



St John the Baptist's church



Graphic representation of the ecclesia major of the Carthusian monastery at Žiče, dating from the 18th century

Revitalization of the Carthusian Monastery at Žiče

The Slovenian National Building and Civil Engineering Institute, together with its project partners BAM, Berlin and the University of Pavia, has successfully taken part in the Culture 2000 programme.

At the level of the European Commission the programme Culture 2000 takes place through the Directorate - General for Education and Culture. It supports projects which contribute to the development and spreading of innovative concepts, methods and techniques from the field of conservation and restoration in Europe.

Within the framework of the project an interdisciplinary group of experts from the fields of humanistic, natural and technical sciences researched the historic materials, the construction of building tissue, the archaeology and the building development of the church of St. John the Baptist.

The purpose of the research was not the restoration of the monastery to its original state. Rather it was aimed at stressing its exceptionality with new arguments, to bring the monastery's mysticism closer to the general public, and to enable the local community to take an active part in the further development of their town, especially through richer cultural and tourist activities in the area

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Culture 2000



Federal Institute for
Materials Research
and Testing



DIPARTIMENTO DI
SCIENZE
DELLA
TERRA



EC project within the programme CULTURE 2000

Agreement No.:
2005-0817/001-001 CLT-CA31
Period: 2005-2006
<http://zicka.zag.si>

Research into structure

Field and laboratory research established that the wall structures originated in different historical periods. Non-destructive georadar and thermal methods were used to identify hidden columns, arches and voids inside the walls, and for ground investigations.

A Finite Element Model of the church was defined for numerical analysis of the structure in its present and revitalized (retrofitted) loading states.



1. Different types of masonry at north wall, 2. Boroscopy investigation, 3. Non-destructive assessment of ground of the Otokar Chapel, 4. Radar traces of grave in the Otokar Chapel

Research into archaeology

Drilling core 8, located next to the east wall of the presbytery, is exceptional for the depth of archaeological deposits: a layer of mortar was found at a depth of 330 cm - the deeper clay layers do not show any traces of human activity.

It is very likely that the mortar belongs to the remains of the church nave or to the reconstruction of the northern side chapel.

Fragments of gothic glass and modern age ceramics have been classified as rare findings in the existing archaeological research of the Žiće monastery.



5. The core of the archaeological borehole, 6. The pieces of new-age ceramics and glass from Gothic period



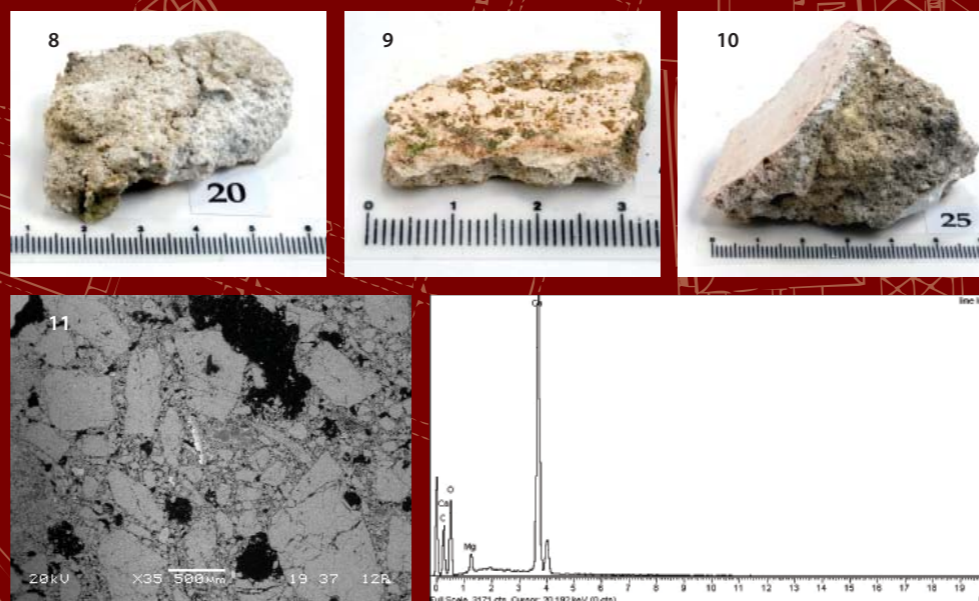
7. Research into archaeology inside the Carthusian Monastery

Research into historic materials

Mortars

The main goal of the research into mortars was to determine their age on the basis of their composition. The noted differences in the composition of the mortars suggest that the building development of the Church of St. John the Baptist dates back to the Romanesque, Gothic, and Baroque periods.

The incorporated historical materials are of local origin.

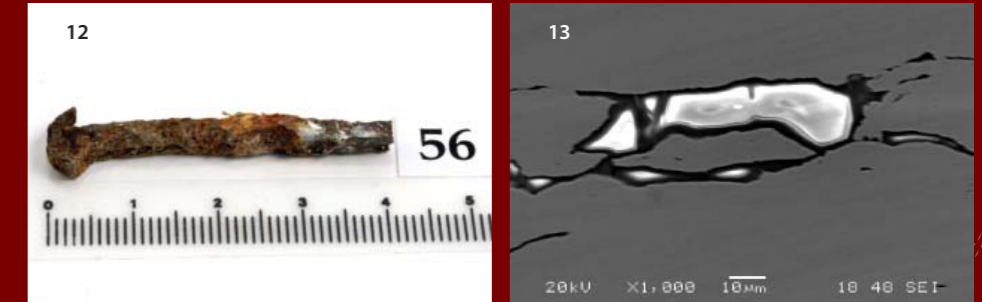


8. Pointing mortar from the Romanesque period, 9. One-layered plaster with smooth finishing layer from the Gothic period, 10. Double-layered plaster with finishing layer from the Baroque period, 11. Sample back-scattered image of mortar (left) with Ca-rich binder (right) from the Gothic period

Metals

The inspected specimens of nails are made of non-homogeneous composite materials, consisting of different oxides of silicon, calcium, aluminium, magnesium, and iron.

The metal products are of good quality, and even after 700 years they are not significantly corroded.



12. Handmade nail from Gothic period, 13. Back-scattered image of the non-metallic inclusions in the ferrite matrix

Glass

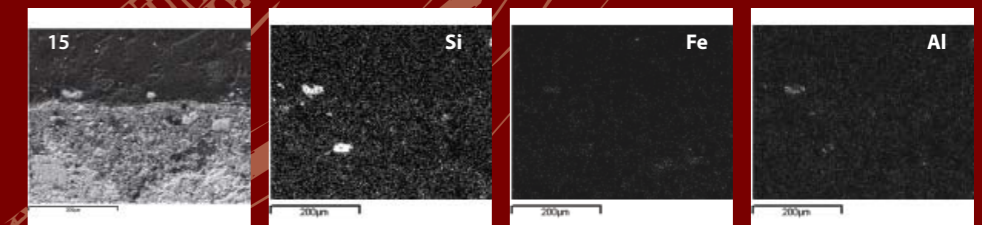
The chemical composition of the inspected glass fragments is homogenous: they consist of different oxides of Si, Al, Mn, Mg, Ca, Na, K, P, S, Cu, Fe, Ti and Pb. Comparative analyses of glass fragments from the Central European territories suggest that the Žiće glass dates back to the Gothic period.



14. A piece of original window glass (left) and SEM image of the glass cross-section (right) from the Gothic period

Pigments

The Carthusian architecture is modestly painted, so the number of identified pigments was small. Red soil, as well as pigments of copper, lead, titanium, chromium and nickel, were identified, of which the red soil and lead pigments are historical.



15. EDS mapping analysis of most common red soil pigment