



Prefabricating Solutions

Prefabricated housing is suitable for delivering social and affordable homes in Ireland according to construction industry experts

There is currently significant demand for social and affordable housing in Ireland. Prefabricated off-site methods of construction have been proposed as the solution for delivering housing on a large scale. Last year, the Dublin local authorities hosted the Modular Housing Demonstration Project, where a range of housing units were presented. As part of the Rebuilding Ireland Action Plan, the Rapid-Build Housing Programme is being implemented to help with the problem of limited social housing supply. According to the Action Plan, the prefabricated units employed will have 50 to 60-year lifespans. A total of 1,500 rapid-delivery units are planned to be delivered by 2018. In the past, we have used precast units and timber frame housing to deliver homes in Ireland. Prefabricated housing is not new, although it is often branded as 'new' it has been used to deliver homes in Britain and its colonies for centuries. Prefabricated housing is common in mainstream construction in Continental Europe and Japan.

In Britain, there has been scepticism of non-traditional housing in the past due to the poor quality of some methods built during the Post-World War 2 housing crisis and the media attention received; however, Britain is once again turning to prefabricated methods to solve its housing shortage. Some of the scepticism and generalisations of prefabricated housing reached the Irish Construction Industry over past decades. Irish building magazine spoke to industry experts to get their views on the

suitability of prefabricated housing for delivering social and affordable homes in Ireland. Their response was positive and favourable.

John O'Mahony



There are different concepts, terms, and definitions attributed to off-site methods of construction: mass production, industrialisation, industrialised building systems, modularisation, prefabrication, off-site manufacturing, volumetric housing, and modern methods of construction. Regardless of classifications, systemised buildings or

industrialised building systems, the essence of off-site construction is best represented by prefabrication. Building has always been associated with prefabrication, with prefabricated components being incorporated into what is known as traditional construction.

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John O'Mahony, Vice President of the **Royal Institute of Architects** of Ireland, gave us his views on prefabricated housing. John said, "Prefabricated housing is suitable for building all forms of housing. If you look at the cost of prefabrication compared to traditional build housing, prefabricated housing is probably 25% more expensive than traditional building methods but saving on time on your programme more than compensates. When you add in the benefits of snag-free, factory quality assembly and finishing and safer, cleaner sites the advantages are considerable. If you see the costs of the emergency housing the Minister Alan Kelly built before Christmas and the prices being quoted, the build cost is high, but there you were asking for housing 'straight off the shelf'. No lead in time, it was obviously going to cost more."

Pre-Fab Housing

"My practice has used prefabrication methodologies for years on housing. I visited Finland to view developments and I saw how they use prefabrication for low-rise as well as high-rise housing. It is particularly appropriate in Northern Europe as winters are cold and daylight is short. Prefabrication has a long history and there are many typologies and a variety of technologies. You have a wide selection of formats and there are numerous tried and tested methodologies for building prefabricated housing."

John stressed the need for volume and he also emphasised the need for detailed planning and organisation at the design stage to take full advantage of prefabricated construction formats: "It is a terrific method of building, but you need to have volume, a minimum of 50 units, to take advantage of economies of scale and you need to manage the costs. Prefabricated construction is not new in Ireland. Many developments during the building boom in the last decade used prefabricated elements such as tunnel form construction, precast concrete loadbearing panels. Timber frame, bathroom and kitchen pods etc., so prefabrication and modular is nothing new to the Irish Construction Industry. An added advantage with prefabrication is the ease in achieving air tightness standards associated with new energy regulations"

Dublin City Council is the largest social housing provider and landlord in the state with a housing stock of approximately 25,000 units. Dublin City Architect, Ali Grehan gave us her views on prefabricated housing. Ali said, "Rapid delivery construction methods are already employed to varying extents in the construction industry. Many building elements may be fabricated off-site, and in terms of residential development, may include structural elements and products such as floor slabs and cassettes, wall frames and wall panels, roof trusses and stairs, kitchen and bathroom pods, balconies etc. Prefabricated modular housing systems (volumetric and flat pack systems) were introduced relatively recently in Ireland, but have generally only been used for standalone houses."



Ali Grehan



Poppintree

Speaking of Dublin City Council's prefabricated housing projects, Ali said, "We're actively exploring the use of rapid delivery / system building / prefabricated / off-site construction methods for the design, procurement and construction of homes. We've completed a pilot project in Poppintree, which was 'rapid build', but in terms of construction was a mixture of traditional and prefabrication, and are close to signing contracts for four more small developments around the city. However, these are all two-storey terraced houses, not apartments. We're now looking at how we can apply system building to high-density residential projects, including apartments for family housing, older people, homeless hostels etc."

Speaking of prefabricated housing's suitability and quality, she said, "Of course system-built homes are suitable for public housing. Done properly, the process delivers buildings that are constructed to a very high quality, within a fast timeframe and with the least possible disruption for adjoining residents and businesses, which is particularly useful in tight urban sites. This, in turn, delivers homes that are more affordable. However, it's arguable that even more design investment is needed than for traditional methods. We're talking about precision engineering so the prototype has to be perfected before the homes go into 'production'. Above all, we have to remember that the construction approach is just one part of the process. We still have to allow ourselves time to design the homes and development overall, so that it sits comfortably with its neighbours, has well considered public and private spaces and meets the residents' needs. We shouldn't lose sight of that."

Having undertaken significant research on housing, Dr Derek Sinnott, Head of Department of the Built Environment at Waterford Institute of Technology, said "Legacy buildings which were poorly designed and constructed have resulted in conflicting anecdotal evidence relating to prefabricated housing. This has engendered negative attitudinal behaviour which blames the process of prefabrication rather than the particular products. However, regulatory requirements

relating to sustainability, energy efficiency, product quality and quality control means that contemporary practice bears little resemblance to the past. Technologies have continuously improved and we can benchmark against a number of successful cases of prefabricated social housing throughout Europe."

Dr Derek Sinnott



"Prefabrication techniques where BIM models link intelligently with precision machines ensures a value added lean manufacturing process, with efficient material usage and minimal waste. These quality controlled environments, with rigorous checks and testing, can surpass what is achievable in traditional construction."

In Britain, The National Housing Taskforce was established to develop clear, workable proposals for both Government and industry to address the housing shortage. The Chartered Institute of Building (CIOB) is responsible for the work-stream: "Skills, Materials and New Technology" and will report to the Taskforce on this. Last August, the CIOB launched a call for evidence into skills, materials and new technology in the housing sector. The CIOB is interested in the use of prefabricated housing, under the terms "off-site manufacture" and "modern methods of construction", due to the efficiencies it could deliver. Dr Samantha Organ, Senior Lecturer in Building Surveying at The University of the West of England, having recently researched the evolution of prefabricated housing in Britain, said, "Modern prefabricated housing has increasingly been seen as a solution to not just social and affordable housing, but also as being able to deliver low energy solutions. It is essential that this form of construction is carefully designed and erected on site to be an effective, long-lasting solution, and to contribute to the wider debates around the demand, affordability, and sustainability of our housing."

With the development of prefabricated systems and technologies, savings in on-site time and cost, and the housing shortages of recent years, prefabrication is due to play a big part in delivering social and affordable housing in Ireland, and Britain, in the near future. ■