

## Abstract

# Structural documentation before and during the restoration interventions

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Just like a good doctor, a restoration engineer must, first of all, have a direct personal contact with the historical building he has to look after, in order to examine it closely and raise the right questions about its condition. Only after having paid this thorough attention, he will be able to evaluate efficiently all existing documentation data about the building, and propose additional survey and research projects.

**Existing data:** research in archives for information about past interventions, old photographs or designs, history of old damages due to natural phenomena such as earthquakes, floods, corrosion etc or human interventions such as vandalisms, structural deformations due to changes of use or additions to the initial structure, etc.

The first step is to gather all publications, research projects, official documents and files about the monument existing in various public archives and Public Services.

The fact that sometimes one finds little information even about recent interventions, may be astonishing but is true. It is also true that such information is sometimes not accessible to everyone. Additionally, the presentations of former restorations are not always totally truthful, and have a tendency to ameliorate the final result, and hide some annoying details or mistakes, the impact of which however is revealed, sooner or later, to the attentive eye of today's restoration engineer. The action of earthquakes also makes those hidden faults appear as structural damages.

Since, most of the times, public archives are not a sufficient source, additional information may be derived also by indirect sources such as family photos, gravures, contracts with technicians, wills and other documents of the owners, even local traditions and fiction. Some times for example, old documents with general descriptions of the impact that a past earthquake had on a city may help to evaluate the approximate size of the seismic forces that had damaged a historical building of this city.

Indirect information may be also derived by comparison to other similar buildings of the same architectural type or built at the same period to this area.

Yet one has to be very careful and cross-evaluate such information with his personal examination and survey.

**Additional documentation:** After having evaluated existing data, the restorer can demand some more documentation projects in order to complete his knowledge of the historical building, before proceeding to the final diagnosis of the damages and the repair and strengthening proposals.

Such additional investigations may be: architectural, photogrammetrical survey, laboratory tests of building materials, geotechnical survey, special radiographies, in situ investigations of the seismic impact, monitoring etc. Some such modern techniques and their results will be presented today by other colleagues.

I will point out once again that the quality of a modern survey is not based only on the competence of the various equipment or techniques used, but on the attentiveness and ability of the person using them. Documentation and survey on a

historical building is never a mechanical action. And as experience accumulates, the understanding of the condition of an old building is based on scientific data as well as on the engineer's intuition.

**Documentation during the intervention:** Skipping the phase of the design project, we arrive at the phase of intervention.

During the restoration works a very detailed archive must be kept: everyday diary, photographs, sketches, in situ tests, characteristics of incorporated building materials and as built plans, sections and construction details. This data will enrich the file of the historical building.

No matter how complete the initial survey and design projects may have been, new and unexpected conditions will appear as the restoration work proceeds. It is always necessary to have foreseen alternative solutions, or to be able to design new ones very quickly, especially in cases of damaged buildings that cannot remain exposed meanwhile.

It is very important to document the new findings with sketches, photographs, monitoring, etc and continuously update the architectural and structural survey.

The collaboration of the supervisor with the initial designers is always useful, because, due to their former acquaintance with the building, they may be able to produce quick and valuable estimations of the new findings and adjust their proposals.

Additional calculations may be needed in order to redimension or change some of the proposed interventions. It is of great importance to keep detailed information about the final interventions and the fullest possible explanation about the need of these alterations.

The whole file containing the as-built documentation of the project must be completed and submitted soon after the end of the interventions. It will be very helpful to those responsible for the conservation of the historical building, as well as to future restorers.