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STRENGTHS AND WEAKNESSES

Vulnerability factors

The Research Project allowed us to test hypotheses, methods and analytical instruments, and at the same time to obtain indications which could be used within the local system. Strengths and weaknesses not only represent things which have been rediscovered or lost from the community's earthquake culture; they are also the basis of an understanding which is vital to any organic plan for protecting the architectural fabric.

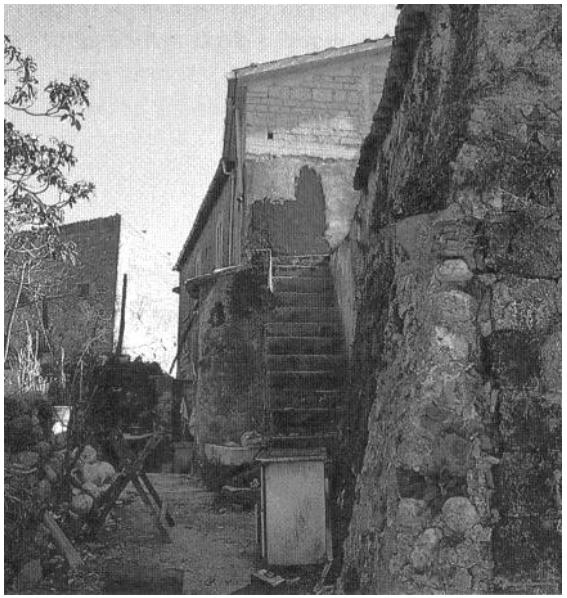
We thus list them, together with a few brief notes.

The map of vulnerability factors is a useful aid in identifying the constituents of a community's earthquake culture. It includes not only older factors which used to be well known (excessively large openings or corner openings, chimneys and vents, etc.) but also modern features of buildings and architecture which have become vulnerability factors due to lack of maintenance or because buildings are put to a range of different uses, etc.

It was found that certain features, such as rainwater downpipes which are recessed (and which no one knows how to repair these days), or roof spaces converted into attics, were things which caused buildings to become run-down faster and thus made them more vulnerable.

The list of old and new vulnerability factors includes:

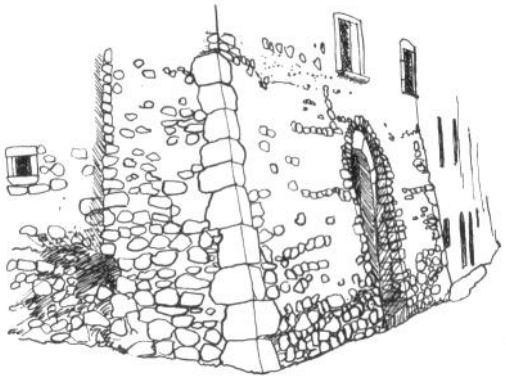
- **bays** which are **excessively wide** relative to the wall;
- the **position of openings** relative to the intersections of walls (often, both inside and outside, older and more recent gaps are found close to the crossings of walls and roof ridges);
- **older and more recent floor additions**;
- recessed **chimneys and vents**;
- recessed **rainwater downpipes made of brick**, with a very wide diameter (up to 20 cm);
- infiltrations due to the type of **dripstone** used for windows and balconies;
- **partial reinforcement work** (e.g. reinforced concrete applied on top of rough-walling).

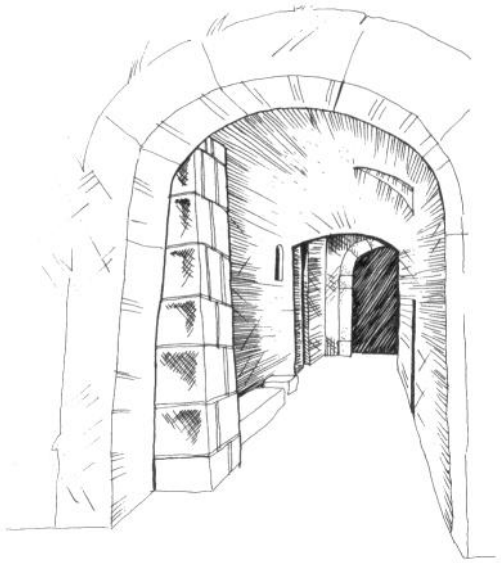


Reinforcement factors

Anomalies which eliminated earlier vulnerability factors and can thus be regarded as reinforcement techniques forming part of San Lorenzello's earthquake culture are as follows:

- **buttresses**, traditionally of stone, and more recently of brick, used to shore up points of local deformation, are a method of reinforcement and repair;
- **wall bracing**, angled or vertical, is a general preventive measure, however. Our analysis of the methods used suggests that all such bracing was constructed after the 1688 earthquake. Comparison with Cerreto, where none of the buildings in the oldest part have wall bracing, proves that this technique was always used for subsequent reinforcement and not as part of the original construction work;
- **tie-beams**, terminating in tie bolts and plates, were little used, and only from the 19th century onwards, when new regulations made streets and





passages no longer communal areas but publicly administered areas, so that it was no longer possible to strengthen roof ridges by building vaulted passageways or staircases supported by rampant arches;

- **vaulted passageways** of tuff or rubble. Originally additions which combined static reinforcement with improvements in amenities, these became a regular feature of the architectural repertoire and are now incorporated into new structures right from the start.
- "**contrast**" **arches** made of tuff, at the topmost point of buildings, probably serve as a barrier to cracks caused by the thrust of the roof or rotation of the walls. They are used when the part of the wall concerned is too high so that a new room or

staircase cannot be built whilst reinforcement work is being carried out;

- **staircases, supported by rampant arches** between two buildings are the simplest use of a "contrast" feature;
- **outside staircases**, sometimes with a terrace or loggia, may have become necessary when properties were divided and separate access was required. But the fact that they were accepted by the community even though they take up a considerable area of common ground suggests that they were essential to balance the building;
- **extensions**, usually to the ground floor, so that its roof can be used as a terrace.