



THE CIRCUS MAXIMUS: DIACHRONIC RECONSTRUCTION THROUGH THE APPLICATION OF NEW TECHNOLOGIES

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Abstract:

The area occupied by the Circus Maximus in Rome is currently undergoing some restoration, archaeological surveys and a re-opening to the public. The targeted excavations have uncovered a great amount of new information, which needs to be reviewed and analyzed in order to address many problems still unsolved. The project hereafter presented is an investigation conducted by the University of Pisa in collaboration with the Bruno Kessler Foundation of Trento, Italy. The project aims to study the Circus with a new methodological approach for the site, i.e. photogrammetry and a relational database. It aims to create a graphic model with attached database accessible by the Soprintendenza for measurements, mappings, future restorations, consultations and fruition.

Key words: cultural heritage, documentation, 3D reconstruction, valorization, Circus Maximus

1. History of Circus and topographical grading

The Circus Maximus in Rome is the largest building dedicated to shows of all time. It is an exceptional structure, at the centre of the Roman “sporting” passion for centuries, it has an unbroken continuity of life, at least from the archaic period to the present day (Fig. 1) It is a unique area containing a well-known building, remained in use until 549 AD (Ciancio Rossetto 2001).

Many Latin authors agree that, since the protohistoric age, the area between the Palatine and Aventine, called Valle Murcia, was the seat of worship such as the games in honor of Conso, in which there were chariot races. However, it was only in regia age, in particular with Tarquini, who according to tradition were organized circus games on the site, the place was outlined and the first wooden chairs were arranged for the public. The oldest roads in the region consisted of two streets, which were to go into the valley of the circus following the slopes of the Palatine and Aventine, avoiding the swampy valley: the vicus and the vicus lugarius Tuscus.

In the last centuries of the republic, the Valley was gradually placed urban-architectural profile and with partially set structures.

On the side towards the Aventine several temples were built, all places out of the pomerio, of plebeian character and often linked to commercial functions: in particular, the temple of Ceres, Free and Free, Spurrier probably built by Crassus in 493 BC. The building, along with that of Flora stood alongside the clivus Publicus (current clivo of Publici) above carceres of Circus Maximus, it quickly became the real political center and the archive of the populace.

At the opposite end of the circus was to be the Temple of Mercury, patron of merchants, which is also very old (founded in 495 BC), that of Venus Obsequens (295 BC) and the Venus Verticordia (which replaced an archaic shrine of Fortuna virilis, attributed to Servius Tullius).

During the age of Caesar, to meet the new requirements and allow a greater usability, the surrounding road network was redesigned.

The plan of the circus in the first century B.C. was probably less complicated than the construction of the Imperial period (Bigot 1908).



Figure 1: The Circus Maximus in Rome: white blue indicates the actual archaeological area, with the overlap of the marble tables of the FUR.

The circus was large 621 m and wide 118 m. The auditorium would have been unified, the two long sides being connected together by the short side opposite to

carceres, in the shape of crescent moon (Ciancio 2002). There were steps sloping on each other, as in theaters, divided into three areas: the bottom with stone seats and the upper with wood. The total capacity was probably around 150,000 people. The building was destroyed by several fires under Nero (Marcatili 2006) and Domitian. It was later rebuilt by Trajan in 100-104, when it saw its most important building phase. In year 80, a triple arch was placed in the center of the circus hemicycle, in remembrance of the victories of Vespasian and Titus in the Jewish War (Golvin 2002). The circus was then enlarged by Caracalla and restored by Constantine (Brandizzi 1991) up in order to contain up to 300,000 spectators.

In the Middle Ages the area around the circus was gradually burying and was used as an agricultural area. During the Fascism period (Muñoz 1934), due to the construction of the archaeological walk, the Circus Maximus was liberated of all the warehouses and industrial buildings that were placed around it. Only in 1975 excavations were carried out and the area assumed the archaeological area dignity for the part related to hemicycle (Ciancio 1986), while the remaining is used for public events.

Various transformations and destructions have made difficult the understanding of the heritage site itself. The whole area is currently undergoing restoration and re-opening to the public with the project "Environmental regeneration and enhancement of the archaeological remains of the Circus Maximus and the related public spaces in Via dei Cerchi and Piazza di Porta Capena" which included archaeological surveys and small surveys in the still visible remains of the Circus Maximus (Fig. 2).



Figure 2: The Circus Maximus in Rome as visible today.

2. The project

The project, named "The Circus Maximus in the urban arrangement of the region XI: diachronic reconstruction and topographical development through the application of new technologies" is conducted by the University of Pisa in collaboration with the Bruno Kessler Foundation of Trento, Italy. The project investigates the Circus with a new methodological approach for the site, i.e. photogrammetry (Nocerino *et al.* 2014), 3D modelling and a relational database. The investigation, through a total review of historical data and new surveys, aims to tackle the study of how the construction of the building has changed the topography of the Regio XI

(Colini 1934). The final digital product will contain collected historical data of the ruins in one accessible portal/informatics system. The global aim is to demonstrate how new technologies can change the practical and daily work and the way of thinking archaeology.

3. Working methodology

The first step was to collect data of all the traceable archaeological knowledge, published and unpublished, about the Regio XI where the Circus is placed: the iconographic, cartographic, cadastral, epigraphic, as well as the chronicles of medieval and modern finds often unpublished. For this purpose, given the quantity of material and its heterogeneous source, a relational database was selected as best solution to organize, display and access all the material. The preparation of the database will be essential for classification, mapping and evaluation of the area occupied by the Circus in its various stages of life.

The database was completed with direct and indirect surveying operations: the archaeological survey is an essential part in the comprehension of ancient structures and monuments. With photogrammetric acquisitions (Luhmann *et al.* 2006) we obtained a three-dimensional photo-realistic relief of the existing situation (Fig. 3). Digital photogrammetry (Mikhaikl *et al.* 2001) after comparing costs and benefits, proved to be the best solution for the project's needs: Photogrammetry helped to engage the various stages in different contexts at the same site, discovered at different times; Photogrammetry helped to integrate the old data, derived from previous excavations or surveys.

This indirect surveying was coupled with CAD rendering to reconstruct also areas which could not easily be reproduced through traditional graphic (Remondino *et al.* 2014).

The methodological choice was motivated by the hybrid and complex nature of the archaeological site – an educational excavation but also a public work of urgent nature: the restoration works were urgent and this forced to speed the archaeological research and, subsequently, the graphic recording of the structures and findings.

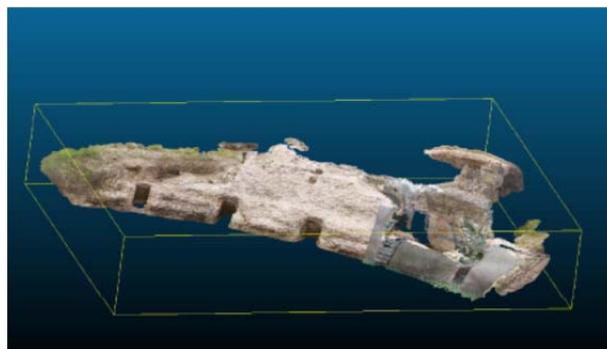


Figure 3: The overlap of photogrammetric survey of cavea side Aventino before and after restoration.

4. Actual results and outcomes

So far the accomplished results consist in a metric photo-realistic 3D rendering (Fryer *et al.* 2007), useful for grasping the Circus's racecourse aspects not easily

reproduced through traditional graphic. It is also connected to the realized database for measurements, mappings for future restorations. The three-dimensional restitution helped to produce drawings and maps that highlight certain changes. These are still essential working tools for critical reading of the structural characteristics of the circus and its relationship with the surrounding buildings (Fig. 4).

Such 2D/3D data, in the future, may form the basis for bringing together the idea of reconstruction of the topography of the Regio XI and its main monuments.

The final results will be accessible by the Soprintendenza for consultations and for developing restoration and fruition policies (interactive computer workstation present in the museum, virtual reality with Oculus, etc.).

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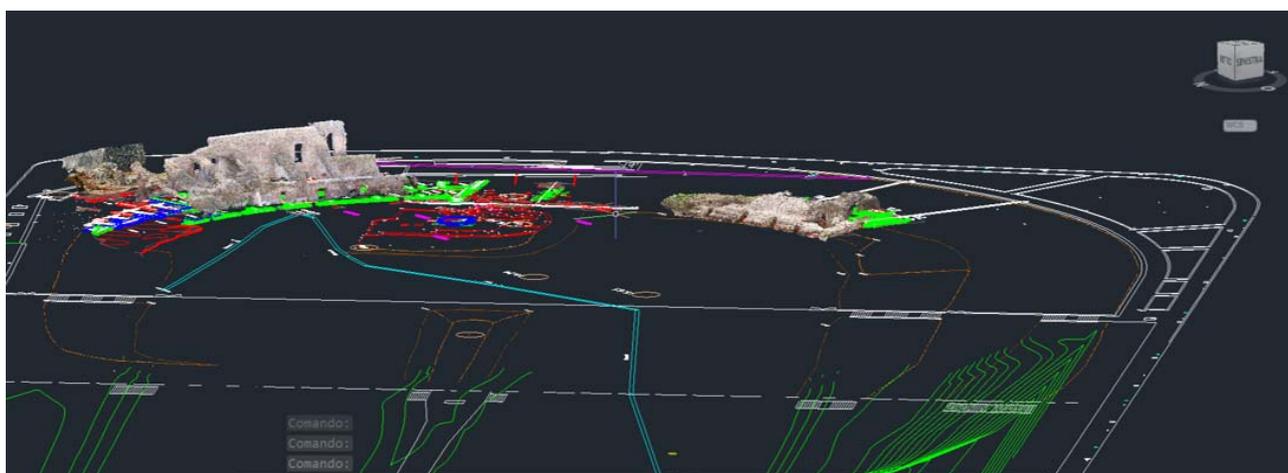


Figure 4: Photogrammetric survey of Circus

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