

Conservation of historical buildings – concepts and details

Marina Traykova, Alexander Traykov

University of Architecture, Civil Engineering and Geodesy, Sofia, Bulgaria

Contact: marina5261@abv.bg

Abstract

Conservation engineering is a relatively new and exciting field. Engineers are still educated today mainly oriented to new construction, but the modern understanding is to preserve the heritage and to plan the appropriate interventions on historic structures. Finding the potential for future use of heritage buildings is an act of sustainable development. Extending their service life leads to an appreciation of the art of structural engineering. The paper aims to present the basic concepts of the contemporary methodology for conservation of historical buildings/structures, how to understand the behavior of the structure through some basic details, how to proceed in case of modern adaptation for the contemporary conditions and how to make better appraisal of its potential for the future. Examples of analysis of structural systems and details and the possibilities for restoration and reinforcement of historical structures for vertical and seismic actions are considered.

Keywords: historical structures, conservation, adaptation, restoration, strengthening.

1 Introduction

Conservation engineering can be defined as the process of understanding, interpreting and managing the architectural heritage in order to safely deliver it to posterity [1]. An important aspect in understanding the engineering heritage is the use of modern knowledge in the assessment of historical building and the general understanding of its structural system. The performance of the structure is the key moment in the conservation of existing/historical buildings. Structure is the skeleton of the building's envelope with its architectural details, decorations and finishes. It is essential to understand the structure and its actual condition. The understanding of the structure is based on accurate analysis, whether numerical or qualitative or involving the study of historical records, in order to understand the evolution of its behaviour, to formulate a diagnosis relating to its current state and to forecast its future

performance, based on appropriate interventions. The proper method for retrofitting requires a detailed recognition of the structural arrangement of the whole building, identification of construction material properties and also a history of its erection.

The main cause of the inappropriate choices of interventions is due to the lack of knowledge on the details and the behavior of the peculiar type of structure. Records of details inevitably reflect the state of knowledge prevailing at the time they are made. The details should be used for the preparation of the scheme of conservation, repair or alteration. All collected information may come to light the performance of the structure and to lead to reappraisal of existing structure and its future function.

To provide the best decision and to collect properly the data, it is necessary to have enough information concerning: 1) the geometrical, technological and constructive characteristics of