How Procurement Connects to the Uptake of bio-OSM

Transforming Timber

CONTENTS

OVERVIEW

The UK Government has recognised the importance of the construction sector in achieving net-zero emissions. However, to deliver high energy performance buildings, the construction industry needs to adapt to reduce carbon emissions generated by operational and embodied energy. Further improvements will also be required to both Building Regulations and the procurement process. Within this context, the Transforming Timber project aims to promote homegrown biogenic offsite manufacturing (bio-OSM), a form of construction that utilises naturally renewable resources.

The UK is the second largest net importer of forest products after China. This fact shows both how vulnerable the UK is to external factors affecting the timber supply chain as well as the environmental consequences of transporting these products. Therefore, the development and application of homegrown products like bio-OSM could be transformative in encouraging growth, innovation, and sustainability in the construction sector.

In order to facilitate and mainstream the use of homegrown bio-OSM, it needs to be compatible with established procurement methods. This summary of two research studies provides an analysis of current practices and key features underpinning different UK procurement models and their implications for bio-OSM. Through a review of academic journals, industry reports, expert interviews, and stakeholder workshops, the key procurement risks for homegrown bio-OSM have been identified, and recommendations for mitigating those risks and promoting the use of bio-OSM have been provided.

THE STATE OF PROCUREMENT

The standard procurement process can be assessed by the criteria of cost, time, quality, and compliance with building regulations. Additional criteria relating to sustainability is sometimes added at the discretion of the client. Data relating to these criteria was reviewed to provide a picture of how they relate to and are influenced by different procurement models. This information is crucial for shifting the approach to procurement so that the benefits of bio-OSM can be recognised.

Findings show that over the 15-year period between 2003 and 2018, overall cost forecasts for construction projects are less than 70% accurate, and indeed the accuracy of forecasting design-stage costs has not significantly improved during this time. And while the accuracy of forecasts for the overall allocation of time needed to complete a project improved during the same period, the time estimates for the design and construction phases are similar in 2018 to what they were in 2003 despite the introduction of new technologies. Data provided by Constructing Excellence shows that there have been no significant improvements with client satisfaction as measured by value for money during the same 15-year period. Key environmental indicators improved overall, but water consumption has remained stable while energy consumption was significantly higher in 2018 than in 2003. There is clearly room for improvement in all these areas, and bio-OSM's emphasis on homegrown timber products, factory systems, and digital processes could help. But clients, designers, and construction professionals must understand how procurement methods influence the adoption of bio-OSM.

PROCUREMENT MODELS AND BIO-OSM

Five procurement models were reviewed and then analysed in the context of bio-OSM: Design & Build, Traditional, Social Value Model, Growth Balanced Scorecard, and Integrated Project Insurance (IPI) designed by Integrated Project Initiatives Ltd in conjunction with brokers Griffiths & Armour. Complete details of the SWOT analyses can be found in the full reports, but the overall picture reveals some problematic features of the two most commonly used procurement methods, Design & Build and Traditional, and some potential limitations of the Social Value Model and the Growth Balanced Scorecard. Key findings from interviews with industry experts reveal the potential of the IPI model to facilitate the uptake of bio-OSM through its focus on skill, capability, and behaviour as opposed to cost. A side-by-side comparison of the Traditional model and the IPI Model can be found in the full report on future procurement strategy, alongside testimonies about successful experience using IPInitiatives.

The critical difference with IPI is that it is not just a procurement model; it is a procurement process that is completely backed up and supported by an alliance contract. The alliance means that the entire team is responsible for design, delivery, and cost, and the supply chain and deliverers are involved. IPI also emphasizes early and frequent collaboration between designers and manufacturers, which was found to be lacking in the Traditional and Design & Build models. For these and other reasons, IPI is seen by some industry experts as being capable of overcoming other problems associated with established procurement methods. Interviewees reported that IPI is a good strategy for creating an alliance, encouraging collaboration and innovation, and managing risks, and for this reason is more suitable for projects using mass timber and OSM. However, experts felt that IPI is less appropriate for projects of less than £10 million, with private sector and complex projects seeing as the most suitable. Any shift towards homegrown bio-OSM for construction must be driven by the client, in terms of their brief and specification. Nonetheless, clients, especially public bodies, appear to be indecisive with regard to the best strategy for reducing the carbon emissions associated to the construction industry.

OVERCOMING CHALLENGES

Several key challenges exist related to procurement and homegrown bio-OSM. These can be categorized as:

- A requirement to manage procurement risks, such as meeting transparency, equity, and non-discriminatory requirements, or risks related to contracts, payments, warranty, or liability;
- The need to develop long term relationships, which create alliances, encourage collaboration, and share knowledge;
- A lack of expertise, whether related to client/public knowledge of mass timber/OSM or to construction sector skills in BIM and other technologies related to the use of bio-OSM;
- The incomplete evaluation of environmental benefits of bio-OSM such as using local resources or exceeding minimum standards.

Some initial steps to overcome these challenges can be taken. For instance, the use of homegrown bio-OSM can be specifically requested during the procurement process if the project can demonstrate certain educational objectives or if the project intends to promote local forest areas. However, cost remains the primary driver in procurement. This ethos results in a situation where contractors are primarily focussed on completing works at the lowest possible cost. An alternative approach is to consider ‘whole life costing’, as opposed to the initial, upfront cost. Life cycle cost (LCC) analysis takes into consideration the total cost over the asset lifetime, and includes factors such as initial costs, maintenance and adaptation costs, and end of life costs. A similar, related concept is the life cycle assessment (LCA). LCA is a technique to assess environmental impacts associated with all the stages of a product's life, from raw material extraction and material processing to manufacture, distribution, and use.

In addition, standard procurement processes that encourage the transfer of risk and responsibility could be avoided since these are seen as precluding the participation of SMEs, and consequently manufacturers of homegrown bio-OSM. Instead, a more collaborative approach should be adopted where risk is shared and dialogue is enhanced. IPI is therefore a good procurement strategy for promoting bio-OSM since it creates an alliance between all stakeholders, encourages collaboration and innovation between them, and insures all parties against risk.

Further recommendations to overcome these challenges include:

- Establishing strong, long-term alliances between public sector bodies and manufacturers of homegrown bio-OSM;
- Supporting the acceptance of non-standard procurement methods through knowledge exchange and skills development;
- Standardising and mainstreaming LCC and LCA methodologies and further developing these through education and research;
- Identifying and documenting case studies where innovative procurement models have been adopted that overcome common problems and support local economic growth.

CONCLUSIONS

While the construction industry is ready to embrace sustainability and collaboration as a means to reduce carbon emissions and mitigate climate change, the move towards homegrown bio-OSM is undermined by several factors, including:

- A lack of understanding. Key concepts such as operational and embodied carbon are misunderstood, particularly by clients.
- The exposure to risk limits the opportunity for collaborative practices, and stifles innovation.
- Cost, and value for money, are the key drivers - despite the inaccuracy of initial costings, which often result in additional costs and delays.

The purpose of the studies summarized here was to investigate how the procurement process could help promote the use of homegrown bio-OSM products in the UK. Findings show that despite the introduction of criteria to promote social value in the procurement process to support local economies and foster innovation, the need for further, fundamental changes to the procurement process is evident.

Procurement has traditionally been driven by one overriding consideration: Value for money. However, standard procedures fail to account for additional costs that occur over the life of an asset. More sophisticated techniques, such as LCC and LCA, calculate these long-term costs and allow the client to make a more informed decision. A procurement model to promote homegrown bio-OSM should adopt some of the key features of the IPI model.

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