment of a soil reinforced embankment structure with Cradle-to-Grave system boundary in accordance with PAS 2050:2011 and to share the outcome.

Keywords: geosynthetic materials, greenhouse gas, carbon footprint, PAS 2050:2011