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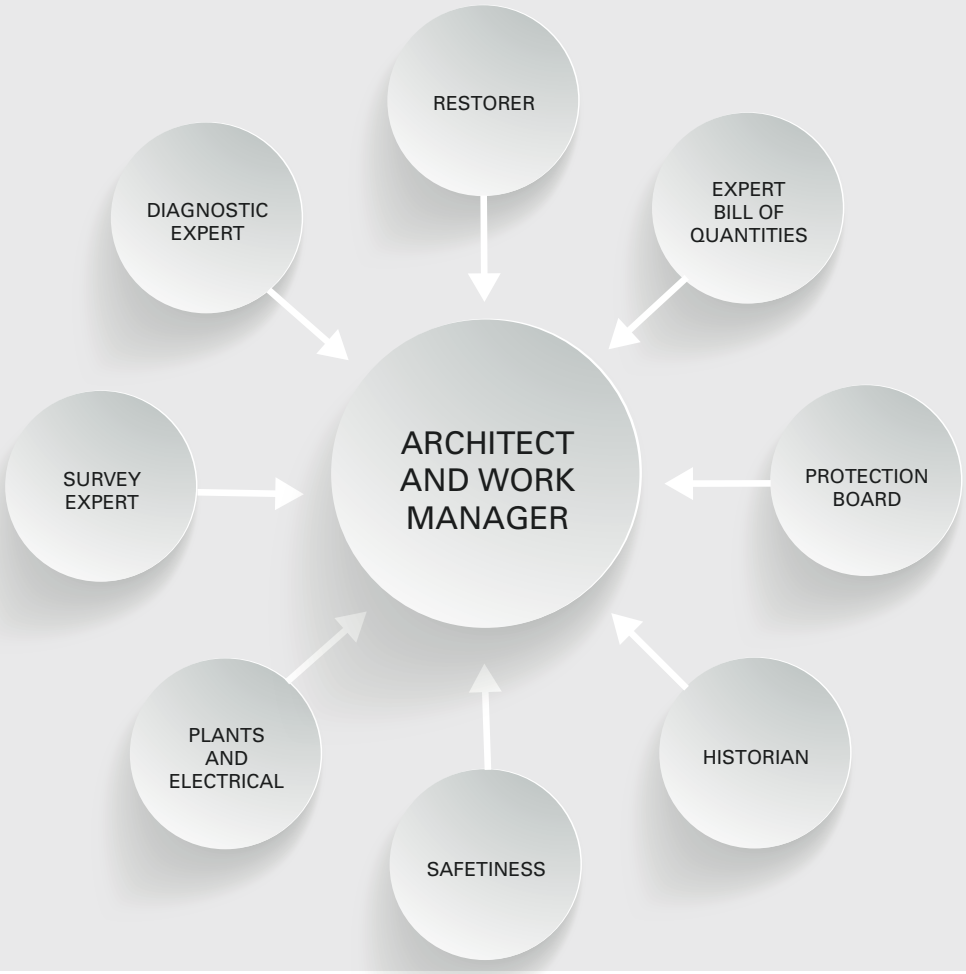
THE IMPORTANCE OF A MULTIDISCIPLINARY APPROACH IN RESTORATION PROJECTS

The restoration project is a very complex task that involves many disciplines and many professionals: the restoration of the mosque of Sheik Suleyman is an example of how to run a multi-disciplinary design and it is also an example of complexity to be able to conserve all changes that have occurred in more than a thousand years of history.
The designer architect and construction manager is a kind of "orchestra conductor" (fig. 1) who must be able to engage and communicate with different specialized professionals, such as the expert of diagnostics and surveys, the restorer, the structural engineer, the engineer who deals with systems and heating and cooling, the art historian, the head of safeness of the site and last, but not least, must be able to interact with the Protection Board. All these specialists need to be coordinated by a figure that has multidisciplinary experience and that is able to understand the needs of the individual specialist.
In Italy, the state of the restoration discipline can be considered in a very advanced stage, but we can affirm that, despite the theory of restoration had taken life since 1800 with great Italian scholars then systematized with the paper of Venice, the restoration approaches are still not uniform.
If we look at the restoration of St. Peter's Basilica in Rome, or at the restoration of the facades of Procuratie Nove in Venice (St. Mark's Square) we see that the level of cleaning



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The architect is like an Orchestra Conductor

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The surface represents a palimpsest of history of the building

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Important remains of Byzantine decorated plasters could suggest some works to valorize them

of the monumental surfaces ranges from being very respectful of the patinas to deeper cleaning approaches depending on the approval of the local ministerial authorities.
There are examples in Italy of renovations incorrectly called restoration where ancient buildings see the brutal insertion of new parts in total disrespect of the original structure while in other cases the mere opening of a window can be seen as “incorrect” by the local Superintendence Authority. A designer could ask: what are the guidelines for the restoration? Theoretically the Cultural Heritage Ministry imposes almost complete preservation of the monument, but in fact this practice is not uniform and depends on the individual protection board. The importance of the Italian experience lies mainly in the method with which you deal with a restoration project: in all cases, despite different end results, the study and the level of knowledge refer to a well defined methodology; any project that needs to be submitted for approval by the Superintendent assumes historical research, deep visit of the construction site, surface analysis, a careful geometric survey and orthophotos, a stratigraphic survey, a survey of the degradation, the knowledge of chemistry and physics of the materials that form the building, the diagnostic analysis support etc.
All these steps are essential and are now a standard of any successful project: the knowledge of the building is the first phase of the project and it’s very important; you have to be able to know every material to respect it; the project is not realized in the studio but is done on site by studying and deeply understanding the building and obtaining from the building itself its maintenance history.

Fig. 4. The old pictures can give a reliable reference as a starting point for restoration project

Fig. 5. A realistic and precise 3D project can give a perfect idea of final result and suggest possible changes or implementation before starting the works

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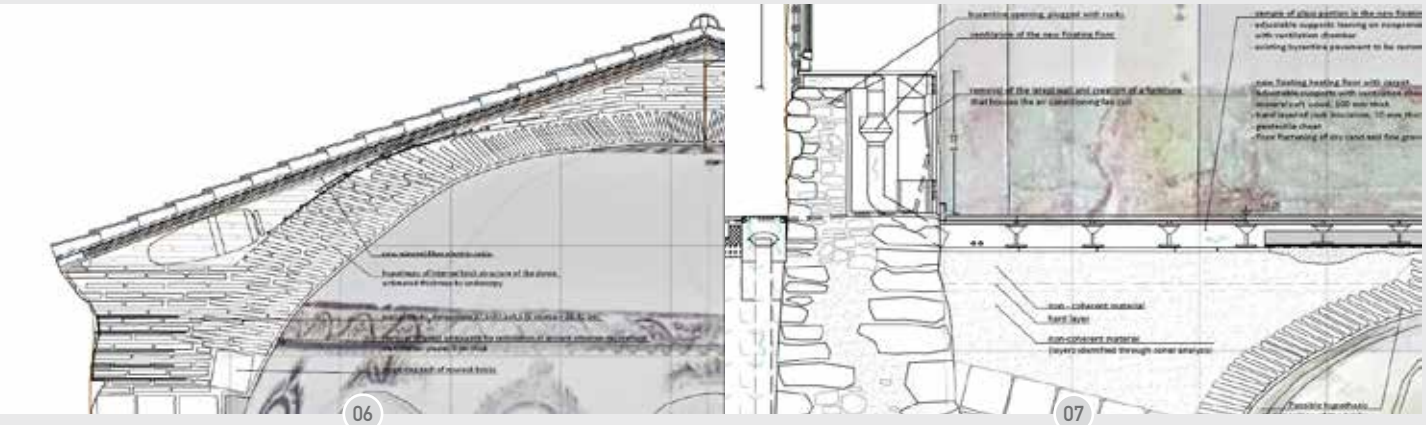
You need to look closely at the surfaces to understand the phases of construction in order to be almost "advised" by the building about the needs and the necessary works: "to know, to maintain", can be a slogan that well represents this approach.
The restoration project should not override the monument but should remain in the background: a beautiful Italian definition by a friend architect Marco Ermentini is to create a "Shy Restoration", a restoration in which the designer agrees not to be at the center of attention, not to be the artist who puts his signature but only the "Preserver", who is responsible for handing down to posterity what has come to us form the past.
We prefer a restored building rather than a redone one: it is clear that a case like the mosque of Sheik Suleyman with more than a thousand years of history is a perfect palimpsest of interventions and stages (fig. 2). Perhaps we start even from a mausoleum or a Roman tomb, transformed into a Byzantine baptistery (fig. 3), later a mosque modified further and painted and richly decorated in 1700. How can we do a project that guarantees that all these stages and this story are not deleted? We can for example refer to the photographs and prints from the 1900 and use these photos (fig. 4) as a time reference of an important phase that had not yet seen the actions of the very low quality recent decades works and start our project since that time without wanting to return the mosque to an indefinite period (Byzantine or Ottoman) or worse without wanting to create a hybrid that never existed. The project drawn up with the help of all experts of Assorestauro and VGM just wants to delete the recent very low quality additions and wants to enter the services and technological systems in respect of this story and this succession of stages. Some attached pictures show how the long work done by the design team has been to design and predict every possible intervention still in the design phase (fig. 5) to avoid any variation or surprise during construction, which make the works longer and more expensive, as often happens in Turkey but also in Italy. A careful multidisciplinary project is the only solution that allows us to treat on the same plan not only the architecture but also the historical aspect, the structural one, the systems, the lighting and the archaeological point of view so as to avoid having an aspect that is considered dominant than the other. The restoration project should always proceed in parallel to check the inconsistencies and incompatibilities, such as the lighting system and the electrical system must be designed in parallel to the architectural aspects, not in a different hierarchy but all equally important.



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Details of the project: all aspects are included, roof insulation, strengthening and electrical cable path, vent and floating heating floor

The detailed project and the details of the tables presented in this paper show that the great work done by our study with the support of all the experts of design team has been to include in the project drawings all information been obtained by the individual specialists, so the graphics represent a sort of x-ray of the building (fig. 6, 7): the masonries are not designed on hypothesis and represented with AutoCAD patterns but report the real composition of the building and are made thanks to the close visual analysis and all diagnostic investigations.

Energy aspects are just as essential to a modern restoration, the proposal involves the construction of a plant floor radiant formed by floating floor elements (fig. 8) detached and respectful of the remains of the Byzantine pavement below and provides a lighting LED specially designed and verified in its effectiveness (fig. 9, 10).

The study conducted on to the heating and cooling will allow a great energy savings estimated in 74% warming compared to an electric carpet heating in winter (fig.11) and a saving of 15% compared to a standard air-conditioning system (fig. 12), also if it were possible to connect this system to a series of solar panels it could have a system with zero power consumption and completely autonomous

The toilets, the space for ablutions and technical rooms are designed with contemporary forms and materials to form a clear insertion element which would break away from the monument and that meets modern requirements (fig. 13).

In the same contemporary architectural style was designed a new access to the crypt, currently difficult to access through a simple hatch (fig.14).

What are the conclusions that could be drawn from this brief paper, and what may be in my view some different approaches between Turkey and Italy? From what I could see in Italy the need to provide a detailed implementation plan is now uniquely defined before any contract, the project must already take into account the surrounding environment, the rules, the architecture, the history, the structure and energy performance with careful analysis and a forecast of everything that might be unexpected.

The advantages are that once contracted the work, there are no further delays and that will not be necessary to require further approval from Protection Board with the time and cost of construction becoming reliable and trustworthy.

In Turkey, from my limited experience, there is great attention to the architectural and

Fig. 8. Detail of the proposed heating and cooling floor

Fig. 9. the proposal for a new led low consumption chandelier with hidden leds that enlighten the frescoes of the dome

Fig. 10. Illuminance calculations of the new lighting proposal

historical aspects, there is a tendency to delegate aspects merely to the so-called implementation project (structural and system detailed project),; projects in some cases can be carried out by the technicians of the successful tenderer and they generally involve new approvals and changes to the original contract rates and conditions, all with lengthy and unpredictable outcomes.
We hope that this example will serve to appreciate the importance of multidisciplinary design and to realize that even in restoration field it is possible to avoid changes and increasing of costs during construction.

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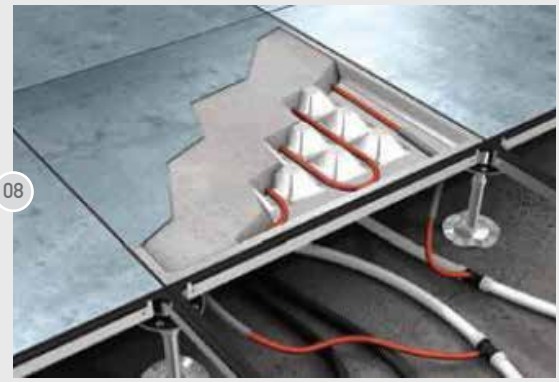

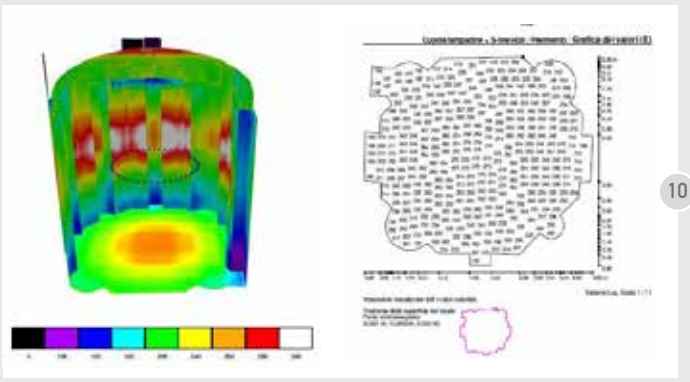

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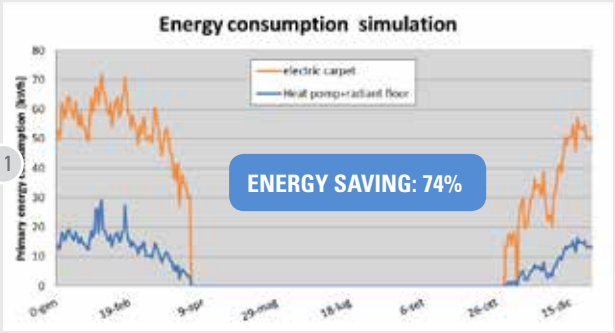

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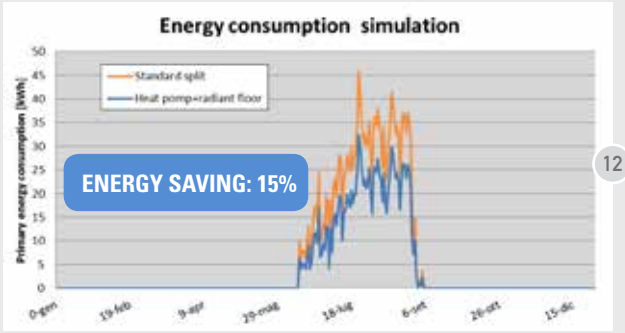

Energy consumption simulation and comparison between HVAC system and previous electric carpet during winter heating

Energy consumption simulation and comparison between HVAC system during summer cooling and standard air conditioning system

13 The new insertions have been designed with contemporary style not to alter the ancient monument

14 The section shows the proposal for new entrance to crypt