



SAVING EEMIL - CONSERVATION PROJECT 2017–2018  
Final report 31.8.2018

The Halonen Museum Foundation – The Art Museum Eemil, Lapinlahti 2018

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## Introduction

This is the final report for the project Saving Eemil. It is also a summary of all the conservation and restoration treatments that have been made for the plaster sculptures and reliefs in the Eemil Halonen Collection, in the Art Museum Eemil, between April 2017 and January 2018. The Saving Eemil Conservation Project was based on the efforts made by the Halonen Museum Foundation to improve the conservation of sculptor Eemil Halonen's plaster collection and to preserve his legacy for future generations. The Saving Eemil project was one of the first and extremely important steps towards this goal. Thanks to the Finnish Cultural Foundation, this one-year project was successfully implemented.

The vast majority of sculptures in the Eemil Halonen collection are made of plaster. The sculpt collection was stored and exposed in the Eemil Halonen Museum until the summer of 2016. The museum building was old, and the conditions for plaster works were very problematic. The sculptures stood without protection under severe and adverse conditions for decades. Many have suffered from extensive damage and loss of material. They were very dirty and dust covered over the years. These problems accumulated as the high moisture of the environment and the high porosity of the plaster reacted with each other. The dirt became part of the sculpture surface and proved to be very difficult to remove. In many cases, the metallic structure was so rusty that it was breaking plaster all around the work. The second greatest problem was the old restoration – or rather repairing – techniques and materials that had been used for the sculptures. They were either not adequate or showed evidence of ageing, yellowing and darkening the plaster figures.

The renovation and extension project of the Lapinlahti Art Museum (since 2017 named the Art Museum Eemil) during the years 2015–2016 made it possible to move the entire Eemil Halonen Collection into the modernised museum building. The Halonen Museum Foundation initiated the Saving Eemil Conservation Project with its own funding. In 2016, during the reinstallation of the sculpture collection to the renovated art museum, the condition survey was conducted by conservator Fede Petri Sancha to evaluate the main problems and conservation needs of the plaster collection. The first plaster sculptures were also treated by conservator Sancha for the new collection exhibition called *Taiteiljan tie – Eemil Halonen Suomea veistämässä* (*The Life Path of the Artist – Eemil Halonen sculpting Finland*), opened on February 2017. Extensive problems and damages in the plaster works of the Eemil Halonen collection were revealed. The condition of the sculptures and reliefs varied greatly, but almost all of them needed conservation and restoration treatments. In particular, the bigger sculptures (real-size statues) were showing severe degradation: structural alterations and constant aggressive environmental impact.

The main objective of this conservation project was to clean, repair and restore the works of art, selected according to their deficient condition, in order to improve the condition of the collection. Another important part of the project was to develop strategies for the future preservation of the plaster sculpture collection, through methodologies on preventive conservation of plaster sculptures to ensure long-term preservation. During the project planning, we proposed to treat about one-third of the collection (almost 200 works), but after the detailed examination of the sculptures and analysing the severity of the injuries, we were forced to limit the number of treated sculptures. Thus, we were able to successfully carry out a more-detailed and exhaustive restoration for many badly injured sculptures. In addition to this, there were other works of arts (small figures and reliefs) in the Eemil Halonen Collection that were in need of urgent conservation treatments, such as cleaning or adhesion. During this conservation project, we have made efforts to complete all urgent conservation treatments to ensure stability on as many damaged sculptures as possible. After the conservation treatment, all of the works of art were documented by photographer Titus Verhe by the end of August, 2018. These photos can be used in presenting sculptor Eemil Halonen and his art in different types of media and publications, too.

The conservation project was coordinated by the working team of the Art Museum Eemil. The team members were Riitta Marin, as director of the museum, researcher Jaana Luttinen and conservators Fede Petri Sancha and Kerena Pinillos. Decisions have been made in an interdisciplinary way considering the collection policy of the Art Museum Eemil, the museological criteria and the specific needs for the conservation of the sculptures. The working team has met monthly to monitor the progress of this project.

## 1. Historical Background

Eemil Halonen (1875–1950) was one of the first Finnish professional sculptors and belongs to the most well-known sculptors in Finnish art history. His role was significant when Finnish people were building their national identity through the arts in the early 20<sup>th</sup> century. Eemil Halonen was born in Lapinlahti, Eastern Finland. In the same generation of the Halonen peasant family, there were also four other professional artists: cousins Pekka and Antti Halonen and brothers Arttu and Kalle Halonen.

Eemil Halonen studied at cottage industry schools and became a skilled carpenter. He worked as an apprentice in the middle of the 1890's at sculptor Emil Wikström's studio in Visavuori, near Tampere and Hämeenlinna. Halonen enrolled in the drawing school of the Finnish Art Society and graduated in 1898. He made several study trips abroad: to St Petersburg, Paris and Florence. Eemil Halonen's artistic career lasted over 50 years and was productive. In 1903–1919, he worked in Lapinlahti, while doing custom work in Vyborg and Helsinki at the same time for long periods. Halonen tried to combine art and agricultural work in his own farms. From the beginning of the 1920s, Eemil Halonen lived permanently in Helsinki. His art developed from the early 20<sup>th</sup> century national romanticism to post-war idealistic symbolism in the 1920s and 1930s. The themes of Kalevala, Finnish rural life (common people and work), mother's love, children and idealistic male and female figures are typical for his art. He produced many portraits, cemetery sculptures and reliefs of Finnish statesmen, politicians, businessmen, cultural personalities, his family members and friends.

The Halonen Museum Foundation was founded in the year 1971 in Lapinlahti, to conserve and cherish the legacy of the Halonen Art Family and to promote common interest in art. The Eemil Halonen Museum was opened in 1975 and the Lapinlahti Art Museum in 1977. The museums were merged in 2017 and the renovated art museum building was renamed the Art Museum Eemil. The main art collection belongs to sculptor Eemil Halonen. The collection is the oldest and largest in the art museum, thanks to the donations and testament of Eemil Halonen's widow, Mrs. Alli Halonen (1889–1980). This unique art collection consists of about 600 works and models of art and hundreds of sketches, and it covers the 50-year career of Eemil Halonen. Plaster is the most present material in the collection. Plaster casts were created in many cases as not finished works of art, but as part of the creative process in order to get a final sculpture made of stone or bronze.

The visual image of Eemil Halonen's plaster sculptures is highly influenced by their history as casting for other copies. The process of casting figures on plaster often involves casting separated parts of the body. These parts are then joined together. The plaster sculptures involve repairs made over and over, too. A large number of plaster casts had also received protective coating, coloured with different mixtures of materials. This colour coating applied to the plaster casts were meant to ensure their maintenance and imitate the colour of the durable materials, such as stone, bronze, etc.



*Photo1.* Sculptor Eemil Halonen.

## 2. Criteria for the Selected Works

The project team discussed and decided upon the selection criteria for the plaster sculptures as follows:

1. *The stabilisation of degraded large-format sculptures*, because of the difficulty involved in their conservation, maintenance and manipulation by the museum staff.
2. *The conservation condition of the sculptures*, prioritising those with more serious problems, such as structural damage, cracks, fragmentation or detachment of parts.
3. *The theme of the works of art*. The project team wanted to raise some lesser-known aspects of Eemil Halonen's artistic production; those that represent a similar theme and show the artist production in the best possible way. The selection consists of a representation of *the cemetery sculptures* and some *sport-thematic works*.

The list of restored objects included 16 large-scale works of art, 4 reliefs, and 8 small-format sculptures. These sculptures were thoroughly restored, with the aim of restoring the structural strength, removing old restorations, reconstructing lost areas and returning their visual image to its original condition. In addition to this, we were working on the other group of 16 sculptures and reliefs and 15 small clay studies. In these art works, the conservation was only focused on cleaning and stabilising the figures and reliefs due to their structural problems, but we have left, for a future project, the opportunity to continue restoration. The total sum of the conserved objects is 41 (see *Appendix 1.*). The big quantitative difference between the years 2016 (80 objects) and 2017–2018 (41 objects) is because of the qualitative condition of the conserved objects. While in the year 2016, project works involved cleaning, adhesion and some colour retouching, the working treatments in the current project included consolidation, reconstruction, replacing broken parts, fracture treatments and massive colour retouching on large-scale damaged sculptures.

The average working time spent on every sculpture is about 3–4 weeks per object, but some sculptures (*Semper Excelsior* and *Lyrran soittaja*) have taken about 6–7 weeks per object.

## 3. Condition of the Eemil Halonen Collection

Generally, the condition of the plaster sculptures in the Eemil Halonen Collection is moderate. However, the condition of the works varies greatly. There are extensive and serious conservation problems mainly in the large-format plaster figures, due to external factors and to the inherent properties of material, such as extreme fragility or porosity.

### 3.1. Inherent Vulnerability

From the conservation point of view, the inherent vulnerability of material is the most characteristic of plaster sculptures. A large number of damages are due to the fragility of the plaster, such as broken pieces, missing parts, holes, marks etc. (*Photos 2 and 3.*)



*Photo 2. Kirkkauteen sculpture with fragmentation and lost areas.*



*Photo 3. Plaster relief Kärkkäinen with a crossing fracture and lost edges.*

The specific properties of plaster make it a material widely used by sculptors, both for artistic production or reproducing other works; but plaster is also a material with very adverse characteristics for its conservation. The technology used in the artistic production of plaster castings makes the resulting sculpture extremely fragile, brittle and very porous.

In the past, the sculptors worked out solutions to prevent the vulnerability and fragility of plaster by building metallic structures inside the sculptures. Now, there are many alterations in these structures. The natural oxidation and corrosion of the structures affect the structural stability of many plaster sculptures, and provoke other alterations, such as fractures, broken parts, fragmentation, deformation, exfoliation and disintegration of the surface. (*Photos 4 and 5.*)



*Photo 4. Small figure Edelfelt with broken parts due to oxidation of iron structure.*



*Photo 5. Aamuhartaus sculpture, one side of the base detached due to wood structure deterioration.*

### 3.2. External Factors

Regarding the influence of external factors, the Eemil Halonen Collection was stored and exposed for many decades, until 2016, in the Eemil Halonen Museum (originally a barn made of stone, 1900) under aggressive environmental conditions. The museum was open only during the summer, and there was no heating in the winter. Monitoring the environment of the works is very important in order to ensure the preservation of this type of art collections. The variations in temperature and the high levels of relative humidity that existed in the old museum building negatively affected the objects.

Humidity is the most damaging deterioration agent for the plaster works of art. Due to the high porosity of plaster, the negative effects of humidity variations are worse than in other materials: moisture penetrates into the interior of a plaster sculpture, provoking alterations in its structure, including severe corrosion alterations in the internal metallic structures, especially iron, and causes serious deterioration in plaster sculptures, such as breakage, detachment, fragmentation or oxidation stains. The humidity is also the cause of many superficial alterations on the sculptures. The combination of the humidity and the dirt deposits on the surface penetrates into the interior of the plaster. After that, a dirt patina is almost impossible to remove. On the other hand, there are a large number of works of art that have avoided moist alterations, thanks to the protective coatings, varnish and shellac applied in the past.

The high rates of humidity and low ventilation in the old storage have caused the evolution of biological growth in many of the plaster objects, probably aggravated by the presence of organic deposits from older coatings, used as release agents or final protective coatings. The dark spots produced by this biological colonisation are shown as chromatic alterations on white plaster and are difficult to remove. (*Photo 6.*)



*Photo 6. Aatami ja Eeva relief with dark spots from biological degradation.*

### 3.3. Use and Handling

The incorrect use and handling have also affected the sculptures. Due to the extreme fragility of plaster, any wrong movement produces fractures or fissures, despite having internal structures. This is evident in the large format objects: the heavy weight and high height provoke major structural unbalance, with the consequence of new cracks or fragmentation areas that proved to be especially fragile.

Many of the sculptures have previously been used in the reproduction of copies. It was a common practice to use plaster figures as models for reproductions in plaster, stone or bronze. This process produces the accumulation of material on the surface of the object, such as wax, soil and dirt residues, or mixtures of materials. The persistent use of these objects in the past as models for copies has led to successive adjustments and adaptations that have modified the original appearance and visual harmony.



We found many detached parts of the sculptures that have been cut in order to ease their reproduction, provoking the lack of material in the cutting areas and the difficulty to be joined again correctly. (*Photo 7 and 8.*)



*Photo 7. Mieteissä sculpture with the leg divided for older casting process.*



*Photo 8. Elämänlankavyvyhti sculpture with divided parts on the arms and waist.*

### 3.4. Structural Degradations

The most important structural degradations and alterations on plaster were:

- Missing parts (fingers, bases etc.)
- Disjoined arms, heads etc.
- Erosion (bases, surfaces etc.)
- Cracks, fracture
- Fragmentation
- Inherent vulnerability
- The oxidation of inner structures
- Punctures, holes, cuts etc.

### 3.5. Surface Alterations

We found a difference between the superficial alterations on plaster sculptures with protective colour coatings and those without. The surface on the sculptures with a protective colour coating were in better condition. These waterproof coatings protect the surface of plaster, preventing access of moisture and dirt deposits, as well as prevention of erosion and marks that show up on the surface of non-coated works of art. However, the condition of these patinas varies greatly. The most visible deterioration that manifests in these kinds of patinas is the loss of adhesion and its cracking. In the most severe cases, the coating rises completely and is lost. (*Photo 9.*)





*Photo 9. Detachment of colour coating on Lyyran soittaja sculpture.*

The accumulation of these varnishes, their ageing, as well as the different nature of the materials used, have caused chromatic alterations, producing very contrasting areas of dark and light colours and disturbing the visibility of the plaster sculptures. (*Photos 10 and 11.*)



*Photo 10. Chromatic alterations due to old repairs with colour varnish on Kohtalon lanka sculpture.*



*Photo 11. Chromatic alterations and plaster repairs on the hand of Semper Excelsior Sculpture.*

On the sculptures without a protective colour coating, there are a large number of superficial alterations, in many cases permanently. Stains have penetrated into the structure of plaster or migrated from the interior of the sculptures as red stains, due to iron oxidation. They have multiple marks, erosions and deterioration from stain. (*Photo 12.*)



*Photo 12. Dirt residues on the white plaster relief Joutsen.*

### 3.6. Past Restorations

Many of the plaster sculptures in the Eemil Halonen Collection have been restored several times, or rather have been repaired as first-aid in the past. With the gradual abandonment of traditional sculpting techniques during the last few decades, there have been several restoration/repairing practices that often have revealed to be unsuitable.

The most repaired parts of the sculptures tend to be the most delicate, which over time have been fractured, for example arms, ankles or bases of the sculptures. These old reparations significantly alter and modify the original visual concept. In the sculptures with superposition of these old reparations, the added materials have covered the original surface with plasters, shellac or varnish colours. (*Photos 13, 14, 15.*)



*Photo 13. Old unsuitable reconstruction with plaster on the base of Elämänlankavyöhti sculpture.*



*Photo 14. Old unsuitable adhesive treatments with glue, iron nails and plaster on the back side of Semper Excelsior Sculpture.*



Photo 15. Old unsuitable reconstruction of the lost fingers on *Vapaus* sculpture.

#### 4. Normative Framework and Conservation Guidelines

In attempting to solve many technical difficulties in the conservation of plaster objects listed in *Appendix 1*, it must be noted that the available scientific literature on the conservative theory and practice is very limited. However, the museums around the world have had growing interest in this type of collection nowadays, especially in the maintenance of good practices in their care and in their preventive conservation.<sup>1</sup> Despite the limited specific bibliography, the proposals of some projects of conservation and restoration in international museums<sup>2</sup> have helped to establish a normative framework for our conservation project.

We cannot over-address the methodological differences between the terms conservation and restoration. “The term art conservation denotes the maintenance and preservation of works of art and their protection from future damage and deterioration. Art restoration, by contrast, denotes the repair or renovation of artworks that have already sustained injury or decay and the attempted restoration of such objects to something approaching their original undamaged appearance”.<sup>3</sup>

Our proposal for the restoration project is addressed to restore the structural strength of the sculptures and return visual harmony removing past restoration materials that are unsuitable. For this proposal, we have considered both the condition of the most damaged sculptures and the specific needs of the museum.

Regarding the condition of the damaged sculptures, we first identified those degraded large-scale works of art with more serious problems, such as structural deterioration, fragmentation of pieces, cracks, separation of parts of the sculpture, due to the difficulty involved in its conservation, maintenance and manipulation by the museum staff.

On the other hand, the museum needs to increase the number of sculptures for use in public exhibitions. Because of this, we have found it necessary to restore the original visual appearance of

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<sup>1</sup> Doulgeridis, M., Kliafa, M.: *The Object in Context: Crossing Conservation Boundaries*: Contributions to the Munich Congress 28 August – 1 September 2006, p.303-303 (2006); *Care of Objects Made of Plaster of Paris - Canadian Conservation Institute* (CCI) Notes 12/2 - Canada.ca <https://www.canada.ca/en/conservation-institute/services/conservation-preservation-publications/canadian-conservation-institute-notes/care-plaster-paris.html>.

<sup>2</sup> Museums with conservation projects on plaster collections: *Victoria and Albert Museum*. <https://www.vam.ac.uk/>; *Real Academia de Bellas Artes*. <http://www.realacademiabellasartessanfernando.com/es>; *National Gallery of Athens*. <http://www.nationalgallery.gr/en/>

<sup>3</sup> *Encyclopaedia Britannica*, <https://www.britannica.com/art/art-conservation-and-restoration>

the sculptures, which implies more extensive research and development work on the restoration treatments of the visual image, removing overpaints and recovering lost areas with reintegration of colour.

*The conservation guidelines, on which we based the restoration works, have been as follows:*

- a) *Maximum respect for the original work of art*, considering both the artistic and historical value of the original shape and colour coatings.

Although colour coating in origin did not have an aesthetic character, but merely practical as a protector of the plaster sculptures, it has to be preserved as part of the sculpture.

The divisions made by the artist for the figures into parts have been respected. We have considered restoring the sculptures with the idea of being able to dismantle the arms in the future and to offer the structural solidity necessary to handle the work, but so that the sculpture remains stable in time.

- b) *Documentation of all the restoration treatments for every single object* has been carried out, through reports, photographic and graphic documentation. All the documentation has been transferred to individual files showing the initial condition of the object, all the interventions for conservation, materials used, and the final result.

Graphic documentation was carried out to show how anchorage elements are located and attached to the sculptures, giving the opportunity for disassembling and replacing in the future.

The elaboration of this final report, with the intention of publishing the results of the project.

- c) *All conservation procedures and materials used* must be reversible and compatible with the originals. In the restoration procedures that require the addition of any material, only such are used which have been proven neutral or compatible with the original.
- d) *Updating and replacing the materials of the previous restorations*. Plaster reparations are removed when they have not been accurate or they covered the original. They are only preserved for security reasons or where the lost elements are documented by historical photographs. New reconstructions and reparations must be recorded and have a reversible character.

*The working methods* have been organised on four steps: 1) the examination and analysis of the works of art and knowledge of their materials, 2) the testing restoration treatments and materials to value their efficiency, 3) the restoration and conservation treatments and 4) the documentation and report of the final results.

## 5. Conservation and Restoration Treatments

### 5.1. Cleaning

Cleaning the sculptures is an irreversible procedure. It is better not to undertake any cleaning unless essential. In any case, the cleaning is necessary to carry out the previous studies of the conservation status of the work, and the analysis of the elements that must be eliminated are essential.

Cleaning a plaster sculpture is complicated for several reasons. Its fragility and weakness make it necessary to maximise caution and to always give priority to a superficial and soft cleaning (vacuum, soft brushes, soft rubbers). In cases where the dirt is very tight, it is necessary to avoid the use of aqueous systems. Gypsum is extremely hygroscopic, and moisture addition may harm plaster irreversibly.

The best results have been obtained in the combination of mechanical cleaning and the application of cleaning gels; even some water-based gels do not damage the surface of plaster and allows the elimination of the deposits adhered to the superficial layer of the sculptures with caution.

The cleaning methods vary depending on whether the object is a white plaster sculpture or a sculpture with coloured protection layers.

#### 5.1.1. Cleaning of White Plaster Sculptures

We have used mechanical cleaning methods, which are safer than chemical, or mixtures of mechanical and chemical cleaning.

To remove the elements and deposits of surface dirt, brushes with soft bristles and a vacuum cleaner have been used. It has also proceeded to the full brushing of the reverse of the works, both in castings of sculptures and reliefs, because there is a greater accumulation of dirt. (*Photo 16.*)



*Photo 16.* Superficial cleaning treatments on plaster reliefs with vacuum cleaner and soft brush.

When plaster sculptures have dirt adhering, cleanings based on soft erasers or Wisab cleaning foams are applied. The complete elimination of stains on white plaster has required the use of aqueous systems in gel. Agar-Agar gel has been selected for the good results obtained and the consensus among specialists on its use for cleaning plaster.<sup>4</sup> (*Photos 17, 18*) Agar-Agar has a great capacity of water retention, which allows long contact times with a limited absorption from the material, which is a desirable circumstance, especially where porous, hygroscopic, soluble or materials sensitive to the action of water, such as plaster. The main advantages of this gel are as follows: not harmful to the plaster superficial layer; very effective absorption of stains and dirt deposits; and finally, that the remaining residues are easily removed with a soft brushing.

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<sup>4</sup> Anzani, M., M. Berzioli, E. Campani, A. Casoli, P. Cremonesi, M. Fratelli, A. Rabbolini, and D. Riggiardi, *Gel rigidi di agar per il trattamento di pulitura di manufatti in gesso*. 2010 CESMAR 7.





Photo 17. Cleaning treatment on process with Agar-Agar and eraser on *Kirkkauteen* sculpture.



Photo 18. Cleaning treatment on process with eraser tools on *Värttinätyttö* sculpture.

### 5.1.2. Chemical Cleaning of Sculptures with Protective Colour Coating

For the sculptures with protective colour coating, the cleaning method is different. The objective of this process is the elimination of the deposits, recent paints and elements that cover the original colour coating.

Each sculpture requires a different approach based on the nature of the protective colour coating (shellac, mixtures of organic resins and waxes, etc.) and those elements that are necessary to be removed (deposited wax, oxidised varnishes, glues and adhesives) (Photos 19, 20.)

Solubility tests were carried out to determine the most suitable cleaning method and the least aggressive products for the colour coating. At first, it was necessary to remove the recent protection coatings with non-polar solvents (white spirit). The accumulation of old varnish was removed with organic solvents or mixtures of polar and non-polar solvents.



*Photo 19. Chemical cleaning treatments on Lyyran soittaja small figure.*



*Photo 20. Half-cleaned, the cleaning process of Voimistelija figure.*



### 5.1.3. Elimination of Old and Recent Overpaints

The past restorations used overpaint and yellow varnish coatings to hide damaged areas of loss polychrome, joints or cracks. It has been necessary to remove this overpaint with mixtures of solvents and update the visual reintegration, adjusting the colours to the original tones, using removable retouching materials (watercolours, gouache). We have used higher solvent concentration cleaning gels for removing large oil coloured overpainting areas. (*Photos 21, 22.*)



*Photo 21. Removal of old overpainting restorations on the face and chest of Kohtalon Lanka sculpture.*



*Photo 22. Removal of old yellow varnish and overpaint on the legs of Vapaus sculpture.*

#### 5.1.4. Conservation Treatment for Biological Degradation

This conservation treatment is both curative and preventive. We have carried out mechanical cleaning removing the dark spots on plaster with soft brushes and vacuum cleaning, combined with chemical products suitable for plaster works of art, including ethanol and *Bioclean L*. (*Photo 23.*) The dark spots caused by mould growth are shown as chromatic alterations, although its intensity can be mitigated. The combination of these conservation procedures, together with monitoring environment conditions of moisture and temperature within the optimal ranges, will prevent new mould colonies.



*Photo 23.* Conservation treatment with Bioclean L to avoid mould growth on plaster reliefs.

#### 5.2. Consolidation and Adhesion

Once we finished the cleaning and removal of overpaint layers, we found much more deterioration than before the cleaning. Dirt residues and old paintings covered and hid a large number of issues, such as cracking, detached plaster, deformed joints, etc.

Consolidation and adhesion procedures are essential to restore structural solidity on the works of art that have been weakened over time, and ensure their future conservation.

It is necessary to carefully check the joined parts of the figure (arms, hips, heads) and improve the efficiency of old restorations made in the most delicate parts of the sculptures (ankles, bases). Most of the materials used in these old restorations have aged and they have lost their mechanical properties (old adhesives turn into crystallisation and fragmentation; materials used for the structural bonds are corroded and have caused weakening and fragmentation of these joints). (*Photo 24.*) To remove old adhesives, we have used the action of solvents combined with mechanical removal using scalpels and brushes. The consolidation treatments include the following: 1) consolidation and sealing cracks and fractures, 2) the adhesion of parts and 3) structural reinforcement in deteriorated sculpture bases.



*Photo 24.* Removing weakened plaster from old repairs on waist of *Elämänlankavyhti* sculpture.

### 5.2.1. Consolidation and Sealing of Cracks and Fractures

We have carried out consolidation of the weak and brittle plaster on both sides of fractures and cracks, using water based acrylic emulsion adhesives. Subsequently the cracks are filled with plaster and a slight addition of water-based acrylic emulsion adhesive to reinforce new plaster. (*Photo 25.*)



*Photo 25.* Consolidation of fractures and cracks with injection of acrylic resins on *Lause* sculpture.

### 5.2.2. Adhesion of Parts

The attachment of small fragments of the sculptures has been done with acrylic resin in acetone.<sup>5</sup> Previously, it was necessary to seal the pores of contact zones by applying acrylic resin with a higher thinning rate in acetone.

Rejoining the different elements of the sculpture, where structural reinforcement is required, we have used two types of reinforcement: stainless steel threaded rods of M8 were used for the heavy elements in large sculptures, and fibreglass rods of 4–6 mm diameter have been used for the light elements in the medium–small format sculptures. Finally, to adhere the position of rods to plaster, we used acrylic resin mixed with colloidal silica as adhesive filler. (*Photos 26, 27, 28.*) Acrylic resins in acetone have also been used in fissures for the adhesion with structural properties. In these areas, small perforations have been made to inject resins and help penetration.



*Photo 26.* Drilling a hole for new fibreglass rod to join the arm onto *Elämänlankavyhti* sculpture.

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<sup>5</sup> Podany, J. , M. Garland, K. , R. Freeman W. , Rogers, J. Paraloid, *b-72 as a structural adhesive and as a barrier within structural adhesive bonds: evaluations of strength and reversibility*. AIC 2001, Volume 40, Number 1, Article 2 (pp. 15 to 33)



Photo 27. Adhesion of fragments on the arms of *Uhri* sculpture.



Photo 28. New metallic rod to reinforce the anchorage between arm and shoulder on *Lyyran soittaja* sculpture.

### 5.2.3. Structural Reinforcement in the Deteriorated Sculpture Bases

A large number of the sculpture bases were in very poor condition due to continuous use and mishandling, including previous unsuitable repairs/restorations. The major alterations had to do with lost fragments, fragmentation, deformations, fractures or plaster areas added improperly during recent restorations.

It is important that large-size sculptures rest on a regular and solid base. A great deal of alteration work, such as mechanical stress or internal damages, can be prevented by finding the right balance for the sculpture.

We have proceeded in removing unsuitable plaster reconstruction from the old and recent repairs/restorations that modify the regularity of the base. We have then consolidated fragile and brittle original plaster areas with water-based acrylic emulsion adhesives. To provide structural reinforcement to the bases, both the lower area and internal walls are rebuilt with strips of plaster-impregnated bandage. (Photos 29, 30, 31.)



Photo 29. Initial condition on the base of *Elämänlankavyty* sculpture with lost parts, fractures and plaster areas added improperly in old repairs. (Note: newspaper used on plaster repairs.)



Photo 30. Reinforcement with plaster bandages on *Elämänlankavyty* sculpture base.



Photo 31. *Elämänlankavyty* sculpture base after restoration treatments.

### 5.3. Reconstruction and the Colour Retouching

The reconstruction and colour reintegration are those treatments intended to return cultural heritage to a known or assumed state, often through the addition of non-original material. Restoration theory is applied to prevent actions that could be detrimental to the works of art. This process must be in accordance with the



original shape and colour of the figure and at the same time respect the patina “being that general darkness which time causes to appear on paintings and which often enhances them”.<sup>6</sup>

### 5.3.1. Reconstruction Treatments

The reconstruction treatments have a double propose: to provide a greater cohesion on the damaged parts and to restore the formal integrity of the figure at the same time. We have used light grey-coloured plaster to remain as similar as possible to the original plaster of the sculptures. In those cases, where a greater reinforcement has been needed for the reconstruction with plaster, structures with fibreglass rods and stainless-steel wire have been assembled. The plaster was modelled once it began to harden, and it was sanded dry to give it the desired texture and final shape.

The most important reconstruction works have been the following:

- The substitution and adaptation of old restorations. In those areas that have been previously restored and do not adapt to the original regularity and shape of the figure, we have carried out necessary adjustments by removing or adding plaster. They are mainly located in the bases (*photo 32*), union areas (arms, waist) or the reconstruction of lost areas (fingers).
- Filling the union areas between parts of the sculpture. Mainly located in the union between the arms and the body (*photo 33*), the union of the lower part of the body with the upper part.
- Filling cracks and fractures. Cracks and fractures have been filled with plaster without covering the original and maintaining the level of the original shape.
- The reconstruction of lost areas. This has been done to recover the shape in those areas where part of the original plaster has been lost. The reintegration was made with respect to the original shape and texture. (*Photo 34.*)



*Photo 32. Reconstruction treatments with new plaster on the base of Elämänlankavytyhti sculpture.*

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<sup>6</sup> Brandi, Cesare: *Teoría del Restauro*. Rome: *Edizione di Storia e Letteratura*, 1963. (English version: “*Historical and Philosophical Issues in the Conservation of Cultural Heritage*.” In *Readings in Conservation*. Los Angeles, Getty Conservation Institute, 1996.)



Photo 33. Shape reconstruction on *Lause* sculpture, filling fractures and union areas.



Photo 34. Shape reconstruction of the lost areas on the vest folds on *Semper Excelsior* Sculpture.

### 5.3.2. Colour Retouching

Most of the sculptures in the collection have alterations in the colour of the original coating. Each of them has slight tonal variations that makes each one different from the other, which must be preserved. The colour patina is the result of the original protective colour coating and the ageing of the work.

The chromatic reintegration or retouching was necessary because a large number of lost or altered areas were found on the original patina and negatively transformed the visual harmony and aesthetic work.

Gouache and acrylic colours have been used with removable techniques to facilitate the possibility of removing these colours in the future. (Photos 35, 36.) The areas where colour retouching has been made are as follows:

- Lost areas of the original colour patina, chromatic alterations (rust spots), detach of the colour layer, etc.



- Areas where with previous restorations and overpaints have been removed
- Reconstructed areas with new plaster. It has been necessary to apply an intermediate coating, thus being able to waterproof the plaster and allow the reversibility of the colour treatment.

Even the white plaster sculptures maintain a light grey patina. It has been necessary to adapt the colour white volume reconstruction of to the specific tone present in the original work.



Photo 35. Colour retouching with gouache on new white plaster areas on *Elämänlankavytyhti* sculpture



Photo 36. Colour retouching on lost chromatic areas on *Autuaitten Asunnolla*.

#### 5.4. Surface protection

The final treatments after the restoration of the sculptures with colour coatings include the application of a light varnish of neutral appearance and stability which allows the natural transpiration of moisture between the work of art and the environment.

The final protection layer will help create a barrier to external agents (light, moisture, dust), to ensure the stability of the colour patina over time and increase the chromatic qualities of the works of art.

## 6. Case Studies

### 6.1. Vapaa Henki 189-E

The first case study summarises the restoration works on the plaster sculpture entitled *Vapaa Henki* or *Vapaus*, made by Eemil Halonen in 1920. The plaster sculpture was made for casting the bronze statue for the heroes of the Finnish Freedom War 1918, Iisalmi 1920. The sculpture is signed by the artist on the left side of the base: EEMIL HALONEN 1920. The sculpture is a plaster cast made in several parts, and it was used as a mould for the bronze copy.

The sculpture had been divided into two parts. Its physical appearance was very much deteriorated due to the poor conservation condition. There were large number of previous repairs and arrangements throughout the entire sculpture. (Photos 37, 38.)



Photo 37. Initial condition of the upper part of the sculpture.



Photo 38. Initial condition of the legs.

The most important degradation was located in the area that separates the body and legs. The box profile for assembling the upper part of the body to the legs was very much damaged, because this area of the sculpture has suffered from permanent use. In this area, the plaster had become extremely weak and several areas were lost. (*Photo 39.*)



*Photo 39.* Box profile before restoration.

The union system between the arms and the body was also damaged. The old metal bolts were rusted and one of the arms was separated from the body. As usual in these sculptures, there were a large number of previous repairs, motivated for fixing the damages as soon as these occurred. The union areas between the legs and body were very dark by presence of recent glue and varnish, and the fingers of the left hand were poorly reconstructed with plaster. In the union area of the arms with the body, there was also the presence of successive arrangements with plaster, glue and varnish. (*Photos 40, 41.*)



*Photo 40.* Previous repairs on the union areas between the legs and body



*Photo 41.* Previous repairs on the union area between the arm and shoulder.

The deterioration in the original protective colour coating was much more advanced on the front side of the sculpture than on the backside. There were a large number of gypsum repairs and with dark colour overpainted areas on the torso, body and arms.

The necessary studies were carried out to determine the most important structural alterations and chromatic degradation. Comparing with old photographs, it was estimated as to how much the physical appearance of the sculpture had been altered.

Mechanical and chemical cleaning treatments were carried out on the surface of the sculpture, removing wax and dirt residue and previous overpaints. (*Photos 42, 43.*)



*Photo 42.* Cleaning process to remove dirt residue and old varnish.





*Photo 43.* Cleaning process on the legs to remove old varnish and overpaint from previous restoration.

Consolidation treatments were made to stabilise and give structural strength to the sculpture, consolidating the weakened plaster areas and reconstructing the box profile to match and fix the lower and upper parts of the figure. A new secure but reversible anchoring system was applied. The consolidation of the union areas for the assembly of the arms was also carried out restoring the original anchoring materials. (*Photos 44, 45, 46.*)



*Photo 44.* Consolidation and reconstruction with plaster of the of box profile.



*Photo 45.* Ensemble between all the parts of the sculpture: body, legs and both arms.



*Photo 46.* Union area reconstruction before colour retouching

The previous plaster reconstructions were adapted, and missing plaster areas were reconstructed with new plaster. Finally, the chromatic reintegration of areas with colour loss was carried out using reversible materials and techniques, to return the sculpture to its assumed original condition. (*Photos 47, 48*).



*Photo 47. Colour retouch of the missing chromatic areas and new plaster reconstructions.*



*Photo 48. Vapaus sculpture after restoration work. Photo: Titus Verhe.*



## 6.2. Semper Excelsior 252-E

The second case study summarises the restoration of the plaster sculpture entitled *Semper Excelsior*, 1934. The plaster figure was originally made for casting the bronze cemetery sculpture for Professor Ernst Nevanlinna (1873–1932).

*Semper Excelsior* is a large-format plaster cast with protective colour coating. It represents a woman standing on tiptoes and with both arms extended towards the sky. The base of the sculpture is divided into two parts; SEMPER EXCELSIOR is shown in the relief on the front of the base. It is also signed by the artist on the left side of the base: EEMIL HALONEN. 1934.

The sculpture is a plaster cast made in several parts to be joined later. There are several studies previously made by the artist in plaster and clay in the Eemil Halonen collection. (*Photo 49.*) The plaster sculpture was used as model for the following bronze copies.



*Photo 49.* Plaster study for *Semper excelsior*.

The plaster sculpture was in rather poor conservation condition. Both arms had been removed from the body at shoulder height. The sculpture base had been divided into two parts, one of them was the part where the figure rests. (*Photo 50.*)



*Photo 50.* Initial conservation condition before restoration.

The sculpture had gone through a number of unsuitable arrangements in the past. On the back of the sculpture, the vest had been joined with glue and iron nails. (*Photo 51.*) In both arms, several arrangements had been found: in hands, wrists and in the union areas between the arms and the body.



*Photo 51.* Previous restorations on the back side of the sculpture.

Old restorations were found at the base of the sculpture. There were large reconstructed areas on the upper part of the base, including the reconstruction of the letters on the front side: SEMPER EX. While the lower part of the base was so over reconstructed and damaged that it compromised the balance of this tall sculpture. (*Photo 52.*)



*Photo 52.* Previous restoration on the base of the sculpture with reproduction of the letters.

There were many chromatic alterations related to the accumulation of overpaint, glue and varnish, frequently applied one after the other for years. Mixtures of these materials, together with the dirt residue, modified the visual appearance of the figure and interfered with the understanding of original shapes and details. (*Photo 53.*)



*Photo 53. Dark chromatic alterations on the chest.*

Those materials used in previous arrangements were not adequate. As they aged, they had darkened and weakened, so it was necessary to remove them.

The surface of the sculpture has been cleaned by alternating mechanical tools (scalpel, brush) and with chemical cleaning by mixtures of polar and apolar solvents. In this way, thick layers of glue and varnish have been removed from areas of the chest, hands, arms and vest. (*Photos 54, 55.*)



*Photo 54. Removing overpaint from previous restorations on the waist.*



*Photo 55. Removing old glue and damaged plaster from the vest.*

The thick iron nails that held the vest on the back have been removed. The old arrangements of plaster that hid the vest folds have also been removed. The back of the vest has been reattached with acrylic resin in acetone and structural reinforcement with fibreglass rods. The joints and union gaps have also been filled with plaster and chromatically reintegrated with colour retouching. (*Photos 56, 57, 58.*)



*Photo 56. Removing back side of the vest for further cleaning and reinforcement.*



*Photo 57. Plaster reconstruction of the missing parts of the vest.*



*Photo 58. Colour retouching of the vest.*

The restoration interventions were carried out in the base. The intention was for the figure to rest on a regular and reinforced base to avoid the precedent unbalances. The reconstructions made in the previous repairs/restorations were adjusted or removed. We have not removed the reconstructed areas in the front



side, so we could preserve the letters of the name of the figure. Brittle and fragmented plaster has been consolidated using acrylic resins in aqueous dispersion; afterward, the lost areas of the base have been reconstructed. Both parts of the base have been adjusted in shape and colour, so they will match. Yet it was decided to keep the division of the bases to enable better storage conditions. (*Photos 59, 60*).



*Photo 59.* Base consolidation and reconstruction.



*Photo 60.* Base reconstruction results before colour retouching.

The arms have been reattached to the body using an anchoring system that allows the possibility to disassemble in the future. The union areas between the arms and body have been reinforced and filled with plaster.

Finally, the figure was chromatically reintegrated with retouching gouache colours according to the chromatic tones provided by the original colour coating. (*Photo 61.*)



*Photo 61. Semper Excelsior sculpture after restoration work. Photo: Titus Verhe.*



### 6.3. Lyyran soittaja 95-S

The last case study summarises the restoration of the plaster sculpture entitled *Lyyran soittaja*, 1936. The plaster figure was made for casting the bronze cemetery sculpture on the family grave of famous Finnish poet Otto Manninen (1872–1950) and author Anni Swan (1875–1958) and their son, translator and poet Sulevi Manninen (1909–1936), who died as a young man.

*Lyyran soittaja* by Eemil Halonen is a large-format plaster cast with protective colour coating representing the figure of a man playing the lyre with one leg kneeling and the other bent. There is the artist's signature on the left side of the base: EEMIL HALONEN. 1937

This plaster cast in origin was created not as a finished work of art, but as a part of the creative process in order to make a final sculpture of bronze. The figure was created on the basis of smaller studies, in clay and plaster (*Photos 62, 63.*) These studies are in the Eemil Halonen Collection, and they have been useful in the case study of *Lyyran soittaja's* restoration. In these small studies already, the characteristic separation of both arms from the body has been shown, which also exists in the large-format plaster sculpture. This feature provides the possibility of casting the bronze copy by separate pieces to be joined and welded.



*Photos 62.* Clay study for *Lyyran soittaja*.



*Photos 63.* Plaster study for *Lyyran soittaja*.

The condition of the plaster sculpture was very much deteriorated. (*Photo 64.*) The visual perception of the figure was the result of successive repairs/restorations and adjustments that in many cases have not been adequate. Persistent restorations and consecutive repairs with glue and varnish of the damaged areas in the arms, legs and clothing folds have caused a strong fragmentation of the figure in colour spots.



*Photo 64.* Initial conservation condition before restoration. Extended dark brown areas hiding plaster alterations.

The extended right arm that holds the heavy lyre had moved out of place, and the consequences had been catastrophic for the stability of the figure (*Photo 65.*) The balance of the figure had moved from the axis, which caused the separation of the back foot from the base that acts as an anchorage to the whole figure. In addition, lower areas of the figure, the right leg and foot, have been affected by this unbalance, and a high number of fractures and cracks have raised, provoking detachment and loss of original plaster fragments. (*Photos 66, 67, 68.*)



*Photo 65.* Union area between the right arm and shoulder before restoration shows previous repairs intended to solve joining issues.



*Photo 66.* Right leg before restoration shows severe structural problems.



*Photo 67.* Back foot before restoration shows fractures and separation from the base.



*Photo 68.* Lower areas of the figure before restoration. Many cracks and fractures have raised and caused detachment of the colour coating.

The most important alterations have been studied and analysed, and they have been documented with photographs and alteration graphic maps.

The old rusty bolts that hold the arms to the body have been removed. (*Photo 69*). Once the arms had been disassembled, the deterioration of the metallic anchor structure had been verified, so it was decided to replace it with a new anchoring system.



*Photo 69.* Removing left arm to check the anchorage system.

The new anchoring system has been incorporated using proven durable and stainless materials. Furthermore, in designing the anchoring system, we maintained the existing concept of being able to disassemble the arms, and at the same time to provide the necessary structural strength and long-lasting stability to the sculpture. (*Photos 70, 71.*)



*Photo 70.* Right arm, broken anchorage system.





*Photo 71.* Reconstruction of a new box profile in plaster and a new anchorage system in the right arm.

It was decided to remove the thick overpaint layers of varnish and glue and replace them with a new protective coating. Unsuitable and invasive repairs had changed the image of the sculpture with successive layers of plaster, glue and varnish hiding cracks and fractures. As a general basis, we decided to keep the protective colour coatings on the sculptures; but in this particular case, we considered the critical conservation condition of the figure and decided to remove the protection coatings. (*Photos 72, 73*).



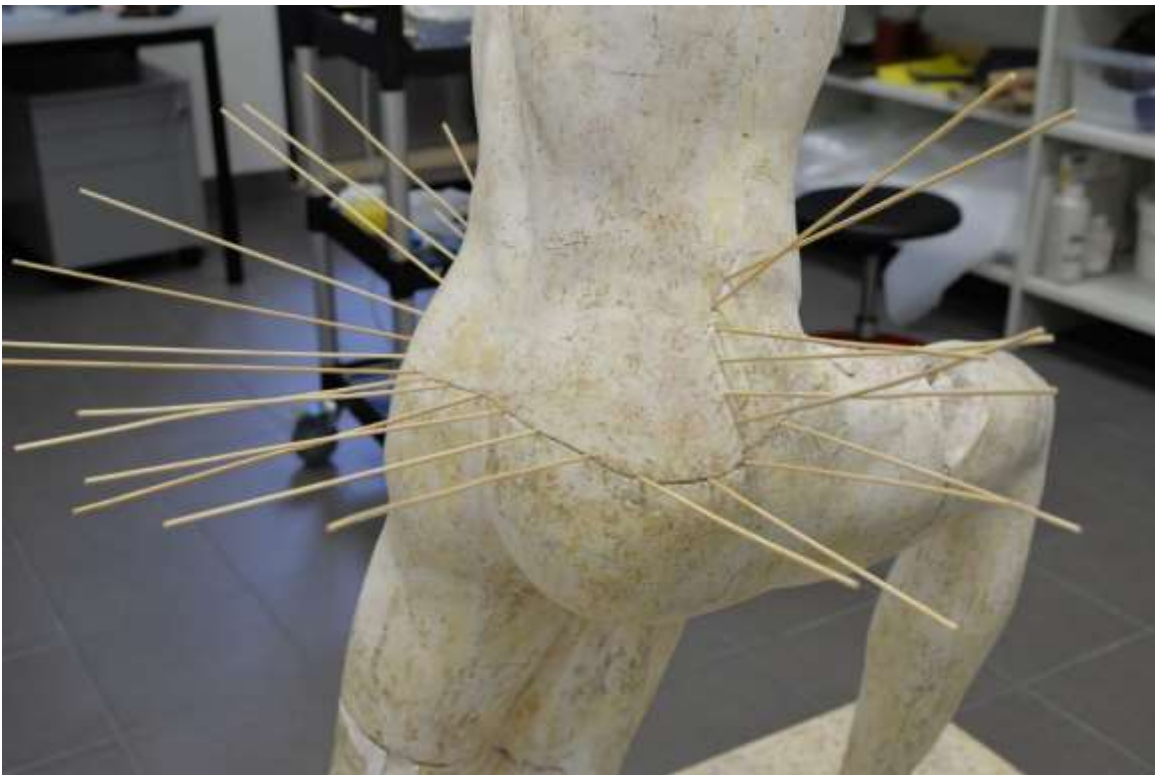
*Photo 72.* Severe alterations are shown on both legs after removing varnish coatings.





*Photo 73.* Fragmentation on right foot after removing varnish coatings.

The work was consolidated by means of acrylic resin injections in aqueous dispersion and mineral filler in cracks and fractures (*photos 74, 75*); detached fragments were cleaned and replaced back with acrylic resin adhesive in acetone. Finally, lost areas were reconstructed, and open fractures were filled with plaster.



*Photo 74.* Small holes were made on the waist for consolidation of weakened areas with acrylic resin injections.



*Photo 75. Consolidation and adhesion of fragments on the right feet.*

In addition, the arms were replaced with the new anchor system, and the union areas between the arms and body were consolidated and reconstructed. (*Photos 76, 77.*)



*Photo 76. Assembly of the right arm and shoulder.*



*Photo 77. Reconstruction of lost areas with plaster between the right arm and shoulder.*

Colour retouching was done with gouache pigments to chromatically reintegrate the figure according to the chromatic tones provided by the remaining colours from the original coating. A transparent thin coating of shellac was applied as an intermediate film before the colour retouching to enable reversibility of surface coatings. (*Photos 78, 79, 80.*) Finally, a layer of transparent protective varnish of dammar resin was applied. (*Photo 81.*)



*Photo 78. Restoration process on the right leg.*



*Photo 79. Restoration process on the right leg.*



*Photo 80. Restoration process on the right leg.*





*Photo 81.* Lyyran soittaja sculpture after restoration work. Photo: Titus Verhe.



## 7. Preventive Conservation

The preventive conservation is the mitigation of deterioration and damage to cultural property through the formulation and implementation of policies and procedures for the following: appropriate environmental conditions, handling and maintenance procedures for storage, exhibition, packing, transport and use.

*Monitoring environmental conditions in storage and exhibition halls.* It is necessary to take into account the diversity of materials that make up the collection of the museum (sculptures in plaster, bronze, clays, oil paintings, watercolours). The parameters established in the museum have remained between 18–22 C, the relative humidity between 45–55%. The storage lighting is established with a lighting timer. The exhibition halls have been illuminated with led lights between 300–400 lux.

*Handling and moving.* Criteria have been established for proper handling of plaster works of art to avoid alterations in the future. Each restored work has an individual file with information for its manipulation, to avoid endangering the most delicate areas. The sculptures have been removed from the aged wooden plates that were preserved under the bases of the sculptures. They have been replaced by wooden frames to protect the bottom of the sculptures. They also have grip areas on the sides to manipulate the works of art. In addition, each sculpture rests on a synthetic pallet of HDPE to move them through the museum with the pallet carrier.

*Conservation and maintenance.* The most important preservation and maintenance work needed by the museum plaster collection of sculptures was the cleaning of accumulated dust and dirt with a vacuum cleaner and brushes.

*Minimising dust on objects.* Dust embedded in the pores of plaster will cause discolouration. Covering shelving units with thin sheets of water-resistant, breathable fabric (Tyvek). Vacuuming the surrounding area regularly as needed using a high-efficiency particulate air (HEPA) filter vacuum cleaner is recommended. When cleaning objects, using a soft artist's brush lifts dust on the object toward the nozzle of the vacuum.

## Further Reading

Healey-Dilkes, Sarah. Historic surface coatings on the V&A's plaster cast collection:

<http://www.vam.ac.uk/content/journals/conservation-journal/autumn-2014-issue-62/historic-surface-coatings-on-the-v-and-as-plaster-cast-collection/>

Lang, S. 1999. Not so new methods of cleaning. Victoria and Albert Museum Conservation Journal 32 (July).

[http://amethyst.vam.ac.uk/res\\_cons/conservation/journal/journal32/notsonew32/index.html](http://amethyst.vam.ac.uk/res_cons/conservation/journal/journal32/notsonew32/index.html)

Richard C. Wolbers and Margaret A.. The surface revealed: cleaning of two painted plaster sculptures. AIC Objects Specialty Group Postprints, Vol. 11, 2004

Beale, A., C. Craine, and C. Forsythe. "The Conservation of Plaster Casts." pp. 18–26 in Preprints of Papers Presented at the Fifth Annual Meeting of the AIC, Boston, Mass., 30 May - 2 June 1977. Washington, DC: American Institute for Conservation, 1977.

## Appendix 1: List of Restored Sculptures

### 1. Size: Large format; Theme: funerary monuments; Material: plaster and color coating

- *Vapaus (Vapaa henki)* 189 -E
- *Elämänlankavyöhytti* 191-E
- *Lähteenhaltiatar* 195 -E
- *Kirkkauteen* 190-E
- *Semper Excelsior* 252-E
- *Aamuhartaus* 187-E
- *Autuaitten asunnoilla* 100-S
- *Lyyran soittaja* 95-S
- *Lause* 184-E
- *Mietteissä* 182-E
- *Kohtalon lanka* 196-E
- *Rauhan kannel* 61-E
- *Uhri* 178-E
- *Värttinätyttö* 476-E

### 2. Reliefs, thematic cemetery, plaster and colour coating

- *Aatami ja Eeva* 1163-E
- *Cederberg* 169-E
- *Uhri* 176-E
- *Joutsen* 389-S

### 3. Small Figures, thematic cemetery sculptures, plaster and colour coating

- *Mies (Lyyran soittaja )* 1224-E
- *Nainen (Kohtalon lanka )* 467-E
- *Polvistuva äiti* 463-E

### 4. Large format, thematic allegories/Kalevala, plaster and colour coating

- *Tuonen hauki* 382-E
- *Raudan synty* 996-E 71-S

### 5. Small Figures, thematic sport, plaster and colour coating

- *Voimistelija* 458-E
- *Juoksija* 131-E
- *Voimistelija* 360-E

### 6. List of sculptures with urgent conservation treatments

- *Mies* 36-S
- *Edelfelt* 414-E

- *Hiihtäjät (relief) 658-S*
- *Kärkkäinen (relief) 68-S*
- *Äiti ja lapsi 65-S*
- *Clay relief 325-N*

## 7. Unnamed

- *1224-E (relief)*
- *Nainen (relief)*
- *1154-E (relief)*
- *1172-E (relief)*
- *1213-E*
- *397-E*
- *455-E*
- *399-E*
- *118-E*
- *395-S*

## 8. 15 small clay studies, unnamed