RESERVE PROGRAMMABILITY OF BUILDINGS' LIFESPANS USING THE LIFE CYCLES OF BUILDING ELEMENTS

THESIS BOOK

RESERVE

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Thesis book

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SUMMARY

By the turn of the millenium, a significant gap has emerged between the physical and functional lifespans of buildings. While the durable, long-term structural elements can be used for up to a hundred years, the functional role of buildings can change or even cease to exist in less than twenty years. Buildings designed for permanence and durability are unable to keep up with the increasingly dynamic and evolving modes of use that arise from rapid changes in our lifestyles, working methods, or the economic situation.

In recent economic conditions, the complete demolition of buildings that have lost their original function has often proven to be a more cost-effective solution for investors than the conversion itself. In the last few decades, significant buildings from the 1970s and 1980s have been demolished in Budapest. Today, "sustainability" focuses on various technical aspects of buildings, rather than setting the goal to try to keep and use the existing. How can architecture respond to unpredictable functional changes? What tools can be used to enable a building – designed to be physically durable – to take into account the progress of time and thus be functionally durable as well?

By the end of the 20th century, defined floor spaces and rigid spatial relations appeared increasingly in architectural programs as functional requirements, which led to an overdetermined architectural environment. Design according to functional criteria is a space related – and in this sense inflexible – interpretation of the building.

Designing according to functional criteria does not only affect the spatial organization of the building, as it is often impossible to transform and use the building due to changed mechanical space requirements or new energy requirements. At the same time, the functional lifespan of the building depends on the degree of transformability, the possibility of serving different uses without having to modify its system. In this sense, a building will be functionally durable if its transformation is simpler, faster and, above all, cheaper than building a new one; i.e. it has economic reserves.

One of the lessons learned from investigating the preselected architectural firms and examining the various case studies is that in the construction process, the architect must take a decisive role not only in the design, but also in the preparation of the design. The client's intention, the financial framework, the function of the building, but most importantly, the purpose of the construction are the basis on which the strategy – necessary to increase the functional lifespan of the building – can be chosen.

The reserves responsible for durability do not always have to involve additional constructions or costs. The key to durability can be the establishment of an intensive connection with the city, the appropriate design of the building's structural framework and transportation system, or the provision of internal comfort for the building. This requires the conscious management of the life cycles of building elements, their fragmentation and the minimization of their groups. The dissertation examines and analyzes the groupings of building elements used in the selected case studies.

THESIS

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THESIS 01

INTRODUCING THE PROBLEM

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Permanence does not necessarily mean durability. Today we live in an age of demolition of buildings with intellectual reserves. The durability of a building depends on the degree of its adaptability, the ability to serve different uses without having to modify its system. In this sense, a building will be functionally durable if its transformation is simpler, faster and, above all, cheaper than building a new one. Ensuring this is – among other things – a design task, and therefore architects must take responsibility in striving for the durability of buildings.

THESIS 02
PREPARATION OF THE DESIGN PROCESS

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Due to the economic and social changes experienced several times throughout history – and again at the beginning of the 21st century –, an architectural trend emerged that responded to investor's uncertainty with functionally indeterminate, and therefore adaptable buildings. This working method, which facilitated redesigns, later became conscious and developed a comprehensive architectural strategy that goes beyond traditional planning and also takes a role in project preparation, program creation, and cost analysis.

THESIS 03

DESIGN PROCESS // PROGRAMMABILITY OF LIFE CYCLES

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In order to increase durability, architects should group building elements according to the equivalence of their life cycles – similarly to the principle of uniform strength structures –, and should minimize the number of these groups.

THESIS 04

DESIGN PROCESS // LONG-LIFE BUILDING ELEMENTS

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A functionally adaptable building is an infrastructure that creates the conditions for the development of changing functions. The building turns inside out, as the structure, – consisting of long-lived elements –, becomes independent of the internal functions and through its use as a public space, gets integrated into a larger, urban structure.

THESIS 05
DESIGN PROCESS // MEDIUM-LIFE BUILDING ELEMENTS

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Beyond becoming an infrastructure, the condition for the use of a building regardless of its function is comfort, which must become an integral part of a durable building. Due to the constantly tightening regulations and the resulting dynamic development of technologies, technical solutions – that were once considered new – will sooner or later be replaced. As a result, in buildings designed for durability, comfort must be ensured by long-term structures with simple, low-tech solutions.