

Summary

The doctoral thesis investigates the issue of the reuse of materials in architecture and examines how buildings should be designed to enable the future recycling of their elements. The research is based on the analysis of related theories, projects, buildings, certification programs, design tools and processing technologies. Moreover, technical, chemical and aesthetic properties of reused materials are examined, as well as recyclable products and new building materials containing waste are explored.

Presented doctoral thesis consists of five chapters – first three parts contain an analysis and systematics of existing research concerning the reuse of materials in architecture. First chapter procurs theories related to the reuse and sustainable circulation of materials in urban areas are presented. Furthermore, the occurrence and properties of reused materials as well as design tools and processing technologies are described. Twenty-five buildings were selected based on this data. They provide examples how reused materials can be used in architecture and how buildings should be designed for future recycling of their elements. Chosen examples are presented as detailed case studies in the second chapter. The third part of the thesis examines determinants, constraints and opportunities for the reuse of building materials in architecture. The research was based on the analysis of selected publications, recommendations from outside Poland and legal acts which promote and foster the sustainable circulation of building materials. Political, legal, infrastructural, planning, social, environmental and economic determinants were investigated. The results of this evaluation were compared with the current state of the art in Poland. This study shows opportunities, constraints and necessary actions allowing the reuse of materials in Polish architecture.

The fourth and fifth chapters, which are the summary of the previous analysis, present guidelines for designers who wish to use waste materials or to enable the future recycling of building elements in their projects. An urban analysis presented in the fourth part as a Harvest Map for Konstancin – Jeziorna municipality shows possibilities of sourcing and processing reused materials in urban areas. The fifth chapter gives guidance for the architectural design with reused materials or for the one enabling the future recycling of building materials. Instructions are presented as general recommendations for the design and construction process, building design and project documentation. Moreover, detailed guidelines for selected types of reused materials are depicted. The thesis ends with general, summative conclusions.

30.09.2016 *Monika Wójcik*