

POLYTECHNIC OF TORINO
FACULTY OF ARCHITECTURE
Degree in Architecture
Honors theses

Static analysis and hypothesis of project for the conservative restoration of Saints Nazario and Celso's Church in Montechiaro, in Asti

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My passion for **Romanesque culture** and its expression in Italy (and not only), combined with a great interest in **restoration**, drove me to search a theme for my thesis belonging to that historical period and, at the same time, requiring a work of conservative restoration.

The opportunity to foster my interest was given to me by architect Paola Salerno, an official of the Superintendence for environmental and architectural Heritage in Piedmont, who, as a responsible for the monumental protection in the territory of Asti, led the restoration works of **Saints Nazario and Celso's Church** in Montechiaro, a little town near Asti, within the project for the celebration of the **Jubilee 2000**.

The works, under the guidance of architect Fabrizio Muratore, contracted by Alina Pastorini company, provided for the restoration of masonry and the revision of roofings.

The great possibility I had to go to the building yard enabled me to acquire a knowledge of the monument with a deep level of investigation; in fact, the presence of a scaffolding that surrounded the church, gave me the opportunity to "**touch with hand**" its masonry, see its imperfection, its defects, "its infirmities" and the ability of Romanesque workers.

In this sense, my study tries a conciliation between **theory and practice**, between what you can learn reading university books or listening to teachers, and what you can learn staying in a building yard by the works of restorers, or by the requests of the carpenter or the bricklayer.

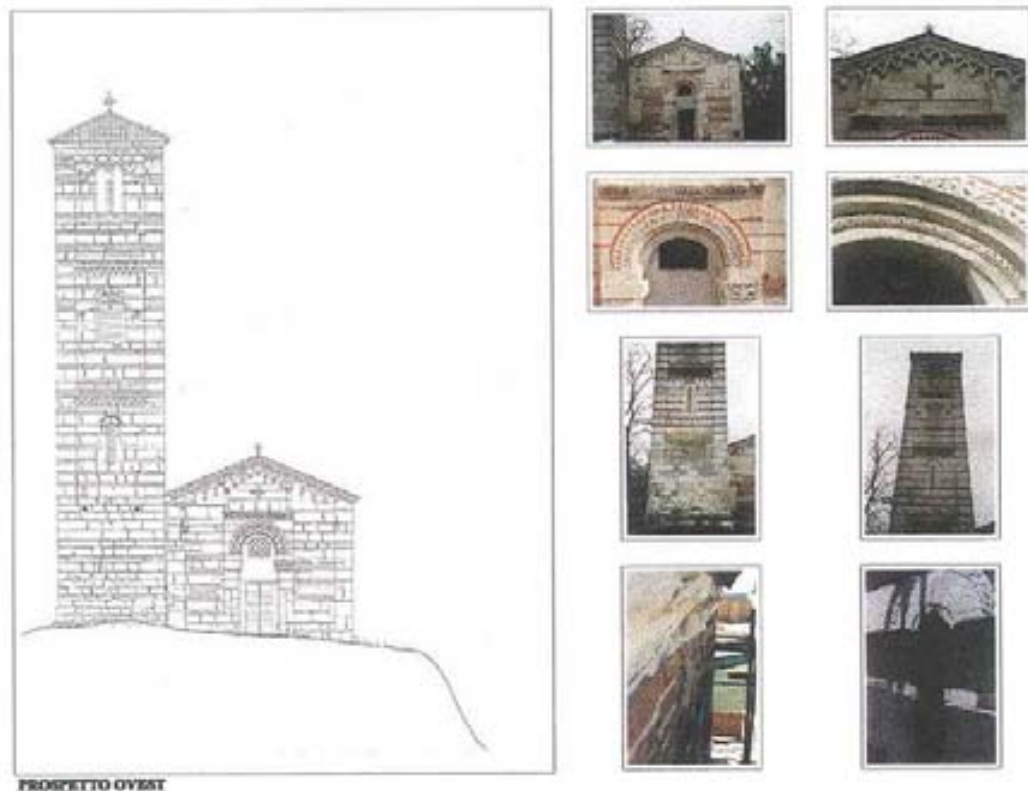
The **experience of the yard** was a kind of **stage** of great profit to me; the **notes** taken during the different visits I made, were put in order inside my thesis, even if the disorder that characterised them revealed the vitality of a work studied and seen by several people with different priorities.

Within this yard, **the bell tower** near the church became the subject of my **analysis** from a **structural** point of view, in order to verify the state of health of the monument.

My study started with a **historical and territorial** introduction to the monument within the territory of Asti, searching for similarities between expressions of the same

period; then my **survey** focused on the restoration works that involved the church, and in particular the bell tower, from mid-XIX century until today (1982).

The next step of my work was the **relief**, made on a 1:50 scale which gives a real indication of the **masonry texture** of the monument, with its irregularities and anomalies and with the indication of its **state of decay**, **cracks** and conservation.



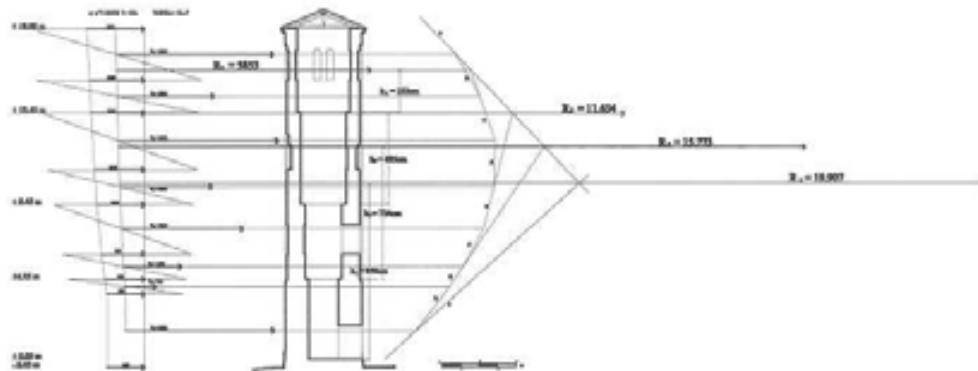
The relief with a photographic documentation

Then many plans at different levels of the bell tower with their relative sections were made with the indication of masonry typology, ie **sack masonry**, made by two external faces in stone and bricks and an internal core of mixed materials.

The **structural study** was made following two different approaches: the first one, on **visual** bases, for the direct knowledge of the monument, and the other, the **scientific** one, for a static analysis.

The former gave as a result, in addition to the relief, an **assessment of the cracks state** of the bell tower, and an **analysis of the basement** of the bell tower itself, with relative sections in the critical points.

The second approach of scientific nature regarded the **static analysis** of the bell tower until the level of foundations considering **gravitational loads** and horizontal actions due to the power of **winds**.



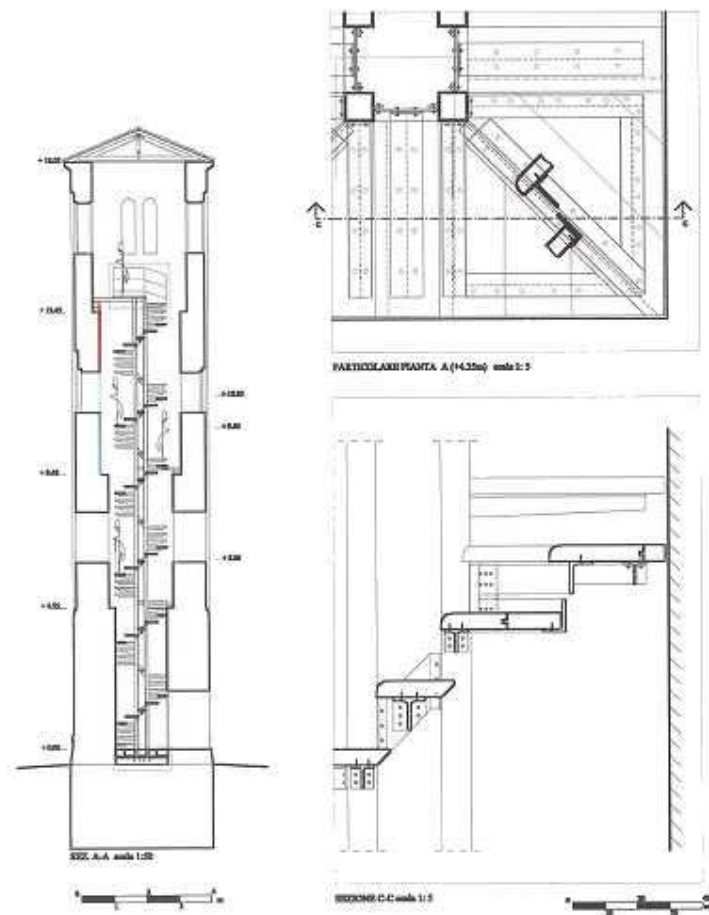
The action of winds: the individuation of total and partial resultants

The static analysis brought to the consideration that the interventions of consolidation, already made by the Superintendence in the 80's, as testified by archive documents, have been considered sufficient; in this sense, a particular control was made, first of all on the relief of the position of the chains installed to carry out the works.

The last phase of my task was characterised by **planning**; my attention focused on the project of a **staircase** inside the bell tower, in order to permit, first of all, ordinary and extraordinary maintenance, but also the access to a few fortunate visitors.

The staircase was conceived as a very **flexible** structure, with a great respect of the context in which it is situated, and very little intrusion in the masonry of the bell tower, but first of all **feasible**.

The structure consists of a lot of pieces that you can rivet and screw in the yard, and easily assemble and disassemble, using wood combined with steel. In this sense the system does not disturb the existing context, but it also increases the value of the bell tower as a whole.



The project of the staircase

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