

OBSOLESCENCE AND DEMOLITION OF LOCAL AUTHORITY DWELLINGS IN THE UK – A CASE STUDY

Helen Bowes (Telford Institute Of Environmental Systems, University of Salford, UK), and Bryn Golton (Faculty of Architecture, University Vasco de Gama, Portugal)

SUMMARY

In the UK at present many local authorities are facing increasing numbers of undesirable dwellings in their area, which are proving to be very difficult or impossible to let. Some local authorities are incorporating demolition of selected properties into their overall strategy for tackling this problem.

The demolition of the Jespersen Street flats, part of the St. Mary's Estate in Oldham, North West England, began in June 2000. The 132 flats were contained in a five storey pre-cast concrete framed block, erected in 1967.

This paper first examines the issues behind the obsolescence of this building and the local authority's decision to demolish. It then continues by assessing the physical demolition process: the methods employed; the debris trails produced; and the level of reclamation and recycling on the project. Finally the paper examines the attempts made to 'close the loop' by finding new uses for the project's debris within the local authority area.

It is intended that this paper will illuminate whether a relationship exists between obsolescence and subsequent demolition and recovery of materials, or whether the two phases of the demolition process are mutually exclusive. Does the reason for demolition affect how it is carried out? And if so, to what extent?

KEYWORDS: Obsolescence; Demolition; Materials reclamation; UK local authorities.

1. BUILDING OBSOLESCENCE

1.1 Why demolish?

Building obsolescence has been termed "... the fourth dimension in building..." [1] and "... is the condition of being antiquated, old fashioned, outmoded, or out of date. The obsolete item is not necessarily broken, worn out, or otherwise dysfunctional, although these conditions may underscore the obsolescence." [1]. Obsolescence is the dimension that determines the timing of the demolition of the building. Demolition occurs generally, but not always, at the point at which those who have control of the building have no further use for it. It is in their terms obsolete and the fabric of the building is wasted. Components may be reused or recycled and the building may be capable of reuse, but for those in control the efficient way forward is the premature demise of the building. What are the perspectives that lead to this waste of resources?

A taxonomy of building obsolescence was posited by Golton [2].

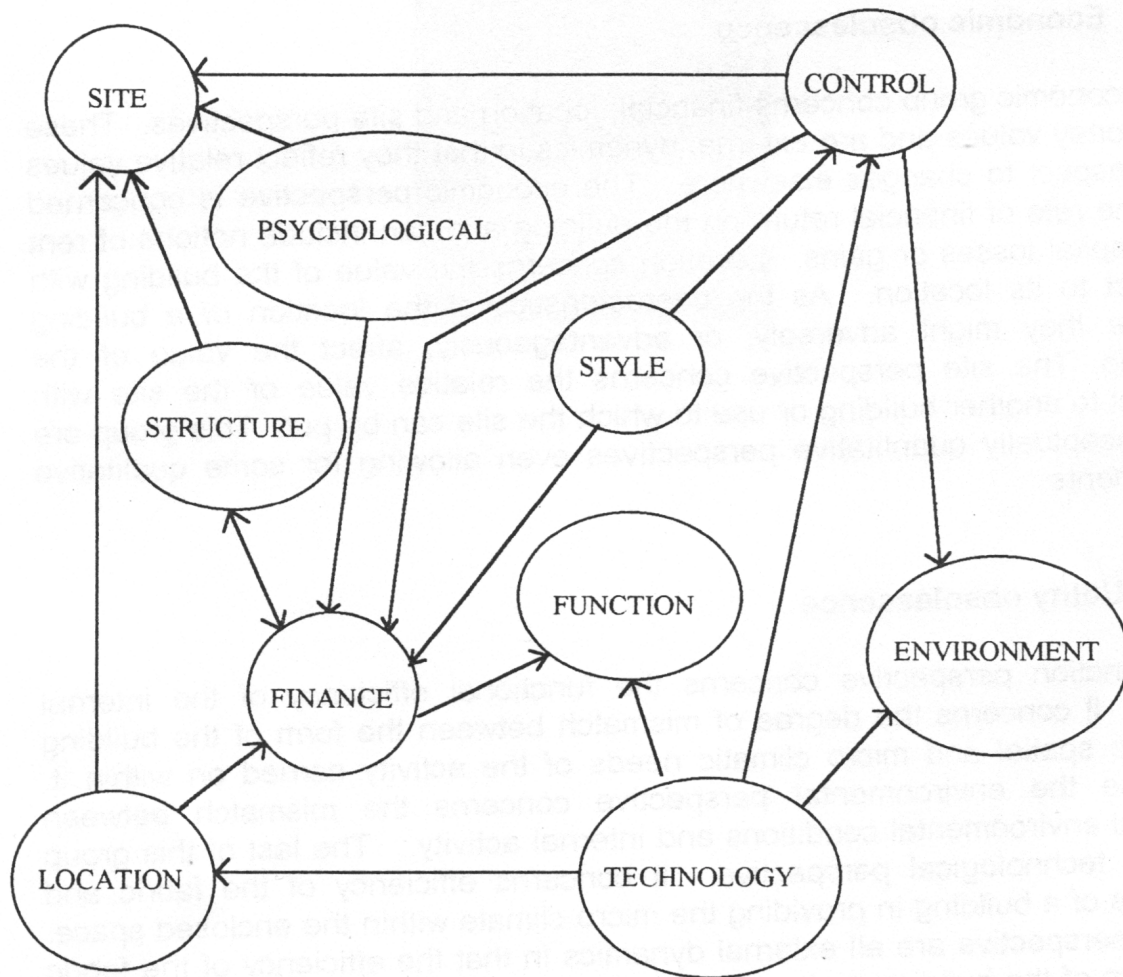


Figure 1. A taxonomy of building obsolescence [2]

The taxonomy suggests that there are ten perspectives that are interrelated and can be categorised into four groups of perspectives. Changes in one perspective iterate through other perspectives. They are dependent variables whose groups are; Structure that sits alone; the Economic perspectives of finance, site and location; the Utility perspectives of function, environment and technology; and the Social perspectives of psychology, style and control.

Structure concerns the fabric of the building. The rates of decay of the fabric of building can be measured, although the accuracy of the measurement may be questionable. It is an internal dynamic in that the measures are absolute change in the building. Conceptually it is a quantitative perspective.

The economic group concerns finance, site and location issues. These are money values and are external dynamics in that they reflect values relative to changes elsewhere. The financial perspective is concerned with the rate of financial return on the building and can include notions of rent and capital losses or gains. Location concerns the value of the building with respect to its location. As the characteristics of the location of building change they might adversely, or advantageously, affect the value of the building. The site perspective concerns the relative value of the site with respect to another building or use to which the site can be put. The elements in this group are all conceptually quantitative perspectives even allowing for some qualitative judgements.

The utility perspectives concern the functional efficiency of the internal space. Functional obsolescence addresses the degree of mismatch between the form of the building and the spatial and microclimatic needs of the activity carried on within it. Likewise the environmental perspective concerns the mismatch between external environmental conditions and internal activity. The technological perspective addresses the efficiency of the fabric and the services of a building in providing the microclimate within the enclosed space. These perspectives are all external dynamics in that the efficiency of the fabric and form of the building is dependent on relative efficiencies with other buildings. The efficiency is measured by quantitative and qualitative methodologies.

The social perspectives are those of psychological, style and control issues. Control addresses the legislative environment that is a political act of defining the obsolescence of buildings by decree. For example the building and fire codes define the technology of the fabric and services of buildings, and planning legislation defines the form and use of building. Style concerns the fashion of the time, essentially a qualitative value. The psychological perspective concerns an individual's reaction to the physical clues expressed by a building and the meaning of those clues conveyed to the observer. It is, as Rapoport [3] argued, about symbolism and psychological constructs. Whilst generic approaches exist to explore these issues, they are essentially qualitative.

Why then was it decided to demolish the building that is the subject of this study? Cole et al [4] reported that "Increasing concern is being expressed about the problem of low demand for housing and the consequences for social cohesion and community well-being of unpopular and obsolete properties... locked in a spiral of decline of which low demand for housing is both a key cause and effect." St Mary's, Oldham was such a development to which these observations could be applied.

On exploring the history [5] it can be seen that this epitaph in a similar form has been applied to developments at St Mary's on many occasions. In 1820 the site was farmland with a sparse scattering of cottages. By 1850 the site had been developed with terrace and courtyard housing for miners and mill workers with an occupation rate of five persons per house in 1871. By 1880 the whole area had been developed on a gridiron pattern and all floor surfaces were cobbled, paved or covered in brickwork. In 1886 the Medical Officer of Health is reported as saying "The special insanitary form which poverty takes in... St Mary's is unhealthy dwellings." The key problems at this time were dampness and bad ventilation. In 1962 the Ministry of Housing and Local Government Report [5] on the area was revealing similar problems relating to the lack of satisfactory sanitary facilities. Where occupiers were spending money on the properties it was for furnishing and decorations and not for resolving structural problems or providing sanitary facilities. The approach was adopted irrespective of tenure. In 1962 it was an area of steady demand due to low housing costs, a supportive social community close to the town centre, and the properties being houses.

The local authority of the day decided that the best way to resolve the unsatisfactory housing conditions was by redevelopment. The comprehensive redevelopment approach required the complete clearance of the area before rebuilding could begin and so the community would have to be dispersed. 75% of the residents expressed a desire to stay in St Mary's. There was also an overwhelming desire to be rehoused in houses or bungalows and not in flats. "The opposition to living in flats was not... based on the experience, but it is worth considering in detail as a record of what people felt (in so far as they could be explicit about their

apprehensions).” [5]. In the event the area was redeveloped mainly with flats. In a social survey 18 months after the occupation of the last flat, 93% of the tenants were very or fairly satisfied with their dwelling [6].

By the mid-1990's St Mary's was again cause for concern. "...tenant turnover was 35%, considerably higher than the borough wide figure of 15%. Demand for properties on the estate is low evidenced by the fact that over 20 percent of those housed last year had no points and were therefore not assessed as in housing need." Technically the dwellings were generally sound and were capable of being refurbished but the cost of the works demonstrated that the estate had a negative value [7]. It was economically obsolete.

The development of choice in the social housing market meant that the preferences expressed by the tenants some 30 years earlier could now be exercised. The prospective occupiers considered them obsolete from utility and social perspectives. Exercising choice determined the obsolescence of the properties for the landlord from an economic and functional perspective. The appropriate decision was therefore to demolish the buildings.

Having decided to waste the buildings a key decision concerns the maximisation of recovery of resources in the obsolete structures. This is the focus of this study.

2. ST. MARY'S ESTATE, OLDHAM: THE JESPERSEN STREET PROJECT

When the St. Mary's Estate was redeveloped in 1967, Jespersen Street was one of a number of low-rise blocks of flats that were built alongside terraced houses. The blocks of flats were originally linked with 'sky-bridges' to provide easy access from one to another. At the time of this demolition, all other flats had already been removed as part of previous demolition projects, and Jespersen Street stood isolated. The terraced houses are still occupied and there are no plans to demolish these in the foreseeable future.



Photo 1. A section of the north elevation of Jespersen Street before demolition.

2.1 General Building Description

1 – 133 Jespersen Street consisted of a linear block of one-, two- and three-bedroomed flats and bedsits, with raised deck access on alternate floors. The block was aligned east-west with access from the rear (north) elevation. The eastern end of the building was five storeys in height, reducing to three storeys at the western end; this arrangement was dictated by the sloping site which has gradients of up to 1 in 8. The eastern end of the building also had a short length of basement below.

2.2 Construction Technology

The St. Mary's Estate redevelopment used the 12M Jespersen method [8]. This prefabricated system of building was developed in Denmark, and brought to the UK by John Laing and Son. The system relied on prefabricated medium weight concrete panels for cross walls and floors, and other factory techniques for external cladding and internal partitions. The size of the St. Mary's Estate (originally 495 dwellings) made it an ideal project on which to use a prefabricated system; the larger the scheme the greater the savings in both cost and erection time.

Walls

Load bearing cross walls were a standardised height of 8ft 4ins (2.5m), in lengths of 4ft (1.2m) or 8ft (2.4m), and had a thickness of 7ins (180mm). These were not reinforced. Gable walls had a standard load bearing inner leaf with a layer of bonded polystyrene insulation and the outer cladding panel applied (see below). Special 'goalpost' panels [9] were used to frame the access deck.

Floors

These were also formed of 7ins thick concrete, but this time reinforced, and came in a standard width of 4ft. Lengths could vary from 6ft (1.8m) to 18ft (5.4m) in 1ft (0.3m) increments. The floors were finished with a screed and domestic floor finish to the ground floor flats and tongue and groove (T&G) boarding on battens to upper floors.

Cladding and Partitions

Infill cladding comprised dense-aggregate concrete panels between cross walls with continuous glazing over. Internal non-loadbearing partitions were unplastered pre-cast lightweight concrete slabs.

Stairs and Deck Access

Public staircases were pre-cast concrete with metal handrails, whilst internal staircases were timber. The access decks were finished with a layer of asphalt, and had polystyrene tiles adhered to the soffits. Here concrete handrails were provided, with a lightweight composite panel spanning between columns beneath.

Windows and Doors

Originally painted softwood exterior doors were provided, and metal framed single glazed windows. However in some flats these had been replaced with PVC doors, windows and fascias. All internal doors were hollow-core.

Heating

The St. Mary's Estate operates a district heating system to remaining houses, which initially supplied ducted warm air heating and hot water to Jespersen Street as well. The ducted warm air heating was later altered to radiators in the flats.

The overall dimensions of the building were 200m long by 11m deep. To achieve this depth nine floor panels and five wall panels (four large and one small) were used per structural bay. Jespersen Street comprised 50 structural bays, containing 5 staircase/refuse bays and 45 accommodation bays, (the accommodation bays provided two flats per level for every three structural bays, see Figure 2 below)

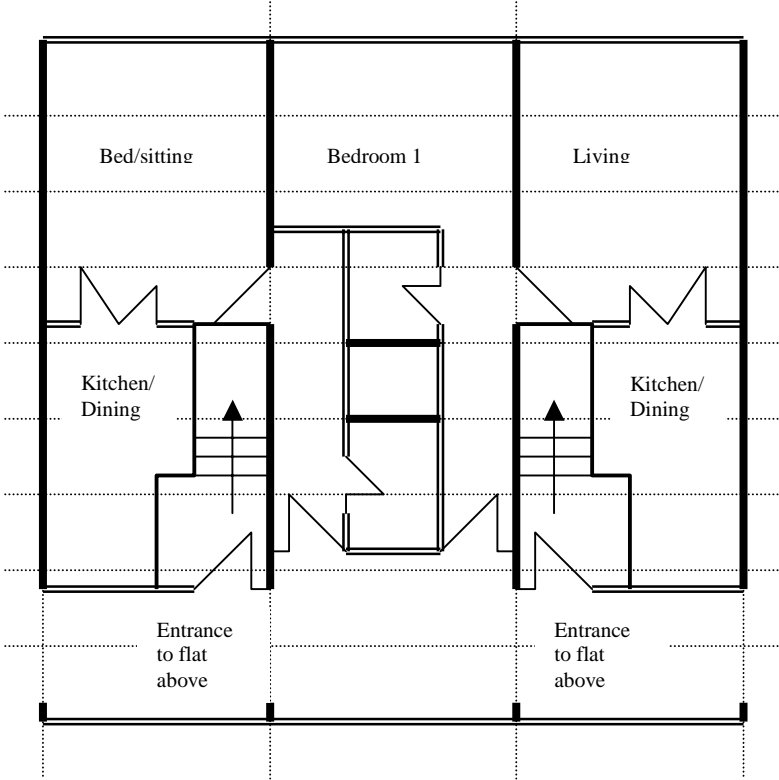


Figure 2. Typical flat layout on access deck level. Left: Bed-sitting room flat. Right: 1 bedroom 2 person flat. (Not to Scale)

All the floor and wall panels (not external cladding) were produced in steel moulds to give a smooth finish. Fixings were moulded into the panels at the factory, and joints between panels were concrete filled in-situ.

2.3 The Demolition

Martin Flynn Demolition of Manchester bid £10,000 less than their nearest two competitors to win the contract to demolish Jespersen Street from Oldham Metropolitan Borough Council. The contract period ran for eighteen weeks from 22nd May 2000 to 22nd September 2000.

Hoardings were erected around the site during the first three weeks of the contract. These consisted of chipboard panels screwed to a framework of timber posts and rails. Since these were screwed instead of nailed, this allowed them to be dismantled and either be reused by Flynn or sold on to another user. Screw fixing is more expensive initially, but not only can the boards then be reused, they are also more resistant to being kicked through by vandals than the nailed equivalent. The hoardings on this project cost £15,000.

At the beginning of the fourth week, a sub-contractor started to strip out the building. From the first week of the strip out, two types of skip were on site: one from a local timber recycler that produced chipboard; and one of Flynn's own for debris to be landfilled. Except for the T&G boards, all solid wood removed from the building was placed in the chipboard skip. Some of the fittings removed from the flats could not be recycled in this manner, for example hollowcore doors and kitchen unit carcasses, and these were landfilled. The T&G boarding was stockpiled on site, and all reusable boards were taken by H & J Reclaimed Timber at the end of the project. The remaining off-cuts and damaged boards were then put in the chipboard skip.

In flats which had been unoccupied for a long period before demolition most of the heating system, radiators and pipework had already been removed, but in those more recently vacated, some remained. Any copper found was kept in one of the site huts until the end of the project when enough was collected to send to a dealer. All the sanitaryware and radiators went to a scrap dealer to be sold on. The protective boards from the windows in good condition went to Flynn's yard, although ten were sold to a member of the public for £10. The rest were scrapped.

Asbestos panels were found in the airing cupboards of some flats. An asbestos removal firm was brought in from the sixth week, and once the flats were cleared of asbestos they were marked so that in the event of a fire the fire brigade would know which flats still contained asbestos and act accordingly. Flynn use the same asbestos removers on all their contracts in the region.

Attempts were made to find a recycler willing to take PVC window frames, but when this proved to be impossible (recyclers were unwilling to take post-demolition waste, and only really dealt with waste from the manufacturing process) the windows were removed from the north side of the building. This allowed other materials such as the timber to be dropped from upper storeys, whilst leaving the windows on the southern elevation meant better site security. (This elevation looked directly over a main road, and was considerably nearer to the boundary of the site than the northern elevation).

Some of the infill panels on the deck fascia of the flats turned out to be good quality timber with insulation behind. Once the insulation was stripped from these panels they were sent for chipboard. Polystyrene tiles from above the deck were removed with a hoe and bagged as work progressed to prevent the wind taking them. This proved to be quite a time consuming job, and could only be carried out after materials stripped from the flats had been removed from the deck (see photo 2), and sorted into the appropriate skips.

An asphalt roofing company came to the site and enquired about taking up some of the decking surface. Flynn agreed that they could have the asphalt free of charge if they took it up themselves. This helped both parties, as the amount of timber in the flats meant that Flynn were getting behind with the stripping out, and the asphalt company brought their wagon on site and fed the removed material straight into the boiler.

Demolition of the actual structure began on 18th July. This was initially carried out with a long-reach excavator with hydraulic breaker attachment. However, as demolition progressed it was found that an ordinary excavator with bucket claw attachment sufficed.



Photo 2. Materials stripped from flats are left on access decks for sorting.

The sloping nature of the site, and the proximity of the building to the site boundary in some places meant that demolition could not simply start at one end of the building and proceed linearly. A section had to be taken out of the centre of the building, so that the excavator could get into the line of the building. Demolition then proceeded westerly to the end of the building, and the excavator was turned around to complete the demolition in the other direction.



Photo 3. The 75 tonne excavator gains the height it needs using the debris pile.

It took two days to reach the western end of the building, where an operative had to be constantly watching the footpath just outside the site boundary to make sure pedestrians didn't walk too close whilst demolition was in progress.

When the demolition doubled back, the 75 tonne excavator could be used. All the concrete was going to be crushed offsite but was initially stockpiled on the site. This debris pile was banked up so that it would give the smaller excavator the height it needed to reach the top of the building. See Photo 3 overleaf:

The final section of the building at the easterly end had to be demolished at a quiet time of day in terms of traffic (early in the morning on a Saturday), because it was so close to the road there were concerns about debris falling on the carriageway.

Once all the building was demolished, sorting of the rubble began. Reinforcing bars were sent for recycling, and all the concrete went for crushing off-site (Oldham MBC wouldn't allow crushing on the site).

2.4 Debris Trails

The following table provides a summary of the debris that was removed from Jespersen Street in terms of type, quantity and destination and ultimate fate:

Table 1. Summary of Debris Trails from Jespersen Street

Material Type	Quantity	Destination	Fate
Concrete	9400 tonnes	Off-site crusher	Recycled
T & G floorboards	3000 sq. m	H& J Reclaimed timber	Reclaimed
General timber	92 tonnes	Chipboard companies	Recycled
Asphalt	10 tonnes	Roofing company	Recycled
Copper pipe	2 tonnes	Scrap merchants	Recycled
Aluminium	0.25 tonnes	Scrap merchants	Recycled
Reinforcing steel	140 tonnes	Scrap merchants	Recycled
General waste (including plastics and chipboard)	45 tonnes	Landfill	Disposal

In addition to the above, the hoardings and protective covers from the windows of Jespersen Street were also taken for reuse, and small numbers of toilets, washbasins and other fittings such as boilers and radiators.

2.5 Closing the loop

Overall Oldham MBC were very impressed with the level of reclamation and recycling that took place on the Jespersen Street project. No previous demolition contractor had recycled as much as Flynn on an Oldham contract. This could partly be due to the fact that there was no redevelopment taking place immediately on the site, so the time period for the demolition was longer. However, the lack of redevelopment did mean that Oldham MBC had no demand for recycled concrete for use on their own site. They also refused planning permission for a mobile crusher in a yard close to Jespersen Street, making the recycling and sale of the aggregate difficult. Flynn had to find other outlets for the material.

Although the idea of screw fixing the hoardings was good, when panels were removed (either by vandals or by the operatives) they were replaced using nails.

In this case the level of reclamation and recycling is high given the circumstances. Oldham MBC could have given more thought to their role as a possible recipient of some of the recycle and this would have helped to close the loop still further. Apparently, although the council did not need to use the crushed concrete on their site at Jespersen Street, they were completing another project at a school in the area for which they were importing virgin aggregates. Unfortunately this site was for the Education Department, not the Housing Department as at Jespersen Street, so the connection had not been made before tendering. This shows the need for organisations to realise that when demolishing properties, resources are being released. These resources may be of use to other sections within the organisation and there is a need to establish appropriate communications to disseminate that information. A new culture needs to be developed.

3. CONCLUSION

This paper has introduced a study of Jespersen Street in Oldham to try and illuminate whether a relationship exists between the reason for a demolition and the way in which that demolition is carried out.

In the case of the flats on the St Mary's Estate, although they were structurally sound and offered substantially larger accommodation than in many modern homes, prospective tenants had deemed them obsolete from social and utility viewpoints. The demolition of Jespersen Street was the final stage in the systematic removal of all the flats built on the estate in the 1960s. The whole process was partly instigated by the residents association who were worried about increasing incidences of drug abuse, arson and unsociable behaviour. Many of the estate's residents liked the area and wanted to remain in the vicinity, but believed that the blocks of flats were attracting the "wrong sort" of tenants. One of the reasons for the demolition from Oldham MBC's point of view was there were too few tenants to support the amount of housing available on the estate.

Although outline plans are in place to introduce a lower density of housing (possibly pensioners' bungalows) on the site in the future, there were no immediate plans to replace the quantity of accommodation demolished. The demolition contract period was therefore longer than if the site was to have been built on immediately, and meant that the proportion of materials reclaimed or recycled was greater than could have been expected otherwise. Unfortunately, the lack of imminent redevelopment also meant that there was no obvious outlet for some of the recycled concrete, and the contractor had to explore other avenues for recycling in consequence.

Although this case study does not prove a direct link between obsolescence of a building and the demolition method employed, it does show that an indirect relationship between the two may exist. The reason for obsolescence influences decisions made with regard to demolition and/or rebuilding a structure. These decisions can in turn influence the contractual terms for a demolition, for example the time period allowed. Ultimately this can affect the method chosen for a particular demolition and thus the amount of reclamation and recycling carried out.

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