

architectural issues - prefabrication and mass production

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01. Image showing prefabricated retail unit currently employed in Orange Farm (by author)

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## architectural issues - mass production and prefabrication

In the developed world a large amount of buildings are not developed by architects and fall outside of the architectural field. There is a current belief that architecture is a real force for change in the world. It is this self delusion that is the major reason that architecture at present is not a real force for change. Most of these non architectural examples estimated to be 80% are ordinary buildings which are not considered to be architectural. This means that architecture generally fails to have an impact on the majority of people's most intimate experience of buildings. Many architects in the past saw ideas of mass production and prefabrication as a way to bring architecture to the masses and ordinary people and have a genuine positive impact. (Davies 2005:9)

The architectural enthusiasm for prefabricated housing began in the 1940's and it was believed that in a few years all houses would be built on production lines and delivered like cars from competing dealerships. This however has never happened and the image of the automobile production line has haunted architects, builders and those associated with the industry for most of the past century. The application of the idea has never achieved more than the status of a project in the field of architecture. However the idea is still of interest today. (Fezer 2004:55)

Many architects interpret the 'failure' of the prefabricated house as proof that buildings don't lend themselves to factory production. However, this is not true as ordinary prefabricated housing has managed successfully for many years without architecture's guidance and outside the field of architecture. The strength of the prefabricated house lies in its popularity, its cheapness and the industrial base from which it operates. It is in these areas that modern architecture was the weakest as it was unpopular, expensive and divorced from industrial production. These are the elements that have interested architects for many years. The challenge of the potential of prefabrication to lower capital and developmental costs by using purpose made components which are mass produced in great quantity, to bring architecture to ordinary people, is still relevant today. (Davies 2005:10)

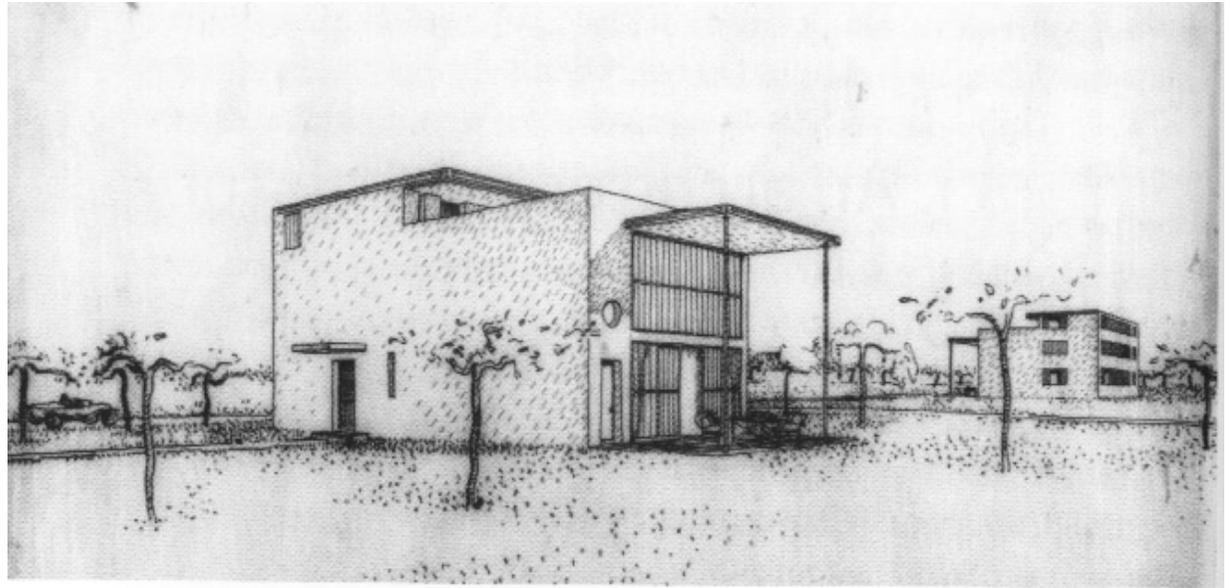
The prefabricated module has been chosen as it is a subject of wide interest but also because it challenges some of architecture's most deep seated prejudices. It calls into question architecture's concept of authorship which keeps itself as an exclusive art form which makes it inaccessible to ordinary people. It insists on the architect's knowledge of production, distribution, marketing, and construction methods. Finally its lightweight portable technology makes a mockery of the obsession with monumental pretensions. So what this suggests is that if architecture can succeed in the prefabricated housing business it may recover some of the influence it has lost over the last 30 years and begin to have a real impact on the built environment. (Davies 2005:10)

## a 'prefabricated' history

The idea of the prefabricated home is an important theme in 20th century architecture and the modernist movement. Modernists saw the idea of prefabrication as a way to bring architecture to the masses and for the profession to come to terms with an industrial society. They saw it as an opportunity to design houses that could be mass produced in factories just like Model T Fords.

The most important figure in the early history of the architecturally designed prefabricated house was Le Corbusier the French architect and the leading protagonist of the modern movement. In his book 'Towards a New Architecture' published in 1923 he wrote about the idea of 'Mass Production houses' with an impressive array of his own designs for mass produced houses. The most famous of these was the Domino house of 1914 which he illustrated using a perspective drawing illustrated by 3 flat floor slabs supported by six columns and linked by a cantilevered stair. His idea was that these units would be mass produced and in-filled with block work walls with standard doors and windows to make cheap flexible dwellings. This however, did not look like a mass produced house. (Davies 2005:11-43)

The idea was further developed and can be seen in Le Corbusier's drawing for Maison Citrohan (1920) where the image of the mass produced house starts to come into focus. The perspective view shows two identical detached houses with a different orientation to show us four elevations in a suburban setting. The name is also a pun on Citroen the car maker seemingly indicating that the house is not just standardised but mass produced in a factory.



03. Maison Citrohan by LeCorbusier (Davies 2005:11-43)

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It is doubtful that Le Corbusier had intended the houses to be produced in a factory but was more of a comment of industrialising the building process. These early drawings became prototypes in Le Corbusier's Villas in the 1920's and 1930's such as Villa La Roche, Villa Cook and Villa Savoye. Their influence can also be seen in his massive housing blocks of the 60's and 70's like the famous Unite d'Habitation. Le Corbusier was one of the most important architects of the 20th century and those early projects for mass produced houses became the basis for the modernist movement which transformed cities in the developed world. However, the original aim of producing affordable individual housing for working people was a neglected and forgotten. . (Davies 2005:11-43)

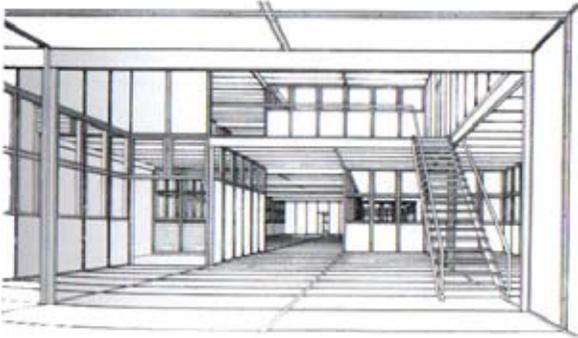
Many architects also later experimented with the idea of prefabricated housing. Some of the most notable examples were Walter Gropius (the founder of the Bauhaus school and a leading protagonist of the modern movement) and Konrad Wachsmann's (the pioneer of space frame structures) the 1942 'Packaged house' as described in Gilbert Herbert's 1984 book 'The Dream of the Factory- Made House'. The book describes how the system ultimately failed due to the architect's pursuit of the ultimate abstract system. Wachsmann was more concerned about developing his system than the original intention of alleviating the housing crises faced at the time. Another important experiment was Richard Buckminster Fuller's 1944 'Dymaxion House' and 'The Wichita House' which was an efficiently engineered house designed as if they

were aeroplanes. They were built with controlled heating, air circulation, mechanical and plumbing services. They were to be factory produced and easily assembled and to be manufactured in aeroplane factories after the war. These however, were also never realised. . (Davies 2005:11-43)

The idea of the prefabricated house was also a recurring theme in the writing of Frank Lloyd Wright in which he described his idea of the 'Assembled House' made up of standard room sized units. Customers would buy the basic minimum of units with a bathroom, kitchen and bedroom and add further rooms when needed. This would allow several unit possibilities to suit customer's requirements.

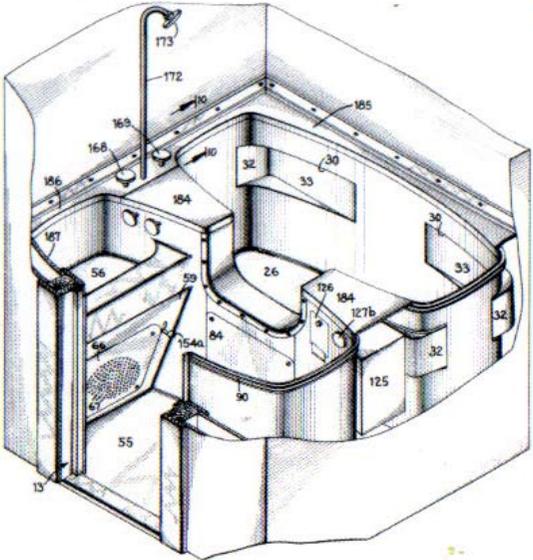
He once suggested that "the prefabricated house must be no makeshift but must be radical architecture in an organic sense as not only a good machine is but also as any natural thing is. Say a tree."

He also designed several prefabricated typologies in 1937 in Los Angeles but failed to find suitable sponsors. These ideas were also relevant in his later design for his Usonian houses which were designed as moderately priced houses for ordinary people. Although they weren't standardised or mass produced they were all designed using a system with a controlled planning and vertical grids. They were also designed to conform to standard brick courses and timber sizes using simplified construction details and construction. This kind of systematic production is what one associates with the factory process. In the second half of the century these ideas of mass production where also to have an important influence in architecture with many examples

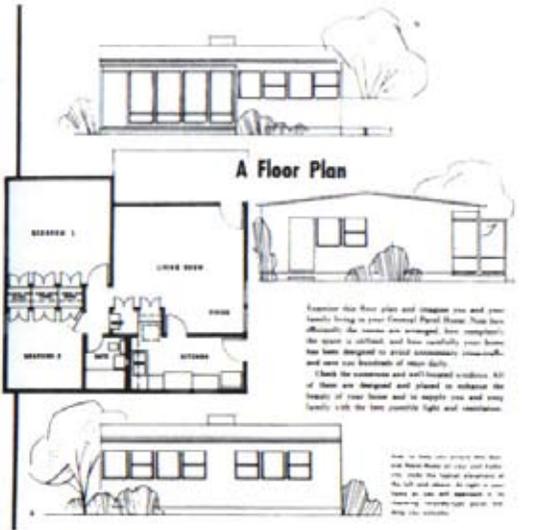


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of architect designed houses which could be mass produced or embodied ideas of mass production. A famous example of this was the Eames House designed by Charles Eames in 1949. The steel framed house made use of standard steel framed windows straight from manufacturer's catalogues, standard components and exposed materials. It was meant to be a catalogue component house that would be cheap and easy to erect quickly. The demonstration house like many in the same era remained just that and the ideas were never put into real practice. More radical experimentation with prefabricated modules happened in the 1960's with the work of Archigram and their design for mass produced dwellings they described as pods or capsules. They visualised a dynamic, flexible throw away alternative to housing modules. In their design for the Plug-In city they envisaged an enormous mega structure spanning 44 metres in which thousands of pods (modules) plugged into funnel shaped towers around car silos 100 storeys high. At the same time in Japan Kisho Kurokawa a member of the metabolist movement was working with



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- 04. Image of The Packaged House by Gropius and Washmann(Davies 2005:11-43)
- 05. Image of Dynamaxion House by Buckminster Fuller (Davies 2005:11-43)
- 06. Image of The Packaged House by Gropius and Washmann(Davies 2005:11-43)

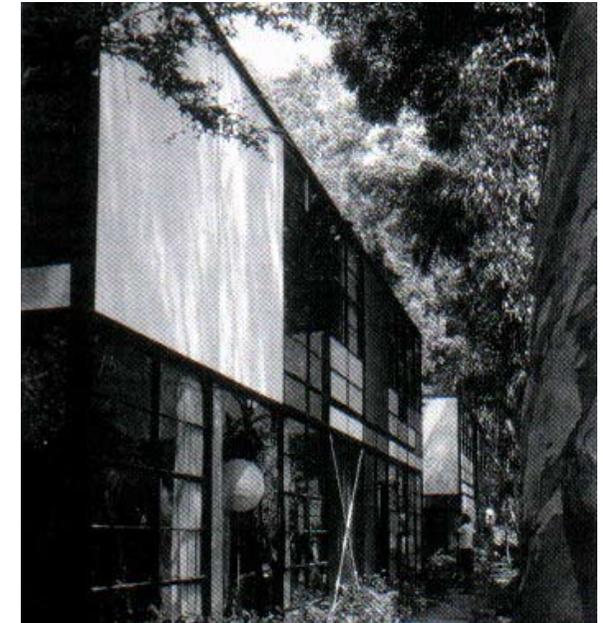
similar ideas with his design for the actually realised Nagakin Capsule Tower in Toyko his capsules were plugged into a concrete core creating a tower block. . (Davies 2005:11-43)

All of the housing typologies described above are well known examples of the architectural history of the prefabricated house. However, one thing that they all have in common is that in terms creating housing as industrial products for ordinary people have been non starters or remained simply as once off projects. Archigram expressed this unease in a collage they published in Archigram 3 where they explored the gap between the idea and image in prefabricated housing. It showed Buckminster Fuller's Dymaxion house and other architectural examples collaged with ordinary prefabricated typologies. The images suggest that ordinary examples that have failed in architectural terms have actually been more successful and have succeeded where architecture has failed. (Davies 2005:44)

So it also becomes important to understand the positive aspects of ordinary prefabricated housing to design a successful architectural response. The strength of ordinary prefabricated housing lies in that it becomes a collaborative exercise together with factory managers, production engineers, buyers, accountants, marketing, people, shop floor workers and lorry drivers. It takes real experts to develop a building technology with hands on knowledge of the materials involved. Ordinary typologies often rely on adapting old technology making production safer and cheaper. More important is the collaboration with the consumers of the house. Ordinary prefabricated housing has

been successful as it has a general appeal to a customer and is not in a detached language that only architects understand. Architects need to respect the language everyone understands and use it gracefully. Also in contrast to normal architecture almost anybody can understand and erect these typologies and are specified in catalogues and manuals. Architects have to stop despising manuals and learn to use them to their advantage. It is these elements architecture needs to learn from. The ordinary typology is still however not without its own share of problems and some of its strengths are also its weaknesses. The resistance from architects in the past to ordinary prefabricated typologies is the perception that to prefabricate buildings you must standardise them and mass produce them resulting in a built environment of mind numbing monotony. Their weakness is also in the faceless mass market customer and its lack of sensitivity to place and differences of building sites. (Davies 2005:204)

So in conclusion this project will explore a possible solution which positions itself between the 'take it or leave it' architectural designed single house type and the universal monotonous system at the other extreme. The idea explored will be the one first imagined by Frank Lloyd Wright in 1932 of the 'assembled house' to which extra ready made rooms could be added as the owner could afford it. This flexibility also allows for houses to be customised for individual users needs while still being sensitive to site conditions. This also will attempt to take the strengths of ordinary designed prefabricated housing in an architectural response while avoiding some of the pitfalls of earlier architectural examples.



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**07.** Image of Eames House by Charles Ray Eames(Davies 2005:11-43)





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