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REBURIAL OF IN SITU MOSAIC PAVEMENTS: COMPARISON OF DIFFERENT METHODS BASED ON EXPERIMENTS

The poster presents the preliminary results of the ongoing PhD dissertation “Protection of In Situ Mosaic Pavements by Reburial”, being conducted in the Southern Baths of Perge (ancient Pamphylia). Perge is located on the western edge of the Pamphylian plain by the modern gulf of Antalya (Fig.1). Mosaic findings in the city dates back to the Roman Imperial Age and the Late Antique Period. The monumental hall identified as a “basilica thermarum (the so-called Claudius Piso Hall) of Southern Bath was selected as the experimental area considering: 1.the sufficient size of the pavement, 2. its atribution to the same mosaic workshop and 3. bearing the same mortar characteristics (Figs.2,3).

The objective of the project is firstly to understand the problems that are encountered by the reburial techniques currently in use, and secondly to devise an efficient technique which will effectively ensure protection. The reburial techniques which are currently in use, do not provide sufficient protection for mosaic pavements against atmospheric effects, plant roots and mechanical loads (Figs. 4-7). It is obvious that comparative field testing is required in order to obtain technical and practical improvement. Therefore, in order to better comprehend the conditions, different systems that are commonly used for reburial are being examined. The key parameters in this research are: water/humidity, wetting-drying cycle and temperature. In addition plant density/diversity, external mechanical loads of reburial systems are also being examined.

Fig. 1
(Plan after ANRW II.7.2, 1980)

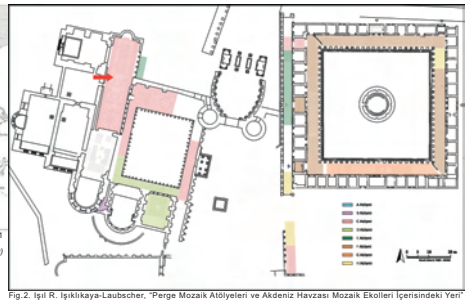

Fig.2. Işıl R. Işıklıkaya-Laubscher, “Perge Mozaik Atölyeleri ve Akdeniz Havzası Mozaik Ekolleri İçerisindeki Yeri” **Adalya XIX**, Antalya, 2016, p. 169-227, pl.5.

Fig. 3. Claudius Piso Hall (photo by Asst. Prof. Dr. Işıl R. Işıklıkaya-Laubscher)

Fig.4

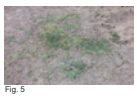

Fig. 5

Fig. 6

Fig.7

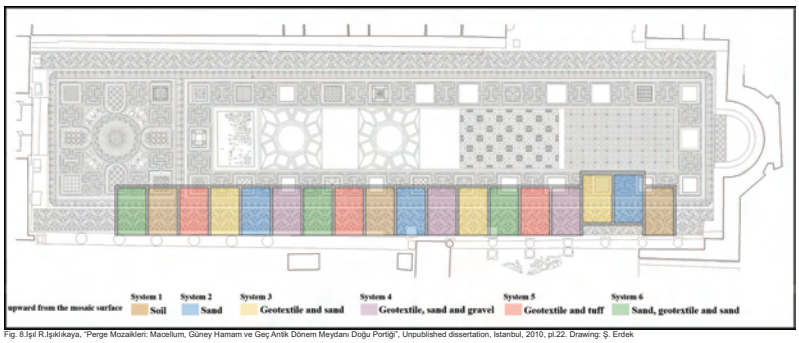

Fig. 8.Işıl R.Işıklıkaya, “Perge Mozaikleri: Macellum, Güney Hamam ve Geç Antik Dönem Meydanı Doğu Portiği”, Unpublished dissertation, Istanbul, 2010, pl.22. Drawing: Ş. Erdek

Six different systems commonly used for reburial in Turkey have been determined according to related publications. These systems are:

upward from the mosaic surface:

1. Soil (approx. 25 cm high sieved earth);
2. Sand (approx. 25 cm high natural sand);
3. 200 gr / m² geotextile and approx. 25 cm high sand
4. 200 gr / m² geotextile, approx. 15 cm high sand and 10 cm high gravel
5. 200 gr / m² geotextile and approx. 25 cm high tuff stone.
6. Approx. 5 cm. high sand, 200 gr / m² geotextile and 20 cm high sand.

Fig.9

Fig. 10

Fig. 11

Fig. 12

A rectangular are (3 x 2 m in size) has been prepared for each reburial system as an experimental module, in order to obtain statistical information. Each module was replicated three times (Fig. 8). To measure humidity and temprature, capacitive type sensors were installed in the filling layer each of the 18 modules (Figs. 9-11). In addition, a mini meteorological station was installed in the area to correlate the data from the sensors with the environmental conditions (Fig. 12). Collected data received can be monitored over the internet for a minimum of 10 minute periods.

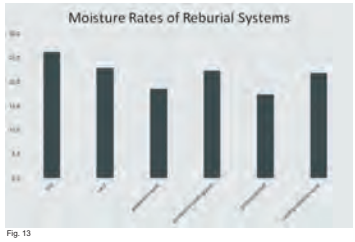

Fig. 13

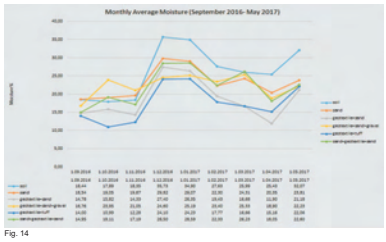

Fig. 14

According to the first results, systems nr 3 (geotextile + sand) and nr 5 (geotextile + tuff) with geotextile placed directly on the mosaic floor are the best in terms of filtering water and balancing humidity. Although geotextile is placed directly on the mosaic surface in the system nr 4, the capacity of filtering water is lower than system nr 3 and 5. This can be explained by the gravel layer on the top causing decrease in the evaporation level. However, system nr 4 gives better results than systems nr 2 and 6 which use sand directly on the mosaic surface. This result shows that the use of geotextile is the right choice among the systems used up until today in terms of ensuring the filtration. The minor difference between the results of the systems nr 2 and nr 6 shows that the usage of geotextile as a seperator rather than directly on the mosaic surface has hardly any positive effect on removing humidity. System nr 1 (soil) gives the most unfavourable result in terms of filtration of water (Figs. 13-14).

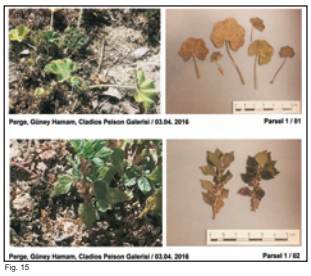

Fig. 15

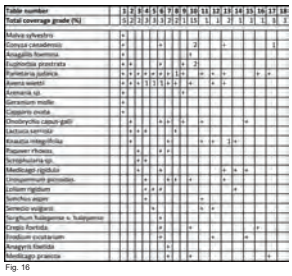

Fig. 16

Fig. 17. Mechanical experiments (photo by Buket Akçay-Güven, 2016)

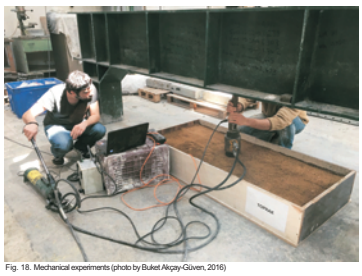

Fig. 18. Mechanical experiments (photo by Buket Akçay-Güven, 2016)

To determine the plant density/diversity, plant samples were systematically collected in March, April and May in years 2016 and 2017 (Figs.15,16). These plants were catalogued and the analysis of the species is being performed by Botanist Assoc. Prof. Dr. Ali Kavgacı.

Comparative analysis of mechanical loads is being performed in the Civil Engineering Laboratory at Istanbul Technical University by Assoc. Prof. Dr. Bekir Yılmaz with contribution of Civil Engineer Fatih Güler (MA) (Figs. 17,18).

All drawings borrowed from Perge archives, Istanbul University with the courtesy of Prof. Dr. Haluk Abbasoğlu and Asst. Prof. Dr. Işıl R. Işıklıkaya-Laubscher. All visual materials belong to the author unless otherwise stated. The project is carried out with the permission of the Ministry of Culture and Tourism of Turkey with the contribution of Antalya Archeolojical Museum. The dissertation project is supported by Istanbul University, Scientific Research Fund and Işık University, Scientific Research Fund.