

Reviews

Domenico Iovane

La rappresentazione del patrimonio archeologico attraverso procedure integrate di rilievo. Il sito dell'anfiteatro campano di Capua Antica. Applicazioni e metodi di analisi

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Domenico Iovane's book reports the results of a research experience focusing the documentation of the amphitheater of the Roman Capua, whose site is today located inside the territory of the municipality of Santa Maria Capua Vetere, province of Caserta. The case study is particularly relevant for the history of Roman Empire architecture and culture; the amphitheater of Capua, built between the end of the 1st and the 2nd century AD, was famous both for its size and for the reputation of the gladiator school that was in that town. Its major and minor axes measured respectively 167 and 134 meters and the cavea could host up to 60,000 people; only the Colosseum in Rome had greater dimensions and capacity.

After the fall of the Roman Empire, the amphitheater became, as in many similar cases, a sort of huge quarry and its stone blocks were used for the construction of other buildings. Parts of the amphitheater were used for the construction of the Cathedral of the present city of Capua and a small part of the 240 protomes that decorated the arches were relocated on the facade of the Town Hall of the same town.

The few parts of the amphitheater still on site could have survived thanks to an edict dated 1826, released by the Bourbon king Francis I to forbid further removal of construction elements from the site. Subsequent excavation and restoration campaigns, developed at following stages along the last century, have brought

to light and protected the parts of the building that remained on site.

Domenico Iovane's book has its roots in the research experience developed during the PhD course in Architecture and Environment Survey and Representation, XXV cycle, at the University Federico II of Naples, under the scientific coordination of prof. Riccardo Florio; tutor of the thesis and author of the preface to the volume is prof. Massimiliano Campi.

The book is, at the same time, a reduction and an extension of the contents of the PhD thesis; the author chooses to reduce the part dedicated to historical digression on amphitheaters and their morphological-structural functions and features, thus giving more evidence to the discussion on the surveying methods used during the research and on their integration.

This peculiar feature of Iovane's book is highlighted in the Preface by Massimiliano Campi, who states: «the value and relevance of the documentary and representative work is based on the consistent and accurate acquisition of metric, geometric and dimensional data, suitable not only for the definition of methodological workflows, but for the investigation of the existing building as well».

The first chapter opens with a brief description of the site and the monument; the author retraces the historical **excursus** of the amphitheater, to make the reader aware of the events that caused the present layout of the site and the

monument. The following paragraph sums up the surveying tools used by the Romans; this paragraph reveals the competence of the author on this subject, but, unfortunately, this part of the text suffers from excessive compression, certainly due to editing needs. The next section is dedicated to an accurate discussion on data georeferencing, on the mathematical models used for the discretization of earth's surface, on the standards used for the classification of geographic coordinates; the paragraph shows a well-articulated structure and a comprehensive discussion. The final part of the first chapter is dedicated to TIN, triangular mesh surface models, with a brief mention of the photogrammetric survey which will be discussed in the following chapter.

The second chapter starts with a detailed presentation of surveying methods, developed according to well-known classifications; the author then illustrates the first step of the complex surveying campaign, dedicated to GPS surveying. The coordinates of points measured with GPS were used, during the surveying campaign and the following processing steps, for three different purposes: 1) terrain survey; 2) determination of the coordinates of points to be used as polygonal vertices for topographic survey with a total station; 3) determination of the coordinates of particular points, identified by signals or clearly visible, to be used in the external orientation of the aerial photos taken by a drone.

The third chapter begins with a description of the software tools used to integrate GPS and topographic data into a

single operating environment; this part is followed by the description of one of the two photogrammetric surveying methods used in the research: digital stereoscopic photogrammetry.

The fourth and last chapters are dedicated to laser scanning and SfM photogrammetric surveying.

The author uses both surveying methods to document the morphology of Capua's amphitheater: laser scans are referred to the topographic and GPS coordinate system thanks to the topographic measure of coded signals; SfM photogrammetric surveying is referred to the same coordinate system thanks to the dislocation on the ground of coded signals measured with GPS methods.

The reference to a common coordinate system allows the author to perform a comparison between the point clouds generated by the two surveying methods and discuss the results of such comparison: the uneven distribution of points in the clouds taken by a laser scanner is balanced by a lower 'noise' than that resulting in the more homogeneous photogrammetric point cloud. In the concluding chapter of the volume, the author focuses on low-cost survey methods applied to decorative fragments of the amphitheater, now relocated to another place.

The last part of the experimentation addresses the issue of the dissemination and navigation of the numerical models (mesh) of the amphitheater and its decorative elements on dedicated digital platforms, which do not demand access privileges and therefore allow a simple and intuitive exploration of models.

The complex system of operations used for the documentation finally leads to the production of textured 3D models of the monument and its decorative elements, the so-called "digital twins". Information notes can be attached to these models, thus adding to the pleasure of three-dimensional exploration the possibility to increase the knowledge of the time and culture that produced these artworks.

Domenico Iovane's volume is a useful palimpsest of the digital surveying methods available today; the author illustrates with competence different tools and methodologies, specifying the application areas and the possibilities offered by each one.

The research experience, focused on the survey of Capua's Roman amphitheater, gives the author the opportunity to discuss the state of art of surveying methods.

The drawing that has been chosen to illustrate this brief review appears on page 90 of the book; in this graphic elaboration the author proposes an interesting comparison between the horizontal section of the mesh model and the CAD drawing of its plan, based on geometric traces. This drawing seems a promise to the reader: the promise of a new publication where the results of geometric analysis will be illustrated, thus adding to the relevance of surveying for the conservation and dissemination of cultural heritage, a further role that, in the words of Riccardo Migliari, aims at the "reconstruction of the architectural design".

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