

Chances to preserve GDR buildings for the next generation

Serial manufactured MLK-steel buildings – Record and analyse

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Abstract

Until the second half of the 20th century, lightweight construction in structural engineering is considered to be well researched in the field of lightweight materials and moulded construction and is associated with great names in engineering such as Fritz Leonhardt and Frei Otto. In contrast, there is little knowledge about the planning, execution and distribution of marketable, typified lightweight metal constructions, which were developed, serially produced and finally realised at various locations in the German Democratic Republic (GDR) from the end of the 1960s by the Volkseigener Betrieb Metalleichtbaukombinat (VEB MLK) as the leading building combine of the GDR. These lightweight metal structures in the form of various types of buildings, such as multi-purpose buildings, sports halls or residential buildings, have been preserved in large numbers to the present day and can be found in many German cities, but also abroad. They have survived in very different states of preservation: While some of the building structures that have survived to the present day are close to decay, many of the buildings have been put to subsequent use and/or renovated in accordance with a sustainable and resource-conserving approach to our environment. The examination and analysis of both can be used as a basis for assessing their worthiness of preservation in terms of monument protection and cultural heritage, but also for research into the GDR's lightweight metal construction as a whole¹.

¹ The research project "Reconstruction and analysis of the development of lightweight steel and metal construction in the GDR with the aid of the model stock of the 'Metalleichtbaukombinat Leipzig'" is a sub-project of the "Deutsche Forschungsgemeinschaft" (DFG) SPP 2255 Cultural Heritage Construction.

The VEB Metalleichtbaukombinat and its product range

The VEB MLK was an association of constructive steel construction companies in the GDR between 1969 and 1990. The MLK consisted of a total of 13 production companies with different locations, which made it possible to serve a wide range of products. MLK not only produced for the GDR, but also offered its entire range of products, from individual products to system solutions, to the FRG and the socialist economic areas and exported them on a large scale.

The product range comprised typed, i.e. serially manufactured and largely completed products, ranging from large industrial complexes to multi-storey and single-storey administrative or multi-purpose buildings to shopping halls and kindergartens, but also bridges, aircraft hangers or energy pylons. These included, for example, the company buildings multi-purpose buildings *Typ Berlin* and *Typ Leipzig*, shopping halls type *CIII* and *ESK* as well as sports halls, which include the *GT60L* and *27x48x7,4 MLB* space frame structures and the bar networks such as *KT60L*. In addition to industrial halls with solid wall or trusses, the range of products included room cells, greenhouses and roofing structures. Many of the structures mentioned are still preserved today.

Methods

Extensive archival research, interviews with contemporary witnesses and trade fair models, which were produced by the company's own model workshop for export, serve as the basis for locating these products. In addition, the localisation is aided by the production of *type* buildings that have the same specific characteristics. This enables a targeted evaluation of aerial photographs, also with machine support (Deep Learning). Using these methods, the research project has already located over 200 buildings. 60² locations alone of approx. 300³ of the *KT60L* sports hall were determined in the former GDR. In addition, locations in e.g. Poland and Qatar could be identified due to foreign trade. The investigation area was focussed on Germany, as the buildings were not only located, but also reconstructed and analysed in terms of building construction history. This is done in the form of data sheets on the individual buildings, which are collected and compared in a database.

Recorded structures of the MLK

When the buildings were recorded, they were found in various states. Since the buildings are exposed to different influences, they are discussed individually below.

² Heinrich, A., Mende, V., Wesche, L., and Achanccaray, P. (2022). 'Database of recorded serial manufactured MLK-buildings (GDR) (Release 1)'. [Data set]. Available at: <https://doi.org/10.24355/dbbs.084-202206080745-0> (Accessed: 19 July 2022).

³ Bundesinstitut für Sportwissenschaften (1999): Sanierung typisierter Sporthallen in den neuen Bundesländern, Forschungsbericht B1/99, 1. Auflage Sport und Buch Strauß, p. 95. Available at http://bisp.de/nn_113306/SharedDocs/Downloads/Publikationen/Jahrbuch/Jb_1999_Artikel/Mund,templateId=raw,property=publicationFile.pdf/Mund.pdf (Accessed: 07 June 2022).



a



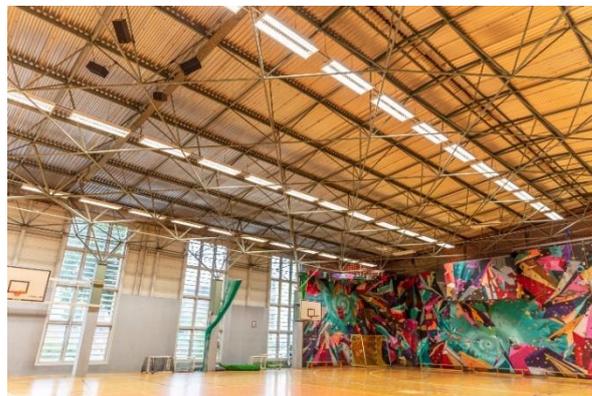
b

Fig. 1. Multi-purpose building *Typ Berlin* in a) Leipzig (© Leif Paulsen); b) Magdeburg (© Annkathrin Heinrich).

The multi-purpose building *Typ Berlin* once served as an office building for the combine management, like Fig. 1a. Due to storm damage with subsequent water ingress, the building was cleared and deconstructed.



a



b

Fig. 2. Sports hall *GT60L* in Magdeburg a) *Nachtweide*; b) *UniSportHalle 3* (© Annkathrin Heinrich).

The *Nachtweide GT60L* sports hall also developed cracks in the facade due to different settlement behaviour of the building ground, like Fig. 2a. As a result, temporary supports were ordered, but a replacement construction and thus demolition of the existing building is imminent. The damage caused by rainwater penetration as well as the estimated costs for an energetic renovation are decisive.



a



b

Fig. 3. Sports hall *KT60L* in a) *Niesky: Rosensporthalle*; b) *Magdeburg: Freie Waldorfschule* (© Annkathrin Heinrich).

Similar reasons lead to the demolition of the *KT60L* Rosensporthalle, like Fig. 3a. In the meantime, this hall has also received a new floor, but the costly but necessary conversion measures for the thermal insulation and the sanitary areas prevent further use. Furthermore, three almost identical *Typ Leipzig* residential buildings were demolished because the space was needed for new buildings. Elsewhere, another *Typ Leipzig* building of the GDR's planning commission and an open roof construction used as a warehouse are in need of renovation. The reason for this is improper use due to, among other things, shunting work or arson.

In contrast to these finds, Fig. 1b, 2b and 3b show respective type buildings in preserved condition. All counterparts have received renovation measures and are in use.

Opportunities through serial manufactured MLK-steel buildings

The serial construction of the MLK not only facilitated the planning and implementation at that time, but also the location of the required construction projects today. In addition to the manual search, it was already possible to mechanically identify the locations of the type buildings in satellite images and record them in a database. Here, both non-existing and existing as well as rehabilitated structures are documented, so that a basis for the preservation and upgrading of steel structures of the MLK is given. In addition, these measures can bring benefits back to the buildings. With the production focus on the social buildings, the restoration provides access to them for the public.

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