Tensar Carbon Calculator Assumptions – Based on International Carbon Calculator V4.0

Introduction

The Tensar Carbon Footprint Calculator estimates the percentage carbon saving available by using a Tensar Mechanically Stabilised Layer (MSL) incorporating Tensar TriAx geogrid(s) for ground stabilisation when compared with the construction of a non-stabilised granular layer of equivalent performance. This saving is due to the use of the Tensar MSL enabling a reduced thickness of aggregate to be used in the construction.

The Tensar Carbon Calculator is not a design tool per se. It has been developed to complement Tensar Application Suggestions generated using the "Ground Stabilisation" module in Tensar's bespoke TensarPave software with information on the carbon emissions associated with Tensar MSL and non-stabilised ground stabilisation solutions, respectively. It is important to emphasise that the calculator is intended for use only in conjunction with Application Suggestions generated using the Ground Stabilisation method.

Coffey Geotechnics was commissioned by Tensar International to develop the Carbon Calculator.

Methodology

The calculator follows the Publically Available Specification 2050 – Assessing the life cycle greenhouse gas emissions of goods and services (PAS 2050:2011). The calculation of carbon savings considers and compares a mechanically stabilised solution and an associated non-stabilised solution for a given set of input parameters. The boundaries of the calculation are:

i)   the embodied carbon within construction materials at their respective 'factory gates',
ii)   the delivery of materials to site, and
iii)   completion of construction of the stabilisation works.

Assumptions

The Tensar Carbon Footprint Calculator is based on the following assumptions:

General
- The user has a Tensar Application Suggestion for a stabilisation scheme, which provides the MSL thickness, the number of layers of TriAx geogrid required and the strength of the subgrade.
- Carbon emissions data are based on TriAx TX150, TX160, TX170 and TX190L.
- The equivalent non-stabilised thickness is calculated based on the input data.
- The online carbon calculator assumes that deformation due to trafficking is limited to 40mm in accordance with TRL Laboratory Report 1132.

Construction
- Carbon emissions for the construction of stabilised and non-stabilised layers are calculated separately and the percentage difference is presented to the user.
- TriAx is delivered from the Tensar plant in Blackburn, UK, or Wuhan, China, to the site location chosen by the user (outward journey only).
- Quarried aggregate is delivered to the site from a quarry at a distance specified by the user (outward and return journey).
- Quarried aggregate is compacted in accordance with HA SHW Series 600 Table 6/1 and Table 6/4.

Materials
- Embodied carbon in quarried aggregate is taken to be in accordance with University of Bath Inventory of Carbon and Energy (2011).
- Embodied carbon in the TriAx is calculated in accordance with PAS 2050:2011, including embodied carbon of polypropylene (100 year equivalent) in accordance with Plastics Europe Eco-profiles (2005).
- Embodied carbon and conversion factors for fuel consumptions and efficiencies are in accordance with Defra Conversion Factors (2012).
- Embodied carbon for container ship transportation and aggregate properties are in accordance with the Aggregain (WRAP) CO_2 Emissions Estimator Tool (2010).