

## Salvage of Paper Materials from the Flooding of São Luiz do Paraitinga

### INTRODUCTION

São Luiz do Paraitinga, a city of São Paulo State, Brazil, is considered a cultural and historical heritage site. Located to the East of São Paulo in the region known as Vale do Paraíba it was founded in 1769 when that part of the state was being settled.

The city has a total area of 737 Km<sup>2</sup>, an altitude of 760 meters and a population of just 11,000. Its main characteristic is the rich heritage of material and non-material regional culture of the countryside of São Paulo State, such as the street Carnival, the religious commemoration of Divino Espírito Santo, colonial buildings, etc.

Recognition of the city as a cultural landmark began in 1983 when part of the city historical center was designated a State Heritage Site and continued in 2002 when it was given, by the State Government, the title of “Estância Turística” (a landmark), which brings to the city additional funding to be used for its own improvements.

On January 1st, 2010 the city experienced a devastating flood which resulted in destruction of most of the city. Historical and public buildings, monuments and houses were seriously damaged. There was structural damage as well as loss of documents from the city’s administrative center. Personal documents, such as those relating to retirement paperwork, medical certificates, maternity leave, legal process, and contracts, for example, were significantly damaged or completely destroyed by the flood water. These documents from the Municipal Government and Public Ministry are essential in order for citizens to receive their state benefits. With the damage and destruction of these documents most of the population lost their legal identity.

The Nucleus for Conservation of Public Files of São Paulo—APESP and the Nucleus of Restoration—Conservation Edson Motta, from National Service for Industrial Apprenticeship (NUCLEM-SENAI), worked in conjunction to salvage these documents. However, due to

bureaucratic reasons, access to the Municipal Government and Public Ministry documents was only authorized 26 days after the flooding.

Three technicians from the State Public Archive and one from SENAI were sent to São Luiz do Paraitinga to salvage the documents. The first allotment sent to the Archive had been found stored on the second floor of a building located in front of the river. The materials found there were in an advanced state of deterioration because they had not been cared for since the flood. They were all adhered together with mold and mud and stored in drawers which were also muddy. The documents were taken from the drawers and re-housed in polypropylene corrugated boxes for transport to the city of São Paulo 181 Km away.

In Brazil there are few local bibliographic references to preservation emergency response and salvage work of this size and complexity. Generally there is little information in Portuguese about large salvage operations.

Because this was an extraordinary event for the country, we had many challenges and difficulties in preserving the documents. There were no salvage workers trained to preserve books and documents which were deteriorating because of being under water for more than twenty days and there were no specialized salvaging companies or freeze drying or lyophilisation facilities. We had financial constraints and no time to come up with a “big plan”. With an enormous material challenge during a community crisis, we had to immediately devise and put into action a practical plan to treat as many items as possible within the capabilities of our limited resources. A completely manual protocol was developed and implemented to recover the documents.

The above mentioned collection was treated in three allotments: the first two included 800 files of different thickness, weight and dimension, 14 linear meters of documents from the 1970’s up to today with a variety of paper types and formats, multiple handwritten ink and printing processes, photographs and reprographic copies. The third one had 176 files (3.52 linear meters) and the same variety of paper types and formats, types of media, and production processes.

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## METHODOLOGY

The procedures described below were all compatible with technical methods and criteria of paper conservation and were developed in the APESP laboratory for the first two allotments:

- Drying procedures: the documents were arranged in a wide space with constant natural and artificial ventilation as well as dehumidifiers. The process took approximately ten days with variations of temperature of 24°C and 27°C and 60% to 75% UR.
- Document pages were interleaved with absorbent papers which were frequently replaced during the work shifts to facilitate the drying process and to mitigate the adhesion of sheets. The papers used in this process were Vergé®, paper towel, alkaline Chambri® 120g/m<sup>2</sup> and filter paper depending on the availability of the laboratory's stock:
- As there was no inventory of the material received by APESP, data was recorded on a detailed technical form which described the characteristics as well as the preservation state of each of the documents found in the files. This was a fundamental step for performing the job safely and efficiently as there were absolutely no references documenting the contents of the files. It also helped in documenting the quantity of documents sent for recovery. The technical form also described the content of the files, maintaining the original folders identification (names and numbers).
- Sheets which remained adhered despite interleaving during drying, were cleaned with brushes and attempts were made to mechanically separate the dry blocks into individual sheets.
- Aqueous immersion treatment with deionized water was used to separate sheets strongly adhered together. Many of them resisted all mentioned treatments and because of that, they were kept as they were.
- Aqueous immersion treatment with deionized water and the use of brushes was also used to remove the excess of mud on the dirtier sheets and on documents where the text was obscured by deposits.
- Topical or immersion treatments of 70% ethanol and 30% deionized water were used in order to treat mold on the documents.
- Supports were stabilized with Japanese paper Kamino 6g/m<sup>2</sup> and adhesive methylcellulose.
- Sheets with significant planar distortion, particularly where text was obscured, were humidified and dried under weight.
- The documents were then placed in alkaline paper file folders 120g/m<sup>2</sup> and stored in corrugated polypropylene boxes.

## THE THIRD ALLOTMENT

Due to wrong information, the documents belonging to this allotment were kept wet in black plastic rubbish bags. They were sent to APESP after three months. As a result, the material was strongly infested by a variety of mold.

Using traditional methods to mitigate such a big infestation, even drying the material, would certainly not give effective results. It would also jeopardize the technicians' health as well as the health of future users. Another consideration was that the documents would have to be returned to the city administrative center where there are no environmental controls. The poor environment could exacerbate the mold growth and create the possibility of mold spreading to other areas of the collections.

It was decided therefore, to submit the documents to gamma-rays cobalt-60 from a multipurpose compact type radiator from the Radiation Technology Centre for Nuclear and Energy Research Institute - CTR-IPEN. A dose of disinfection (about 11kGy) was applied to reduce the bio burden. It is well known that doses used for sterilizing (25kGy) are considered way too high for materials based on cellulose because it degrades them.

## RESULTS AND DISCUSSION

The constraints of scarce financial resources played an important role when deciding on assembling the team and conducting treatments. It was not possible to maintain a pattern referred to the use of materials so, it was necessary to use only what was available in stock.

The team included permanent and temporary staff. The permanent staff included four technicians in preservation and conservation of whom only one of them was available daily to supervise the job. The temporary members were employees or students apprentices of High or Superior School. It was possible to keep, on average, four people working constantly although sometimes there was only one—and this one was a temporary member of the staff. Therefore, the team did not have the required experience and had to provide several practical training courses due to frequent personnel changes.

The procedures were based solely on manual techniques (except for the use of ionizing radiation); this was also due to lack of technical resources in the country. Despite all the difficulties faced and despite the minimal experience in document salvage, it was possible to create conditions to efficiently train technical staff, adapt material resources, and devise and implement salvage protocols and techniques.

For the first and second allotment of eight hundred files which had been wet for more than twenty days, the drying process implemented by the APESP team showed to be effective in inhibiting mold growth. Only 30% of the documentation needed disinfection (topical or immersion).

Comparing the third allotment with the first and second which did not receive irradiation, it was possible to see that after irradiation:

- The mechanical cleaning process was much easier;
- Removing spores was easier when using brushes. It appeared as just a layer of dust.
- The adhered sheets separated quite easily in spite of their advanced state of degradation caused by the improper storage;
- The conservation treatment of the material was rapid especially when compared to traditional techniques.

Other advantages noticed in the ionizing radiation process are:

- There is no need for quarantine;
- No toxic or radioactive residuals produced;
- It can be applied to large quantities and varieties of materials simultaneously;
- It can be applied to the documents transportation housing;
- It is a fast procedure and;
- Costs are acceptable.

Despite the constraints of limited financial resources, limited professional staff, limited supplies, no access to salvage companies, facilities and equipment, no published reports of local responses, and little experience in large scale emergency response, the results of the operation were rather satisfactory and marked a milestone in the Brazilian history of treatment and conservation of materials damaged by disasters. The documents in the three allotments were rescued over a long period of time which took eight months. In the meantime, all procedures, implemented according to criteria described in the “Methodology” section and manual for the most part, resulted in 95% recuperation of the documents belonging to the Municipality and Ministry. However, without using Gamma radiation obviously there would not have been such a significant success.

## CONCLUSIONS

It is significant that the procedures devised and implemented were made available within the Brazilian preservation community and that they established procedures to follow when there was no precedent available. As APESP and SENAI are reference centers and provide for the dissemination of information concerning the preservation of paper based material heritage, this project has already increased the available knowledge and in helping to generate new debates and discussion topics concerning Preservation in Brazil. The devised and implemented procedures allowed us to return these crucial documents to the city of São Luiz do Paraitinga in conditions that permit safe handling for research and other

uses that require access to the contents of the documents. This makes possible the retrieval of official information critical to the Luizenses citizens’ lives and restores to them the legal identities.

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