

SKIN MATTERS. CONSERVATION-RESTORATION TREATMENT OF A SIXTEENTH-CENTURY POLYCHROME WOODEN SCULPTURE

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ABSTRACT

This paper presents results of the preliminary examination and conservation-restoration treatment of polychrome wooden sculpture, *Madonna and Child*, dated around 1520 from the National Gallery of Slovenia.

Extensive areas of paint loss, discoloration of old retouches and darkened coating on gildings disrupted the sculpture's visual unity and balance. Overpaints have progressively and significantly changed its appearance. Prior to the intervention we conducted detailed technical examination. Treatment included surface cleaning and partial removal of materials. Decisions, methods, and materials regarding aesthetic reintegration are pointed out: various approaches used on different surfaces, of which faces, and other parts of the skin, received a comprehensive "skin care".

Keywords

Sculpture; Wood; Polychromy; Overpaints removal; Aesthetic reintegration

1. INTRODUCTION

In 1979, the National Gallery of Slovenia acquired a polychrome wooden, life-size standing *Madonna and Child* (161 × 56 × 17 cm), dated around 1520 and attributed to the (unknown) Lower Styrian workshop at the auction in Munich, Germany. It was most likely placed in the central shrine of a late-Gothic altarpiece. The sculpture represents Madonna holding her naked son and standing on a crescent moon. Her very long hair is surrounded by a veil and a crown. She is dressed in

red and donned with a long, gilded mantle with punched trimmings and blue lining (Fig. 1).

The sculpture was not treated until 2015 when we reassessed its condition, conducted preliminary technical examination and planned a treatment.

1.1 Provenance /History

Madonna comes from the collection of Dr Richard Oertl (1865–1943), who was an art historian and a collector. He focused on German late-Gothic wooden sculptures (around 1480–1530) and developed a unique collection of art from Upper and Lower Bavaria, Tyrol, Swabia, and Upper Rhineland. For economic reasons he had to sell his collection at different auctions. One of the highlights of his set sold already in 1913 was *The Dangolsheim Madonna* by Nicolaus Gerhaert von Leiden (created around 1460), today in Bode Museum in Berlin. Other important works went to museums in Düsseldorf and Stuttgart, among others. In 1919, the Bavarian National Museum in Munich bought Michel Erhart's *Madonna from the Kaufbeurer altar* [1].

Dr Oertl lived and kept his valuable possessions in Miltach castle in Bavaria until his death in 1943. In 1979 the castle and the last quarter of his collection went on sale in *Neumeister Münchener* auction house where the work in question was purchased [2].

The owner suggested the provenance of *Madonna* at the mine church in Hallein near Salzburg. But the statue shows more stylistic similarities to sixteenth century sculptures from Lower Styria, which now belongs to Slovenia, and to a closely related figure of *Madonna and Child* from the Provincial Museum Ptuj Ormož. The attribution to the still-unknown Lower Styrian Workshop has not yet been discussed in scholarly literature [2][3][4].ⁱ



Figure 1 – *Madonna and Child*, (Anonymous) Lower Styrian Workshop, 1500 to 1520, National Gallery of Slovenia, polychromed wood. Sculpture before treatment. (Photo: National Gallery of Slovenia)

1.2 Study of artistic techniques

The statue is carved as a self-standing sculpture. The main volume is composed of two blocks of wood. The reverse of the statue is flat, but half of it has been additionally trimmed, probably with an axe. Besides gluing, no additional joining technique was used. The right block includes the heart of the wood (the pith), whereas the left block is made of tangential timber with the outer surface facing forward. Traces/indentations of a flat clamp and a drill hole for attachment are visible on the underside.

From the presence of various holes and recesses, we conclude that smaller elements were carved separately and were then attached to the main volume: upper part of Madonna's crown, Jesus's crown, and a cross from the orb he is holding.

The wood has been gilded and painted. Small pieces of canvas that covered the wood prior to painting could be observed locally. The mantle, water gilded on a red bole has punched trimmings. The punch mark went through the polychromy into the wood.

On the ropery folds hidden from direct view we can observe typically darkened patches where so-called part-gold, *Zwischgold* (German), *oro di meta* (Italian) was used, material created by beating gold and silver together. This was quite popular in the Middle Ages in German sculptures. Its darkening could be attributed to aging mechanisms and insufficient protection of the silver in the double-layer material. At that time, apart from the economic reasons (as it allowed the gold layer to be thinner), it was often applied to hair with oil gilding technique and covered with coloured glazing [5], which we later discovered in our case as well.

1.3 State of conservation

The condition of the wooden support is generally very good. Next to the separately carved elements, only the smaller parts of Madonna's crown or spikes and fragments of the standing surface around the bottom edge are missing.

Paint layer was generally in good condition, too, but considerable loss occurred on Jesus' lap, thighs, and Madonna's right hand. Covering the nudity of the Christ probably led to this limited, but extensively damaged area where paint layers detached from the ground layer and fell off.

Old retouches on the faces turned to a warmer colour and became more visible. Except from the gilded mantle, several repaints covered all other surfaces. The dark brown colour of the crown strongly suggested repaints. Similarly, very dark colour of hair was unconvincing and also the colour seen locally underneath was much lighter. When examining the surfaces, on some areas (hair, mantle's lining) we have noticed irregularities, unevenness that indicated application of overpaints to previously uncleaned and/or damaged surfaces. The lining of the coat was very dark, almost black.

The high-quality original gilding of the mantle showed moderate wear damage and only fragment losses. Darkened, brown to grey coating obscured the gilding.

2. MATERIALS AND METHODS

We reassessed the sculpture's condition as generally stable but surfaces and the appearance have progressively and significantly changed.

Many mainly aesthetic problems disrupted sculpture's visual unity and balance. The most noticeable and disfiguring damage was the area of missing paint layer on Jesus's body.

Team of curators and conservators assessed the goals of the conservation-restoration treatment that would reveal at least some of the original colour scheme and would regain the artwork's artistic and esthetical values.

2.1 Preliminary technical examination

Prior to the treatment, polychromed *Madonna and Child*, a beginning of sixteenth-century production, was the subject of a study that aimed to reveal the artist's practice. We undertook radiography, ultraviolet examination and photography under UV radiation, stratigraphic and material analyses. Combining results contributed to a better understanding of the original technology, later interventions and helped us plan the treatment.

In UV radiation besides the missing paint layer and old retouches, extensive repaints on the Child's face became clearly visible (Fig. 2).

X-ray radiography showed no additional joining elements between constituent wooden blocks. Several layers of lead white pigment used on skin areas were noticeable as intense white areas.

We took samples from skin parts, hair, and garments to survey the stratigraphy and to characterize the material composition of the original and subsequent paint layers. These investigations would also help us to assess options for overpaint removal and to select appropriate methods and materials.

Sample analyses performed by the Natural Science Department of the Institute for the Protection of the Cultural Heritage of Slovenia included optical microscopy, Fourier transform infrared spectroscopy (FTIR), Raman spectroscopy and scanning electron microscopy coupled with energy dispersive X-ray Spectroscopy (SEM-EDS).



Figure 2 – Photography under UV fluorescence. The darker areas show retouches, and extensive repaints on the Child's face. (Photo: National Gallery of Slovenia)

Results of the analyses revealed that original ground preparation (with distinguishable two layers) is composed of calcium carbonate filler with dolomite inclusions and proteinaceous binder with slight differences in a sample of a dress, where oil was possibly added.

Bole layer of similar reddish-brown colour on a mantle and a dress is applied in all the extension of the water gilded areas. It is composed of iron oxide, aluminium hydroxide, and litharge (probably from lead pigment degradation) mixed with protein and oil binder.

Sample taken from Madonna's hair (Fig.3) shows that at the time of its creation, the white ground (Fig. 3, layer 3) was covered with yellow paint first and then a translucent orange layer (Fig.3, layers 4, 5, 6) before the leaf was applied on oil binder (Fig. 3, layer 7). The alloy of the original metal layer identified by SEM-EDS (Fig.3 bottom left) shows the presence of silver and gold from the two-layered foil, *Zwischgold*. Metal leaf was then covered with a translucent brown glaze composed of natural earth pigment and oil (Fig.3, layer 8). The hair had been re-gilded once (Fig. 3, layer 9) and then repainted several times with protein/oil binder (*tempera grassa*) (Fig. 3, layers 10, 11, 12) [6].

The original polychromy of a dress applied on a red bole is made of (most probably burnished) silver leaf under translucent yellowish glaze. On the original lining of the mantle, the blue azurite pigment in oil binder was applied over a thin black underlayer, which was quite often in medieval times.

Flesh tones are originally composed of lead white matrix with cinnabar and minium (red lead, red oxide) in oil. The original polychromy was then repainted three

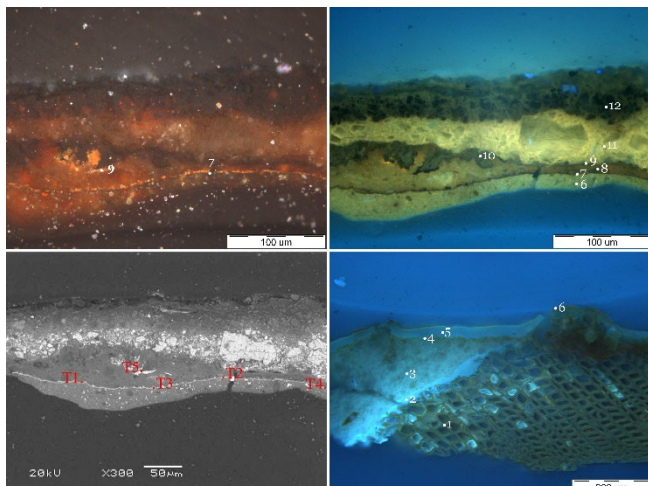


Figure 3 – Cross section from Madonna's hair (upper left) under UV light (upper and bottom right) and SEM-EDS analysis (bottom left). Photo: Institute for the Protection of the Cultural Heritage of Slovenia, Restoration Centre)

times. These layers are composed of lead white, cinnabar, occasionally with the addition of barium sulphate in oil binder [6].

2.2 Conservation-Restoration Treatment

2.2.1 Surface cleaning

Grime layers covered and obscured surfaces, which was especially perceivable and disturbing on lighter parts, like the skin. Surface cleaning was the first step of the treatment. Loose dust and dirt were firstly vacuumed off. After testing the solubility of the soiling material, we have chosen the most suitable buffer solution at pH value 5.5 in a liquid and/or gelled form. We utilized citric acid (with also mild chelating ability) buffered with sodium hydroxide. Where longer application time was needed, the same solution was gelled with hydroxypropyl cellulose Klucel G was used (Fig. 4).

2.2.2 Removal of film-forming materials

After surface cleaning, extensive repaints and fills from the previous treatment became clearly visible on the Child's face. Locally, the fills were not limited to the damaged area, but covered the paint layer around it, too. We removed the excess fill material around the edges mechanically with the use of a surgical scalpel. We smoothed the surface of the old fill and its edges with an abrasive paper with fine grit size and in this way we removed also the repaint of inappropriate colour.

2.2.2.1 Removal of water-soluble coating from the gilding

Medieval sculptures can have surface coatings on water gildings that could be original or subsequent. Authors suggest various materials that could be used: animal glue [7], egg white (glair) or water-soluble gums [8]. Due to the exposure to the UV light these coatings darken considerably.

Such an unevenly applied and discoloured greyish-brown coating covered only Madonna's gilded mantle. This coating was recognized as a later application which was utilized probably to consolidate damaged surface of the gilding. This conclusion stemmed from the accumulation of the material along the damaged edges. Subsequent application and aesthetically unacceptable changed appearance were the reasons that justified its removal.

A coating was not analysed, but tests showed its water solubility after slightly prolonged application of water in form of a rigid agar gel patch. As egg white coatings look bluish-white under UV light and they need a chelating agent to become soluble in water [8], we concluded that animal glue was most probably used in our case.

Rigid agar gel represents a targeted and controlled way of delivering water to the water-sensitive surface [9]. The moisture from agar patches laid on the gilding for very short time (less than a minute) dissolved and picked up most of the coating material and didn't damage the gilding. We avoided areas with exposed ground and bole layers.



Figure 4 – Partly removed surface dirt (left) and partly removed coating from the water gilded mantle (right). (Photo: National Gallery of Slovenia)

2.2.2.2 Overpaint removal

On the skin parts, overpaint layers show very similar composition (pigments and binders) and consequently colour very similar to the original one, while garments and hair were more comprehensively changed.

Although contemporary conservation theory generally turns away from overpaint removal to reveal the original [10], we decided, based on careful consideration, for a partial removal.

The decision to preserve overpaints on the skin was based on the composition, the quality, good adhesion, and the overall condition of these repaints. Removing overpaints from the very damaged Christ's body could further jeopardize the underlying layers.

In other instances, we decided to remove disfiguring and inauthentic layers and reveal some of the (more valuable) original layers. Unevenness of some surfaces (the hair and the mantle's lining) indicated that the condition of the underlying layers is not very good, but we estimated that a large portion of the original polychromy was still preserved. On the dress the surface of the repaints was even, there was no hint/implication of underlying damages. The yellow glaze on a silver leaf could give considerably different impression from the top red repaint of the dress. Small stratigraphic windows, undertaken by solvents and scraping, indicated the original polychromy was still present, which also guided our choice to remove these repaints.

The sample analyses also helped us to decide and to select appropriate methods and materials for the cleaning and removal of materials. Recent development in the field has brought many new methods that enable the procedures of cleaning and removing of film-forming materials to be carried out more gradually, selectively, efficiently and, above all, more safely for both the work of art and the conservator-restorer [11]. We changed the cleaning protocols for various problems and selected materials and methods for specific layers to be removed. The work was undertaken very carefully, also under the stereomicroscope *Leica M80* for certain tasks.

Aged oil repaints were softened by several applications of highly viscous solvent surfactant gels, where the penetration of the solvent is limited. The solvent action is held on the surface and the evaporation rate of the solvent is slowed.

After testing solubility of the repaints, we firstly prepared nonpolar solvent surfactant gel with ligroin, *Carbopol* and *Ethomeen C12* and water. Then we added

20-30 % of benzyl alcohol. Applications of the gel covered with *Melinex* foil lasted between a couple of minutes to more than an hour and softened the layers that we then removed mechanically with the use of a disposable surgical scalpel. We used this method to remove repaints from the crown, the veil, the dress, and the mantle's lining. Knowing the azurite layers (on the lining) are very susceptible to solvent cleaning, we removed the top (dark blueish black) layer using nonpolar solvent surfactant gel, but the last whitish overpaint layer was removed from it with a surgical scalpel and under the stereomicroscope for more precise work.

For the removal of greasy tempera repaints from the hair we used gelled emulsions in which we combined solution of diethylenetriaminepenta acetic acid (DTPA) buffered with sodium hydroxide to (an alkaline) pH value 9 and a nonpolar mixture of solvents (isooctane and benzyl alcohol). As a gelling agent for the water solution in O/W emulsion we used *Carbopol*. In W/O gelled emulsion, the outer phase represented nonpolar solvent surfactant gel. Layers were taken off gradually and with the help of the microscope to clearly see what needed to be removed.

Repaints on the hair and the crown significantly changed the original appearance. Removing them brought to light a veil of a warmer white colour, a gilded headband, and a narrow area of hair just above it, both previously overpainted white. Gilded and punched crown became visible again. We revealed remains of the original polychromy on the hair: gilding with an orange-brown glaze which lay on the (exposed) priming ground of a very similar orange colour. (Fig. 6).

Removal of the repaints from the mantle's blue lining revealed damaged original polychromy made of azurite layer applied over a black underlayer which still gives the overall impression of a blue velvety surface. On the dress, the silver leaf with a yellow glaze was heavily worn out, probably sanded, and the extensive area of exposed bole gave a reddish-brown colour impression to the dress.

2.2.3 Aesthetic Reintegration

After the surface cleaning, some damages became even more evident, for example exposed priming ground where paint layer fell off became lighter white and more contrasting. Removal of repaints also revealed some areas of heavily damaged original polychromy.



Figure 5 – Removing overpaints revealed a gilded headband and a crown with punched decoration and lightly-coloured hair. (Photo: National Gallery of Slovenia)

When observing a work of art, damage to it is the most eye-catching element - where the continuity of a surface is interrupted, the unity is invalidated. An area of damage creates a strong visual disturbance and greatly influences the perception of the work.

But it is not just the damaged area that attract our attention, and not all in the same way.

A study by Massaro et al. from 2012 analysed the human gaze. Methods developed in medicine, psychology and neuroscience were used to analyse the viewers' responses to works of art. One of the outcomes of this study was that when observing a coloured static human image, the gaze is mostly focused on the facial area, followed by the hands. The face is the first to attract attention; it contributes to an aesthetic experience of the artwork and can also elicit the simulation of emotions and sensations [12].

These aspects guided our choices regarding the range/ extensiveness of the aesthetic reintegration. We decided to select a protocol not very common in conservation-restoration (of polychrome wooden sculpture) and to address various parts of the sculpture with three different approaches: filling and retouching, retouching only or no intervention.

We limited the aesthetic reintegration to damages on the faces, hands, and the surrounding skin parts. The treatment would restore the unity of the work by respecting the theoretical principles of recognition and the reversibility of the intervention. We sought to find a balance between aesthetics and the work's role as a historical document.

We differentiated between two areas with losses: the faces and the rest of the skin. Since they receive the maximum of the attention, losses on the faces would most disturb the perception of the artwork.

Where both the original and the subsequent layers peeled of the ground, slightly recessed lacunae with sharply defined edges were created. On these edges the effect of catching the light unevenly was more evident and disturbing. We determined that on the faces this could not be solved only by retouching. Retouches should be quite thick to level the damaged with the surrounding area. We decided to eliminate the interference of the lacunae with a fill first. We used a mixture of chalk *Bologna light*, acrylic dispersion *Ares33* (Samson Kamnik) and *Gesso primer* (Lascaux) to fill the gaps on the faces. We smoothed the surface of the new repairs.

The whitish islands of the exposed ground on Madonna's right hand and the Child's body were also very contrasting, eye-catching elements, that could be perceived as placed in front and would also impair the perception of the work. It was difficult to leave them non-retouched. But as they are not so much in focus, we decided not to fill them, but to retouch directly to the exposed ground.

In the final phase, the technique of recognizable retouching was chosen. We connected the filled parts and/or exposed ground with the surroundings using *puntinato* (Italian), a technique introduced in the restoration of polychrome wooden sculpture by *Istituto Centrale per il Restauro* (Rome, Italy). With *puntinato* or pointillist technique, the desirable effect is realized by dots in the colours that unite the gaps with the encompassing surface. The technique accommodates perceiving from a distance, when dots visually merge and reconstruct the optical continuity of the surface, but on close inspection remain clearly visible. We agree

that when applied to 3D objects, the dots are in advantage as they do not compete with the form, which sometimes happens with parallel hatching [13]. Retouching was carried out with *Gamblin Conservation Colours* (Gamblin) that ensured simple removability (Fig. 6).

We decided not to reintegrate lacunae that reveal the ground layer, bole, or the bare wood on the rest of the surfaces, but to leave them visible. The gilding of the mantle and the crown was, apart from being worn out, in a remarkably good condition. The original polychromy on the hair, the orb Jesus is holding, the dress and the blue lining, although fragmentary in places, was left to make its impact. We adopted the solution used in Belgium at the KIK IRPAⁱⁱ, which presumes that viewers can mentally reconstruct certain missing parts from (past) experiences [13] that is why the wear and losses on these surfaces could be accepted without filling and retouching. In rare instances, the visibility of these damages was just toned down. We varnished only a dress with *Soluvar Gloss Varnish* (Liquitex)ⁱⁱⁱ where worn-out and locally exposed silver needed to be protected. The varnish has excellent stability and is removable in nonpolar solvents [14].

3. RESULTS AND DISCUSSION

On the statue of *Madonna with Child*, where aesthetic problems confront historical reality, we decided to preserve the remains of different periods.

Removing overpaints had a great impact on the appearance. On certain surfaces we revealed just fragments of the original polychromy. In the case of the hair, similar colours of fragments and the ground layer reduce the visibility of damage and (without additional treatment) we achieved the visual impression of the original, fair-haired Madonna.

However, the polychromy of the dress is (unexpectedly) damaged with the red bole layer exposed over a large part of the surface. It is possible that the surface was smoothed, sanded before applying the paint. Locally preserved patches show the original polychromy, but the overall final impression of the dress is dominated by the exposed red bole, which deviates from the original appearance of golden glaze on silver and to some extent affects the color balance.

With the aesthetic reintegration limited to skin parts, we succeeded to re-establish the optical continuity of the surface and achieved oneness of the work. We



Figure 6 – Detail of *Madonna and Child* after treatment. Pointillist retouching applied to filled lacunae on the faces and to the exposed ground on the rest of the skin parts visually merges the damaged areas with its surroundings when viewed from a distance but maintains discernibility. (Photo: National Gallery of Slovenia)

maintained the discernability and reversibility of the retouching. We estimate/believe that the decision not to reintegrate damages on the other parts has proven to be successful and that the appearance of these surfaces does not significantly impact the perception of the whole.

4. CONCLUSIONS

The appearance of this medieval sculpture is a patchwork of the original and the subsequent materials, damages, and old repaints. When dealing with the aesthetic reintegration of these surfaces, we used an approach that was slightly different from the established theories and practices, since we treated surfaces individually.

The time required for such a treatment could represent a well-founded concern about the justification of the intervention, which is pointed out by the modern

approach to the restoration of polychrome wooden sculpture.

While some decisions may have been different, we truly believe that this long-lasting process and the selected approach in esthetic reintegration regained and highlighted the work's artistic, historical, and aesthetic values and that the observer can once again enjoy the beauty of *Madonna and Child*, which entered the Permanent Collection of the National Gallery of Slovenia in February 2020.

The author is constantly accompanied by self-questioning about the appropriateness of past decisions. Especially when thinking about them from a distance, these issues become particularly challenging. Sharing decisions with fellow professionals is like putting yourself in front of the strictest jury, which could become especially burdensome. Nevertheless, with this contribution we would like to share our solutions and the results of the intervention, which are available for further evaluation/ assessment.

REFERENCES

- [1] BRANDT, K. (1999). Oertel, Richard. In: Neue Deutsche Biographie 19, p. 451 [Online-Version]; URL: <https://www.deutsche-biographie.de/pnd128791640.html#ndbcontent> [10 April 2020].
- [2] ANONYMOUS, (1979). *Sammlung Dr. Richard Oertel: Skulpturen und Gemälde, Neumaister-KG, Auktion 191 (5 November 1979)*, (pp. 65-66). München: Münchener Kunstauktionshaus.
- [3] BALAŽIČ J. (2017). *Umetnost srednjega in zgodnjega novega veka (1200-1550)*, (pp. 74-77). Ptuj: Pokrajinski muzej Ptuj – Ormož. Available at: <https://issuu.com/pokrajinskimuzejptujormoz/docs/pmpo-umetnost-srednjega-in-zgodnjega-novega-veka-2> [2 December 2021].
- [4] CEVC E. (1970). *Poznogotska plastika na Slovenskem*, (pp. 48-50). Ljubljana: Slovenska matica.
- [5] QUING, W. et al. (2018). Investigation of the foil structure and corrosion mechanisms of modern *Zwischgold* using

NOTES

ⁱ Personal communication with prof. dr. Samo Štefanac (University of Ljubljana, The Faculty of Arts), dr. Branko Vnuk (curator from Provincial Museum Ptuj Ormož), Marie-Theres Haslböck (Neumeister Münchener Kunstauktionshaus)

advanced analysis techniques, (pp. 122-132). *Journal of Cultural Heritage*, Vol. 31.

- [6] PADOVNIK, A., KAVKLER, K. (2017). *Marija z detetom (NGP 694), Analize barvnih plasti*. Ljubljana: ZVKDS RC.
- [7] WESTHOFF, H. (1991). Coatings of Medieval Gilded Surfaces and their Deterioration. In D. BIGELOW, ed. *Gilded Wood: Conservation and History*, (pp. 79-86). Madison, CT: Sound View Press.
- [8] WOUDHUYSEN-KELLER, R., WOUDHUYSEN, P. (1999). A Short History of Eggwhite Varnishes. In A. HARMSEN, ed. *Firmis: Material – Aesthetic – Geschichte, International Kolloquium*, (pp. 80-86). Brunschweig: Herzog-Anton-Ulrich Museum.
- [9] CREMONESI, P. (2013). Rigid gels and Enzyme Cleaning. In: M. F. Mecklenburg, A. E. Charola and R. Koestler, eds. *New Insights into the Cleaning of Paintings: Proceedings from the Cleaning 2010 International Conference*. Universidad Politecnica de Valencia and Museum Conservation Institute, Smithsonian Contributions to Museum Conservation, (pp. 179–183). Washington, DC: Smithsonian Institution.
- [10] MARINCOLA, M. D., KARGER, L. (2020). *The Conservation of Medieval Polychrome Wood Sculpture - History, Theory, Practice*, (pp. 161-183). Los Angeles: Getty Conservation Institute.
- [11] CREMONESI, P. (2017). An Approach to cleaning and removal of film-forming materials. In *Workshop handouts by Paolo Cremonesi* Ljubljana: University of Ljubljana, Academy of Fine Arts and Design.
- [12] MASSARO, D. et al. (2012). When Art Moves the Eyes: A Behavioral and Eye-Tracking Study, (pp. 1-16). *PLOS One*, Vol. 7, Iss. 5,
- [13] MERCIER, E., BENATI RABELLO, E. (2017). The golden stain of time: The inpainting of gildings on wooden sculpture. In: *Postprints of RECH4, 4th International Conference on retouching Cultural Heritage*, (pp. 144-151). Split: University of Split, Academy of Fine Arts.
- [14] THORNTON, J. (1991). The use of nontraditional gilding methods and materials in conservation. In D. BIGELOW, ed. *Gilded Wood: Conservation and History* (pp. 217-228). Madison, CT: Sound View Press.

ⁱⁱ *KIK-IRPA*, Royal Institute for Cultural Heritage-Koninklijk Instituut voor het Kunstpatrimonium - Institut Royal du Patrimoine Artistique); Bruxelles Belgium

ⁱⁱⁱ Soluvar Varnish is composed of 40% solids (Paraloid B-67, piBMA and Paraloid F-10, piBMA) in slow drying petroleum destilate.