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Planning and Management of the Reconstruction of Historical Buildings

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Cenek Jarsky, born 1953, received his MSc in Civil Engineering and PhD degree in Technology of Structures at the Czech Technical University of Prague where he teaches part-time nowadays. As director and owner of a Construction Technology Consulting firm he is responsible for planning and management of significant Czech projects and for software development in this field.

Summary

The process of reconstruction of historical buildings has several specific questions and problems which must be solved in the planning and management stage of the building process - from the architectural and art-historical significance, via the future purpose of use of the building, links to the surrounding buildings, environmental questions, questions of cost, time analysis and quality assurance problems. A lot of these problems can be solved by the help of a computer model of the flow of rehabilitation and reconstruction of the building created by a construction technology network diagram. The CONTEC integrated project planning, management and quality control system based on these diagrams has been used for bidding, planning and management of the reconstruction process of several significant historical buildings in Prague.

Keywords: project management, planning, quality assurance, reconstruction, historical buildings, network diagram, construction technology, building process, network analysis, mathematical model

On computer modelling of the reconstruction process of historical buildings

During planning and management of the reconstruction process of historical building there are some specific questions and problems which must be - from the architectural and art-historical significance, via the future purpose of use of the building, links to the surrounding buildings, environmental questions, to the cost, time analysis and quality assurance problems. A lot of answers to these problems can be obtained by the help of a computer model of the rehabilitation and reconstruction of the building. The model must be based on the construction technology analysis of the reconstruction process and must reflect all of the main points of view and architectural, technical, technological and economical links of the building process. Several historical buildings reconstructed recently in Prague have been planned and controlled by the CONTEC integrated project planning, management and quality control system. The system is based on modelling of the building by use of network diagrams created by an original construction technology network diagram method. This method enables to create and then to use different typical network diagrams as sequences of the construction processes and their linkage for different sorts of buildings as computer files, which can be modified according to the spatial structure of the actual building. In case of reconstruction of buildings there is usually difficult to use the typical network diagram as it is, because each reconstruction process of a certain building is unique. The model created on the typical base has to be modified according to the facts known about the building and the flow or the reconstruction process. Databases of the main data about all construction processes and their quality checks are available. The system includes the linkage to different quantity and cost estimation computer systems. The system enables to print the calculated network diagram in

different forms (technological standards, bar chart, line-of-production graph, resource allocation graphs of cash flow, labour consumption, need of work force etc. and quality assurance checklists.).

The system enables to create these documents for planning, technical and organisational control of reconstruction of the building according to the main point of view of minimum costs and maximum utilisation of labour during the whole reconstruction process. Resulting documents answer not only the price question, but also the optimum reconstruction and maintenance processes flow, cash and resource flow and the quality assurance question. All documents can be easily updated according to the actual completion of construction processes on site at a certain term. In case of a delay, the system suggests what measures are to be done to be able to keep the final deadline of the project.

Examples from site

The mentioned system has been used for managing reconstruction of many significant structures and buildings in Czech Republic and Slovakia (e.g. Civic House in Prague, Czech Savings Bank Headquarters, Czech Parliament building, Toskán Palace, Ungelt area and Hybernia Palace in Prague and many others). Two of the most interesting buildings that have been reconstructed recently are the Civic House in Prague and the Hybernia Palace. The Civic House is a huge cultural complex with the famous Smetana concert hall, see fig. 1, originally built in the l'art nouveau style at the beginning of the 20th century. A model of the reconstruction process of this complex was worked out for the bid. The former exhibition hall in Hybernia Palace, fig. 2, originally built in the classic style at the beginning of 19th century which is being rebuilt to a musical theatre, a particular model of the reconstruction process control was created. As some parts of the load bearing structure are to be changed and replaced by a steel construction, there were lots of problems with the sequence of demolition processes and the erection of different parts of the new load bearing construction. The network diagram managed to model all linkages according to static requirements. Nowadays the model is regularly updated according to the state of construction.

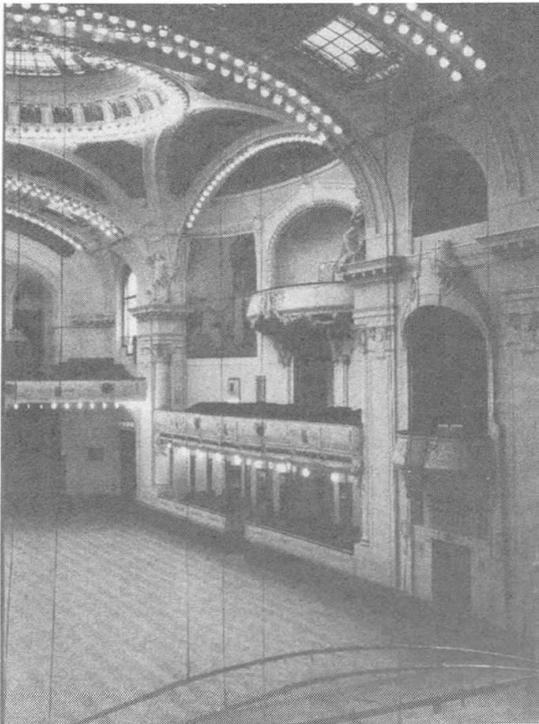


Fig. 1: Interior of the Civic House

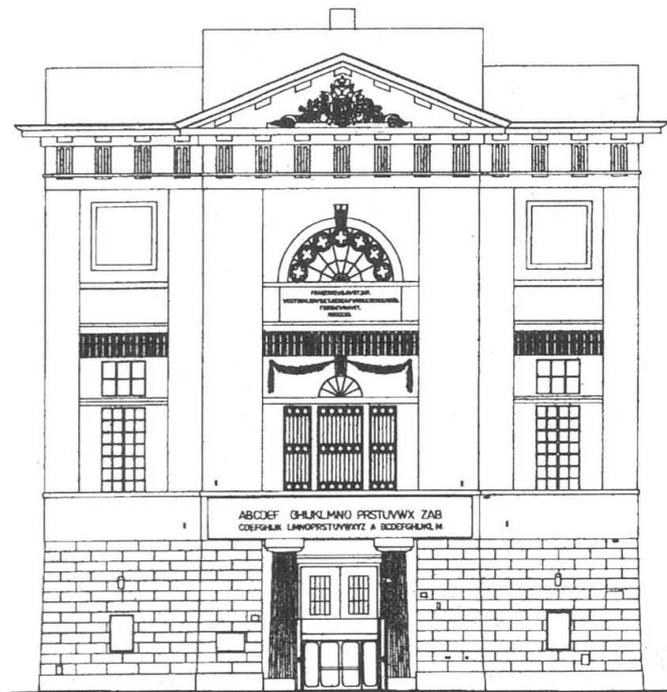


Fig. 2: Hybernia Palace, western façade