



MOCK-UP RECONSTRUCTIONS OF GOLDEN TEXTILES DEPICTED IN THREE RENAISSANCE PAINTINGS FROM CROATIA: THE PURSUIT OF EMBELLISHMENT TECHNIQUES

Lucija Duplancic (1)
Klaudia Hozjan(1)
Paola Matkovic (1)
Sandra Sustic Cvetkovic (2)

- (1) Arts Academy of the University of Split; Zagrebacka 3, 21000 Split, Croatia, E-mail address:
dlucija6@gmail.com, klaudia.hozjan@gmail.com, matkovicpaola@gmail.com
(2) Croatian Conservation Institute, Šibenik Department for Conservation, Milice i Turka 4, 22000 Šibenik,
Croatia; E-mail address: ssustic@hrz.hr

ABSTRACT

This research will focus on three small-scale mock-up reconstructions of several embellishment motifs used by renaissance painter Nikola Bozidarevic from Dubrovnik (Croatia). The reconstructions were carried out as a part of the practical portion of the *Technical analyses and historical reconstructions* course at the Arts Academy of the University of Split during the academic year 2020/2021. During the reconstruction process a number of questions concerning the painter's working properties aroused. The attempt was made to answer which methods of transferring the pattern on the gilded surface could have been used. Further questions concerned the subsequent steps of decoration, for example did the pouncing of the surface occurred before or after delineation of the motifs in thick paint. In spite the fact that most of these questions remind ambiguous, the experience gained from the reconstruction process emphasized the importance of understanding the practical aspects of decorative techniques as well as the high level of knowledge about the painter's materials required for this kind of process.

Keywords

Renaissance paintings, Golden textiles, Embellishment techniques, Small-scale mock-up reconstruction.

1. INTRODUCTION

During the 15th and 16th century, in the Dubrovnik Republic, artist developed specific techniques to emulate the gold brocaded silk velvets worn by the religious characters in their paintings. This paper will focus on three small-scale mock-up reconstructions of several embellishment patterns used by Nikola Bozidarevic (1460.-1517.), one of the most important painters within the entire Dalmatian painting of that time. All reconstructions were carried out by conservation-restoration students during a practical portion of the course *Technical analyses and historical reconstructions II*, taught at the Arts Academy of the University of Split (AY 2020/2021). This research is inspired by an ongoing project of the Croatian Conservation Institute (HRZ) related to the conservation and technical investigation of the panel painting *The Virgin and Child* from the church of Our Lady of the Snows in Cavtat¹, whose authorship is associated with Bozidarevic and his father Bozidar Vlatkovic. [1]

1.1 Objectives

In accordance with the typical motif selection of the 15th century European masters [2], Bozidarevic often

Table 1 – Analyses of the blue and red coloured motifs of the gilded Virgin’s dress from the painting The Virgin and Child, The Church of Our Lady of the Snows, Cavtat. Column III. and IV. are based primarily on XRF results performed by Domagoj Mudronja, PhD from the Natural Science Laboratory of the HRZ, Zagreb. [5]

ANALYSES OF THE BLUE AND RED COLOURED MOTIFS OF THE VIRGIN’S DRESS				
Technical studies	Location	Registered elements	Possible materials / pigments	Materials used in reconstructions
Visual observation Cross section analyses X-Ray Fluorescence Energy-dispersive X-ray spectroscopy	Blue motifs	Ca, Fe, Cu, Au, Pb (S, K, Co, Ba)	4 th blue layer - azurite, lead white	Prussian Blue LUX 45202 Cl : PB 27. 77510, Kremer; Titanium white (Art. 46200) - Kremer
	Red motifs	S, Ca, Fe, Sr, Hg, Pb (K, Cu)	4 th transparent red layer – (?) 3 rd red layer - vermilion	Cadmium red Nr. 1 hell hochst lichtecht, deckend 211200 ce: PR 77208, 77196, SiO ₂ ; Alizarin Krapplack dkl. Conc. C, 23611

painted vegetable motifs in red and blue with undulating repeats of flowers, pomegranates, leaves, or seed like forms over the gilded surface. The motifs were also methodically ornamented with punch marks, in contrast with the flat background. [3, 4]

This research was guided by the idea that motifs were not made freehand by the master from the very beginning, but rather that the patterns were used to achieve simple motif replication, after which the lines of the imprint are thickened freely by hand. The idea was based on the cross-section analysis of the red motifs from one of his paintings (see chapter 2) as well as on the usefulness of using such design patterns, in particular for accelerating the decoration process and saving time.

Further aims were to discover how the painter conveyed the subsequent steps of decoration. For example, did the ornamentation with punch marks occur before or after the pattern was delineated onto the surface. The goal was also to imitate the effect of the textured lines i.e., the thick paint used for delineation of the motifs.

Finally, this research includes the reconstruction of *sgraffito* technique, also used by Bozidarevic to depict minute details of the embellishments on the edges of garments. Due to the toxicity of the required traditional pigments and their price on the market, contemporary equivalents were used in the process as shown in Table 1.

2. MATERIALS AND METHODS

The technical studies of the painting from Cavtat, performed by the Natural Science Laboratory of the HRZ, contributed to better understanding of Bozidarevic’s embellishment techniques.

The results concerning the motifs were used as a guiding tool in the reconstruction process (Table 1). [5] However, since the painting from Cavtat is badly damaged and altered with several campaigns of overpaint, the motifs for the mock-up reconstructions were selected from three other paintings made by Božidarević during the 16th century: polyptych depicting The Virgin and Child with Saints from the Church of St Mary's (Our Lady of Dance) in Dubrovnik, altarpiece for the family Đorđić - *Sacra conversazione* and triptych of the Bundic family, both from the Dominican Monastery in Dubrovnik.

All reconstructions were performed in six principal steps: (1) preparation of the gesso, (2) preparation of the red clay – bole, (3) gilding, (4) preparatory drawing of the motifs, i.e. motif replication, (5, 6) paint delineation of the motifs (Figure 3, 5, 7).

The idea of introducing the preparatory drawing of the motifs (step 4) or more precisely - the lines of the imprint, in reconstructions No. 1 and No. 2, was inspired by the insight into the stratigraphy of the red motif (Figure 2) on the painting from Cavtat, i.e. the presence of a thin opaque red layer (vermilion) situated

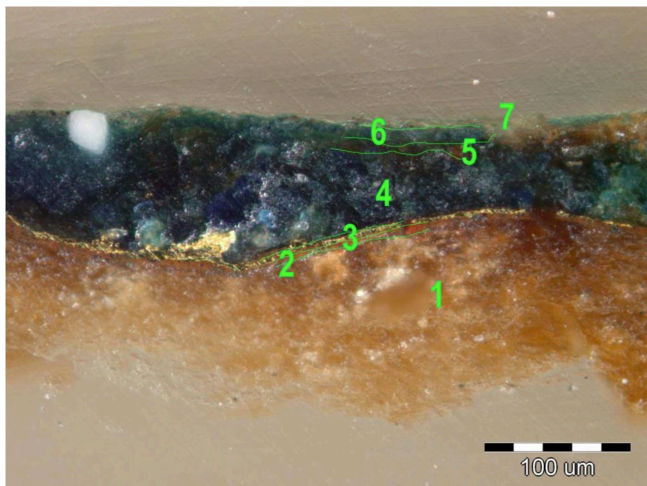


Figure 1 – Photomicrograph of the cross section of the blue motif (sample no. 26031). Photo: M. Jelincic. (7) yellow-brown layer; (6) blue-green layer - azurite, malachite, barium white, (5) brown layer - iron oxide, (4) blue layer - azurite, lead white, (3) gilding – gold, (2) red layer - iron oxide, (1) yellow-brown layer – plaster. [5] Note that the sixth and seventh layers are part of the overpaint.

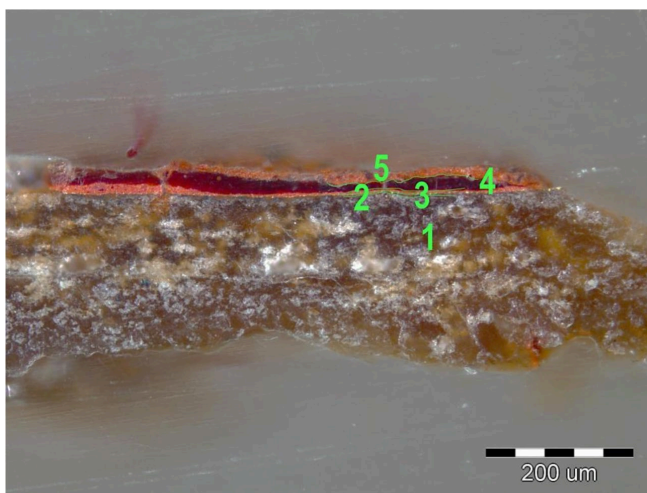


Figure 2 – Photomicrograph of the cross section of the red motif (sample no. 26032). Photo: M. Jelincic. (5) red layer with grains of red and blue pigment - vermillion, azurite; (4) transparent red layer – (?), (3) red layer – vermillion, (2) gilding – gold, (1) yellow-brown layer - gypsum, lead white, iron oxide. [5] Note that the fifth layer is part of the overpaint

between the gold leaf and the thick transparent red paint of most likely organic origin.

2.1 Reconstruction No. 1 - blue motifs

Reconstruction No. 1 – depicting blue motifs – was based on the photography of the Polyptych the Virgin and Child with Saints (detail of Virgin’s dress), 16th c., Church of St Mary's (Our Lady of Dance), Dubrovnik.

For the reconstruction No. 1. the cardboard tiles were used as a support (dim. 5 x 5 cm).

With the respect to the drying time between each application, the surface was covered with six layers of gesso. When the final gesso layer was dry completely, the surface was evenly smoothed with sandpaper. The red clay – bole, mixed with glue, was applied in several transparent layers. After drying, it was gently burnished with smooth bristle brushes. The surface



Figure 3 – Detail of the polyptych The Virgin and Child with Saints (detail of Virgin’s dress), 16th c., Church of St Mary's (Our Lady of Dance), Dubrovnik.

was then wetted with water containing small amount of ethanol, and the gold leaf was placed and gently pressed down. Shortly after, it was burnished with agate tools to make it more reflective.

The method of transferring the motif onto the gilded surface was inspired by *spolvero* technique. Instead of cartoon and charcoal dust, tracing paper and wet paint were used in the process (blue Miloriblauf pigment in gum arabic as a binding medium). Namely, the tracing paper was pricked with a needle, and the paint was pushed through the holes with a pointed brush to mark the surface below. (Figure 4)

The initial drawing of the motif was formed by connecting the dots using the mixture of Miloriblauf and Titanium white in gum arabic. The decision about choosing this particular medium is addressed in final discussion.

Next, the ornamentation of the spaces within the motifs was performed by gently hitting the punching tool of required size and shape with a hammer. [3, 6]

Finally, the lines of the imprint, i.e. preparatory drawing of the motif, were covered with two additional applications of the paint (same as for the preparatory drawing), but with the exception of Titanium white. The goal was to achieve the required thickness of the motif lines (Figure 3).

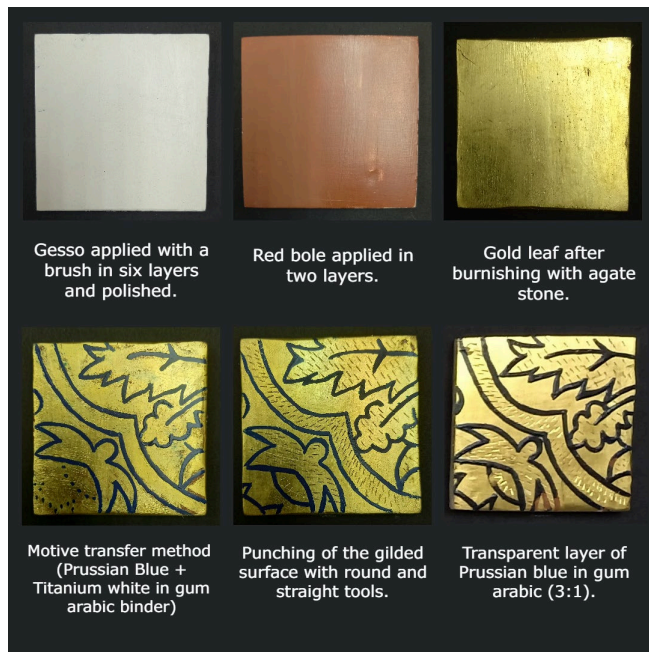


Figure 4 – Chronological process of making the mock-ups for the reconstruction No. 1

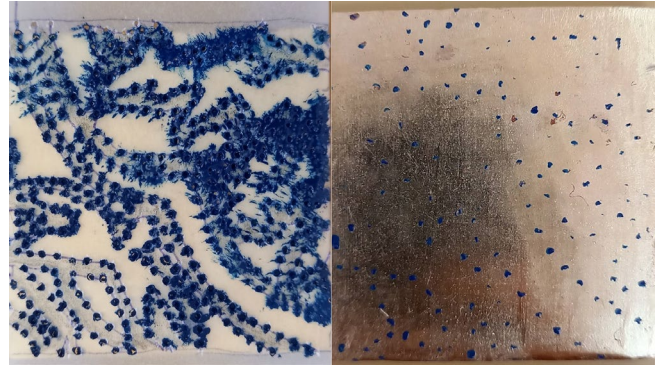


Figure 5 – Motif transfer technique performed on the reconstruction No. 1

2.2 Reconstruction No. 2 - red motifs

Reconstruction No. 2, depicting red motifs, was based on the photography of the altarpiece for the family Đorđić - *Sacra conversazione*, (detail of St. Blaise cloak), from the Dominican Monastery in Dubrovnik.



Figure 6 – Detail of the altarpiece for the family Đorđić - *Sacra conversazione*, (detail of St. Blaise cloak), 16th c., Dominican Monastery in Dubrovnik.

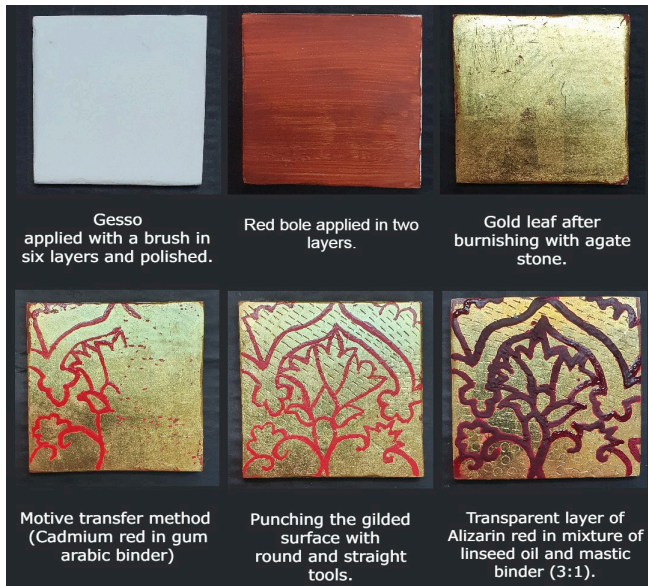


Figure 7 – Chronological process of making the mock-ups for reconstruction No. 2



Figure 8 – Application of the final transparent layer over the opaque preparatory drawing of the red motif.

The preparation of the surface, the gilding, as well as the motif transferring method, was performed in the same manner as in the reconstruction No. 1.

Besides the pigments and the pouncing tools, the main difference regarding reconstruction No. 2 was the selection of the paint medium for the final delineation of motifs.

Namely, the preparatory drawing of the motif was made by the mixture of Cadmium red, Titanium white and Cadmium yellow bonded with gum arabic.

After drying, the spaces within the motifs were patterned with the combination of straight and rounded metal punches, similar to the ones in the original painting (Figure 5). [3, 6] Finally, the motif lines were thickened with two coats of Alizarin pigment bound with the oil-resin medium (cooked linseed oil with the addition of mastic) (Figure 6).

2.3 Reconstruction No. 3 – *sgraffito*

Reconstruction No. 3, depicting blue and red motifs in *sgraffito* technique, was based on the photography of the Triptych of the Bundic family (detail of Virgin's dress), from the Dominican Monastery in Dubrovnik. The cardboard tiles (dim. 5 x 5 cm) were prepared with gesso in the same manner as for the reconstruction No. 1 and No. 2.

The sketch of the chosen motif was transferred with the help of translucent tracing paper and carbon transfer paper. The sketch was then carved into the gesso with a pointed metal tool.

Again, the application of the bole, as well as the gilding process, was made in the same manner as for the reconstruction No. 1 and No. 2.

However, tempera was prepared from the mixture of egg yolk and water in 1:1 ratio, and used as the medium for the pigments (Figure 8). Two colours were made; first one using Prussian blue and Titanium white, and second using Cadmium red and small addition of Venetian red earth to match the required hue. The prepared paint was applied on gilded surface while matching the lines of the incised motif. When dried, the paint was carefully scrapped with the bamboo stick following the forms of the motif and revealing the gold underneath. This was done with minimal pressure onto the surface (Figure 7).

3. RESULTS AND DISCUSSION

During the reconstruction process, a number of questions concerning the painter's working methods aroused. Regarding the initial transfer of the motifs, the reconstructions No. 1 and No. 2, made evident that



Figure 9 – Detail of the Triptych of the Bundic family (detail of Virgin's dress), 16th c., Dominican Monastery

the method we have used to transfer the pattern (similar to *spolvero* technique), is rather questionable method even for a small mock-up format, let alone a large painting. One can easily lose the shape of the motifs while linking the dots, even if the initial pattern is constantly observed during the process (Figure 4).

Although gum arabic was primarily used for the art on parchment at the time [3], the decision was made to explore its behavior and adhesion onto the gilded surface and to compare it with other mediums (such as egg tempera and oil-based binding media) at the next stage of this project.

Interesting problem occurred when trying to emulate the thickness of the lines of original motifs. Namely, it was immediately evident, that the initial drawing of the motifs needed to be followed by an additional layer of paint in order to get the required thickness. However, regardless of the different selection of the mediums, both reconstruction No. 1 and No. 2 displayed the same problem of the coat flattening after it had dried. This indicated that our attempt in selecting the medium for emulating Bozidarevic's motifs was rather poor. It is unlikely that he would repeat the same action on a large surface until he achieved the preferred thickness. The question is how would egg tempera and oil-based binding media behave in this regard?

Furthermore, the paint used in the reconstructions No. 1 and No. 2 turned out to be very brittle with low adhesion to the gold leaf, resulting in fine network of craquelures several weeks after the application.

Regarding the reconstruction No. 3, it was evident that the bamboo stick used for *sgraffito*, was not sufficiently precise tool in defining miniature shapes of Bozidarevic's motifs. The paint separated from the surface in lumps, making the scratching hard to control. This phenomenon led to the suspicion that the

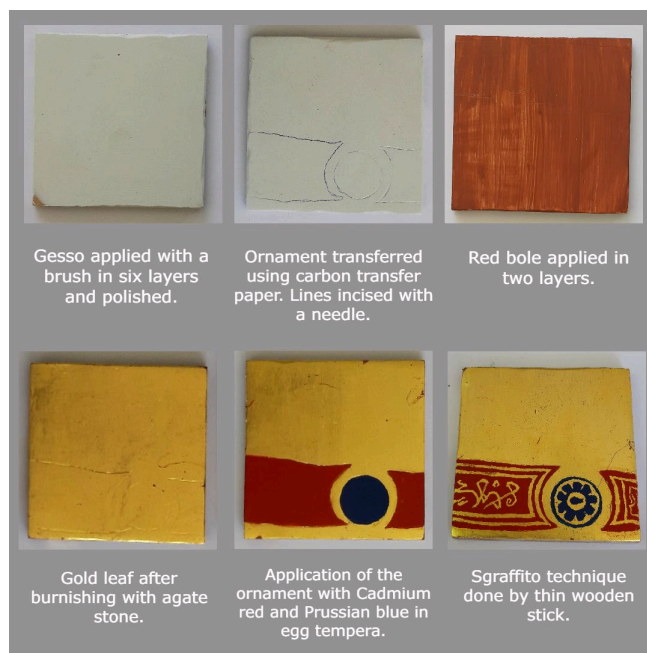


Figure 10 – Chronological process of making the mock-ups for the reconstruction No. 3

time passed for the paint to dry was rather too long, or the pigment concentration was not suitable.

4. CONCLUSIONS

Although the exact method of depicting golden textiles in Bozidarevic's paintings remind ambiguous, this research has helped in understanding certain practical aspects useful for further discussions in this area. Namely, the inadequacy of the method we have used to transfer the pattern onto the gilded surface, was clearly demonstrated.

Owing to the insight into the practicality of the process, the ornamentation with punch marks most likely occurred between two sessions of motif delineation – the first one, concerning simple motif replication, and the second one, made by thickening of the imprint lines freely by hand.

In addition to further investigate other possibilities of transferring the pattern, future research should be aimed at discovering Bozidarevi's paint binder, capable of achieving the required thickness in a single

application. Besides the need of selecting a more precise tool for *sgraffito*, working on reconstruction No. 3 revealed the necessity to consider the drying time of the paint as well as to test the different ratios of water and egg yolk in order to make the paint more workable for depicting minute details of Bozidarevic embellishments.

In spite the fact that most of these questions remind enigmatic, the experience gained from the reconstruction process emphasized the importance of understanding the practical aspects of decorative techniques as well as the high level of knowledge about the painter's materials required for this kind of process.

5. SUPPLIERS

Mini cardboard for painting (5 x 5 cm), Hobby Art Centar Chemaco, Grada Vukovara 226, 10 000 Zagreb, Hrvatska

Linseed oil for oil paint (Art. 5840650). Maimeri (refined linen seed extract). Industria Maimeri S.p.a., Via Gianni Maimeri 1, 20060 Bottelino di Mediglia (MI).

Drying medium for oil painting (Art. 5816626). Industria Maimeri S.p.a. Via Gianni Maimeri 1, 20060 Bottelino di Mediglia (MI).

Mastic Varnish (1:2 dissolved in double rectified turpentine), UV Stabilized (79350). Kremer Pigmente GmbH & Co. KG, Hauptstr. 41 - 47, DE 88317, Aichstetten, Germany.

Charbonnel Gilders Clay: LeFranc & Bourgeois Charbonnel Extra Fine Gilder's Clay Base (bole premixed with water). Magasin CHARBONNEL 13, Quai Montebello F-75005 PARIS.

Rabbit Skin Glue (made from rabbit hide). Fine grind (63028). Kremer Pigmente GmbH & Co. KG, Hauptstr. 41 - 47, DE 88317, Aichstetten, Germany.

Bologna chalk (Art. 58100). KREMER, Kremer Pigments Inc. 247 West 29th Street New York, NY 10001

Blue pigment (Miloriblau LUX 45202 Cl : PB 27. 77510, Kremer Pigmente, Ersatzproduct fur 45200) KREMER, Kremer Pigments Inc. 247 West 29th Street New York, NY 10001

Titanium white (Art. 46200) - KREMER, Kremer Pigments Inc. 247 West 29th Street New York, NY 10001

Cadmium pigment (Cadmiumrot Nr. 1 nell hochst lichtecht, deckend 211200 ce: PR 77208, 77196) SiO₂ – haltigen Fullstoff Zusten, KREMER, Kremer Pigments Inc. 247 West 29th Street New York, NY 10001

Cadmium yellow (2135 Mitel. F) KREMER, Kremer Pigments Inc. 247 West 29th Street New York, NY 10001

Venetian red (40510e), KREMER, Kremer Pigments Inc. 247 West 29th Street New York, NY 10001

Alizarin pigment (Alizarin Krapplack dkl. Conc. C, 23611). KREMER, Kremer Pigments Inc. 247 West 29th Street New York, NY 10001

Gum arabic, Winsor & Newton, London, UK

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NOTES

ⁱ Conservation-restoration of the panel painting The Virgin and Child from the Church of Our Lady of the Snows in Cavtat was initiated in 2012 by the Dubrovnik Department for Conservation of HRZ. Leader of the conservation-restoration project were: Katarina Alamat Kusijanovic (from 2012 to 2019); Mara Kolić Pustić (in 2020), and Sandra Sustic Cvetkovic (from 2020 to present).