Scientific Research Publishing

Art and Design Review, 2025, 13(1), 89-106
https://www.scirp.org/journal/adr
ISSN Online: 2332-2004
ISSN Print: 2332-1997

Conservation Works on Wall Paintings of Aghtamar Church in Van

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How to cite this paper: Sedes, F. (2025). Conservation Works on Wall Paintings of Aghtamar Church in Van. *Art and Design Review, 13,* 89-106.
https://doi.org/10.4236/adr.2025.131006

Received: January 8, 2025
Accepted: February 25, 2025
Published: February 28, 2025

Abstract

Purpose: Church of the Holy Pilgrimage-Aghtamar with a monastery complex is on Aghtamar Island within the boundaries of Gevaş District, which is 4 km distance to the coast of Lake Van towards the west side of the Van Province. Moving from a peninsula called Çumar Peninsula, transportation is made by boats. The restoration application and landscaping execution are made by the Kartalkaya Firm. The purpose is to explain the conservation works of wall paintings. **Description:** From all those building complexes, it remained the main church and a belfry, on its west side established Jamadun in 1763, the Katalikos Zakarias Chapel with its date 1296, and the Saint Stephan Chapel as it's dated 1293. A small chapel was built on the north side of the church, which was called a summer chapel. That building's year of building is not known. **Method:** In this paper, one will find a history of the church, its architectural and ornamentation features, and works of restoration and conservation of wall paintings. **Research and Short History:** Eastern Anatolia and especially the Van region witnessed the wars between Byzantine and Sasanians in the Middle Ages, and a continuous change in management happened. This region came under the domination of Muslims in the seventh century, that's to say, in the Omer period. Armenian domination began towards the end of this century, as in the Abbasid state period, it turned into a Governorship of the Province.

Keywords

Aghtamar, Aghtamar Church, Monumental Architectural Restoration, Wall Painting Conservation

1. Introduction

Akdamar Church was built by the Vaspurakan dynasty that ruled the region by King Gagik I. A.D. It was built by the architect Monk Manuel between 915-921

(AD) (İpşiroğlu, 2003). The central dome of the church is in the shape of a cross in the form of a four-leaf clover and was built on cut tuff stones (Der Nersessian, 1963).

On the stone reliefs outside the building, religious subjects taken from the Bible and the Torah, as well as worldly subjects, palace life, hunting scenes, human and animal figures, are depicted (Der Nersessian, 1975). In these reliefs, it is possible to see the effects of the IXth and Xth century Abbasid Art, which carries the intense effects of Central Asian art (**Figure 1** and **Figure 2**).

Figure 1. Arial view (taken by Kartav in 2005).

Figure 2. The church of Holy Cross Aghtamar (taken by Kartav in 2005).

2. Status of the Main Building

Since the structure has moved, especially due to ground tremors over a 1000-year period (Bingöl, 2007), there has been play in the bearing stones, therefore, deep cracks have occurred in the plaster, and spills have occurred in the liquid.

Moisture, which is formed inside by the effect of the lake and penetrates into the stones, has adversely affected the paints, plasters and stones. The paints have faded, lost their vitality, and the plasters have rotten and discoloured (Sedes, 2005).

These decays in the stone cause exfoliation in the stone, and in more advanced stages, the stone turns into dust. After the building was abandoned, especially due to the lack of glasses at windows to prevent the rain, the rain water flowed inside, destroyed the paints in the places where it flowed, and also created traces of streams with the dirt it carried (**Figures 2-4**).

Figure 3. Dirty traces of streams in the dome (Bengül, 2005).

Figure 4. The church walls before repairing (Bengül, 2005).

Figure 5. Deteriorations of plasters (Bengül, 2005).

Figure 6. Pollution from rain runoff (Bengül, 2005).

3. Status of Plasters

Arricio: This plaster is applied to the stone surface and is made to smooth the surface of the stone. The coarse material is used and the surface is made rough. The reason for this is to ensure that the thin plaster to be made on it holds better. Material used: coarse sand + lime + broken brick (or terracotta shards) + brick

dust (or clay that can give that color). Plant fibers were found in the central dome. The purpose of using it is to increase the binding of the plaster (Bengül, 2005).

Intonaco: This is the plaster made to smooth the plaster surface a little more. In this plaster, although it is the same, thinner towed material is used.

Painting Floor Plaster: This layer of plaster was applied as thin as 1 - 2 mm. Material Used: A small amount of fine sand + lime + brick dust (or clay). Paint was applied on the painting floor plaster (Bengül, 2005; Sedes, 2005).

The three layers of plaster were separated from the stone (**Figure 5** and **Figure 6**) and separated from each other due to earth tremors and gravity during the 1000-year life of the building, and a large part of it was poured, especially in the domes. Most of the spills were in the painting floor plaster and intonacoda. Just below the pulley, the plasters were completely poured and stones remained. We understand from the plaster made in 3 - 4 layers that the building has been repaired before (**Figure 7** and **Figure 8**).

Figure 7. Swelling and flaking plasters (Bengül, 2005).

Figure 8. Plaster that splits and cracks from the wall (Bengül, 2005).

4. Reinforcement of Plasters

The painting floor plaster is separated in the form of foil, and when it is too thin, (Figure 9) its consolidation is done first. While doing this, the dust between the puar and the two plasters was cleaned first, then Primal SF 016 prepared at a rate of 2% - 4% was injected into the back with the help of an injector and adhered by pressing with a pompom (nylon filled with cotton). Then, the place made with wet cotton was cleaned so that Primal SF 016, which overflowed, did not dry and shine.

Figure 9. Plaster losses in the dome and rotting of the plaster due to moisture (Bengül, 2005).

In some places, the plaster of the painting floor was breaking like crackers because it was too hard. After cleaning the dust with a puar in these places, water was sprayed in the form of a spray and the plaster was softened a little. Thus, the plaster was prevented from falling apart. On coarser plasters, a study was carried out by increasing the percentage of Primal SF 016.

5. Injection

On the lower floors, it was understood that some parts were separated from the wall according to the sound of the plaster and the back was empty. A hole was drilled where needed with auger, and it was cleaned with a puar. Water with 2.5% alcohol was given by syringe. Then, hydraulic lime + 2% Primal SF 016 + pumice powder + water mixed slurry was injected. Control was carried out by constantly hitting it by hand. The process ended when the voice gave a full sound. Checked again a day later. Decay was detected in the stone in places that continued to give a sound. In order to strengthen this decay, a low percentage (2% - 3%) SF 016 was injected into the back of the plaster. After waiting for one day, the injection process was performed (Figures 10-13).

Egg wastes were seen in the North and West façades, the North half dome, the South half dome, and the window niche on the lower floor in the apse where the paintings were. These egg wastes penetrated the plaster thoroughly and dried. In addition, the egg corresponding to the dyes penetrated the dyes well and darkened the color of the place where it was found.

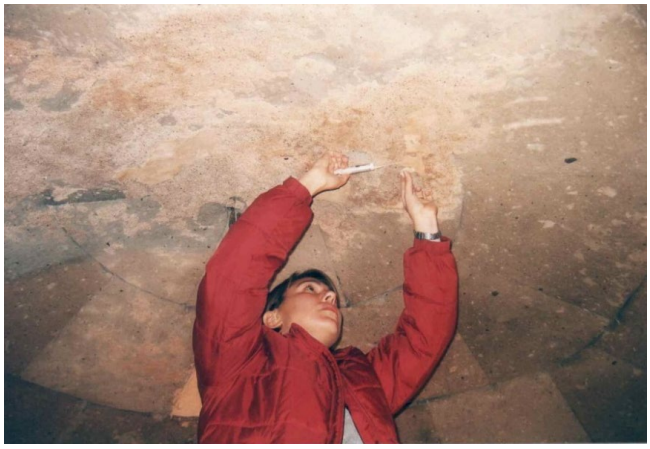

Figure 10. Consolidation of the plaster by injecting primal SF 016 with the help of an injector (Bengül, 2005).

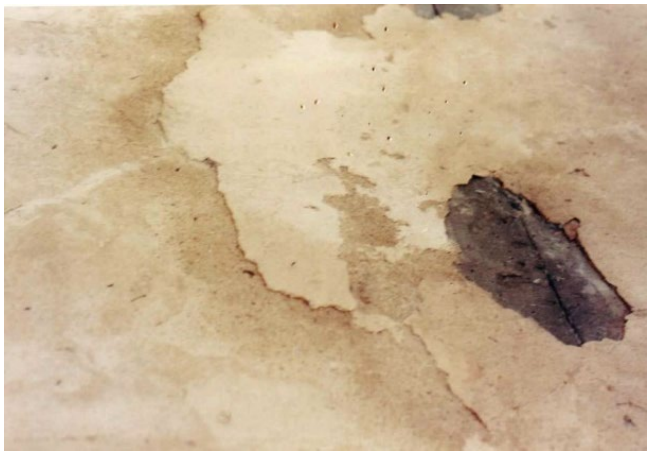

Figure 11. Consolidation of the plaster that has reached the deterioration stage (Bengül, 2005).

Figure 12. Example of reinforced plaster (Bengül, 2005).

Figure 13. Injection process (Bengül, 2005).

In some places, it has polluted a large area that will cover an area of 50 × 70 cm (**Figures 13-15**).

All the facades and walls of the church have polluted the walls and paintings with their excrement as a result of pigeons, bats, crows and seagulls nesting and settling inside. Especially since bat excrement is acidic, it penetrated the plaster thoroughly and discolored the place where it was found, leaving a greenish stain (Öney, 1990).

Figure 14. Egg waste on the inner walls of the west side (Bengül, 2005).

Figure 15. Egg waste on the inner walls of the north side (Bengül, 2005).

Figure 16. Mechanical cleaning of egg waste (Bengül, 2005).

Intense traces of burns and wax flows were seen in the king's box, in the window niches of the apse and on the lower floor of the south entrance.

Mechanical application was made to clean bird droppings and aged dirt (**Figure 16**). Bird droppings were first brushed with a soft brush, and the remaining dirt was cleaned with a scalpel. Aged dirt was erased with a non-marking eraser. In places where there was no paint, especially in the king's lodge, cleaning was done with the help of water and a soft sponge (Öney, 1990).

Aged dirt caused by moisture was removed by making small blows from the top.

6. Status of Wall Paintings

The pictures are on the hoop that have never been left on the domes and are largely destroyed at the lower levels.

Since the paints have lost their binding, they are at the stage of exfoliation even when touched with a brush.

The effect of lake water and therefore soda on dyes was tested with litmus paper (pH value was 10). It has been determined that the soda in the lake water has a very negative effect on the dyes (**Figure 17** and **Figure 18**).

Figure 17. Blue paint on the wall paintings (Bengül, 2005).

Figure 18. Deterioration of the wall paintings (Bengül, 2005).

Litmus paper experiment showing the effect of soda on the pictures. The dark blue litmus paper was wetted with lake water. Closed bottled water, which is yellow in color. There was no change in the color of the litmus paper.

When the paints have lost their binding, they have reached the stage of exfoliation.

These swelled paints were fixed again with the help of an injector with 2% thinned SF 016. SF 016 remaining on the surface was cleaned with wet cotton. After this process, paraloid B 72, which was thinned by 2%, was applied to the pollinated paints by spraying with a brush to the non-pollinating paints.

7. Protective Application after Cleaning

Since the cleaning will be interrupted due to weather conditions, it was decided to apply 4% paraloid B 72 after various trials so that the paints would become more resistant to natural conditions. Since the surface is very absorbent, it was treated very carefully against the possibility of glare. A spray application was made on the paints that had reached the pollination level. Elsewhere, a soft brush with long bristles was used.

8. Bullet Holes on the Walls

Especially in the dome, just above the drum, there are large bullet holes throughout the diameter of the dome. These bullets also punctured the stone, causing holes up to 30 - 35 cm in size and up to 10 centimeters deep.

In the scene of the massacre of the king's children on the western front, there are intensely ridiculous traces on the king. These pellets made 2 - 3 cm holes in the plaster (**Figure 19**).

Figure 19. Holes made by bullet holes in plaster and walls (Bengül, 2005).

9. Cracks and Joints

As the building moved due to ground tremors, the stones were moved, separated from each other and deep cracks were formed. These separations in the stones caused cracks in the plasters. These cracks formed in both directions, horizontally and vertically, and formed zigzags in most places.

Cracks are visible on every facade of the whole building from top to bottom. Some cracks 3 mm. While most of them were opened up to 1 cm (**Figure 20**).

Figure 20. Vertically descending zigzag crack (Bengül, 2005).

There are spills in the three layers of plaster. This also causes a fluctuation in the image.

There is a large-scale loss of painting floor plaster and fine plaster in the dome and half-domes. Most of the plaster (arricio) covering the stone surface remained. Except for the lowest floor, there are occasional spills on the plasters on the lower floors, but it is generally seen as solid on three layers of plaster.

10. Completing the Spilled Plaster

In this application, first of all, used material was determined. The most suitable mortar was found in various trials. In the rough plaster, coarse crumb brick + sand + brick dust + hydraulic lime was used. As the first process, the surface was cleaned of dust and dirt with a long-bristled brush and puar. The surface was thoroughly wetted with water, the mortar was applied to the application area sufficiently. After the mortar set, the surface was scraped and made rough with the help of a flat trowel. Although it is the same in thinner plaster, thin towed material was used. In the same way, after the surface was cleaned with puar, it was thoroughly wetted and mortar was applied to the surface with the help of a spatula (**Figure 21**).

11. Rooting Stones at the Degrees of Pollination

In very deep decays, especially on the bottom floor, the stone was completely removed and replaced with a solid stone. Depth or black spots on the lower floor

were covered with 1 hydraulic lime + 3 sand scale mortar (Figure 21).

Figure 21. Filling process of the deep cracks (Bengül, 2005).

Figure 22. The blue paint applied in the form of whitewash on the apse (Bengül, 2005).

12. Cleaning Mortar Blue Paint

The swollen areas were strengthened with 2% SF 016 with the help of an injector. Paraloid B 72 thinned by 2.5% was applied in order to reduce the absorbency of the surface and to keep the plum on the surface a little longer. Thus, more melt remaining on the surface can enter the reaction more.

A solution of 10% - 20% Ammoniumbicarbonate + EDTA mixture was applied

over the clinex with a soft brush. The same process was applied until there were 5 klinex in a row. Gelatin was placed on it in order to cut off its contact with the air and to provide a better reaction. Waiting time was different everywhere. The melt applied areas were checked every 10 - 15 minutes. When the colors started to become clear, the molten clinex was removed. Further waiting will result in damage to the original paint (**Figure 22**).

After this process was finished, local cleaning was done by wrapping cotton on the sticks and dipping them in plum. The melt remaining on the surface was removed by placing klinex and pressing it with a sponge.

After the wet plaster dries, the areas that did not come off due to the intense application of blue paint were scraped off the surface with a scalpel, then thinning was made on the areas where the blue paint did not come off with a pen-shaped glass fiber of various thickness.

After all possible cleaning work was done, 2% thinned paraloid B 72 was applied. The aim here is to throw back the blue paint that remains on the surface like a curtain and to make the original colors more pronounced. Paraloid B72 was applied 6 - 8 times before the surface reached the shine stage (**Figure 23**).

Figure 23. Images of saints coming out from under the blue paint (Bengül, 2005).

13. Plastered Part in Blue Paint

In the experiments, it was understood that the column parts and the lower floors of the apse were first plastered and then painted with blue. With this part, it was removed by hitting with the help of small chisels or with the help of a spatula. Pictures came out from under this plaster. In the study, these notches were closed in accordance with the original (Henry & Stewart, 2009).

14. Blue Dye Streamers

There were copious amounts of paint bleeds on the six saints who weren't painted over. These streams of paint were mechanically cleaned with the help of a scalpel (**Figure 24**).

Figure 24. Intense paint runs (Bengül, 2005).

14.1. Works on Windows

The plaster on the windows was similarly swollen and poured. In the study, the plasters were strengthened with Primal SF 016. Necessary parts of the poured plaster were covered with a mortar suitable for the original (Tekinmirza, 2014).

14.2. Retouch Work

In the retouching work, the work was done with quality watercolors. Where the original paint remained and spills occurred in the paint, a study was carried out in a way that would match the color but be lighter. The aim here is to notice the retouched area when viewed closely, but not to be noticed when viewed from afar. The places where the paint was completely spilled, only the traces remained, were not intervened. Again, while retouching, the areas with large spills were not touched up (**Figure 25** and **Figure 26**).

Figure 25. The retouching work (Bengül, 2005).

Figure 26. Crying women scene after retouch (Bengül, 2005).

14.3. Protective Application after Retouch

After the retouching process was completed, in order to protect the original work and the original, paraloid B 72 thinned to 3%, it was applied with a soft brush with long bristles to protect the wall paintings against external factors (**Figure 26** and **Figure 27**) (Mora et al., 1984).

Figure 27. Process of protective application (Bengül, 2005).

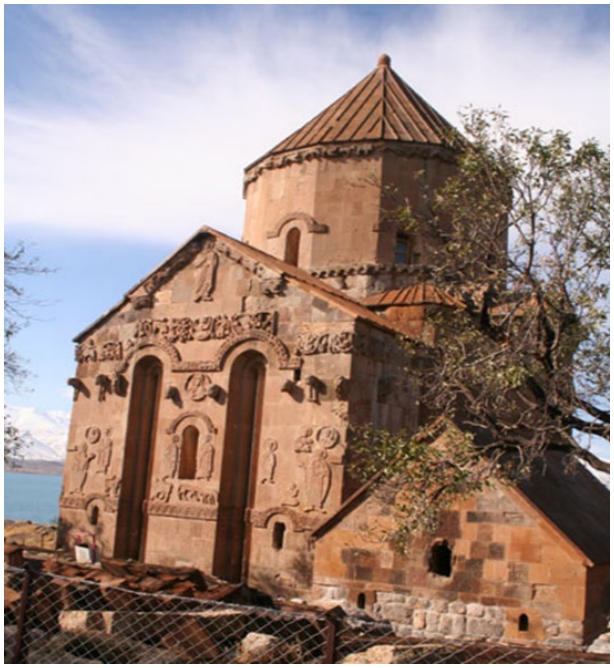

Figure 28. After restoration (outer walls) (Sedes, 2005).

15. Conclusion

By considering the most important principle of the Venice Code, it has been avoided from completions that depend on several assumptions. As with other important principles, the qualified annexes and elements belonging to various periods have been protected.

Also, while the building is protected, its surrounding' maintenance is considered too. For this purpose, a drainage system was formed, and the walk ways, vistas, and stairs, which provided the connection with the pier, were executed by natural stone on the Palladian tissue. It should be said that restoration is an unending process (**Figure 28**). For transferring the building/production (of art) to the future—to its continuity—sensitive artists must keep their hands on it carefully (**Figure 28**). The materials to be used in conservation/restoration are obtained from laboratory tests. They should have tried in the past and in the field, long-term effects and possible future interventions and also be selected with consideration. The aim of the restoration is to keep the wall painting's shape and content intact (Sözen & Tanyeli, 1992).

It should be respected and prolong the life span. Overpainting should especially be avoided. Touch-ups and fillers from authentic material must be made with a distinguishable material and method and can be easily recycled when necessary. If blasting is required, very serious surface surveys must be done beforehand. And the condition of the work should be evaluated. Otherwise, it will cause more damage to the work. When done carelessly, it causes very serious losses.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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