

Developing Timber Frame Construction Methods for a Sustainable Future

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Timber Frame construction methods have emerged as a strong approach in domestic construction in Ireland. Environmental performance, improvement in energy performance and improving quality of life are common terms raised during discussion of domestic construction. This research project focuses on timber frame construction industry both in Ireland and abroad in an attempt to contribute to better practice. The primary aim of the research is to explore and investigate timber frame processes and offer a framework as a viable and effective method of domestic construction. In recent times there has been a large emphasis placed on improving the construction methods used in traditional dwellings. The rise in popularity of the 'Passive House' construction method has begun to impact positively on the housing market in Ireland with a move away from traditional in-situ block and brick built houses to pre-fabricated, factory controlled panel models is happening. Reasons for this change include, paying particular attention to the space heating energy requirements, the air tight capabilities of the structure and the overall sustainability of the dwelling. Building on the research aim, objectives for the research include comparing the heat loss data of the various construction methods used involving concrete, block, steel and timber frame built dwellings. It is also proposed to analyse the method of timber frame construction, particularly in the closed panel sector and assess its suitability for the Irish market and beyond. This specifically relates to improving the jointing method between closed panels in order to advance airtight capabilities in this area. A further objective is to assess the attitude and prejudices relating to timber frame construction in society. This will be achieved by obtaining opinion through interview and surveys of industry professionals and the general public. This data, coupled with research in areas such as cost, quality control, fire control and the aforementioned energy performance, will determine where timber frame currently is in the scope of the construction industry and how it has to go to be at the forefront. The research is at a preliminary stage however, initial research design and strategy has been investigated and prepared. The methodological approach will be a pragmatic mixed modal design where the strict research practices will be applied. Applying a mixed method approach allows for both quantitative and qualitative methods to be used at this early phase and is essential for establishing a solid foundation as the research can cover a large area before refining a suitable line of investigation. The research described deals primarily with the built environment and the hope of possible action on research results. With this philosophy in mind, a pragmatic approach will also be adopted during the course of research as findings will be practical in nature. The preliminary findings identify the improvements in connection design and detailing between closed framed timber wall panels and roof members respectively. The results, while tested on a small scale recommend that the proposed improvements be created for further testing in an environment that will produce data to support the adoption into mainstream timber frame construction. This line of research, coupled with the outlined methodology, offers timber frame construction as a sustainable future industry standard.

Key Words: Timber frame construction, sustainability, connection details