Evacuation of artworks after the earthquake – examples from the Croatian conservation-restoration profession

DRUŠTVO RESTAVRATORJEV SLOVENIJE
Slovenian Society for Conservation-Restoration

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Sveučilište u Zagrebu Akademija likovnih umjetnosti

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The poster will present examples of evacuation, inventory, packing, transportation, and storage of different movable inventories such as altars, paintings, sculptures, Stations of the Cross, liturgical items, and other items such as candlesticks, crucifixes, a Christmas nativity set, kneelers, and benches after the earthquakes in 2020 in Croatia. Experiences were gathered from the evacuation works in the Basilica of the Sacred Heart of Jesus (Photo 3.), the church of the Visitation of the Blessed Virgin Mary (Photo 1.) in Zagreb city, the church of St. Simon and St. Jude Thaddeus (Photo 2.), and the chapel of Our Mother God in Markuševec in 2021-2022. The focus will also be on the research done in collaboration with a specialised company, Metroteka, on geotextile vapour-permeable foil made of recycled polyester fibres, Perdura T 200 gramme, that was used for packaging most of the sacral inventory.


Photo 1.


Photo 2.

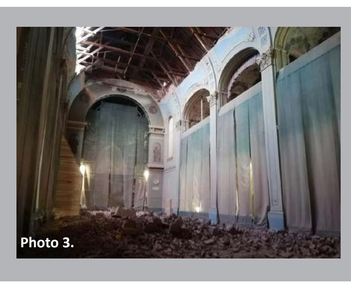
Photo 3.

Evacuation of the church inventories had to be done because of the ongoing construction work that consisted primarily of constructive renovation of the architecture.

The church inventories were dismantled by a team that usually included conservators-restorers of different specialisations, depending on the material, in collaboration with conservators, architects, building engineers, and builders. Different types and levels of scaffolding, safety equipment, and construction tools were used (Photo 4). The inventory that was fixed or that the process of dismantlement could endanger the artwork's static or structural form was protected *in situ* using different textiles and foams that were covered with sturdy wooden boards and (Photo 6.).


Photo 4.

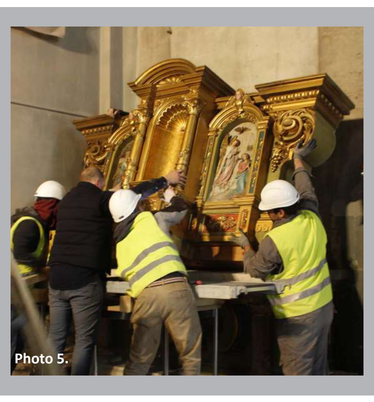
Photo 5.


Photo 6.

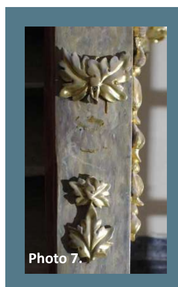
Photo 7.

All dismantled parts were dusted off with a soft brush prior to packing, and all the dismantled parts, and damages and changes of material were photographed.


Photo 8.

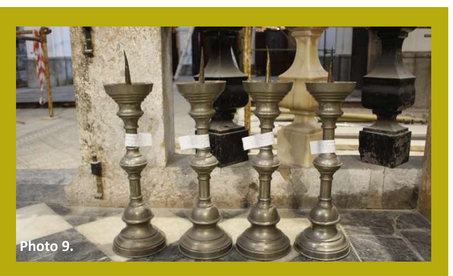
Photo 9.

Every time an evacuation proceeded, the inventory list and labelling of the dismanteled parts were done. The labelling included small labels with general information that were attached directly to the objects (depending on the material of the object; Photo 8.,9.), and big labels (Photo 8.) containing pictures of the object and the object's position were attached to the package and sealed (Photo 16.).


Photo 10.

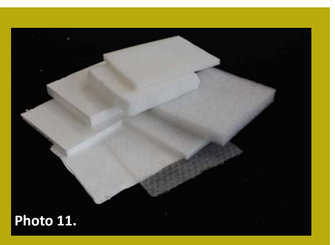
Photo 11.


Photo 12.


Photo 13.

The materials and tools that were used for packaging included different types of tapes (paper tape, duct tape), metal staples, ropes, foils (bubble foil, plastic foil), textile rolls (polyethilene textile, geotextile), sponges (synthetic) and soft foams (polyethilene), styrophore, gloves for handling objects (polyethilene), scisors, and scalpels.


Photo 14.


Photo 15.


Photo 16.

The packing depended on the type of inventory and the object's technical layers. Polyethilene textile (Photo 14.), geotextile (Photo 15.) and bubble foil (Photo16.) were mostly used for packing. Paintings were packed in polyethilene textile, polychrome and gilded wooden sculptures, altar parts, Stations of the Cross, and small inventory were packed in geotextile, and fragile objects were packed additionally in bubble foil during transportation.

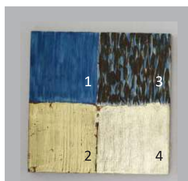
Photo 17.

The efficienty of geotextile packaging of the polychrome and gilded wooden artworks are being measured and analysed in collaboration with Metroteka, ISO/IEC 17025 accredited calibration laboratory in Zagreb, Croatia.
Three mock-ups (Photo 17.) were prepared using balsa wood as a support with four different upper layers: 1st layer: 10% rabbit glue + 7% rabbit glue with Champagne chalk + gouache + 5% shellac; 2nd layer: 10% rabbit glue + 7% rabbit glue with Champagne chalk + 7% red bole + gilding; 3rd layer: acrylic gesso + gouache + Laropal A81; 4th layer: acrylic gesso + acrylic mixtion + golden Schlagmetal leaf.


Photo 18.

Mock-ups were then packed: the first mock-up was packed in bubble foil with paper tape, the second in Perdura T 200 gramme geotextile that was fixed with metal staples and duct tape, and the third in Tyvek 1442 fixed with paper tape.
Thermohygrometer data loggers (Rotronic HL-1D), with calibrated temperature and relative humidity sensors were packed in the same way as the mock-ups and positioned as close as possible to them in the climatic chamber.
To ensure that the temperature and relative humidity in the chamber is homogenous and stable enough in all locations, and that thus the results for all samples and loggers are comparable, climatic chamber was itself calibrated in accordance with EURAMET cg-20: Calibration of Temperature and/or Humidity Enclosures (Photo 18.).

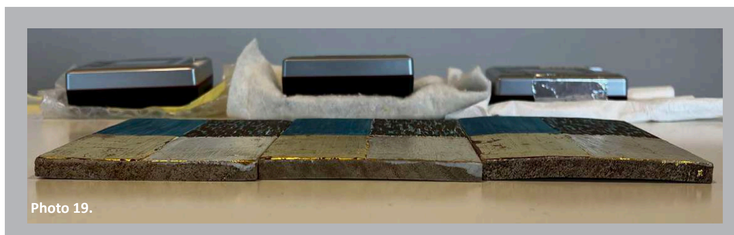
Photo 19.

Finally, calibration (ISO/IEC 17025 accredited) of both data loggers and climatic chamber ensures traceability of measurements to SI. The temperature was programmed to change between 21°C and 30°C, and relative humidity between 21% RH and 99% RH.
After approximately 5 days the results showed that the wooden support/mock-up that was in Tyvek 1442 has deformed the most, and the wooden support/mock-up that was packed in Perdura T 200 gramme geotextile deformed slightly (Photo 19.).

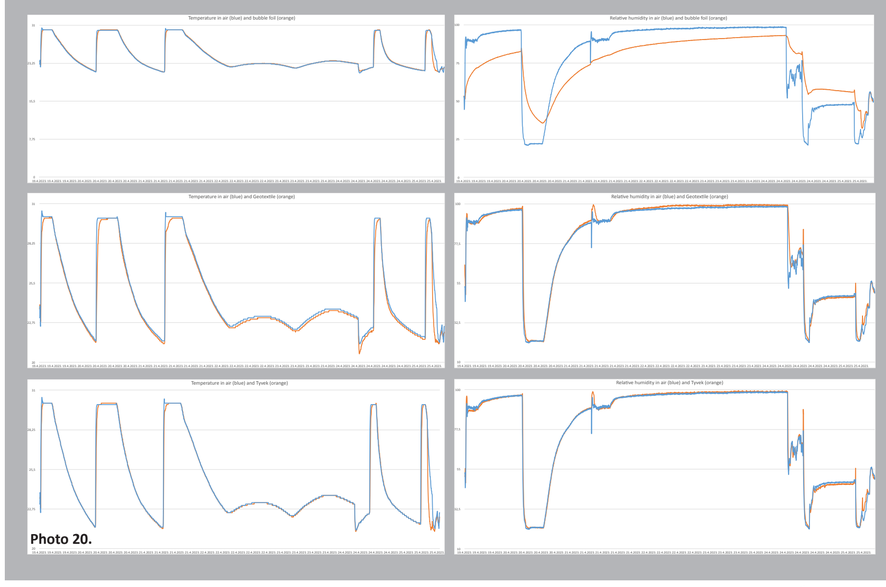

Photo 20.

The difference between both temperature and relative humidity inside the Tyvek 1442 and Perdura T 200 gramme geotextile packed data loggers was not significantly different than the air, but the temperature changes in air are shown to penetrate inside the Geotextile somewhat slower than inside Tyvek. So both deformation and slower temperature penetration show that Geotextile is the better solution than Tyvek.

Bubble foil is shown not to block temperature changes from the air at all, but to block relative humidity changes from the air very significantly, which is something that needs separate research.

Also, the recorded charts have shown that only wrapped bubble foil has some effect on relative humidity in relation to relative humidity in the environment.

The research is ongoing.


Photo 21.


Photo 22.


Photo 23.


Photo 24.


Photo 25.


Photo 26.

The means of transport varied depending on the size of the inventory and the location of the storage. In general, it included trucks and cars, but also carts (Photo 21.) and parts of scaffolding with wheels. Small objects were transported by a car and a small truck (Photo 22.,23.), while larger and heavier objects were moved with a crane and transported by a big truck (Photo 24.,25). The transport required a large number of employees, logistics, and supervision.
All objects were additionally packed for transportation in bubble foil except the large parts because of the better grip of crane holders. The objects were transported on a fine day, and a car drove behind the truck to make sure that the transportation was going smoothly.


Photo 27.


Photo 28.


Photo 29.


Photo 30.

After the transportation was done, the bubble foil, if used, was removed. For storing the objects, additional packing and sorting materials were used: cardboard (Photo 28.), wooden (Photo 29.), and metal (Photo 30.) boxes (for more sensitive objects), as well as metal shelves that were fixed in the walls to prevent overturning, with the plastic foil that was additionally wrapped around the shelves; the bigger or heavier objects were placed on wooden pallets in case of flooding or surface moisture condensation; for the division of the object, thick sponges (Photo 26.) or styrophore were used; the hollow parts of the objects (Photo 27.) were also used for storage when lacking the space. Additional labelling was needed.

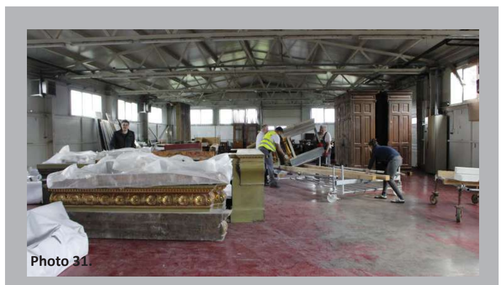
Photo 31


Photo 32.

Packed inventory was stored in large storage spaces (Photo 31.) or placed in rooms of the parish offices (Photo 32.) that were repurposed and adapted to be functional for storing cultural heritage objects, depending on the available space, funds, size, and type of the inventory.


Photo 33

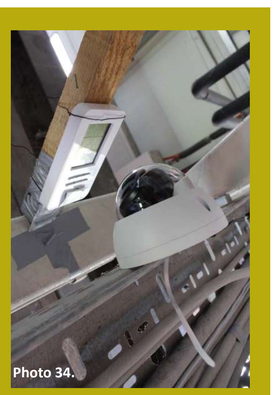
Photo 34.

The storages were equipped with an installed security alarm system, moisture diffusers, data loggers were placed and the inventory will be monitored to prevent changes in material but also to test the resistance and efficiency of the packaging.

Photo sources:

Photo 1.,2.,4.-18., 21.-34. Maja Sučević Miklin
Photo 3. https://www.jutarnji.hr/vijesti/zagreb/u-utorak-miniraju-svod-crkve-u-palmoticevoj-koja-je-razorena-u-potresu-gradanima-poslano-upozorenje-15105534
Photo 19. , 20. Metroteka