

THE ARCHITECT'S SKILL IN MONUMENTS SCANNING

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1. INTRODUCTION

Whatever the quality of the scan, it always ends up with an architectural interpretation. The architectural scan is translated in a drawing interpreting the architecture to transmit a more or less targeted knowledge of the building.

On the one hand, the request for information about a building can be connected to the order, for instance from an architect who needs to restore or re-assign a monument, from an art historian or from an archaeologist. The requests for information are as varied as they are specific and they define the purpose of the scan. On the other hand, the interpretation of architecture through a drawing is part of the skills of an architect who will be able to "read" the building, find the data that will interest the client and will take the initiative of showing data the client didn't suspect but that he will need. We are far from the scan of a ground-plan type which would be modified later on and which would only be a document on which to put on measures like surfaces, lengths etc., and we are just as far from the background decoration for an illusion on a video game.

2. THE SCAN AS A SOURCE OF KNOWLEDGE

Scanning is first and foremost a crucial moment to learn and get all information on the building techniques, on the craft used for the building, on the various disorders and their connection to one another, on the pathology of the building and its origin, on the indications of evolution of the building, putting these indications together to find the logic used.

The architect's competence is enriched by what the "reading" of the building teaches. This is the reason why sub-contracting the architectural scan to geometers or to archaeologists deprives architects from the intimate contact with the building. Drawing what has been seen, just like writing what has been heard, is a clarifying step in the understanding of the object of study. According to me, the experience can't be obtained only through books and through virtual images. The art of building is also revealed through the direct contact with the building itself and through the understanding of the problems it raises. This is the reason why the scan of a building is interesting for the profession of architect. Architects shouldn't be deprived from this source of knowledge.

3. THE SCAN AS AN EXERCISE OF INTELLIGIBILITY THROUGH THE DRAWING

Interpretation through the drawing, whether it is 2D, 3D, with a SIG data base, will always end up with a plan, section and front drawing. Just as in an architectural project the section translates intelligence, so it is with the relevance of the "scan-section" of an existing building which will translate the intelligent understanding of the building. This exercise already induces an architectural intention and a relevance in the know-how to transmit the knowledge of the building.

4. THE SCAN AS A WAY TO LEARN THE TRANSMISSION OF INFORMATION ABOUT THE BUILDING (recording of the different interventions in time)

Already at that point architects can be made sensitive (they have efforts to make in this field) about transmitting the understanding and the knowledge that they have of a building. It is only by asking them clearly the question or by ordering scan jobs to transmit knowledge about a building that the trade will evolve in this attitude.

Through the scan and the management of the works done on the building, we will transmit to future generations the data on what was done at such and such period. Very often stabilised disorders previously worked on are worked on again because the previous intervention had not been memorised.

5. THE SCAN FROM AN ECONOMIC VIEWPOINT

The cost of scans seem great before work campaigns but only represent 2% to 3% of the amount for the work. It is an important part of the architect's fees that must come as a complement to the fees received for a usual mission. When we reason in this way all the time, we take away from the amount a few percentages for archaeology, a few percentages for building site safety, a few percentages for insurance and although these percentages from marginal costs are justified, they end up reducing the investment capacity for the architectural design, that is to say an artistic expression that can be a source of dream inviting people to recognise themselves in what their Society creates. This philosophic aparté leads up to hold a very respectful attitude towards the means used and therefore it is necessary to truly outline the scanning target.

Here are several examples of purposes that a scanning can target:

- First example: Can the scanning of each stone be justified for every building ? At what point is the stone by stone scanning relevant for architecture and for the knowledge of the building, when we know that this expression is only a translation of reality and not reality itself.
- Second example: Acting on a building, the vaults of which are splitting and cracking, the architect will certainly prefer scanning the plumb of the walls, the cracks, the placing of reference marks on the cracks. The marks will be read or checked with scanning devices to ensure a follow-up of the distortions. The client will be able to say what he needs, and the architect doing the scanning will understand better and will be in a better position to take the necessary initiatives during the scan. Even after the restoration, these scans will be used to check for example the repositioning of the building on its new supports.
- Third example: The study of downloads will be done with a basic scan and drawing but on the other hand, a far more elaborate scanning will make it possible to estimate the warped geometry of a vault, the weight on the segmented load of the vault in connection to the different cracks which show the discontinuity of the compression efforts.
- Fourth example: Scanning with a modelling of arches for example, will make it possible to find the building technique previously used and check its value; however one will have to ask the question: when do we need this piece of information and do we need it systematically ?
- Fifth example: Scanning archaeological traces on building walls combines the expertise of the archaeologist and that of the architect. Transmission of the knowledge of the building between the archaeologist and the architect doing the scanning on the one hand and the architect working on the building for its re-use or its restructuring on the other hand is essential for the intelligence of the project.
- Sixth example: The relevancy of the architectural drawing enlightened by its graphics will take it possible to justify such and such a type of restoration and the decision taken.

Very often the order to scan details of architectural ornamentation (modenature) stems from a contradiction between handmade sketch with a 1/10th or 1/20th scale showing geometry in the tone mouldings that can be idealised in the detailed architectural drawing and a computer drawing scanned with a 1/100th precision which thanks to computer techniques is going to be as detailed as a handmade drawing with a 1/50th scale: if we can easily scan mouldings with the precision we could have with a moulding comb, can we still be realistic:

- 1) Will the given budget correspond to what is expected from the scan ?
 - 2) Can we have on the same drawing both the true pertinency of the legendary geometry of the moulding and the traces of time that give authenticity and emotion faced to the building ? Aren't we expecting a difference between the virtual image and the physical contact ? Wouldn't the spirit of restoration be disturbed by the characteristics of the scanned drawing ?
- Seventh example: A still more technical scan could be that of an arch adorned with sculptures that would be taken down to allow the building to be restored and consolidated. Then the arch would be put back with the help of the scan and the scanning devices to reposition precisely the different arch-stones after checking with virtual modelling if this was possible taking into account the changes in the structure.
 - Eighth example: A virtual analysis can be the purpose of the scan of archaeological foundations completed with the modelling of architectural elements found on the ground. In the same way, the reconstitution of an older building lay-out is the same kind of purpose for a scan. Virtual anastylosis can be a tool to check a scientific hypothesis or a pedagogical tool to present researches.

6. BABEL OR INCOMPLETION

All these demonstrations and examples show in what double skill for scanning, that is to say the technique of scanning and the architect's skill, sometimes tripled if an archaeologist is involved are essential to endow the architectural practise with the restoration of the following know-hows:

- Knowledge of the art of building
- Skill to express knowledge through drawing
- Know-how to transmit the knowledge of the art of building.

But I can also see the limit of these researches crystallised in the scan. Indeed, I connect the position of the maximum with an exhaustive knowledge of the monument, a filing of all immediately useful data and of the other data researched by measure of precaution to the myth of Babel.

The positive theology of the myth of Babel shows how abandoning the building became a factor of freedom and salvation allowing society to discover new horizons. In his work "Babel or Incompletion", Paul Zumthor suggests that it is through incompletion that there is a possibility to create a new purpose, to offer the possibility for a new creation. The economy of the project beyond the material economy of what we can offer ourselves as knowledge of the building sets with Paul Zumthor the problem of the aptitude that we have to let go of the power of history on the building and give a new destiny to it.

This is the reason why ordering a scan finds its balance between a cultural enrichment from the research and the acceptable threshold for incompletion that opens to the future.

Finally I call on my fellow-members architects asking for scans, who are numerous at ICOMOS, who are numerous in our administrations to understand the stakes for the know-how of the profession.

As far as ordering scans are concerned, I would have a hard time believing that architects would be contrivers of the depreciation and sinking of the architect's know-how.

The experience of scanning done by Chief Architects for historical monuments ("Architectes en Chef des monuments historiques") showed me to which extent the "know-how", the "know-how to read" and the "know-how to express" were enriched by the way of going back and forth between analysis and synthesis. This dialogue brought about by this new technology is to be mastered by architects as well.