

Educational Digital Innovative Cultural heritage related Learning Activities

THE EDICULA IMMERSIVE EVENT

19 December 2022 | 10:30 - 14:30

National Technical University of Athens, Patission Campus, Averof Building, Kaftatzoglou Ceremony Hall



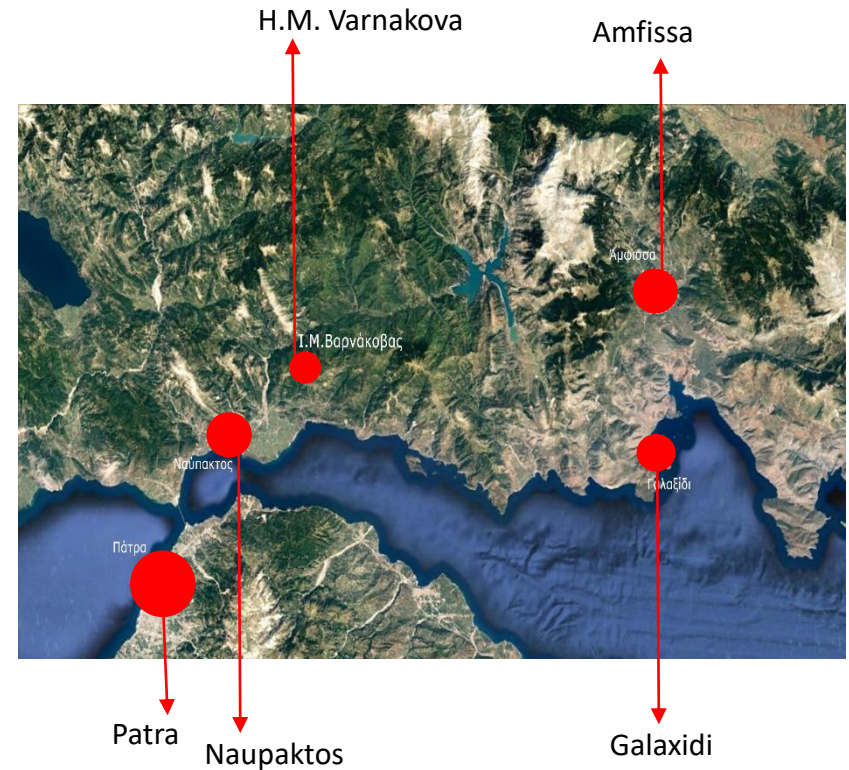
The case of the Varnakova Monastery in Fokis: The rehabilitation of the Katholikon

The Architectural Approach

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Identity Information of the Monument



The historic monastery of Varnakova is one of the oldest monasteries in **Central Greece**. It is located on the border of Nafpaktia and Dorida, about 25 km outside Naupaktos, built at an altitude of 750m. The first Katholikon of the Monastery was built in 1077, according to a founding inscription located above the Gate of the inner narthex. The current church is the result of the complete reconstruction of the new church above the ruins of the original, in 1831.

The monastery complex was characterized as a historical monument with the decision of ΥΠΠΟ / ΑΡΧ / Β1 / Φ 26/35014/722 / 21-07-1993 (ΦΕΚ 580 / ΒΔ / 03-08-1993), with a protection zone of 1000m around its current compound.

Historical Information about the Monument

1077 founded by the monk Osios Arsenios Varnakovitis

1084-1111 construction of the monastic complex was **completed** and decorated with murals

1148 the Katholikon was **renovated**.

1151 the construction and illustration of the **inner narthex** was **completed**,

1229-1230 the **external narthex** was built and illustrated.

1204, the Monastery came under the **jurisdiction** of the **Despotate of Epirus**.

1826, the Katholikon was **blown up** by the Turks.

1831 The **reconstruction** of the Katholikon was carried out Kapodistrias,

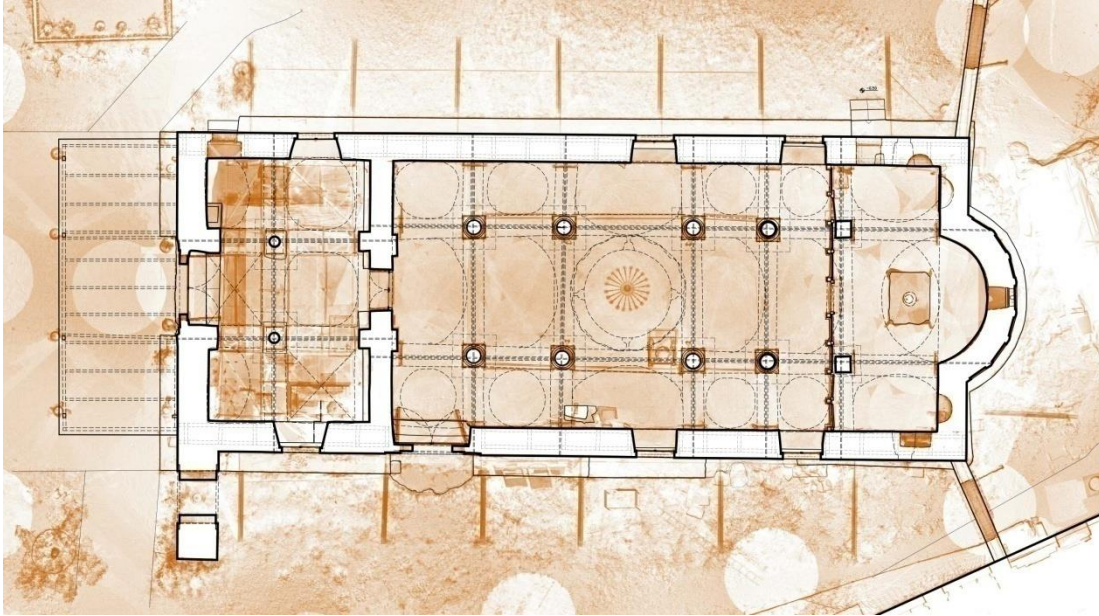
1838, the gilded wood-carved **iconostasis** was **completed**

1919, Anastasios Orlandos **found the tombs of the Komnenian Emperors** Alexios and Manouil Porfyrogennitos of the Despotate of Epirus (1204 until the end of the 14th century).

First decades of the 20th century belfry, finally, was **built** in the southwest corner in the by the state architect Gasparis,

1990s Wooden tiled **roof** outbuilding was **added** to the west side of the **narthexin**.

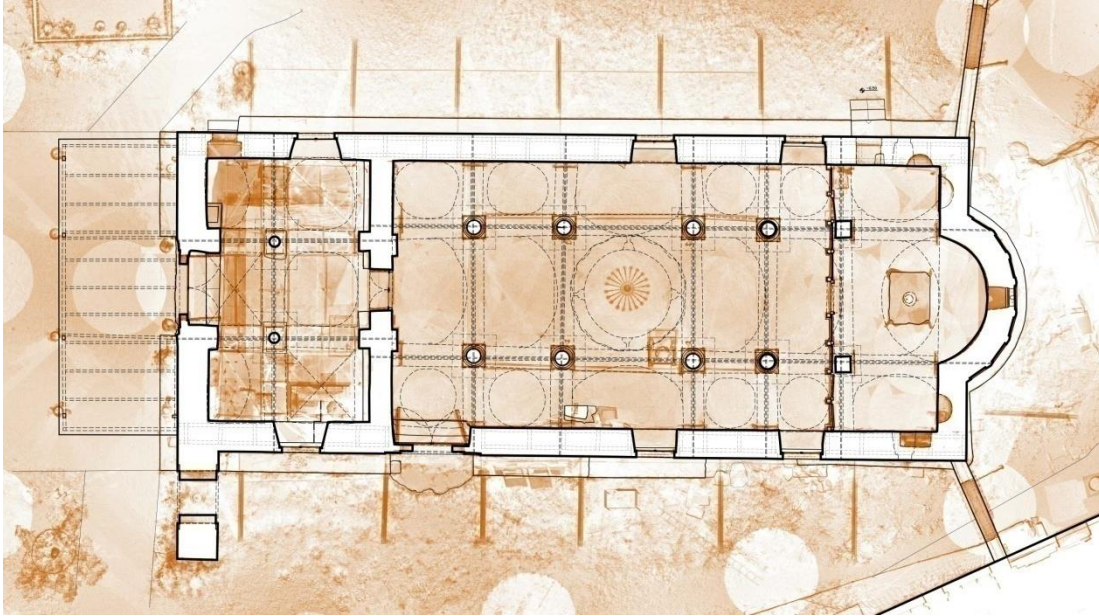
Description of the Monument



General plan of the Catholic Church of the Monastery
(source: Record of geometric and architectural data of the Katholikon and fire-damaged cells of the Holy Monastery of Panagia Varnakova, Design researcher: Koumtzoglou T.)

- The newest Katholikon of the 19th century (with general dimensions 23x9,39m.), follows the typology of the three-nave basilica with a dome.
- The perimetrical masonry is 0.80m thick.
- The three naves, are defined by two rows of colonnades which are joined together by arches.
- In the main church there are a total of eight columns and two pillars of square bisection to which the wood-carved iconostasis is abutted.

Description of the Monument

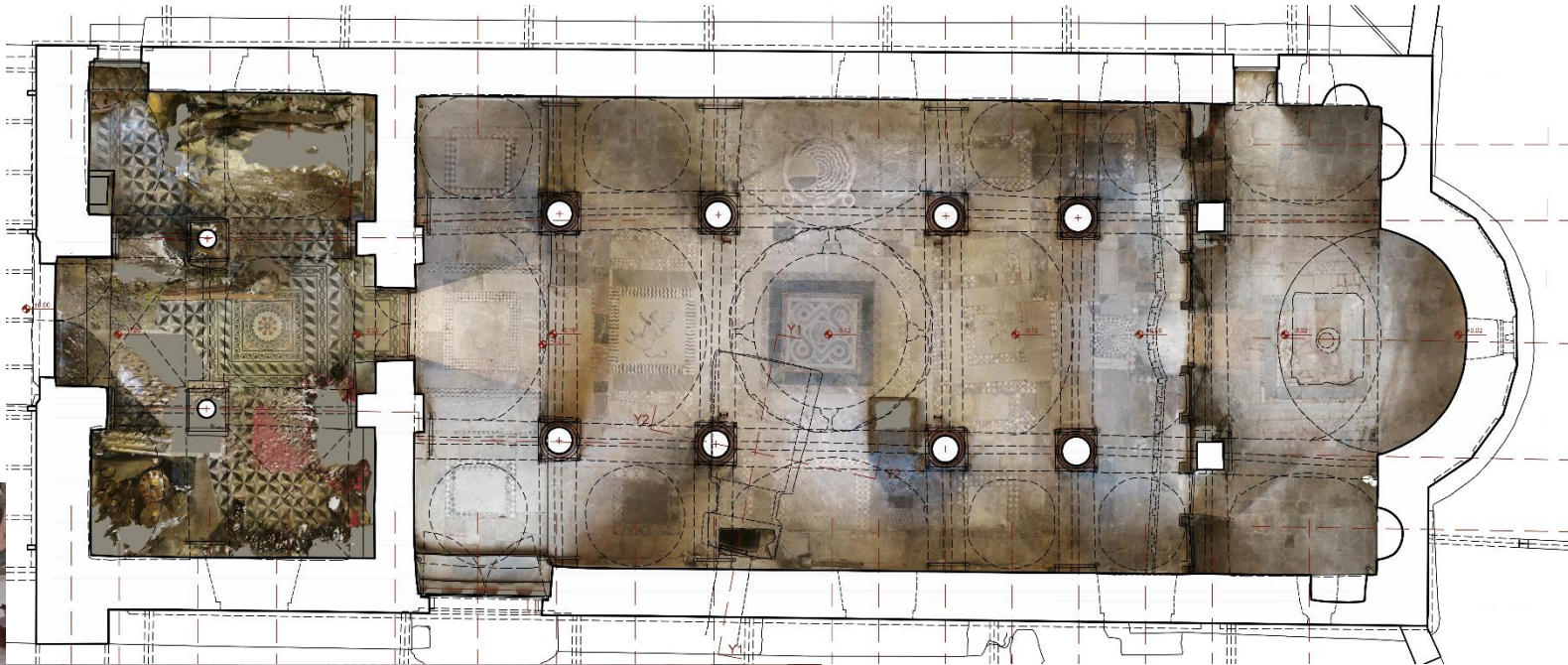


General plan of the Catholic Church of the Monastery
(source: Record of geometric and architectural data of the Katholikon and fire-damaged cells of the Holy Monastery of Panagia Varnakova, Design researcher: Koumtzoglou T.)

The four central columns are equally spaced (approximately 3.78 m), forming an ideal square and supporting the dome. From this element we conclude that the original basilica also had a dome.

Unlike the outer narthex, the old internal narthex was not visible in the present church. The initial separation of the temple into an internal narthex and main part was perceived by a small difference in height of a few centimeters on the floor of the main temple.

Description of the Monument

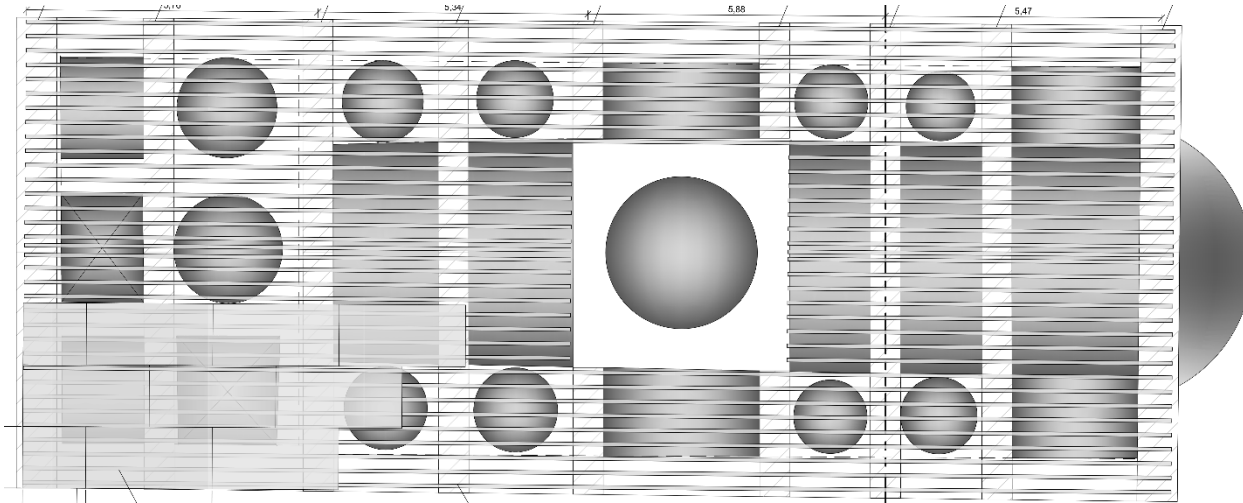


Design researcher: Koumtzoglou T



The **floor** of the temple is particularly remarkable, while it comes from the first phase of the monument, in the 11th century.

Description of the Monument



Design-Search: Ch. Mouzakis

The **roof** of the Temple consists of a vaulting system that is composed of domes, semi-domes and groin vaults, which rest on columns and pillars.



Design : Kouimtzooglou T

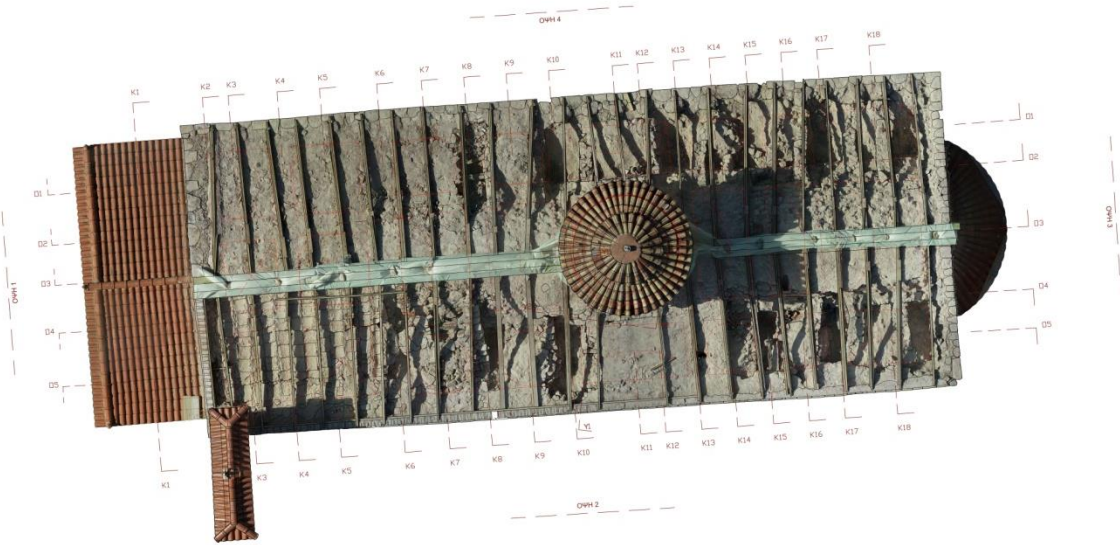
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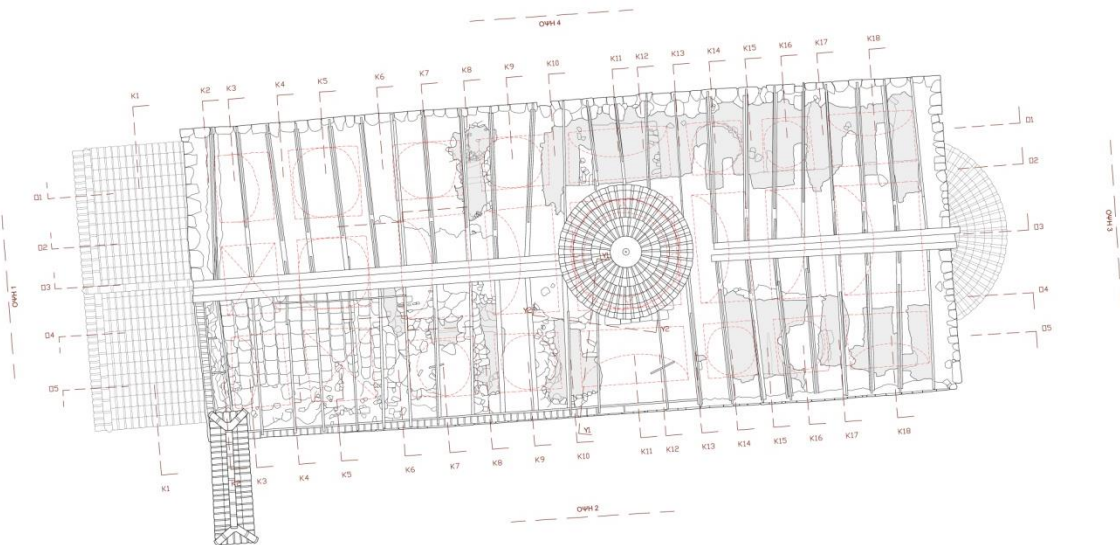
Photos: Zafeiris Vasilis

During the repair works, the **roof** was opened and its **construction was revealed**. It is a complex system of the newer phase, in which the slope of the roof is formed by stone gables, the gaps between which are bridged with wooden logs. The gaps are filled with stones and mortar. Stone slabs, wooden logs, slats and tiles were placed on top.

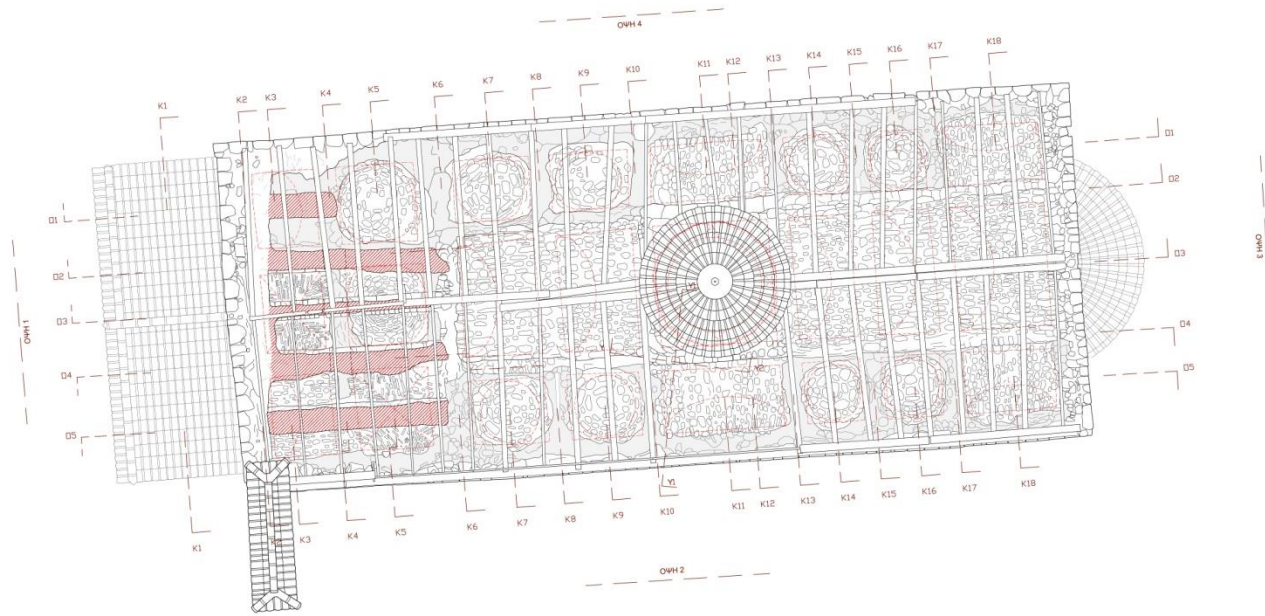
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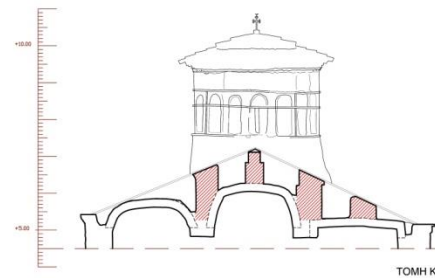
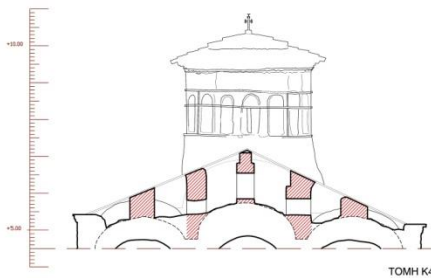
Documenting the roof during the project
28-2-2022



Description of the Monument



Documenting the
roof during the
project
23-8-2022



Pathology



The bearing structure of the Katholikon is a **seismically vulnerable body**, whose seismic behavior is typical to that of the basilicas, as it has been historically recorded.

The church presents significant deformation, which led to the buttress of the **perimetrical masonry** and the support of its roof.

Pathology



Perimetrical Masonry

The temple is made externally of isodomic stonework, which shows cracks of significant width in the areas of openings and corners, as well as loss of bonding mortar.

Internally, there is a significant horizontal crack at a low level, in both the northern and southern masonry. This crack indicates a possible subsidence of the foundation soil of the temple. After exploratory sections, it was found that the foundation of the temple is very superficial.

Pathology



Arches and Vaulting

The arches in the transverse direction of the temple show significant pathology, in contrast to the arches in the longitudinal direction, which are in good condition. The arches are connected with wooden tension rods in both directions.

The vaulting system of the temple is in bad condition. In its entirety, the roof of the temple is supported by beams and columns created by grids with tubular beams, which are in contact with the masonry and carry the loads of the superstructure to the floor through wooden inserts. A protective grid has been placed at the height of the column capitals to hold the detached materials from the superstructure. The dome is internally supported by beams perpendicular to each other, placed horizontally, while externally it is covered with cement mortar and has a clamp at three levels.

The out-of-level movement of the North and South wall has caused the cracking of the entire vault in all three naves.

Pathology



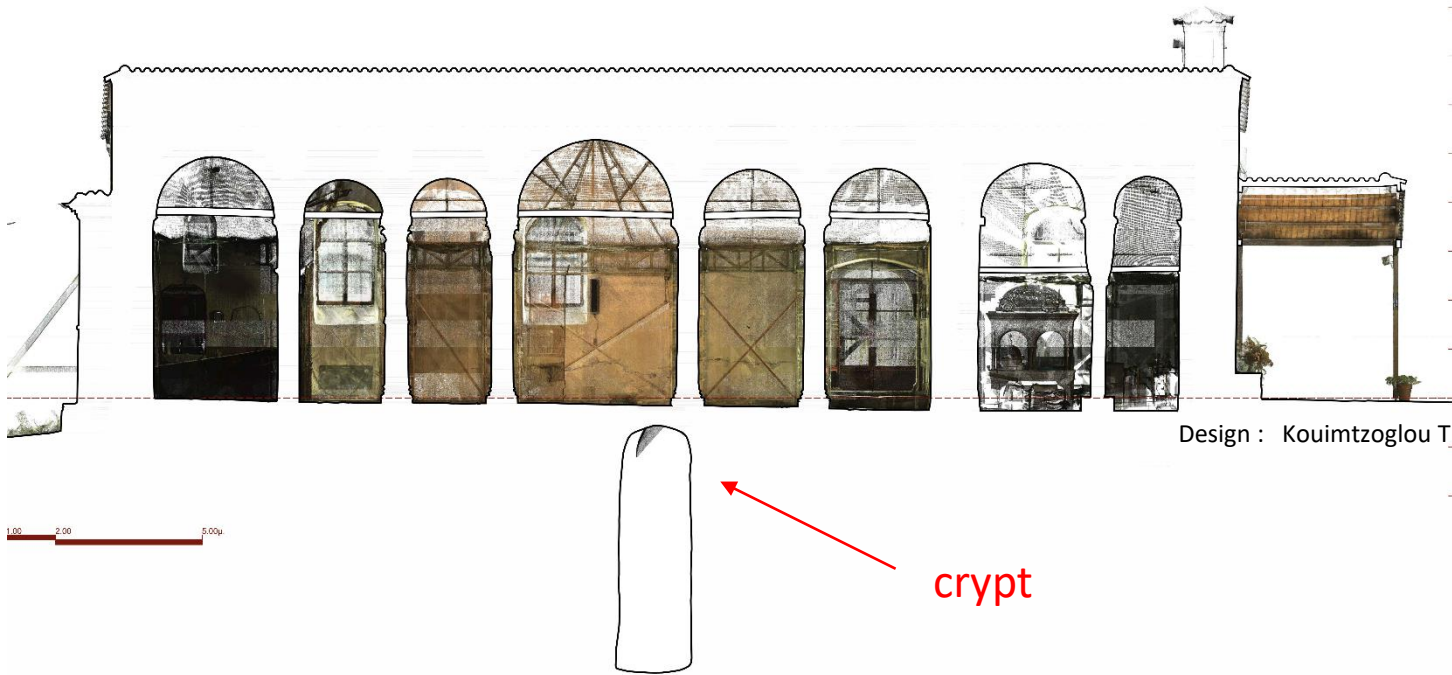
Columns and Pillars

The arches of the temple are supported by monolithic columns and two pillars inside the sanctuary.

The main failures of the pillars and columns of the temple are:

- The marble columns of the outer narthex of circular bisection are in good condition.
- The columns of the central part of the temple, which have circular bisection, built by stone and plastered, present a variety of pathology with shear, flexural and capillary cracks, while this pathology reaches in many cases up to their marble base.
- The columns in the sanctuary area of rectangular bisection, built by stone and plastered. They show shear and flexural cracks.

Pathology



Floor

The floor of the temple shows significant deformations, cracks and loss of material. Approximately in the middle of the temple and towards the south wall, a hole has been drilled for the study of the underlying hatch. At a depth of 6m below the position of the episcopal throne, two underground spaces were explored, on the south side of which a vaulted crypt begins. These underground spaces also contributed to the subsidence of the temple.

Pathology

Aesthetic Problems



The choice of stonework outside the Katholikon, degrades the aesthetic value of its interior, the floor of which is a presumption of its high art.



Also, a burden on the overall perception of the monument is the modern wooden shed, west of the narthex, which changes the proportions of the temple and makes it difficult to perceive its historicity.

Pathology

Object and Purpose of the Study

The purpose of this study was:

- the revocation of the pathology of the monument, which presents extensive problems from multiple earthquakes,
- the emphasis on the historical and aesthetic value of the temple, and
- its restoration to make it accessible



Orthophoto: V. Zafeiris

During the elaboration of the study and the on-site works, new elements were revealed, such as **the Komnenian phase of the Monument**, on the western wall of the temple, towards the outer narthex. Therefore, the study was updated in order to highlight these elements and to improve the perception of the monument in terms of its historicity.

Architectural Restoration Proposal



The selected architectural intervention draws its inspiration from the historicity of similar monuments and historical ensembles. It is consistent with the static resolution of the support, as well as with the building character of the temple.

The principles of preserving the structural system of the monument, the compatibility of the new elements with the old materials, the reversibility of the interventions -where it is feasible- and the minimum possible intervention in the existing ones, remain constant values that aim not only at the protection of the old historical constructions, but also provide for its shielding against seismic excitations.

Architectural Restoration Proposal



The following interventions are proposed to remove the pathology of the monument, but also to improve its perceptual image:

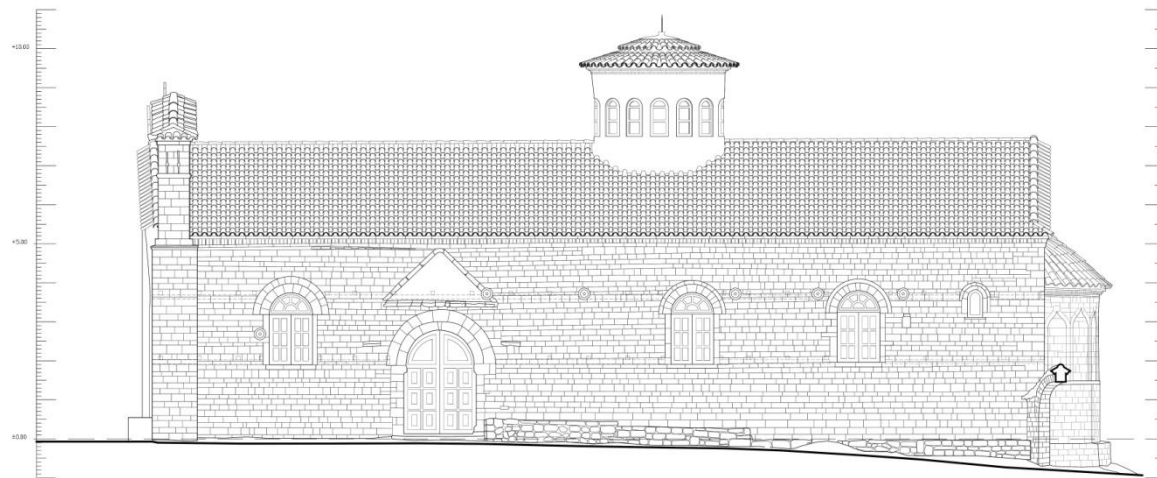
- Not to cause any damage to the Byzantine era floor of the church and to take care of the elaboration of its maintenance study.
- To remove the outbuilding from the west side of the Katholikon, because it causes aesthetic damage to the monument and alters its shape.
- The outer surface of the walls to remain uncoated. The stone elements (doorsteps, headers, etc.) should be carefully cleaned and left unpainted and visible.
- To investigate the possible existence of murals, before applying the coatings on the interior surfaces of the temple.

Architectural Restoration Proposal - Proposed Actions

Reinforcement of masonry

1. Jointing

A careful inspection of the joints will be carried out, in order to identify the areas with washed or loose joint mortar, which need new joint mortar, as well as the areas where the original joint mortar can be fixed (impregnation with lime water and special solutions, plastering) by specialist personnel, who have the necessary knowledge and previous maintenance experience.



SOUTH VIEW

Architectural Restoration Proposal - Proposed Actions

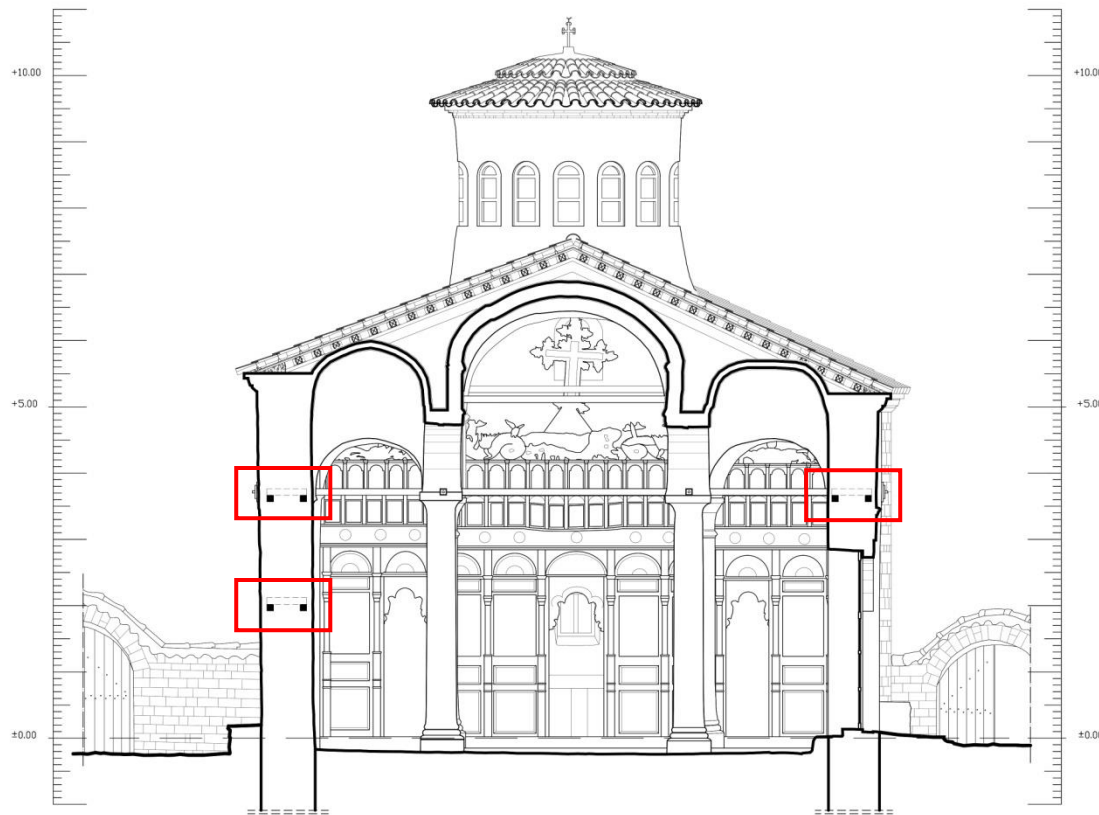


Reinforcement of masonry

2. Application of grout injection

The homogenization of masonry with grouts is a necessary operation aimed at filling the voids of the masonry (cracks, masonry joints, wood ties) and improving its mechanical characteristics.

Architectural Restoration Proposal - Proposed Actions

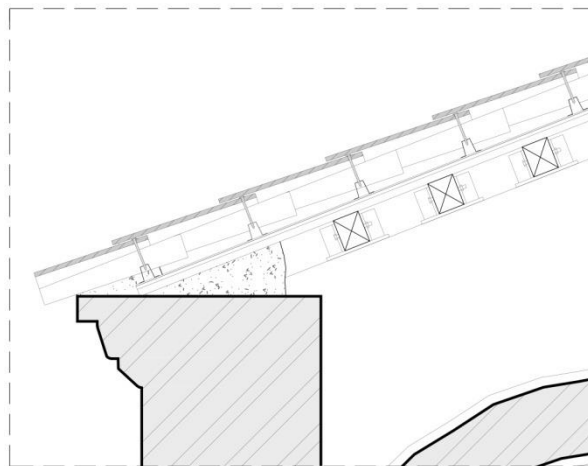


Reinforcement of masonry

3. Installation of tension-compression rod system in the arches

- To strengthen the vaulting, a general application of grouting is carried out and then tension-compression system is placed at the origin of the arches in both directions inside the temple.
- Alongside, vaulting reinforcement with stainless steel mesh is placed.

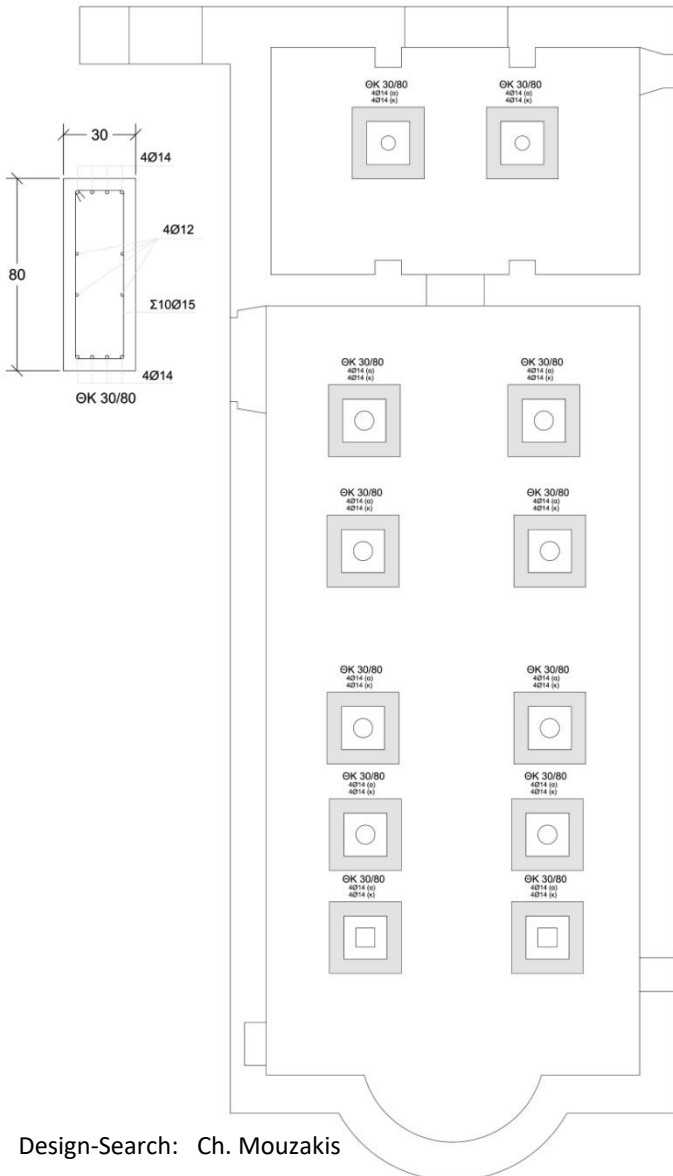
Architectural Restoration Proposal - Proposed Actions



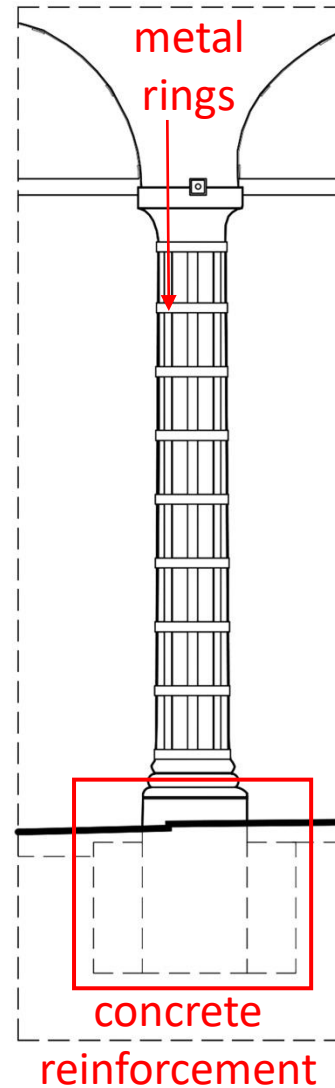
Replacement of the roof

- Initially the filling materials between the exterior and the roof are removed.
- The original perimeter stone cornice of the roof is retained and acts as a guide to form the pitch of the roof.
- Roof covering from bottom to top has the following layers:
 1. Sheathing from sheets of non-stick wood (marine-type plywood), 22cm thick.
 2. Wooden joists perpendicular to the longitudinal beams, measuring 1x4cm.
 3. Breathable 4mm polyurethane waterproofing membrane.
 4. Reinforcement of the roof with Byzantine-style tiles, installed dry nailed on a metal frame.

Architectural Restoration Proposal - Proposed Actions



Design-Search: Ch. Mouzakis

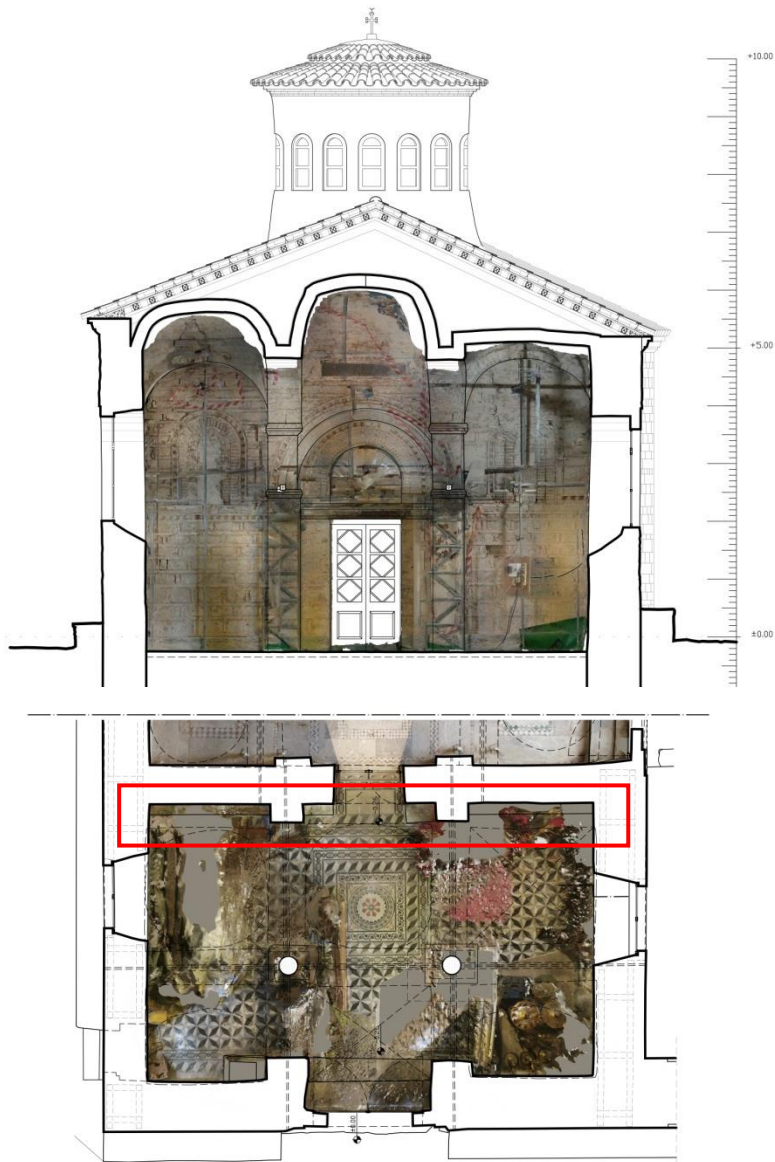


Column reinforcement

- The deformation of the north and south walls has dragged the columns along and they now show a deviation from their original position. It is necessary to form a stable foundation field of the columns so that the columns can now successfully receive the loads. This will be achieved by constructing a **reinforced concrete perimeter beam** at the base of the columns.

- It is recommended to install **metal rings** on the stainless steel columns along their entire height, taking into account the cracks of the columns. Between the stainless reinforcements and the stones of the column, grouting is carried out with Albaria Inezione and the entire reinforcement system is covered with plaster, so that its final image is that of a monolithic element.

Architectural Restoration Proposal - Proposed Actions



Emergence of eastern wall of exonarthex, of Komnenian phase

- To highlight it, the cleaning of the joints is chosen, which must be carried out manually, and the final cleaning from dust using air or a wet sponge under absolutely controlled conditions. It is pointed out that in cases of areas with fragile original mortars that are preserved, the application of the above techniques is not allowed and cleaning is done with special conservator techniques.

In places of discontinuities or cracks, grouting is applied.

Architectural Restoration Proposal - Proposed Actions



Reinforcement of bell tower

- The bell tower of the church is in generally good condition. The main point of its pathology is the loss of the binding mortar, for the solution of which a new cleaning is proposed, joints on the entire surface of the masonry and grouts to homogenize the masonry.

Removal of modern wooden shed, west of the narthex

- The removal is chosen, because it changes the proportions of the Catholic and makes it difficult to perceive the degree of its historicity. Thus, the entrance to the temple and the triangular mosaic representation of the Virgin Mary will be more clearly visible.

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The Architectural Approach



Thank you for your attention