The conservation and restoration of architectural surfaces as a learning process

Claudia Carvalho[1], Patricia Cordeiro [2], Thiago Turino[3], Gabriel Avellar [4]

[1.] Fundação Casa de Rui Barbosa, Ministry of Culture, Brazil. crcarvalho@rb.gov.br

[2.] Fundaçao Casa de Rui Barbosa, Ministry of Culture, Brazil, ccordeiro.patricia@gmail.com

[3.] Fundação Casa de Rui Barbosa, Ministry of Culture, Brazil. turino@gmail.com

[4.] Fundação Casa de Rui Barbosa, Ministry of Brazil. gpavellar@gmail.com

Abstract: In order to bridge the gap between theoretical, technical and practical attitudes towards Brazilian field of conservation of historic buildings, and to bring together necessary information to decision making process for the conservation of architectural surfaces of a 19th century Historic House Museum, a research project, involving different professionals from scientists, researchers and also workers, has been developed since 2011. This paper deals with the achievements of the research project Preventive Conservation Plan of Casa de Rui Barbosa Museum: Conservation of Architectural Surfaces emphasizing three aspects of the process that have been also been a training and didactic experience, both for researchers and for other professionals involved, as this kind of investigation is very unusual in the field of cultural heritage preservation in Brazil.

One aspect was related with lime based mortars and plasters issues, that included field experiences and the completion of a wall test mortars. The second aspect was a deepening in the conservation assessment procedures and the determination of the main problems to be addressed in the conservation/restoration works. The third aspect, which is now being concluded, deals with paintings and color technology, trying to map the different color approaches and kinds of paints already employed and to be employed during the interventions.

1 Introduction

The Casa de Rui Barbosa was built in 1849, and was opened as the first historic house museum in Brazil in 1930, in Rio de Janeiro, with a varied collection including a precious 19th century library with books on law, humanities and culture.

After more than 150 years from its construction, the building has changed by historical usage and alteration of natural material aging processes, and interventions that added cementitious mortars to external surfaces.

In 2008, the facades of a part of the built complex (a small pavilion and a former stable) were conserved using lime plaster to replace cements which had caused an accelerated rate of deterioration. The results exemplify the problematic issues of surface conservation. Soon after the end of the works the surfaces presented spots in the paintings and renders became detached; large areas were also affected by salt efflorescence. The problems were related to high humidity, the use of cement in the repairs and the alteration of the traditional characteristics of the building, and also the need of a more detailed specification and stronger field control.

The uncertainty of the extent of these areas and the observation of resultant changes and damage, motivated the development of a research project in order to establish a compromise to maintain authenticity and integrity without accelerating decay; to develop compatible materials and techniques, improving the skills of builders and craftspeople and to define building conservation techniques to remove damaged, deteriorated, contaminated and incompatible areas of plaster.

It has been observed in Brazilian conservation field that it is not clear for many professionals, managers and owners of cultural heritage that mortars and plasters play an important role not only in conservation but also in the determination of the significance of the cultural built heritage, and many works has been carried out as an ordinary maintenance.

The architectural surfaces of Casa de Rui Barbosa present both general and specific difficulties for their conservation and restoration. In the specific case where the house has an architectural value, a museum function, and the actual surfaces are not from the time of its construction but from later intervention (i.e. from the seventies), the conservation and restoration decisions are very complex.

In this sense, besides practical aspects the research intended to demonstrate that the conservation of architectural surfaces must be conducted using the established principles of the field preservation of cultural heritage, through historical research, formal analyses and technical knowledge.

2 Research Plan

A first research plan has been carried out in 2010, which has been presented at HMC2010, in Prague [1], which has been adapted in 2011, when the research was

launched funded by the Casa de Rui Barbosa Foundation through an internship program, and had the following working methodology:

1. Survey and consolidation of information including updating the Monument Documentation, adding systematic information on its structure, materials and construction techniques; consolidation of data relating to historical research, literature, and iconography on the building and its use; identifying additions and removals in the historic fabric.
2. Typological and formal analysis to define the specificities of the architectural surfaces of Casa de Rui Barbosa Museum regarding permeability, texture, color, rightness, consistency, transparency that should be considered in the conservation process.
3. Conservation assessment, identification and mapping of specific pathologies using scientific analyses when needed.
4. Establish parameters for running conservation of historical architectural surfaces, comprising the identification of additions to remove; identification of the original elements to be preserved; identifying the missing elements to be reintegrated; identifying the treatment of specific pathologies.
5. Definition of the technical procedures for the conservation of surfaces, including testing and monitoring.

Following the proposed methodology were conducted archival and bibliographic research, literature review, record of previous interventions, study of the building envelope, typological analysis, visual inspection and stratigraphic analysis of some sections of the facade. The results of this stage showed that the external architectural surfaces of the building undergone significant changes in its course in time, mainly due to interventions occurred after the 1970s, when there were introduced materials and techniques different from those originally used in building construction, particularly mortars, oil and acrylic based paints, which were current conservation practices.

Documentation of interventions is incomplete and inconsistent, and also we have no information about original design and construction. In this sense, the research had to deal with the existing materiality and also with the existing data provided by scientific research in this field.

Figure 1: House of Rui Barbosa 1930, 1970, 1980, 2013. FCRB files

3 Field Experience

As originally planned, an important aspect of the research was to improve the skill related with lime based mortars and plasters issues through field experiences and the execution of a wall test mortars.

In this sense, we carried out an experimental stage, using a variation of plaster and plastering mortars, various types of finishes and textures, as well as several paintings with the intention to better understand the behavior of exterior coatings based on lime, check its effectiveness, and establishing specifications for replacement mortars to be used for the conservation of historical architectural surfaces in general, especially in those of Casa de Rui Barbosa.

The field experience has been carried out in existing wall at the Museum´s garden, whose construction features hold great similarity with the external walls of the museum - stone masonry with clay and lime mortar.

It is known that the preparation of the support, as well as techniques for preparing and implementing the mortars combined to environmental conditions contribute to the quality of coatings as much as the materials used and its formulation. The development and application of mortars followed traditional patterns of mixtures, curing, storage application [2]. Through workshop were developed formulations of test-mortar, and craftsmen were trained to work with it in the wall test.

The first parameter defined was the type of sand to be used. The sands influence the behavior of mortar according to their particle size, and especially of their origin. We used a known source of sand, and washed free from impurities (clay, twigs, etc.). To ensure good cohesion between aggregate and binder was made to grading curve of the sand to ensure a balance in its composition.

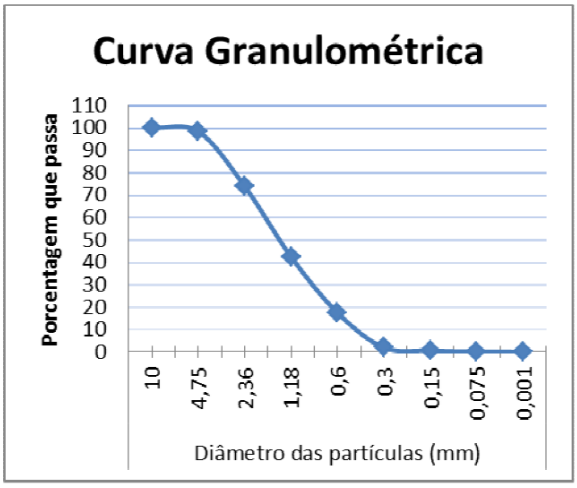

Figure 2: Grading curve of sand used in the test mortars. FCRB files

To define the lime would be used, it was considered important in the execution of the in the execution of the tests that could compare the materials and techniques of traditional mortar formulations with industrial lime products. Four groups of mortars were defined, two using with quicklime and two with lime industrialized.

To facilitate the application and analyzes the surface of the test wall was subdivided into four panels, and each panel variations of the formulations were applicated as follows:

1. Mortar test group A- used the known and traditional manner by professional's restoration, i.e., the use of quicklime paste, slaked on site and stand for two months before use. In plaster, a lime paste was mixed with sand grain size of less than 4.75 mm, with three variations of traces. In this group, were used two kinds of finishing, the first a pigmented grout sand with a particle size of less than 1,18mm, the stroke of 1: 1.5 and the pigmented paint according to a lime base with the addition of a small amount sand grain size less than 0,300mm, the trace of 1: 0.5.

2. Mortars test, B- group used a less common technique, which is quicklime in powder with sand in proportions and particle size defined for each trace. After preparation, this mortar was stored for one week prior to application. The particle size of sand used was the same as group A (less than 4.75mm) with three dash variations. Plaster and paint were applicated with the same formulation used in the test mortars group, with the only difference that the lime has been slaked along with sand and pigment.

3. Mortars test, C- group was used hydrated lime industrialized category CH-I [3]. To improve the performance of the material and better compare with the quicklime, this hydrated lime has been immersed in water during two months.

Traces of plaster varied in each panel and used particle size of the sand was the same as group A of less than 4.75 mm. The plaster was repeated the same formulation used previously in groups A and B, since the lime painting was done using the products developed by the same manufacturer of the lime, thus allowing a comparison with the traditional formulation.

4. Mortar test, group D was used hydraulic lime mortar ready (dry product) with addition of water in the proportion specified by the manufacturer. The finish was painting with silicate, from the same manufacturer, with the addition of pigment.

Table 1: Formulation of mortar test. FCRB file

FORMULATION OF MORTAR TEST						
TRACES USED IN THE TEST						
Group	**quicklime paste immersed in water for 2 months**	**quicklime powder**	**Lime industrialized immersed in water for 2 months**	**Sand granulometry under 4,75 mm**	**plaster pigmented with sand granulometry under 1,18 mm**	**paint with sand granulometry under 0,03 mm**
A1	1			2,5	1:1,5	
A2	1			3	1:1,5	
A3	1			4		1:0,5
B1		1		3	1:1,5	
B2		1		4		
B3		1		5	1:1,5	
C1			1	2,5		1:0,5
C2			1	3		
C3			1	4		
D1	Following specifications and materials of fabricator					
D2	Following specifications and materials of fabricator					

The implementation process was monitored and recorded in a report by the research team. All formulation and implementation steps were detailed item by item and after being prepared the mortars were packed in plastics tanks for a week before application. In each barrel was added a water bead on the surface of the mortar to prevent drying.

After the formulation of all mortars, it began the implementation phase which consisted of cleaning the surface to remove dust and dirt with a brush, humidification, release of the mortar with the trowel, using plenty impact to facilitate the adherence of the material. The mortars were applied in two layers (slurry mortar and plaster), being given finishing with plastic trowel in the last layer.

The group A had a dry mortar consistency at the time of application, with a lower workability hampering the work. Mortar group B showed very different consistency and appearance of the other, whiter and more pasty, which facilitated

the release and adhesion to the substrate, but by its weight showed cracks when the superposition of layers. The mortars group C showed a higher plasticity and easily be released to the wall by a larger proportion of lime slurry.

The mortar type D showed very fine texture, creating an aspect simulate mortar type "cimentcola". The application was greatly facilitated by their workability and the slower setting time than the others, being necessary to wait a day to applying the second layer of mortar and a few hours for final finishing. The final aspect of surface nothing like mortar applied in other panels. The mortar had a very smooth appearance and a gray coloration, which raised the possibility of the presence of some kind of additive not revealed by the manufacturer.

After application of the test-mortar the panels were monitored for 6 months, and ended this period samples were taken for laboratory testing. Planning for monitoring the behavior of test-mortar followed the manual of recommendations for visual monitoring with the use of techniques and materials for easy access. Started in the preparation of the mortars, and duration for one year after the application, the analysis refers to workability, water content, time of healing, the reduction in carbonation, the hardness (abrasion resistance), the cohesion, the variation in color and texture.

During the first two months of observation after applying the finishing variants applied in group B of mortars the test showed good cohesion, homogeneity in color and texture. The finish paint made some brush marks, but it was considered normal for the material used. The plaster showed less cohesion, but after the application of plaster and paint the result was satisfactory. The mortar showed no cracking, peeling or other pathology that could compromise their quality. Despite the sand grains of detachment in the initial period of observation, it was considered satisfactory its hardness and compactness. In relation to the visual aspects of color, texture and finish of the final homogenously, the results of group A mortar was considered very satisfactory.

The biggest question in the use of this mortar group in future interventions of the Museum's facade could be the difficulty of working with quicklime, to be extinguished and kept immersed for at least a month to achieve good performance.

Mortar test group B showed significant change in the plaster coating. Retractions gave rise to cracks visible to the distance (cited in the application cracks were observed), probably caused by the amount of water in the formulation of mortars and lowered rest time. Among the plaster mortars this group, the one with a more satisfactory behavior was the mortar test group B, 3, to present more sand ratio (trace 1: 5), which reduced shrinkage and consequently the number of cracks It was lower. The hardness and cohesion test mortars this group showed a very satisfactory result, and the mortar were very homogeneous, as a function of lime has been slaked with sand. Regarding the finish, the plaster appeared more homogeneous with respect to color and least for texture; and painting presented somewhat homogeneous results regarding color and texture. The lack of practice in the formulation of this type of lime mortar raises questions about its use on a large scale.

The group C mortar test showed good results with regard to the plastering with regard to cohesion, hardness and shrinkage. Already the finishes did not have the same performance. The plaster had a homogeneous texture but there was a slight variation of colors. In the paintings the results were well below both in colors that varied greatly, as in texture, very irregular.

The Group D-mortar test showed very different results in relation to the other. The smoother texture, very similar to a cement mortar, more gray color, highly cohesive materials and much lower hardness. The paint employed in this mortar, the base potassium silicate show uniformity with respect to color and texture, but its finish, slightly glossy, can compromise the outcome when used over large areas.

Figure 3: Overview wall test. FCRB Archive by Claudia Carvalho

4 Conservation Assessment

The second phase was a deepening in the diagnoses procedures and the determination of the main problems to be addressed in the conservation/restoration works. The problems arising from the use of cement mortars for restoration of buildings built with traditional materials are well known, explains R. Veiga: Thus, cement mortars have a finished look very different mortars of prints, in terms, for example, surface texture, so as to reflect light. Furthermore, it is known that contains soluble salts in its composition which are transported to the interior walls and there crystallize, contributing to its degradation. It has been found that also other sound unfavorable characteristics such as excessive rigidity and allow a limited drying capacity of the wall (…)[4].

It is also known that the use of cement screed most affects the structures exposed to more severe moisture conditions - high rainfall, and structures with high moisture content inside, caused by variations in the levels of the water table and deficiencies in coverage . Walls can be saturated with moisture under the waterproofing layer of cement screed, which accelerates the process of deterioration.

In step relating to identification of pathologies, it proceeded to a conservation assessment, including damage mapping, and analysis in situ of surfaces characterization. It is found that materials compatibility used and environmental aggression, affected over the lower surfaces composed of a cement mortar finished like "rough plaster" with plastic paint in dark gray color, which is a waterproof cover for the basement of construction. In this excerpt, the main pathologies identified are loss of cohesion and loss of grip, and a worsening in the condition of the masonry with the presence of salts. According to M. Tavares: The main causes of deterioration of an outer coating are generally the same as that affect architectural structures. The deterioration of a coating occurs due to several factors: physical, mechanical, chemical or biological, one of the main forms of degradation to loss of cohesion, which is the loss of mechanical strength of the plaster layers, due to the loss or alteration of features binding between the particles; and the loss of grip, which is the separation or detachment may occur between the different layers of a plaster or between the plaster and the support. These degradations cause the coating the appearance of various anomalies: peeling, detachment, detachment, breakdown, chalking, cracking and gaps (..)[5].

At the top of the walls, coated cement mortar and finishing acrylic paint in pink salmon color, the situation observed by visual inspection until now, has apparent damage to a lesser extent, the main problems related to the layers of paint, and not to the coating layer. Percussion examinations and laboratory analyzes will be conducted to bring it to a more conclusive diagnosis in relation to masonry conservation status in this area.

At the same time, it was defined the need of an update in the damage mapping of the facades of the Museum, using the recommendations of UNI standard: 11182/2006, which replaced the NORMAL 1/88 [6]..

This standard stipulates for each pathology linked to "natural stone" or "artificial stone", a specific nomenclature followed by a definition. Accompany further examples with photographs of the condition in question.

The main difference between the standard UNI 11182: 2006 and its predecessor, the Normal 1/88, is that the latter defines a standard hatches for each pathology, which facilitates and assists in the implementation and representation of the damage mappings.

For this reason, we decided that we would use in our damage mapping the hatches of Normal 1/88 to illustrate the pathologies identified and defined in the UNI 11182: 2006. Already been completed mappings of the facades, accompanied by photographic record for all the different pathologies found.

As a product of this work, printed boards were generated, containing the design of facades in scale 1/100. In these drawings, are represented by the subtitle system made by colorful hatches, all the pathologies encountered.

In addition to the printed boards, a standard plug damage classification system was designed. These chips, made individually for each different type of pathology in the existing facades of the Museum, posted the code; the name on the standard and its proper translation; the substrate; the localization; the date; the example of pathology through photograph contained in the UNI; the representation used by NORMAL 1/88; the description for implementing the hatch in CAD; Pathology photo on the facade of the museum and the definition according to UNI.

5 Color Technology

The last phase, which is now being concluded, deals with paintings and color technology, trying to map the different color approaches and types of paints already employed. The beginning of questioning the meaning and preservation of color in architectural heritage is quite recent and is a result of evolving theories of conservation and urban preservation, discussed since the eighties years in some European countries.

The chromaticism of architectural coatings is of great importance for the impact they have on the surrounding environment. The color is closely related to the type of material and the pictorial technique.

In several European countries from the seventies it was given the warning about the destruction (intentional or accidental) of original chromatic coatings in historic buildings. Since then, record and preserve the remaining witnesses has become a growing concern in debates about the color of the built heritage that increasingly call for the need for specialized technical training and joint action of multidisciplinary teams.

The Casa de Rui Barbosa Museum is a building from 1850, whose construction system provides solutions of traditional Brazilian architecture. The facades shows the influence of neo-classical architecture, and in the seventies it has been painted in salmon pink color which gives the whole a formal unit, and has been repainted with acrylic based paint in the eighties. As well as cement, modern paint, called plastic paints also bring big problems for the conservation of these historic surfaces, the incompatibility of these paints with lime mortar is due to its waterproofing properties, forming a film that prevents evaporation and retain moisture inside walls. At this time just the film will suffer one process micro cracks that allow the entry of water and increasing the internal moisture of a process leading to bloating and break the layer of paint and exposure of the support mortar.

Given the bad aesthetic results and weak durability demonstrated by many modern paints applied in old buildings, attention increasingly turn to the reintroduction of traditional materials and painting techniques consistent with the original finishes.

Silicate inks has been applied on the facades of old buildings with great success is a dye whose mineral components, widely available in nature, amount to over 95% by weight, such as potassium silicate, quartz, limestone, inorganic pigments and rheology modifiers, and at most 5% of dispersants, polymers and water-repellent. The crystal structure of the silicate ink allows to maintain high vapor permeability between the atmosphere and the plaster, leaving the surface dry at all times and avoids the proliferation of fungi, algae, molds the accumulation of dirt and the formation of bubbles in the ink. These features provide healthier environments.

The vapor permeability combined with hydro repellency ink silicate, which holds moisture and condensation-free surface, and its highly alkaline character, fighting the spores, prevent the formation of an enabling environment for the installation of fungi and algae.

The microcrystalline structure of silicate paint, reflects light and heat more intensively, aiming at thermal comfort inside the building. In hot climates, this reduces stress on the plaster, avoiding possible damage.

Because of its mineral composition, the paint has high resistance pollution, dirt and acid rain, protecting it from aggressive atmospheric gases. The use of inorganic pigments provides greater color durability, even in harsh climates or under strong direct sunlight (UV resistant). The use of organic dyes is only suitable for indoor environments.

A field experience has been done, and the results are being analyzed in the time of this article is being written.

Figure 4: Wall Paintings testing

6 Procedures

The action taken on architectural historical surfaces may have two main approaches, the first, as suggested by Carbonara is when minimal intervention is possible to consolidate the plaster and stabilize the painting, keeping the sense of passed time. The second is related to a situation where it is impossible to avoid surface renovation. In this case the solution must be seen as an addition, based on critical judgment and technical analyses, developed to preserve the aesthetic and historical values of a building. Such a solution must not be a retrospective falsification, and must bear in mind technical compatibility and the ability for its re-work in the future.

The removal of cement mortar can promote serious problems in traditional masonry, although it is normally recommended, as well as the use of lime-based mortars for replacement as they can be more compatible and offer a better protection. In the specific case of the architectural surfaces of the Casa de Rui Barbosa, the solution is to remove an addition and do something to offer a better protection for masonry. In this sense what is adopted is a lime based mortars and silicate paints, based on the theoretical principles and technical preservation of cultural heritage.

In our proposal prevails the intention of minimal intervention on the materiality of surfaces while preserving the most of consolidated image of the monument in recent decades, without causing disruptions, fostering its permanence and continuity, based on technical and scientific criteria.

The aim is to systematize procedures to prevent and avoid the need for larger interventions and allow managing the building changes in close relationship with the nature of the materials, the technical characteristics and interaction with the surrounding environment.

7 Final Considerations

The exterior architectural surfaces, commonly understood as a sacrifice surfaces, has been the subject of conceptual and technical discussions for their conservation. There are at least four decades, there is a growing interest in the preservation of finishes and colors of the facades, especially in Europe. In our country also we check up the development of studies and research for the best knowledge of the constitution of traditional surfaces, materials and construction techniques as well as the adoption of conservation methods in line with international standards. However, the understanding of its figurative value acquired with the passage of time and its recognition as a historical record require evaluation capacity not always present, as observed by B. Kühl:

Passages of time signals are less and less appreciated in our society. With this current trend for renewal and pasteurization surfaces, much is lost of wealth and resulting vibration of the own traditional methods of execution mortars and paints and "accidents" in the life of a work. It must be remembered that the aim of a

restoration is not to offer an image of the past easily consumable, crudely simplified to make it more palatable to the massiveness taste. It is rather, explore and appreciate the richness of the stratifications of history. This can be achieved through historical-critical act, antidote to the current trend of turning to frivolous colors - that in our environment often is translating in garish colors that come to prevent the own appraisal of the property, such a cacophony that require the work -. or amorphous colors, which do not relate to the tectonic characteristics and composition of the work [...][7].

Understanding these plural aspects make the conservation of surfaces a theoretical and practical problem of restoration, and cannot be considered only as routine maintenance. It is an action involving both the form and the material of the building, and that should not be performed as a mere scenic treatment, on the contrary, must consider the architectural object as a whole in its functional complexity, aesthetic and structural [8].

We must safeguard the technique, the functionality and aesthetic aspects being mentioned a project for intervention involving a thorough knowledge of the history, technique and condition of these coatings, articulating various fields of knowledge. There are few documents dealing with the restoration project methodology / conservation of exterior architectural surfaces, but there are among the works that search a systematization

The preventive and sustainable conservation approach of the works that have been applied at Casa de Rui Barbosa imposed a deep reflection about the changes in the use and maintenance of the house during its historical time as a residence and nowadays since it has become a historic house museum. The maintenance routines varied very much and also preservation policies including restauration works altered its original architectural characteristics, making the understanding of deterioration process every day more complex, requiring an investigation and a critical assessment in order to improve the building condition and maintain its authenticity. Bridging the gap between theoretical, technical and practical attitudes towards the traditions within heritage conservation in Brazilian context, this research project, launched in 2011, has as a main goal to increase the knowledge about the role of mortars and plasters in the determination of the significance of the cultural built heritage.

Actually there is a lack of knowledge about the repair materials available in the national market and the concrete results of its application in the historic buildings. We tried to make its more understandable throughout field experiences that improved skills and showed what are the points we need to go deeper. This is expected that the reflections and proposals of this paper will contribute to an increase in the conservation works at Casa Rui Barbosa as well as at other sites throughout Brazil that present similar challenges.

8 References:

1. Carvalho CR, Kanan MI. (2010) Rui Barbosa Museum´S Architetural Surfaces In Rio De Janeiro: Reflections And Planning Issues. In: 2nd Historic Mortars Conference. Prage, Czech republic.

2. Kanan MI (2008). Guide of conservation and intervention in lime-based mortars and coatings. IPHAN / Monumenta program - Technical notebooks - n° 8. Brazil.

3. ABNT Brazilian Association of Technical Standards (2003). Hydrated lime for mortars – Requirements. http://www.abntcatalogo.com.br/norma.aspx?ID=002473. Assessed 26 april 2016.

4. Veiga MR (2004) The Conservation and renovation of walls coatings of Ancient Buildings. LINEC, Portugal.

5. Tavares MV, Aguiar J, Veiga MR (2005) A Study Methodology for the Conservation of Old plasters : The Restoration Consolidation Technique Through. Portugal

6. Normal (1988) Normal 1/88. Alterazioni Macroscopiche dei Materiali Lapidei: Lessico. Italia.

7. Carbonara G (1997) Avvicinamento al restauro. Napoli.

8. Kühl B (2004) The treatment of architectural surfaces such as theoretical problem of restoration. Paulista Museum, São Paulo.

9 Acknowledgements

During the development of the research we could exchange information and experience with many institutions we would like to acknowledge, especially Laboratorio Nacional de Engenharia Civil, Universidade Federal de Pernambuco, Laboratório Hercules, Universidade Católica do Porto e Universidade de São Paulo.

The authors aknowledge Dra. Maria do Rosario Veiga from LNEC by providing a very special presentation of the results of her researchs both in Lisbon, during Claudia Carvalho´s techicnal visit to LNEC and in Brasil, in Casa de Rui Barbosa Foundation where she made a very impressive workshop on the theme.

The authors aknowledge Dra. Maria Isabel Kanan for being consultant during the whole process of the field experience, and for sharing with the staff components her huge experience with lime mortars and plasters procedures.

EDUARDA??