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Title	Building for Long Life-cultural influences
Author(s)	Batty, W. J.
Citation	年次学術大会講演要旨集, 17: 682-686
Issue Date	2002-10-24
Type	Conference Paper
Text version	publisher
URL	http://hdl.handle.net/10119/6815
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Description	一般論文

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2D30 Building for Long Life – cultural influences

○W. J. Batty (Cranfield University at Kitakyushu)

Introduction

Concern has been expressed regarding the rate of human population growth and the accelerating urbanisation of this population. This concern has promoted discussions regarding a more sustainable approach to the use of resources and energy in the construction of urban infrastructures and the buildings that exist within them. Buildings with long life spans use the resources required to construct them in a more sustainable manner than those that endure for much shorter periods. This is true for buildings constructed from renewable materials derived from plants, such as trees, and for those fabricated from stone, brick or concrete.

For renewable resources such as wood it is important that sufficient time exists for the materials used to be replaced in nature by new growth and this will depend on the length of the growing cycle of the renewable resources used. Even for rapidly growing softwoods this can be up to 60 years. For non-renewable resources such as stone or clay it is important that their rate of consumption is reduced and this can be achieved by designing buildings to be capable of long life spans and through the recycling of the construction materials at the end of a building's life.

Additionally, the notion of the long life building has important implications in terms of energy use. In order to manufacture building materials from both renewable and non-renewable resources it is important to consider the energy used in their mining, quarrying or harvesting, manufacture, transport to the point of use and that used during construction. The total quantity of energy expended in manufacturing the component materials and for the actual construction of a building is often termed as embodied energy. It is important to minimise the embodied energy content of a building, but equally to ensure that this energy is put to long use through an extended building life span. In this way the energy content per year of a building's lifetime is reduced and so as a consequence is its environmental impact.

At present much discussion exists in Japan as to why the average lifespan of buildings in Japan is much less than those in Europe and the UK in particular. This difference is considerable, being approximately 30 years in Japan and over 100 years in the UK. The current average life span in Japan makes any attempt at developing more sustainable buildings through material choices almost irrelevant. It is important to ask why this difference of building lifespan in Europe and Japan exists. In order to achieve this, an examination of the reasons why buildings have long life spans in England will be undertaken. The development of UK housing over the past few centuries will be considered to ascertain what factors have led to average building life spans of over 100 years so that these can provide insights for future development.

Demography of the UK population

As with all countries in the world the UK has seen considerable changes in the demography of its population over the past two centuries. This has and continues to affect the provision of housing. A dominant trend has been the decrease of the number of people in each household. For example in 1861 there were between 5 and 11 people in each household whereas the average had dropped to 3 people by 1961. The reduction in average household size has been almost linear throughout the 20th century. During the 40 years between the census of 1921 and 1961 the population of the UK increased by 20%, however the number of households increased by 70% for the same period. These trends mean that the requirement for new housing has always been greater than the rate of population growth. Consequently, existing housing has always had a high financial value in a market where supply has lagged behind demand.

The English home – history of development

The development of dwellings is not uniform throughout Europe and differs with each country and sometimes the semi-autonomous regions within them. These differences exist for a number of reasons that include history, geography, culture, legal system and social and financial organisation. For example within the UK, Scotland has

maintained a separate legal system and cultural identity that has led to a difference of approach to the development of dwellings from that found in England.

The notion of the English home is not a static concept but has changed considerably over the last 300-200 years. During the late 18th and early 19th centuries the rapidly expanding population of London required a rapid building programme for housing. It became evident that this rapid expansion needed to be controlled and as early as 1774 regulations were introduced in parliament to control housing development in London, in the form of the London Building Act. This act specified "rates" of housing in terms of the heights of the houses, their relationship to the width of the road and details of their construction. This demonstrates that legal intervention has been an important element of the development of the urban environment in the UK for several centuries.

As a consequence of the industrial revolution, during the late 18th and early 19th centuries, the UK's population migrated from rural areas to become concentrated into new and expanding metropolitan centres such as Manchester, Sheffield and Birmingham. These urban developments grew up around the new factories that were providing. The housing developments adjacent to the factories were financed, constructed and owned by the entrepreneurs who built the factories and owned the manufacturing businesses conducted within them.

The chief characteristic of these developments was close parallel rows of terraced housing built of brick or stone. At the time of their construction in the early to middle 19th century these houses were seen as an improvement on existing dwellings, but they were quickly deemed to be inadequate and heavily criticised.

This rapid expansion of building construction relied upon the new factory based manufacturing techniques of the industrial revolution to produce vast quantities of bricks manufactured from fired clay, with coal as the main energy resource. The need to house the rapidly growing urban population that was required to service the expanding manufacturing industries continued throughout the 19th century. However, the desire to regulate these housing developments became evident in the new industrial metropolitan areas, as it had done previously in London. Local and regional administrative authorities began to legislate from 1840 onwards to improve the quality of the buildings themselves as well as the form of the developments. Much of the drive for this legislation arose from the desire to introduce public health reforms. Such legislation became set nationally in 1877.

The "through terrace" form of construction became the norm and led to larger dwellings that had improved sanitation, larger windows and higher ceilings and were constructed using better quality materials and to higher standards. In terms of layout, these developments were typified by regularly spaced parallel streets broken up by occasional cross streets. Many of these 19th century housing developments in England's industrial towns and cities, were demolished as late as the 1960's and 70's, but many have survived through to the present.

During this period the middle-classes population expanded along with that of factory workers. By the mid 19th century about 17% of the population of England could be considered as belonging to the middle classes. The development of dwellings for the middle classes during the early 19th century also was typified by high-density terraced housing, but on a grander scale than that for the factory workers. These were sometimes up to 6 storeys high with accommodation for servants. Now much of this type of property has been converted to apartments, hotels, offices or even embassies.

As the 19th century progressed the form of middle class housing changed from the terrace to the more popular semi-detached. The detached villa first saw development in the late 18th century. This form of dwelling reflected the desire of the middle classes to keep their dwellings separated from those of the lower classes. However, many families at the lower end of the middle classes could not afford such grandeur and so semi-detached villas were developed. This set the form for urban development into the 20th century and the semi-detached house made life in suburbia attainable to the vast majority of the growing middle class.

Although suggestions were made during the 19th century that the further growth and expansion of English cities should be upwards rather than outwards the development of flats, or apartments, did not occur in England to the extent that it had in Scotland or in continental Europe. This was probably due to a lack of interest in financing such developments, which in turn reflected different legal systems regarding the purchase and ownership of land. By the end of the 19th century in England 87% of dwellings were of the terraced form, 10% detached or semi-detached houses and villas and only 3% apartments.

A key feature of housing in the 19th century was that nearly all of the housing was privately rented.

In the late 19th century the development of council housing began with the legislation "Housing for the Working Classes Act" of 1890. For the first time, this act gave local authorities the power to build and collect rent for housing. After World War 1 (1914-18) a serious shortage of housing existed and many of the returning servicemen remained unemployed. Consequently, the government used unemployed ex-servicemen to construct new council housing for rent. The Local Government Board's "Manual on the preparation of state-aided housing" was used as the basis for the 1919 Housing Act that improved housing quality by removing the link between the cost of building a council house and the rents that could be charged. This was possible because the government provided the majority of the funds for building, but the rents were controlled independently by the local councils. Housing quality was improved but the cost was not passed on to the tenants. This situation did cause concerns and by 1924 the amounts of subsidy and the levels of regulation were reduced, but the standards of building remained high.

Another change that occurred after the First World War was the way in which houses were owned. Home ownership by the occupant became a more common feature as the proportion of the middle class population increased. Between the First and Second World Wars nearly 4 million homes were constructed and two-thirds of these were owned by their occupants. A number of factors were responsible for this change. The construction of urban railways and roads made cheap land available, state subsidies for home building were introduced and building societies had become relatively common and with them the availability of mortgages for borrowing money to purchase the house.

The first building society in England was set up in 1775. Originally these societies were confined to the industrial midlands and north of England. The purpose of the original societies was to make funds available to members of the society to purchase land and construct property for personal use. Loans of money were made to individuals, with security for the debt provided by the value of the property that was being purchased or constructed. The period for repayment of the debt was specified and limited. In the early 1840's building societies began accepting savings from members who were not necessarily interested in buying a house, but rather to obtain a good rate of interest for their savings. Originally building societies were set up to help the working classes to improve their conditions of life through mutual help. However by the early 20th century the members of these societies were predominantly middle class.

The housing developed during the 1920s and 30s was typically either semi-detached or short terraces of up to eight houses. The semidetached houses were an extension and development of the Victorian villa, but also drew their design and quality from the "Manual on the preparation of state-aided housing schemes". Thus the development of council housing had a direct effect on the quality of middle class housing. The homeowner and the suburb were probably the most significant and influential housing development of the 20th century and the 1920's and 30's set up an urban form that has remained popular since.

The period after the end of World War Two until the present has seen the rise and fall of public or council housing, while the private housing sector has remain almost unchanged in terms of style and form. A severe housing shortage existed in 1945 due to damage that occurred during World War 2. A commitment existed to improve the living conditions of the returning servicemen. Public housing development was seen as the means to achieve this. New standards were set for the internal space requirements within houses and the urban form of the public housing developments. However, these added considerably to the cost of development. Perhaps the most famous set of standards from this period were those that came from the Parker Morris report of 1961.

One major aspect of these regulations was the tensions they created between the cost of complying with them and the finance available for land purchase and building. It was considered that the regulations derived from the Parker Morris report could add up to 15% to the cost of building a new home. However, unlike the situation in the early 1920s, the budgets of local authorities were capped and so the funds available for new housing were limited. Consequently, if compliance with regulations regarding internal space and building quality and the concomitant increase in costs were to be managed then savings had to be made elsewhere. This meant that local authorities opted for standardised building systems and higher housing densities to reduce construction and land costs.

Another concern in the immediate post-war period was to prevent development overspill at the edges of cities and towns. Rather provision was made for the development of new towns. However, this programme was stopped with a change of government in 1951 and only those new cities already started were allowed to continue to develop, but with reduced budgets. In 1955 greenbelts were introduced which made it increasingly difficult for urban local authorities to develop public housing into rural areas. At the same time slum clearance of decaying 19th century development was activated. Although this slum clearance released land for redevelopment it also

displaced the families that lived in these areas at a rate of 90,000 each year and in many ways compounded the situation.

These conditions of higher standards, pressure to lower costs and the growth of the numbers of households needing accommodation had a number of effects on development. However, the key effect was to force development in the form of apartments and high-rise buildings. This was encouraged by the introduction of higher government subsidies for housing over 6 storeys high. This unleashed a period in many English industrial cities when vast developments of high-rise buildings, often over 20 storeys in height were constructed. Experience of constructing high-rise buildings was scarce in the UK at this time and so many of these developments used imported systems of construction that were ill suited to the UK climate and construction and site practices. This era of dwelling development ended in the late 1960s after a gas explosion led to the collapse of an entire face of a high-rise apartment building. This accident led to the ending subsidies for dwelling properties over 6 storeys. However, growing social problems associated with such developments also added to their demise. Many of these apartment buildings have now been demolished.

During the 1970s public housing reverted to high-density low-rise development based on houses. However, the development of public housing was constrained by a change of government in 1979 and declined rapidly.

Private housing during the 1950s through to the 1970s saw a period of relative ease. Mortgages were cheap, materials prices stable and the demand in the market place was greater than the rate of supply. As a consequence, little change or innovation occurred in private housing development, which remained much as it had been in the 1920s and 30s with the construction of detached and semi-detached houses. The lack of market pressure also led to a decline in both space and building standards. Another important factor with private housing development was the lack of constraint regarding sites. Unlike the local authorities that were forced to develop within their administrative boundaries, private developers operated mostly in rural districts. This led to the dispersal of the urban population from cities into villages and country towns throughout this period.

During the 1980s and 90s public housing development almost ceased while private and housing association development has maintained or increased levels of production respectively. The social housing sector development has largely been provided by "housing associations" during this period. More innovative design has been evident and the housing development market is being forced to change as demographic pressures change the composition of the house buying public.

Long lifetimes for buildings

How does this history of development explain the long life of buildings within England? Why are so many of the buildings constructed during the 19th century still in use? A number of factors are at work to create this situation. The need for more houses has always been greater than the rate of replacement and construction of new houses throughout the last two centuries. This has been exacerbated by a rapidly growing population and a reduction of the number of people living in each household. Consequently, the rate of increase of households has been greater than that of the population growth.

The materials used to construct these houses have been a major factor. Much of the building development during this period has used stone, brick and/or concrete, materials that are inherently stable and resistant to physical weathering, rot and decay. The most vulnerable material used in these buildings has been wood. However, if internal woodwork is kept dry and free from insect attack it can survive for centuries. Wooden window frames and doors are exposed to the ambient climate and so they are the most commonly maintained, repaired and replaced elements of building construction. However, this is generally a straightforward procedure, particularly as most of the housing stock rises only to two floors.

However, other factors are important and the culture of financing and owning property, as well as the legislative nature of UK government have and continue to play important roles. Much of the current UK housing stock has been constructed by local authorities in the form of rented property or by private developers in the form of owner occupied houses. Both have tended to develop estates of mostly uniform design that gain their design integrity from the repetition of a few basic variations of housing units.

Local authorities have considerable control on post development planning. This means that both individuals and developers have to receive planning permission before they can develop or redevelop an area of land, even at the level of a single dwelling. If an individual homeowner wishes to extend their property by more than 10% of the

ground floor area then planning permission is required. This system creates considerable inertia, especially regarding the redevelopment of land containing an existing building or buildings. This control is felt very strongly in the housing sector and affects homeowners' perceptions of where the investment value lies in their combined asset of land and property. Because it is difficult at best, and usually impossible, for an individual homeowner to gain permission to demolish and rebuild on estate developments the value of the combined asset of land and building has become heavily weighted towards the continued existence and state of repair of the building. Consequently, homeowners tend to perceive ownership in terms of the building rather than the ownership of land.

This attitude on the part of homeowners has a significant consequence regarding the length of life of the building. If the value of the investment in providing a home is primarily in the building then it makes good sense to maintain the building in good condition to maximise its value when it is sold.

Another consequence is that homeowners tend to move house throughout their lives as space requirements change with the size and age of their families. It is not unusual for newly married couples, unmarried partners or even single individuals to buy small properties while aged in their mid-20s to "get a start on the house owning ladder". The purchase of this property will be financed largely by a fixed term mortgage of 25 years duration. As the family earning capacity grows and as its size increases with the arrival of children so the need for more space arises. Consequently, they will look for a larger property to buy. This behaviour supports the notion of the financial value of a dwelling being in the building itself rather than the land.

Summary

- **Legislation** — A long history of legislative intervention exists in housing and building development in England. This has acted through:
  - Planning constraints
  - Indoor space requirements
  - Quality of construction
- **Materials** — Since the 18th century buildings have been constructed mostly from long life materials such as stone, bricks and more recently concrete
- **Change of use** — The middle class housing of the 19th century is now too large for modern families that no longer use servants. They have been easily converted to other uses such as apartments, offices, hotels and even embassies.
- **Home ownership** — During the 19th century only a small proportion of homes were owned by the occupants. Home ownership began to grow rapidly in the 1920s and 30s. Existing, previously rented, buildings were often sold to satisfy this demand.
- **Perceptions** — The effect of planning constraints mean that land and house are perceived as combined assets with most of the value being in the building itself. This encourages owners to maintain the structural integrity and life of the building.