Refurbishment and modernization of Gdansk University of Technology campus main building, case study

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Summary

Ten years' refurbishment and modernization of the main building of Gdansk University of Technology is just closing with an installation of the reconstructed clock tower. The present-day university educates – and enjoys – ten times more students than when it started, but its campus and buildings not always were ready to accommodate such a massive rush. During 100 years of history of the University there have been both glorious and dramatic moments, and the World War II heavy damage was the most traumatic. It was not only a collapse of parts of the building; several vital elements of the building infrastructure were ruined, including the ventilation system. Although the restoration was a very quick and thorough process, it lacked specialized focus set on the building infrastructure. Now, the implementation of these crucial elements is coming finally to the end. Besides of technical equipment there were other issues playing an important role: fire-safety problems, organizational relations between various units, last but not least – limitations arising from protection of architectural and technical heritage.

The article describes methods and means used during the renovation process, both in design and construction domains. A tissue of a historic building required special approach to these tasks, with special emphases on good recognition of problems, careful planning and consistent implementing of proper solutions. Modernization of main assembly hall, adaptation of attics and glazing of inner courtyards has been chosen as examples to discuss the topics.

Keywords: historic building refurbishment and modernization.

1. Introduction

The article provides a brief overview of design solutions, both architectural as well as installations, in order to restore full capacity of an object with a complex functional program, located in the historical tissue. The presented solutions are part of the technical modernization plan for the main building of the Gdansk University of Technology. In an almost continuous way, excluding the years of World War II and the period of post-war reconstruction, the building performs the same function for over 100 years. The boundary conditions defining the framework for this activity are the only change. These conditions may vary due to many reasons: growing number of students and staff, adjusting the functioning of the university (increasing the number of training courses, new teaching methods, increasing the role of the laboratory exercises etc.) and, finally, improving utility requirements (improving comfort, facilitating access for the disabled, updating technical equipment and technology). From this point of view, there are several problems relying on building infrastructure issues: access to separate functional areas, heating, ventilation and fire-safety. Additionally, a significant increase in the number of users has been generating “social” needs serving the academic community – yet virtually non-existent (or existent in rudimentary form) in

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the main building. So, the technical refurbishment has become a contribution to the functional revitalization. Scheduling of investments has enforced a pattern and sequence of activities: high priority to technical solutions and then, on a technical basis, the further architectural concepts are implemented. The path is constantly revised, as there are changes in deciding factors – for example adjustments of refurbishment strategies or financial capacities. Thus the adopted path of realization allows for the implementation of the necessary technical solutions and mechanisms that form the basis for subsequent utility transformations.

2. Design assumptions

Diagnosis of above mentioned defects in the functioning of buildings, supported by analysis of the original layout plan, design and installation, helped to prepare a general repair plan. Despite the relatively scarce resources that could be initially allocated for the implementation of the most urgent tasks, it was decided that the project would take into account the complementary solutions, mutually reinforcing, scheduled for possible independent implementation stages. Each of the stages would be a functionally, technically and organizationally closed part of the target solution. Thus approved method of execution assumed a hierarchy of tasks – priority was given to these stages, the implementation of which depended more during further ones. For each task, the original action was to adopt appropriate infrastructure solutions, strictly related to the building as a whole; only on this basis any architectural solutions could be built. Assumptions for refurbishment and technical modernization of the building fully complied with the current financial and organizational capabilities, allowing for the partial realization of the necessary technical elements. Due to the historic nature of the building certain restrictions were imposed and requirements for technical and architectural solutions – preservation of the form and detail. There was also a need to find and "discover" the construction module of the building, to fit future systems in the existing one. Although the building was built in a historic style, it was erected with relatively new, almost industrial methods.

The paper is to prove, taking architecture and ventilation system as examples, that it is possible to interlace these issues into a single project, that aesthetics and utility is closely associated with the intention purely technical. Now, considering several elements, we will trace how these assumptions worked in practice.

3. Conclusion

From a technical point of view the adopted design method is relatively simple: determine the space required for technical equipment, find the ducts for the installation and to fit the solutions in an attractive architectural packaging. It becomes a more complex task when we consider a historical building, with its limitations – alterations and reconstructions from the past, with an out-dated original installation system, requirements for heritage conservation.

There is a difference between designing a system from a scratch for a new building and the introduction of the system into a historic building. The technical tool for this purpose is to identify the building's structure and elements, to prepare a detailed inventory (in the case of the University building there were hundreds, if not thousands, of auxiliary drawings) and to develop a long-term strategy for the implementation of the proposed technical solutions. It is certain, too, that a satisfactory result can be achieved only through the cooperation of specialists in many fields.