

Housing mmc construction essay



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Introduction

Modern Methods of construction (MMC) consist of a range of techniques aimed at improving efficiency in construction.

There is currently a serious shortage of homes in the UK. Mainly as a result of too few homes for sale being built, prices have been forced up to unaffordable levels. It is not possible for many people on average incomes to buy even a cheaper home.

The shortage of homes for rent is causing still greater problems for people on low incomes. Housing waiting lists have lengthened, resulting in more overcrowding and sharing and more homeless families than ever in temporary accommodation.

There is an urgent need for new homes – to make it possible for young families to buy a home, for essential workers in key public services to be able to afford somewhere to live, and for people on low incomes to have a home to rent.

The government are looking to MMC to solve this problem by creating affordable homes quickly, and in 2004 set targets to add an extra 120 000 homes to the housing stock every year for the next ten years. The government's social housing funding body, The Housing Cooperation, has set a target that at least 25% of every new social housing development has to be built using MMC techniques.

A shortage of housing in the UK however is by no means a new problem. We've been in similar situations before, and looked for similar answers. Many solutions of the past have, in the long-term, failed.

The idea that Modern Methods of Construction could address a low cost housing issue has been used before.

Shortly after the First World War and the passing of a series of housing acts from 1919 the government became concerned at the high cost of 'working class' housing. In 1924 a committee on New Methods of House Construction (Later to become Modern Methods of construction (MMC)) was set up which produced a series of reports, which among other things recommended that they wanted to see 'what may be called factory production of houses'

In the middle of the Second World War, a mission sent to study systems in America urged the wholesale reorganisation of the British building industry; among many other specific points it recommended

- Simplification of building design for greater standardisation and mechanisation of constructional work
- Much more use of factory produced units and assemblies

55 years later in 1998, Egan, in his report 'Rethinking Construction', recommended exactly the same change of direction. So what went wrong? And has the industry yet listened?

Modern methods of Construction is the government's initiative to push firms to look for new technologies as well as the government doing its own research, this is clearly a big problem.

The Office of the Deputy Prime Minister defines modern methods of construction as a process to produce more, better quality homes in less time. The Office of the Deputy Prime Minister also offers grants to firms to help them develop new methods, yet despite all this, there is still a problem. The UK is, again, in the middle of a housing crisis.

The Housing crisis

Merseyside housing renewal bosses are considering the use of flat pack Boklok housing to try to solve the problem of affordable housing in Merseyside which is of particular interest to me as it is in this area, my immediate concern with this project is whether the housing will actually be 'affordable'

House factory - there are currently over 30 house factories in the UK, I will look at Westbury Homes Space4 factory near Birmingham which opened in 2001 Onsite house factory.

Despite there being many house factories in the UK none of them are quite the same as the on-site house factories being used in the US, I plan to see if these types of factories could be used in the UK

Problems in the past - quality has always suffered, aesthetics too

Modern Methods of Construction (MMC)

The Office of the Deputy Prime Minister defines modern methods of construction as a process to produce more, better quality homes in less time.

Post war pre fabricated housing failure

There is a current housing crisis

Volumetric: involves the manufacture of three-dimensional units in factory conditions for delivery to Site. Some units are delivered with all internal and external finishes and services installed.

Panellised: Flat panel units are produced in a factory and assembled on site. These may be ‘ open’ panels or frames to which services, insulation and internal and external cladding is fixed on site, of fully-furnished panels containing more factory fabrication.

Hybrid: A combination of panellised and volumetric units typically with more highly serviced and repeatable elements (such as bathrooms) supplied as ‘ pods’.

Subassemblies and components: Construction methods that incorporate factory-made subassemblies, such as floor cassettes or precise concrete foundations, within otherwise traditional structures can also be classified as MMC.

Non-off-site: Not all MMC’s are factory based. Some, such as those employing lightweight concrete and ‘ thin-joint’ mortar construction, are site based.

Prefabricated housing has been used in the UK during periods of high demand, such as after the world wars and during the slum clearances of the 1960s. In total about 1 million prefabricated homes were built during the 20th century, many of which were designed to be temporary. However,

problems arose over the quality of building materials and poor workmanship, leading to negative public attitudes towards prefabrication.

In Japan 40% of new housing uses MMC. In other European countries there is also much greater use of MMC, particularly in Scandinavia and Germany. Indeed, some house building companies in Europe have started to export their houses to the UK

The reasons for greater use of MMC in these countries are uncertain, but suggestions have included: 3

- In colder climates the building season is short due to bad weather
- Use of MMC allows quick construction.
- MMC building materials, such as timber, are more readily available.
- There is a greater tradition of self build housing. MMC appeals because faster construction reduces disruption to neighbours and allows earlier occupancy.
- There are cultural preferences for certain house styles, e. g. timber frame in Scandinavia.

Issues surrounding MMC

While the Government is keen to encourage use of MMC for house building, research is still ongoing to assess its benefits. Issues arise over the cost of MMC; the industry capacity; its environmental benefits; the quality of such housing; public acceptance; and planning and building regulations. These questions are considered below.

Cost

Although some house builders argue that MMC is less expensive than traditional methods, industry sources indicate increased costs of around 7-10%. Reasons for the higher costs are difficult to discern because most project financial information is commercially confidential, and traditional masonry building costs vary widely too. It may be that the costs appear high because some benefits of using MMC, such as better quality housing and fewer accidents, are not obviously reflected in project accounts.

MMC housing is faster to build, reducing on-site construction time by up to 50%, and thus reducing labour costs. Quicker construction is an extra benefit for builders of apartments (because viewing often starts only once all flats are finished), and for Housing Associations, who receive rent earlier.

However, it is less important for private house builders as they rarely sell all the properties on a new development at once. An additional consideration is that the majority of factory overhead costs, e. g. labour, are fixed regardless of output. In contrast, site-based construction costs are only incurred if building is taking place. It is therefore less easy with MMC to respond to fluctuating demand.

Industry capacity

Industry capacity may be a barrier to increasing the number of houses built using MMC. Difficulties fall into two categories: a shortage of skills, and the factory capacity to manufacture parts.

Revisions to the Building Regulations

Building Regulations have been a major influence in the design specification for housing. They have been used by the Government to drive up standards and as the need for more sustainable buildings has increased, two of the regulations have been significantly revised which has had a large impact on construction methods.

- Part L is concerned with the conservation of fuel and power.
- Part E is concerned with resistance to the passage of sound, which is becoming more important as dwelling densities increase.

It is not just the improvement in the standards themselves that is exercising the minds of builders but that some aspects of the building's performance (i. e. air tightness and sound resistance) will now be tested post construction. If the building falls short, expensive remedial work will have to be carried out.

Building performance in these areas is not just dependent on design detail, but also on the repeatability and consistency of good quality construction, aspects that lend themselves to the use of MMC.

Barriers to the use of MMC in housing

In a major survey of the top 100 house builders[8], the following factors were identified as being significant barriers to the introduction of MMC. They are summarised in Box 3 and discussed below in order of importance.

Capital costs

MMC are perceived as being more expensive than traditional methods with economies of scale being hard to achieve. 68% of housebuilders said that this was a barrier to the introduction of MMC. The National Audit Office (NAO)

[9] reported that, for Registered Social Landlords (RSLs), open panel systems had a similar cost to traditional methods, but that hybrid and volumetric methods were slightly more expensive. To come to this conclusion, they took into account the following advantages: earlier rental income streams, the Social Housing Grant being drawn down earlier (thereby reducing borrowing and interest payments), reduced defects and reduced inspection. Some of these advantages would also benefit private developers.

The NAO estimated that as the market matured the cost of building elements could be reduced by 15% which would close the gap in costs between traditional build and volumetric/hybrid MMC. This appears obtainable, but is more likely to occur if developers and RSLs partner with manufacturers so that they can have the assurance of the long-term viability of the MMC market. This will enable investment in finding ways of reducing costs through product and process development.

Costs to the developer are also likely to reduce over time as developers become more familiar with MMC and are able to increase the efficiency of on-site trades as a result.

Concern over interfaces

This covers the interfaces (joints) of MMC to traditional build (eg how to fit roof trusses to a steel-frame house) and between different MMC systems (eg between a steel-frame house and a panellised timber-roof systems). This is a genuine concern that must be dealt with head-on. There are of course no reasons why interfaces should be more difficult than with traditional

construction techniques. They are merely different and this needs to be planned for.

Early design freeze

MMC does require an early design freeze (when the details of the dwelling are set and cannot be altered) in comparison with traditional build. The timing of the design freeze will depend on the manufacturer's lead times and this is in part to do with manufacturing capacity. Although MMC providers should do all that they can to minimise their lead times and to build in flexibility, it is likely that users will always experience this problem to some extent.

Planning

The constraint of planning on MMC may be perceived rather than actual. Planners, quite rightly, are keen to make sure that neighbourhoods do not all look the same. Some people's perception of factory-produced housing is of lines of identical houses and clearly this should be avoided. The introduction of CAD/CAM techniques makes variation of MMC products relatively simple to achieve, although volumetric units will always have some constraints by their nature.

Having said that, the planners often want to see changes to storey heights, window design and window layout. These can sometimes be agreed at a late stage in the planning application process and can result in extending the factory lead times through:

- Delaying the start of the MMC design process, which has to be completed before the MMC product can be produced in the factory.

- Delaying the purchase of the fenestration, which is often on long lead times. Where the windows and doors are installed in the MMC product in the factory, the production is either delayed or the product has to be shipped without the fenestration being installed.

In traditional build, windows are fitted much later in the build process and hence their delayed specification is more easily accommodated.