

Opponent's review of the Doctoral Thesis

Candidate Pavla Bauerová

Title of the doctoral thesis Characteristaion of Czech Modern Mosaic Mortars

Study Programme Civil engineering

Tutor Martin Keppert PhD

Opponent Brigitta Maria Kürtösi DLA

e-mail kurtosi.brigitta@mke.hu

Topicality of the doctoral thesis theme

Commentary: The topic of the thesis is expressly important in the field of conservation science. The choice of the examined group of artworks is highly actual. Not only in the point of view of the Czech mosaic heritage but also concerning the present-day direction how the near past' artworks and techniques, this new heritage, become the accepted part of the historical knowledge. We are in a transitional era to start to deal with the artworks of a controversial history as well. We can tell that the awareness rising toward a genre on the interface of arts and crafts, the new mosaic heritage with the material science has organic place in the international monumental art' tissue. Not only the actuality of the mosaic technique' study, but the investigation of the modern mortar compositions and the available methods limits represent a less covered field in the conservation science' palette.

excellent above average average below average poor

Fulfilment of the doctoral thesis objectives

Commentary: As the goal of the thesis was decided the way of the most precise methods in the detection of the organic content of modern mosaic mortars together with their pros and cons the reviewer found the content straightforward and correct. The lacks are perhaps in the data which are waiting for more investigation and can be expandable concerning mainly the previous centuries' technologies.

excellent above average average below average poor

Research methods and procedures

Commentary: The represented research methods are well designed. From the point of view of the author, as a chemist it cannot be easy to get into a practical art profession, but the reviewer found the voice and understanding of these aspects above average. The reviewer finds lacks in the content of the earlier periods' techniques (3-4. chapters) which are although not the part of results and discussion of the thesis but the connected knowledge can be important for a scientist and may affect the future model tests (7. chapter)

The author mentions more times concerning the ratio of materials found in sources the right doubt about the issue of the measuring methods. Concerning the practice, it is more often to use volume units instead of the mass units which can create confusion during the comparison. Also, it is not clear why 1:1 mass ratio of binder/aggregate was chosen for the model samples which is not consistent with the mentioned Gerspach's recipe, and not clearly evident either with the b/a

calculation of the control sample (PB1707 Pelunek mortar).

There is an issue concerning the lime as binder, the so-called hot lime mix methods are completely missing from the antecedents. This kind of hot mixtures were common in the historical times and can be effect on the ratio of components in a mortar. When the quicklime is used together with fillers during slaking was a typical way of mortar preparation in the ancient and medieval times. During this procedure the lime slaking bring an increase in volume so the initial ratio of the raw materials is not the same any more after the so called dry or hot lime slaking. It can also affect the preparation ratios of the model samples as well.

There are publications compare properties of lime mortar made with slaked lime and fillers and quicklime slaked together with fillers and not only the empirical properties but the visual appearance and the more compact matrix visible by SEM-EDS can prove the highly different mortar quality and final ratios.

(The method was used in the mosaic mortar preparation as well, a significant fingerprint is the kind of lime lump which contain portlandite because of these nodules remained unslaked during the process. This kind of lumps are so called healing parts in the mortar; in the context of moisture the newly slaked binder can fill microcracks in the mortar context, thus the mortars can become more compact and solid.)

The reviewer has experience with Roman mosaic mortars from Pannonian sites with the same effect and together with the results on medieval mosaic fragments from Székesfehérvár can be note as relevant data. The latter can be important concerning the organic content as well.

In 4.1.1. the author mentions the connected part by Vitruvius concerning the floor mosaic' stratigraphy. The firstly mentioned case, the so-called contignatio, when the layers were laid on oak-wood boards are really scarce the opponent knows about just one investigated case in Türkiye (Olympos Church No.3.).

In the case of the medieval mentions in the thesis the opponent has to point out that the vegetal fibrous filler material issue is missing from the dedicated, really short part of the thesis 3.2. Aggregates p.11. and only two lines deal with the topic in 3.3 Organic admixtures in mosaic mortars p. 12.

It is important to note that the straw and sedge fillers in the lime mortars were common in the Byzantine rendering and intermediate mortars, or arricchio layers of wall and vault mosaics. Similar structure in the first and second (rendering and intermediate) layers have been already described in the 1930's by the conservators of the Byzantine Institute in the Hagia Sophia, Istanbul, which is one of the first published research on Byzantine wall mosaics. The detailed working diaries and archive photos are available online at the Dumbarton Oaks Research Library collection. The bedding mortar layer is without vegetal fibrous fillers, and one of the conservators brings up the possibility of "heat plaster" as well.

There is a misunderstood part on the page no. 21., which connected to one of the reviewer's publications. The excavated fragments derive from the former Royal Basilica of Székesfehérvár only contain the bedding mortar with preparatory paint and tesserae. The bedding mortar has limestone aggregates without vegetal parts. The backside of the bedding mortar fragments preserved the imprints of vegetal fibrous filler material of the lower mortar. We cannot know if there were third or more layers on the former walls or not, because we only have the remains of the bedding mortar. What is sure that at least two layers had to existed. The presence of sinopia is mentioned in general not directly in this case.

Also a note to the preparatory mortar layers, there is no mention about a historically important binder type, the clay. Mud mortar with vegetal fibrous fillers was typical not only in the Roman times but we can meet the use of it in the San Marco Basilica, Venice, as a basic mortar layer under wall mosaics. (One can study the backside of a detached fragment in the exhibition about the mosaic works in the Basilica.)

Important to add that the use of stone as tesserae was not stopped in 400 AD as the Figure 1. shows, but the stone tesserae were common in the case of flash tones in the Byzantine-type wall mosaics continuously, surely until the 14. century AD. Glass tesserae' use has started earlier than it is indicated in Fig.1. Concerning the fixing materials, the use of lime starts earlier, as

Neolithic terrazzo floors of Cayönü Tepesi (now Türkiye) were found around 7000 BC.

About the portable mosaics' issue, in the Byzantine period mainly micro-mosaic icons were created on wooden support. The fixing material was generally beeswax.

Reference on early lime mortars:

Haklay and Gopher (2019) Architectural planning and measuring in the Pre-Pottery Neolithic site of Çayönü, Turkey. In: PALÉORIENT Revue pluridisciplinaire de préhistoire et protohistoire de l'Asie du Sud-Ouest et de l'Asie centrale. CNRS, Paris. pp. 7-17.

Reference on contignatio:

Evcim (2023) Olympos 3 No'lu Kilise'den Yeni Bulgular Işığında Az Bilinen Bir Uygulama: Ahşap Kat Zemini Üzerine Mozaik Döşeme/A Less Known Practice from Olympos Church No. 3 in the Light of Recent Finds: Mosaic Pavement on Wooden Upper Floor. In: Journal of Mosaic Research 16, pp. 187-199.

Reference on Byzantine mortars:

Teteriatnikov: Mosaics of Hagia Sophia, Istanbul. The Fossati Restoration and the work of the Byzantine Institute (1998) Dumbarton Oaks Research Library, Washington D.C.

Working diaries in Hagia Sophia by different authors of the Byzantine Institute (1933-50), digitalized in Dumbarton Oaks Research Library

References on the traces of hot lime slaking detected on mosaic mortars:

Kürtösi (2017): Archaeometric investigation of Ancient and Medieval mosaic findings from Hungary. DLA dissertation, Doctoral School of the Hungarian University of Fine Arts, pp. 23-31. http://doktori.mke.hu/sites/default/files/doktori/Disszert%C3%A1ci%C3%B3_K%C3%BCrt%C3%B6si2016teljes.pdf

Kürtösi (2011): Investigation and conservation of a fragment of a Roman mosaic floor (Governor's Palace of Aquincum, Hungary) In: Managing archaeological sites with mosaics: from real problems to practical solutions. The 11th Conference of the ICCM, Meknes, Morocco, October 24-27 2011 Edifir Edizioni Firenze, pp. 411-418.

References on hot lime mix method in general:

Margalha et al. (2011): Traditional methods of mortar preparation: The hot lime mix method. In: Cement and Concrete Composites Volume 33, Issue 8, pp 796-804

Pesce et al. (2021): Towards a better understanding of hot-mixed mortars for the conservation of historic buildings: the role of water temperature and steam during lime slaking. In: Heritage Science 9:72

Copsey (2019): Traditional hot mixed lime mortars for conservation and repair. In: Journal of Building Survey, Appraisal & Valuation Volume 8 Number 1

excellent | above average | average | below average | poor

Results of the doctoral thesis – dissertant's concrete achievements

Commentary: The achievements of the thesis are in harmony with the described goals. The research is a really good starting point concerning the neglected field of preparation techniques and materials of modern and contemporary mosaics.

The detailed investigation of the mosaics' technologies and materials around and after 1989 would be welcome. The part dedicated to this period is unfortunately short-spoken. Also, the Byzantine and medieval strategies would need more scientific investigation also from the point of view of the drying oil content of the mortars.

excellent | above average | average | below average | poor

Importance for practice and for development within a branch of science

Commentary: About the importance, we can assume that these kind of investigation methods are highly important in a special field like the investigation of heritage science' material. Although it is not comparable in its scale with the industrial use and application but the rareness of the scientific professional who is involved into the cultural field is a great treasure and a special factor on any level.

excellent above average average below average poor

Formal layout of the doctoral thesis and the level of language used

Commentary: The level of language used was perfect, the content was clear and the wording was completely conformed to the international scientific style.

About the formal layout (requirements on the scope, illustrations, citations) the reviewer has no scenario available, but it was not easy to follow the citation of the references. In the references the alphabetic order is more transparent and probably to put an abbreviation (the author(s), year of publication) into the text, or in footnote is better choice.

excellent above average average below average poor

Statement on compliance with citation ethics

No problem with citation ethics.

Remarks

-

Final assessment of the doctoral thesis

The content of the thesis meets the requirements concerning its well-defined goals. The topic is very welcome because the author started to cover a gap in the field of modern mosaic heritage research. The author correctly uses the scientific methods she worked with, and the results of model tests represent an initial database for the future works.

Following a successful defence of the doctoral thesis I recommend the granting of the Ph.D. degree

yes no

Date: Budapest,
29. 12. 2023

Opponent's signature.