PREVENTIVE ARt CONSERVATION WORKSHOP:

Storage and Environment Control Based on Context Found in Thailand

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03

The Fundamental of Painting Conservation

By Dr. Nicole Tse

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20 January 2023

What is the nature of paintings and paper conservation? The act of conservation asserts values, voice and legitimacy. This leads to questions around what knowledge is important, who gets to decide what is important to conserve, and what form this takes. What is appropriate in localised contexts is often positioned within the aims of heritage and identity, and object-centred practice and scientific processes.

Figure 33: Conservation and Contexts;
top left Nuestra Señora de la Luz Parish Church (Loon Church), Bohol, the Philippines after the 7.2 magnitude earthquake, 2013;
top right Unknown Artist, Ascension of the Lord, circa 1859, Immaculate Concepcion Parish, Baclayon, Bohol,
image N Tse 1999;
bottom left Conservation training in Malaysia,
image N Tse 2001;
bottom right Susceptibility of works on paper to biodeterioration,
image N Tse 1999.

Conservation is not only driven by materials, the environment, degradation mechanisms, and material science but by people, society, and the way cultural heritage is used, valued and respected Shown in the first slide (Image 33), are different ways conservation interacts with heritage collections and culture, and manages change. These are built on the concepts that Aj. Jeeraporn shared during the workshop The top left shows the immediate and catastrophic destruction of heritage in this case the effects of the 7.2 magnitude earthquake that damaged the Nuestra Señora de la Luz Parish Church (Loon Church), Bohol, in the Philippines in October 2013. Such loss shows the level of high-risk and the vulnerability of the physical structure of the church but most of all the fragility of communities that value it. Then there are other high-risk forms of material damage, such as the development of biodeterioration and mold (Image 33, bottom right) but at a much smaller scale and without the catastrophic effects to people. While at the Immaculate Concepcion Parish of Baclayon, a treasured 1859 panel of the Acension of

the Lord (Image 1, top right), remains within the Church and is good stable conditions despite the hot and humid climate in the Philippines.

Then as museums and collections have grown in the Southeast Asian region, such as the Bangkok Art and Cultural Centre professionalised and 'best practice' approaches to collection care has emerged The collection survey by Aj. Ochana's team is an important example of understanding collections in situated contexts which according to their geographic place, operational factors and people-based values. Another significant risks to cultural heritage is knowledge and skills.

For example, involvement in conservation training in Malaysia (Image 33, bottom-left) has highlighted how a greater understanding of collections and conservation t. Training in the global south and tropical environments is crucial. In many former colonised countries and where hot, humid climates exist, knowledge of collections, their materials and degradation in tropical climates is less accessible.

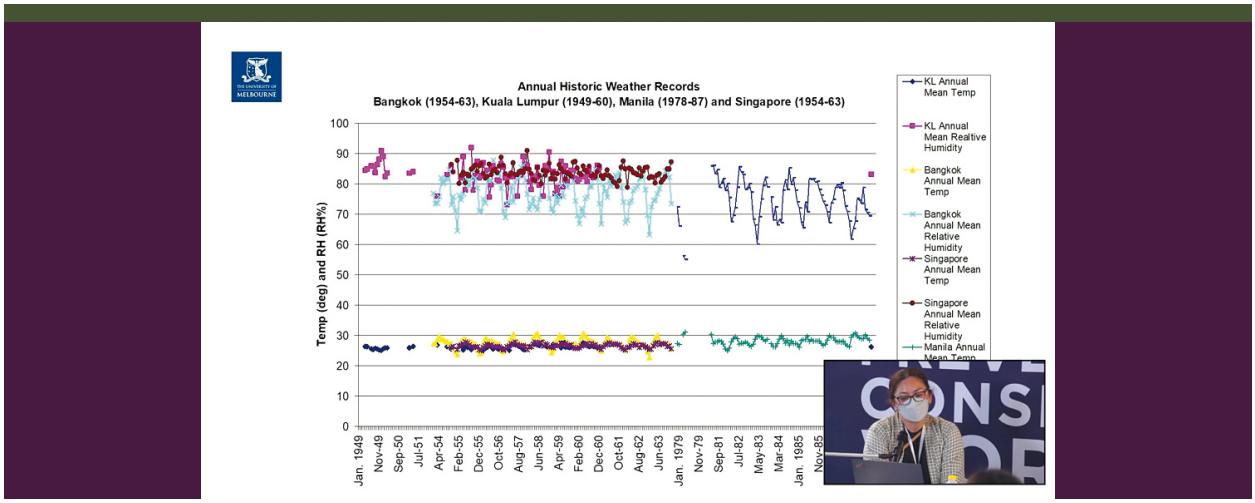


Figure 34 : Annual Historic Weather Records, adapted from Tse, N 2010 'The Characterisation of Canvas Paintings in Tropical Southeast Asia; PhD thesis, The University of Melbourne, 2002- 2008.

These various conservation examples frame the context in which conservators work, the eco-systems that inform decisions and the values placed on collections. They highlight the environmental and geographical risks such as high relative humidity and temperatures, which means more rapid degradation; and how the tropical zones in the

global south vary in annual temperature and relative humidity. Shown too are the threats of higher rainfall, floods, and water damage (Image 34). These are immense challenges conservation in the global south.

All the exemplary cases mentioned raise the question of how we approach these issues and challenges. Of course, the relationship between collections and environment are necessary for our understanding, but there is a much wider ecology of knowledge and interdisciplinary thinking that informs conservation decisions and actions. These different forms of knowledge need to be broken down into parts and this lecture will focus more on the materials relating to paper and paintings conservation.

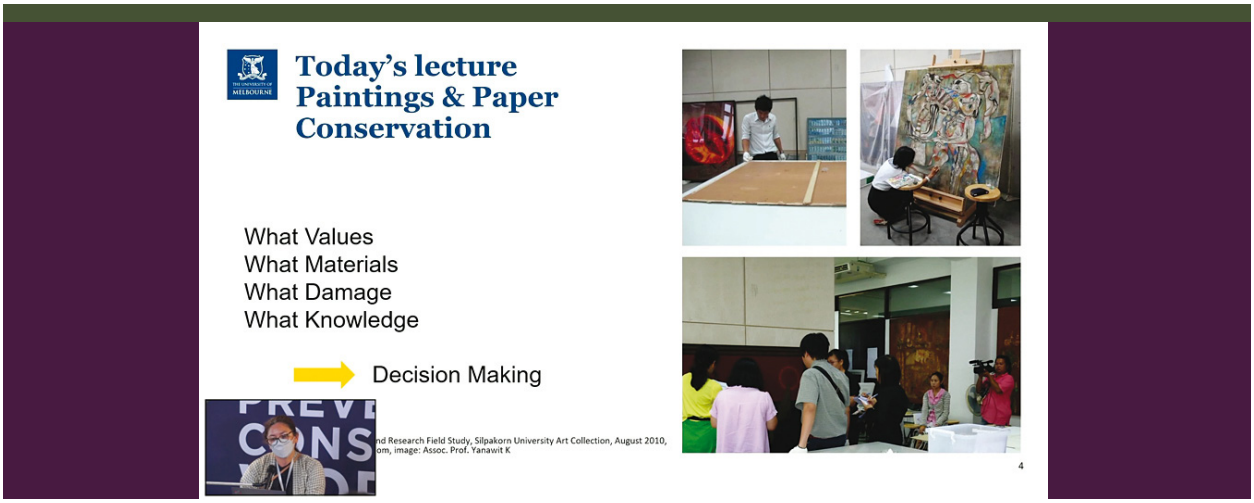


Figure 35 : Decision making principles : what values, what materials, what damage and what knowledge, 2010 Conservation workshop at Silpakorn University.

images: Nicole Tse and Silpakorn University

Keeping in mind that conservation is not just about the materials and the damage. It's also a matter of who cares and how much we care. What values do we place on heritage to want it to last, and what knowledge informs it? Is it conservation alone? Is it science? Is it anthropology? Is it art history? Is it curatorship? Is it environmental studies? Is it biological studies? Many disciplines contribute to conservation, and the key point is that interdisciplinarity and a shared approach is necessary. Within this, there are hierarchies of knowledge and different forms of expertise. My knowledge has its origins in scholarship and academia from overseas but that is not to say that it is more expert

or important than others. Respecting everyone's knowledge and how it can contribute to the cultural record is a more inclusive approach which may fill knowledge gaps or sometimes not, and even build new relationships and connections.

Within conservation, collection maintenance and systems of care , there are lived experiences particularly in Thailand, where people have learned from the ground up and passed on traditions through practice and oral history, and not necessarily in written form. Much research knowledge in conservation in tropical climates needs to be better disseminated and published, and this includes the scholarly outputs like this e-book and also the lived-embodied knowledge that is intergenerational and has been passed down The top-right image (Image 35) shows painting conservator, Kwanjit Lertsiri (อาจารย์ขวัญจิต เลิศศิริ) who knows a lot about conservation in the tropics with 30 years of lived experience. There is a lot we can learn from practice and experience from professionals and non-professionals. What it important is that notions of conservation, cultural maintenance and care are not new but come from many different sources and are part of daily lives and traditions.

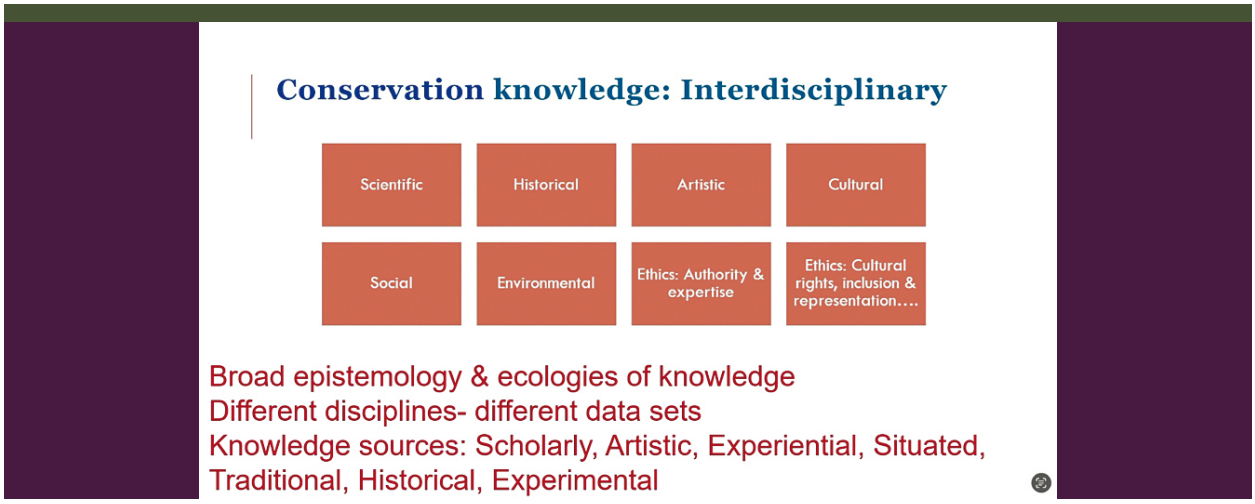


Figure 36 : Conservation Knowledge: Interdisciplinary.

Image: Nicole Tse

Likewise, conservation is interdisciplinary; there are so many different ways to approach conservation. Image 4 shows some of the disciplines that conservation may draw on; scientific, historical, artistic, cultural, social, and environmental knowledge for broad epistemologies and ecologies of knowledge to evolve. There are many others too. This sits alongside the breadth of skills, own experiences, views, bias and different ways of negotiating with expertise and professional frameworks such as codes of ethics, cultural rights and inclusion. One cannot achieve this alone and tThe key to conservation is to partner with people, become part of larger networks in making conservation decisions and acknowledge the limits of what know (Image 36).

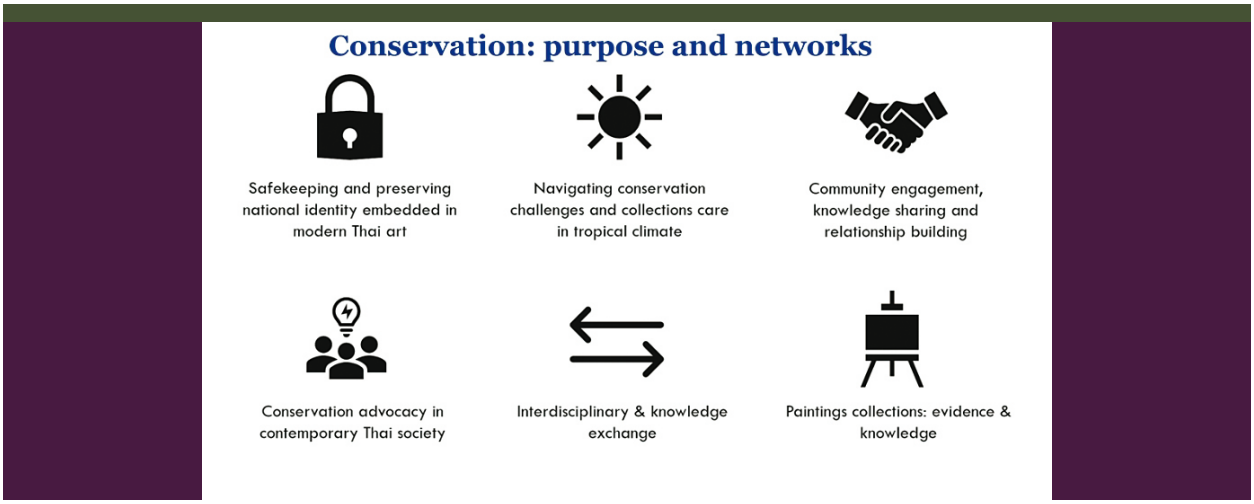


Figure 37 : Conservation: purpose and networks.

image: Nicole Tse

Conservation can also be seen as a silent pursuit, a process that is not seen and that occurs behind doors. Such silence and absence in the real world means that the value and purpose of conservation actions are not well understood and valued. Greater visibility, access and advocacy is therefore a key as we see in image 5 'Conservation advocacy in contemporary Thai society' and sharing what you know about conservation so more information can be built and reciprocated. It also shows how conservation can build rich interdisciplinary knowledge and meaning beyond just fixing an object. Our wide networks and dialogues contribute to this.

Conservation dialogues and the building of relationships are always the first starting point, and the great thing about having so many people in the room is that all of you know things very differently. During Covid, we lacked face-to-face exchanges for more meaningful links to evolve So during the workshop some of the focus will be on the sharing of different perspectives and for the building of new knowledge.

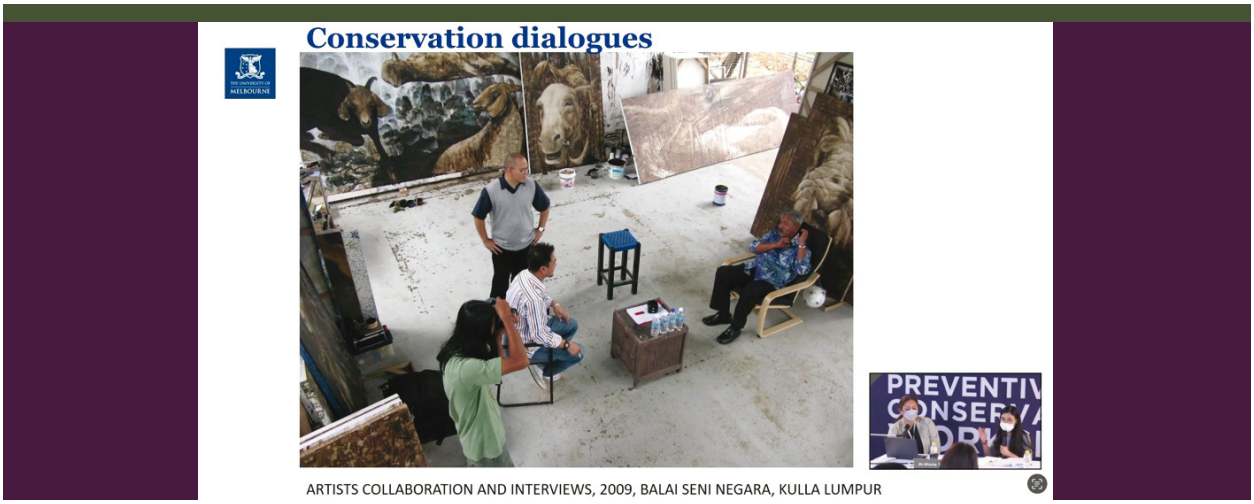


Figure 38 : Artist collaboration, dialogues and interviews with Hamir Soib Mohamed and Balai Seni Negara, Kuala Lumpur, 2009.

image: BALAI SENI NEGARA, KULLA LUMPUR

Conservation often starts with a problem, and sometimes that problem is seen through a negative lens. Sometimes you can look at the scale of damage, become overwhelmed and struggle to know where to start. Having more of a positive attitude about damage, how is can reveal new information about the history of the object, the way it was used and the meaning of such use, is a good way to start. Why is a painting flaking, was it in a flood, kept at a high humidity, in an air conditioned room, and what materials did the artist use maybe some of the question we can ask? The best way to approach this is through dialogues with as many people as possible, as we see here in image 6. Collaborating with artists, producers and makers of cultural records, is a good place to start the conversation.

Often conservation research questions come from real-life problems, and through discussion, in this instance, through artist interviews in Malaysia and the works of art themselves. More information is often needed on the media used, in this case a locally sourced bitumen paint applied directly to aon canvas support (Image 38). Through discussions with the artist, conservators could develop conservation research questions. that were drawn from the artists knowledge of bitumen paint on canvas, the way it behaved and some of the perceived problems. This is just one example of how conservation questions may arise from real-life situations and experience. These dialogues can ground further material science research as shown in Image 39.

Figure 39 : Art materials and questions, Balai Seni Negara, Kuala Lumpur, 2009.
image: BALAI SENI NEGARA, KULLA LUMPUR

Figure 40 : Traditonal cultural maintenance and conservation, Preservation of Northern Thai Manuscripts Project (PNTMP).

image:<https://www.culthernews.de/tag/temple/>

Again conservation is not a new idea - we know of objects and collections that have survived a long time because of actions or approaches taken to how they were stored, valued and maintained. This is different from looking down a microscope or pointing scientific instrumentation at objects which has its origins in more authorized and official forms of heritage conservation. Here in Thailand is a Thai Wat from Chiang Mai (Image 8), where palm leaf manuscripts are located above water to stop termites from damaging them and are also ceremoniously wrapped and placed in custom made cabinets (Image 40). Termites cannot walk on water so it is example of a smart preservation solution that has emerged out of its localized context and conditions. What we learn from this example are the historical and living heritage practices of care in society which are somewhat in contention with standard museum practices today: How can one explain a manuscript repository placed above water where the humidity is high? We are told to exclude water in terms of the ten agents of deterioration.

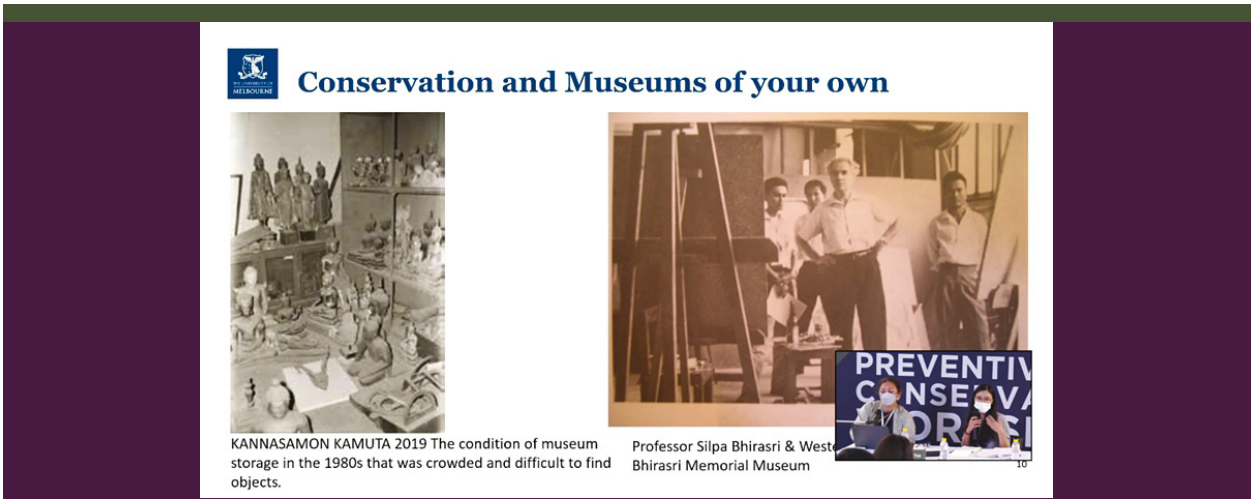


Figure 41 : Collection care and Museums of Thailand.
image: **left:** Kannasamon Kamuta (2019);
right: Professor Silpa Bhirasri & Western Painting Practice,
Silpa Bhirasri Memorial Museum.
image: source unknown

This highlights some of the ambiguities and tensions linked to universal professional museum practices and those that have evolved out of localised contexts. The decolonization of knowledge interrogates the colonised and modernist systems and how former colonised and influenced countries were subject to the ideology of colonialism and the systems that were established. In developing heritage conservation solutions for Thailand, that is why is necessary to interrogate conservation processes and develop localised ones. In fact, it calls into question the role of an international experts and guest speakers coming in to talk about the conservation of heritage outside their own culture. There is also widespread knowledge within Thailand to acknowledge and promote. We see this here during the 3-day lectures by Aj. Chiraporn (ดร. จิราภรณ์ อรัณยะนาค), Sophit (อาจารย์โสภิต ปัญญาขัน), and also Kwanjit (อาจารย์ขวัญจิต เลิศศิริ).

In saying this “We still live in a very global world, and we’re connected”. One way we can develop conservation knowledge in tropical climates is by sharing experiences and continuing dialogues and learning from each others challenge led experiences. In this lecture, my intention is to present my point of view and experience, having done

a little research in Thailand many years ago during my PhD and PostDoctorate, and other Southeast Asian countries.

There are many types of knowledge which inform conservation decisions. If we draw different disciplines together, we can understand what the artwork is about, why it is valued and its meaning. These steps inform conservation decision-making. Artistic knowledge is used to understand how materials have evolved over time: What materials did artists have access to? How did they learn about this artistic practice? Who did they learn it from? Were there networks of training and ways to obtain and exchange art materials.

Figure 42 : Art Historical and artistic development, image: left and right: Unknown Artist, Maha Jataka Royal Ceremony in 1788 reign of King Rama I, acc. 32/2521, National Gallery Bangkok.

image: Nicole Tse (2010)

An example is a painting from 1788 (Image 42) from the National Gallery in Bangkok. In this period some artists were using tempera media on paint supports. How much of this an assimilation of Western informed artistic practice imported from Europe with traditional Thai painting techniques?

Art Schools in Malaysia, the Philippines, Singapore and Thailand

Country	Date	School	Director or established by	Academic Model
Manila, Philippines	1815-1820	Private School	Damian Domingo	Spanish Missionary, self taught?, locally trained mestizo artist
Manila, Philippines	1821	Academia del Dubujo	Sociedad Económica de Amigos del Pais & Damian Domingo	Spanish Administrators, self taught? locally trained artists
Manila, Philippines	1850	Academia de Dibujo y Pintura	Agustin Saez Granadell	Academia de San Fernando in Madrid
Manila, Philippines	1900s	School of Fine Arts at the University of the Philippines (UPSFA), later changed to the UP College of Fine Arts	Fabian de la Rosa Fernando Amorsolo	Based on the Academie de Dibujo y Pintura principles, Manila, Philippines
Bangkok, Thailand	1913	Rongrian Poh-Chang (School of Arts and Crafts)	King Rama VI	Italian Academic and Edward Healey (Royal Academy London)
Bangkok, Thailand	1934	Praneet Silpakum School (School of Fine Arts)	Silpa Bhirasri (Corrado Feroci) Thai Royal Monarchy	Italian Academic: Florence (Rattanakosin Art in the of King Rama IX
Bangkok, Thailand	1943	Silpakorn University	Silpa Bhirasri (Corrado Feroci)	Italian Academic
Singapore	1938	Nanyang Academy of Fine Arts (NAFA)	Lim Hak Tai	Xiamen Acade... College. Chine... discourses
		Art Superintendent of High Schools	Richard Walker	British [water...
Penang	1935	Societe des Artistes Chinois (The Society of Chinese Artists)		Alumni Shang... assimilated fr...
Kuala Lumpur	1952	Wednesday Art Group	Peter Harris	British

Figure 43 : Art Schools in Malaysia, Philippines, Singapore and Thailand.

Image : Nicole Tse (2010)

A way to investigate painting practices is to examine the Schools of art practice (image 43) : What materials were available for artists? How did they learn about painting practice? We can develop a basic premise through art historical knowledge and knowing what art schools were established and what their influences The section highlighted in yellow (Image 43) shows the different art schools in Thailand. We know there's been a solid Italian academic tradition in terms of introduced western art practices through the influences of Professor Silpa Bhirasri.

The other thing we look at is past conservation. What does that mean in terms of conservation skills, and what materials are we using? Do we retain past conservation treatment? Do they signify something in history? Do we want to keep them? Or do we think that those forms of repair, as you might see in the image below (Image 12), do no't do justice to the original artist's intention? Therefore, do you remove them? All of these are value-based decisions. Some people like to keep the repairs as a biography of the object's timeline. Some people believe the painting should be returned to its original state as much as possible. These are value-based decisions informed through dialogues, situated best practices and governance.

Figure 44 : Previous conservation treatments Unknown Artist, Queen Sawang Wattana, her sons & daughters, National Gallery Bangkok.

Image: Nicole Tse (2010)

Value-based decisions are made with others, always in dialogue and situated. Earlier this was raised and how artist's interviews, about and lived and experiential conservation contribute to conservation knowledge for holistic decisions to be made. Such information is also continually built. It is not just one person who builds knowledge and keeps it to themselves but shares it as broadly as possible. Hopefully such an approach reduces duplication; and develops collective knowledge that continues to grow

Then there is the geography of Thailand and what the high risks are for collections. From this mornings video and the Thai conservation team's findings, the two high risks for materials in Thailand are pest damage and biodeterioration, like mould.

Figure 45 : High collection risks: pest damage and biodeterioration in tropical geographies.

Images : Nicole Tse

There is no universal standard or one way of doing conservation Decisions are based on your museum environment, those involved, the climate, the data you have access to and then looking at the works themselves. What can we learn from the visual damages? Can it tell us anything about its history of care ? This particular painting (Image 46) by Fua Haribhitak (เฟื้อ หริพิทักษ์), can be seen with very horizontal and linear cracks, which tells you that this painting was rolled at some stage. How the artwork was cared for is embedded in the type of damage it holds, and one could say that physical changes to artworks all tell a different story.

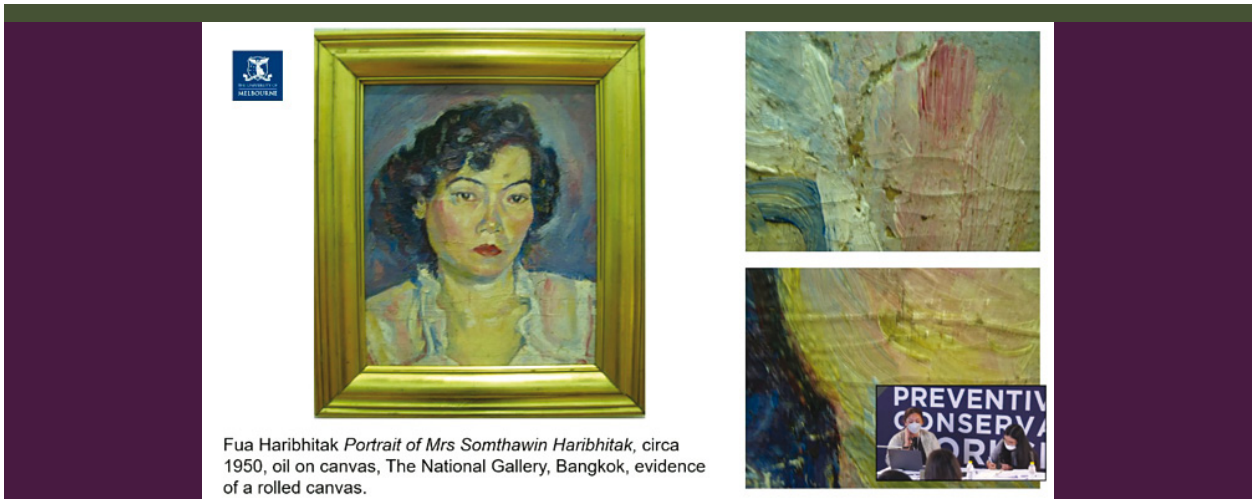


Figure 46 : Fua Hirabjitak, Portrait of Mrs Somthawin Haribhitak, circa 1950, Oil on Canvas, The National Gallery, Bangkok.

image: Nicole Tse (2010)

In some cases, for say in depth conservation treatment, we may focus on one work of art. However when managing larger collections, rather than focus narrowly on one work at a time, it is better to develop a wider and more holistic view of a collections. This is when collections surveys are useful. They provide a broader understanding of the collection risks and environmental impacts, help to prioritise what should be done first and are more representative of the needs of a collection. Often, conservators undertake collection surveys before starting more intensive treatments to identify the priorities.

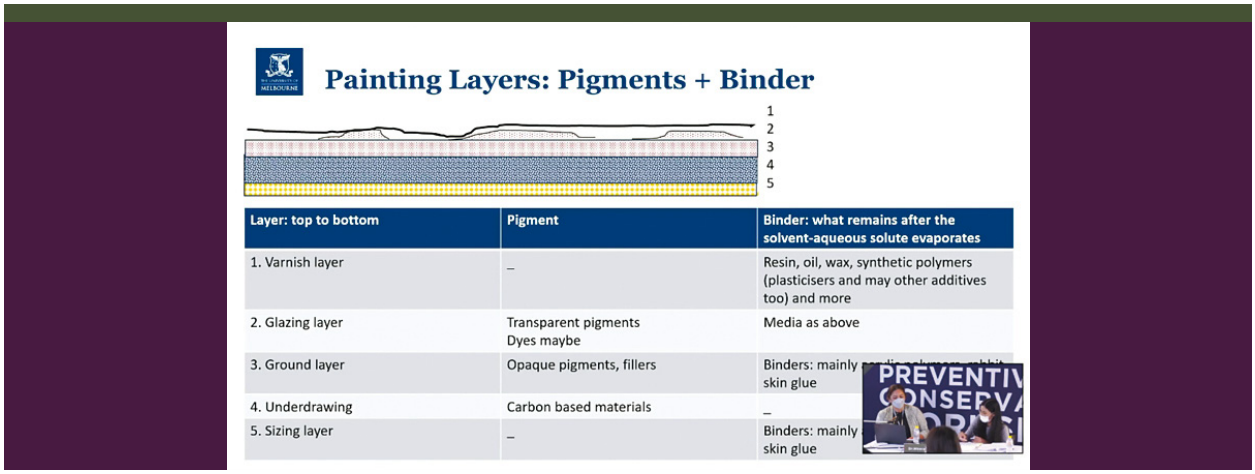


Figure 47 : Painting Layers: Pigments + Binders.

image: Nicole Tse

Conservation is also concerned with the materials art works are produced with and investigating the different layers within the painting. We will focus on this during the practical sessions, discuss paint damages to inform our conservation decision-making, then examine different materials used within paintings and works of art

When we think about a painting, it is a layered structure. It is not just one type of material; it is many different materials on top of each other. Each layer has different types of materials in them, and they all have different purposes. From the top to the bottom layer, there is a a glazing layer, a varnish layer, the paint layers, a ground layer, possible underdrawing, a sizing layers and a support layer. Most common in the twentieth century are paint supports of flexible canvas attached to an auxiliary support. An auxiliary support is either a stretcher with expandable corners or a strainer with fixed corners

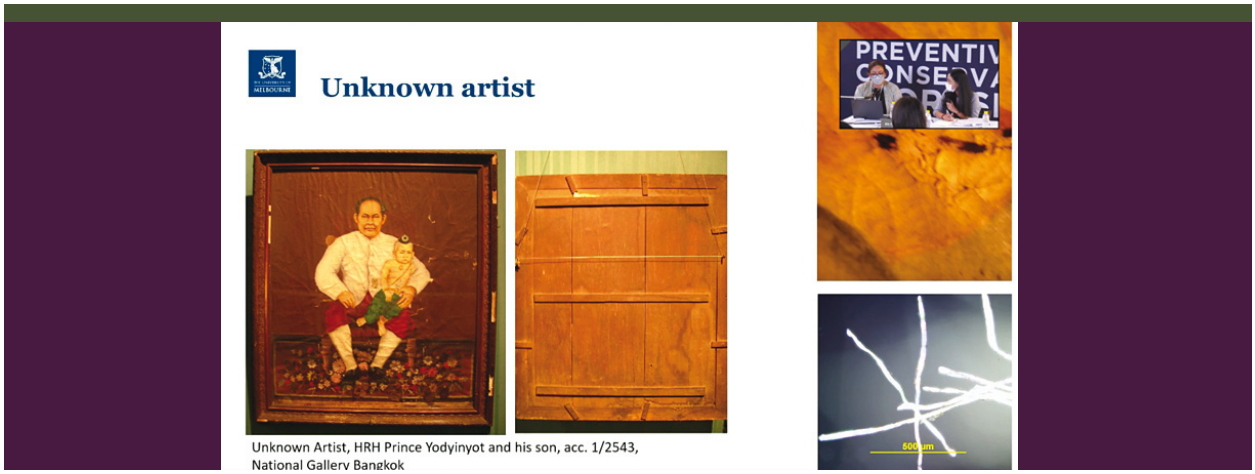


Figure 48 : Painting by unknown artist, HRH Prince Yodyinyot and his son, National Gallery Bangkok with a detail and magnified fibre sample.

image: Nicole Tse (2010)

Here is an example of a painting from the National Gallery in Bangkok (Image 16). As seen, it 'is significantly damaged. You might ask why it is so damaged. Why is the canvas punctured with a hole in it? Often the type of materials along with the collection climates, history of care, management structure and governenace, are linked to such damagesincluded in that painting. In this case, cotton was identified under the microscope. Cotton, with time, degrades much more quickly than other types of fibres and becomes very brittle. The brittle canvas along with the paint-media layer above, which is a tempera type of material, also becomes quite brittle with time and dos not have the same plasticity as oil or acrylic paint. If you have brittle materials exposed to a climate with a high relative humidity and- hotter temperatures and exposure to a range of very hot to cooler conditions, and high to lower relative humidity changes, it means the painting layers will not have the strength, and capacity to adjust to the climate changes. The works will crack or tear as a consequence and often brittle materials will produce these types of tight knit cracks we see in image 48.

An important action is to stabilise the environment to ensure your materials are stable too. The way paintings are put together and the types of materials used also adds to the stability of works. For example, cotton is less strong than a linen canvas; it will take longer for linen to degrade. A solid support such as a wood panel is more stable than a flexible canvas support (if the wood is good quality and not a composite board or Masonite). While the types of stretchers or strainer used to hold a flexible supports in places, sometimes called an auxiliary support, can produce more or less stable paint surfaces. More complex joins like mitred mortise and tenon joins are stronger than a simple butt join, and a stretcher or strainer's bevelled edge means the canvas support is less exposed to damage.

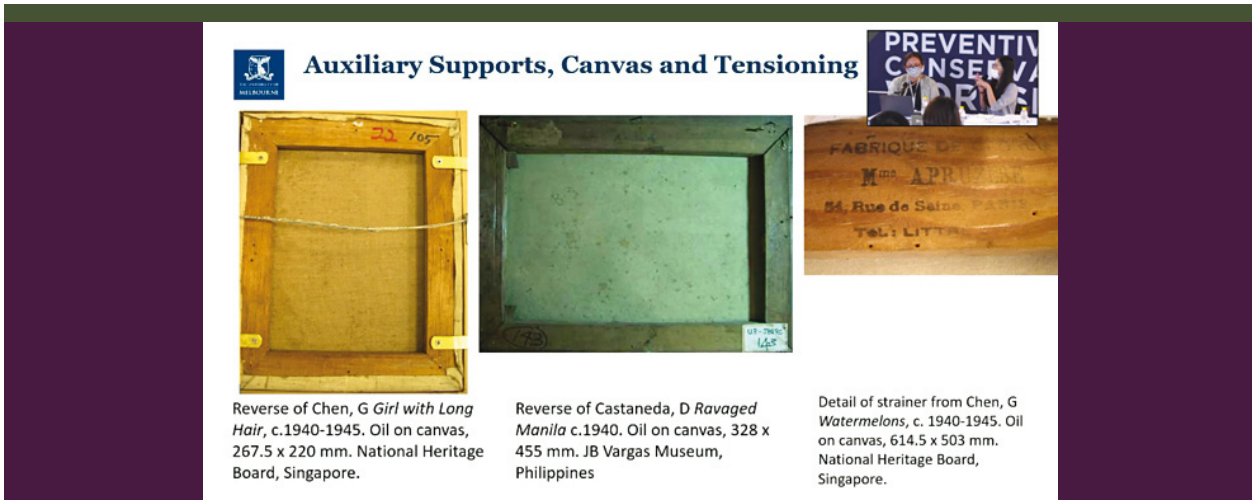


Figure 49 : Auxiliary Support, Canvas and Tensioning,
left: Reverse of Chen, G Girl with Long Hair, c.1940-1945.
Oil on canvas, 267.5 x 220 mm. National Heritage Board, Singapore;
centre: Reverse of Castaneda, D Ravaged Manila c.1940.
Oil on canvas, 328 x 455 mm. JB Vargas Museum, Philippines;
right: Detail of strainer from Chen, G Watermelons, c. 1940-1945.
Oil on canvas, 614.5 x 503 mm. National Heritage Board, Singapore.
image: Nicole Tse (2010)

If we can identify these types of materials, it can tell us many things. Identification of the types of materials used in paintings can 1) contribute to art historical knowledge, the materiality and meaning of works of art and even the social and economic influences on artists at the time; and 2) tell us what type of damage may occur if we construct artworks with certain materials.

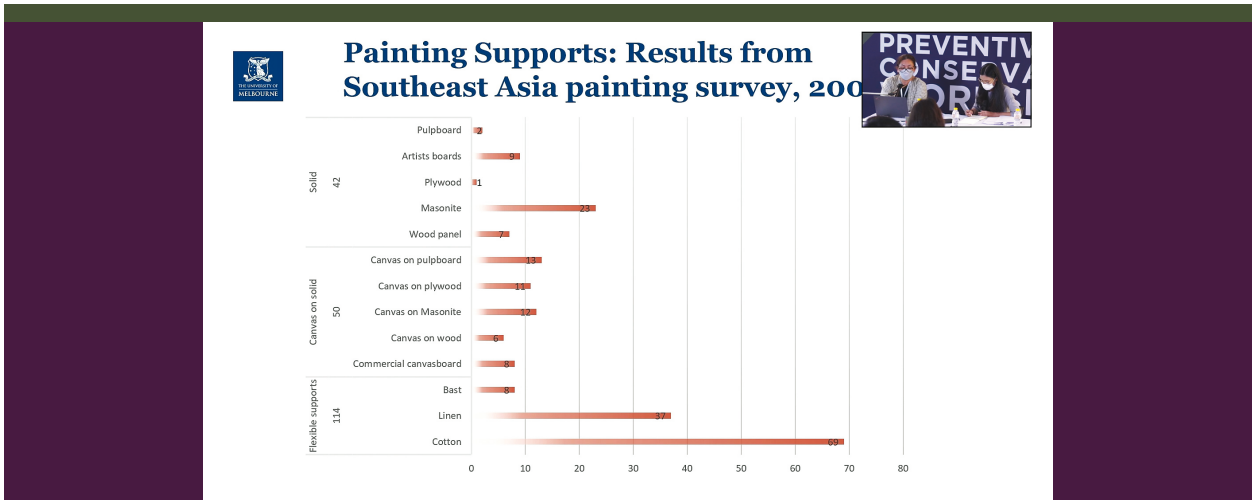


Figure 50 : Painting Support:s in Southeast Asia based on a collection survey 2003-2006 from the national collections in Malaysia, Singapore, Thailand and a University of the Philippines in the Philippines, adapted from Tse, N 2010 'The Characterisation of Canvas Paintings in Tropical Southeast Asia; PhD thesis, The University of Melbourne.

Here is a summary of results from looking at Southeast Asian paintings based on a collection survey 2003-2006 from early 20th century paintings from national collections in Malaysia, Singapore, Thailand and a University of the Philippines in the Philippines (Tse 2010) (Image 50). You can see the most common types of materials identified in early 20th century paintings. Once you know the materials, you can start comparing materials science knowledge to the physical evidence of damage. Results showed that cotton canvases we used more frequently than linen canvases, which is half the amount. It is known that cotton is quite vulnerable, and insects like to eat cellulose fibres.

The other thing to observe in painting supports is: How tight it is, and what is its tension like? What is considered to be too tight or oo loose in tropical Southeast Asian climates? What is the perfect balance? The role of canvas support is to keep things stable, so it needs to be under positive tension. Then the paint will be held in place and will not move much, but if the canvas support t can't be asis as tight as a drum (where it makes a echoing sound when lightly tapped), it means it si too tight and the paint layer above is more vulnerable. There is a myth-practice of spraying water on the back of a canvas

support to tighten it, however this can also cause it to become too tight and make the paint layer above vulnerable. This is probably not the best practice in tropical climates where the relative humidity is already high (there is already a lot of moisture in the air). The cotton fibres will swell quickly, cause a sudden tightening of the canvas support and possibly make the sizing, ground or paint layers delaminate.

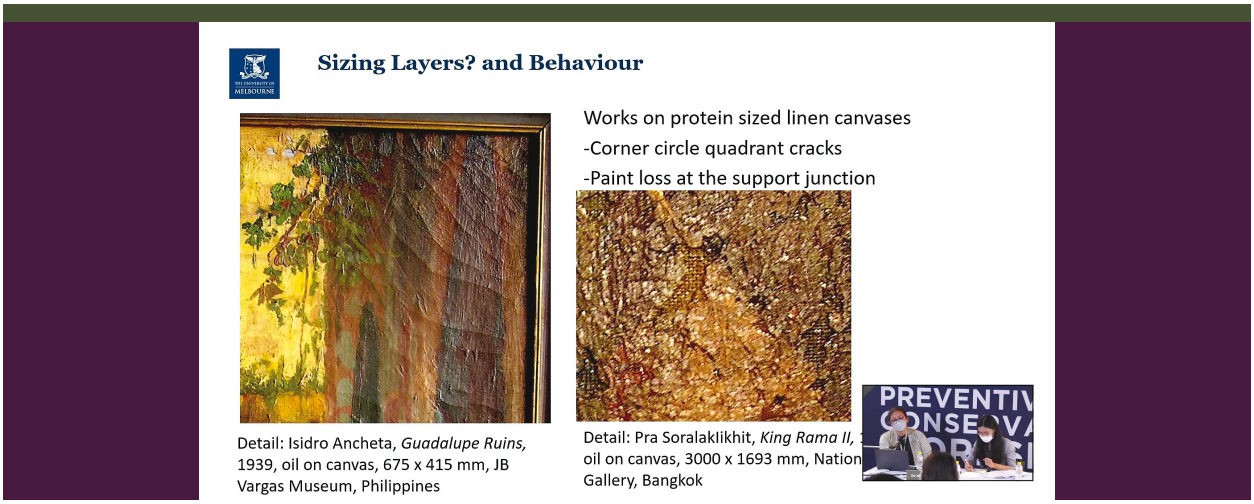


Figure 51 : Sizing layers and behaviour,
left: Detail: Isidro Ancheta, Guadalupe Ruins, 1939,
oil on canvas, 675 x 415 mm, JB Vargas Museum, Philippines;
right: Detail: Pra SoralakIikhit, King Rama II, 1908-17,
oil on canvas, 3000 x 1693 mm, National Gallery, Bangkok.
image: Nicole Tse (2010)

In the case of Image 51, his type of damage is typical of the identification of and behaviour of a sizing layer. A glue size layer is the first layer on top of the canvas. This is typical of an academic painting practice like the European techniques introduced to Thailand in the early 19th Century and are more related to imported materials from commercial art supply companies. In Southeast Asia's humid tropical environments, a glue size swells due to the environmental moisture, it dissolves and can delaminate away from the canvas support. This type of damage is quite common for glue-size layers, and maybe typical for paintings constructed from imported and western commercial art supplies or those influenced by such practices. We can also look at different cracks; these types of

curtain cracks indicate there's a glue size layer and that it has been exposed from a very high relative humidity to a low relative humidity.

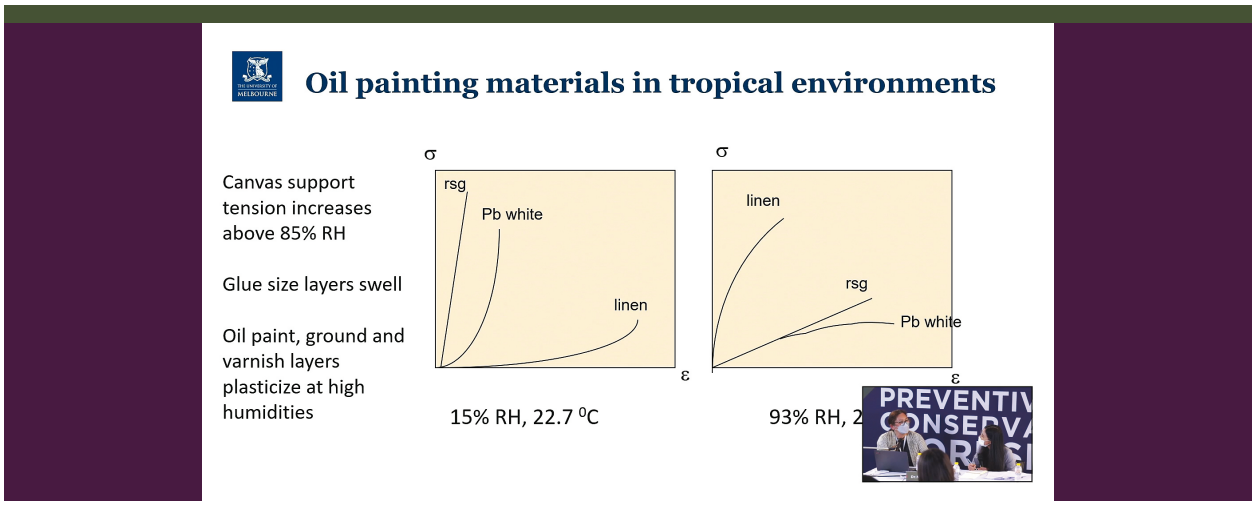


Figure 52 : Traditional Western informed oOil painting materials linen canvas, rabbit skin glue and lead white often included in ground and paint layers; and behaviour at 15%RH compared to 93% RH.

image: Nicole Tse

The climate is such an issue here in Thailand. Conservators do have to think about how the materials behave at high relative humidity and temperatures. With canvas paintings, increased stress and strain occurs at high relative humidity as seen at 93% RH on the right (Image 52). Stress is how much force and tight a layer in a paint is, and strain is how that layer can move. The canvas support as you see with the linen curve is very tight and stressed at high relative humidity. To avoid this, an action maybe to reduce the relative humidity as much as practically possible . Or can you create a microclimate around the painting to absorb that extra moisture and buffer climate changes?

Figure 53 : Paintings by Christain Frosch, Oben/unten#39, 2007.

image: http://www.artnet.com/artists/Christian-frosch/

Another layer in a painting is obviously paint, which can have many different types, qualities and behaviours depending on the artists choice. When choosing paint, they all have different behaviours. Here is a 2017 artwork by a French artist Christain Frosch, where different paints produce different behaviour (Image 53). Paint behaviour is why an artists may choose one paint over another, and it likewise ages differently over time and can be more or less stable. In the series of paintings in image 53, the work on the right is latex paint; it is visibly drippy, would produce a thinner layer that would dry quicker than the other two. On the left is an artist's oil paint that produces a buttery paint layer that is more slow drying (also due to the polymer used). We canno't expect latex paint to behave the same as an artist's paint because they have very different qualities and formulations. The difference between the artist's paint and the latex is that the latex is made from faster drying synthetic polymer dispersion and oil paint is a slow drying paint that cures via cross linking.

Further a latex paint has many additives and fillers that changes their behaviour and stability. Less pigments are incorporated and other synthetic additives are included which disperses a synethetic polymer in water and also stabilises it. As more and more materials are added, degradation is more probablee. Oil paints will behave better because

they have fewer materials and a high pigment load. It is the high pigment load which makes the paint film cure and also dry.

Figure 54 : Binders: Aqueous and non-aqueous.

image: Nicole Tse

In the practical session, participants will look at different materials. There are aqueous ones and non-aqueous ones (water-based and non-water based). The queous ones are glues; gums; proteins, traditionally artists would use egg tempera; casein made from protein milk; and today synthetic acrylic dspersions; and sometimes just water alone are used.

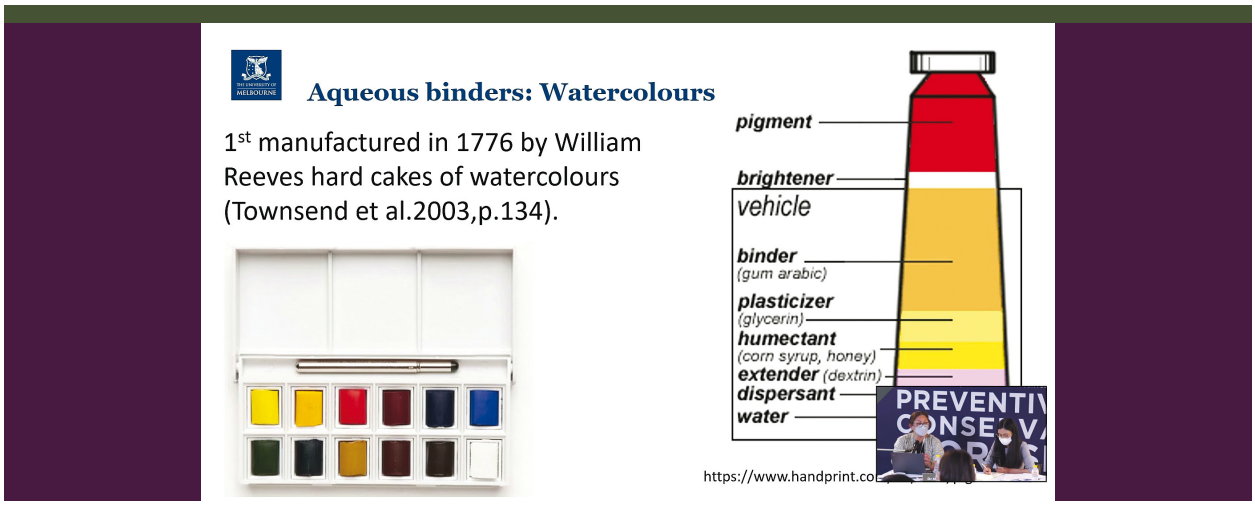


Figure 55 : Aqueous binders: Commercial wWatercolours and their formulations,

image https://www.handprint.com/HP/WCL/pigmt1.html

When looking at the range of materials, try to work out when they were introduced. The first commercial watercolour in the United Kingdom was manufactured by the Reeves artists colourmen in 1776. Of course, there were different variations of this occurring in Thailand with the use of water-based binders missed with dry pigments. Watercolour paints are composed of Gum Arabic as the main ingredient together with these aspects: pigments; brighteners; a plasticizer which is glycerine to give it plasticity; a humectant such as honey different extenders, such as fillers, dextrin in watercolours; and water as the dilutent.

When a watercolour dries, what is left? The water will evaporate, and the other components remain. Over time these materials will interact with each and degrade according to their characteristics and climates they are exposed to.

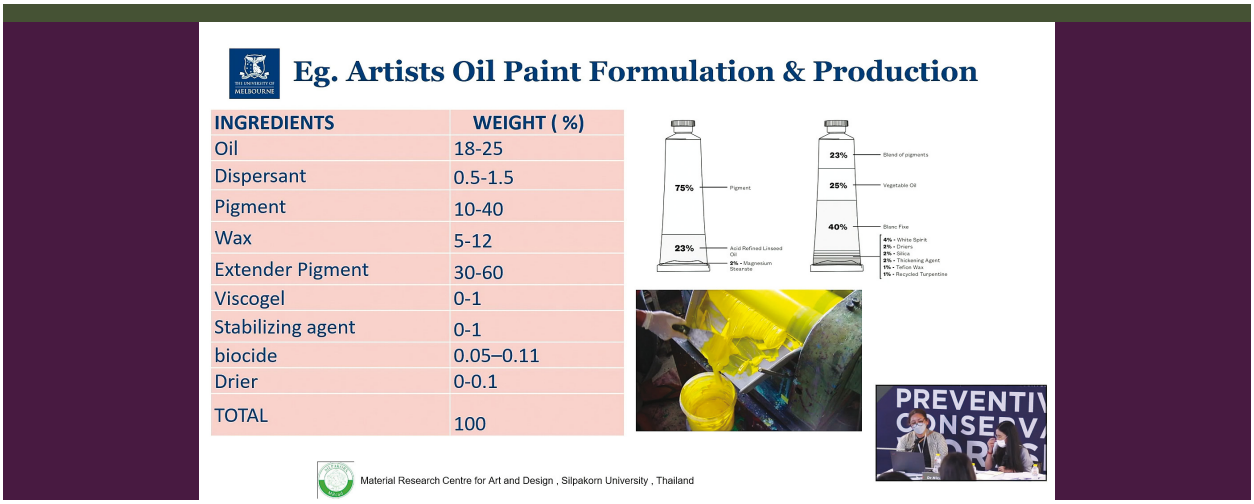


Figure 56 : Examples of Artist Oil Paint Formulation and Production.

image: Nicole Tse, Chayabutra, Kamolchote, Panmanee & Khlungwisarn (2014)

The same type of analysis can be applied to thing is with oil paints. An understanding of their composition provides an insight on how stable they maybe. Here are some examples of artists oil paint formulations. The types of materials included and their % are markers of quality.

As seen in Image 56, this one is fairly typical of artists paints globally, beside the higher biocide content, but one that is produced in Thailand (Tse, Chayabutra, Kamolchote, Panmanee & Khlungwisarn 2014). Let us look at the formulation, we have the oil at 18-25% which is dependent on the type of pigment it is mixed with the pigments oil index, shape etc, a dispersant to separate out the pigment particles- often the new fine synthetic pigments want to agglomerate together so a dispersant is needed to separate them or the paints need to be milled for longer in a triple mill like we see here (but commercially, the longer the milling, the higher cost, but the higher the dispersant as a quick step the lesser quality paint), the pigment again relates to the PVC but also cost, the more pigment the higher the cost so that is why extender pigments are added to bulk out and cheapen the production of oil paints, wax is added to make it buttery and thicken the paint, and driers to initiate the oxidation process (more metal catalyst the less stable as we are now finding with lead, zinc, cobalt metal soap production in oil paint films- these become metal soaps that are RH, water sensitive paints.

So the higher quality oil paints have more milling and less materials, and a higher pigment load. While some oil paints produced in the 1970-80s with plant-based oils include safflower, sunflower and soybean drying oils which is good for light colours as it does not yellow. However, these semi-dry oils, are now showing paint drips in recent research and is starting to be a problem.

Figure 57 : Imported Colourman art Supplies: Filipino Distributors.
Property of Dr. Nicole Tse

he arrival of 'Artists Colourman' companies is another important historical demarcation that contributed to the use of Western artists' materials in Southeast Asia. Obviously access to art materials played an important role in the adoption of imported materials. The early art supply shops in my thesis (Tse 2010) included the Malaysian Nanyang Book Company established in 1943 in Kuala Lumpur and Penang; Straits Commercial established in 1947 in Singapore, EL82 established in 1882 in Manila (Image 57) as well as Enriquez Art Supply early in the 1900s; and Mohameds, who supplied the Royal Court, around the 1940s in Bangkok. They emerged when European and American 'Artists Colourman' companies were active and Malaya, the Philippines, Singapore and Thailand were becoming increasingly international in their focus.

In image 57 we see how European 'Artists colourmen' stamps in the Philippines were double stamped with a local supplier. The Filipino suppliers include EI82 (1), Arte (1) and La Paleta de Plata (1). As can be seen here the two are double stamped with the Filipino supplier and the French LeFranc supplier. The date of the work on the right is 1943 and on the 'Arte' board was 1930. 'Arte' in fact opened in 1928 on Avenido Rizal and closed in 1931,and was also run by one of the Ongpin descendents (EI82) and La Paleta de Plata some 10 years later again was run by an Ongpin.

In summary, by looking at art materials and understanding the production history of art materials, their global distribution, trade, important and up take by artists, a rich technical art history story can evolve. The methodologies employed in heritage conservation not only shed light on art history, but by understanding material changes and undertaking conservation actions, art works can be accessed into the future.

Practical Session

There are three practical parts. The first practical part is decision-making. The aim is to work out what to do in terms of conservation intervention or treatment.

There are many decision-making models; this is just one (Image 26) developed by the Cologne Institute in Germany. It applies to contemporary works of art but is also relevant to all works of art because it asks a set of questions about the value of the artwork in localised contexts. Once the values are shared and agreed upon, you can move forward to working out the appropriate place based actions.

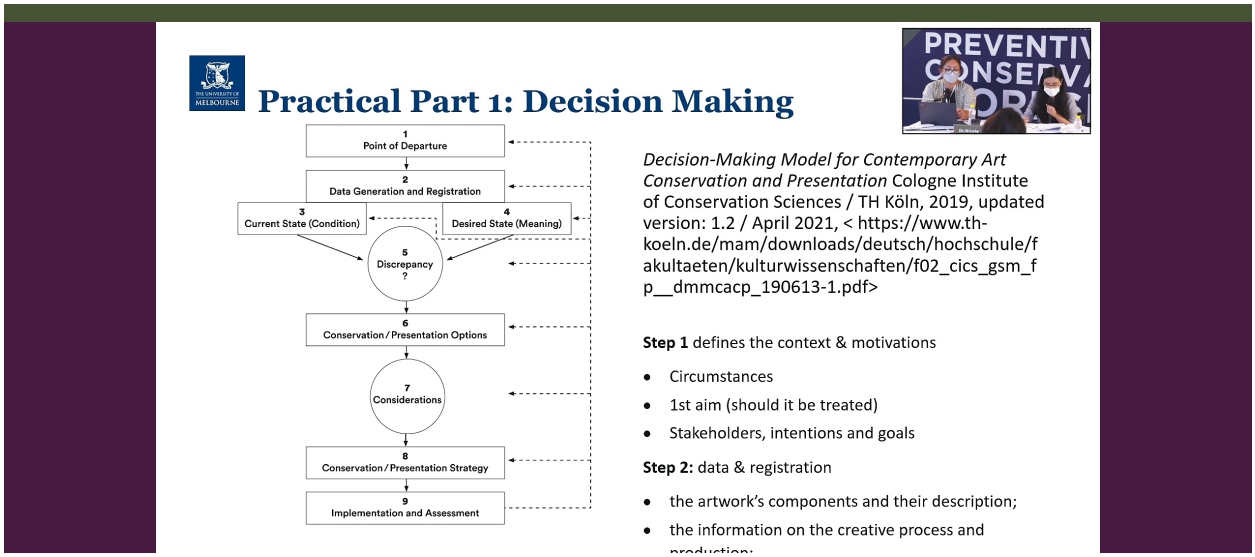


Figure 58 : Practical Part 1: Conservation Decision Making, Adapted from Decision-Making Model for Contemporary Art Conservation and Presentation Cologne Institute of Conservation Sciences / TH Köln, 2019, updated version: 1.2 / April 2021, < https://www.th-koeln.de/mam/downloads/deutsch/hochschule/fakultaeten/kulturwissenschaften/f02_cics_gsm_fp__dmmcacp_190613-1.pdf>

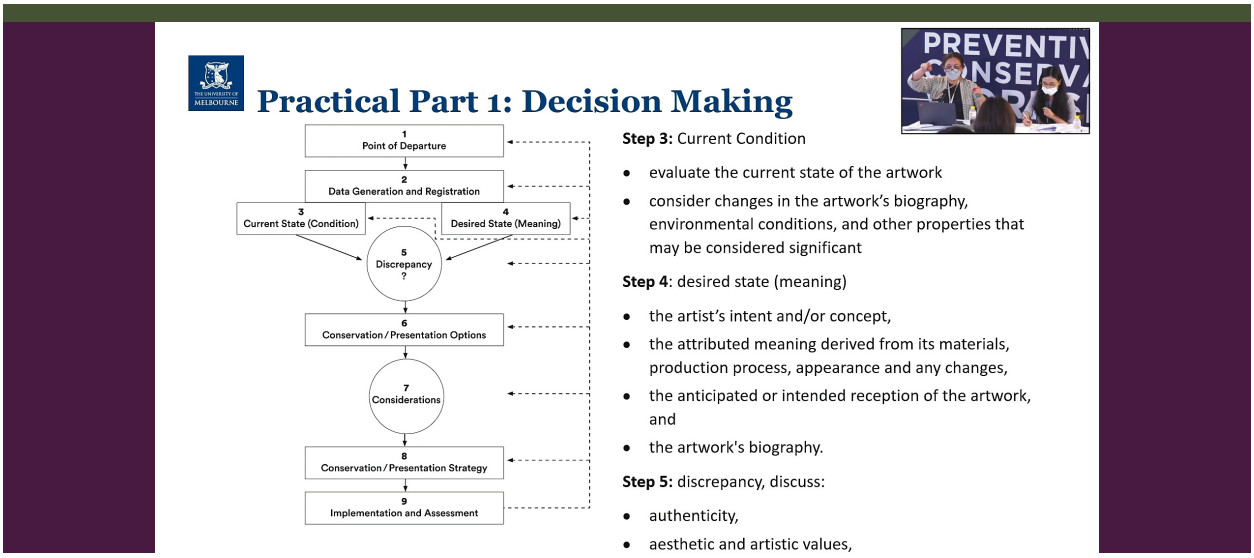


Figure 59 : Practical Part 1: Conservation Decision Making, Adapted from Decision-Making Model for Contemporary Art Conservation and Presentation Cologne Institute of Conservation Sciences / TH Köln, 2019, updated version: 1.2 / April 2021, < https://www.th-koeln.de/mam/downloads/deutsch/hochschule/fakultaeten/kulturwissenschaften/f02_cics_gsm_fp__dmmcacp_190613-1.pdf>

Three workstations will be set up. The groups will have 30 minutes at each station and rotate between workstations.

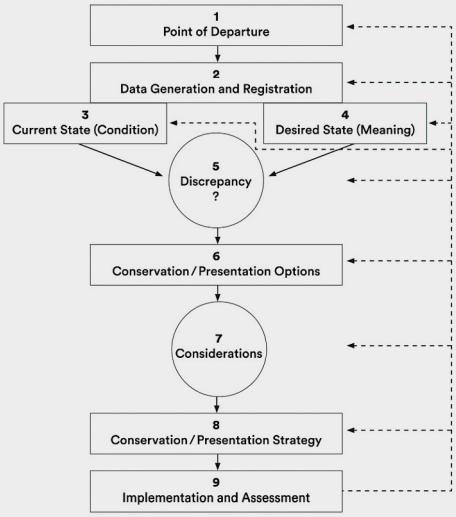
Part 1: Decision-making in painting and paper conservation.

Each group will work on one of the paintings from Silpakorn University's Art collection (Image 28). These paintings will form the focus for the part 1 practical session.

Figure 60 : Artwork: Silpakorn University's Art collection

Procedure

1. Before conservation treatments begin, think about why and what conservation will do. Each group should examine a few questions and follow the Decision-Making Model for Contemporary Art Conservation and Presentation.
2. Select a work of art and focus the discussion on conservation decision making. Use the table below as prompts.
3. Interview each other to discover different views and interpretations about what is important.
4. Collate the groups discussion under each step.
5. How do these inform Step 6 and the conservation options?

Questions	Decision-Making Model
Step 1 defines the context & motivations - Circumstances - 1st aim (should it be treated) - Stakeholders, intentions and goals **Step 2: data & registration** - the artwork's components and their description; - the information on the creative process and production; - the location of the artwork and associated environmental conditions; - the present condition of the artwork; - the installation instructions and information on the variability (including scores, notations, floor plans, architectural and exhibition models, etc.); - the information on past iterations and the acquisition history; - the information on the artist, assistants, technicians, performers, **Step 3: Current Condition** - evaluate the current state of the artwork - consider changes in the artwork's biography, environmental conditions, and other properties that may be considered significant **Step 4: desired state (meaning)** - the artist's intent and / or concept, - the attributed meaning derived from its materials, production process, appearance and any changes, - the anticipated or intended reception of the artwork, and - the artwork's biography. **Step 5: discrepancy, discuss:** - authenticity, - aesthetic and artistic values, - historicity, - functionality & use, - artist's intent and anticipation of potential future development / changes, - cultural protocols (right to know) - cultural safety - agency, representation, authorship - claims to knowledge & hierarchy of knowledge - who ascribes value	

Part 2: Materials

Figure 60 : Practical Part 2: Materials.

image: Nicole Tse

Another group will be doing part 2, looking at art materials and discussing what is in them, when they were introduced and how to classify them. That can give you an idea of how shared knowledge can really evolve from learning from each other and interviewing each other.

Examples of materials

Stretchers, strainers, cotton canvas, linen canvas, bast supports, stapes, canvas boards, papers, tacks, media types (oil, acrylic, pastel, water colour, pens, markers, alkyds), paint tubes & spray cans, pigments, fillers, media components like oil, acrylic media, biocides, wax, coalescent agents

Paper supports: Thai papers, newsprint, cartridge, copy papers, Japanese papers, paper with watermarks, woven papers, laid papers, different papers with different fibres: wood, bast, cotton, bamboo, leaf (mulberry) and more.

Equipment

Handling tools: paper tongs, gloves, boards, Lights, torch

Procedure

1. Examine archival and art materials from works on paper and paintings
2. What knowledge systems do we need to understand painting materials?
3. Let's look, let's interview each other
4. Examine and classify the materials into their:
    - class (natural / synthetic / organic / inorganic)
    - sub class (Acrylic resin, PVC, proteins etc)
    - date of introduction / use / availability
    - purpose and use
    - preparation method
    - practical and ageing characteristics
    - knowledge system
5. Note classifications in the following table
6. Let's arrange the materials into groups and a timeline.
7. Discuss characteristics

Class / Other term	Subclass / Other term	Date / when used / available?	Purpose / Use	Preparation Method	Proprietary Name	Comments: Practical and Ageing Characteristics	Source: lacal / imported	Knowledge system
Natural Materials	Drying Oils			Various oxidised states to promote drying	Sun thickened Linseed Oil	triglyceride, double bonds oxidise, yellow with age		
Synthetic Materials	Acrylic Resins							

Part 3: Damage

Look at works of art and identify different damages on individual layers first, then look at the relationship between those layers and why something might occur.

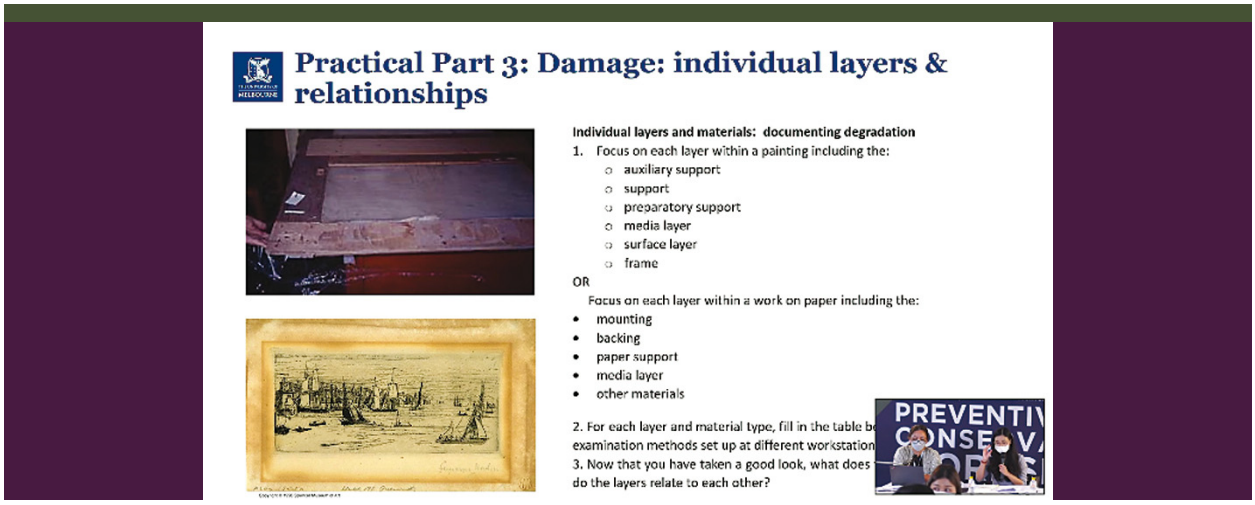


Figure 61 : Practical Part 3: Damage: Individual layers and relationships.

image Property of Dr. Nicole Tse

Procedure

1. The aim is to examine the individual layers within works of art and consider the relationship between layers.
2. Focus on each layer within a painting including the:
    - auxiliary support
    - support
    - preparatory support
    - media layer
    - surface layer
    - frame

Focus on each layer within a work on paper including the:

- mounting
- backing
- paper support
- media layer
- other materials

3. For each layer and material type, fill in the table below by following the examination methods set up at different workstations.
4. Now that you have taken a good look, what does this data mean? How do the layers relate to each other?

Solid paper support and/or Auxiliary support

Description	Solid support: Y/N & type	Auxiliary support: Type	Aux support: Dimensions. bevel edge?	Corner joins: Square?	Corner joins: open / closed	Aux Support: splits-damages	Aux Support: Staining	Aux Support: tack / staple holes	Tacks-staples-no. & no. lost
1									
2									

Flexible support layer

Description	Fibre type	Weave type	Thread count	Selvage edge? Warp / Weft Direction	Tension? Planar-Warped	Tension? +ve or -ve	Crimp, weave tightness	Staining / Discolouration / Location / front / back	Stretch Dimensional change-strain	Fibre breaking strength	Tears / Location	Canvas stamp / Inscriptions
1 Painting details	Cotton	Plain	14 x 14									
2 Sample 1 etc												

Ground layer, media layer & surface layer

Description	Type?	Colour?	Where is it applied: face, edges, reverse?	What layer is it applied to?	Is it well attached? If delaminated where is this occurring?	Colour changes Location?	Cracking: Sharp Aged or Wide Drying cracks	Location of cracks on painting	Direction of cracks	Distribution of cracks: tight / wide	Type of cracks and location	Type of cracks and location
1 Ground layer												
2 Media layer: 1st layer etc												
Add more layers												

PREVENTIVE ART CONSERVATION:
Storage and Environment Control Based on Context Found in Thailand

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Translate	Chewasit Boonyakiet Sittisak Rungcharoensuksri Polwach Beokhaimook
Graphic design	Vinai Nimgulsathien
First edition	February 2024
ISBN (e-book)	978-616-584-163-4
Published by	Thailand Academy of Social Sciences, Humanities and Arts (TASSHA) Office of the Permanent Secretary, Ministry of Higher Education, Science, Research, and Innovation (NRCT)

National Library of Thailand Cataloging in Publication Data

Preventive Art Conservation: Storage and Environment Control Based on Context Found in Thailand.-- Bangkok : Thailand Academy of Social Sciences, Humanities and Arts ; TASSHA Office of the Permanant Secretary, Ministry of Higher Education, Science, Research and Innovation, 2024.
320 p.

1. Arts. 2. Arts -- Conservation and restoration. I. Tse, Nicole. II. Title.

700
ISBN 978-616-584-163-4

This book is a part of the "Workshop on Preventive Conservation of Artworks: Organization and Environmental Condition Control from the Perspective of Art Conservation in Thailand." It is conducted as part of the National Art Museum of Thailand (NAMT) plan with the support of the research and development program in social sciences, humanities, and arts through the Thailand Academy of Social Sciences, Humanities, and Arts (TASSHA). Funding and support for research and innovation activities have been generously provided by the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research, and Innovation, as well as the National Research Council of Thailand (NRCT) for the fiscal year 2022.

Supported by