

'Freezing' as a Manuscript Preservation Method at Sonobudoyo Museum Library

Nurul Setyawati¹

¹IAIN Tulungagung

Correspondence email: Nurulsh622@gmail.com

Notes

Submitted: 20-01-2023

Revised: 26-04-2023

Accepted: 21-05-2023

How to cite: Nurul Setyawati. (2023). 'Freezing' as a Manuscript Preservation Method at Sonobudoyo Museum Library . *Khizanah Al-Hikmah : Jurnal Ilmu Perpustakaan, Informasi, Dan Kearsipan*, 11(1). <https://doi.org/10.24252/kah.v11i1a4>

DOI: [10.24252/kah.v11i1a4](https://doi.org/10.24252/kah.v11i1a4)

Copyright 2023 ©the Author(s)

This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).



ABSTRACT

Freezing is known as a method that is considered to quickly eradicate active forms of plants and insects so that it can kill insects and their eggs in ancient manuscripts. The purpose of this research is to find out more about the causes of ancient manuscript damage and the application of freezing as a form of the ancient manuscript preservation method. The method used in this research is descriptive with an approach. The research method uses a qualitative descriptive approach. While the informants of this study were the Head of the collection, conservation, and preparation section, the Manuscript conservator, the Collection section assistant, and the Manuscript room management officer. Observation, interviews, and documentation are used as data collection methods. The data analysis method, however, makes use of three methods: data reduction, data display, and conclusion. Triangulation of sources to determine the accuracy of the data. The study discovered that insect elements such as silverfish, book lice, and book worm are the main causes of destruction to old texts. As a solution, the freezing method is applied in three stages: pre-freezing, the freezing procedure, and post-freezing. The lack of work safety equipment for officers performing freezing duties was one of the challenges. In addition, the collection was still mostly located on the second floor, making the transfer rather time-consuming.

Keywords: Manuscript preservation; library collection; freezing method

1. INTRODUCTION

In preserving the cultural heritage of high value, what needs to be considered is maintaining the physical condition and information value of ancient manuscripts. Manuscripts are considered a treasure or national identity, especially in Indonesia. The majority of manuscripts produce historical records concerning the heritage of knowledge, customs, and behavior in society, both internal and developed as a result of the impact of other civilizations. Not infrequently, some people consider manuscripts to be sacred and unique. As mentioned in (*Undang-Undang Nomor 43 Tahun 2007 tentang Perpustakaan*, 2007) manuscripts are

considered written documents that are not printed or reproduced in any other way, whether their positions are in the country or abroad, which are kept for at least 50 years with important uses. This proves that manuscripts have historical value and a very long life.

There are roughly 1,000 different written languages and different scripts used by different ethnic groups in Indonesia. Naturally, this has to do with the origins of many cultures, such as those of India, Islam, and Europe, which all received the Latin script that we still use today. They left behind quite a few old manuscripts because they spoke so many different tribes and languages. Additionally, they think there are more old texts abroad than in the nation. Suppose this concept is placed on the concept of state sovereignty. In that case, the preservation of ancient manuscripts must be maintained and developed to preserve the nation's cultural heritage and as a binder of nationalism (Latiar, 2018). It requires strategic steps from an institution to maintain this treasure.

Preservation activities, especially on ancient manuscripts, are still a lively discussion today because preservation activities aim to maintain the cultural treasures owned by individuals, institutions, or organizations. It needs to look in detail and broadly at several similar and relevant studies between this research and other reflections on preserving ancient manuscripts. Herwin Cahya Nugraha and Nurdin Laugu conducted the research at the Dewantara Kirti Griya Tamansiswa Yogyakarta Museum Library, which focused its research on preventive and curative preservation activities, as well as discussing the obstacles faced and solutions provided in ancient manuscript preservation activities. This study found that the preservation activities of ancient manuscripts began with a policy to regulate preservation activities such as curative and preventive handling to maintain the physicality of cultural heritage, namely the ancient manuscripts themselves so that the information contained could be published to the public. In addition, academically, this activity can be an urgent input in the preservation of ancient manuscripts and related to the continuity of the nation's cultural heritage (Nugraha & Laugu, 2021).

Yunus Winoto conducted the same research at the Pangeran Sumedang Foundation Library with his research on how the librarians experience activities in preserving library materials in the form of ancient manuscripts "Babad Sumedang." It tells that librarians can find out about the existence and content contained in the book "Babad Sumedang" and librarians can carry out preventive preservation activities such as prevention and preservation in the form of repairs and have even carried out the process of changing the form (curative) (Winoto, 2018).

Ute Lies Siti Khadijah also conducted similar research at the Bandar Cimanuk Indramayu Museum regarding the preservation activities of ancient manuscripts left by Sheikh Abdul Manan. Based on the results, it is explained that the museum has carried out preservation activities on ancient manuscripts through several activities including limiting visitor access to original manuscripts in the form of storage in special esterase and boxes; Cleaning of manuscripts and museum environments is routinely carried out by regulating light, humidity, using camphor and using dehumidifiers; fumigation activities are carried out routinely once a year with a fumigation process using pesticides; and digitizing ancient manuscripts into flipbooks in collaboration between researchers and UNPAD students. From the research, it is said that preservation activities on ancient manuscripts are essential to maintain and preserve the ancient manuscript heritage so that it can still be accessed and utilized by the wider community (Khadijah et al., 2021).

According to the review of the three previous studies, in this study, there are differences, namely regarding the physical handling process of ancient manuscripts at the Sonobudoyo

Museum Library, which emphasizes the handling of damage from biota factors and the use of freezing methods that are considered helpful. Preservation activities are not limited to restoration alone, but also to physical maintenance activities and prevention of damage. In addition, the freezing method is still rarely used in ancient manuscript preservation activities, especially in institutions in Indonesia.

Several institutions, museums, libraries, and other parties store manuscripts. Even the Indonesian government itself through the Government Regulation of the Republic of Indonesia states that the museum is an institution that has the function of protecting, developing, utilizing collections, and communicating them to the public (*Peraturan Pemerintah RI No. 66 Tahun 2015 tentang Museum*, 2015). In addition, museums are also considered institutions that are permanent and not for profit but used to exhibit and prove documents for study, research, and recreation. However, seeing the conditions, it turns out that ancient manuscripts are stored in various institutions that lack maintenance, so many ancient manuscripts are damaged or destroyed, even until the contents cannot be saved. The handling can be overcome by preservation efforts so that the old manuscripts last for a long time and the data on the paper can still be retrieved intact.

In overcoming these problems, ancient manuscript management institutions need to pay special attention to maintaining the physical durability of the manuscripts. The treatment of ancient manuscripts can be done with preservation and conservation activities. Preservation is one of the efforts to maintain library materials. This is related to the maintenance, repair, and duplication of library materials (Fatmawati, 2018). In addition, it is stated that preservation is the most appropriate way to maintain the existence of ancient manuscripts from destruction (Sahidi, 2019). The purpose of preservation is to keep all documents that contain history and are intellectual, cultural, and artistic in the past well preserved so that future generations can still enjoy them and rediscover thoughts in one generation (Pramana, 2022).

Preservation is not a new activity for manuscript managers but a risky task. Various factors, including internal and external factors, influence the damaged items. The quality of the paper material used causes damage from internal factors. In addition, the acid in old manuscripts' paper may be the start of harm. It happens because of the chemical residues left behind during the manufacturing process. While damage from external factors is caused by biological, chemical, physical, and other factors (humans and the environment). As for the damage to the manuscript due to biota factors itself, it is caused by rodents, insects, rats, and even fungi. As a result of the biota factor, the damage is considered a destroyer that is quite difficult to eradicate because one of the main foods of these animals is paper. In addition, if fungi cause damage, eliminating it is undoubtedly challenging because fungi can thrive on manuscripts and other library materials.

Following the topic previously described, the researcher is interested in conducting direct observations at the Sonobudoyo Museum Library in Yogyakarta because this library still adheres to a solid and sticky royal system in preserving and maintaining existing cultural and historical sources, this can be felt from the way it upholds its local wisdom. It is said that the preservation of historic libraries and their buildings is still required to be carefully managed, that one of its materiality becomes an irreplaceable testimony of our past for present and future generations (Verticchio et al., 2021). This is also done by the Sonobudoyo Museum Library in Yogyakarta, where this library is a Service Technical Implementation Unit within the Culture and Tourism Office. There are 10 collections totaling approximately 1,378 ancient manuscripts in the form of written and printed manuscripts on display and stored in special rooms. The ancient manuscripts are quite old, some are tens or even hundreds of years old.

The oldest manuscript stored in the Library's manuscript room was written in the 17th century, and it can be said that the manuscript is classified as sensitive to damage. Based on observations, it turns out that there are ancient manuscripts that are damaged and mostly caused by biota factors, this can be seen in the physical manuscripts that have many holes. So that the handling carried out by the library in overcoming physical form damage is to use a non-chemical process, one of which is the freezing method.

Hence, the current study will know how biota factors cause the damage factors of ancient manuscripts, how it is applied in preserving ancient manuscripts, and the obstacles faced in overcoming the damage to ancient manuscripts at the Sonobudoyo Yogyakarta Museum Library. This research aims to find out in detail the form of damage to ancient manuscripts caused by biota factors and how conservators apply the freezing method to overcome physical damage to ancient manuscripts. The benefits of this research are expected to educate students, librarians, or managers of library materials in other places regarding preservation activities that are considered essential to save the information and physical value of ancient manuscripts so that their physical authenticity can be maintained.

2. METHODS

The method used in this research is descriptive with a qualitative approach. As for obtaining information about the topic of this problem, the researcher conducted interviews with several informants, namely (1) the Head of the collection, conservation, and documentation section, (2) the manuscript conservator, (3) the Assistant collection section, and (4) manuscript room management officer. The experience of the informant was taken into consideration while choosing the informants. Therefore, it was essential to find someone knowledgeable about the research issue and had firsthand experience with the freezing method of manuscript preservation. Data collection techniques were carried out through literature study, observation, interviews, and documentation. At the same time, the data validity test combines the triangulation of data sources through observation and interview results and the triangulation of theory.

The data analysis technique used is the Miles and Huberman interactive model with three methods (Fuad, 2014): data reduction through sorting and selecting critical data and simplifying data related to research interests only obtained during research at the museum. Data display briefly describes charts and causal relationships between flowchart categories and the like by presenting data in narrative text. And the conclusion concludes and verifies the results of observations, interviews, and documentation obtained during the field. This is an appropriate or interactive relationship between data supported by relevant theories, then new researchers get a complete picture of the phenomenon studied at the Sonobudoyo Museum Library.

3. RESULTS AND DISCUSSION

Sonobudoyo Museum Library's Profile

Sonobudoyo Museum Library is in one location with the Sonobudoyo Museum. The museum is one of the historical museums included in Javanese culture. It can be seen from the building and its distinctive Javanese architecture, located just north of the South Square. At first the Sonobudoyo Museum was founded by the Java Institute in 1919 and was situated in Surakarta. This foundation is engaged in Java, Madura, Bali, and Lombok culture during the colonial

period. Then in a congress held in 1924, the Java Institute decided to establish a museum in Yogyakarta. Furthermore, in 1934 the museum committee was authorized to determine the location and architectural style of the building. At that time, Sri Sultan Hamengku Buwono VIII gifted the land and building "Sekautan", the head of the Police (Dutch Bahasan), which was used as the principal capital to establish a museum.

The inauguration of the opening of the Sonobudoyo Museum coincided with the birthday of Sri Sultan Hamengku Buwono VIII in 1866 Java or November 6, 1935 AD. In January 2001, the museum officially joined the DIY Provincial Culture and Tourism Office, which was proposed as UPTD Perda No.7 / Th. 2002 dated August 3, 2002, concerning the establishment and organization of UPTD at the Regional Office within the DIY Provincial Government and Governor Decree No.161/the Year 2002 Dated November 4, concerning the Main Task and Function. the museum has various forms of heritage collections, with a total collection of approximately 58,466 collections which are divided into ten types (Sonobudoyo State Museum Yogyakarta, n.d.). The ten types of collections are as follows:

Table 1. Data Collection of the Yogyakarta Sonobudoyo Museum Library

No.	Collection Type	Collection Name
1	Geology	Objects from objects of geology, for example, Rocks, Minerals, Fossils, natural objects (gems, granite, andesite), barite
2	Biology	Objects from biology, for example, Human skeleton (skull), plants, animals (dried birds)
3	Ethnography	This object is the result of a culture or ethnic identity, for example, kacip the number is approximately 8,157 pieces
4	Archeology	This object comes from the results of human remains from prehistoric times to the influx of Western cultural influences, for example, mirrors. The number is approximately 1,983 pieces
5	History	This object was obtained since the introduction of Western culture to the present, for example, rifles. The number is approximately 42 pieces
6	Numismatics and Heraldika	This object is in the form of metal or paper currency.
7	Keramology	This object is made from baked clay, for example, jars. Total collection of 348 pieces
8	Art	Series objects that express artistic experiences through two or three-dimensional objects, for example, paintings and photographs. The number is about 9,120 pieces.
9	Tech	This object describes a prominent technological development, such as the gramophone. There are 384 of them in total
10	Philology	This object is in the form of manuscripts or ancient manuscripts in the form of handwriting containing historical past events. The library holds 1,354 copies.

The storage of the philology collection is divided into the manuscript room and the library room. The types of collections stored here are lontar, manuscripts with Arabic and Javanese writing. Some have even been digitized so that the manuscripts can be displayed on a computer to facilitate searching. The collection in this library holds a variety of collections inherited from the Java Institute in the Dutch era as well as magazines from an agency.

The types of philological collections in the form of manuscripts owned by the Sonobudoyo Yogyakarta Museum Library consist of history, genealogy of regulatory laws, wayang, wayang literature, literature, *piwulang* and *suluk*, Islamic religion, *primbon* and

pawukon, language, music, dances, and customs. Even in terms of the script used, it is very diverse; namely there is Javanese, Javanese Latin script, Dutch Latin script, and Javanese Arabic.

These manuscripts are not loaned out or even taken home. This library has a rule for visitors: manuscripts can only be read on the spot and used as intended. The Sonobudoyo Museum Public Library is in the former KONI Building (Jalan Pangurakan No.4 Yogyakarta). In contrast, the Sonobudoyo Museum Manuscript Library is located in Sonobudoyo Museum Unit II (Ndalem Condrokiranan). (*Museum Negeri Sonobudoyo Yogyakarta*, n.d.).

Causes of Damage to the Ancient Manuscripts

The condition of the manuscripts within the library is diverse. Since the ancient manuscripts themselves are composed of paper, a material that is highly delicate and destroyed, it is even possible to say that the amount of damage to the collection is exceptionally high. Most manuscripts contain cellulose, making them an easy target for insects and fungi to breed, making the consequences extremely dangerous for ancient manuscripts. Damage to ancient manuscripts can be fatal when combined with Indonesia's tropical climate.

One of the causes of the damaged ancient manuscripts in the library is caused by insects. The types of insects include cockroaches, termites, silverfish, booklice, and bookworms. Silverfish are animals with a gray color when adults reach 12 mm in length and are active at night in dark and humid places. It will lay eggs and hatch if conditions are favorable in about a week. How to survive by eating glue/adhesive contained in the book can even damage the binding. As a result of the damage caused by this silverfish, ancient manuscripts cannot be restored to their original condition because this insect damages the book by making holes until it runs out. This is clarified that "Damage caused by silverfish can be characterized by the condition of paper damage that forms like an elongated island, so it is very detrimental" (SMD, 2022). Ancient manuscripts are particularly vulnerable to silverfish damage, which can even cause the cover to dissolve completely.



Figure 1. Ancient manuscript damaged due to silverfish

There are also other insects, such as booklice. These pests are so small that the senses cannot see them. These insects attack the spine and edges of books. It survives by eating

adhesives, glue, and paper that is covered in mold. Damage caused by these insects can be noticed when eggs or carcasses remain near the binding or on the manuscripts.



Figure 2. Ancient manuscript damaged due to booklice

Bookworms cause further damage. These insects damage the manuscript by laying its eggs on the paper's surface or between the paper near the binding. When the eggs are laid, the larvae will come out, which is very dangerous because it will damage the manuscript by making holes like tunnels in the cover and back to serve as a road.



Figure 3. Ancient manuscript damaged due to bookworm

In addition, dust can also be a destructive factor in ancient manuscripts if it easily enters the books. We know that dust is very soft and has a high absorption capacity. The nature of the paper is organic, if it is covered with dust, it will react to cause brown rust stains and if the dust is on the top, front, back, and edges of the paper, there will be a brownish-yellow color. In addition, dust can also grow mold while increasing the acidity of the paper and can shorten the life of the paper.



Figure 4. Rare books damaged due to dust

Ancient manuscripts in the Sonobudoyo Yogyakarta Museum Library are primarily damaged by insect and dust problems, among other things. The managers and conservators of ancient manuscripts take extra care with this damage, namely by using the freezing or cooling process, this way to be able to overcome the current issues so that ancient manuscripts can live longer.

Application of Freezing Method

Preservation activities can be carried out in various ways and methods. This activity is used to maintain library materials and strives so that library materials do not experience more severe damage. The Sonobudoyo Museum Library used the freezing method to preserve its manuscripts. Due to it does not involve non-chemical materials and puts preservation by the fumigation method at risk, this method is considered safer. The main purpose of the freezing method is to treat and preserve ancient manuscripts and can eradicate them. It is following "the purpose and purpose of freezing is for the treatment and preservation of ancient manuscripts or books. While its function is to eradicate pests in ancient manuscripts from various attacks, namely insects" (SMD, 2022). In line with another explanation that "The purpose of the freezing method is one of which can stop damage caused by biota factors, this is due to the effects of weather with temperature or humidity, resulting in the growth and breeding of fungi that can physically damage ancient manuscripts" (PK, 2022). The optimum temperature that insects are interested in is around F, and most insects will die when it is below 28F or above F (Wirayati et al., 2013). In other words, the purpose of preserving with the freezing method can be considered more effective and very safe in overcoming the problem of physical damage in ancient manuscripts and manuscripts, besides that it is also considered more humane because there is a particular room in carrying out its activities.

The implementation of freezing carried out at Sonobudoyo Museum has been carried out routinely approximately 3 times a year, this is according to the program made by the library. The stages carried out in this freezing activity are as follows:

A. Pre-Freezing

When performing a preservation operation, the current policy must be taken into account first. This preservation policy is in the form of a written document. It follows the pouring and thinking

of someone considered easier to apply in a preservation activity carried out. It is said that "This freezing policy originated from the agreement of the conservation section officers in the Sonobudoyo Museum laboratory and received approval from the head of the collection, conservation, and documentation section at Sonobudoyo State Museum" (ES, 2022). This policy cannot be separated from a mutual agreement between subordinates and superiors, which can certainly be done after obtaining approval from superiors to be implemented to maintain the durability of the manuscript.

The implementation of freezing is carried out periodically, namely routinely carried out at least quarterly in a year and a maximum of approximately five years, but depending on the condition of the collection. As explained that "routinely activities are carried out once a quarter in a year on the collection of ancient manuscripts in Latin script in the library, but it is different from the collection of ancient manuscripts in Arabic and Javanese script which are specifically carried out for approximately five years to maintain their durability" (ES, 2022). Before carrying out freezing activities, of course, officers must pay attention to the condition of the manuscripts first. The number of manuscripts in the Sonobudoyo library manuscript room is undoubtedly huge, including manuscripts with ancient Arabic and Javanese writing. Besides that, there are also different forms of manuscripts; some are still in book forms and some have been digitized.

B. Freezing Process

Carrying out preservation activities by utilizing the freezing method certainly requires careful preparation to run effectively and efficiently. In the freezing process, several stages must be prepared, as follows:

Checklist. Before carrying out the freezing process, manuscript officers and conservators must first inspect because this activity is one of the important activities in curative treatment and must be adequately considered. Even this inspection activity is carried out when the process is carried out and can be carried out when the weather is less favorable, for example, during the rainy season. During the rainy season, the room feels humid, which can trigger mold growth, which will have a major effect on the script in the room. This inspection is carried out by looking at the ancient manuscripts individually and selecting each row of shelves if insects, mold, or dust identify the manuscript. It was also clarified "for the problem of this inspection activity, the system is periodic, meaning that the initial process of 500 manuscripts in a row of 1 shelf, then continued with 1000 rows of shelves, and so on. In addition, the manuscript officer also checks five collections as samples by looking at the manuscript sheets one by one. If an insect is identified in the manuscript, the conservator must follow up by pulling 1 row of shelves to anticipate transmission to other manuscripts. This is intended to overcome more severe and large damage to ancient manuscripts" (ES, 2022). It is also emphasized that "if in checking the ancient manuscripts there are symptoms of damage due to insects, the officer must immediately report to the conservator to immediately follow up on the next process, namely by freezing or cooling methods" (SY, 2022).



Figure 5. Sheet-by-sheet examination of manuscripts

Manuscript retrieval. Retrieval is carried out by staff and conservators of the collection section with the assistance of other management officers. Before taking the manuscript, the manager needs to prepare and record the manuscript first before the freezing process is carried out. It is adjusted to the code on the manuscript and the number of copies. The number of manuscripts to be taken is approximately 500 copies. Furthermore, officers can take it from the shelf and put it into a basket containing 5-6 collections, depending on the thickness of the ancient manuscript. Taking is done sequentially from right to left and must be correct in the middle of the book's spine and when returning to the shelf. It is done with the aim that the back of the book is not damaged, namely torn.

Documentation. Before the freezing process is carried out, it is necessary to document it first as evidence of carrying out preservation activities with the freezing process. It can identify existing problems, both the causes and symptoms of the damage, which can then be used as a final report on activities that have been carried out routinely.

Packing. This activity is carried out by putting the manuscript into a plastic vacuum bag to protect the manuscript from identified by insects and dust and saving the manuscript when cooling in the freezer. The manuscripts were packed using a plastic vacuum bag containing 2-3 copies, depending on the size. According to the information, "This vacuum bag plastic is like ice plastic used to pack or wrap manuscripts and books" (SMD, 2022). There are two types of vacuum bag plastic used, namely (a) vacuum bags from Australia that have good quality, flexible and unique textures, but the price is relatively expensive and difficult to obtain, and (2) ordinary but thick plastic bags which are indeed very easy to obtain. The difference is also evident in the packing process, if the ancient manuscripts are packed in vacuum bags from Australia when in the vacuum sealer, the air inside automatically comes out.



Figure 6. Packaging with a vacuum bag from Australia

However, if the packaging uses ordinary plastic from Indonesia, it is necessary to use a vacuum cleaner to remove the air from the plastic first.



Figure 7. Packaging with an ordinary vacuum bag

There is a difference between the two plastics. According to the statement, "After the collection is put into the plastic vacuum bag from Australia and then the air is removed from the plastic using a vacuum sealer, the bag can seal itself. Whereas this is different when using plastic from Indonesia when removing the wind, it needs the help of a vacuum cleaner fitted with a small hose first to suck the air in the bag to prevent evaporation in the bag during cooling" (SMD, 2022).

Freezer operation. In operating the freezer, the most important thing is to pay attention to the temperature setting in the freezer first. The most effective freezing is done by setting the temperature below C to eradicate insects. This process is done not directly but gradually, namely by warming up and cooling down first for 1x24 hours to adjust the temperature before the ancient manuscript is put into the freezer. According to the explanation, "Cooling is carried out for 1 day and 1 night with ambient temperatures starting when the officer will go home" (SMD, 2022).

Structuring in the freezer. The arrangement stage can be done if the temperature in the freezer is stable. Ancient manuscripts can be arranged by inserting them one by one to make it easier to arrange the position according to the size of the manuscript/book. This was

clarified by informant 2 "The position of the manuscript is normal, the collection can be put to bed or attached to the wood in the freezer" (SMD, 2022).

Freezing process. The cooling process is carried out in stages, starting from waiting for the manuscript for half a day in the freezer to unite the temperature of the manuscript in the freezer, then setting the temperature to the maximum. From here, calculating the freezing process on the manuscript begins. It is clarified, "After the collection is in the freezer, then the freezer is closed, and the maximum temperature volume is added. In other words, the cooling calculation process begins. The calculation starts by counting the next day as the first day of the freezing process (Interview of Ancient Manuscript Conservator, 2022). Adjusting the freezing process time is carried out by measuring the temperature chart in the guidelines. If the cooling is longer, the better the quality of handling the damage to the collection or ancient manuscripts is better. Based on certain information that "The cooling implementation time is carried out for about 15 days in the freezer" (SMD, 2022). After cooling for 15 days, the officer continued the next stage by reducing half of the previous maximum temperature capacity in the freezer cooler with the aim that the manuscript could adjust its condition. According to the direction, "The temperature reduction process is carried out in the morning and then in the afternoon the temperature volume is normalized back to, then the electricity is turned off/unplugged" (SMD, 2022). The process is carried out so that the machine is not easily damaged due to instability in working time.

Opening the freezer. Opening the freezer is possible one day after the temperature returns to normal, so this procedure is completed on day 16. After that, the freezer lid can be left open for one day to bring the collection that is still covered in ice crystals to room temperature and allow the crystals to melt naturally.



Figure 8. Manuscript condition after the freezer is opened

C. Post Freezing

After the freezer's freezing cycle has finished, the post freezing stage is carried out. The actions involve taking the manuscript apart and cleaning it to remove dust and damage-causing elements. This procedure cleans the manuscript of dirt and eliminates any odors. The following are the tasks completed.

Remove the manuscript from the freezer. The manuscript is placed on the table for the following process, which is aerated with the intention that the manuscript temperature can return to normal after this process, which is carried out when the manuscript is in a normal

state according to room temperature and the ice crystals that attach to it have all melted. It is explained that “thawing in the freezer is done for 1x24 hours, and the collection can be lifted. The goal is to make the temperature in the freezer normal like the outside temperature and then the collection can be lifted and aerated on the table until the temperature really returns to normal and this process is carried out for another 1x24 hours” (SMD, 2022).

Open the manuscript from the vacuum bag. This step could be considered the final step before cleaning old manuscripts. The text must be left alone for a day without being opened. It is impossible to predict when this process will be finished, therefore, if the collection is substantial, it will take roughly two days to finish. Additionally, when opening or removing it from the plastic, authorities must be mindful of the state of the plastic. If the plastic is in good shape, it can be recycled up to two times, which can reduce operating expenses..

Preparing first aid kits. To carry out this activity, safety protective equipment, including gloves, masks, and protective clothing, must be worn by conservators when working in the laboratory. But in reality, conservators only use makeshift protective equipment, namely masks, and gloves.



Figure 9. Manuscript cleaning process

Cleaning the manuscript. This stage is a curative cleaning process by slowly cleaning dust and insect carcasses in the manuscript using a brush and vacuum cleaner and assisted by a vacuum cleaner funnel tool. The time required is quite long and can even take up to a month. It is clarified that “Cleaning dust and dead insects is done after the freezing process is complete and the cleaning process requires accuracy and painstakingness because by opening one sheet at a time then cleaning using a brush or vacuum in a direct motion” (SMD, 2022).



Figure 10. Sonobudoyo State Museum Laboratory

Arrange the manuscripts on the shelves. The process is carried out after the shelf can be confirmed to be completely sterile and safe from insects. Moving can be done with the aid of a trolley or a specific gadget to make the transition from the laboratory to the storage room easier. If everything appears to have been completed, the officer can return and arrange the manuscript on the shelf so that users can access it later.



Figure 11. Arrangement of Manuscripts in the Library Room

Special phases are one of the three processes in the freezing implementation process that must be completed. This is done primarily to guarantee the job's effectiveness, including survey activities, collection selection, procurement, and viability of the required materials and instruments. In the end, these three steps will address the physical deterioration of old manuscripts brought on by insects and dust.

4. CONCLUSION

The freezing process at Sonobudoyo State Museum has three stages: pre-freezing, freezing, and post-freezing. The pre-freezing stage takes freezing implementation policies, the condition of ancient manuscripts, and damage to ancient manuscripts. At the same time, the freezing steps include a manuscript checklist, manuscript return, documentation, packing, freezer operation, arrangement in the freezer, the cooling process begins, and opening the freezer.

Meanwhile, the post-freezing phase includes removing the manuscript from the freezer, opening the vacuum bag, preparing first aid, cleaning the processed manuscript, moving the manuscript to a sterile place, and arranging the manuscript to the original shelf.

From the above findings, the study may suggest four things to improve the freezing process; officers should pay attention to the use of work safety personal protection during or when sterilizing ancient manuscripts, providing suitable handling methods to maintain physical integrity when cleaning ancient manuscripts by not striking them to avoid further damage, experts in the field of manuscript preservation is a necessity, and careful planning is needed with a robust procedure so that that implementation can be carried out regularly according to objectives.

REFERENCES

- ES. (2022). Wawancara Kepala bagian seksi koleksi, konservasi dan dokumentasi.
- Fatmawati, E. F. E. (2018). Preservasi, Konservasi, dan Restorasi Bahan Perpustakaan. *LIBRIA*, 10(1), 13–32. <https://doi.org/10.22373/3379>
- Fuad, A. N. kandung S. (2014). Panduan Praktis Penelitian Kualitatif (Pertama). Graha Ilmu.
- Khadijah, U. L. S., Khoerunnisa, L., Anwar, R. K., & Apriliani, A. (2021). Kegiatan preservasi naskah kuno Syekh Abdul Manan di Museum Bandar Cimanuk Indramayu. *Jurnal Kajian Informasi & Perpustakaan* Vol. 9, No. 1, 115–128. <https://jurnal.unpad.ac.id/jkip/article/view/30648/15619>
- Latiar, H. (2018). Preservasi Naskah Kuno Sebagai Upaya Pelestarian Budaya Bangsa. *Al-Kuttab: Jurnal Perpustakaan Dan Informasi*, 5(1), 67–84. <https://doi.org/10.24952/KTB.V5I1.827>
- Museum Negeri Sonobudoyo Yogyakarta. (n.d.). Retrieved July 4, 2022, from <https://sonobudoyo.com/id/museum/sejarah>
- Nugraha, H. C., & Laugu, N. (2021). Pelestarian Naskah Kuno dalam Upaya Menjaga Warisan Budaya Bangsa di Perpustakaan Museum Dewantara Kirti Griya Tamansiswa Yogyakarta. *Lentera Pustaka: Jurnal Kajian Ilmu Perpustakaan, Informasi Dan Kearsipan*, 7(1), 105–120. <https://doi.org/10.14710/LENPUST.V7I1.37694>
- PK. (2022). Wawancara Asisten seksi koleksi.
- Restu Kartiko Widi. (2010). *Asas Metodologi Penelitian (Sebuah Pengenalan dan Penuntun Langkah demi Langkah Pelaksanaan Penelitian) (Pertama)*. Graha Ilmu.
- Peraturan Pemerintah RI No. 66 Tahun 2015 tentang Museum. (2015). <https://peraturan.bpk.go.id/Home/Details/5642>
- Pramana, W. D. (2022). Strategi pelestarian naskah kuno di Dinas Perpustakaan dan Kearsipan Provinsi Jawa Timur. *Daluang: Journal of Library and Information Science*, 2(2), 31–41. <https://doi.org/10.21580/DALUANG.V2I2.2022.10293>
- Sahidi, S. (2019). Pentingnya pelestarian naskah kuno sebagai warisan budaya bangsa. *IQRA` : Jurnal Perpustakaan dan Informasi*, 12(2), 106–117. <https://doi.org/10.30829/IQRA.V12I2.3986>
- Undang-Undang Nomor 43 Tahun 2007 tentang Perpustakaan. (2007.).
- SMD. (2022). Wawancara Konservator naskah.
- SY. (2022). Wawancara Petugas pengelola ruang naskah.
- Verticchio, E., Frasca, F., Bertolin, C., & Siani, A. M. (2021). Climate-induced risk for the preservation of paper collections: Comparative study among three historic libraries in

- Italy. Building and Environment, 206. <https://doi.org/10.1016/J.BUILDENV.2021.108394>
- Winoto, Y. (2018). Membangun Kesadaran Masyarakat Sumedang Dalam Melestarikan Warisan Budaya. *LIBRARIA: Jurnal Perpustakaan*, 6(1), 83–110. <https://doi.org/10.21043/LIBRARIA.V6I1.3891>
- Wirayati, M. A., Ayu, E. S., & Riyadi, A. (2013). Pedoman teknis Pembasmian Serangga & Biota di Perpustakaan. Perpustakaan Nasional RI.