

INVESTIGATIONS OF DAMAGES OF STONE MATERIALS CAUSED BY SALTS AND MOISTURE MIGRATION IN CAPITHULUM HALL OF RIGA DOME CATHEDRAL **SĀĻU UN MITRUMA MIGRĀCIJAS RADĪTO BOJĀJUMU IZPĒTE RĪGAS DOMA KAPITULZĀLES AKMENS MATERIĀLOS**

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Summary: The construction of Riga Dome Cathedral was initiated in 1211, at the same time the Cross-Vaulted Gallery and the Capithulum hall of Cathedral were built.

In order to diminish the problems caused by moisture, during the last restoration (already in 1888-1891) the walls of Capithulum hall were covered with damp proof sandwich-type plaster, consisting of cement – glass tile (ca 4-5 mm thick) – cement. Thus the evaporation of water through the walls is hindered. Soluble salts crystallise on the surface of carvings dislocated above the level of historical hydroisolation and cause damages. The central – heating system of Cathedral intensifies crystallisation of salts.

The processes of corrosion of historical building materials of Capithulum hall were studied from the viewpoint of moisture and salt migration and comparing the obtained data with outdoor season and parameters.

The Capithulum hall is situated under the ground level. There is no hydroisolation; therefore water together with salts can freely penetrate into the walls of hall. The processes of migration and infiltration are provided by capillary rising and hygroscopic moisture. The type, range and distribution of salts and moisture in masonry of Capithulum hall were detected by qualitative and quantitative chemical analysis, measurement of physical properties and XRD analysis.

Samples from the surface and boreholes with different depths of brick walls as well as historical mortars were analysed. The efficiency of experimentally applied multi layer porous render applied in 1995 were estimated

Qualitative and quantitative chemical analysis presents very high concentrations of soluble salts found on the surface of brick walls of Capithulum hall, indicating that the situation since previous investigations in 2004 has not changed. However, low concentration of salts and relatively low moisture content was detected in the depth until 30 cm of brick walls.

Historical jointing mortar used for brick cladding was detected to be naturally hydraulic lime, mechanically strong and relatively well preserved in the conditions of high salination.

It was proved that experimentally applied multi layer porous render from 1995 does not work.

Using the data obtained during qualitative and quantitative analysis and indicators of distribution of salts and moisture is possible to select the appropriate method of desalinisation for Capithulum hall and to try to prevent detected causes of problems. It gives possibility to work out procedure of restoration-conservation, which makes possible to maintain this object of cultural heritage for future generations as a sample of significant historical artistic building. At the same time it illustrates destructive consequences of inferior investigations of object, applying and realising unsuitable restoration and conservation.

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