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Deconstruction, demolition and destruction

André Thomsen, Frank Schultmann and Niklaus Kohler

There is a large general agreement on what constitutes ‘demolition’: it is the complete elimination of all parts of a building at a specific location and time – typically it is the end of life for the building. Unlike the initial phases of design and construction (which fill most of the shelves of architectural libraries), the end-of-life phase of buildings has received little scientific attention so far, although its quantitative and qualitative significance is considerable. However, partial demolition actually begins during the service life of buildings as maintenance and adaptation include the replacement of building parts, resulting in a considerable waste flow. Over a very long life-span this has been shown to exceed the waste flow from simple demolition. From the perspective of waste prevention, the downstream flows of the building stock (*i.e.* ‘construction waste’), will be an issue of growing importance in both construction and property management.

The consideration of what factors influence the survival of buildings (and thereby reduce the demolition rate) often entails the structure and form, the location and possibly the function of a building. The use, refurbishment, transformation, enlargement, etc. of buildings and the building stock are typically neglected in our discourse and research. This omission is particularly problematic. The large amount of embedded natural, social and financial capitals in the built environment mean that the linked topics of building survival and demolition are vital in any understanding of sustainability and the long-term management of a significant resource.

Ironically, the composition of many historic Central European towns whose buildings appear authentic and well-conserved is deceptive. There is only a small part that is probably original and most buildings have already been ‘demolished’ (*i.e.* reconstituted, renovated or replaced in part) several times. This brief consideration of the term ‘demolition’ suggests the definition is not as unequivocal as might be

thought. The reasons, the objectives, the context, and the methods of demolition vary considerably and general statements on ‘demolition’ are highly suspect. The objectives of this special issue are to understand why the issue of ‘demolition’ has become increasingly important, to connect ‘demolition’ to adjacent concepts, to consider how the different types of definition could be analysed and classified, and to suggest what future research is necessary. A short bibliography of *Building Research & Information* papers on deconstruction, demolition and destruction is also provided.

The amount, the reasons, the objectives and the contextual conditions for losses of buildings became an issue when the attention began to shift from a view of construction that was exclusively focused on the production of new buildings to a more stock-oriented one (Hassler and Kohler, 2002). In most developed countries, the small amount of new construction relative to the existing stock (which typically is below an annual average of 1% of the stock) combined with the need for a more sustainable approach to the management of the existing building stock requires a paradigm change (Thomsen and van der Flier, 2009). In contrast, most developing countries are experiencing a massive expansion of their building stock to accommodate an expanding and shifting population which is often accompanied by the demolition of traditional living areas and large-scale environmental damage.

From a building stock perspective, demolition can be seen both as a loss of substance (risk) and a possibility to create something new (opportunity), a moment of ‘creative destruction’. In addition, most developed societies tend to have a stabilization (or even ageing) of their population and their building stock tends to be stable. An increasing recognition is placed on the management of the stock as this is related to pension income and retirement issues.

Ongoing globalization is characterized by a paradox of a massive increase of new buildings (e.g. in China and in other fast-growing economies) and, at the same time, a shrinking phenomena (sometimes within the same country). The latter is linked to industrial transformations and economic decline, property (real-estate) over-production or demographic changes. The rate of demolition is the most visible aspect of this profound social process.

The life cycle vision of buildings is another significant perspective. Initially the end of the life cycle was mainly seen as a waste (landfill) and maybe a recycling (down-cycling) problem. But 'waste' is increasingly considered as another form of resource. The 'cradle-to-cradle' perspective means the end of the life cycle is just the beginning of a new life cycle. The implication for the construction and deconstruction sector is that they are both part of the same industrial cycle, which is a closed loop. Based on a larger industrial ecology approach, a new perspective is emerging. Resource conservation and industrial ecology have become research issues, reverse engineering, regenerative design, notions known from other industries, are beginning to be discussed in the building sector. One manifestation is to understand buildings as future resources and is known as 'urban mining'.

There is also increasing recognition of the cultural and social implications of continuity and discontinuity. Demolition cannot be considered as a purely technical or environmental problem, it is situated in the larger context of town regeneration, or less positively, town shrinkage phenomena. But the social and cultural phenomena behind demolition can be embedded within violence and take the form of massive eradication of culturally important buildings and ensembles as destruction of monuments (International Council on Monuments and Sites (ICOMOS), 2007), as 'architecture at war' (Bevan, 2006; Vanderbilt, 2003).

In addition, inside the large metropolises of the world, social and/or political transformation processes are often accompanied by massive destruction. Destructions through fire (as well as fire prevention – by replacing combustible wooden quarters) are in turn often used as a weapon in transforming towns and displacing social groups, as Wallace and Wallace describe in this issue. The 'right to the city'¹ is not granted forever and open to contention. It results from a social differentiation process, which takes different forms from the transformation of Paris by Baron Haussmann to the transformation of New York by Robert Moses and to the transformation–destruction of the historic centre of Beijing (Harvey, 2008). From this viewpoint, destruction and demolition are considered as a 'natural process', as something creative. Haussmann, when entering the

Academie Française called himself an '*artiste démolisseur*' (a destroyer artist) (Haussmann, 1890, p. X). The notion of creative destruction is generally associated with the economist Schumpeter (1949/1951), but goes back further to Marx (1857/1973, p. 750) who described this as *schöpferische Zerstörung*. How the act of demolition is exertion of power and control by politicians and planners and its urban processes is supremely described by Jane Jacobs (1961) in her influential book on the subject of urban planning.

The present issue can only cover a very small part of a large new research field. As a first distinction three notions are used to classify the contributions: deconstruction, demolition and destruction.

Deconstruction

Deconstruction is generally a positive notion. It is a well-defined field of engineering drawing on construction, structural design, construction management and industrial ecology. It is generally opposed to demolition as an undifferentiated process of taking apart and compressing a building and disposing the waste as landfill. Deconstruction has two phases:

- the careful planning and highly controlled deconstruction process producing a differentiated assortment of components and materials
- the continued use of the deconstructed components and materials in other buildings or in other functions at the highest possible level, to avoid down cycling, energy transformation and deposit into landfill as much as possible

The first phase is relatively well known: there are a number of case studies, specific scheduling techniques have been developed, firms have accumulated a considerable technical capacities and standardization is beginning to occur. The second phase is much less known. The contribution by Hiete, Stengel and Schultmann in this issue concerns the second phase by understanding the system dynamics of deconstruction in terms of supply and demand at a regional level. Reuse or recycling normally does not happen at the same place as the demolition. The presented optimization model works at a regional level and allows the optimization of downstream flows and reuse under certain institutional and economic (transport) constraints.

There is enormous potential for future research areas. A number of further questions need to be placed on the research agenda in order to provide the necessary evidence, knowledge and confidence for improving

public policy, strategic thinking and actual implementation/practices:

- How can concepts of industrial ecology be triggered to the specific needs of (de-)construction?
- What can be learned and applied from engineering knowledge to de-engineering or reverse-engineering in order to adapt them from construction to deconstruction?
- What policies and processes are needed to shift from case studies and pilot projects to industrial scale deconstruction?
- Are specialized ‘deconstruction workers’ needed? What expertise is required and what specific skills are needed?
- Is there a need for a qualified certification for deconstruction work and how should such a process be operated?
- How can the risks associated with deconstruction works and the use of the resulting materials be managed?
- How can public policies (financial and legislative) be designed to support the practices of deconstruction and recycling as a public ‘good’ without negatively impacting on the loss of building stock?
- How should certification processes for components and the associated risks for reuse be generated?

Demolition

Demolition can be considered as a normal process to regenerate building stocks over longer periods. As mentioned, partial demolition begins with maintenance and refurbishment work; in theory this could continue until the whole building is replaced (one or more times) in a piecemeal manner. The governance (or the ‘regime’ comprising a complex set of legal, financial, commercial and operational rules, drivers and barriers) is the most significant influence on demolition. Until a century ago the small-scale ‘organic’ renewal and transformation process was the normal way buildings and towns were redeveloped. The introduction of mass construction and large-scale tenure also brought large-scale stop-and-go development cycles. As a result, the conditions for development and renewal processes are nowadays highly dependent on regional market conditions and tenure. Market conditions determine the rate of transformation. A low and/or declining market demand generally results in a slow speed of transformation that might lead to dereliction. A high and/or rising demand usually fuels

development and transformation, which may (in combination with changing conditions) potentially lead to excessive speed and even to system overshoot and market collapse. In both cases the result is a loss of resources, of value in different forms. Tenure is also a factor for the kind and the scale of development decisions. Demolition of owner-occupied terraced houses seldom happens (although the maintenance and housing quality are often below acceptable standards) but demolition does occur in the rented social sector.

In terms of physical and functional performance, the criteria informing demolition issues comprise a broad definition of the different forms of value losses of buildings. The notion of ‘obsolescence’ (from the Latin *obsolesco* meaning ‘losing prestige and value’) could form the basis for understanding demolition. Thomsen and van der Flier in this issue propose a conceptual model for buildings based on understanding obsolescence:

Obsolescence presents a serious threat to built property as it rarely accounts for the immobile, long-lasting and (financial and natural resource) capital-intensive characteristics of property, nor its societal and cultural significance. Minimizing obsolescence and extending longevity are therefore indispensable for maintaining the physical, economical and societal investments.

(p. 352)

They propose a conceptual model for different kinds of obsolescence which distinguishes physical and behavioural factors. This is certainly an interesting first step towards an evidence-based approach of obsolescence.

However, demolition is not only a ‘natural’ phenomenon. The role of public policies and their influence on practices are formidable, although not well understood. These policies – whether explicitly or inadvertently – may exacerbate demolition and therefore warrant closer inspection and research. These policies take a variety of forms and often work in concert with each other to create a regime that can promote demolition over other alternatives. These policies include tax and financial instruments which favour new construction instead of refurbishment and maintenance, planning incentives, property values and valuation processes, opportunity costs and regulations mandating the upgrading of existing buildings, etc. One example is the UK tax regime where the value-added tax (VAT) on constructing a new building is zero, but the tax cost of renovation and maintenance is 20%. The impact of changing the tax rate on renovation and maintenance to be equal to the tax on new building would make demolition less viable. Another example is the land policy in the Netherlands that

guarantees municipalities full coverage of the costs of renewal of the infrastructure (streets, sewage, green space, etc.) in the case of new construction but not in the case renovation, causing municipalities to favour replacement after demolition instead of renovation. Another revenge effect from public policy is the application of current building codes and regulations to existing buildings. This often entails expensive alterations which can make compliance through demolition and rebuilding a cheaper or more profitable option for the owner/developer.

Although there are scant statistics concerning the probability for demolition as a function of specific buildings attributes, two particular cases are of interest: the small, insignificant buildings which just disappear one day (even if their gradual disappearance creates empty spaces); and the large ensembles with a prominent status. An example of large ensembles could be the demolition of Les Halles in Paris (1971–1973) described by Chevalier (1977), or the demolition of large housing estates built after the Second World War, e.g. Pruitt-Igoe in St. Louis in Missouri, US, completed in 1955 and demolished in 1972–1976 (Bristol, 2004). Its destruction was described by postmodern architectural historian Charles Jencks (1984, p. 9) as ‘the day Modern architecture died’. A similar example is the demolition of the Bijlmermeer, one of the world’s most famous large housing estates in Amsterdam, the Netherlands. Frank Wassenberg in this issue focuses on the contrast between the high expectations and the actual outcome which turned out to be a failure. This acknowledged failure led to the demolition of well over half of the 13 000 dwellings. It is this contrast between reasonable expectation and complete failure, which (after other social, physical and economic interventions have been tried) does not seem to leave any other solution than demolition, although the physical quality of the buildings is undisputedly good. The Bijlmermeer is not a unique case; similar demolitions occurred in France (Gilbert, 2009) and the UK (Power, 2010) and will occur in other cities as long as demolition is used as a means to solve social problems. It is not certain that the interventions after the demolition (new urban development) that formally go in opposite directions (a low-rise pavilion to replace a high-rise, etc.) will avoid analogue processes of social and physical dereliction. An in-depth analysis of these processes is absolutely necessary; the existing evidence is still largely unexploited by research.

A distinction should be made to account for the dynamics and effects of demolition in different situations. The demolition of individual buildings should be contrasted with the more complicated larger-scale demolition that is generally situated and explained in a larger urban transformation process. There are several characteristic situations: fast growth (e.g. the

old town of Beijing), intensive transformation (e.g. the transformation of Paris under Haussmann) or shrinkage following demographic decrease or de-industrialization (e.g. eastern Germany after 1989). These phenomena have been the object of research (Deilmann *et al.*, 2009). New phenomena appearing combining shrinking and sprawl are being analysed under the title of ‘shrinkage sprawl’ (Siedentop and Fina, 2010).

Alan Mallach’s ‘Demolition and preservation in shrinking US industrial cities’ (in this issue) explores the history of demolition as a policy response to real or perceived problems. Although demolition has received little attention from scholars so far, he draws attention to the fact that its quantitative significance is considerable. From the 46 million dwellings existing in the US in 1950, only 26 million had survived to 2006: 44% had been removed, ‘the vast majority most probably through deliberate demolition’. A useful distinction is made between product-driven demolition (the site is cleared for an alternative use) and problem-driven demolition (the aspiration of solving a problem by demolition). In a similar way, Thomsen and van der Flier (2009) distinguish between profit- and quality-driven demolition motives. In the case of de-industrializing shrinking cities in the US (and elsewhere), a balance between demolition and preservation is critical to preserving viable neighbourhoods and restoring vitality to these cities. This balance could be the framework for preserving viable communities rather than individual buildings.

Whereas the preceding contributions mainly consider why buildings are demolished, Deborah and Rodrick Wallace in this issue analyse the ‘Consequences of massive housing destruction: the New York City fire epidemic’. This presents a transdisciplinary case study of the fire epidemic in the 1970s. New York City’s fire-fighting services were greatly reduced with the consequences of loss of housing, movements of population, and disruption of social, political and economic networks. The financial, social and human costs of these consequences are extremely high and a number of false/poor assumptions about cost–benefit savings are highlighted. The structural and functional continuity after a disturbance (ecological resilience) depend on many non-disjunctive ‘loose’ relationships to diffuse these impacts. Concentrated housing destruction destroys healthy resilience and social control and support. Indirectly, it elevates the mortality rate through increased risk behaviours. The authors conclude:

At every stage of its life, a building embodies the social, economic, and political processes and structures of many organizational levels from the community to the global. Although art historians and architects have filled libraries with

analyses of how these processes and structures imprint themselves onto the design, siting, and construction of individual buildings and stands of buildings, the maintenance and destruction of buildings also reflects the same societal processes and structures.

(p. 410)

The particular phenomenon described in this paper suggests a wilful (political and economic) approach to the cumulative destruction of buildings and the communities they support. Destruction (and the implied violence associated with it) is perhaps more widespread than has been previously acknowledged and can take many subtle and overt forms within a society. It is not only planners and developers who control losses to the building stock, the withdrawal of services and support have a huge impact on buildings, neighbourhoods and cities that can take a generation or more to heal.

The questions surrounding demolition deserve further exploration through the development of a research agenda to inform policy, strategy, education and practice. *Building Research & Information* will continue to examine these questions and seek to broaden and deepen this research agenda by publishing further papers. Some future research issues include:

- What are the theoretical and practical physical and economic life spans of (different types of) dwellings?
- Is there a normal (physically determined) demolition rate?
- What is the average life span and demolition rate in similar countries (European Union, Organisation for Economic Co-operation and Development (OECD), etc.) and what explains the differences?
- What are the key demolition motives of different property owners and related stakeholders (e.g. municipalities) of different stocks? To what extent can and should these be influenced and publicly legitimated?
- What processes exist to understand and value the social and other impacts of demolition?
- What forms/examples of governance (regime) accelerate or impede demolition? What are the wider implications for a society that has a slow/high rate of demolition?
- What is the influence of the design on the physical and economic life cycle of buildings? To what extent could general design knowledge (and rules) prevent building obsolescence and unnecessary demolition waste?

- How can the value of a building be determined in the case of demolition? What shortcomings exist in the current (economic) valuation methods? What value propositions (building appraisal/valuation and property factors such as planning density) influence demolition decisions?
- How can immaterial (intangible) values (e.g. residents' interests, affections, and emotions and heritage) be incorporated?

Destruction

Some demolitions of buildings and ensembles have a clear cultural intent. Certain buildings are destroyed with the intent of erasing the (collective) memory or identity related to these buildings (or what they stand for):

Buildings are attacked not because they are in the path of a military objective: to their destroyers, they *are* the objective.

(Bevan, 2006, p. 8)

A large number of such examples of destructions of architecture and of works of art with high symbolic signification can be found.

(Gamboni, 1997)

Other examples of large-scale destructions for cultural reasons are not immediately perceived to belong in this violent category, but often have similar drivers. The contribution by Johansson in this issue shows that the post-war redevelopment of Swedish inner cities entailed a radical destruction and rebuilding programme to reshape the centres of those cities. The scale of this mass destruction programme was significant and led to a major loss of building stock. The documentation and the analysis of the complex underlying drivers show a confluence of many different interests. These included planning and architectural theories, a disregard for heritage, the cult of modernity, strong pressure groups formed by big business, and others. The particular case of post-war Sweden suggests that the wholesale demolition was unnecessary in practical terms but undertaken to fulfil vested interests and ideological beliefs.

The dramatic violence of war and conflict that is used to destroy buildings is obvious to all. It raises fundamental questions about the right to act in this way. Even warfare has some rules on what is and is not permissible. If the destruction of the cultural identity and memory embodied in certain buildings or monuments is allowed, what separates this act from further acts of violence and torture? Does an unchecked act of cultural destruction embolden a group to escalate their violence in other ways? Is it right to obliterate cultural identity as an act of violence?

Conclusions

The distinction between deconstruction, demolition, and destruction shows a first attempt to classify and refine the reasons, the objectives, the form and the context of demolitions. A large field of research is opening which combines top-down theoretical approaches (e.g. a theory of obsolescence), concepts from social-ecological system analysis (adaptation, resilience), approaches from social science (e.g. social capital, collective memories), and others still to be articulated. In parallel and to complement the top-down approach, bottom-up studies are emerging about the process of urban transformation, e.g. shrinkage under different forms, survival analysis of particular building stocks, actor-oriented approaches. Demolition is a good example of the necessity of trans-disciplinary research: no discipline can claim demolition to be its own. The demolition problematic is clearly a societal problem with multiple facets. In the same way, no one profession has control over demolition. Coordination and dialogue are required amongst and between various professions, public policy-makers and stakeholders if constructive change is to occur.

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Endnote

- ¹Harvey (2008, p. 23) defines the ‘right to the city’ as ‘far more than the individual liberty to access urban resources: it is a right to change ourselves by changing the city. It is, moreover, a common rather than an individual right since this transformation inevitably depends upon the exercise of a collective power to reshape the processes of urbanization’.