

AL-SHAJARAH

JOURNAL OF ISLAMIC THOUGHT AND CIVILIZATION
OF
THE INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA (IIUM)

2018 Volume 23 Number 2

AL-SHAJARAH

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NONDESTRUCTIVE ANALYSIS TESTS TO EVALUATE THE PROPERTY OF QUR'AN BINDINGS¹

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Abstract

Qur'an bindings from before the 20th century are some of the cultural artefacts made from organic materials that are easily damaged during research due to mishandling. Therefore, nondestructive tests are the best approach to uncover, record and learn about artefacts without damaging the physical attributes of the manuscripts. These tests could contribute significantly in identifying and recording Qur'an bindings in particular, and Islamic manuscripts in general, especially in rural areas, or an area with limited facilities. There are basic tests, such as observations conducted under a microscope, burn tests and physical observations and comparisons. Basic forms and materials such as type of leather, type of paper, types of threads and weaving technique, which could all be easily identified and documented for heritage purposes. These tests facilitate the evaluation of the techniques and materials used in the production process of the pasteboards, wrapping and stampings of the Qur'an bindings, which were universal, but the principle aligned with Islamic traditions in safeguarding the purity and the sacredness of the Qur'an starting from the materials used in bindings, which cover and protect the Qur'an both physically and spiritually.

Key words: Nondestructive, Test, the Qur'an, Binding, Islam.

¹ Article Received: February 2016; Article submitted: November 2018; Article accepted: December 2018

Introduction

The Qur'an is categorized as a manuscript with regard to Islamic artefacts. The Qur'an has been handled and studied by various researchers, conservators, curators and academicians to understand its significance in Islam. Al-Qur'an collections are some of the most important collections in Islamic collections, especially in Islamic museums or galleries.

The 19th century East Coast Qur'an collection is one of the most important artifact collections related to Islam in the Malay Peninsula. It is considered one of the rarest, or most limited, of collections. Physical attributes are one of the important criteria used to identify and record the collection. Due to its materials, such as paper and leather, it is important that the artefacts are handled with care and all physical tests are nondestructive to the artefacts. Binding is one of the important parts of the manuscripts, which protect the manuscript pages² from dust and damage and facilitate storage.³

The study of bookbinding was popular in the West. According to Foot, *bookbinding is a physical object which includes its illustration, decoration and structure*.⁴ While Miller described bookbinding as the *dress of his century wore*, the product of its time.⁵ Furthermore, Kropf mentioned that *the study on bookbinding is a part of manuscript culture...ownership, technique and approaches practiced by book binders at that time*.⁶ This is a part of a research on the East Coast red leather Qur'an bindings, where a limited

² Duncan Haldane, *Islamic Bookbindings* (London: World of Islam Festival Trust in association with Victoria and Albert Museum, 1983).

³ Ros Mahwati Ahmad Zakaria, "Penjilidan Kulit Manuskrip Al-Quran Pantai Timur Sebelum Abad ke-20 Masihi: Kepandaian dan Harta Intelek Tempatan," (PhD thesis, National University of Malaysia, 2015).

⁴ Mirjam M. Foot, *Bookbinders at Work* (London: The British Library and Oak Knoll Press, 2006).

⁵ Julia Miller, *Books Will Speak Plain* (United States of America: The Legacy Press, 2010).

⁶ Eryn Kropf, "Historical Repair, Recycling and Recovering Phenomena in the Islamic Bindings of the University of Michigan Library: Exploring the Codicological Evidence," in *Suave Mechanicals: Essays on the History of Bookbinding*, Volume 1, ed. Julia Miller (Ann Arbor, MI: The Legacy Press, 2013): 1-41.

number of *Qur'ans* were identified with a set of criteria to build the empirical data. According to Benson:

Codicological methods of comparison are perhaps ideal to negotiate the evidence; hence the task at this stage may be best handled through the investigation of groupings of manuscripts, particularly those with strong evidence for a common provenance and multivolume sets. This allow for easier recognition of trends in materials and techniques that may than be more easily linked to a place and historical moment.⁷

The *Qur'ans* are identified by its text illumination style, known as the East Coast style where it owns criteria such as illumination on opening pages, central pages and closing pages, three triangle shapes attached to the rectangular text frame known as “tebar layar” in Malay, local floral and foliate motifs such as “sulur-bayung” or tendrils, as well as the use of red, black and yellow or gold colours in the illumination.⁸ Sometimes, small amounts of blue was also applied.⁹

In the Islamic Arts Museum Malaysia is a custodian of important Malay manuscripts collections in Malaysia. The owner of this collection is the Department of Religious Development Malaysia or JAKIM on behalf of the Malaysian Government. Eleven (11) *Qur'ans* in its collection were identified as East Coast *Qur'ans*. This is the largest collection found in this research, but only two *Qur'ans* were selected for the nondestructive test to evaluate its binding property. The East Coast *Qur'ans* accessioned as IAMM 1998.1.

⁷ Jake Benson, “Satisfying Appetite for Books Innovation, Production and Modernization in Later Islamic Bookbinding.” (Presentation, Conference on Codicology of Manuscripts of the Arabic Script, Madrid, Spain, May 19 -21, 2010).

⁸ Dzulhaimi Md. Zain et al., *Ragam Hias Al-Qur'an di Alam Melayu*. Final Project Report. (Shah Alam: UiTM, 1999); Annabel Gallop, “The Spirit of Langkasuka? Illuminated Manuscripts from the East Coast of the Malay Peninsula,” *Indonesia and the Malay World* 33, no. 96 (2005): 113 – 182; Hasnira Hassan, “Naskhah al-Qur'an Kilau ‘Gaya Terengganu’ sebagai Kesenian Teokratik,” in *Prosiding Antarabangsa ke-2 Arkeologi, Sejarah dan Budaya di Alam Melayu* (2014), 419 – 436.

⁹ Ros Mahwati Ahmad Zakaria and Latifah Abdul Latif, *Malay Manuscripts: An Introduction* (Kuala Lumpur: IAMM, 2008).

3444 and IAMM 1998.1.3615 that were used in this research are partly damaged, fragile and needed extra caution and special handling advice from museum professionals and conservators. The loose parts provided samples for the test. Analytical tests, such as a burn test and observation under microscope are two nondestructive tests used to evaluate the property of the 19th century East Coast Qur'an binding. Detailed physical observation is an additional test to obtain more data. The evaluation of the Qur'an binding materials is important due to its status in Islam. There are rules and guidelines to adhere to ensure that the 'purity and the sacredness' of the Qur'ans are followed. The test confirmed the rules were followed, the tradition continues and the design is appreciated by Muslims in the East Coast of the Malay Peninsula in the 19th century.

Method and Materials

Al-Qur'an is one of the Islamic manuscripts with the highest status. Generally, the materials used in Qur'an production are identified as paper, leather and textile. These are organic materials which are easily damaged due to temperature, humidity, mishandling and pests. Therefore, a procedure was set to ensure that a nondestructive method is used.

- a. Authorised personnel to take samples.
After the Qur'ans IAMM 1998.1.3444 (*appendix 1*) and IAMM 1998.1.3615 (*appendix 2*) were identified as East Coast Red Leather Qur'ans by the researcher, an authorised personnel cum conservator was assigned to collect some samples from the debris of the binding materials. This is to ensure the safety of the artefacts (Figure 1).

Figure 1 Discussion between the researcher and conservator to confirm sample requirement.



b. Purification of Qur'an handlers before handling artefacts

As instructed in Islam, Muslims who want to touch the Qur'an must first purify themselves by washing some parts of their body known as ablution or *wudu'* in Islam. After the ablution, there is an estimated time of 3-5 minutes to let the water dry completely before the handlers could start to wear acid-free gloves to handle the Qur'an. If the conservator or the handler is a woman, she must also be clean from her menstruation.

c. Collected Samples

Based on the above descriptions, the samples are taken from the most fragile parts of the artefact binding with approval and advice from conservators. This is to ensure the process does not give any harm to the artefacts or cause defect to the visual look of the binding. Binding material samples are taken from the red cover, gilded stamp decoration, strands of threads from the textile (Figure 2) and pasteboards cover. All samples are kept

individually in petri dishes for separate tests and stored in the analytical lab for further tests schedules.

Figure 2 Conservator collecting debris from a bookbinding IAMM 1998.1.3444.



d. Microscope observation

The detail observation test was carried out using a microscope model Olympus BX-41 (Figure3). This test is to identify the fine physical criteria, such as leather grain and fibre. The test is conducted by a qualified and trained lab officer. The sample in the petri dish is stiffened by applying polyester resin to it, because it causes the sample to be steady under the microscope. The officer used 100x magnifications for leather samples and 200x magnifications for textile threads. The detail images are used to confirm the type of skin and textile threads.

Figure 3 Conservator observed the samples under microscope.

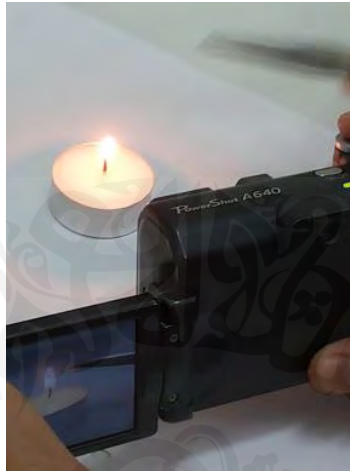


e. Burn test

This is a simple test but requires full attention and expeditious documentation. The required equipment involve the material samples (red fragment and textile threads), candle, lighter, stainless-steel tweezers, video recorder, camera, test chamber. The test is to identify the organic and nonorganic material of the Qur'an binding by using the samples collected. There are two conservators involved in this test, one is to do the burn test and another one is to record the process (Figure 4). The researcher is to record the whole work as below:



Figure 5 One conservator handling the burn test and another conservator recording the test process in the test chamber.



f. Physical comparison and examination

Another method used in this research is the physical comparison, where the leather grain, textile woven technique and decoration motifs were compared with the samples from lab and previous research to match and to identify the material. Physical examination is where the researcher, assisted by the museum professional or the conservator, examines the Qur'ans to see how the binding was done. For example, how the pasteboard was attached together, what type of recycled papers and what are the wrapping techniques used. These methods provide additional information particularly related to the regional designs and decoration.

These nondestructive tests are simple tests done to acquire fast and relevant data to support this art research. This kind of test is also a part of book-forensics, *where this technique was employed in the examination and analysis, and care was taken to attempt to distinguish those repairs made prior to the book entry.*¹⁰ The main

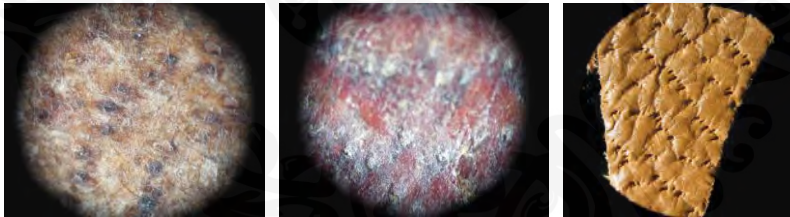
¹⁰ Martha Little, "Book Forensic: Interpreting Evidence of Structure," (presentation, 29th Seminar on Standards of Excellence in Hand Bookbinding, Guild of Book

objective of this method is to guarantee the safety of the artefacts and at the same time to supplement important information to this research. The findings have verified the Islamic traditions of Qur'an binding were obeyed by the previous Qur'an binders.

Results and Discussion

Due to the highest status of Qur'ans in Islam, the materials used in producing copies of Qur'ans are seriously observed. The nondestructive tests conducted in this research have revealed the properties of the East Coast Qur'an. The leather used to wrap the manuscript cover is identified as goat skin, where the red leather grains on the sample is compared with the leather grains in the lab. Goat skin is one of the common materials used as bookbinding in the other Islamic regions. The image captured under the microscope below (Figure 6) shows that the leather is a full leather grain, where it still has imperfections (left and middle images) and the grains are in a same pattern with the goat leather sample in the lab (right image).

Figure 6: The detail images of goat skin leather grain under the microscope (left and middle) compared with goat leather sample in the lab (right)



Goat skin is a type of leather, besides sheep, gazelle and cow leathers. Generally, red leather is famously known as Moroccan leather and it was made from goat skin.¹¹ Moroccan leather was used as one of the wrappings for Islamic bookbinding and usually

Workers, Tucson, Arizona, October 14-16, 2010).

¹¹ Matt Roberts and Don Etherington, *Bookbinding and the Conservation of Books* (Washington: Library of Congress, 1982); Fatih Rukanci and Hakan Anameric, "The art of Bookbinding in the Ottoman Empire (Fifteenth to the Nineteenth Centuries)," *Toruńskie Studia Bibliologiczne* 2, no. 9 (2012): 9-28.

decorated with stamps. The stamps could be blind stamps or gilded stamps. Some of the stamps were embellished with gold coloured paper and gold paper.¹²

In the burn test, the samples produced a burnt hair smell and the sample shrank when burnt. The test confirmed the sample is leather (*please see appendix 2*). The red coloured leather was probably Moroccan and Moroccan leather is tanned with vegetable tannage such as sumach or *rhus coriaria* species. In the 19th century, Moroccan leather was still used for luxurious book binding, it was expensive and became difficult to obtain.¹³

Through physical observation and comparison, red leather is durable and has a beautiful grain, although most of the leathers are stiff due to ageing and improper storage or environment control before it came under museum custody. Very few of them have discolouration problems and most of them still have a very bright red colour for almost more than one decade.

Another material confirmed in these nondestructive tests is cotton textile. The samples collected were observed under the microscope, burn test and physical comparison and observation. The detailed image under the microscope shows the fiber is in an off white colour, flat, twisted and slightly rough. In the burn test, the sample did not shrinking away from flame and burnt continuously with light grey smoke. It produced a burning paper smell during the process. After the flame was turned off, the residue is in a feathery grey colour with a smooth edge left at the tweezers. Please see table 1 below for the checklist record.

Table 1 Burn test for the thread fiber sample for manuscripts number IAMM 1998.1.3615

N0.	CHECK LIST	YES	NO
1.	Does it burn? If yes please describe: <i>It burns fast</i>	/	X
2.	Does it shrink when burning? If yes please describe:	X	/

¹² Ros Mahwati Ahmad Zakaria, “Penjilidan Kulit Manuskrip Al-Quran . . .

¹³ Roberts and Etherington, *Bookbinding and the Conservation . . .*

3.	Does it smell? If yes please describe: <i>The smells is like burning paper</i>	/	X
4.	Is there any smoke when it burns? If yes please describe: <i>It produced light grey smoke</i>	/	X
5.	Is there any residue after burning? If yes please describe: <i>The residue is feathery grey colour with a smooth edge</i>	/	X

Cotton, as confirmed in the tests, is the most common textile found in the Malay Peninsula. The trade relation between the East Coast states of the Malay Peninsula and India is known in history before the 19th century AD. The British East India Company was also interested in the cotton trade in this area especially after the second half of the 19th century AD when they supplied cotton cloths made in Britain to its colonies, including the Malay Peninsula after the Dutch powers over the Malay Peninsula transferred to the British in 1824.

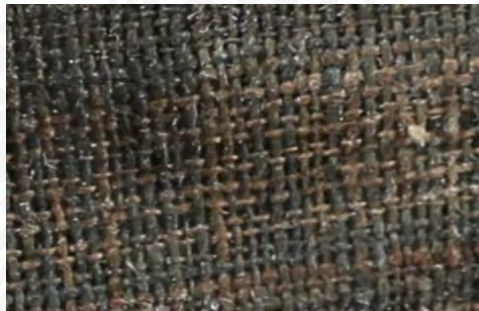
The textiles' weaving techniques were observed and we found that there are at least two woven techniques in the binding material. The first weaving techniques is known as "*silang polos*" or plain weave, where the same thickness of threads used (Figure 7) and the second technique is another branch of plain weave known as "*silang alur*", a slightly different technique where both thin and thick threads were used together (Figure 8). Woven technique variations or hybrid woven techniques are created from three basic woven techniques where it used the same basic technique, but the differences are in the thread counts and their sizes. The "*alur silang*" technique is a hybrid from plain weave, but by using thin and thick threads, it creates a ribbed effect on the textile.¹⁴ The weaving technique proved that the quality of the textile is good and it might be in an expensive goods list before 20th century. Through the ages, the textiles are able to retain their physical characteristics and colours to protect the Qur'an texts. The textiles are also weighty when held.

¹⁴ Goet Poespo, *Pemilihan Bahan Tekstil* (Yogyakarta: Penerbit Kanisius, 2005).

Figure 7 The plain weave technique or “*silang polos*” in textile Qur’an binding IAMM 1998.1.3499.



Figure 8 The plain weave hybrid or “*alur silang*” in textile Qur’an binding IAMM 1998.1.3479.



In terms of textile design, the printed Indian and European flower styles with light and bright background colours suggest that it is chintz. Chintz is a type of cotton textile from India, which was favoured and was in high demand in Europe. Most of these textiles flourished in the 19th century in Europe and definitely in the British colonies. Some types of flowers identified on the textiles are English roses, lavender, carnations and paisley. Different types of rose designs were noticed and recorded in the research. Light coloured backgrounds, such as peach, greyish blue, grey and beige were recorded. The chintz were used as a layer for the end paper section of

the red leather Qur'an binding.

Another material identified through this test is the gilded materials used on the stamped area. Physical observation found there are two types of materials used. One is a gold colour material with white colour surface at the back and the second material is thinner than the first material and has a black surface on the back. Samples were taken for microscope observation and burn test. Through detailed microscope observation, fibrous substances were recorded and a layer of gold colour on the top of the sample. This has confirmed that the sample collected is a gold coloured paper (*Appendix 1*).

The paper board used as the Qur'an cover base was also checked and there are two types of techniques used to create the thick board. First is the layered paper technique and second is the layered pasteboard technique. The first technique used several unused white paper to create thickness before the binder wrapped it with leather. The second technique is several layers of grey pasteboards used to create thickness. The thickness contributed to the depth of the stamped effects and the look of the whole cover.

The layering pasteboard technique is simple, but it was a serious practice in Islamic bookbinding, especially for historical Qur'an binding. Muslim bookbinders made the pasteboards by pasting the papers layer by layer.¹⁵ Another material used as pasteboard is paper mache (Figure 9). In the 18th century, casted papier mache bookbinding was considered a new bookbinding style in the West. It is made of paper pulp and plaster casted with a metal cast.¹⁶ This technique is recorded through physical examination and observation on Qur'an bindings in the research.

¹⁵ Gulnar Bosch, John Craswell, and Guy Petherbridge, *Islamic Bindings and Bookmaking* (Chicago: The Oriental Institute, the University of Chicago, 1981).

¹⁶ Miller, *Books Will Speak* . . .

Figure 9 Fibrous pasteboard layers in East Coast Qur'an cover. IAMM 1998.1.3444.



Two of the identified materials, textile and leather are the most common materials found in the area. Cotton or chintz is a suitable textile for use in the East Coast of the Malay Peninsula due to its tropical climate. Leather should be common in Malay society and the supply of cattle was huge in the East Coast area, for example in Kelantan during the 19th century.¹⁷ On the other hand, papers were not so common, especially the paper mache pasteboard, which is rare in this area. All the tests used have confirmed the main materials, namely leather, textile and gold paper, were used for Qur'an binding and decoration in the East Coast, Malay Peninsula, were organic and followed Muslim binder traditions where no material from pig or dog which are prohibited in Islam.

Conclusion

The Qur'an is the most important manuscript in Islam. Everything from the content to the physical character of the Qur'an is seriously taken care of by Muslims around the world. Bookbinding is one of the most important studies in the West that seeks to understand manuscript tradition, culture and learning phenomenon in an area.


¹⁷ Abdullah Abdul Kadir Munshi, *Kisah Pelayaran Abdullah* (Singapura: Malaysia Publications Limited, 1965).

Material, technique and style are a mirror to the religious and intellectual culture in Islam. As cultural objects or artefacts, the sustainability of the 19th century AD Qur'an binding is a top priority. Nondestructive tests are the best methods to identify and to evaluate the materials. The confirmation of materials in these tests endorse that the Islamic tradition in safeguarding the purity and the sacredness of the Qur'an were upheld by Muslim bookbinders everywhere, including the East Coast area of the Malay Peninsula. At the same time, the Qur'an bindings are still intact and safe for future research and documentation. The tests have enriched Islamic bookbinding tradition and history in the South East Asia.

Acknowledgement:

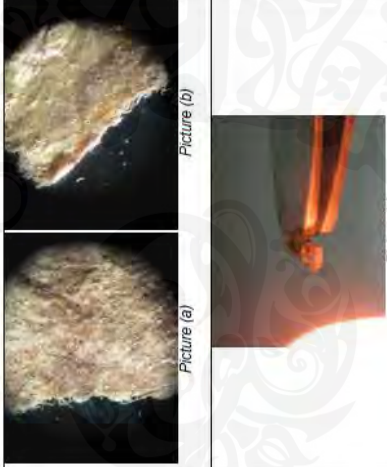
This research was conducted under DPP-2015-068 research grant. Therefore, the authors would like to express their gratitude to the Universiti Kebangsaan Malaysia (UKM) for the research grant awarded. The authors also wish to extend their gratitude to the Museum Director, Syed Mohamad Albukhary and the Conservation Department of the Islamic Arts Museum Malaysia for all technical assistance in handling the tests.





Appendix 1

 <p>Islamic Arts Museum Malaysia (IAMM) CONSERVATION AND RESEARCH CENTRE Analytical Unit LABORATORY REPORT</p>			
Object Name:	Quran	Accession No:	1998.1.3444
Transferred from Department/Unit: (Name of Laboratory/Unit & Date of Transfer)	Rosmahwati 09/06/2014	Title (Topic/Objective):	Analysis on Book Cover Materials
Analysis completed:	04/07/2014	Lab. Reg. No.:	98/AR/0614
Analysis Request:	What materials uses at the book cover parts?		
Summary of finding: <i>* this is an Abstract and not a substitute for reading the full report</i>	<p>The stamping part uses paper as base material, which is gilded. The textile part use cotton as base material.</p>		

Appendix 2

Report (method/result/picture/conclusion):

Tested Parts	Test / Method	Observation & Documentation	Findings, Facts and Discussion/Result
Stamping Part	<p>Microscopic analysis: The capture of sample which taken by using Polarize Light Microscope (PLM)</p>	 <p>Picture (a)</p> <p>Picture (b)</p> <p>Picture (c)</p>	<p>Picture (a). Mixed of off white and light brown fibrous material observed.</p> <p>Picture (b): Gold layer observed covered on one surface only.</p> <p>Indicates fibrous material and not metal stamping and covered with gold layer.</p> <p>Picture (c). Sample does not fuse or shrink from flame and burn continuously with light grey smoke.</p> <p>Burn paper smells also detect.</p> <p>The stamping part confirm as a gilt paper.</p>
	<p>Burn Test: 1. The sample of fibre was hold by using tweezers. 2. The one end of sample fibre was moved slowly towards flame. 3. The burning character and odour produce were recorded.</p>		

Textile Part	<p>Microscopic analysis: The capture of fibre which taken by using Polarize Light Microscope (PLM)</p> <p>The fibre was place longitudinally with distilled water as mounting medium.</p>	 <p>Picture (d)</p>	 <p>Picture (e)</p>	<p>Picture (d): Bundles of fibre with off white colour observed.</p> <p>Picture (e): Single fibre of flat, twisted and ribbon-like fibre with slightly rough surface observed.</p> <p>Indicates cotton fibre.</p>
<p>Burn Test:</p> <ol style="list-style-type: none"> 1. The sample of fibre was hold by using tweezers. 2. The one end of sample fibre was moved slowly towards flame. 3. The burning character and odour produce were recorded. 	 <p>Picture (f)</p>	 <p>Picture (g)</p>	<p>Picture (d): The fibre does not fuse or shrink away from flame and burn continuously with light grey smoke</p> <p>Picture (e): Burning paper smell produce with feathery grey smooth edge left as residue.</p> <p>Indicates cotton fibre</p>	

Discussion/ explanation:
A book cover is any protective covering used to bind together the pages of a book. In this analysis, we try to identify the base material use as book cover for the Quran. The textile and the stamping material found on the book cover surface was study.

The stamping part was found to be paper based material [and not metal base], while, the textile part uses cotton as main material. This might be because of cotton has strong and durable character. These are base of the observation under the microscope and based on burning test.

Conclusion/finding:
The stamping part is paper as base material, which is glued.
The textile part use cotton as base material.



Prepared by: Ramiah Ngatten (17/07/2014)
Received by: Rosmahwati



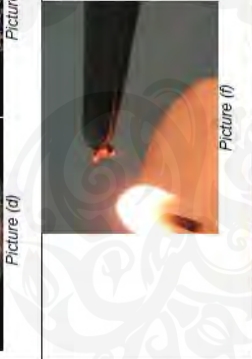


29.08.2014, fznzk



 <p>Islamic Arts Museum Malaysia (IAMM) CONSERVATION AND RESEARCH CENTRE Analytical Unit LABORATORY REPORT</p>	
Object Name:	Qur'an
Accession No.:	1998.1.3615
Transferred from Department/Unit: <small>(Name of Department/Unit & Date of Transfer)</small>	Rosmahwati 09/06/2014
Title (Topic/Objective):	Analysis on Book Cover Materials
Analysis completed:	04/07/2014
Lab. Reg. No.:	97/AR/0614
Analysis Request:	What materials uses at the book cover parts?
Summary of finding: <i>* this is an Abstract and not a substitute for reading the full report</i>	<p>The book covers surface use leather as base material. The stamping part uses paper as base material, which gold-stamping. The textile part uses cotton as base material.</p>

Report (method/result/picture/conclusion):

Tested Parts	Test / Method	Observation & Documentation	Findings, Facts and Discussion/Result
Leather Part.	<p>Microscopic analysis: The capture of sample which taken by using Polarize Light Microscope (PLM)</p>	 <p>Picture (a)</p> <p>Picture (b)</p>	<p>Picture (a): Dark maroon colour leather surface observed.</p> <p>Picture (b): Off white fibrous material observed. Indicates fibrous material.</p>
	<p>Burn Test:</p> <ol style="list-style-type: none"> 1. The sample of fibre was hold by using tweezers. 2. The one end of sample fibre was moved slowly towards flame. 3. The burning character and odour produce were recorded. 	 <p>Picture (c)</p>	<p>Picture (c): Sample fuse of shrink from flame and burn hair smell observed.</p> <p>Confirm leather.</p>

<p>Stamping Part</p>	<p>Microscopic analysis: The capture of sample which taken by using Polarize Light Microscope (PLM)</p>	 <p>Picture (d)</p>  <p>Picture (e)</p>	<p>Picture (d): Mixed of off white and light brown fibrous material observed. Picture (e): Gold layer observed covered on one surface only.</p>
<p>Textile Part</p>	<p>Burn Test: 1. The sample of fibre was hold by using tweezers. 2. The one end of sample fibre was moved slowly towards flame. 3. The burning character and colour produce were recorded.</p> <p>Microscopic analysis: The capture of fibre which taken by using Polarize Light Microscope (PLM) The fibre was place longitudinally with distilled water as mounting medium.</p>	 <p>Picture (f)</p>  <p>Picture (g)</p>  <p>Picture (h)</p>	<p>Picture (f): Sample does not fuse of shrink from flame and burn continuously with light grey smoke. Burn paper smells also detect. Burn paper smell observed. The stamping part confirm as a gilt paper. Picture (g): Bundles of fibre with off white colour observed. Picture (h): Single fibre of flat, twisted and ribbon-like fibre with slightly rough surface observed. Indicates cotton fibre.</p>

<p>Burn Test:</p> <ol style="list-style-type: none"> 1. The sample of fibre was held by using tweezers. 2. The one end of sample fibre was moved slowly towards flame. 3. The burning character and odour produce were recorded. 	 <p style="text-align: right;">Picture (i)</p>	<p>Picture (i): The fibre does not fuse or shrink away from flame and burn continuously with light grey smell produce with feathery grey smooth edge left as residue.</p> <p>Indicates cotton fibre</p>
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Discussion/ explanation:

A book cover is any protective covering used to bind together the pages of a book. In this analysis, we try to identify the base material use as book cover for the Quran. The leather use, the textile and the stamping material found on the book cover surface was study.

From the simple burning test and microscopic analysis we confirm the book cover surface use leather as their base material. However the type of leather cannot be simply identified due to the abraded surface.

The stamping part was found to be paper base material and not metal base. These are base on the observation under the microscope and base on the burning test done.

The textile part was found use cotton as their main material. This might be because of cotton has strong and durable character.

Conclusion/finding:

The book covers surface uses leather as base material.

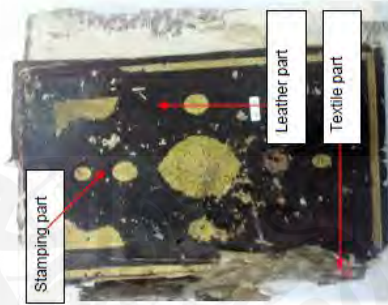
The stamping part use paper as base material, which is gold-stamped.

The textile part use cotton as base material.

Prepared by: Ramlihan Ngaitan (17/07/2014)

Received by: Rosmahwati

29.08.2014, HZmk

AL-SHAJARA
Vol. 23, No. 2, 2018

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WoS-Indexed under Arts & Humanities Citation Index, Current Contents/Arts and Humanities and Scopus

ISSN 1394-6870



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