TO WHOM IT MAY CONCERN

25/08/2020
REF: DAR0820-2

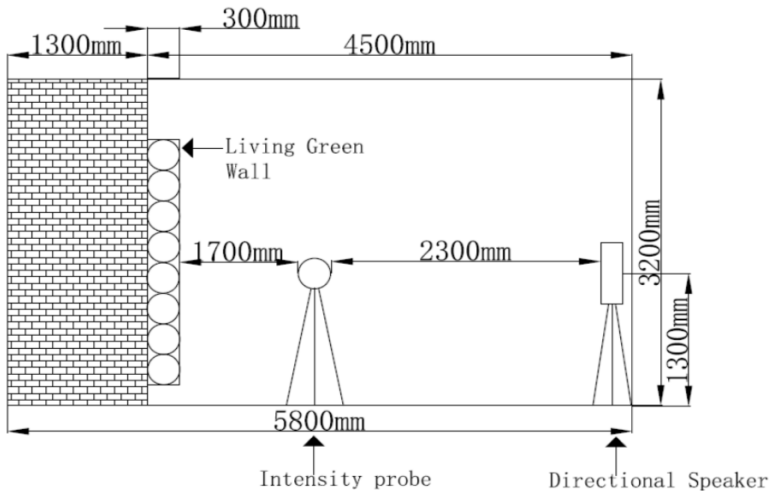
Acoustics Test and Carbon Footprint Simulation Result Report

Fytotextile Living wall system by Terapia Urbana and Scotscape Smartscape Limited

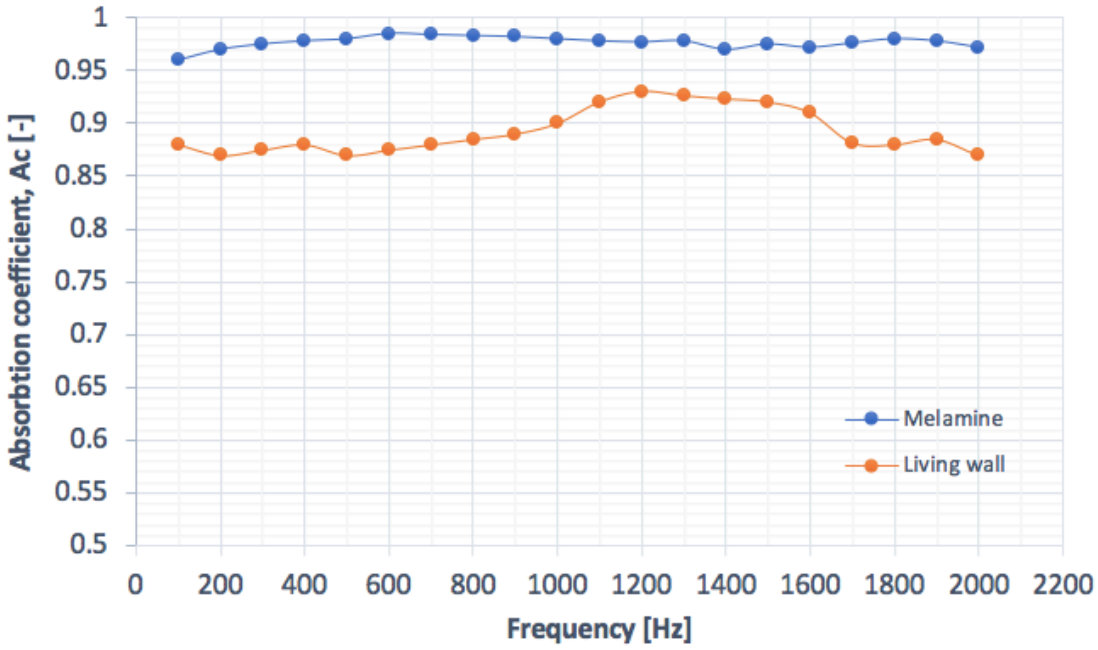
1. Acoustics Test Results

Specimen Living wall was of 2500 x 2500 mm in size was based at University of Greenwich, Medway Campus Laboratory, see image below. The selection of plants as seen from the image was random, however represented a diverse plant morphology, where such parameters have been considered: length, width, thickness and coverage area of leaves, flowers and stems. The wall has been controlled to have soil moisture content of around 10%. A parametric transducer method to measure sound absorption of the specimen wall was used as per [1].

The transducer (intensity probe) was set at a 1.3m height from the ground and 1.7m away from the Living wall centre. The directional speaker was emitting the sinusoidal chirp sound, 10Hz – 20kHz, and was set 2.3m away from the transducer (intensity probe), as seen below. The tests have been executed at a 90-degree angle towards the Living wall.



The results of the acoustic sound test for the Melamine (reference acoustic absorbent material) and the Living wall are seen below. Absorbtion coefficient of 1 indicates 100% of sound absorbtion in reference frequency.



[1] Romanova A, Horoshenkov KV, Hurrell A (2019) 'An application of a parametric transducer to measure acoustic absorption of a living green wall'. Journal of Applied Acoustics, Elsevier, 145, pp. 89-97.

2. Carbon Footprint Simulation Results

For the identification and measurement of transportation related carbon emission, the GHG protocol was followed [1]. The GHG Protocol is developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). It is a widely used framework for accounting carbon emissions. In this case study, activity-based calculation methodology was adopted, which depends on deriving the carbon emissions from activity information using conversion factors. These factors are calculated ratios that relate the quantity of a pollutant released to the atmosphere by activity occurrence [2]. The activity-based calculation is a commonly used approach to calculate carbon emissions [3].

The studied typical sample wall is 17 m^2 and it has been constructed in Webber Street, close to the Waterloo station, London, in 2015.

Total Emission per Module transportation cycle was calculated at 5.69 kg CO_2e.

The repay period [4] of the studied LGW, which is 17 m^2 (size), is 3.36 years.

The repay period is the number of years that is needed by a Living wall to cover for its transportation related Green House Emission.

Living wall can capture substantial quantities of atmospheric carbon dioxide with up to 49 g CO2/h [5]. This means that 1m^2 of Living wall can capture 12.25 g CO2/h, 0.294 kg CO2/day, and 107.31 kg CO2/year. Such, the case study's Living wall size (17 m^2) can capture 208.25 g CO2/h, 4.998 kg CO2/day, and 1824.27 kg CO2/year.

[1] World Resourses Institute, "Greenhouse Gas Protocol." [Online]. Available: https://ghgprotocol.org/. [Accessed: 19-Jul-2019].

[2] T. Boukherroub, Y. Bouchery, C. J. Corbett, J. C. Fransoo, and T. Tan, "Carbon Footprinting in Supply Chains," in Springer Series in Supply Chain Management, vol. 4, Springer, Cham, 2017, pp. 43–64.

[3] DEFRA, "Guidance on how to measure and report your greenhouse gas emissions," 2009.

[4] C. H. W. Foster, "Forests in Time: The Environmental Consequences of 1,000 Years of Change in New England (review)," J. Interdiscip. Hist., vol. 36, no. 2, pp. 270–271, 2005.

[5] F. M. Torpy Zavattaro and P. Irga, "Assessing The Air Quality Remediation Capacity Of The Junglefy Breathing Wall Modular Plant Wall System," 2015.

End of the Report

Kind regards

Dr Anna Romanova (BEng, PhD, SFHEA, MInstLM)
Associate Professor, Engineering Management and IT Portfolio Leader
Faculty of Engineering and Science, Medway Campus, University of Greenwich
Pembroke P206, Central Avenue, Chatham Maritime, ME4 4TB, Kent, UK
Telephone: +44(0)1634883306 | **Email:** A.Romanova@greenwich.ac.uk