Honors thesis

COURSE OF MASTER OF SCIENCE IN ARCHITECTURE
HERITAGE PRESERVATION AND ENHANCEMENT

Abstract

Rating system of sustainability in the measures on historic buildings: critical analysis of the GBC Historic Building and example of its implementation

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This thesis is based on a multidisciplinary approach, finalized to plan a project of restoring looking at sustainability, using a specific tool of evaluation, the GBC Historical Building protocol, underlining its strengths and its weakness.

The building under study is Palazzo Garrone, sited in the city of Bra, in the province of Cuneo, in the North-West of Italy. It is located in the center of the city, in a square overlooked by the town hall, the ancient Palazzo Mathis and the church of Saint Andrew.

This construction, municipal propriety, is today almost unused except part of the ground floor, where there are now some municipal offices.

The thesis consist in an analysis of the main certification protocols of sustainability for buildings (like LEED, BREAM, CASBEE, …) and the subsequent choice of the one deemed as most appropriate to the building: the GBC Historical Building.

The next phase is the relief, in which it has been done a survey of the actual status of the building, planning a project for restore it with a mapping of materials and diseases of the construction and the intervention to do on it (image 1).
Together with the relief, there has been a study about the origins and about the main constructions phases in the history of the building, allowing to direct the reuse project in way to not damage the historical parts.

After this, it start the project of reuse of the property, following the plans provided by the municipality that expects to destine it for accommodation use, as explained by the mayor during an apposite interview.

Subsequently some attempts about how configure the internal disposition of the building, it has been choosen to project the building as a mix of hostel-apartments, to reduce the transformation needed (demolition and new construction) and reuse the existing technical installation.

The same guidelines provided by the GBC protocol direct the project to a lesser impact of intervention and to a reuse of the major part of existing technical components.

Following the protocol, at first it has been compiled the identity card of the building; after that it has been completed the credits and the prerequisites requested by the various sections of the protocol, proving the achievement of the credits when possible (image 2).

Some requirements have been simulated, especially those linked to the construction phase, due to the theoretical nature of the thesis.

For other requirements, it has been verified the impossibility to reach the credits.

Inspiration for the project came also from a visit to a building site in Guarene, the first example of application of the GBC Historic Building protocol, where it has been possible to observe some technological choices adopted.

The thesis has also provided an assessment of the energetic performances of the building, calculated using the software Termolog Epix 6: this has allowed to obtain the indices of overall energy performance both at present and after the intervention provided (image 2).

It also helped to choice the most appropriate technologies to use in the intervention.
Per soddisfare tale prerequisito il protocollo prevede di dimostrare un miglioramento minimo percentuale della prestazione energetica dell’edificio oggetto di intervento di almeno il 3% del (per interventi che ricadono negli ambiti descritti all’interno del D.Lgs. 192 e s.m.i., art. 3, comma 3, lettera a) utilizzando l’opzione 2: simulazione energetica in regime dinamico dell’intero edificio, utilizzando le indicazioni della norma ASHRAE.

Per tale prerequisito però, i dati sul miglioramento energetico sono stati calcolati utilizzando il software Termolog Epix 6, e quindi in riferimento alla Norma UNI/TS 11300, al D.Lgs 192/311 -D.P.R. 59/09.

Di seguito verrà riportato l’indice di prestazione energetica globale $\text{EP}_{gl}$ prima dell’intervento:

$$\text{EP}_{gl} = 40,62 \text{ kWh}/(\text{m}^3\text{anno})$$

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Fonte: protocollo GBC Historic Building pag. 53

Con un miglioramento del 36,2%, essendo un intervento incluso da Art.3 C.3 Lett. A D.Lgs. 192, il prerequisito è soddisfatto.

Di seguito verrà riportato l’indice di prestazione energetica globale $\text{EP}_{gl}$ dopo gli interventi:

$$\text{EP}_{gl} = 25,92 \text{ kWh}/(\text{m}^3\text{anno})$$

Image 2: example of compilation of a credit of the protocol. In particular, the credit linked to energetic improvements, reached using the software “Termolog Epix 6”
Image 3: compilation of the list of the protocol, listing partial scores and getting the final score (gold)
Proceeding with the compilation of the protocol, it has been noted every partial score: at
the end, the intervention on the building scored 65 points, which correspond to a “gold”
score into the rating scale of the protocol (image 3). During the compilation, emerged all
the critical issues and the merits of the application of the protocol to a building
characterized by important historical and architectural values, which are listed at the end of
the thesis.

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