DUPLICATION OF XIX TH-CENTURY PAINTINGS USING POLYMERS AND A PORTABLE DUPLICATING TABLE

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Abstract: This article will discuss the method of portable polymer duplication. Restoration of XIX th-century paintings by an unknown artist using vacuum duplication is a complex of conservation and restoration measures aimed at returning the work to its original condition. This includes conservation to maintain the current state and the restoration of lost parts in accordance with the ethical standards enshrined in documents such as the Venice Charter[1].

Key words: Restoration, duplication, portable, polymer, painting, paint, stretcher, canvas, glue, duplication, varnish, edge, photofixation, monument, preventive gluing.

Lining of paintings on a vacuum table. Vacuum tables are now widely used in the consolidation and lining of easel paintings. They are found in almost all major conservation centers in Europe and the Americas, as well as in Russia's central museums.

Manufactured by a number of European companies, these devices consist of duralumin work surfaces of varying sizes (ranging from 3 to 12 m²) equipped with a vacuum pump and a heating unit with a temperature controller. When performing lamination using synthetic or wax-based adhesives—a practice widely employed abroad—heating the surface is essential for effective canvas bonding[2].

This system is extremely versatile, as it is applicable to paintings requiring only paint layer consolidation as well as those requiring edge lining or full lining, and is based on specially developed techniques. Before proceeding to the lining process itself, let us first examine the polymers used—both water-soluble and solvent-soluble types.[3]

The use of synthetic polymers is widespread in modern conservation. In the 2022 publication *Conservation Materials* by T. S. Fedoseeva and a group of authors, a separate chapter is dedicated to synthetic materials[4].

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[1] Raymond Lemaire. ICOMOS - un regard en arrière, un coup d'oeil en avant (фр.) // ICOMOS Scientific Journal : журнал. — 1995. — Novembre. https://ru.wikipedia.org/wiki

[2] А. Б. Алёшин. Реставрация станковой масляной живописи. Москва 2013. С-95.

[3] Реставрация и консервация книг : методические рекомендации. – Москва: Всесоюзная государственная ордена красного знамени библиотека иностранной литературы, 1987. – 212 с.

[4] И. И. Александрович. Методы применения синтетических полимеров в реставрации переплета книг. Санкт-Петербург 2024. С-3.




1. The painting before restoration.

This formulation introduces the synthetic materials POHAG it SD 15, Plextol D 540, and Plextol D 360 into restoration practice.

1. Initial stages: the lining process follows the procedure described above (selection of the lining canvas and preparation of the original canvas) up to the point of sizing both the lining and original canvases. The subsequent stages of the lining process are carried out as described below:

a) Transferring the painting's outline onto the lining canvas; the outer edges of the outline are secured with wide adhesive tape, flush against the working stretcher bar.

b) The lining canvas is sanded in three directions to raise the nap, thereby improving adhesion; any loose, protruding fibers are carefully trimmed away with scissors.

c) The stretcher bar with the canvas (prepared for lining) is placed vertically on the easel, and a synthetic polymer solution is prepared for application via spray gun.

The solution is prepared by mixing Plextol D 540 adhesive, Dispersion K 360, and POHAG it SD thickener in the following ratio:

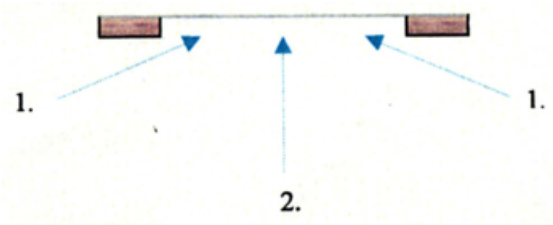
Table No. 1.

Expenditure on 1м² 250Ягr. polymer	
Plextol D 360	140 ml.
Plextol D 540	60 ml.
POHAG it SD	25 ml.
Distilled water	от 50 до 70 ml.

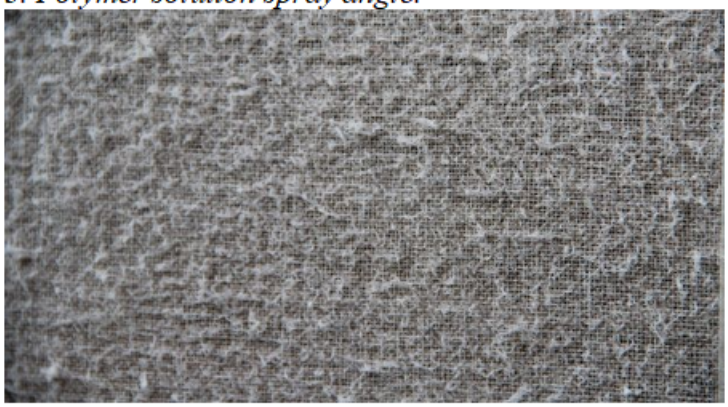


2. Using synthetic polymers.

d) The prepared solution is applied using a spray gun connected to a compressor. Spraying is performed in a sequence—first from right to left, then from left to right, and finally straight on—with 15–20 minute intervals between passes. The spray gun should be held at a distance of at least 30 cm so that the nap of the lining canvas gently meets the adhesive mist. The operating pressure should be approximately 1.8 bar. Check the spray gun nozzle regularly.



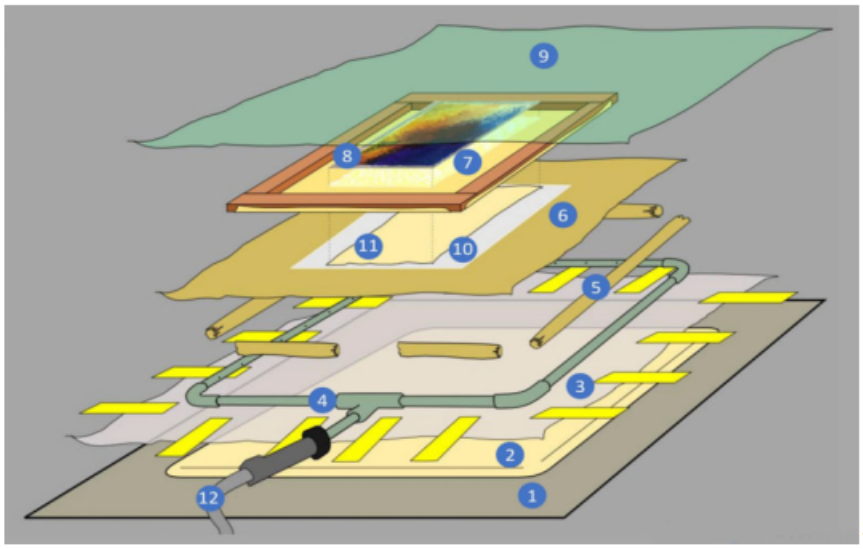
3. Polymer solution spray angle.



4. Fragment of the lining canvas after spraying several layers of adhesive solution.

2. Preparing a portable vacuum table.

To create a vacuum table, a low-pressure assembly is constructed. This design is accessible to everyone and is primarily made from household items.



[5]

5. Diagram of a portable duplicating table.

1. Flat work surface.
2. Soft underlay (flannel or soft material).
3. Bottom thick polyethylene membrane, secured with adhesive tape or stretched over a frame larger than the lining work frame.
4. PVC pipe ring with drilled holes.
5. Canvas strips for the pipes (to prevent the polyethylene from sticking to the pipe holes during air evacuation).
6. Breathable fabric for air extraction (gauze).
7. Prepared lining canvas.
8. Pre-treated painting.
9. Top polyethylene membrane.
10. Melinex – removed before lining.
11. Solvent-delivery cloth – replaced with a dry cloth before lining.
12. Vacuum cleaner.

e) The canvas prepared for lining (coated with adhesive) is placed over the gauze, and the enclosure is sealed airtight.

The reactivation time for the Plextol adhesive solution is approximately 10–15 minutes.

Once the lining adhesive has softened, the polyethylene and gauze are removed; the adhesive should be sufficiently tacky. Replace the damp gauze with a dry one; this will absorb any remaining solvent vapors. The lining canvas is then placed onto the adhesive; this step must take no more than 30 seconds to prevent the solvent from evaporating. The reactivation time for the Plextol adhesive solution is approximately 10–15 minutes.

Seal the vacuum bag and activate the vacuum source (vacuum cleaner). Maintain the vacuum pressure for 45–60 minutes, then gradually reduce it.

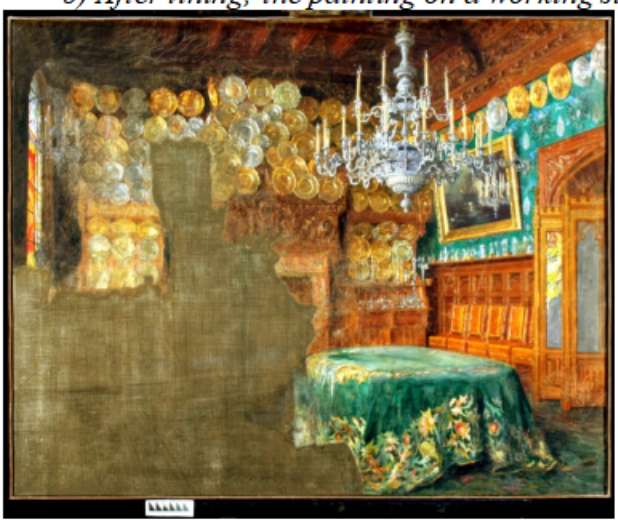
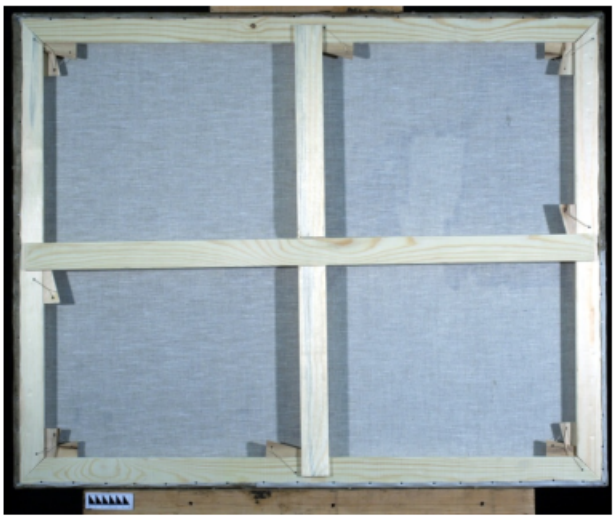
Once the vacuum bag is opened and the ethanol (solvent) has fully evaporated—allowing the adhesive to cure completely—the painting remains on the lining stretcher for at least one day;

[5] Barbara Horvat Kavazović MA Department for Conservation and Restoration of Works of Art. Academy of Fine Arts. "VIRTUAL WORKSHOP ON THE MIST-LINING SYSTEM – EXPERIENCE AND APPLICATION".

subsequently, the lined painting can be removed from the working stretcher and mounted onto its permanent stretcher.




6. a) Reverse side of the painting before lining, during the process of filling losses using PVB. b) After lining; the painting on a working stretcher.

7. The painting after lining.

References.

1. A. B. Alyoshin. Restoration of Easel Oil Paintings. Moscow, 2013.
2. Book Restoration and Conservation: Methodological Guidelines. – Moscow: All-Union State Library of Foreign Literature (Order of the Red Banner), 1987.
3. I. I. Aleksandrovich. Methods of Using Synthetic Polymers in Bookbinding Restoration. St. Petersburg, 2024.
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