

Reintegration Technique (Missing Parts): In Conservation-Restoration of Antiquities

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Abstract: The conservation, protection and enhancement of the historical values present in the archaeological and cultural heritage should be the only important concern. It is important to emphasize that, wherever possible during the integration and reintegration phases, the historical and aesthetic aspects of the monument are respected. The aim of restoration is not only to conserve the integrity of the resource, but also to reveal its cultural values and to improve the legibility of its original design. The aim of modern restoration - to reveal the original state within the limits of still existing material-thus differs from the past aim of bringing back the original by rebuilding a lost form. Therefore, any work on an object must be preceded by the studies of the physical and documentary evidences, object's condition and significance of its cultural value. The regular maintenance of the Cultural heritage objects, both recently restored and non-restored, it is of great significance in the preservation and enhance of object's durability. The treatment of gaps is not just the final act in a restoration, but must be viewed in a preliminary vision of the work of the relevant aspects of degradation and conservation, before and after the restoration. Reintegration intervention in the restoration, still have not found a unique methodology and precise, but it still relies on a case-by-case basis. Reintegration itself is an act of bringing together the components of painting or objects, stone or other materials, into a single fully seen harmony with the missing parts functioning as one.

Keywords: Conservation, Archaeology, Egyptology, Heritage, Conservation Science, Integration, Restoration, Art

1. Introduction

The difference between the word *integration* and the word *reintegration* is that the *integration* is to form into one whole; to make entire; to complete; to renew; to restore something to a state of integration; to be perfect while the *reintegration* is to integrate again or in a different manner. The reintegration is more correctly used in conservation field.

Any intervention aimed at the aesthetic and functional recovery of a product for which a deficiency or defect must be made or adding a new material to the original instead of the original one.

This case research describes the reintegration in the restoration work carried out in the framework of professional experiences in various ways on the restoration of cultural heritage and archaeological sites. Reintegration itself is an act of bringing together the components of the paint or stone object into a single view with the missing parts functioning as one. Reintegration refers to the end result of a process that

aims to stitch together different, often disparate parts, so that the information contained in monument becomes part of a larger, more comprehensive ways of integration that, ideally, quickly and easily shares information and beauty when needed.



Figure 1. Reintegration test with neutral color, shows details of the reintegration test of the paint layer losses area of Seti first (1255 BC) using the retouching with natural color veiling, Tomb of the King Seti I the valley of kings, Luxor, Egypt.

The reintegration has to do mainly with the missing parts of the artwork, the colors, the incision, the stone sculpture and historic buildings, the integration and completion does not have a precise technique, the important thing is to respect the aspects historical and aesthetic of the monument for example; sculptures that could be complemented by different materials.

Other reintegration challenges have to do with the lack of a structure that could be chosen suitable and similar materials to the same of the artwork to establish the state of conservation. It is necessary to have the information of the object through the study in order to choose a way of integrating that preserves the work of art, in order to provide the "visitor" of sites and museums a complete picture of the characteristics of the work of art. The study of the techniques of execution of the work of art is very important to give an idea of how to integrate the missing parts of the work of art, so the reintegration itself is an important act to make the whole picture of the object readable and to reveal its cultural values and to improve the legibility of its original design.



Figure 2. Reintegration test with neutral color, shows details of the reintegration test of the paint layer losses area of Seti first (1255 BC) using the retouching with natural color veiling, Tomb of the King Seti I the valley of kings, Luxor, Egypt.

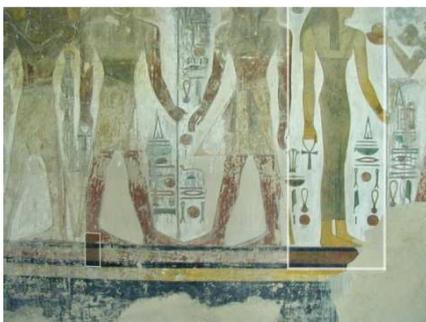


Figure 3. Reintegration test with neutral color, shows details of the reintegration test of the paint layer losses area of the wall of burial chamber of the tomb of Seti first (1255 BC) using the retouching with natural color veiling, The valley of kings, Luxor, Egypt.



Figure 4. Reintegration test with neutral color, showing the method to close light spaces or non colored area (missed) using a mixture of watercolors look like "dirty water", to match color tonality, means toning down excessively light spaces. Wall paintings of Seti first tomb (1290 BC – 1279 BC), valley of the kings, Luxor, Egypt.

2. Conservation - Reintegration of Paintings

The history of the technique of wall painting is of interest to both the restorer and art historian. It provides the restorer with the requisite knowledge to identify different techniques employed by the original creator(s). In the Neolithic period, the wall covering technique was to mix chopped straw with clay to ensure good cohesion during drying. Then, during the pre-dynastic period, Nile silt consisting of a mixture of sand and clay as well as a little natural calcium carbonate and gypsum (hib in Arabic) was employed [3].

Conservation of paintings commonly includes the reintegration phase of missing or damaged paint layers as a final phase in conservation into a state consistent with the remaining original. Retouching is a method of returning the missing parts that make the paintings unreadable and unclear to a clear state by closing the tiny spaces of loss of layers of color. Retouching is not a creative process in itself, but a technique that depends on how to use colors carefully to fill in the lost spots of the painting with neutral color, the existing original color layer must be respected and not touched or altered. Retouching must be performed as objectively as possible with no attempt to misrepresent the conservator's intent, conceptual, and physical characteristics of the painting.

Is important that any given retouching (colors used) is:

- 1) Inert, no chemical reaction to the remaining original.
- 2) Removable without harming.
- 3) Stable and likely to ensure maximum duration of the

restoration, minimizing exposure to potential damage or swelling of the painting layers.

- 4) solvent action used when the retouching is removed in the future.

To make the retouching reversible in case of oil paintings apply a thin layer of varnish to the edges of the original paint and close to the retouch area to allow for easy removal in future, this also prevents damage to the original paint in the event of removal.

The aim of retouching, of cultural paintings is essentially to suppress damage that would otherwise be distracting or that would pull down the quality of a painting rather than a work of art, because of losing parts of colors. There are many approaches to this important stage in the conservation process and just as many philosophies supporting them. It must aim, to limit the intervention to an effective minimum however, the retouching should be as stable as possible and most importantly reversible, so that it can be removed easily and safely at any time in the future [2].

No type of integration shows a theoretical foundation as well as precise and rigid as the hatch. Of all the attempts to find solutions to the problem of integration of theoretical reflections on the street this seems to be one of the most promising. We must realize the point of view that allows us to understand the principle of the hatch. It is essential, says Brandi, arrive at the concept of restoration, and thus integration, using the concept of art itself [1].

This conveys the idea that it is a work of art, what is restored, the indivisible unity of an overall structure and not divided the phenomenon of a painting aesthetically effective and a historical document.

One basis of this insight can be groped an integration. An attempt should not be limited to safeguard archaeological and which is at the same time fundamentally different from an act of artistic creation.

In this way, it protects both the historical and the aesthetic that fits in restoration because restoration with archaeological conservation.

Although 'hatch' technique is visible to anyone and can be removed with simple means, you must use all of the documents to be able to considerably closer to the original.

It is a preparation philological criticism that must guide the entire work, so as to free it from the randomness of the imagination and questionable deductions analog. It seeks to develop rules and theoretical faulted for the practical act of restoration, by clarifying the phenomenon of speculative "work of art" in view of the restoration.

Of course, a misconception able to rip the restoration to the simple practice calling into question the physics and chemistry. They may only have a functional role.

The Italian attitude in front of the restoration in practice originates from a higher authority on the work of art as a whole, the empirical attitude from that of science, which aims first and foremost to the knowledge and way of dealing with the matter.

This explains why the problem of reintegration of the gaps should be a particular concern to the idealistic point of view.

The same basic attitude is reflected in all the conceptions and practical work of the Institute in Rome.

Recognizing the historic character of a work of art in the process of work includes both the work envisioned in its original state is all that the time has deposited throughout the history of the painting. This leads to a much greater respect for the old additions and added that is as a historical expression, also appear worthy to be preserved.

On this basis, it is unthinkable to even the idea of a treaty with the touch-up painting neutral.

There are examples of paintings in which our aesthetic concepts coincide with the intent of a flawless integration from the perspective of the documentary. So, it seems that the hatch is particularly suited to the paintings of Italian old school.



Figure 5. The conservation team during the reintegration phase, wall paintings in the burial chamber of the tomb of Nefertari (1295-1255 B.C).

Its relatively flat character does not create the risk of a disruptive effect on the spatiality of the picture, seen in examples from later periods.

Of course, the criterion of applicability of the method for all ages is the ability and expertise of the respective restorer.

But on the paintings of the Late Period, such as the High Renaissance and the Baroque, in particular, the character of the archaeological method and its systematic theoretical make sometimes unpleasantly noticeable.

So, for example currents oblique movement of the baroque can be interrupted by the hatching always performed vertically, or the hatch on a painting whose ductus and style is similar to the hatch can determine misleading uniformity and an apparently between original and reintegration, which are of most disturbance of a neutral retouching and altering more than a total remodeling.

Finally, is the possibility that through a touch on a painting on wood structural values are created, that suggest the impression of a painting on canvas; or canvas, significant from the point of view of art, is visually impaired in the structure and character.

Remodeling a hatch was at first used in the restoration of frescoes and, after it has unsuccessfully sought to increase the neutrality (neutral context) of large structures with touches of frescoes in the hatch, showed the best results in this field [11].

The influence of the restoration of frescoes (with its techniques and concepts) on the entire restoration is strong in Italy [13].

It can lead to reinterpretations in the restoration of paintings.

Through this relationship and proximity to the restoration of frescoes can partly explain why the Italian method generally appears all the more inadequate the smaller the painting to be restored.

You can recognize an additional visual relationship between the hatch and the ancient Italian art painting technique with his brushwork similar in tempera paint. Here, too, the internal form is essentially "found" by largely drawn parallels. Unlike the Italian method, however, these strokes do not proceed in a vertical position, but we will follow the shape is proposed.

Most important of these relationships are the parallels with modern art and contemporary trends in gender with accuracy and scientific evidence of restoration. The Italian method is based on theoretical considerations. This starting point determines the success of the hatch in an era of scientific guidance and defines it as the exact method of preservation. This is the side of the hatch, which recognizes the work of art as a historical document, as it introduces the documentation directly in the painting [4-7].



Figure 6. Wall paintings after restoration; with a minimum of retouching using technique of color veiling, (a) Osiris wears white from shoulder to toe, setting off the deep and brilliant colors of his necklace and headdress, (b) The ram-headed, mummiform god standing on a small Ma'at plinth; attended by Nephthys and Isis, is Osiris-Re, a fusion of the two gods, done by Paolo Mora's team, valley of the queens, Luxor-Egypt.

2.1. The Reintegration Using Technique of Natural Color Veiling

Reintegration itself is the act of bringing together the small pieces into one system that works as one. In Mural Paintings, the two extremes of all the possibilities for reintegration are retouching neutral and total integration "unexceptionable".

Between the two there are numerous intermediate forms, from the adaptation of a neutral color touch-up to the original fragment, and to the grouting sublevel of integration "unexceptionable" of form and color, until the total integration with the subsequent marking by net or lines of boundary.

They are conciliators attempts to add beauty to the painting in his appearance sides both aesthetic and historical.

Retouching – a completely reversible process – is used to match color tone; attenuating the excessively light colors or spaces lost on paintings due to the bad condition in which the work of art was found. This technique softens the visual flow from one painted area to another, allowing the eye to move over the entire paint without distraction in a way that is consistent with the original paint [13].

Restoration-retouching, as it is often referred to, is carried out only to areas of paint loss, or after filling and texturing the surface of the fillings as necessary (in case of losses of multilayers). Unlike restorations in the not-too-distant past, today's approach is much more minimal, doesn't use materials which will darken, and avoids adding unnecessary material to the art object.

The application of most retouching to old paintings is undertaken on top of a thin layer of isolating varnish in order to aid reversibility. Following retouching the painting is then given a final coat of stable, reversible varnish to produce an even sheen, saturate all colors and provide protection to the paint layer, if it is necessary. A range of retouching media could be employed in these restoration processes as new developments in the field allow and depending on the individual painting.

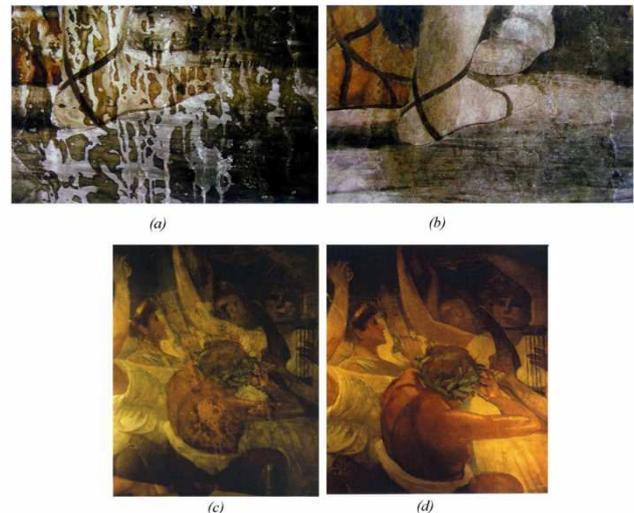


Figure 7. Reintegration area, reintegration done using the technique of vertical lines hatch system (*tratteggio*) applied by the author and conservator E. Ozino on the Frescos of Saint Sebastian, 15th century, Biella, Turin, Italy 1987.

2.2. The Reintegration Using Technique of Vertical Lines (*Tratteggio*)

The execution mode corresponds to the usual editing today: Remodeling is progressing from light tones to dark, from cold to hot ones. The first hyphens affect the next and so on until the gap "closes".

The surface structure is built only where the flatness of remodeling within the original context will affect the visual privacy.

Do not imitate ageing, but the touch-up sticks present appearance of the painting and not, for example, an alleged initial state [1-3].

The hatch (*tratteggio*) is not an artistic integration with intent imitative, but the realization of a principle, a matter of eye and certainly point combination of colors. Despite its systematic there are several examples of this method, in which at a certain distance of observation the degree of reconstruction to hatch visually equivalent to a total integration. In the case of integrations in peripheral areas of the picture the hatch appears more satisfactory retouching neutral, because it has the effect of dampening, a transition to the context, to the wall, to the upholstery. Within an object the intensity of the closing of the gap may vary: some areas are largely integrated, while others remain visually neutral almost to the stage of remodeling. This discrepancy creates a space for nature subjective, but can also help to resolve satisfactorily the duties from time to time different. The hatch has been developed at the Central.



Figure 8. Reintegration test done by retouching using vertical lines hatch system (*tratteggio*), applied on wall paintings of Nefertari tomb (1295 – 1255 BC.), valley of the Queens, Luxor; Egypt 1992.

Institute of Restoration in Rome. It began with dashes relatively uniform and stretched. By the time, it is outlined in a subtler way with shorter dashes of different lengths. In this way, retouching fits better in context and has a lower autonomous existence. But we must not suppose that this development made the perfect end will coincide with the total integration "flawless", because that would be to ignore the knowledge generated by a critical attitude towards the work of art, bipolar appearance of the painting. For the paintings that serve to make you worship (as usual) concessions. In these cases, finds or invents the shape and then the gap is filled with the usual mode of hatching. Here, too avoids mimic aging. Similar examples, in transpires form through a network or a thin veil of dashes. There are attempts that appear at first sight Allies with the Roman method. It's those finishing touches on both dashes used in the restoration of paintings, both of frescoes, sculptures both of which seek to bridge the gap visually in a natural way through points or hatch. Using hyphens mitigates the flat pattern that disturbs the spatial integration of the painting and, at the same time, at a close distance, it guarantees a flawless primary documentation. All these attempts differ from hatching for their freedom; not seek to satisfy any theoretical system[3].

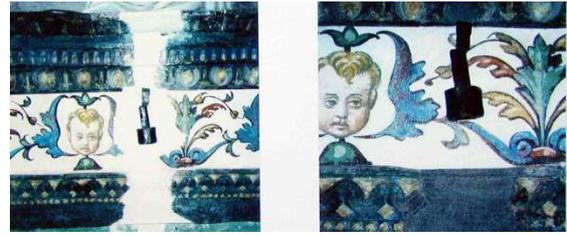


Figure 9. Reintegration area, reintegration done using the technique of vertical lines hatch system (*tratteggio*) applied by the author and conservator E. Ozino on the Frescos of Saint Sebastian, 15th century, Biella, Turin, Italy 1987.

3. Conservation - Reintegration of Buildings and Objects

Artwork and its characteristics must be taken into account when it is completed, since it does not distract from the overall structure of the technical unit while maintaining aesthetic and historical impact.

An attempt should not be limited to archaeological protection, which at the same time is fundamentally different from the act of artistic creativity.

This way preserves both historical and aesthetic aspects that are proportionate to restoration, completion and preservation of the archaeological environment.

That explains why the problem of completing the missing part should be based on partial attention to the perfect vision. It must be understood that artwork cannot be restored to its original appearance and that the part of the original complement should not be simulated.



Figure 10. Stone blocks-1213 B.C (Sandstone) restored to give an idea of meaning to the perfect vision of integration, done by Hiroko & Ray Johnson, Luxor Temple, open court, Luxor-Egypt.

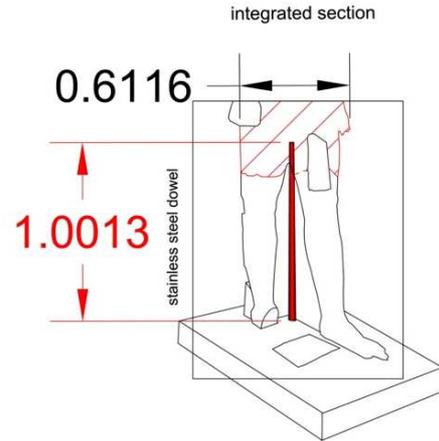


Figure 12. Statue of Seti-1294 B.C (Alabaster), before and after; it has been restored, integrated of the missing middle section and displayed with minimum intervention respecting the both of aesthetic and archaeological sides done by the Author; Luxor Museum-Luxor.

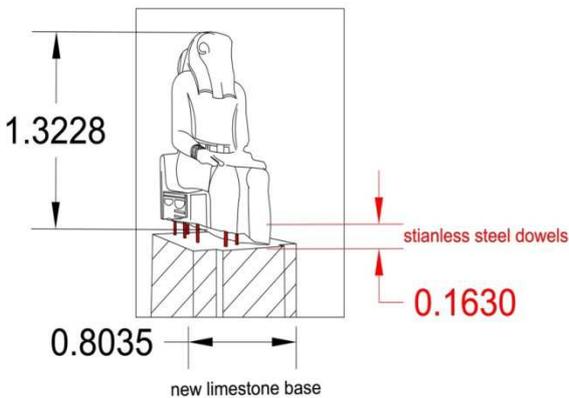
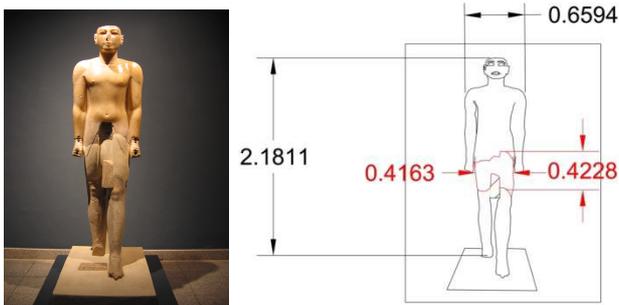


Figure 11. The statue of Horus (Basalt) has been restored and displayed in different way with an aesthetic and archaeological update without direct interference in the impact, done by the Author; Egyptian Museum-Cairo.



Gaps (missing parts) are usually filled for two reasons: aesthetics and support. When an work of art has lost most of its pieces, usually the task of the restoration is to make that work of art appear as complete as possible so that visitors come to its visual interpretation. When the original material of an object is fragmented, it is often difficult for visitors to understand what it would have been like before it was damaged. There is a fine line between helping the visitor to interpret and providing something that is too "explanatory" and not enough original material. If the restorer is not sure what the missing parts will look like, it is unlikely to fill in that area with a "guess". This particularly occurs when there is not enough original material left for example an object probably needs to be supported in its load; the idea of strengthening it, must be far from direct completion by filling in the losses, taking into account the archaeological and aesthetic aspects [9].

As a principle of conservation, it is usual to make any fill material look similar but not exactly like the real thing. Sometimes the filling gaps is far from the original, it would give an idea different than the original technique used, but makes readable for the whole picture presented between the pieces missed and the original remains.

Filling (missing parts) of a glass object is notoriously delicate, it requires time and patience. On clear glass object such as ours, the material used must be resemble glass, have the right color, and even reflect light at a similar angle, a quality known as the refractive index. Materials used as fillers for glassware include epoxy resins, acrylic resins, and polyester resins.

A wide range of materials has been used for gap-filling in wooden objects, very little information exists on their suitability. Whatever the few published studies that have been conducted on the physical properties of gap-filling materials or their long-term effect on the substrate. Several gap-fillers have been conducted from field studies and experiments for their handling properties and their response to pressure resistance, while tests are evaluated for their

response to compressive forces evaluated for their response to compressive forces when placed in locking controls (cracks) in swelling wood that responds to high relative humidity levels. Two types of fillers are acceptable depending on the the kind of wood, they are applied to in different environments. Firstly, these are very low compression modulus fillers, such as waxes, balsa wood, and a silicone rubber, micro balloon mixture, which are suitable in most circumstances; and secondly, strongly adhesive fillers of high compression modulus, such as an epoxy resin, micro balloon mixture, which can be used in applications where the wood would be maintained in a moderately stable relative humidity [3].

Reconstruction means building anew. The term may be used in reference to work executed, using modern or old material, or both, in order to reconstruct dismembered or destroyed elements, or both. Reconstruction must be based

on accurate archaeological and architectural documentation and evidence, never on conjecture.

Although reconstruction may prove to be an appropriate strategy following disasters such as fire, earthquake or war, its validity is more questionable when used as a measure to improve the presentation of heritage sites. It must choose a material by many criteria including its aging properties (most stone, paint turns yellow with time), its hardening time, its refractive index, how it handles changes in its surrounding environment like temperature and humidity, and its ease of use during laboratory processing. The resins are cast by making silicon rubber molds to make a negative of the missing piece in the object and then pouring the resin inside and letting it harden. Once made, which may take many attempts to get a good result, the new piece can be inserted as an original fragment (figure 12, middle part of the statue of Seti I).

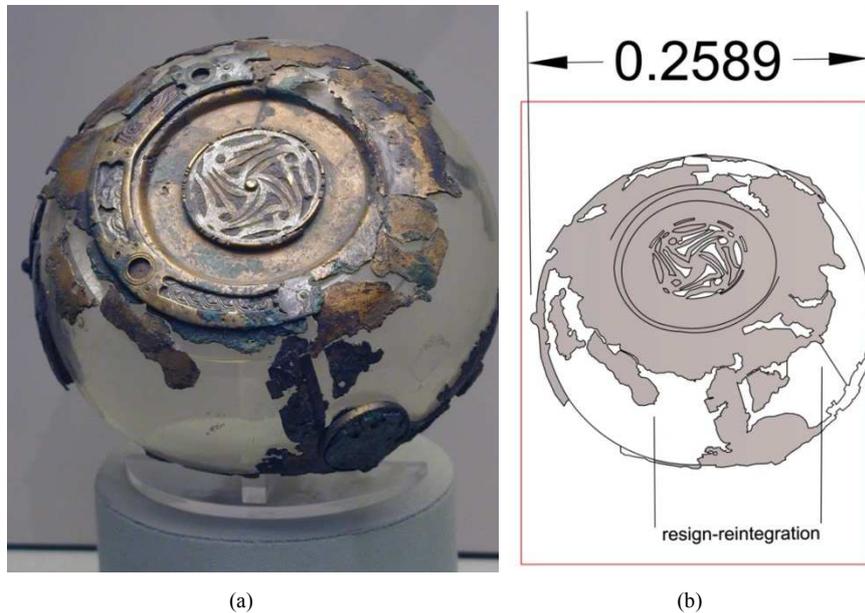


Figure 13. (a), metal utensil displayed in the British museum integrated using the transparent resin, as a support for the original remains which took the same shape and size to make it understand and readable for visitors, (b) explained graphic of the reintegration, British Museum, London, United Kingdom 2001.

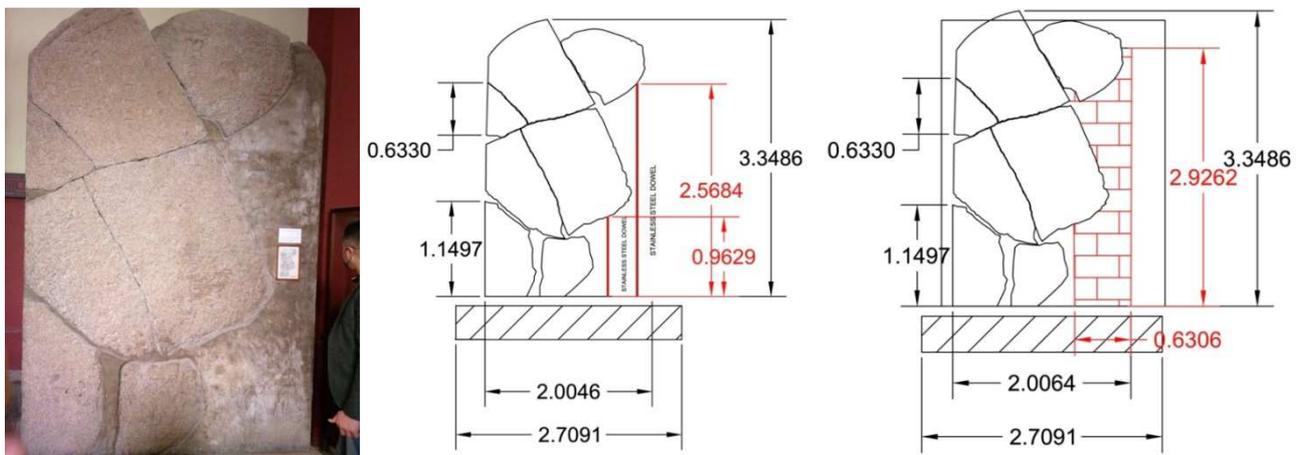


Figure 14. Darius stele-522 B.C (Granite) Old restoration with cement integration of all the right side and Study and design to dismantle and collect Stella and integrate it in a new way done by the Author, given that it is transferred from Cairo Museum to the international Suez Canal Museum to another.

4. Conclusion

It is clear that any reintegration is always a transaction based on substantiated data, and solutions must respect the principles of professional ethics codes. In practice are applied mainly the five principles: minimal intervention on material, convenience/advisability, reversibility, compatibility and readability/detectability, all subordinated to the original piece.

Reintegration represented in the treatment of losses and perturbed spaces that the work of art undergoes due to mechanical damage or atmospheric agents or both, is a professional restoration that requires competence and experience in the technical working field and adequate study of the historical and archaeological aspect. It also requires a high artistic taste to bring out the right vision and the stability of the entire work of art in its legibility and beauty that appear to the public and researchers.

References

- [1] Bernard Feilden & J. Jokilehto, Management Guidelines for world cultural heritage sites, ICCROM, Rome 1993.
- [2] Lucas and Harris, Ancient Egyptian Materials and Industries, (revised edition) London 1962.
- [3] Paolo Mora, L., and P. Philppot, The Conservation of Mural Paintings, Rome, ICCROM 1977.
- [4] Museums & Galleries Commission, Preservation Science Teaching Series, Science for Conservators, Cleaning vol. 2. Chapter, 1. pp. 14-15, New York & London. 1992.
- [5] Lotfi Khaled Hassan. "A Preliminary report, Conservation of wall paintings of small temple at Medinet Habu," Unpublished. The Oriental Institute, Chicago University. USA. 2007.
- [6] S. Quirke & J. Spencer, Ancient Egypt. London, 2001.
- [7] Paul Getty Institute, Nefatari Luci D'Egitto, Roma, 1995.
- [8] Kent Weeks, KV5: A Preliminary Report on the Excavation of the Tomb of the Sons of Ramses II in the Valley of the Kings, Conservation, 1994 -1999 P 135. AUC, Cairo. 2000.
- [9] H. J. Plenderleith, The Preservation of Antiquities, Oxford. 1934.
- [10] Johns Mills & Raymond White, The organic Chemistry of Museum Objects, 2nd ed., London. 1994.
- [11] J. Paul Getty Museum, Nefertari, Conservation of Wall Paintings, California. 1992.
- [12] Lotfi Khaled Hassan, Modern Conservation Technique: Wall Paintings in the Valley of the Queens, a Testament to the Beauty of a Dual Conservation-Restoration Approach, *International Journal of Archaeology*. Vol. 4, No. 6, 2016, pp. 95-102. doi: 10.11648/j.ija.20160406.12.
- [13] Muir, Kim." Approaches to the reintegration of paint loss: theory and practice in the conservation of easel paintings." *Studies in Conservation* 54: sup1, 19–28. DOI: 10.1179/sic.2009.54. Supplement-1.1.