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The case of Capogrossi in Rome: criteria and limits in the retouching process of a contemporary mural painting

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Abstract: This paper focuses on the reintegration treatments studied for a contemporary mural painting, which was designed and carried out by the Italian artist Giuseppe Capogrossi in 1954. This forgotten masterpiece is located on the ceilings of the main double staircase at the entrance of the Airone, an ex-cinema theatre in Rome, which was designed and planned during the Fifties by the famous architects Adalberto Libera, Eugenio Montuori and by the engineer Leo Calini. After a brief introduction based on the conservation history of the building and on the painting itself, it will be described criteria and limits in the reintegration process of a sample area of this highly degraded polyvinyl acetate (PVAc) based mural. The materials selected in the reintegration project, based on natural polymers and synthetic polymers, will be theoretically compared with one another and it will be explained why some of these could be appropriate and effective, while others could not chromatically work in this particular case.

Keywords: Capogrossi, contemporary mural painting, retouching techniques, synthetic polymers, natural polymers, pilot methodology

El caso de Capogrossi en Roma: criterios y límites en el proceso de reintegración cromática de una pintura mural contemporánea

Resumen: Este artículo se centra en los tratamientos de reintegración estudiados para una pintura mural contemporánea, que fue diseñada y realizada por el artista italiano Giuseppe Capogrossi en 1954. Esta obra maestra olvidada se encuentra en los techos de la escalera doble principal en la entrada del Airone, un ex teatro de cine en Roma, que fue diseñado y planeado durante los años cincuenta por los famosos arquitectos Adalberto Libera, Eugenio Montuori y el ingeniero Leo Calini. Después de una breve introducción basada en el historial de conservación del edificio y en la pintura misma, se describirán los criterios y límites en el proceso de reintegración de un área de muestra de este mural basado en acetato de polivinilo altamente degradado (PVAc). Los materiales seleccionados en el proyecto de reintegración, basados en polímeros naturales y polímeros sintéticos, se compararán teóricamente entre sí y se explicará por qué algunos de estos podrían ser apropiados y efectivos, mientras que otros no podrían funcionar cromáticamente en este caso particular.

Palabras clave: Capogrossi, pintura mural contemporánea, técnicas de reintegración cromática, polímeros sintéticos, polímeros naturales, metodología piloto

O caso de Capogrossi em Roma: critérios e limites no processo de reintegração cromática de uma pintura mural contemporânea

Resumo: Este artigo aborda os tratamentos de reintegração estudados para uma pintura mural contemporânea, projetada e executada pelo artista italiano Giuseppe Capogrossi em 1954. Essa obra-prima esquecida encontra-se nos tetos da principal escadaria dupla na entrada do Airone, um ex-teatro de cinema em Roma, que foi desenhado e planeado na década de 1950 pelos famosos arquitetos Adalberto Libera, Eugenio Montuori e o engenheiro Leo Calini. Após uma breve introdução baseada na história da conservação do edifício e na própria pintura, serão descritos os critérios e limites no processo de reintegração de uma área de amostra desse mural à base de acetato de polivinilo e altamente degradado (PVAc). Os materiais selecionados no projeto de reintegração, baseados em polímeros naturais e polímeros sintéticos, serão comparados teoricamente entre si e será explicado por que alguns deles podem ser apropriados e eficazes, enquanto outros não podem funcionar cromaticamente neste caso particular.

Palavras-chave: Capogrossi, pintura mural contemporânea, técnicas de reintegração de cores, polímeros sintéticos, polímeros naturais, metodologia piloto

Introduction

This study wants to introduce the first results into the retouching process of the Capogrossi mural painting at the *Airone* ex-cinema theatre in Rome, Italy. During the conservation project of a sample area in 2015 - 2016, it was developed a compromising reintegration technique of the lower ceiling due to the highly degraded surface of the mural painting. The research is still in progress but, in this context, it will be discussed why it has been necessary to realize a first step process in all the materials and methods selected. All these materials, based on natural polymers and synthetic polymers will be theoretically compared with one another explaining the effectiveness in choosing some of them. The theoretical selection procedure certainly was influenced by the necessity to find materials that were similar to the original one in terms of chromatic gloss but different at the same time in terms of solubility, hence reversible.

Conservation history

The wall painting is developed on the ceilings of the main double staircase at the entrance of the *Airone*, an ex-cinema theatre in Rome which is situated seven meters below the street level and thus, in a conservation way, can be associated to the typology of the hypogeum. The building, which was designed and planned during the Fifties by the architects Adalberto Libera, Eugenio Montuori and by the engineer Leo Calini, is placed inside a central court enclosed by five blocks of flats and was commissioned by a public corporation (Aloi 1958).

The subject of the wall painting was probably developed on the basis of the architects' plans, even though it could be linked to the Informal artistic movement. During that period, Capogrossi had already matured a visual vocabulary of irregular comb or fork-shaped signs. The abstract geometric style of the painting, which is made of graphic and repetitive fields of brilliant and "pop" colours, was obtained utilizing modular elements onto the wall. Overall, in line with the architectural plan, the painting recalls the imagery of a large crowd flowing inside the cinema, their countless eyes watching around [Figure 1]. Overtime, the *Airone* cinema lost its original function and became in order: a ballroom, a nightclub, a discotheque and eventually a strip club. The main architectural project was twisted, transformed and damaged as much as the painting which was completely covered by synthetic coatings: nine layers developed over the first ceiling of the double staircase (De Cesare *et al.* 2015) and six over the second ceiling (Mezzadri *et al.* 2016). The building is abandoned since 1999 and, during the conservation project in 2016, a sample area was completely restored including the first step of the retouching process.



Figure 1.- The wall painting of Capogrossi at the *Airone* cinema in 1954. (Photo published for the first time in Aloi, R., 1958. *Architetture per lo Spettacolo*, Milano: Hoepli. Thanks to the Capogrossi Foundation, all rights reserved.)

Conservation issues

The painting has suffered a complicated conservation history: first due to water infiltrations and then due to the changing use of the building for different purposes.

As confirmed by μ -FTIR spectroscopy, the overpainted layers were vinyl styrenic, polyvinyl acetate (PVAc) and VeoVa based. The closest one to the original was an alkyd resin [Figure 2]. The combination of historical and conservation data with the scientific analysis has also allowed a deeper comprehension of Capogrossi techniques, mainly based on PVAc medium. In time, all the water ingress focused on the lower ceiling had caused the main degradation problem activating a contraction process in most of all the six overpainted layers; this process was characterized by the softening of the layers at first, followed by water evaporation with a consequential contraction. Also the loss of materials like additives and surfactants (due to the water flow) increased this contraction with the substantial rip and delamination of the original film beneath. Other degradation causes like lacunae, swelling, mixing and loss of cohesion of the original colours – the latter

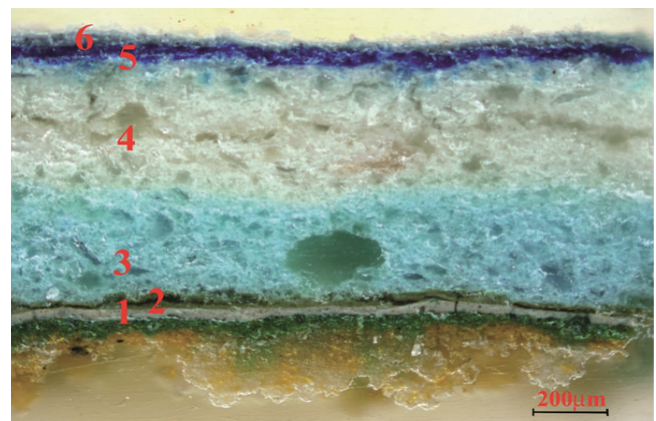


Figure 2.- Cross section with six overpainted layers over the second ceiling of the Capogrossi wall painting at the *Airone* cinema. (Giancarlo Sidoti, Istituto Centrale per il Restauro-ICR-Rome, all rights reserved.)

especially connected to the high presence of efflorescence and subflorescence of soluble salts (potassium, sodium, magnesium and calcium sulphates as detected by XRD) – were all due to the persistency of the water through the painting (Mezzadri 2018).

Therefore, all the degradation problems described above have influenced all the retouching intervention which was founded on a first step process developed on a theoretical and technical reflections based also on the comparison of different reintegration materials necessarily similar to the original one in terms of chromatic gloss but different in terms of solubility, hence reversible or at least retreatable.

Theoretical and technical reflections with materials and methods on the decay process of a PVAc synthetic paint

The fundamental aim of the reintegration process was to evaluate how and how much it was possible to return the reading of the figurative text of the Capogrossi mural painting respecting the authenticity of the work of art and its dual nature: historical and aesthetical.

First of all, the state of conservation of the mural itself was the guide for an appropriate colour treatment during the reintegration phase. This approach led to two reflections: a theoretical and a technical one. In fact, the analysis of the state of conservation of the original surface revealed some emergent problems due to the efflorescences which were located, most of the time, in correspondence with the areas of de-cohesion of the original paint layer; moreover, the interruptions in the figurative text produced by losses, micro-lacunae, abrasions and mixing of one colour with the other prevented the correct perception of the articulation figure-background. The losses, which had their own shape and colour, were perceived by observers as foreign bodies appearing as “figures” relegating the painting to act as a “background” to the lacunae themselves. It was necessary then to reintegrate as much as possible to define again the correct articulation figure-background.

Moreover, the pictorial film which was still preserved – once cleaned and removed the overpainted layers (Mezzadri *et al.* 2017) – showed above a residual veil almost transparent of the reticulated alkyd resin which lowered the original chromatic characteristics of the painting. Therefore, it was necessary to use colours that would allow to perform a retouching intervention by glazes without producing film-forming or barrier effects and that were reversible – or at least retreatable – and compatible with the chemical-physical characteristics of the original material. This theoretical reflection has led directly to the technical one: the necessity to select appropriate materials in the retouching operation of a PVAc based mural painting.

The binders used in the reintegration of synthetic paint films, as far as reported in the scientific literature even though referred to works of art preserved in confined places

or museum environments, are different types and can be ascribed to both natural polymers and synthetic or semi-synthetic polymers.

There is not a real distinction regarding the use of retouching materials depending on the specific type of support (mural, canvas, wooden panel etc.). The first rule is a good knowledge of the original material in order to avoid the use of incompatible and not reversible products and, as usual, the evaluations need to be made case by case.

These products were selected taking in consideration that the intervention was performed on a sample area: this means that most of the entire original surface is still covered by overpainted layers. Therefore the intervention represents a temporary retouching solution until the legibility of the surface and its state of conservation will be discovered. In fact, once all the 63 m² of the Capogrossi mural painting will be cleaned, the reintegration process could be reconsidered depending on the state of conservation of the entire surface.

Materials selected for the retouching process

The following table shows some of the traditional binders used for reintegration and, alternatively, some formulations used on works of art based on synthetic pictorial films preserved in a confined environment [Table 1]. The binder itself does not have a real hiding power. The hiding power of the retouching system is given by the ability of the binder to disperse more or less pigment; furthermore, the type of pigment can also determine the covering power described above. Generally speaking, the maximum level of “gloss” is reached when the amount of binder is sufficient to cover all the pigment particles (the critical pigment volume

Table 1.- selected binders for the experimental evaluations on the retouching process of a PVAc synthetic paint films.

TYPE OF BINDER	CHARACTERISTICS	SOLUBILITY
Arabic gum (watercolours)	Natural polymer Polysaccharide	Water
Purified extract of funori algae	Natural polymer Polysaccharide	Water
Purified extract of opuntia ficus indica	Natural polymer Polysaccharide	Water
Gelatine	Natural polymer hydrolyzed collagen protein	Water
Klucel G	Semi-synthetic polymer Cellulose ether Tg = 0 °C	Water and polar organic solvents
Aquazol 500	Synthetic polymer Poly(2-ethyl-2-oxazoline) Tg = 70°C	Water and polar organic solvents
Laropal A81 (Gamblin Conservation Colours)	Synthetic polymer Urea-aldehyde resin Tg = 49-57°C	Aliphatic hydrocarbons

concentration – CPVC). Moreover, the binder can give to the pictorial layer a glossy or matte effect depending on the amount of binder present in the painting itself. The retouching process can be influenced by all these characteristics which will be clearly developed in the next mock up phase, during the final step of the reintegration project. The essential conditions in materials selected were: similarity to the original one in terms of chromatic gloss, different solubility – where the usable solvents were water and aliphatic hydrocarbons because of the extreme solubility of PVAc in organic polar solvents – and reversibility or retreatability. The characteristics of these binders were theoretically compared to one another in order to select the most appropriate methodology for the reintegration of the Capogrossi mural painting.

Watercolours, whose binder is gum arabic, represent the colours most commonly used and selected for pictorial reintegration in the world of conservation; they show great versatility since their transparency allows proceeding by glazing operation. They are soluble in water and therefore reversible. However, they are often discarded for the reintegration of synthetic paint films, as they are not sufficiently covering.

Some experiences carried out abroad (at the Tate Contemporary in London) attest instead – as a reversible binder in water – also the use of another material of polysaccharide origin: the purified extract of the funori algae.

A tempera based on purified funori algae binder is similar to gum arabic, soluble and reversible in water; the improvement in using this kind of material on synthetic paint films, particularly referring to those based on PVAc – generally matte and opaque – is to obtain the right intensity and hiding power. Unfortunately, the disadvantage of this material, even though it is used at low concentrations, is the high cost (Cross *et al.* 2002). However, junfunori was temporary excluded because of its hiding power, in contrast with the very degraded and thin original paint film in order to avoid the optical predominance of the material of reintegration. Another natural polymer which was often used as a binder of mural paintings in pre-colombian and Mexican archeological sites is the purified extract of *opuntia ficus indica* (Di Ottavio *et al.* 2019). Recent studies in the field of conservation describe “nopal” mucilage as bio-mortar additive, good fixative material for pictorial film and probably a good retouching binder. This product maintains its solubility in water and therefore is reversible or at least retreatable. The improvement in using it on synthetic paint films could be to obtain the right intensity and hiding power. Nevertheless, also this material was temporary excluded because of its hiding power in contrast with the very degraded and thin original paint film in order to avoid the optical predominance of the material of reintegration. One more natural polymer, recently re-discovered in the field of conservation, is hydrolized collagen protein or gelatine. Old and recent studies showed that this material can be a good consolidant, a good adhesive and could probably be used for pictorial reintegration too

(Abrusci *et al.* 2004; Hummert *et al.* 2013; Azolini *et al.* 2019). The gelatine is soluble in water and therefore is reversible or retreatable. Also in this case, the improvement in using it on synthetic paint films could be to obtain the right intensity and hiding power. Unfortunately, it was temporary excluded too due to the same reasons described above.

As attested by some experiences conducted by the ICR Contemporary Art laboratory, one type of binder widely used in the retouching process of contemporary materials is Klucel G, a cellulose ether; also with this binder it is possible to obtain a density and a chromatic intensity equal to a synthetic paint film with characteristics of reversibility in water and in polar organic solvents. Therefore, temperas based on cellulose ethers have the properties of being more opaque than watercolours but equally reversible in water. Consequently, once again, they were excluded because of their hiding power.

Two types of synthetic resins were also considered as valid alternatives to the binders described above. These resins have been selected respectively because they are soluble in water (Aquazol 500) and in poorly polar hydrocarbon solvents (Laropal A81), thus also potentially reversible.

The use of Aquazol (2-Ethyl-2-Oxazoline or PEOX) as a binder for reintegration has never been attested, or at least nothing has been found in the scientific literature in this regard. The product has found a market since the 90s as a hot-melt adhesive (pressure-sensitive) and for the preparation of food containers thanks to its non-toxicity and biodegradability. These characteristics, together with its solubility in water, have led to a preliminary research in the conservation field, testing two types with different molecular weights: Aquazol 50 and 500. This product is used as an adhesive and a consolidating agent but it has not a large adhesive power, even though it could be taken into account due to its solubility in water (Bestetti *et al.* 2014; Colombo *et al.* 2015). However, a realistic problem is emerged from recent studies: in fact, a research on some aged samples shows that Aquazol can depolymerize. Nevertheless, this product would deserve a deepen research also in the field of pictorial reintegration.

Laropal A81urea – aldehyde resin, is instead well known in the world of restoration for having been selected – after careful research and studies conducted by American and English museums together with the *Gamblin colour production company* – as a binder for the colour line Gamblin Conservation Colours (Leonard *et al.* 2000; De la Rie *et al.* 2002; Bestetti *et al.* 2014). However, although it is possible to proceed with them by glazing, they have been excluded because there is few bibliographic evidence which attests their use in critical humidity situations.

In addition, synthetic resins have generally been excluded due to the multiple conservation issues found on the original film and to avoid products that could have been filmed onto the porosity of the wall in a condition of thermo hygrometric progress of changing.

Therefore, the products chosen were watercolours which were not excessively film-forming and which did not produce a "barrier" effect since the humidity still present in the support and the thermo-hygrometric conditions inside the *ex-Airone* cinema theatre. In fact, watercolours allow reintegration by glazing and are soluble in water; they are reversible and their binder (gum arabic) has already been tested for many years even in conditions of severe humidity. The use of watercolours surely not reproduce a saturated and compact chromatic texture equal to a synthetic pictorial film (with oil addition) such as Capogrossi mural painting but the actual state of preservation did not allow the use of products with brilliance and matte effect that the painting has lost. Therefore, at that moment, the use of water colours was the best choice both in terms of reversibility and in terms of colour treatment as compared to the state of conservation of the original.

The aim of the retouching process

The aim of the retouching process was to understand how and how much it was possible to return the reading of the figurative text of the Capogrossi mural painting respecting the authenticity of the work of art and its dual nature: historical and aesthetical (Brandi 1963).

Therefore, it was necessary to re-establish the identity, lost or ambiguously readable, of one colour compared with the other. In fact, where possible, the geometrical motifs in the background – composed by monochromatic colour fields –

have been reconstructed by watercolours glazing in order to obtain again that clear chromatic juxtaposition between fields of different colours that is at the very base of the figurative message of the work of art. Especially in the retouching process of abstract works of art characterized by monochromatic geometric backgrounds, more than ever, colour and shape coincide in carrying the artistic message; therefore re-establish that chromatic alternation became the first operation necessary for a correct reading of the original one.

Another aesthetical nature necessity was to reconnect a largely incomplete and abraded areas of the pictorial text, especially where the limits between a colour field and another where completely lost due to the water infiltrations, the efflorescences, the lacunae and the mixing of the colours.

Consequently, the retouching treatment in the areas of micro-lacunae of the pictorial film in the yellow and red fields of colour was obtained by glazing with the same chromatic tone and value, but less saturated compared to the original one; similarly, abrasions and larger losses of the pictorial film have been integrated with the aim of regaining the visual perception of a geometric figure concluded in its own colour and in its own shape.

The graphic elements on top of them have not been integrated since the exiguity of the fragments in the original pictorial film makes their formal regain impossible, respecting the conservation history of the mural painting [Figures 3, 4, 5, 6].

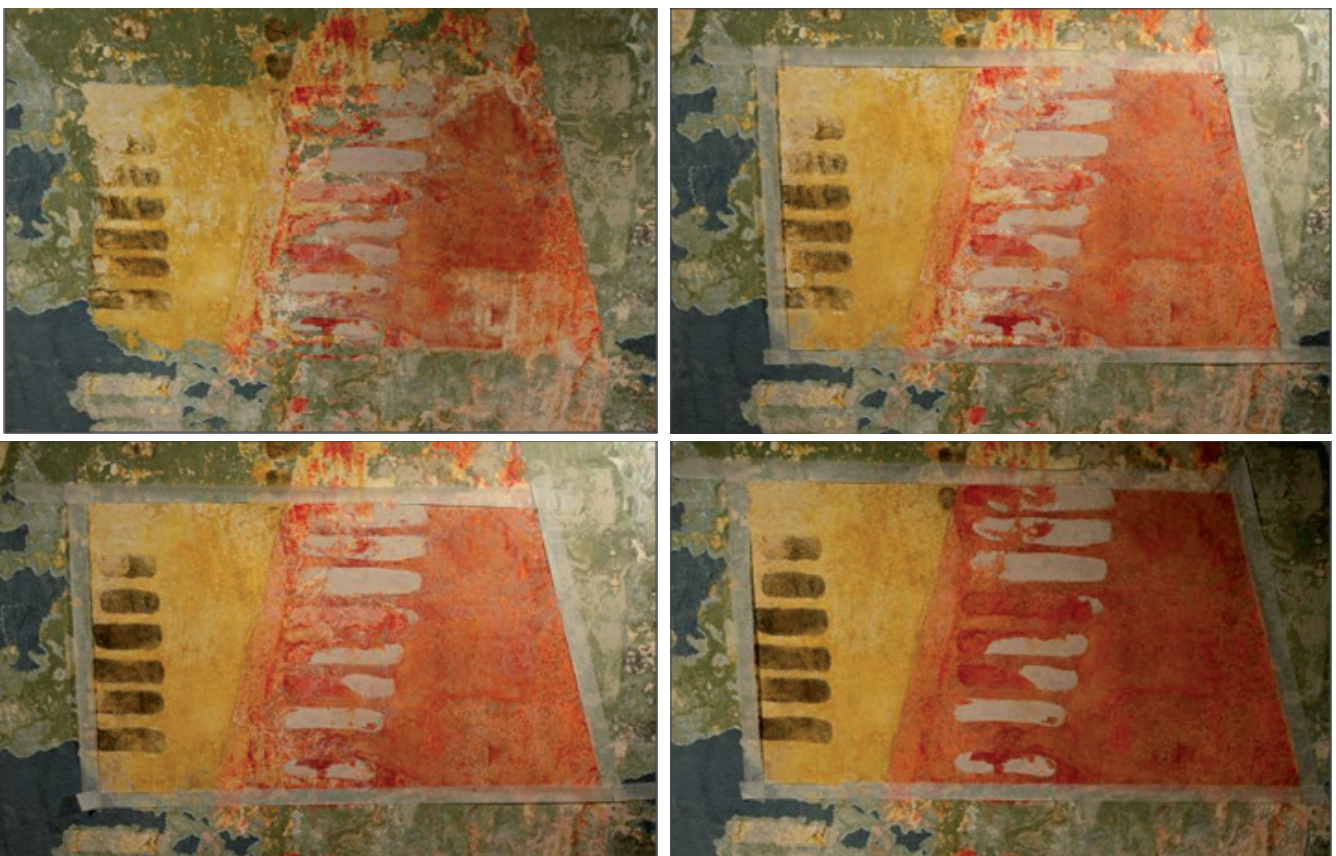


Figure 3, 4, 5, 6.- Four different steps of the retouching process carried out by glazes with watercolors. Photos by Paola Mezzadri, Istituto Centrale per il Restauro-ICR- Rome, all rights reserved

Conclusions

The technical reflections in the first step retouching process of the sample area lead to the following conclusions: synthetic resins as the most of natural polymers have temporary been excluded due to the multiple conservation issues detected on the surface and due to the thermo-hygrometric conditions in progress. Watercolours have been chosen for their characteristics and as a temporary retouching solution. In fact, it is necessary to specify that the level of reintegration achieved could be susceptible of variations, in view of the total restoration of the 63 m² of the painting. The painted ceilings of the two double staircase are still largely covered by all the overpainted layers especially in the upper ceilings. Once the overpainted layers will be removed, the retouching process could be reconsidered, especially if what remains will be found in a better state of conservation than the pilot treated in the sample area. In this case a good technical solution could be interpose a first watercolour layer and then retouch over it with a synthetic resin dissolved in an a polar solvent in order to obtain a more intense chromatic treatment. Mocks up – which will also develop this last hypothesis that deserve more detailed studies – will be, then, prepared with the binders selected to evaluate optical characteristics of materials discussed. In fact, the critical pigment volume concentration (CPCV) is strictly linked to the binders and to the evaporation process of their solvents related to the support itself. The characteristics of the strong bonds between the support, the retouching system and its binder in the drying process will be deepened in the research project, as the measure of gloss. This first phase of critical and technical considerations on materials and methods was necessary to realize the first step reintegration process of a sample area. Nevertheless, further studies in the research will be deepened to develop a definitive reintegration project when there will be an overall view of the entire surface in the Capogrossi mural painting at the *Airone* ex-cinema theatre.

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