

The Challenge of Systems and Series: New Paths in Preserving and Developing 'Late Modernist' Buildings (?)

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Abstract

Today, even some mass-produced and prefabricated buildings from the 1970s are labelled as 20th century buildings worthy of protection. Nevertheless, heritage conservation practice still has its difficulties when it comes to the attribution of architectural, artistic and social values and the resulting management of the built fabric of this period. When selecting outstanding buildings, the inventory encounters difficulties in the argumentation, because numerous buildings were erected during the economic boom of the 1970s. Some experts say that the theories and methods of heritage conservation that have been established for many decades are just as applicable here as they are to other buildings. Others believe that there must be more freedom of action, because the parameters of authenticity and integrity - cornerstones of heritage conservation for around 120 years - must be weighted differently.

Building in existing structures is an increasingly relevant field of activity for the construction industry, which appears particularly attractive in the case of system buildings. Up to now, many refurbishments have been characterised by dismantling the load-bearing system, which sometime led to a loss of the architectural qualities and historic value of the building fabric. Both for listed and non-listed buildings, there appears to be greater scope for conversion than for buildings from other time periods. There are therefore several reasons why these buildings need to be addressed from a heritage conservation perspective: buildings from this recent past are increasingly being reshaped and losing their distinctive character. Their refurbishment poses a current theoretical and technical challenge. This article uses case studies and observations from academic research to ask: Does the practice of heritage conservation on these buildings need to be rethought? Do new strategies and methods need to be developed? In any case, a sensitive and at the same time critical examination of this architectural heritage is a central task of our time.

Keywords

Post-war modernism, Conservation of the Modern Movement, System buildings, Industrial construction, Heritage values.

Introduction

With the economic boom of the 1960s and 1970s, numerous buildings were constructed using prefabricated components in a modular or system-based design, which continue to have a significant impact on our built environment today. The credo of unstoppable progress, which was expressed in the increasing standardisation and industrialisation of the construction process worldwide and in the use of prefabricated components and innovative building systems, also found its way to Austria in the 1960s. The system buildings of the 1960s and 1970s embody the belief in progress and the spirit of industrial production that prevailed at the time.

Reuse and adaptation of existing buildings is increasingly being called for not only by experts but also by civil society (Fig.1). The conversion and renovation of prefabricated buildings appear to be very attractive for the construction

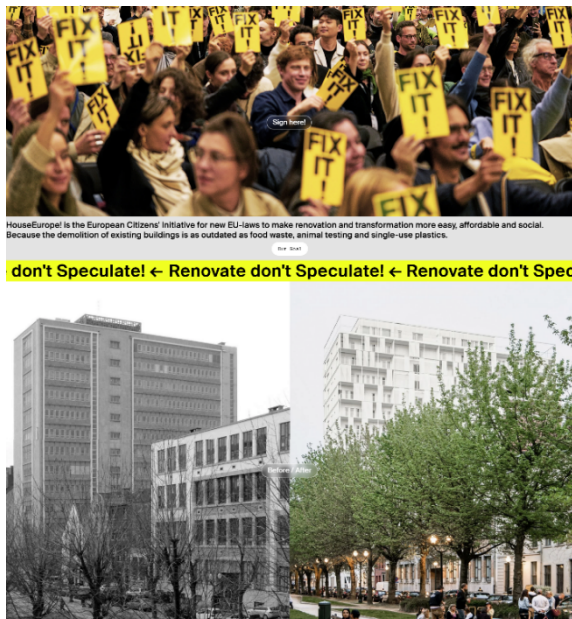


Fig. 1 Call by the 'House Europe' initiative for the continued use and renovation of the building stock, screenshot April 2025.



Fig. 2 Film stills showing construction work in Vienna using the prefabricated assembly method (CAMUS system), from 'Fertighaus Kagan' (Press and Information Service of the City of Vienna, 1962); © Film Archive of media wien, ref. no.: 340, Vienna City and Regional Archives.

industry. Many refurbishments have been characterised by replacing façade elements or completely dismantling the load-bearing system, which has led to a loss of the original characteristics of the built fabric and, in some cases, a loss of high-quality architecture from the recent past. The scope for alteration seems to be broader than for buildings from other time periods. And from the academic point of view, it seems alarmingly late to document, evaluate, preserve and protect outstanding examples of this decisive building stock, making part of our cities building history. There are therefore several reasons why these buildings need to be addressed from a heritage conservation perspective: the refurbishment of further buildings is imminent and presents a theoretical and technical challenge.

This article uses observations from academic research done in Germany, Switzerland and Austria to ask: Does the practice of heritage conservation on these buildings need to be rethought? Do new strategies and methods need to be developed? Recent research projects in Germany and Switzerland demonstrate the importance of building systems and system construction, and defined guiding principles for the preservation of these buildings.¹ Austria has been considerably late in addressing prefabricated buildings and construction systems from the 1960s and 1970s, which have not yet been systematically inventoried and have only been analysed on a case-by-case basis. Students of architecture at TU Wien are currently elaborating reuse projects and conservation strategies for various prefabricated buildings in Austria.²

Foundations of monument preservation: inventorying a "difficult-to-grasp" stock

First, we need to clarify what we are exactly talking about: System construction refers to buildings that are modular and/or mainly assembled from prefabricated components, as ICOMOS Switzerland states. Construction systems were mostly developed by planning groups and one or more companies, consist of (mostly prefabricated) building

elements and follow a specific measurement system or grid.³ Initial considerations regarding ‘systematic’ construction date back to the 19th century and the timber frame buildings developed at that time. In the 1920s, the idea was taken up by the *Neues Bauen* movement and the *Bauhaus*, which experimented with serially manufactured building elements.⁴ During the boom years after the Second World War, many companies began to specialise in the development of building systems for specific – and newly emerging – construction tasks. Some systems were also further developed for other construction tasks, such as the Haller steel construction system in Switzerland, which was adapted from industrial construction for the serial construction of residential buildings during the 1960s.⁵ At the beginning, these systems were still tied to the expertise of the production company.⁶ Subsequently, patents and ideas were sold, rather than the material itself, and numerous buildings were constructed using the same construction method and having (therefore) a similar appearance.⁷ A well-known example of this process is the *Camus system*, which became widely used in Europe (and beyond) through licence sales and was primarily used for residential construction (Fig.2). As with the Camus system in France, the development of building systems was also subsidised by the state in England: the English *CLASP system* was developed already in 1948 on behalf of Hertfordshire County Council for school construction.⁸ It was further developed into the *Brockhouse system* in the 1960s and exported to Germany, among other countries, where it was used to construct more than 80 buildings.⁹ This stock is therefore supra-regional and international, and a comparative analysis limited to regional and local areas – as has been customary in heritage conservation to date – is therefore no longer sufficient.

A stock under general suspicion

But why does this stock pose such a major challenge for heritage conservation? Post-war buildings are under ‘general suspicion’ and, above all, prefabricated buildings from the 1960s and 1970s are the subject of ongoing criticism. Buildings constructed from prefabricated parts have a particularly difficult time, as – in contrast to buildings from the 1950s, which are now gaining a certain degree of recognition – they are not only ‘difficult’ from a material and construction point of view, but also receive little recognition from an aesthetic perspective, also among experts in architecture and construction. After decades of use and weathering, they also pose technical challenges in terms of conservation and repair. Due to the partly experimental use of untested materials, problematic signs of ageing and damage are now becoming apparent. In recent years, there has been an increased risk of buildings from this period being demolished or undergoing extensive renovations without consideration for the quality of the existing structures. Façades are particularly at risk, as they are quite easy to replace. Apparently, there is still too little awareness of the numerous best practice examples that show solutions for repair and restoration,¹⁰ and of the results of research projects that have been published in recent years.¹¹

Values under scrutiny

Today there is still a lack of understanding of the qualities of late modernist architecture and heritage conservation practice still has its difficulties when it comes to the attribution of architectural, artistic and social values. The fact that in Austria public buildings were ‘automatically’ protected under the Austrian Monument Protection Act may have been more of an obstacle than a help in preserving prefabricated buildings in this case. Theoretically, the existing structure did not need to be inspected, but in the event of structural changes, the lack of knowledge about the existing

structure also meant a lack of knowledge about its qualities and characteristics.

When selecting outstanding buildings from this period, the inventory encounters difficulties in the argumentation, because numerous similar buildings were erected during the economic boom of the 1960s and 1970s. The arguments for heritage conservation that are otherwise always compelling, such as scarcity value or artistic value, are therefore hardly relevant here, or require in-depth analysis and review of the existing structure and a profound technical understanding in order to evaluate construction details. Many buildings constructed using modular systems are representative of a large number of very similar buildings and vary only in terms of when they were built on the development ladder and their state of repair, authenticity and integrity. As Alois Riegl noted in 1903, every artistic artefact represents a step in development as an expression of the 'artistic will' of the period in which it was created and thus has historical value.¹² Identifying the outstanding buildings from this mass of serially produced structures requires research in (foreign) company archives, whereas previous assessments required especially art-historical knowledge. Perhaps more than in other architectural periods, the motto here is that a thorough inventory is the basis for appropriate preservation. Of course, not all buildings from the 1960s and 1970s should be protected or preserved. However, it's not only about listed monuments. Looking at renovations that have already been carried out, it becomes clear that preserving the character of the architectural language would be important for inscribing this huge stock as an integral part of our architectural and cultural heritage.

Maintenance and servicing of systems and series

When it comes to reuse and refurbishment measures the evaluation and value attribution provides the basis for deciding on measures to be taken and possible interventions. But what does this mean in the case of prefabricated buildings? What does it mean to preserve and continue to use them in a 'correct' and 'appropriate' manner?

Some experts say that the theories and methods of heritage conservation that have been established for many decades are just as applicable here as they are to other buildings. The premise should be to keep the original fabric in its authenticity – on the basis of archival research and on site investigations – and prefer it to replacement. Others believe that there must be more freedom of action, because the parameters of authenticity and integrity – cornerstones of heritage conservation for around 120 years – must be weighted differently.

Many of these buildings were designed for flexibility, adaptability and expandability in line with the architectural concept of structuralism. The priority of heritage conservation, namely the preservation of the original substance, will therefore have to be weighted differently - on a case-by-case basis (!). Due to the manufacturing process involving industrially produced, serial components, the concept of authenticity must be interpreted more broadly in line with the 1994 Nara Document and not relate solely to materiality: The basic idea and premise of modern monument preservation, the preservation of the fabric, is valid here, but more than in buildings from earlier eras, it also encompasses the design of the building, such as its spatial and functional openness and flexibility, as well as its structural character. The entire system, from construction and materiality to interaction with the environment, should remain legible. However, in the case of certain buildings, the ability to change 'within the system' is possibly more important than preserving all original parts in their original position, as Mayer and Langenberg have already noted.¹³ One example of this is the renovation of the Kleiburg apartment block (note: not a listed building) near Amsterdam. The architects (XVW architectuur and NL Architects) understood the external appearance of the residential building,



Figg. 3, 4 Peter Märkli, Gody Kühnis, Wörgl Federal School Centre, extension and adaptation, 1998-2003 (photos B. Knauer 2025).

defined by its uniform structure and enormous dimensions, as an aesthetic quality that needed to be preserved. On the other hand they allowed major restructuring inside without alienating the overall character of the building and the architectural concept.¹⁴

Preservation and conversion of prefabricated buildings: ways of adaptation and best practice examples

From a heritage conservation perspective, flexibility and adaptability of buildings can be seen as a value and as a potential, namely in terms of preservation through (re)use, which requires structural adaptations. As Isabel Haupt explains, modular buildings and systems can even facilitate heritage-appropriate handling, depending on the construction system, for example in terms of building services that can be easily retrofitted thanks to exposed cabling.¹⁵ Systematically applicable renovations could be developed for certain building systems, which cannot simply be applied to all properties of this type – too many parameters play a role for that – but which do offer points of reference. ‘Mass as opportunity’ was the defined motto for the renovation of the Le Lignon housing estate in Vernier near Geneva (1963-1971), which was completed in 2021. After a thorough architectural and energy study and testing of various measures as part of a research project at the Ecole Polytechnique Federale de Lausanne (TSAM-EPFL) conducted by architects Franz Graf and Giulia Marino, the façade elements were ultimately upgraded to improve their energy efficiency, but their fabric and appearance were largely preserved.¹⁶ Despite numerous best practice projects that show the possibility of adaptation instead of replacement, it is still a very common practice to replace façades. Even though this is usually done under the noble pretext of saving energy, this ongoing practice also leads to a loss of our architectural history.

Several buildings were visited in Tyrol with students from TU Wien in order to gain an overview of the qualities of system construction in Austria and to assess the quality of renovation measures that have already been carried out. The grammar school in Wörgl (1970-74), designed by Viktor Hufnagel and Fritz Gerhard Mayer, is a best practice example for the refurbishment and development of system buildings. In 2001-2003, it was renovated and expanded according to a design by Peter Märkli and Gody Kühnis.¹⁷ The extension remains within the system and its materiality and adds a new component without disturbing the overall appearance (Fig. 3 and 4).

Conclusion

As far as Austria is concerned - and probably also other countries - much more effort needs to be invested in architectural education in order to create fundamental acceptance for buildings of the late 20th century and to bring about a more sensitive approach, even in the case of buildings not listed as historic monuments. Apart from the icons, it is more difficult to convince people to regard this stock as part of our building culture. The young stock of system buildings requires an unusually high level of technical expertise. The documentation and development of renovation concepts must therefore take place in close interdisciplinary exchange between the humanities, architecture and civil engineering. The discourse on values is probably more advanced than the knowledge of appropriate conservation measures and a suitable culture of renovation that has been disseminated to date. It needs a culture of conversion that respects this special stock in its authentic materiality and architectural quality as part of our history. Standard renovations may be possible, but ultimately, the usual and proven approach of case-by-case decision-making in heritage conservation remains valid for buildings from this era.

¹ The research programme 'Cultural Heritage Construction' ('Kulturerbe Konstruktion') funded by the German Research Foundation (DFG) supported sub-projects on topics including heritage values of prefabricated buildings and steel construction systems. <<https://kulturerbe-konstruktion.de/>>; ICOMOS Switzerland conducted a research project on system construction and building systems in Switzerland in collaboration with the Chair of Heritage Conservation at ETH Zurich. The results were published in 2022: ICOMOS SVIZZERA (ed. by), *System & Serie: Systembau in der Schweiz - Geschichte und Erhaltung*, Zurich, Verlag 2022.

² As part of the thematic focus *Preservation and continuation, dealing with system buildings from the 1960s and 1970s (Erhalten & Fortschreiben. Umgang mit Systembauten der 1960er und 1970er Jahre)*, six buildings from this period in Austria are documented, evaluated and a conversion concept is developed. The interdisciplinary course takes place in cooperation of the Chair of Design and Building Construction and the Chair of Heritage Conservation at TU Wien.

³ ICOMOS Svizzera (ed. by), *System & Serie...*, op. cit. p. 5.

⁴ SARAH M. SCHLACHETZKI, *Architekturgeschichte: Vom Typenhaus zum ‚Prefab‘ im großen Stil*, in Raphael Sollberger, ICOMOS Schweiz (ed. by), *System & Serie...*, op. cit., pp. 9-13 (9).

⁵ GEORG VRACHLIOTIS, LAURENT STALDER, Haller, in: *System und Serie...*, op. cit., pp. 66-69 (66).

⁶ LUCIA GRATZ, *Zwischen Idee, Entwurf und angewandter Vielfalt: Architekturmische und konstruktive Aspekte des Schweizer Systembaus*, in ICOMOS Svizzera (a cura di), *System & Serie...*, op. cit., pp. 20-29 (20).

⁷ SARAH M. SCHLACHETZKI, op. cit., p. 10.

⁸ FRANCIS FERGUSON, *Architecture, Cities and the Systems Approach*, New York, Braziller 1975, pp. 60-61.

⁹ GÜNTHER MOEWES, *Baukasten statt Kastenbau: Die Entwicklung des Brockhouse-Systems*, in Silke Haps and Alexandra Apfelbaum (a cura di), *Von "Stahlschachteln" und Bausystemen. Zum Umgang mit Stahlbauten zur Nachkriegszeit*, Dortmund, Kettler, 2019, p. 130.

¹⁰ Only a selection can be mentioned here: ANA TOSTOES (ed. by), *Modern heritage: reuse, renovation, restoration*, Basel, Birkhäuser 2022; ANGEL AYÒN, UTA POTTGIESSER, NATHANIEL RICHARDS, *Neue Fassaden im Bestand. Sanierungsstrategien für Klassiker der Moderne*, Basel, Birkhäuser 2019.

¹¹ Particularly noteworthy are the recent studies conducted by the Getty Institute of Conservation in Los Angeles: <https://www.getty.edu/conservation/our_projects/field_projects/concrete/index.html>; THOMAS JESTER, Getty Conservation Institute (ed. by), *Twentieth-Century Building Materials. History and Conservation*, Los Angeles, Getty Conservation Institute 2019.

¹² ALOIS RIEGL, *Der Moderne Denkmalkultus: Sein Wesen und seine Entstehung*, Vienna, Braumüller 1903.

¹³ SILKE LANGENBERG, HANS-RUDOLF MEIER, *Herausforderung Systembau: Denkmaltheoretische Fragestellungen*, in ICOMOS Svizzera (ed. by), *System & Serie...*, op. cit., p. 135.

¹⁴ See in particular: <<https://www.xvwarchitectuur.nl/kleiburg>>.

¹⁵ ISABEL HAUPT, *Herausforderung Systembau: Praktische Herausforderungen*, in ICOMOS Svizzera (ed. by), *System & Serie...*, op. cit., pp. 136-139.

¹⁶ See e.g. FRANZ GRAF, GIULIA MARINO, *Il Lignon. Un restauro silenzioso/The Lignon. A Silent Restoration*, «Rivista internazionale di architettura», n. 918, 2021, pp. 3-15; ANA TOSTOES, *Modern heritage...*, op. cit., pp. 108-115.

¹⁷ MARTIN TSCHANZ, *Weiterbauen an einer Modellschule: Peter Märkli, Gody Kühnis: Erweiterung und Adaptierung Bundesschulzentrum Wörgl, Tirol, 1998-2003*, «Werk, Bauen + Wohnen», vol. 6, 2004, pp. 32-42.