Project Materiality Assessment To Increase Lower Impact Building Materials Usage

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Abstract

This paper proposes a technique for the early assessment of the suitability of construction projects to be built using lower-impact building materials (LIBM) such as straw bales and rammed earth. The assessment takes key data from the project's brief and sustainability aspirations to assess the appropriateness for the use of LIBM. The technique also addresses how different LIBM would affect the buildability of the project on site and identifies sector-specific drivers for the use of LIBM.

This paper provides an overview on the effect the use of LIBM has on potential project geometries and procurement processes. In addition, themes on knowledge, empowerment, and responsibility concerning sustainability within the built environment are also explored.

This work is the development of academic research into the challenges associated with the systematic consideration of embodied impacts and the adoption of LIBM within the UK construction industry.

Keywords: materials; low impact; sustainability; adoption; behaviour; concept design;

1 Background

Construction activities use large quantities of non-renewable resources and water [1], produce pollution in the form of toxic emissions [2], and create large quantities of waste [3]. The activities also contribute significantly to climate change through greenhouse gas emissions [4]. The greenhouse gas emissions can be broadly categorised into those created through the operation of the building during its working life, 'operational carbon emissions'; and those associated with the creation, maintenance, and disposal of the building products used, 'embodied carbon emissions'. The importance of the embodied carbon emissions will increase as we move towards a lower carbon energy supply through renewable energy incentives [5,6].

U.K. based professional associations such as the Institution of Civil Engineers, Chartered Institution of Building Services Engineers and Royal Institute of British Architects all promote the protection of the environment within their 'Code of Professional Conduct' documents:

- "*Promote the principles of sustainability and seek to prevent the avoidable adverse impact on the environment and Society*" [7]
- "*Honesty, integrity and competency, as well as concern for others and for the environment, are the foundations of the*

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