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THE CHURCH OF SAN PABLO (VALLADOLID, SPAIN). THE SELECTION OF THE RECORDING TECHNIQUES: APPROPRIATENESS, SUITABILITY AND EFFECTIVENESS FOR THE DOCUMENTATION OF A CULTURAL HERITAGE PROJECT

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A-2: Archaeological and architectural heritage conservation applying ICT

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ABSTRACT:

After almost five years of studies and works carried out to restore the façade of San Pablo in Valladolid (Spain), this paper aims at promoting a critical evaluation of these works in order to analyze the selection of the recording techniques used before, during and immediately after the development of the preliminary studies and the conservation works. During the restoration process the survey was continuously implemented, collecting new data and using different techniques in order to provide the kind of information requested by a multidisciplinary team of professionals with completely different needs.

At the same time this project has had the exceptional feature of exposing to the public the development of the conservation works in real time through a lift platform which entailed the obligation of informing everyday through effective and understandable means about how and where the works were being carried out at the façade.

In these terms, this paper will try to bring the attention to the difficulties found in choosing the most suitable, effective and appropriate recording technique for different and specific conservation and communication purposes, searching for a good relation between accuracy, cost, time and efficiency within the whole cultural project.

1. INTRODUCTION

The façade of the church of San Pablo in Valladolid (Spain) is a stone-filigree sculpted masterpiece reconstructed at the end of the 15th century with designs by the architect Simon of Cologne following the indications by Fray Alonso of Burgos, chaplain and confessor of Isabel I, the Catholic Queen. The works were carried out in the ancient convent and in the lower half of the main façade, which was reconstructed in the Hispano-Flemish gothic style.

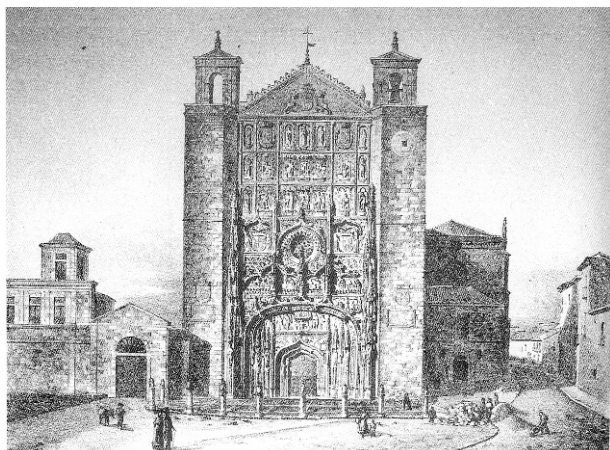


Fig. 1. The façade of San Pablo in 1861 (Crosa 1861)

It would be The Duke of Lerma and the preachers who completed the present façade and church in the first two decades of the 17th century (Fig. 1). During the Spanish Independence War (1808-1814) the complex was seriously damaged by the Napoleonic troops, followed by the Disentailment of 1835 which caused the definitive destruction of the already battered convent premises. In the 20th century the church suffered a fire and several restorations, the last ones carried out in the 70s and 80s.

With these antecedents, in 2005 Caja Madrid Foundation, a non-profit organization created in 1991 with a specific programme for the conservation of architectural heritage in Spain, signed an agreement with the local government of Castilla and León that aimed at the integral restoration and the recovery of the historical significance as well as the artistic and architectural values of the façade of San Pablo. By that time the façade was in a deplorable state of conservation. Time had served up a devastating verdict on the restoration works carried out during the 20th century, since those actions caused new damage that had not existed up until they were performed, much of it caused by overconfidence in the chemical products popular at the time. So an urgent intervention was needed in order to stop the process of deterioration of the stone and the safeguard of almost 250 sculptures that cover completely this magnificent elevation (Fig. 2).

2. THE RESTORATION PROJECT

The façade was affected by a whole series of easily identifiable historical problems, such as the erosion of mortar, deformations, appearance of fissures, breakages, construction pathology, the presence of damp, notable volumetric losses and loss of sculpted material, successive sandblasting and collapse, condition of patinas, exposure of surface salts, pathologies of a vegetal or animal origin, algae, fungus and lichens, microbiological agents, alterations to the original material, protections and dressings, products producing alterations, the presence of cement mortars, wedges of different materials, staples, rusts, stitches, reconstructions, etc. All these factors that had affected the building over a prolonged period of time had given rise to the deplorable state that the façade was in when the cultural restoration project began (Fig. 3).



Fig. 2. Photo plan of the façade prior to the restoration works

In terms of documentation the previous restoration works carried out in the 70s and 80s left only a few photographic and technical documents with no special references about the treatments used. Just a paper published in the proceedings of a Symposium (Cruz & Gárate 1986) permitted to know some data about the treatments applied during the last works carried out in 1985. So in these terms, the architect in charge of the project, Eduardo González Fraile, faced the restoration project with two main goals: the treatment of damp patches, in the basement and in the façade, and the façade conservation treatments. Obviously, without the first part of the process, which had not been tackled in previous restorations, the second one was relatively useless. Therefore, first of all ventilation galleries were made at the basement with an archaeological excavation follow up and once this aeration system was complete, then the works started on the façade itself.

3. THE ROLE OF DOCUMENTATION WITHIN THE RESTORATION PROCESS

In order to proceed with the conservation project the first step was a series of preliminary studies focused on identifying and mapping the main pathologies mentioned previously, visible and invisible, which were affecting seriously every single stone element of the façade.



Fig. 3. State of conservation of some sculptures completely ruined due to the water and external agents

In order to carry out these on-site pre-studies a rigorous and detailed cartography of the façade was considered compulsory and this fact would settle the basis for all the information that in the next five years would be collected and mapped in order to gather a huge amount of data that would be daily managed by the technical team in charge of the restoration works.



Fig. 4. Derrick used to place the targets and to take stereopairs

The survey was carried out by the architects Latorre & Cámara, with topographic and photogrammetric techniques in 3D, with enough detail to guarantee the preliminary documentation of the entire façade before the conservation works (Figs. 6 & 7), to ensure a good cartographic base for studies related to the characterization of the stone material, chemical analysis, map of

pathologies (salts presence, mortars decay, etc.), constructive features, historical description, archaeological studies, and every single study considered necessary in order to obtain a good diagnosis for the restoration project (Fig. 8).

The topographic data was recorded with a four station traverse and a net of 150 control points on the façade (Fig. 5), homogeneously distributed. The stereopairs were 6x6 slides taken with a semi-metric calibrated camera, a Hasselblad 903 SWC. In total, 34 frontal pairs and 22 zenit and lateral pairs were made. The shots were taken from a 28 m height derrick giving a final precision of +/- 5mm (Fig. 4).



Fig. 5. Type of targets used for control points

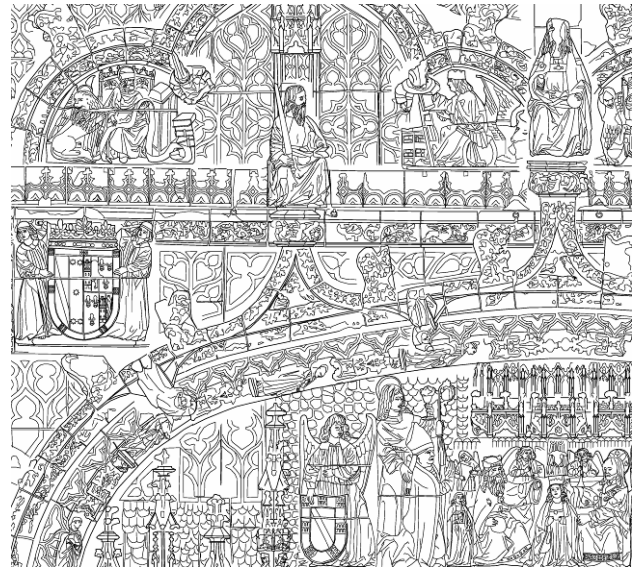


Fig. 7. Level of detail of the photogrammetric plotting

All the information was mapped on 2D CAD projections of the main plotting that permitted the different restoration professionals to work on site on the scaffoldings installed for the preliminary studies and during the restoration process (Fig. 8 & 9). All this data was later on processed by the technical team to evaluate the level of intervention carried out during the day, the results obtained, the problems encountered, so as to have continuously a general overview when extrapolated to the whole façade, in order to keep under control the different treatments, works timing and general planning of the project.

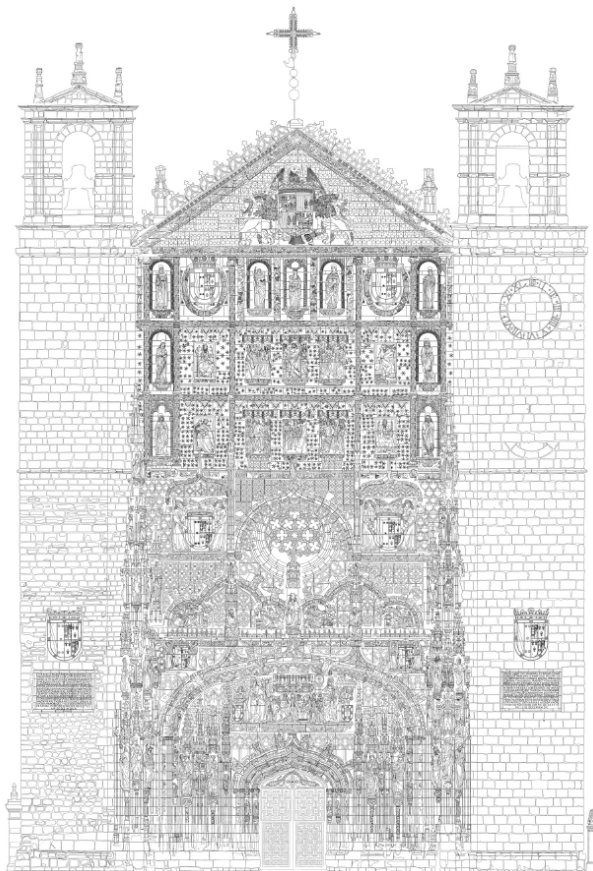


Fig. 6. 3D plotting of the elevation with photogrammetric techniques

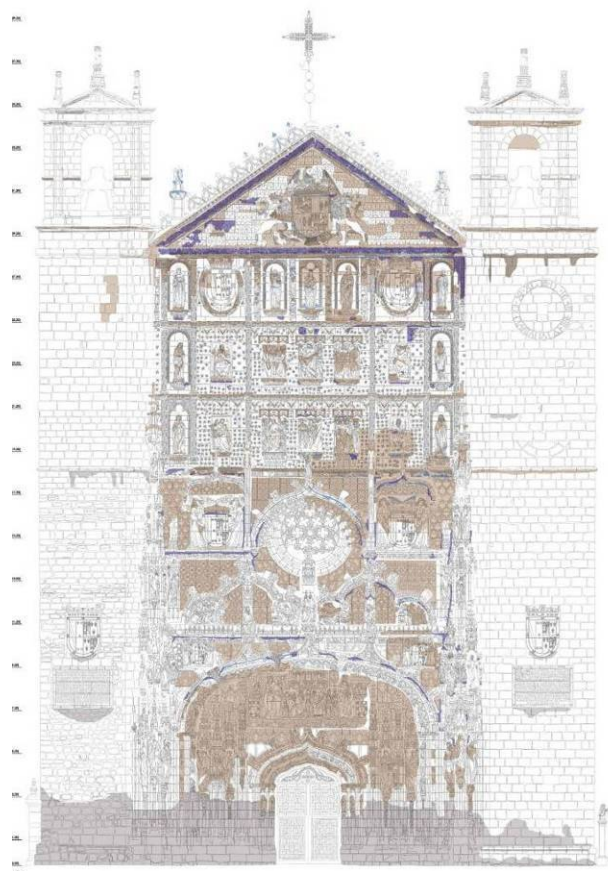


Fig. 8. Map of some pathologies affecting the façade

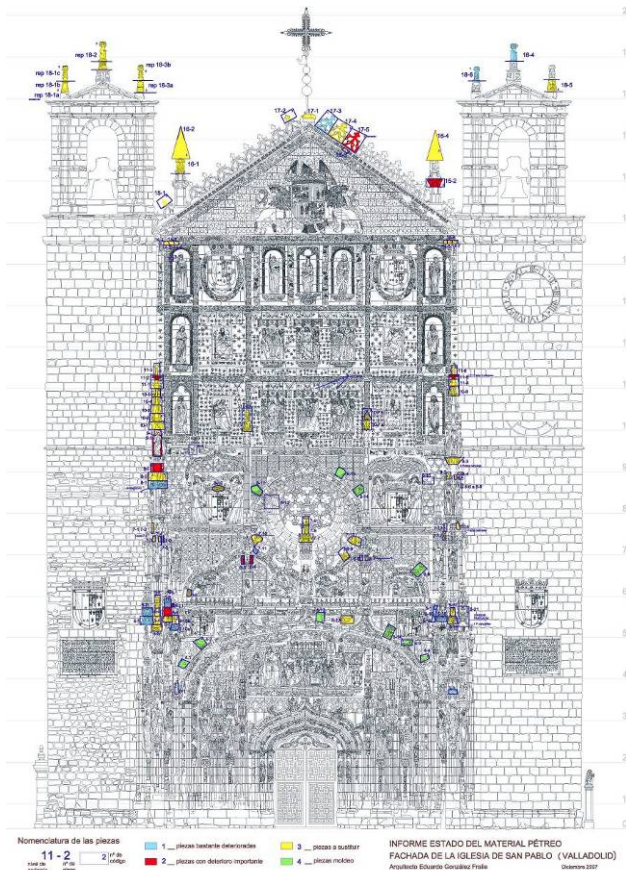


Fig. 9. Map of stone pieces to be replaced due to their bad condition

This documentation was complemented with series of general and detailed photographs that captured the conservation state before, during and after the works. These photographs turned out to be essential to compare preliminary phases of the works when the dust and dirt covered the surfaces of the façade, with the preliminary cleaning processes. This intermediate state permitted to identify, for instance, reconstructions made during the 80s using cement mortars that had affected seriously to the original stone due to the salts, different material behaviours, and the oxidation of steel and iron elements inserted in the volumetric reconstructions.

It is a key point to highlight that in certain processes carried out during the restoration works the documentation processes were determined by the kind of restoration technique used for certain activities. In these terms a wide variety of technologies were used, from IR photography, X ray diffraction, laser scanner or video, for instance. At the same time, We could mention as well the special case of the reconstruction of various pieces of the pinnacles that were completely ruined due to the deterioration of the stone. Wherever there were structural and constructive reasons to replace these pieces, as it was for the pinnacles, then the restoration criterion in these cases was the complete new reconstruction of the piece. For this specific purpose the work was commissioned to a specialized French company, Atelier Jean-Loup Bouvier, that still work following 15th century stonemason and sculptor techniques, with remarkable results in the quality of the pieces, from the architectural, structural and artistic point of view. In order to document the pieces that were going to be replaced, a 3D scan was done so as to record the exact position of every single piece. However, the

documentation produced from the original pieces used to create the replica were just hand plans of the different levels of the piece that would then be used by the sculptor to carve the stone (Fig. 10).



Fig. 10. Pinnacle detail hand drawing in 2D and the same drawing on the stone to be sculpted

There is no doubt that in this case it was the sculptor's hand, his expertise and his experience following the ancient tradition, the factors that permitted to get high quality hand sculpted pieces following 15th century methods within the 21st century. These outstanding results are visible now on-site once the pieces have been replaced on the façade.

4. THE COMMUNICATION AND DISSEMINATION PLAN

During the execution of the restoration works on the façade a special effort was done in order to open the worksite to the public with the intention of sharing information about the values and significance of the monument, as well as promoting awareness of the process of its deterioration and restoration. This permitted, along with the works and through different means of communication, a better understanding and social valuation of the monument and of the problems that affected the façade. To this was added the unique opportunity for the public to experience and observe both the sculpted stone façade and the work of the restorers in real time and from a privileged perspective.

To carry out this ambitious program the Plan was developed through different actions:

4.1 An informative enclosure

The area of the worksite was defined with an informative enclosure containing historical information and video screening.

4.2 The interpretation Centre

As a temporary exhibition space placed next to the façade it served as a welcome space for visitors at the same time as it introduced the history of the building through a graphic museum program that consisted of a highly informative exhibit based on panels, photographs, drawings and engravings as well as an audiovisual projection (Fig. 11).



Fig. 11. The entrance of the interpretation centre

4.3 A lift platform

Without a doubt this was the most impressive part of the visit as it allowed visitors to contemplate the different levels of the sculptured program of the façade-altarpiece of the San Pablo church close up, and at the same time they could follow the restoration work being done live. All of this was accompanied by the pertinent explanations of a guide from the Centre and some documentation brochures delivered about the façade and the project (Fig. 12).



Fig. 12. The lift platform for the public that permitted to visit the restoration works on the façade

4.4 Video monitoring project

Since the inception of the restoration work in 2005 the Caja Madrid Foundation started a project to document the investigative and restoration work videographically. The videos

have been recorded monthly, last 5 minutes and consist of an educational narrative on the construction characteristics of the façade, the origin of the damages it has suffered, the intervention criteria followed, the restoration techniques employed, etc. This information is displayed in real time with the works which permits to attend and understand certain aspects of the restoration process that are usually not open to public visit. The videos have been broadcasted on the worksite on a monitor installed on the informative enclosure and will be displayed indefinitely at the Foundation's web page (www.fundacioncajamadrid.es). This way the evolution of the work carried out can be followed from month to month (Fig. 13).



Fig. 13. Recording the façade with video from the lift platform once the restoration works have finished

4.5 Dissemination over the Internet

Aside from the videos mentioned above, a complete synthesis of the studies performed and of the projects planned out is also available on the Caja Madrid Foundation website. Through historical photographs, diagnostic reports and project plans the members of the public who take an interest can go more deeply into the different aspects of the project.

4.6 "Restored Monuments" series

Now that the project has come to an end a critical revision of what is known up until now about San Pablo will be collected in a book, which will also document the whole restoration process carried out, integrating aspects such as the documentation produced, the communication plan and the coordination performed.

5. THE ROLE OF DOCUMENTATION WITHIN THE COMMUNICATION PROCESS

The continuous process of documentation carried out before and during the restoration works have helped to reinforce the information provided to the public through the visit to the interpretation centre and the lift platform. All the information displayed was the result of processing the preliminary studies, the restoration project documentation and the video monitoring project films, adapted to public understanding and made visually attractive for the visit. The public turned out to consider very useful the brochure with the whole photographic development of the façade divided in levels that were then explained while the visitor was on the lift platform. Also the chance to observe the façade in 3D with anaglyph images is

retained interesting, as well as the project presentation using photogrammetric details of the survey with photographs showing the real state of conservation, permitting the guide to explain the treatments to be applied for each stone pathology.

Again at this point financial issues were responsible for not being able to enlarge the documentation, for instance, to 3D modelling or a complete 3D scan of the façade, probably very effective and impressive for communication purposes with the public but not appropriate and efficient for the kind of documentation requested for the restoration works. In this sense the work carried out by the guides was a key element to transmit the importance of the works at every level of the elevation, the difficulties encountered, the complexity of the façade, always helped by the documentation available.

In fact, this Communication and Dissemination Plan was designed because it was recognized that in Spain the efforts made in this area were minimal. Although the opportunity of observing how restorers and other professionals work on a monument throughout a restoration is not a new idea, it is true that this is the first time that this has been done in Spain (Morate *et alii*, 2008). Dealing with such an initiative entailed the perfect coordination of the different agents that took part during the process in order to get the best information from each of them.

6. CONCLUSIONS

In conclusion, with a project of this nature it has been important to establish a preliminary strategy of documentation, useful for every conservation expert that has played a role during the process. In this sense, 3D photogrammetry has efficiently permitted to have detailed maps of every single area of the façade with enough precision to identify, map and quantify the pathologies and treatments to be applied during the works.

In our opinion, for the time being 3D documentation is still not a useful tool to be used in a handy way on the scaffolding by the professionals that are in charge of the restoration works. Many improvements have still to be done, in terms of software and equipment, prices have to get lower, and the last but not less important thing, a mind change has still to take place in the restoration companies and professionals in order to attend, in a non far away future, how printed paper sheets and colour felt-tip pens on the scaffoldings are substituted by wireless portable computers working on line on integrated documentation systems.

Being conscious of these limitations and analyzing our own needs in this project and the financial possibilities, in our case, 2D projection drawings and a general high resolution photoplan of the façade –used and prepared for communication purposes (Fig. 2)– have turned out to be the most useful and handy tools to map effectively in a short time whatever was happening at a certain point of the façade during the restoration works.

Probably, all this detailed information collected by the restorers on pieces of paper over these five years, following a established documentation protocol in a recording lab, would have permitted to set quite easily an integrated information system applied to the façade, in order to have a monitoring system that could follow the works, their development and the final results, as well as to settle a monitoring system for the future. However, in the conservation world and especially when we deal with

financial responsible agents this point is usually not considered as a key element of the project. The goal is just the final result of the works, not what will happen later, which is a huge error as we can verify in most of the cases. In this project a maintenance plan is now being prepared in order to monitor in the future the protocol of actions that must be performed so as to guarantee the correct preservation of the façade and the correct operation of the anti-pigeon protection system, for instance, main cause of stone deterioration. These actions, carried out in due time and with low but constant investment needs, would avoid in the future other drastic interventions like the one that has just taken place, with the huge financial investment that this kind of projects entail. Thus, at this point conservation policies become a matter of management. Time will tell us if this new goal of the project is accomplished satisfactorily.



Fig. 14. The façade without the scaffolding and with the lift platform that permitted to document the final result of the restoration works

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