

Preface

The work presented in this publication is divided into six chapters organized in three parts. The first part introduces the theoretical framework.

Chapter 1 aims to underline the opportunity of controlling the uncertainty over important long-term objectives in architectural design by adopting risk management methods and techniques. With reference to the problems of maintenance that can arise from the design, the chapter outlines the contribution that the risk management process and techniques can offer in supporting clients and designers during both the decision moments of the brief and the design phases (in analysing the context, simulating events, anticipating possible scenarios), as well as in the operation and management phase (in monitoring performances of buildings in use in order to instruct actions to manage risks over time).

Chapter 2 aims to present the risk management process as a means to control risks over building use and maintenance, by estimating the uncertainty in the most important objectives. To this purpose the framework offered by the International Standards in creating a common ground to deal with uncertainty is analyzed and examples of applications of the risk management process in various contexts are reported. Finally, the possibility to use such an approach in architectural design to control risks over building use and maintenance is put forward.

Chapter 3 aims to propose the use of process monitoring on buildings to gain continuous feedback from their use, in order to monitor risks and learn by use. Both types of building monitoring approaches are introduced in this chapter: punctual monitoring, to periodically check the level of performance of buildings, and continuous monitoring, to allow timely response to changing conditions. Three examples of real-time continuous monitoring and responding systems are reported from projects of the MIT | Senseable City Laboratory.

The second part introduces a methodological experimentation.

Chapter 4 aims to propose a set of tools and methods to manage the risks over a number of objectives over the building process. The final outcome of the process proposed is a dashboard (tableau de bord) in which a level of risk is reported for all requirements. To that end, a set of tools and methods are also introduced in the chapter, with the scope to evaluate both the importance and the uncertainty over all

requirements, by correlating the need for maintenance and the level of maintainability of all elements involved with each requirement.

Chapter 5 aims to propose a process for managing, at the design stage, the risks over long-term objectives. The proposed process consists of two steps: risk assessment, to assign a level of risk to all requirements on the dashboard, by attributing to each of them a degree of importance as well as of uncertainty; and risk monitoring and review, to continuously check the actual performance of buildings, and to compare them with those expected in order to update in real-time databases and evaluations.

In the third part results of applications are presented and discussed. Chapter 6 aims to test in real-world case studies the set of tools and methods to create a dashboard. Tests were run on two buildings of worship. To this purpose a degree of importance was assigned to a set of requirements that represent the needs of the Italian Council of Bishops (CEI) with reference to the phase of use of churches. Then, a degree of importance was estimated for all requirements by using spreadsheets and Monte Carlo simulations. The main results are presented and commented upon.

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Martani, C.

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