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HERITAGE IMPACT ASSESSMENT REPORT EMERGENCY CONSOLIDATION OF THE NORTHERN WALL PORTION OF THE CASTLE OF LEZHA

ATELIER 4
ARCHITECTURE • ENGINEERING • CONSULTING

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1. DESCRIPTION OF THE PROMINENT VALUES THIS MONUMENT BEARS

The earliest traces of Lissus are those of the pre-urban fortification (end of the first iron period) which surrounds the top of the hill, the city's acropolis, which is approximately 2.30 ha. (see fig. 1). The surrounding walls of this phase are built with polygonal stone blocks of size 1.5-0.65 m, coarsely worked and with imperfect joints. This feature of the construction of the walls as well as the ceramics found in that area lead to the dating of the town of Lis in the 6th century B.C.

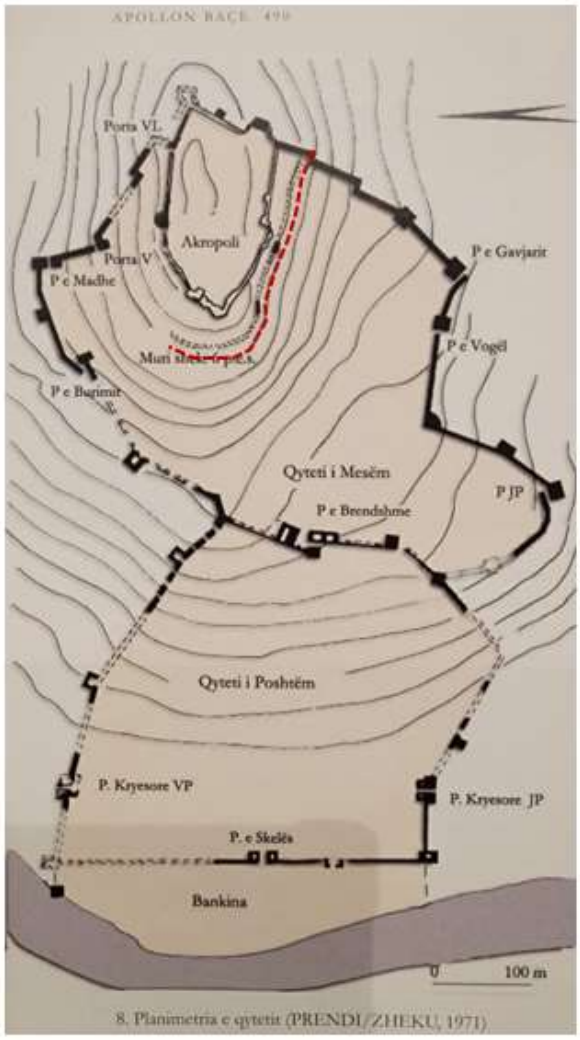

Fig. 1 – Plan of the city of Lissus

Traces of the fortification wall of the first phase (6th century BC)

Fig. 2 – Fragment of wall where all stages of construction are visible

The ancient city of Lissus was established during the 4th century B.C. Looking at the the urban development of the city, is is easy to identify the fortification system of the ancient city, compound by three successive fortification walls:

- The lower city with an area of about 9 ha, which was located in the lowest area, near the bank of the Drin river;
- The upper city with an area of about 11 ha that was established along the hillsides;
- The acropolis with an area of about 2 ha that occupies the highest part of the hill and roughly adheres to the pre-urban contour, while from the east its wall is unified with the outer surrounding wall, protected by 3 square towers. From the beginning of the 3rd century B.C. the acropolis is reformulated with a powerful bastion in the southeast and also equipped with circular towers. This phase coincides with the extension of the Pirro's state in these parts.

The surrounding walls of the new city, about 2150 m long, 3.20 - 3.80 m and about 7.50 m high, are significantly stronger than the 2.00 - 2.50 m walls in the usual fortifications of the same period.

The wall construction technique consists of two side walls connected transversely to each other, once every 4-5 m, and filling (*emplecton*) with ballast filling between them. This wall construction technique provided high moment of inertia and resistance. The side walls are built with limestone, mainly measuring 0.80x0.40 m, placed one on top of the other without any mortar connection between them. These stones are very well carved on their outer face, ensuring perfect joints. To avoid massive land or wall slides, the horizontal joints are interrupted from time to time by bracketing or inserting some 'L' shape blocks, while on sloping terrain the blocks are placed at an angle of 8-12° against the slope of the terrain. On the inner side of the walls, the sloping ground is leveled with stones and gravel, to ensure the passageway, to increase the resistance of the walls to impact and to avoid the pressure of the soil against the walls.

The towers of the acropolis, which belong to the reformulation phase of the acropolis (3rd century B.C.), are built with rectangular blocks, placed in horizontal rows. Their walls are narrow, about 0.70 m, but their little resistance (due to the small width) is compensated by filling the first floor of the towers with stone and ballast.

In the surrounding walls of the acropolis, it can also be seen a third phase, the medieval one. In this period, another surrounding wall was added to the fortification of the acropolis. This wall rises above the route of the walls built during the second phase, 3rd century B.C. The medieval phase is very clearly distinguished from the earlier ones. The technique of building walls in the Middle Ages was quite different from that of ancient walls. Again, the walls were built with two side walls with filling in the space between them. But the side walls of the medieval walls are built with small-sized stones, worked only on their front face, placed in irregular horizontal rows and connected with lime-mud mortar (see fig. 2). The thickness of the medieval walls reaches up to 1-1.2 m.

The fortification system of the ancient city of Lis, is one of the most perfect examples of ancient military architecture and as such has constantly attracted the attention of researchers.

Earlier in time, Lissus has been spoted by Diodorus of Sicily (1st century BC). Then Lisi has been mentioned by Polybius in the context of the Illyrian-Roman War (218 BC) as well as by other ancient authors; Titus Livy, Appian, Strabon, Stephen and Plin.
Based on the physical analysis of the fortified city, it was an unknown phenomenon for the Illyrian part that was lying on the northern part of the Mat river. As such, Lissus has not been considered as a natural product of internal development, but as a momentary product of design and financing by a powerful and advanced founder in the field of fortifications. The construction method and urban development of the fortification walls of the ancient city of Lissus, coincides with the physiognomy of the Syracusian fortifications of the 4th century BC.

There is no record of how long Lissus managed to function as a Syracusan settlement and whether it actually could be developed as a city in this period, but in 213 B.C. Lissus appears as a genuine Illyrian city and in 168 B.C. appears as a residence and as an Ardian military base. The inscriptions show that in the middle of the 1st century BC Lisi had acquired the administrative structure of the city of the second rank, that of the municipality, and a little later it had reached the administrative structure of the first rank, that of the colony.

The ancient city of Lissus is a cultural monument which bears outstanding historical and architectural values. It is a very important witness of a city which has been functional as such, since from the time of its foundation,during 6th century B.C, continuing with its expansion during the 4th and 3rd century B.C., until the medieval period; each construction period is documented over the wall structures. In some specific fragments there are very visible the traces from all the construction periods, overlapped one over another; each of them bears the values of the contruction period it manifests, and at the same time they do not harm or obscure the previous period.
Today, the Lezha's Castle constitutes a magnificent and unique monument, which integrity might only be endangered if the consolidation interventions are not carried out on the deteriorated fragments.

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2. DESCRIPTION OF THE CONSERVATION STATE

The project design "Emergency intervention for the stabilization of a part of the northern wall in Lezha Castle" focuses on the study of the state of conservation as well as the necessary stabilizing interventions for the central fragment of the northern wall of the acropolis. (fig. 3)

Fig. 3 – The acropolis and the fragment of the northern wall where the interventions will be carried out

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As explained in paragraph "I" of this document, the acropolis of the Lissus city is surrounded by fortification walls built in two different periods: the ancient fortification wall with the circular tower, built on 4th B.C. (the wall and the tower built with stone blocks measuring 0.8x0.4 m, without mortar connection between them) and the fortification wall with the rectangular tower, built during the Middle Ages, c. 14th (the wall with small and irregular stones, connected with lime and clay mortar). Both these walls manifest damages that must be analyzed individually, as well as for the correlation of these damages with each other. Specifically:

2.1 THE ANCIENT FORTIFICATION WALL

This fortification itself has two fragments that differ from a technical point of view.

- The surrounding wall is built with two side walls and ballast filling in the middle, the walls are connected transversely between them every 4-5 m.

The transversal connections have lost their function for the wall's fragment under consideration. Due to the alteration of the fill material, which according to the original technique should have been ballast to enable rainwater filtration, currently this fill material is mainly natural soil and some ballast. Under these conditions, rainwater is not easily and completely filtered, but it accumulates and stays in the area between the two side walls of the fortification wall, exerting pressure on the outer wall and on the connecting transverse walls.
Likewise, in the inner part of the wall, the presence of soil instead of the passageway, which should have been layered in ballast too, causes their pressure to be transmitted to the walls.
The weight of the medieval walls built on the route of the ancient walls is another reason for the fractures that the latter manifests. (the weight exerted by the medieval walls in the state they are in today, which have lost their verticality)

- The observation tower which is built from a single wall with a width of up to 0.7 m.

According to the original technique, the inside of the tower had to be filled with ballast to enable the filtering of rainwater as well as to increase the resistance of the tower. Currently the tower is filled with soil. In these conditions, rainwater is not filtered easily and completely, but accumulates and stays inside the tower exerting high pressure on its wall.
Also, the weight of the medieval tower built on the ancient circular tower exerts pressure on the latter due to the damages that the medieval tower manifests itself.

2.2 THE MEDIEVAL FORTIFICATION WALL

The fragment of the medieval wall and the rectangular tower next to this wall, also manifest some damage. Medieval walls are built with two side walls and filling material between them. The medieval walls differ from the ancient ones by both their thickness, which does not exceed 1.2 m, and by the construction technique. The side walls of the medieval walls are built with small and carved stones only on their outer side, connected between them with lime and mud mortar.

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- The wall of the medieval fortification has lost its continuity thus losing its horizontal connections.

Also, the accumulation of soils in the upper part, where the path should have been leveled with ballast, causes the medieval walls and their rectangular tower to also face the pressure coming from the accumulated soils, further causing the loss of stability of the walls.

Due to the loss of horizontal connections as well as the loss of stability, the current situation is presented with very damaged medieval walls; some fragments have shown strong deviations from verticality, risking the complete collapse of these fragments. See fig. 3.

Fig. 4 – Damages on the fragments of ancient and medieval fortifications

3. DESCRIPTION OF CONSERVATION AND RESTORATION INTERVENTIONS

As mentioned in paragraph "II" of this document, both, the damages that the monument manifests and the necessary interventions will be seen and evaluated separately for both fragments of fortification walls from different periods (ancient and medieval) and at the same time are also evaluated in relation to each other.

In the objects of cultural heritage in the field of archeology, restoration interventions must meet these three criteria:

- To ensure the structural stability of the object
- To preserve the *status quo* of the structures (avoiding complementary interventions)
- To preserve the authenticity of the object

In the project "Emergency stabilization of a part of the northern wall in Lezha Castle", after a careful analysis of the state of conservation, the interventions that can provide a solution to the problems can be developed as described below:

The following interventions are foreseen for the medieval wall:

a- Unbanking of a part of the soil that exerts a negative pressure force on the wall
b- The creation of a positive horizontal force, the value of which is calculated to be 110 kN/m (see the report of structural interventions). This will be done by tensioning the wall with metal ties which are anchored in the upper part of the acropolis ground. This intervention aims to restore the verticality of the fragment of the wall, as a result its stability.
c- The injection of grouting in the part of the base of the wall from which it risks collapsing. This kind of intervention is done to reinforce the base of the wall and to give a positive impact to the bearing capacity of the wall.
d- Removal of the damaged wall in the end part and its repair

The following interventions are foreseen for the ancient wall:

a- To eliminate the soils located in the inner part of the walls, to replace these soils with ballast.
b- To eliminate the soil located inside the two walls of the ancient wall and replace it with ballast
c- Consolidate the ancient wall and the circular tower (in separate fragments it will be necessary to apply the anastylosis technique)
d- Consolidate the transverse connecting walls between the two side walls in the ancient walls.

4. WHAT IMPACT WILL THE INTERVENTION HAVE ON THE PROMINENT VALUES OF THE MONUMENT

This analysis will be done for each of the intervention scenarios presented above.

If the intervention is carried out according to this scenario, the impact on the special values of the monument will be only positive since this type of intervention fulfills:

- The first criterion (ensuring the sustainability of the object)
- The second criterion (it does not attempt to make any additions to the wall elements)
- Partially the third criterion (ensures only the authenticity of the wall construction material).
- It is easily feasible.

If the intervention is carried out according to the proposed methodology, the impact on the special values of the monument will be only positive since this intervention fulfils:

- The first criterion (ensuring the sustainability of the object)
- The second criterion (it does not attempt to make any additions to the wall elements)
- The third criterion (fully preserves the authenticity of the monument)
- It is not easily feasible locally.
- The ground where the anchors will be embedded is a terrain with archaeological potential, and as such, during the operations for embedding the anchors, there may be unforeseen situations from an archaeological point of view, and as a result, the works will be temporarily interrupted.

The expected result from both these types of interventions is that at the end of the implementation of the works we have a monument with structural stability, without danger for the fragments of the ancient walls (below it) and without danger for the residential areas that lie on the northern slope of the acropolis hill.

However, it is possible to take measures that can mitigate the negative impact that may have after the application of the second scenario. These measures consist of careful preliminary work before starting the project:

- During the drafting of the project, the schedule of works, the time needed for the review of the project should be taken into consideration in the event that during the works for embedding the anchors, new archaeological findings come to light.
- Works to be developed in close cooperation with archaeologists.