Conservative intervention and building restoration of the old castle of Rivara Canavese

by Andrea Sartore and Stefano Tardito
Tutor: Delio Fois
Co-tutor: Luisa Stafferi

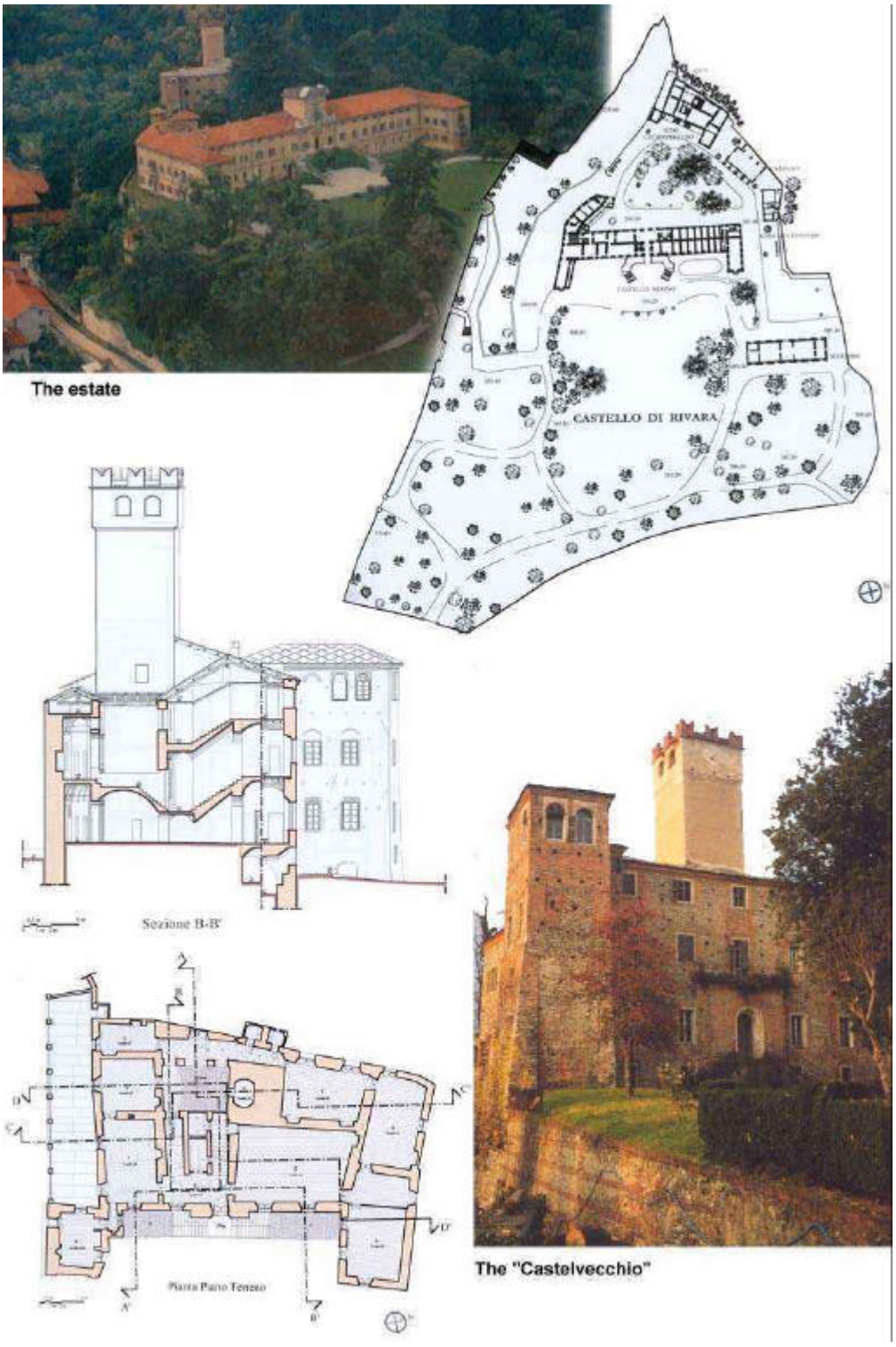
Introduction

"In modern times this is a widespread attitude... disregard old buildings first, then restore them... look after an ancient building very carefully; protect it from decay as much as you can and at all costs... and do it tenderly and reverently and continuously so that other generations will have the possibility to be born and walk in its shade...".

Ruskin's statement underlines the importance of ordinary maintenance. In fact, he firmly believes that it is the only legitimate mode of restoration. On the other hand, Boito echoes his words affirming that buildings "*must be reinforced rather than repaired, repaired rather then restored.*"

These were the guide-lines of our work described in this short outline, which however started from the following concept:

" *Restoration works aim to preserve the original situation as unaltered as possible – removing the elements that greatly changed the constructions and reducing changes and, above all, demolitions to a minimum. Non-invasive means should be employed and the effects of restoration should be as reversible as possible both in the survey phase and during the actual intervention. In this sense it makes no difference whether the works concern visible or invisible parts, rather than specific elements of enormous importance and value."*



Plan of the castle of Rivara and view of the old castle

The cognitive phase

This phase was a key-moment in the restoration project and can be divided into different parts:

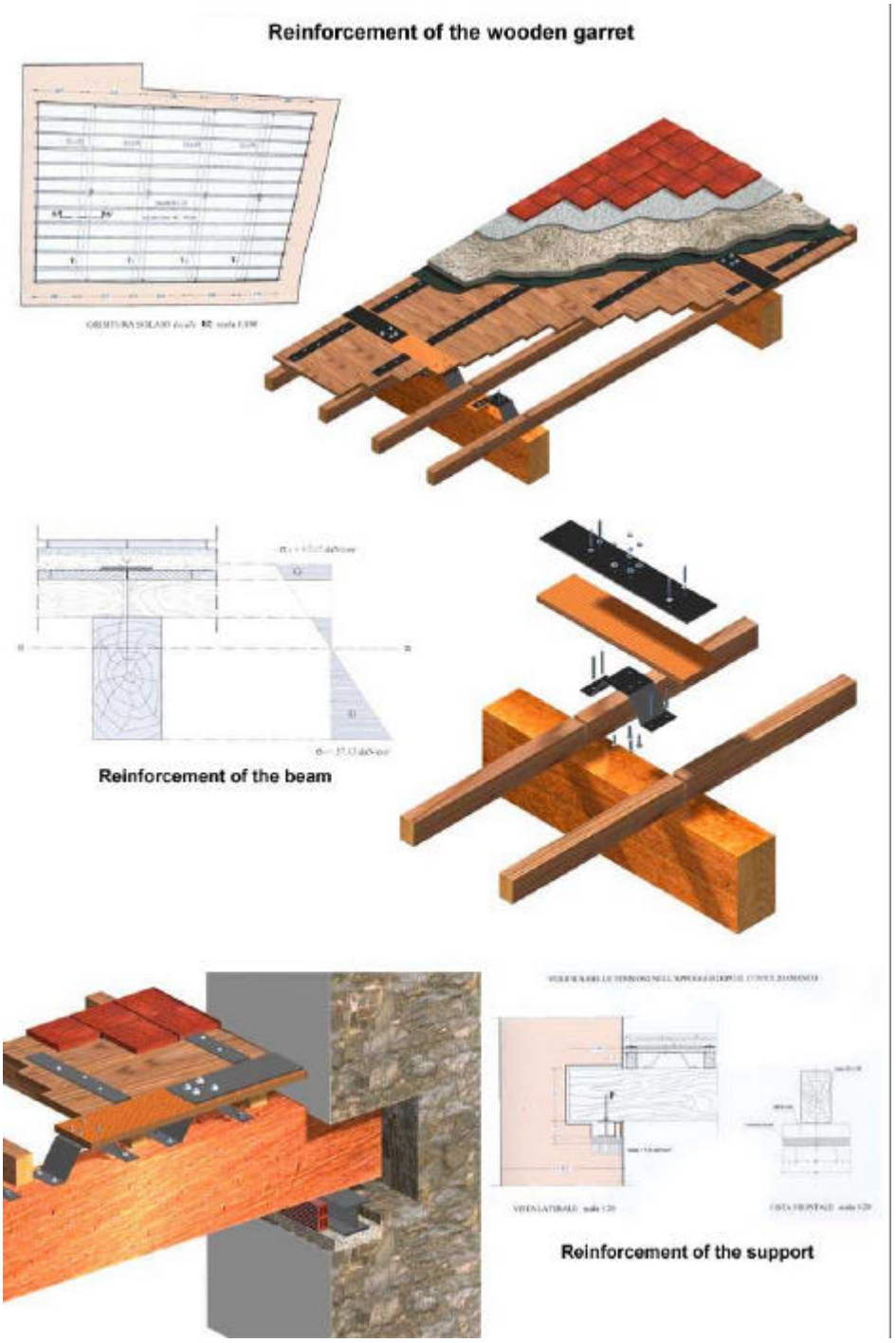
- Historical research, based on archive material and bibliographical sources. It helped us outline the events leading to the development of the construction.
- Survey, realised with direct and indirect methods. It includes the geometric survey and a report describing the material degradation of the estate and the static instability of the structures.
- Direct visual analysis of the constructional and typological systems of the building. It contributed to reconstruct and examine the evolution of the building.

The static check of the structures.

We elaborated the "tables of static survey", which represent a graphic synthesis between the geometric survey of the building and the typological and functional survey. The latter also included additional information concerning certain constructional details or particular evidence of structural degradation.
Afterwards, we provided the structural checks, using the method of admissible tension in compliance with the ministerial laws (DM 20.11.1987 and DM n° 18407, 3.10.1978).
The following elements were taken into consideration:

- The wooden garrets
- The masonry vaults
- The shoulders of the vaults
- The wall close to the ground of the terrace
- ***Conservative intervention and building restoration***

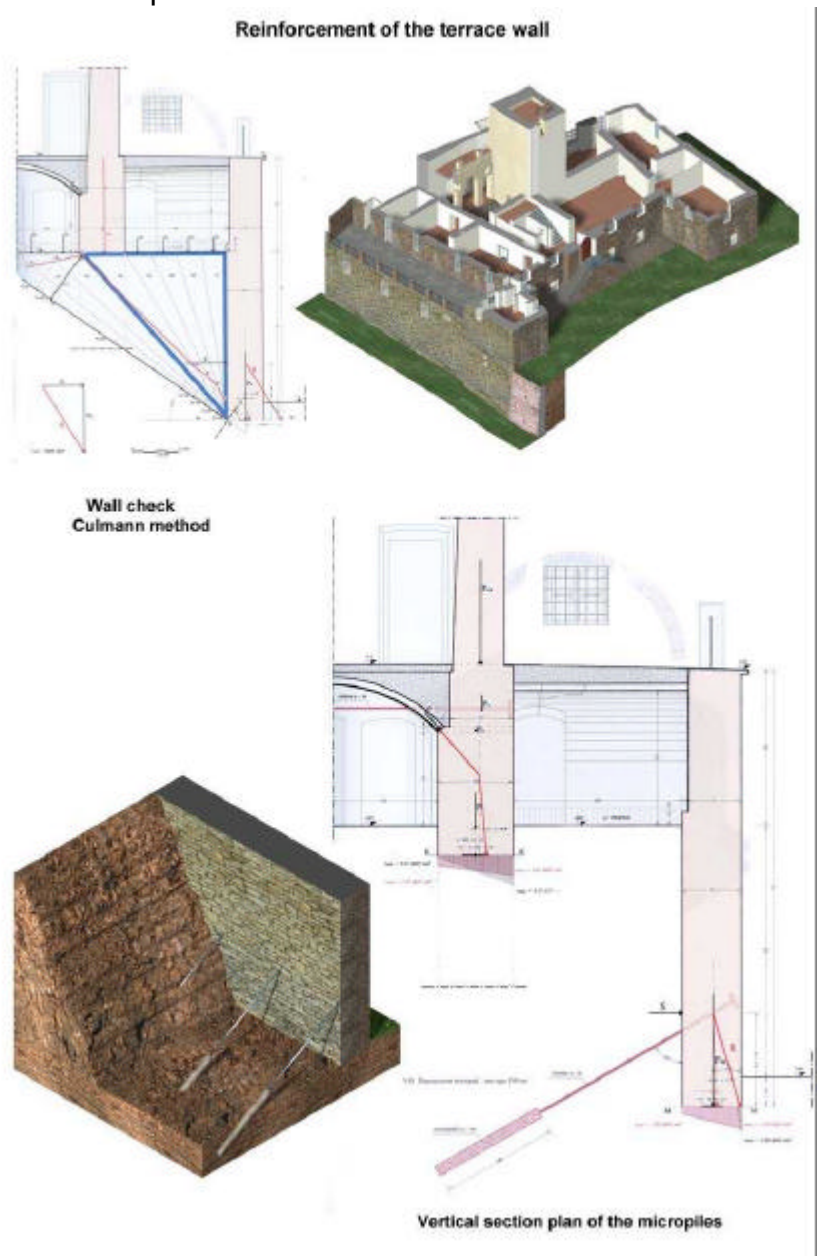
The survey on the cracks and the instability analysis pointed out that most problems were caused by a *lack of enchainment,* by a *rotation* of the external walls and by the *decay* of the *wooden structures*. That was the reason why some garrets inevitably collapsed.
The deterioration analysis allowed us to identify the different alterations to the walls of the construction: moisture, disjointedness, detachment and plaster efflorescence, mortar erosion, rust stains, biological patina and evidence of vegetation.
The reconstruction of the covering was eventually deemed necessary, but the original pattern of the structure was preserved and the already existing wooden elements were re-employed. As regards the wooden garrets, the disposition of straps on the main beams and on the small beams extrados was required owing to the overload increase. This aimed to intensify the inertia. For the beam-strap solidification, omega-shaped metallic elements were employed, fixed on the extrados of the main beams and having the same height of the small beams.



The reinforcement of the wooden garret

We found out that the masonry vaults were suitable on the static plane, but it was necessary to reinforce them with chains, that are still missing at the moment.
The renovation of the external masonry walls included the restoration of bricks and of the original plaster, on the one hand; the reshaping of mortar joints and plaster made of finished mortar, on the other hand - this allows us to define the original building texture.

As the wall close to the ground of the terrace had subsided, its reinforcement works were carried out very carefully. In this case, concrete micropiles had to be driven into the ground, in order to stop its rotation.



The reinforcement of the wall with concrete micropiles

For further information:
Andrea Sartore, e-mail twins75@libero.it
Stefano Tardito, e-mail teos.t@tiscalinet.it