

# The Glass Plate Negative Project at the Heritage Conservation Centre

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## Abstract

This article discusses the glass plate negative preservation project undertaken by the Paper Conservation team at the Heritage Conservation Centre (HCC), Singapore in early 2012. This historically significant collection of early landscape and portrait photography in Singapore belongs to the National Heritage Board (NHB) and numbers approximately 1,700 plates dating from the late 19th and early 20th century.

During an initial condition survey, most of the plates were found to have accretions, surface dirt, old labels, fingerprints, and breaks. Storage was generally inappropriate with different types and sizes of plates stacked in piles. Following the survey, in order to prioritize treatment needs, the plates were divided into three treatment categories: no treatment, minimal treatment, and extensive treatment.

Minimal conservation treatment, primarily surface cleaning, was first carried out on the plates in order to stabilise them. Plates requiring no treatment and minimally treated plates were then individually wrapped in four flap folders and housed vertically in archival quality storage boxes. Each box contained about twenty plates, sorted according to type and size. Extensive treatments including glass repair, emulsion consolidation, and extensive surface cleaning was conducted by trained conservators as time and resources permitted.

The conservation and re-housing of these plates not only ensures long term preservation, but also facilitates their retrieval for research purposes. The experience gained by this project has also allowed HCC to better promote safe handling and researcher access to collections of this type.

## Historical Background

The history of photography in Singapore dates to the mid-19th century with the establishment of many European commercial photography studios, Sachtler & Company and G.R. Lambert & Company being prominent. As they documented the early landscape and people of Singapore, the negatives inevitably became part of Singapore's material culture, being particularly significant as they also capture the photographer's intent. The glass plate negative collection of the NHB is comprised of items from G.R. Lambert & Co. (figs. 1, 2) and numerous other early studios.

The first repository for the collection was the National Museum of Singapore, though there is little information on how the negative came to be there. Established in 1887, the National Museum is the earliest museum in Singapore. The plates were stored un-accessioned in the museum, though some had generic numbers applied with pressure sensitive tape. The

collection was later moved to HCC, which is a centralized storage facility for NHB collections. It is purpose-built, providing climate control storage, collection management and conservation services.



Fig. 1. 'A Nonya' - an original gelatin dry plate by G.R Lambert & Co. (*left*).

Fig. 2. The negative's positive image (*right*).

Courtesy of the National Heritage Board, Singapore.

## Objectives

This project began with a preliminary survey carried out in 2011 by the HCC Paper Section. From the survey, it was found out that the plates were not housed in proper conditions. Most of the early housing methods and materials were in need of improvement (figs. 3, 4) as they had resulted in damage to the plates. In addition, this collection had never been surveyed or treated by trained photograph conservators. This project presented a good opportunity for HCC to examine and preserve this historical collection, while building a more in-depth understanding of it. Following the preliminary survey, a detailed, randomized survey was carried for the first 100 plates, which eventually lead to the conceptualization and implementation of this project.



Fig. 3. Glass plate negatives were stored inside the document drawers at HCC archival storage.



Fig. 4. Assorted plate formats were stacked inside each box.

### Survey and Treatment Categorizations

During the survey (fig. 5), three main standard formats were noted in the collection,  $3\frac{1}{4} \times 4\frac{1}{4}$  in. (quarter plate),  $4\frac{3}{4} \times 6\frac{1}{2}$  in. (half plate) and  $6\frac{1}{2} \times 8\frac{1}{2}$  in. (whole plate). The half plate collection in NHB belongs to the English format, smaller than the American half plate (5 x 7 inches). The majority of the negatives are half plates, comprising approximately 60% of the entire collection. Collodion wet plates and gelatin dry plates were both found in the collection. Both negatives utilized glass as the primary support and were widely used in the 19<sup>th</sup> century, dating from circa 1851 and 1878, respectively.

The collection was assessed according to its condition and further categorized according to treatment needs. Three categories were assigned: Category 1 (Cat. 1) - no treatment, Category 2 (Cat. 2) - minor treatment, and Category 3 (Cat. 3) - moderate to major treatment (see table 1). This categorization process was important as it helped to estimate the amount of time and funds required for the entire project. From the 2011 survey, approximately 90% of the plates were identified as requiring some form of conservation treatment,



Fig. 5. A randomized survey was carried out in early 2012.

and the whole collection needed re-housing. In early 2012, the negatives were sent to the lab for treatment.

**Table 1. Descriptions of Treatment Categorizations**

<b>Treatment Category</b>	<b>Condition Definitions</b>	<b>Treatment Needed</b>	<b>Estimated Distribution</b>
Cat. 1	<ul style="list-style-type: none"> <li>• Generally stable</li> <li>• Minor finger marks or stains</li> </ul>	<ul style="list-style-type: none"> <li>• No treatment required</li> </ul>	3%
Cat. 2	<ul style="list-style-type: none"> <li>• Dirt, accretion and stains on the glass side</li> <li>• Dried mould spots on the glass side</li> </ul>	<ul style="list-style-type: none"> <li>• Required minor treatment such as cleaning and tape removal</li> </ul>	90%
Cat. 3	<ul style="list-style-type: none"> <li>• Plate breakages</li> <li>• Severe accretion and staining on glass and/or emulsion side</li> <li>• Flaking of emulsion layer</li> </ul>	<ul style="list-style-type: none"> <li>• Required moderate to major treatment</li> <li>• Major cleaning on the glass and/or emulsion side</li> <li>• Glass repair</li> <li>• Accretion removal on both sides</li> <li>• Emulsion consolidation</li> </ul>	7%

**Conservation Treatment**

Information about each plate including subject description, type of plate, previous generic numbers, and inscriptions found on the plates had been recorded during the survey. In collaboration with HCC Collection Management Team, the plates were assigned new numbers that were pencilled on the top edge of each four-flap folder during the rehousing.

**Cat. 1 - No Treatment Required**

The treatment project for the collection began in early 2012. The plates were brought to the lab in small batches, and the team proceeded to treat and re-housing them (figs. 6, 7). Because the Cat. 1 materials were stable, only re-housing was required. The negatives were individually wrapped in four-flap folders and housed vertically in storage boxes.

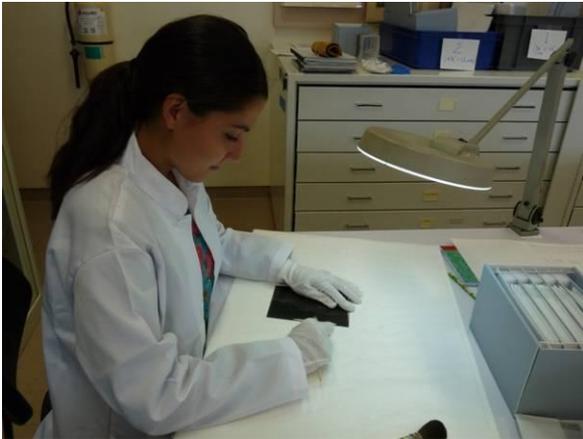
**Cat. 2 – Treatment**

Most of the glass plates were categorised as Cat. 2, and the treatments carried out for this categorization involved mainly the glass sides of the negatives. These Cat. 2 materials were considered structurally stable; however, they exhibited dirt, accretions, and finger marks which necessitated surface cleaning. Pressure sensitive tape labels having no historic value were removed mechanically (fig. 10). Swabs dampened with water/ethanol solutions (50:50 or 70:30, depending on the requirements of each object) were used for reducing stains or tape residues.

Whatman lens tissue, which has a smooth surface and does not leave fibres behind, was used to gently wipe off any residual marks. HCC conservators were assisted with these Cat. 2 treatments by two interns, Ms Alison Bryan and Ms Emily Hick, during their internship programs with the HCC (figs. 8, 9), during which Ms Bryan and Ms Hick worked under the supervision of the HCC paper conservators.



Figs. 6, 7. The Paper Section team working together on the project.



Figs. 8, 9. HCC interns, Ms Alison Bryan and Ms Emily Hick carrying out glass plate negative Category 2 treatments.

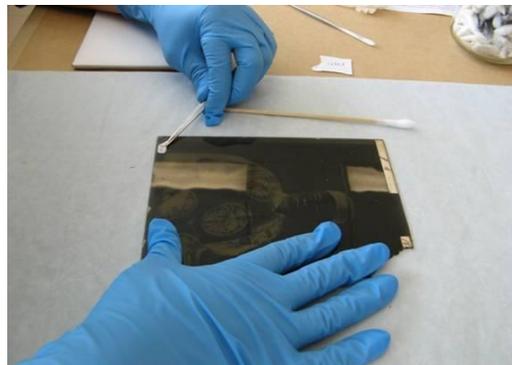


Fig. 10. Pressure sensitive labels were removed during the treatment process.

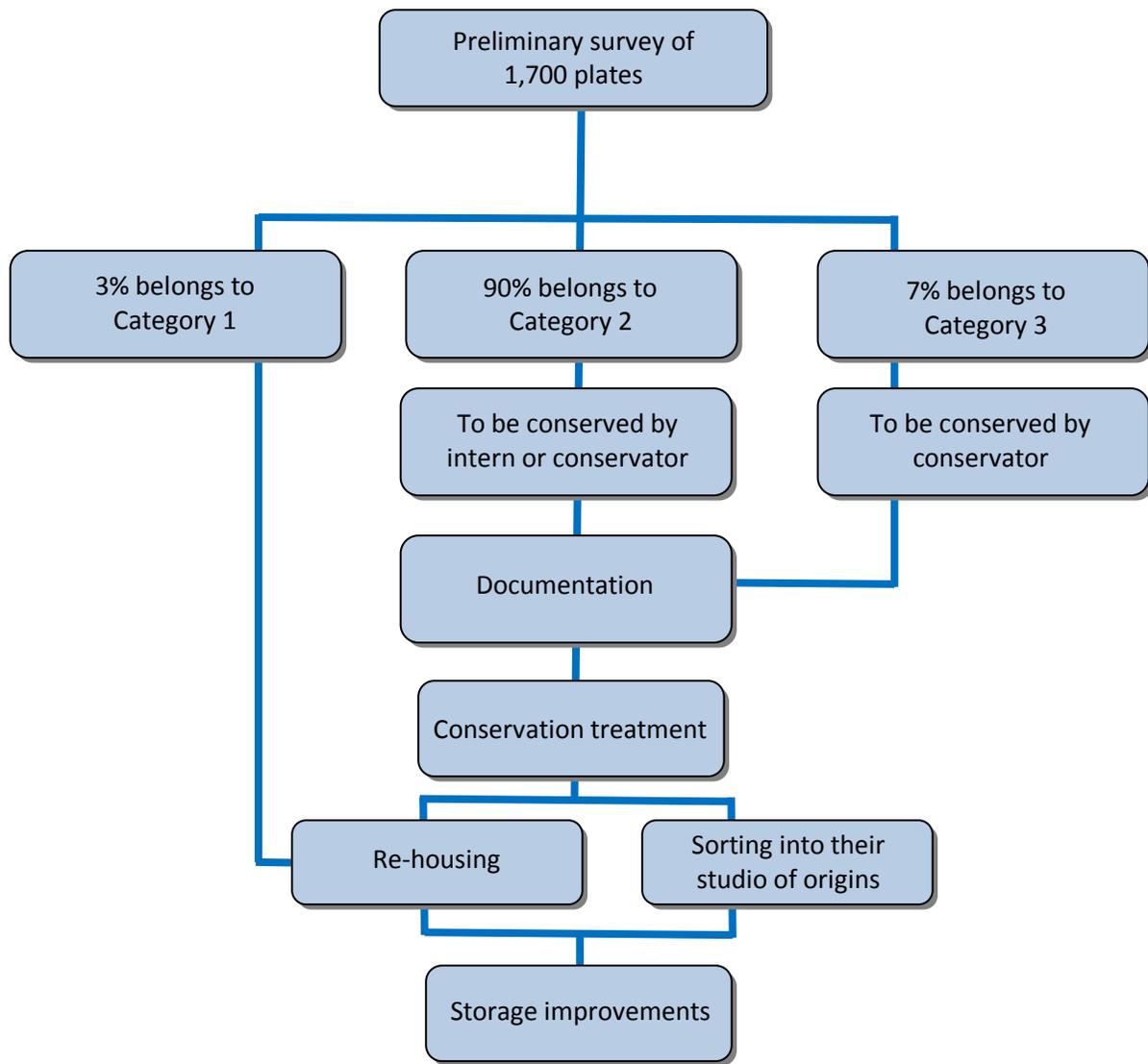


Fig. 11. The glass plate negative project strategy.

### Cat. 3 – Treatment

The plates identified as Cat. 3 were treated only by the paper conservators as the treatments required a higher level of technical competency, as outlined within the project strategy (fig.11). Due to the complexity and time consuming nature of these treatments, conservators began working with Cat. 3 objects only at the later stage of the project. These objects will continue to be treated over the course of the next several years.

The condition of Cat. 3 plates was varied. Most suffered from one or more of the following: severe accretions on the emulsion side, paper accretions/residue overall, dried mould stains, plate breakage, and emulsion lifting or flaking as seen in figures 12 and 13. In order to address these issues, treatment of the emulsion surface was required. Extra care was taken as the emulsion can be very sensitive to moisture, especially if the emulsion had degraded. They were surface cleaned with a soft bristled squirrel hair brush, minimizing the risk of scratching. Pressure sensitive labels adhered to the emulsion sides were removed mechanically. Depending on the amount of tape residue, a swab lightly dampened in a water/ethanol (90:10) solution was used to gently remove the label. This was only done when the emulsion layer had no damage or presented no risk of flaking.



Fig.12. Emulsion flaking and loss on a wet collodion plate. Courtesy of the National Heritage Board, Singapore.



Fig.13. Broken glass plate negative. Courtesy of the National Heritage Board, Singapore.

For the treatment of the broken glass plate negatives, the team adopted the repair method developed by Katherine Whitman (Whitman and Wiegandt 2007). The broken shards of glass are aligned and adhered vertically with the aid of *lightline* as recommended. A slight modification was made to Whitman's method by using button-size magnets on opposite sides of the plates to hold them together during alignment and adhesion, instead of wax, which was recommended. The decision to use magnets was taken as most of plates that are broken are not severely shattered. This method was first encountered and experimented with during an internship the author undertook at the Canadian Conservation Institute (CCI) in 2010 (fig. 14). Silicon release Mylar is placed between the



Fig. 14. The author repairs a glass plate negative during an internship program at the Canadian Conservation Institute.

magnets and the plate to prevent the magnets from adhering to the plate if excess repair adhesive is present. After the treatment, the plates are placed in sink mats in order to minimize direct handling, potentially dislodging the shards.

### Plates with Edge Losses

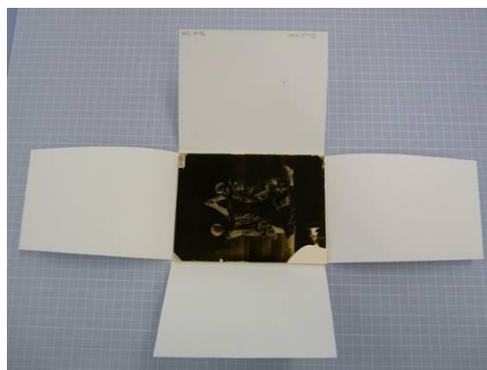
Plates that were found to have moderate cracks or edge losses required immediate attention in order to reduce the chances of further damage occurring. Museum quality mat board was used as rigid secondary supports beneath the plates in the four-flap folders. For plates with larger losses, which could be further damaged, another piece of mat board was cut and added as an 'in-fill,' providing additional support during storage. By tracing the shape of the losses with a fine tip pen and Mylar sheet overlay, an appropriately-sized 'in-fill' was cut (figs.15, 16). The 'in-fill' was then adhered to the secondary support mat board with 3M #415 double sided tape. It was found that 4-ply mat board was matched the thickness of most of the glass plates. The negatives were then placed together with the secondary support board and 'in-fill' (figs. 17, 18) in a 4 flap folder in order to minimize further damages when handled.



Fig. 15. The plate was placed over the board and was aligned on left and right sides.



Fig. 16. Fine tip pen and Mylar sheet was used to trace the loss area.



Figs. 17, 18. The plate was placed on the backing board and fitted into the 'in-fill' board (*left*) before storing into the four flap folder (*right*).

## Storage System Improvements

During the survey, it was observed that all the different-sized plate formats were stacked horizontally on top of each other. This storage method was inappropriate as it placed significant pressure to the plates, particularly those at the bottom of the stacks, and also compromised safe handling. In order to improve this storage system, the conservation team decided to adopt a vertical storage system, helping to achieve the project objectives of easy object retrieval while promoting safe handling of the collection.

The specifications of the storage materials were carefully considered. All storage materials had to meet the criteria for conservation standards - being free from harmful components and any off gassing chemicals that could cause oxidation of the image silver or staining and deterioration of the gelatin. There were initial challenges with the procurement of standard size enclosures and storage boxes that best fit the plates. The glass plate negative vertical storage boxes and four flap paper enclosures offered by the supplier were found to be slightly larger than NHB's glass plates. Though customizing the boxes would have been the ideal solution, the team decided to go ahead and purchase the standard size boxes in consideration of time constraints and cost effectiveness, especially as the survey was still ongoing. Bond paper and glass plate negative boxes were selected and purchased from Talas conservation supplies in New York. Bond paper, which was used to make the four flap folders, was selected because of its smooth surface, which will not cause further abrasion or lifting of the negatives' emulsion. When considering what size storage boxes to purchase, the team took into account safe



Fig 19. Ethafoam was added to the base of the box.



Fig 20. After assembling the partitions, the sides were filled with Ethafoam strips.

handling practices. Having too many plates in each box would result in very heavy boxes, putting the negatives at risk when accessed.

HCC interns and temporary staff assisted in cutting the four flap folders and completing necessary box modifications. Templates of the standard-size glass plate negative four flap folders were created by using 8-ply mat board to facilitate the cutting process. Each folder was individually cut and folded to conform to the plate's size, ensuring the plates would be housed

snugly within the folder. Medium density Ethafoam (*DOW* natural polyethylene foam) was used as a filler material inside of the boxes in order to minimize any movement of the plates while housed within the box (figs. 19, 20). Ethafoam was selected as it met the required conservation standards. Moreover, it could be purchased from a local supplier and pre-cut to the required dimensions. The base of the box was also filled with the same Ethafoam. With this extra Ethafoam base, the plates were slightly elevated inside of the box, facilitating the handling of individual plates as seen in figure 21.

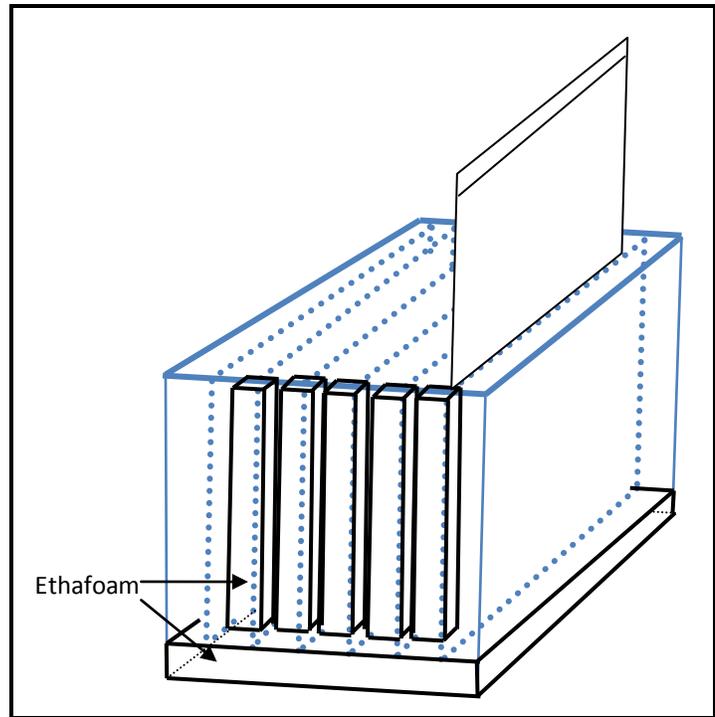


Fig. 21. Diagram showing the interior of the vertical storage box

Twenty plates, each individually wrapped in four flap folders, are housed in each box, with their individual negative numbers labelled on the outside the box (fig. 22 and 23). The light weight of the box allows HCC staff to safely handle the collection, especially when retrieving boxes from upper shelves. Finally, the boxes were stored on powder-coated metal shelves as seen in figure 24.



Fig. 22. After assembling the box, twenty glass plate negatives could be stored inside.



Fig. 23. The glass plate negative numbers were labelled on the outside of the storage box.



Fig. 24. The new storage box is kept inside the powder-coated metal shelf.

### **Sorting into Studios of Origin**

In order to improve the collection retrieval system, the plates were identified and classified whenever possible by the studio of origin. Those plates which have been identified as belonging to one particular studio were separated and housed together. One subset of negatives that the conservation team managed to identify during the project was negatives produced by the studio of G.R. Lambert & Co.

In the past for exhibition or archival purposes, prints had been made from some of the original G.R. Lambert & Co. glass plates. These gelatin silver prints were subsequently accessioned and recorded into the NHB MuseumPlus database system. The MuseumPlus system manages and organizes collections through an online interface, which can be accessed among all NHB museums. Because of this prior history, a list of the images made by G.R. Lambert & Co. was extracted from this system and used as a reference in order to sort the negatives. Besides utilizing the database information, some publications also provided assistance in the sorting process. The separation of the G.R. Lambert & Co. collection and the eventual inclusion of this information within the MuseumPlus database will greatly enhance the resources available to researchers.

### **Conclusion**

The treatment and rehousing of the glass plate negatives at HCC has presented an opportunity for the conservation team to closely examine and preserve the entire glass plate negative collection at NHB. Most of the collection fell within treatment Category 2, which required only minor cleaning as well as rehousing. For the most part these treatments were carried out by interns under the supervision of HCC conservators, while the moderate and major treatments of Category 3 items, including lifting emulsion, removal of accretions on emulsion surfaces, and glass plate repair were carried out by HCC conservators. Having a number of interns in this project working with Category 2 materials enabled the HCC conservators to concentrate on the more in-depth treatments required for Category 3 glass plates. With the HCC's ongoing

workload of conservation support to the NHB museums, the glass plate negative project is expected to be ongoing for the next few years: about 20% of the collection will be treated and rehoused by 2013. Nonetheless, it is a significant learning opportunity for HCC staff and when the project has finished, the collection will become much more accessible to the researcher.