Title: The social acceptability of prefabrication and standardisation in relation to new housing.

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‘It is quite likely that prefabrication will arrive, on a large scale, before we are practically and aesthetically “ready”, that prefabricated houses will be designed, huckstered, and sold, not for the advantage they can offer, but on the basis of what people are used to, prejudiced in favour of, or, can be titillated by...’

(Karl Koch, 1958, Quoted in Russell, B., 1981)

Introduction

Various perceptions, opinions and images spring to mind in the popular imagination when considering concepts such as prefabrication and standardisation in housing. This paper seeks to clarify some of these issues, and to ground the subject within the social context of housing in the UK today. The paper will outline the background to an ongoing project entitled ‘Overcoming Client and Market Resistance to Pre-fabrication and Standardisation in Housing’, and go on to discuss some of the socio-cultural barriers to such innovative construction methods in the UK housing market. Firstly, the historical context of prefabrication is discussed, in an attempt to tie this research to experiences and mistakes from the past. Following this, the nature of prefabrication and standardisation today is outlined, set within the context of a resurgence of the drive to increase efficiency in housebuilding in recent years. Past experiences and constructs of prefabrication and standardisation are thought to have made many people sceptical about the concepts, although the evidence for this is at present largely anecdotal. The paper will then attempt to provide some arguments for what people are likely to think about the prefabricated houses of the near future. Through a discussion of the nature of house and home in modern society, the potential of prefabrication to offer added benefits to house-buyers is outlined. Tentative conclusions are reached, from which a proposed methodology for this research is being developed.

Prefabrication and standardisation in housing - a historical context

Historically, there have been many proponents of the concepts of standardisation and prefabrication in housing. Lethaby in 1911 once said that we should aim to produce houses as efficient as a bicycle, which, as Vale (1996) points out, is very much a standardised object. Since then, others such as Le Corbusier and Gropius, have made similar comparisons (although more often with ships, automobiles or aeroplanes than the bicycle).
The project which has given rise to this paper, funded by the UK Department of Environment, Transport and the Regions (DETR) and a research council (EPSRC), aims to minimise the potential tensions which exist between the idea of industrial manufacturing processes, and the idea of sustainability, by optimising the economic, ecological and social issues surrounding the house construction process.

It is important that the key criteria in prefabrication and standardisation are recognised as relating to the processes as opposed the products. The prefabrication of components, elements, or even entire structures off-site as an alternative to working in-situ has been extensively applied in the past, although recently developed approaches have both refined and expanded the practical application. Any building requires that the construction be broken into stages, regardless of the degree of prefabrication employed. The quality of the finished product depends as much on selection of materials and attention to detail as it does on the construction method.

It is the case however that a number of buildings constructed in the past making use of prefabrication in their construction were judged to be of poor quality. In the UK following World War II, there was an organised and state-led drive for the mass provision of (mainly social) housing. Sustained by decades of steady economic growth, vast and open-ended programmes of housing construction were undertaken. Particularly in Scotland, the extent of state intervention in this process was unmatched elsewhere in Europe (Glendinning and Watters 1999). The concept of the “prefab” home grew in prominence, and referred in the main to two types of construction - a completely prefabricated aluminium bungalow, and various house types incorporating degrees of off-site factory construction. Each variation on the theme of prefabrication has impacted on society’s view of the appropriateness of using such technologies to house people. Although the prominence of “prefab” homes in terms of construction output dwindled by the 1960s, the connection between a conceptual process and a realised product had been established.

For almost two decades between 1960 and the mid 1970s, a programme of standardised and mass produced social housing followed that of the “prefab” home throughout the UK. With particular regard to high rise system built housing of the 1960s, the application of a standardised approach to usually state-owned housing firmly established a connection between very specific building types and the concept of standardised building. Although many examples exist of standardised construction, or at least standardised design, being applied in the UK prior to this time (for example Edinburgh New Town, Glasgow town plan), a new and powerful connection has been forged. The social acceptability of the mass produced housing built in the UK in the past 50 years has varied considerably, with current reactions to current technologies heavily influenced by past errors in design and construction.

With both prefabricated and standardised construction, it is vital to remember that the likely lifespan of such housing constructed between 1946 and 1975 is generally considered to be less than that of “traditional” built housing. Most modern construction, which uses non-masonry materials, also tends to have predicted a lifespans less than those of masonry built housing. Any perceptual links between the ideas of prefabrication, standardisation and non-permanence may therefore prove vital in the acceptance of new approaches to construction.

Prefabrication and standardisation in housing - present day challenges

Bearing in mind the problems associated with certain prefabricated and standardised buildings in the past, it is also useful to identify strengths which emerged from that work, and which can be readily applied now. Standardisation and pre-assembly within construction has been
successful in many, sometimes prominent, projects including Hong Kong airport, much modern hotel construction and the second Severn bridge crossing. The importance of modular construction using a range of materials is also gaining in importance, and will continue to do so.

From the occupant’s perspective, standardising the construction process can satisfy any number of definitions of “value”. For example, a balance of lower time, optimum cost and high quality can be achieved, with due attention also given to whole life assessment. The resultant early completion, user satisfaction and ease of maintenance and replacement all indicate that standardisation and prefabrication have great potential for the future. The current large demand for new housing surely points toward the need for such an approach to be applied. Standardisation can be generic, client-specific, supplier led or project-specific. Similarly, prefabrication can take a number of forms and the term can refer to components, sub-assemblies, volumetric pre-assembly and modular building (Sparksman et al. 1999). The selection of the appropriate level of prefabrication and standardisation will depend on the case to hand, and should be clearly driven by the stated “value needs” of a given project. Systems and components already available incorporating timber, steel, concrete and a combination of these materials, are providing potential solutions in the design and manufacture of housing. Standardisation of the process need not however, in a post-Fordist world in which the economic production of one is widely predicted, lead to standardisation of the product. It should be possible through standardising the process, to arrive at socially desirable, sustainable and technically sound solutions.

An important distinction to be made is that between process and product. Both standardisation and prefabrication suggest not necessarily functionally or aesthetically distinct products from more conventional construction, but more routes toward the attainment of stated goals. With regard to housing, rather than viewing such processes as barriers to innovative and satisfactory design, providing the aims of any project are clearly stated it should be possible to work towards maximising value for all concerned.

Demands set in the UK by the Government sponsored Egan (1998) have moved current thinking towards improving efficiency in construction, and driving towards greater value and quality. Similarly, given the need for sustainability and the generally important consideration of environmental and social values in the longer term, it is essential that a long term view be taken and that the consequent needs for flexibility, maintenance and eventual disposal (or re-use) be addressed at the design stage. It is clear that a wide range of short term goals can be addressed through different levels of standardisation, and that the prefabrication of components, or the use of modular building types, can provide the user with a flexible and personalised living space.

Important past mistakes concerning a lack of quality, attention to detail, and consideration of the life cycle clearly must be recognised. The design team must also recognise where housing is constructed in large volumes, that a duty is owed to ensure that the resulting buildings adequately address the needs of the householder, with regard to emotional satisfaction, function and economic performance. Prefabricated and standardised construction methods provide reliable, tested and flexible tools with which the design team must work to satisfy such demands.

Advances in technology and new organisational structures allow concepts like standardisation and prefabrication potentially to address many of the problems facing the house-building industry, such as a shortage of labour skills and the need for greater client involvement. However, there are various hindrances to change in this respect (CIRIA, 1999), including a general pessimism about past mistakes. It seems that rather than culminating in the standardised housing types of past experiences, the trend in thinking is towards ‘mass-customisation’ and
‘agile production’ (Barlow, 1999), which greatly increases the number of choices offered to customers, while retaining the efficiencies of the production philosophy.

In the context of this trend towards a customer focussed house-building strategy (Roy & Cochrane, 1999), it is considered useful to have an understanding of market preferences, as well as perceptions of the nature and meaning of house and home by potential occupants. The issue of market preferences has been documented elsewhere (see Roy & Cochrane, 1999), and will not be discussed here, other than to say that preference tends to be directed at the second hand housing market, as current new-housing is perceived by house-buyers as offering less choice and flexibility. This is important in a time of increasing diversity of housing demand.

Meanings of House and Home

The thesis of this research argues that a major barrier to greater levels of prefabrication and standardisation in housing is the dominant nature of the house in the UK as an investment, rather than simply a consumer good such as a car or bicycle. This leads to conservatism from the point of view of both house-builders and eventual occupants. That said, the house is also more than a speculative asset for most owners, as the very nature of the ‘house as home’ differentiates it from other financial investments. An individuals’ house is a place of shelter, into which occupants invest in a variety of ways, be they physical, psychological, social or financial. A home is better viewed as an ‘idea’ rather than a prescriptive set of criteria such as the physical aspects of the house. In this way, a ‘home’ can be defined at various levels of scale (country, city, neighbourhood, house), although the word ‘home’ is often used as a synonym for ‘house’, thereby leading to problems of both definition and clarity.

In the UK, Owner occupation has become normalised, and social renting has become a residualised form of tenure (Gurney, 1999). Owner occupation now accounts for 70% of housing in the UK, compared with 58% in The Netherlands (Gann, 1999)1, and 31% in Switzerland2. The historical context of this marginalisation of other tenures in the UK is a complex and often misunderstood phenomenon. Indeed, the 1979 UK Conservative government’s drive away from state ownership of social housing effectively failed much of the existing public housing sector. The intention of the 1950s and 60s, where housing would be “renewed” on a cycle of 30 to 40 years was never realised, leading to dereliction and a further, entirely predictable, failure of the prefabricated and standardised housing already in place.

Saunders (1984) put forward the idea that the need for ontological security (which has been associated with predictability and constancy) in today’s society can be addressed in the consumption sphere through the promotion of owner occupation. The idea is that people could gain control over their everyday lives through home ownership. While this idea may well contain some truth, it is something of a simplification to suggest that home-owners can achieve ontological security, regardless of house quality, size, design, cost, and future performance. Gurney (1996) suggests that many of the arguments surrounding the phenomenon of ‘ontological security’ are at best an academic fantasy, and at worst, promoters of social exclusion. Indeed, evidence suggests that often home-owners can be less ontologically secure’ than renters (Gurney, 1996), and that housing tenure might be relatively unimportant as a factor in ontological security.

1 Interestingly, renters in the Netherlands are far more likely to carry out major house repairs than their counterpart in Britain, suggesting that renting is not seen as the ‘last-resort’ tenure, but instead implies many notions of responsibility towards the house, not often seen in the UK rental sector.
2 http://www.statistik.admin.ch/stat_ch/ber09/eufr09.htm
Arguing instead for an emphasis on emotional (rather than ontological) security, Gurney (1996) defines the home as follows:

“Home is a dynamic concept, grounded in emotional and experiential structures which perpetuates a state of mind and which reflects routine practices which may, or may not occur within a dwelling” (p90)

Thus home can be seen as the setting in which self and social identities are defined and experienced. Furthermore, although a home can be (and often is) experienced within a house, it can also extend beyond the walls, if so defined by a person’s self concept or identity structure. The concept of “home” has been extensively discussed from a wide range of academic disciplines (see Rapoport, 1969; Benjamin & Stea, 1995; Altman & Werner, 1985; Gurney, 1996), but without some form of academic standardisation, the term itself can be conceptually problematic (Rapoport, 1996). Nevertheless, it is usually agreed to mean something more than simply the physical features of the house, including many cultural and psychological components.

Placing this in the context of using greater levels of prefabrication and standardisation in housing, the above mentioned ‘ontological security’ might be a constructive concept. If, technically speaking, prefabrication can facilitate greater design flexibility and customer involvement, then this may have an influence on feelings of ontological security, as a greater degree of control is given to occupants over their dwelling space. While this may not necessarily be the case (if house designs simply replicate the perhaps limited choice on offer today), the potential for design flexibility and occupant participation must be considered two of the greatest non-economic advantages of increasing prefabrication and standardisation in house building. This should not be taken to mean that prefabrication per se leads to ontological security, but rather that the spin off benefits from the prefabrication and standardisation processes may facilitate some of the conditions necessary for such feelings. All of this assumes, however, that housing ‘consumers’ are potentially less conservative than house-builders and estate agents claim. Often however, as Ball (1999) put it; “Conformity breeds conformity in the housing market” (p12).

The end product of the prefabrication process should not be equated with past examples of prefabrication (“Pre-fabs”). Nor indeed should it be particularly associated with some kind of ‘machine aesthetic’. Moreover, while many view such “pre-fabs” as a wholly negative product in aesthetic and architectural terms, many examples exist of occupants holding them in high regard in terms of “home”:

“To us the pre-fabs were the ideal accommodation; the only thing they needed to be perfect was a brick casing on the outer walls. I wish even now to be back in our ‘hen hut’, for it housed us during the happiest years of our lives”, Rooney et al. (1989), pp 43

This quote is interesting, as it not only illustrates some of the misunderstood qualities of the “home”, but also highlights the cultural importance of a ‘brick casing’ in the parts of the UK. Interestingly, this is not so much the case in other northern European countries with similar climatic conditions to the UK, suggesting the influence of a variety of social and historical factors. In Sweden for example, where timber is by far the preferred building material, the

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3 The psychological distinction between ownership and control in this context may be quite small. Moreover, they are both implied by the concept ‘home’ in its popular definition (Rapoport, 1995)
history of prefabrication is much more positive, and is based more on the promotion of self-
building than on the philosophy of prefabrication (Vale, 1996).

With changes in the demographic make-up of the population, together with an increase in
the number of people working from home, there will be a continued demand for increased
flexibility and choice in housing. Demands for better environmental performance, along with the
hope of embedding new technologies into house building suggests the need for an open mind
when exploring various innovative approaches such as prefabrication. As affordability often
takes precedence over environmental standards, especially in the social housing sector,
prefabrication and standardisation, with their inherent cost savings could allow housing providers
to achieve better environmental standards at a given cost. In addition, higher environmental
standards should in many cases equate with reduced life cycle costs. Furthermore, increasing
standardisation might well make it easier for the industry to respond to changes in environmental
standards than at present, as more of the processes will be subject to greater quality control and
monitoring.

As houses with greater levels of prefabrication and standardisation tend to be regarded
with caution by lenders and valuers, reassurance and evidence is required that properties are
attractive and perceived as durable by tenants and buyers (Stevens, 2000). Simply stating that
various degrees of pre-fabrication and standardisation exist in all housing construction projects
misses the valuable point about cultural resistance. As illustrated in the academic studies of risk
perception, communication, and management, risk can mean different things to different people,
and needs to be handled carefully by those seeking to manage it. PERRI 6 (1998) suggest that
ideas from the risk literature can provide useful ways of thinking about housing issues in today’s
‘risk culture’.

The project has so far reviewed the technology available for introducing greater levels of
prefabrication and standardisation in housing, and will continue to address the social and cultural
aspects of these technologies by using a combination of methods from sociology, environmental
economics and environmental psychology.

Discussion and tentative conclusions

This paper has addressed a number of topics and issues, including the meaning of home,
standardised and prefabricated housing, and the manner in which new housing now and in the
future may be regarded by owners, occupants and lenders. The major research commission from
which this paper is drawn aims to address how client resistance to prefabricated and standardised
housing can be overcome, and the potential benefits realised.

There are many questions surrounding the comparisons that exist between industries such
as car manufacturing and house construction. However, these provide a firm base from which to
improve both performance and appropriate innovation in the construction industry, as
recommended by Sir John Egan’s report ‘Rethinking Construction’(1998). Moreover the
comparison between the car and house may prove more interesting today than in Le Corbusier’s
day, as the car is seen more and more as an essential part of modern life. Ironically, the car also
provides some of the ‘shelter’ characteristics of a house. This psychological extension of the
home into the car may provide some valuable insights into the idea of the house as a consumer
good.
A truly sustainable approach to any construction, and housing in particular, can only be achieved where the views and needs of the target group(s) are recognised and incorporated in the design process. This is illustrated in figure 1.

**Figure 1. A client led housing design network**

The diagram illustrates a situation where the needs of the occupant both drive the design, and can then be satisfied by the technical and construction solutions. The ultimate occupant is integrated fully in the cycle, and the technical and design options heavily influenced through such participation.

This paper has aimed to show how established knowledge concerning the meaning of home must be allowed to drive advances in, and application of, new and existing construction technologies. The importance of developing truly sustainable approaches in new housing must be recognised, and can be achieved through the clear and adequate direction of the designs, materials and technologies applied. Any attempt to change substantially the basic nature of the British home, by changing the process, is as doomed as were the post-war ones if it doesn’t address and understand its impact on socio-cultural constructs of the home.

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**References**


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