



CLEANING OF SYNTHETIC PAINT FILMS:
AN INTERNATIONAL COMPARISON OF CONSERVATION PRACTICES



By
Ms. Louisa BLEIL

An Independent Study Submitted in Partial Fulfillment of the Requirements
for Master of Arts Cultural Heritage Conservation and Management (International
Program)

Silpakorn University
Academic Year 2025

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การอนุรักษ์และการจัดการมรดกทางวัฒนธรรม (หลักสูตรนานาชาติ) แผน ข
มหาวิทยาลัยศิลปากร
ปีการศึกษา 2568
ลิขสิทธิ์ของมหาวิทยาลัยศิลปากร

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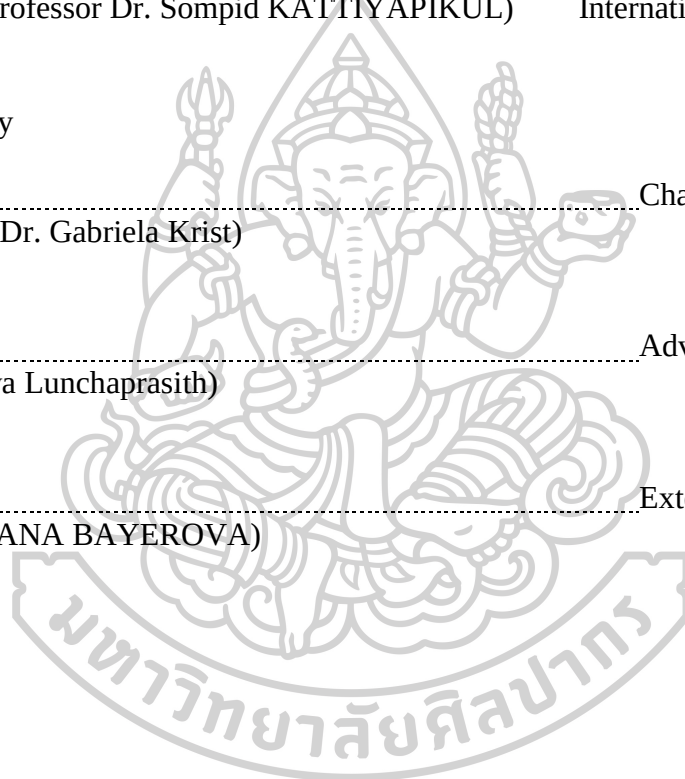
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669020006 : Major Cultural Heritage Conservation and Management (International Program)

Keyword : synthetic paint films, sensitive cleaning, interdisciplinarity, conservation practice, high selectivity, solvent confinement, acrylic emulsion, acrylic solution, PVA, theory practise gap

Ms. Louisa BLEIL : Cleaning Of Synthetic Paint Films: An International Comparison of Conservation Practices Thesis advisor : Dr. Thanya Lunchaprasith

Cleaning of synthetic paint films presents an increasingly urgent yet often under-informed conservation challenge. This study investigates the most used and most sensitive cleaning systems in current practice, identifying regional variations and assessing the gap between research and application. A mixed methods approach was employed, combining secondary literature analysis with primary data from interviews and surveys conducted among conservators and contemporary artists.

The findings reveal that highly sensitive, research-based cleaning systems are rarely implemented in practice, and conservators often lack knowledge about the precise binding media. As these cleaning systems typically require exact material identification, their practical applicability is limited. The study also highlights the under-utilised potential of artist collaboration, suggesting that improved communication could enhance material documentation and contextual understanding.

To bridge the divide between research and practice, future conservation efforts must integrate scientific knowledge, artist insights, and accessible methods within daily workflows, supported by stronger structural and educational frameworks.



ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to all the professionals who generously shared their time, knowledge, and experience by participating in this study. Without your willingness to engage with these topics, this thesis would not have been possible.

Univ.-Prof. Mag.art. Dr.phil. Martina Griesser-Stermscheg
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Personal Acknowledgements
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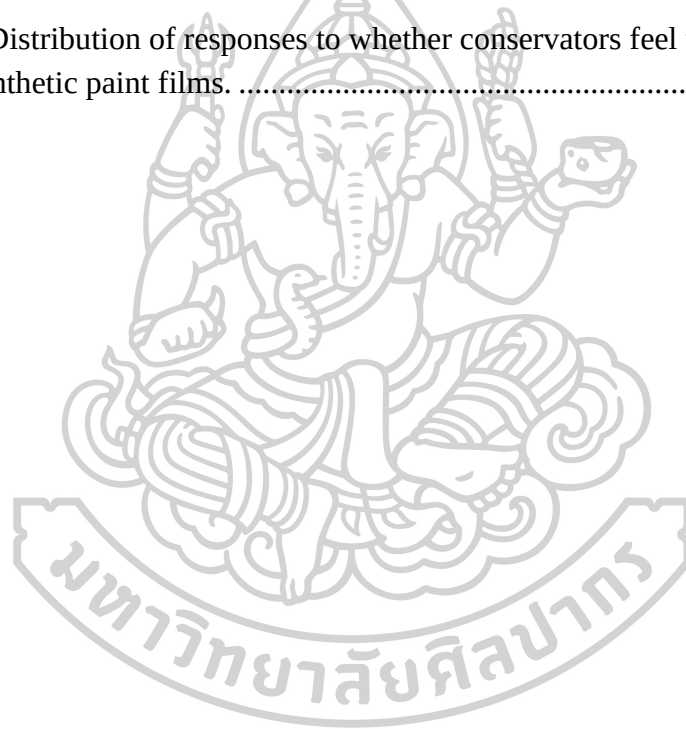
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Introduction

In recent decades, the cleaning of synthetic paint films has become an increasingly urgent concern within the conservation community. Since Nicholas Serota, then Director of Tate, remarked in 2007 that too little was known about the conservation of acrylic emulsion paints, research in this area has expanded significantly. Yet, despite notable advances, much of this scientific knowledge remains within academic and laboratory contexts and has yet to be fully integrated into everyday conservation practice.

The urgency of the issue is underscored by the ageing of early acrylic paintings, many of which are now over 70 years old and in need of cleaning for the first time (Dillon et al., 2014). However, uncertainty persists among conservators regarding the most appropriate and sensitive cleaning methods. The underlying causes include the fragile nature of synthetic paint films, the frequent lack of information about the precise binding media used, and the embedded dirt that complicates surface treatment (Ormsby et al., 2007). Moreover, effective cleaning systems are often highly specific and rely on detailed material analysis, making them difficult to apply in practice.

This thesis aims to investigate how synthetic paint films are cleaned in current conservation practice, identify the most commonly used cleaning agents, and examine how conservators access and apply knowledge in this field. A particular emphasis is placed on exploring regional variations in Europe and Asia, in practice and understanding the potential gaps between research and real-world applications.

Additionally, this work examines the role of living artists in the conservation process, especially in contexts where formal conservation structures are less established, and artists often undertake conservation work themselves. Questions concerning the collaboration between conservators and artists, and the extent to which they share conservation values, are central to this investigation.

The thesis employs a mixed-methods approach: a literature review provides a foundation of current scientific understanding, while surveys and expert interviews generate empirical data from practitioners and artists across two different geographical contexts: Germany and Austria in Central Europe, as well as India, Thailand, Singapore, Cambodia, and Bhutan in South and Southeast Asia. The selection of participants reflects the collaborative framework of the joint Master's programme *Cultural Heritage Conservation and Management*, offered by the University of Applied Arts Vienna and Silpakorn University in Bangkok. This structure enables the inclusion of diverse perspectives from conservators working in both Central Europe and

South/Southeast Asia. The comparison of theory and practice is intended to reveal areas of disconnect, but also broader disparities in conservation infrastructure, access to resources, and collaboration with artists. It further aims to offer insights for future development in conservation training, research, and implementation.

The scope of this thesis is limited to the cleaning of synthetic paint films. It does not aim to provide a comprehensive treatment manual or evaluate every available cleaning system. Instead, it seeks to generate a nuanced overview of current practice, highlight regional differences, and contribute to a broader understanding of how material and artistic knowledge can be more effectively transferred into conservation practice.



Objectives and research questions

This thesis investigates the current international approaches to the cleaning of synthetic paint films, referring to those that use synthetic binders. It aims to understand how these materials are treated in practice, to what extent scientific research is integrated into daily conservation routines, and where divergences between theory and application emerge. Emphasis is placed on the geographical comparison between Germany and Austria, representing a Central European context, and South to Southeast Asia.

From this, the first research question arises:

1. What approaches are currently used in the cleaning of synthetic paint films, and how do these vary across different conservation contexts?
 - How do cleaning practices differ between Central Europe and South/Southeast Asia?
 - Are discrepancies observable between recommended cleaning methods and those applied in daily practice?

Beyond a purely technical perspective, this research also explores the degree to which conservators are aware of the binding media present in synthetic paint films, and how this awareness, or lack of awareness, influences their cleaning decisions.

This leads to the second research question:

2. To what extent are conservators aware of the binding media present in synthetic paint films, and how does this awareness influence their cleaning decisions?

The study further seeks to examine the involvement of living artists in the conservation process and assess how their participation intersects with or challenges conventional ethical frameworks. These considerations raise broader questions about the adequacy of traditional conservation ethics when applied to contemporary artworks and whether current ethical guidelines need to be re-evaluated or expanded to meet the evolving demands of contemporary conservation practice.

Thus, the third research question is posed:

3. How do contemporary artists engage with the conservation of their works, and what tensions arise between their intentions and traditional conservation ethics?
 - Should greater collaboration with artists be sought, and where might its limitations lie?

1. Methodology

This chapter provides an overview of the methodological framework of this research. The methodology of the data collections is discussed first, followed by the corresponding evaluation method.

This research adopts a mixed-methods approach, integrating both qualitative and quantitative data. It is based on a comprehensive literature review and semi-structured interviews with conservation professionals. The interview guide, developed from the theoretical and methodological framework of the study, incorporates both close-ended (quantitative) and open-ended (qualitative) questions. Narrative interview formats were not used to ensure that all relevant aspects were addressed and that all interviews covered the same thematic areas. This design enables the collection of structured data as well as individual perspectives on current cleaning practices for synthetic paint films. In doing so, the study aims to generate a nuanced understanding of decision-making processes in conservation across various international contexts. The following sections outline the research design, data collection methods, and analysis approach.

To support the development, translation, and refinement of academic content, digital language and research tools were employed during the writing process. AI-based applications such as DeepL and ChatGPT were used to enhance the clarity, coherence, and consistency of English-language sections. DeepL was primarily utilised for the initial translation of German-language material into English, ensuring linguistic precision and stylistic fluency. ChatGPT was applied for the structuring of complex arguments, the revision of academic phrasing, and the clarification of disciplinary terminology. The tools were used critically and reflectively, with full awareness of their limitations and the necessity of human editorial oversight.

1.1 Research design

The research is structured around two complementary approaches, that together respond to the three central research questions outlined in the chapter *Objectives and research questions*. The first consists of a review of existing academic and professional literature to identify challenges associated with the cleaning of synthetic paint films, especially acrylic emulsion paint films¹, and to examine most sensitive and effective cleaning systems discussed in conservation science. It also helps to determine to what extent these recommendations align with conservation practice. This approach primarily

¹ The literature review focuses on acrylic emulsion paints as they are the most used synthetic artist paints and the most researched by now.

informs research question 1, particularly the sub-question regarding discrepancies between research findings and daily practice.

The second approach is an empirical study, based on semi-structured interviews with professionals (conservators and artists). These interviews were designed to gather insights into actual conservation practices, including the most used cleaning agents, individual awareness of binding media, and ethical considerations in decision-making. This method addresses research question 1 (regional differences and practical approaches), research question 2 (knowledge and awareness of binding media), and research question 3 (artist involvement and ethical tensions).

The interviews combine quantitative elements, such as frequency of material use or types of interventions with qualitative components that explore the participants' reasoning, priorities, and values. This mixed-method design enables cross-case comparison while also allowing for in-depth analysis of subjective positions.

By combining these methods, the research design enables a comparative analysis across geographical regions and professional perspectives, while remaining flexible enough to capture nuanced and subjective experiences. This structure supports the overall aim of the thesis: to develop a holistic and comprehensive understanding of the conservation of synthetic paint films and the communication between artists and conservators.

1.2 Data collection

Aligned with the mixed-methods research design outlined above, this study gathered data from both secondary and primary sources. Secondary data was obtained through a systematic literature review, which informed the theoretical framework and helped identify key concepts and research gaps. This review provided the necessary context for developing the interview guide and interpreting the empirical findings.

Primary data was collected through semi-structured expert interviews and surveys, combining qualitative and quantitative approaches via open- and close-ended questions. This dual approach enabled both in-depth insight and broader comparability.

The expert interviews formed the core of the empirical investigation. This methodological approach places emphasis on the specific knowledge of individuals actively involved in the field, particularly conservators and artists, and aims to explore underlying professional practices and reasoning processes (Gläser et al. 2010, 11). In

this context, the term “expert” refers not to formal qualifications but to the participants’ professional roles and the specialised, experience-based knowledge associated with them (Gläser et al. 2010, 10).

The perspectives shared by the interviewees are understood not as objective facts, but as context-bound interpretations. Therefore, they must be critically examined during both data collection and analysis (Bogner et al. 2014, 14). The following sections provide a detailed account of the literature review process and the interview design, outlining the methodological framework applied in this study.

1.2.1 Literature review

The assessment of the current state of research is conducted through a review of secondary data in the form of a literature review. Relying on relevant articles and publications from conservation institutes, museums and academic research. Following the EU Green Deal to use and develop sustainable, ecofriendly and non-toxic materials and solutions, this thesis has a focus to research made on bio-based materials, less toxic solvents and aqueous cleaning solutions.

In the context of aqueous cleaning systems with enhanced selectivity, several key publications have served as foundational sources. Among the most relevant are Ormsby et al. (2007), Dillon et al. (2013), Ormsby et al. (2016), Chelazzi and Baglioni (2023), and Casini et al. (2023). The first two focus specifically on the wet cleaning of acrylic emulsion paints, particularly examining issues such as surfactant migration and changes in the microstructure of the paint film.

In contrast, the studies by Ormsby et al. (2016), Chelazzi and Baglioni (2023), and Casini et al. (2023) reflect a broader shift in conservation science toward the development of innovative cleaning systems that improve selectivity, material compatibility, and environmental safety. Ormsby et al. introduce mineral spirits-based microemulsions designed to enhance control over solvent action, while minimising risks to the paint layer. Chelazzi and Baglioni provide a detailed overview of nanostructured systems—including nanoparticles and gels—as tools for precise, localized cleaning. Casini et al., building on this research, emphasize the use of less toxic solvents and their confinement in bio-based gels, aligning their methodology with current sustainability goals (e.g., the EU Green Deal).

In addition to these sources, the works of Zumbühl et al. (2008) and Kanth et al. (2021) have been consulted to further understand solvent behavior and its spatial confinement

within highly retentive gel matrices. These references collectively inform the technical foundation of this thesis, particularly regarding the cleaning of synthetic paint films with minimal impact on original material.

1.2.2 Interview design

The interviews work with two separate questionnaires, one targets painting conservators, the second is directed at artists working with synthetic binding media. To prepare the artist interviews the guide, “*The Artist Interview in Conservation*” by Debik, J. et al., (2021) was consulted.

All interviewees and survey participants were based either in the Germany–Austria region (DE-AT) or in South and Southeast Asia (SASEA), reflecting the collaborative nature of the study programme between institutions in Thailand and Austria. The term “SASEA” was defined broadly to include participants from various countries across both South and Southeast Asia. A detailed breakdown of the participant distribution is provided in the sample description section. While this regional focus offers valuable insights into specific conservation practices and local contexts, it may also limit the broader applicability of the findings to other geographic or institutional settings.

Where participants consented, interviews were audio-recorded and subsequently transcribed using MAXQDA, a specialized software for qualitative data analysis. A simplified transcription style was employed, focusing on the content of responses rather than phonetic or paralinguistic details (cf. Dresing & Pehl, 2017, p. 20). Non-topic-relevant sections were omitted from the transcripts. For interviews that could not be recorded, detailed written notes were taken during the conversation, and the main sections of the questionnaire were completed in real time to ensure consistency and comparability across all interviews.

To increase the number of responses, participants were given the option to either take part in an interview or fill out a written questionnaire. The written version included the same questions as the interview guide and allowed participants to elaborate in open-text fields. While the questionnaire followed a structured format, the interviews adopted a semi-structured approach. Pre-determined questions were combined with follow-up and clarifying prompts, enhancing the flexibility to explore topics in greater depth during the conversation. This mixed-method strategy helped to balance the benefits of in-depth qualitative exploration with broader participation.

To illustrate the type of questions used, one qualitative and one quantitative example from the conservator questionnaire are provided below. The full questionnaires are included in the appendix.

Question 6 (Qualitative): Have you always been aware of which binding medium was present when cleaning a painting? If yes, how did you find out?

Sample Answer:

"Not necessarily. Most of the time, the information is provided by the artist, gallery, or curator. If required, we send the work for testing in a lab."

Question 7 (Quantitative with elaboration option): Do you carry out any analyses of the paint film before cleaning?

Answer options:

- Yes / No
- If yes, how?

Sample Answer:

"No (not unless required)."

The following sections provide a detailed description of each questionnaire, outlining their structure, focus areas, and the rationale behind their design.

Questionnaire for painting conservators

To address the first and second research questions, which focus on cleaning methods and the awareness of binding media, a structured questionnaire with fixed questions was developed for conservators. These fixed questions form the comparable core of the practical data collection and were supplemented with follow-up questions during the interviews. The aim is to gather insights into the practical challenges conservators encounter when cleaning synthetic paint films, their preferred materials and techniques, and their confidence in working with these modern materials. The questionnaire also explores conservators' perspectives on collaboration with artists and the evolving ethical considerations in contemporary conservation.

The questionnaire consists of 15 questions, combining qualitative and quantitative elements. It includes closed-ended questions (multiple choice and rating scales) for structured data collection, as well as open-ended questions to allow for detailed personal insights and experiences.

Participants were selected based on their professional background in painting conservation, with a focus on those familiar with synthetic paint films. Efforts were made to achieve diversity in geographic and educational background, supporting an international comparison between Germany/Austria and South/Southeast Asia. Participants were identified through professional networks, institutional websites, and the 'Restorer Search' tool of the German Association of Conservators (VDR). To ensure a diverse range of perspectives and allow cross-sector comparison the questionnaire was distributed in different settings, including in house conservation studios of galleries and museums, freelance conservators and private ateliers and academic research institutions.

Conservators were contacted via email and invited to participate either in interviews or via a written survey, depending on availability. A number of minimum 10 completed responses was sought. Responses are treated confidentially and analysed both statistically and thematically, with comparative graphs used to visualise international trends and divergences between research and practice.

- **Questions 1–4** collect demographic and professional background data (training, workplace, years of experience) to enable subgroup analysis.
- **Questions 5–7** assess if and how binding media are identified and whether pre-cleaning analyses are conducted.
- **Questions 8–11** explore cleaning methods, preferred materials, and unexpected results or limitations.
- **Question 13** investigates whether cleaning knowledge is transmitted informally within countries or institutions.
- **Questions 14–15** address attitudes toward conservation ethics and collaboration with artists, directly contributing to research question 3.

In parallel, a second questionnaire was developed for artists to address the third research question concerning their role in the conservation process and their perspectives on ethical considerations.

Questionnaire for artists

To address the third research question regarding artist involvement and ethical tensions, a separate structured questionnaire was developed for contemporary artists using synthetic binding media. This questionnaire comprises 10 questions, combining both close-ended (multiple choice) and open-ended formats to facilitate quantitative and qualitative analysis. The questionnaire was distributed to artists to collect comparative data. Interviews followed a semi-structured format, allowing for follow-up questions in order to gain more nuanced insights. The objective was to understand artists' expectations regarding the longevity of their works, their perspectives on conservation ethics, and their experiences working with conservators.

Target participants for this questionnaire are artists who work with synthetic binding media. The aim was to distribute the questionnaire to actively engaged artists, ensuring that their experiences are relevant to the conservation challenges associated with synthetic paint films. An effort was made to reach artists of different stands, aiming to collecting responses from artists working in the same geographical areas as the participating conservators. With a focus on obtaining diverse perspectives from different artistic and cultural contexts.

- **Questions 1–2** gather demographic and material background to contextualise responses.
- **Questions 3–4** explore motivations for material choices and awareness of conservation-related risks.
- **Questions 5–6** ask about direct involvement in conservation and personal attitudes toward longevity.
- **Questions 7–8** assess how artists interpret the value and meaning of their work, and how these views align or conflict with traditional conservation ethics.
- **Questions 9–10** investigate previous experiences collaborating with conservators and willingness to share information for conservation purposes.

1.3 Data analysis

The collected responses from primary sources have been analysed using a mixed-methods approach. Quantitative data (e.g., multiple-choice questions, rating scale responses) will be statistically evaluated to identify trends, while qualitative responses (e.g., open-ended answers) will undergo a thematic analysis to detect common patterns and key concerns among conservators. The results are compared between two geographical groups: the Germany-Austria region (DE-AT) and South and Southeast

Asia (SASEA). Geographical and professional profiles of the participants are used for the sample description and to compare the results “internationally” and across different professional profiles. The identified variations in practice and knowledge will finally be compared to the secondary sources, outlined in Chapter 3. *Literature review*.

1.4 Limitations

One of the key limitations of this study lies in the gap between the specificity of scientific literature and the broader context of conservation practice. At the same time, however, this very discrepancy is precisely what motivated the choice of topic and underlines the relevance of the investigation. While academic studies often investigate well-defined materials, particularly acrylic emulsions with known formulations, practicing conservators rarely have access to such detailed information about the paint films they treat. For this reason, interview questions referred more generally to “synthetic paint films,” which limits direct comparability with material-specific research findings.

Further limitations concern the data collection process. The sample size was limited and cannot claim to represent a fully global perspective. Both interviews and questionnaires were used to allow broader participation; however, this mixed-method approach resulted in varying levels of detail, potentially affecting the consistency and depth of the data. Moreover, most participants responded in English, which was not their first language, possibly restricting the nuance of some responses.

Cultural and linguistic influences may also have shaped responses. For instance, in one question, which used a numerical scale, participants might have differing internal concepts of numerical values. Some individuals or cultures may avoid extreme ratings, while others are more inclined to use them. While the numerical scale offered a useful general overview, it cannot fully reflect the complex, context-dependent nature of the topic.

2. Technical background

The following subchapters provide the theoretical foundation necessary for understanding synthetic binding media in the context of modern and contemporary art. Their composition, manufacturing processes, and historical use are outlined, with a focus on the sensitivities of these materials to environmental factors. This section further introduces the challenges associated with their cleaning and conservation. This technical background provides the basis for the following chapter, which reviews current research on the wet cleaning of acrylic emulsion paint films. A more detailed elaboration on acrylic emulsion paint is provided, as these represent the most relevant

synthetic paints in current artistic practice and also the most extensively researched ones in current conservation research (Learner 2007, 5 ; Novak 2023, 19).

2.1 Synthetic binding media

Synthetic binders are man-made polymeric substances used to bind pigments and form a stable cohesive and adhesive paint film. Since the twentieth century, synthetic binding media have played a central role in the production of paints. Natural resins in oleoresinous paints and varnishes were increasingly replaced by synthetic resins. Many of these materials were originally developed for industrial or household applications, while others were specifically designed as artist-grade paints, in which case the resins were often offered in water-emulsified form (Standeven 2011, 62). Numerous synthetic resins have been formulated for this purpose and have been increasingly adopted by contemporary artists since the 1950s. However, artists often did not limit themselves to products specifically intended for artistic use; particularly within contemporary art, there has been extensive experimentation, including the use of paints originating from various industrial sectors (Learner 2007, 3).

The principal synthetic binding media found in painting can be broadly categorized into four main classes: nitrocellulose, alkyd resins, polyvinyl acetates (PVA) and acrylic resins² (Learner, 2010). In Table 1, adapted from "Modern Paints: Uncovering the Choices", Learner's 2007 introductory article, a comprehensive overview is provided on the evolution of binding media that are now frequently encountered in contemporary artworks. Each of these classes exhibits specific properties and applications, which have significant implications for the aging behavior and conservation needs of paint films.

Most synthetic binding media incorporate additional additives that strongly influence their material properties and aesthetic characteristics. Among the general advantages of synthetic binding media are their ease of preparation and handling, the reduction in the use of organic solvents, and their rapid drying time, features particularly beneficial for the artists working with them. They also demonstrate greater resistance to photo-degradation and higher flexibility compared to classical natural binders such as oil paints.

It is important to emphasise that paint films based on synthetic binding media, and their cleaning as part of the conservation process, are becoming increasingly relevant in

² The order presented here reflects the chronological development and introduction of these synthetic binding media into commercial and artistic use, beginning with nitrocellulose in the early twentieth century, followed by alkyd resins, polyvinyl acetates (PVA), and, lastly, acrylic resins.

contemporary conservation practice. The diverse range of possible formulations presents new conservation and analytical challenges for conservators (Learner 2010), which are further exacerbated by the sensitivity of many of these paint films to moisture-induced swelling and their relatively low film-formation temperatures.

Another key challenge in the conservation of paint layers containing synthetic binders is their often complex chemical composition, which makes them difficult to identify and analyse accurately (Novak et al., 2023, 13).

Table 1: Evolution of binding media frequently encountered in contemporary artworks (Learner, 2010).

Dates of introduction of principal binders in modern paints (Learner, 2010)	
Paint Type	Date of Introduction
Nitrocellulose house paint	Late 1920s
Alkyd house paint	Late 1930s
PVA emulsion house paint	Late 1940s
Acrylic solution artists' paint	Late 1940s
Acrylic emulsion artists' paint	1950s

2.1.1 Nitrocellulose paint

Nitrocellulose is a semi-synthetic resin that was used in a wide range of paints and lacquers. The first lacquers containing cellulose nitrate blends were introduced as early as the late nineteenth century. In 1923, DuPont developed, Duco® a synthetic spray lacquer based on nitrocellulose, which revolutionised the industry by significantly reducing drying times. This innovation had a major impact on the automotive sector during the 1920s, enabling faster and more efficient production processes. The accelerated drying process made paint manufacturers experiment with those resins in other ambits including household coatings which could be applied also by brush (Standeven 2011, 66). However, these decorative house paints enjoyed only a brief period of popularity during the mid-1920s and were finally discontinued in the 1940s. In general, nitrocellulose lacquers are nowadays much less used, being limited to applications such as low-cost spray paints for car respraying.

In contrast to traditional oleoresinous paints, nitrocellulose lacquers dry primarily through solvent evaporation without oxidation processes, resulting in fundamentally different films that are not crosslinked and thus remain fully or partially soluble in their carrier solvents. This permanent solvent sensitivity prevents the application of multiple overlapping layers by brush, as the underlying layer would be directly dissolved by the solvent in the subsequent layer (Standeven 2011, 55). This property constitutes a

significant disadvantage for the application of these paints by brushing and can be considered a reason for the short-lived success of these coatings. Additionally, the processing of brushing lacquers can be described as very unpleasant due to the high solvent content, which presents both a health hazard and makes the application with a brush very challenging, offering little time to brush out the paint properly (Standeven 2011, 57). Other material-related disadvantages include yellowing, cracking and fading of the pigments over time (Canadian Conservation Institute, n.d.).

In conservation literature, nitrocellulose lacquers and paints³ are often not clearly distinguished, with the terms frequently used interchangeably due to overlapping practical applications. Many artists worked experimentally and utilised industrial automotive lacquers, spray paints, or furniture polishes, which cannot be clearly categorised as either paint or lacquer.

Although nitrocellulose-based lacquers were originally intended for industrial applications and are thus rare in fine art, some significant artists, such as the Mexican muralist David Alfaro Siqueiros, Jackson Pollock and Richard Hamilton, experimented with them (Canadian Conservation Institute, n.d.; Leaner 2007, 23). Consequently, these synthetic resins are now commonly considered in the broader material research within conservation (Leaner 2007, 23).

Richard Hamilton employed spray paints to create colour fields that required exceptional uniformity and smoothness; similarly, David Alfaro Siqueiros used them to produce large, evenly distributed areas (Canadian Conservation Institute, n.d.; Leaner 2007, 23). Moreover, their fluidity enabled techniques such as dribbling, splattering and dripping. In 1936, Siqueiros conducted a workshop in New York during which he demonstrated the technical possibilities of nitrocellulose-based lacquers to Jackson Pollock and other artists (Canadian Conservation Institute, n.d.).

Given their experimental use in contemporary art and their persistent solubility, nitrocellulose-based materials present particular challenges in conservation treatments and cleaning.

³ Compared to nitrocellulose lacquers, nitrocellulose paints usually contain a secondary oxidizing resin such as alkyd, to reduce the solvent sensitivity, and plasticizer like phthalates (Leaner 2007, 8 ; Standeven 2011, 61). They are richer in pigment and therefore more opaque.

2.1.2 Alkyd paint

The first true alkyd paints, oil-modified polyester paints, were introduced in the 1930s. They took their name from their main binder, the alkyd resin, a polyester resin modified with fatty acids or oils that was first accidentally discovered in 1847 and appeared more broadly shortly after the First World War. In the *beginning*, alkyds were not used in paints, they were hard and brittle and only used for adhesives and electrical insulators (Standeven 2011, 71). In 1927, DuPont began its research on alkyds as the main binder in decorative paints, still struggling with some weaknesses such as: “[...] *acidity, poor color, yellowing, poor brushing, dragging, poor stability in the can, heavy skinning, granulation, and high cost*” (Standeven 2011, 72). During the late 1950s, they finally found their way, as the principal binder, into most industrial solvent-borne oil-based house paints, but could also be found in emulsified form. In the form of house paints they have been employed by a number of prominent artists—such as Pablo Picasso, Jackson Pollock, Pierre Soulages, Frank Stella and others (Leaner 2007, 8).

The paint films created with these house paints are completely sealed with few, almost invisible brushmarks, creating high surface gloss. They also have a very low impasto, tend to wrinkle when applied too thickly, and are sensitive to humidity and UV degradation with age (Leaner 2007, 8).

Besides alkyd resin also phenol-formaldehyde was used as synthetic resins in oleoresinous house paints, but as alkyds are the most employed and are considered the far more important binder (Standeven 2011, 63), phenol-formaldehyde won't be mentioned in more detail. Alkyd resins are nowadays most associated with glossy house paints but were also employed in matt wall finishes other areas of paint production, revolutionizing this industry (Leaner 2007, 8). As mentioned in the chapter 2.1.1, they were, for example, added in the nitrocellulose lacquer Duco to make it brushable (Standeven 2011, 72).

Alkyds are formed by the condensation polymerisation of three components: a polyhydric alcohol (polyol), a polybasic carboxylic acid and a drying or semi-drying oil. The oil part in alkyd house paints is typically higher than 60 % by weight. This part exerts the greatest influence on the properties of the paint, controlling its solubility, crosslinking capacity and compatibility with other resins (Standeven 2011, 70). Furthermore it is the part with most influence on the yellowing of the final paint film, which is why soybean oil, being both less prone to yellowing and more economical than other low-yellowing oils such as safflower or sunflower oil, is currently most widely used. There are two other further types of alkyd resins with lower concentrations of oil which result in more viscous paints that need stronger solvents and are mainly used

in industrial applications. But only the long-oil alkyds with 60%– 80% oil are used in decorative paints that are adapted for brushing (Standeven 2011, 70).

The drying of an alkyd paint involves an initial phase of solvent evaporation followed by a complex, auto-oxidative polymerisation similar to the drying processes in classical oil paints. This results in an insoluble, cross-linked paint film (Learner 2007, 8). Alkyd paints dry more slowly than nitrocellulose-based coatings but considerably faster than unmodified oil paints, since the polyester backbone is already partly cross-linked, thereby accelerating the final curing stage (Canadian Conservation Institute n.d.). The cross-linking capability of the molecules is reduced by the fatty acid chains, which make the otherwise brittle resin less hard and more flexible (Standeven 2011, 70).

2.1.3 Poly(vinyl acetate) paint

The first water-based polyvinyl acetate (PVA) emulsion paints in artist quality were introduced to the market in the 1960s by the British company Rowney[®], around the same time the first acrylic emulsion paints were launched by Liquitex[®]. Like acrylic paints, early PVA paint formulations were developed as solvent-based solutions. However, these solvent-based paints were not widely adopted within the artistic community. Following, in the 1950s waterborne PVA emulsion paints were commercially available, first as household paints and later specifically tailored for artistic use (Novak 2023, 4). In the research conducted by Ormsby et al., one of the few studies focusing on PVA paints within a conservation context, both artist-grade and household PVA paints are examined. This is important, as artists such as Bridget Riley have historically used both industrial and household paints despite the differences in quality (Learner 2006, 9).

Artist-grade and household PVA paints are based on the same vinyl binder. The primary compositional differences lie in the pigment load and the presence of thickeners and extenders. Artist-grade paints typically contain more pigments and thickeners, and fewer extenders, making them higher in quality and significantly more expensive (Croll 2006, 18).

Rowney initially marketed pure, non-pigmented PVA homopolymer emulsion as a standalone binder. From 1966 onwards, they also introduced pre-mixed, pigmented PVA paints (Antunes Ferreira 2011, 9). Artists did not limit themselves to ready-made paints, but also used commercial PVA resins and binders to mix their own paints with dry pigments (Novak et al. 2023, 2). In the following years, a wide range of PVA-based paints was produced and marketed. Particularly notable for conservation purposes are the conservation-grade PVA paints introduced by Golden Artist Colors, which are

soluble in alcohol. Today, PVA is primarily used in the formulation of household paints (Novak et al. 2023, 4).

The foundation of PVA emulsion paint is PVA resin itself, which is first produced separately by emulsion polymerization of vinyl acetate monomers with the help of surfactants and an initiator, which triggers the free-radical polymerization. To form the final emulsion paint the resin then is mixed with other components such as pigments and additives. The additive systems are often very complex and include plasticizers, stabilizers, thickeners, and surfactants to modify drying time, flexibility, and stability.

To address the inherent rigidity of polyvinyl acetate (PVA) resins, whose relatively high glass transition temperature (T_g) of around 30 °C would otherwise result in brittle paint films, two main approaches have been employed: the addition of external (non-bonded) plasticisers and copolymerisation with softer monomers. While plasticisers can enhance flexibility, they are not chemically bound to the polymer matrix and may migrate over time, potentially affecting the long-term stability of the paint film (Novak, 2023, 5). Since the 1960s, the more commonly adopted method has been copolymerisation with highly branched vinyl esters, which effectively lowers the T_g and improves film flexibility in a more stable and predictable manner (Learner, 2006, 9).

Both approaches improve the flexibility of the paint film but introduce distinct challenges for material conservation. External plasticisers are prone to migration or evaporation over time, which may lead to surface tackiness, a return to brittleness, and alterations in gloss characteristics. Conversely, copolymerisation with softer monomers can significantly influence the solubility properties of the paint film, complicating both material identification and the development of suitable cleaning strategies (Novak 2023, 5).

These material modifications not only impact the physical and chemical stability of the paint but also influence how conservators can safely approach cleaning treatments. Due to their inherent sensitivity, such films are particularly vulnerable to polar solvents, including water, which can cause swelling of the paint matrix and extraction of hydrophilic additives, a phenomenon similarly observed in acrylic emulsion systems (Novak 2023, 19).

2.1.4 Acrylic emulsion paint

Artistic acrylic emulsion paints were introduced in 1956 by Liquitex[®], following the first artistic acrylic paint, Magna[®] an acrylic solution paint, that was introduced 1947. The great difference between those two is, that acrylic emulsion paints are water bound, while acrylic solution paints needed organic solvents, making acrylic emulsion paints the less toxic and handier version (Ormsby et al. 2007, 9). Moreover, there are also differences in their final solubility caused by a diver's drying process. While acrylic emulsion paints harden through the coalescence of the emulsified polymer spheres, which makes them insoluble in water once dried. Acrylic solution paints dry through evaporation of the organic solvent, consequently remaining soluble in many hydrocarbon solvents (Jablonski, et al. 2004). Nevertheless, acrylic solution paints show almost no swelling in contact with water while acrylic emulsion paint are highly sensitive to swelling upon contact with polar solvents like water (Learner 2007, 5). In 1963 Liquitex changed the composition of their acrylic emulsion paints achieving a more viscous consistency, from then on acrylic emulsion paints clearly dominated the market, it was sold in tubes and started to be used by a wide range of artists (Learner 2007, 6).

Acrylic emulsion paint is the more commonly encountered type, under the synthetic binding media used in artist colours (Learner 2007, 5), they were immediately accepted as they reflected the spirit of change and the interest in new materials, which drove contemporary artists. It was possible to accomplish a totally new aesthetic using them, either as a transparent water wash or in thick pastes almost mouldable ways directly on different supports. Artists like Kenneth Noland, Helen Frankenthaler and John Hoyland used acrylic emulsion paints for their easily handling, fast drying colour stability and aging resistance, and probably because of the general excitement for new materials (Jablonski et al. 2004; Ormsby et al. 2007). The possibility of mixing acrylic emulsion paint with water, thus avoiding the use of stronger aromatic solvents and thinners, is a key advantage. Another key advantage is their short drying time, which promotes fast and consumer-oriented work and is an important economic factor.

As they were used in the production of many masterpieces and still are the commonly used in artist paint, most of the current research on the cleaning of synthetic binding media is done on acrylic emulsion paint. Consequently, this part of the thesis, primarily focuses on the cleaning of acrylic emulsion paint layers.

Acrylic emulsion paints are primarily composed of high-molecular-weight acrylic polymers (Cardaba et al. 2020, 1). These polymers are the binding media for the acrylic emulsion paints, they are typically made from esters of acrylic acid and methacrylic acid. Their role is to form cohesive and adhesive films incorporating the colour part of

the paint which consist of dyes or pigments, with organic or inorganic nature. Another big part of the acrylic emulsion paints are additives which typically include a variety of surfactants, stabilizers, wetting agents and viscosity modifiers. The interaction of these additives ensures reliable film formation, good workability and increased durability of the colour layer.

Acrylic films are more flexible than oil-based films due to their low minimum film-forming temperature, low glass transition temperature, and low molecular weight (Kanth, 2018. 451), which makes them softer at room temperature and less prone to cracking and breakage. However, this also leads to more sensitive paint layers, which can result in surface damage from impacts, knocks, and careless handling, as well as from direct contact with packaging materials. This phenomenon can be further exacerbated at higher temperatures, where the paint layers become softer (Ormsby, 2007). This means that despite their good mechanical properties and ageing resistance, acrylic emulsion films are at risk of damage, especially from external influences. The low glass transition temperature combined with the typical migration of hydrophilic additives, like surfactants, to the paint surface after drying make acrylic paint films especially prone to attract airborne dust. As acrylic paint films usually don't have varnish coatings this phenomenon leads to dust embedment, which furthers the need of cleaning of this paint films (Ormsby et al. 2016, 12).

2.2 Principles and risks of cleaning in conservation

Cleaning is a very common but highly delicate conservation treatment which is often necessary to stabilize the object, as many kinds of dirt are a strong deterioration agent. It is also an irreversible intervention that requires careful consideration. In many cases, cleaning is a prerequisite for further conservation measures such as consolidation or coating applications (Moncrieff et al. 1987, 13). Additionally, especially for artworks in the art market or public display, aesthetic clarity and the visual integrity of the object are often expected—though the concept of “clean” is highly subjective and culturally influenced.

In conservation science, “cleaning” refers to the removal of soil, meaning unwanted material from the surface of an object, following the definition used in Science for Conservator Volume 2 (1987) on Cleaning, these materials, “unwanted matter” fall into two broad categories. One is foreign matter, material that is not part of the original composition of the artwork and has been deposited on it, this includes for example: dust, grease, adhesives, overpainting, fillings and any type of stains. The other category is products of alteration, which are caused by the degradation of original material, including: corrosion patinas, aged varnishes, coatings etc. (Moncrieff et al. 1987, 14). The key challenge lies in distinguishing clearly between original and unwanted

material, and in executing the removal process with maximal control and minimal loss, as cleaning is an irreversible operation (Moncrieff et al. 1987, 14–15).

Highly sensitive and mixed materials, such as dyes, pigments and binders, are especially difficult to clean without alteration or removal of original material. These challenges are particularly pronounced when dealing with sensitive and composite materials such as synthetic paint films. The following section outlines the specific risks and material behaviors associated with the cleaning of modern synthetic surfaces.

2.2.1 Sensitivity of synthetic paint films

The conservation and cleaning of synthetic paint films present several significant challenges.

This section examines general vulnerabilities of synthetic films, contrasts dry- and wet-cleaning risks, explores polymer-specific sensitivities, reviews brand-to-brand variations, and concludes with a detailed case study illustrating these challenges. One of the primary issues is the relatively young age of the material, which results in a limited understanding of its aging process and the changes it undergoes over time. This lack of comprehensive knowledge is further complicated by the uncertainty surrounding the composition of those films. The formulation can vary widely depending on the manufacturer and the raw materials used; this information is often not sufficiently communicated by the manufacturers themselves, since it is treated as a company secret.

Moreover, the inherent sensitivity of the material adds another layer of complexity, particularly in relation to changes in gloss and colour behavior. This is especially problematic in the case of monochrome paint layers, which are increasingly common in contemporary art. Over time, these paint films become more susceptible to subtle shifts in appearance, making their conservation and cleaning more difficult (Jablonski et al. 2016, 1).

Synthetic paint films cannot simply be treated like classical oil paint layers, their specific properties can lead to paint surfaces in which dust is effectively embedded (Ormsby et. al. 2007, 11). This occurs especially with acrylics, which due to their surface structure, are non-conductive and can therefore become statically charged, attracting dust particles from the air (Dillon et. al. 2014, 52). The surface dirt can then easily be absorbed into the paint layer since acrylic paints have a low glass transition and film-forming temperature, which creates soft and sticky surface. Additionally, they

are often unvarnished and intentionally unprotected, (Novak 2023,17) increasing possible dust embedding and general surface sensibility.

There are two main categories of cleaning, dry and wet cleaning. The associated risks with dry cleaning are, that it frequently leaves unwanted residues, which over time can bond with the soft surfaces of the paint layer (Ormsby et al. 2007). Additional disadvantages of dry cleaning include the friction created during the cleaning process, which can lead to abrasion, flattening, and gloss loss in the paint layer (Daudin-Schotte et al. 2013). The susceptibility to changes in gloss and the formation of tidelines is particularly problematic in modern paintings with large monochrome areas, as it is very difficult to achieve an even cleaning pattern (Jablonski et al. 2016, 1).

Following the assessment of risks associated with dry cleaning, attention shifts to the complexities of wet cleaning, which also poses a set of challenges. As discussed in chapter 2.1, synthetic binding media contain a wide range of additives—plasticisers, surfactants, residual monomers, etc.—many of which are prone to extraction, particularly during aqueous cleaning procedures. Moreover, these materials are often highly susceptible to swelling and deformation due to the differing ways in which they cure. While traditional oil paints cure through a slow oxidative polymerisation process, synthetic paints, including those based on nitrocellulose, alkyds, polyvinyl acetate or acrylics, form films in fundamentally different ways. In particular, Jablonski et al. (2004) and Learner (2007) note that acrylic emulsions dry through the coalescence of polymer particles, producing thermoplastic films rather than cross-linked networks, which remain soft and can be reactivated by solvents or heat. Nitrocellulose and some alkyds may undergo partial cross-linking, but they often retain a degree of solubility in their original solvents even after drying (Standeven 2011, 55). This structural distinction renders synthetic paints significantly more sensitive to solvents commonly used in oil painting conservation.

Building on these concerns, quantitative studies have demonstrated that synthetic paint films can exhibit swelling capacities up to ten times higher than those of oil paint films (Zumbühl et al. 2008). Furthermore, Wolbers et al. (2013) show that young acrylic layers are particularly vulnerable to mechanical damage during aqueous cleaning. These findings clearly indicate that solvent systems designed for cleaning oil paintings cannot be applied indiscriminately to synthetic films. A cleaning agent that may safely remove surface dirt or aged varnish from a cross-linked oil film could irreversibly damage a synthetic paint layer by inducing softening, swelling, or extraction of binding components. These issues highlight the necessity of distinguishing between oil-based and synthetic binders, whose differing physical and chemical properties have significant implications for conservation treatment.

However, the distinction between oil and synthetic binders alone is not enough, within the broader group of synthetic binding media, there is further complexity. Variations in chemical composition, such as polymer type, the presence of plasticisers, co-monomers, and surfactants, can result in drastically different behaviours during cleaning. A useful example illustrating this sensitivity is the distinction between acrylic solution paints and acrylic emulsion paints. While both fall under the category of synthetic acrylics, their responses to solvents differ markedly: acrylic solution paints are highly sensitive to non-polar organic solvents and may dissolve upon contact, whereas acrylic emulsions remain relatively stable. In contrast, immersion in water leads acrylic emulsion films to swell considerably, sometimes expanding two to four times in volume, while solution-based films remain largely unaffected (Learner, 2005; Ormsby et al., 2007). The swelling ultimately results in alterations to the microstructure of the paint film, potentially increasing brittleness and altering its ageing behaviour.

The need for precise material identification becomes even more evident when considering variations within the same type of synthetic binder. A study by Willneff et al. (2014) investigated the effects of various solvents on acrylic emulsion paints from two different brands. The results demonstrated that even when the main polymer is the same, differences in co-polymer composition or formulation by different manufacturers can lead to significantly different responses to identical cleaning procedures. In particular, Willneff et al. (2014) and Cardaba et al. (2024) showed that such variations can influence the degree of pigment extraction during cleaning. Cardaba et al. (2024) concluded: “ [...] *that it is not possible to define a common cleaning system for all the acrylic brands and pigments.*” This underscores the importance of identifying not only the general class of binder, such as acrylic emulsions, but also the specific formulation, as these details can have a decisive impact on the material's behaviour during conservation treatments.

A compelling example of the complexities involved in cleaning synthetic paint films can be seen in the treatment of John Hoyland's 25.4.69 (1969), carried out by the Tate within the (TAAMPP)⁴ project. The painting, executed with acrylic emulsion on canvas, features both thin, veil-like washes and thick impasto applications, creating a highly textured surface with varying sensitivities (Ormsby et al. 2009, 11). Surface analysis revealed the presence of migrated surfactants and a hazy grey deposit, particularly in the lower impasto sections. Cleaning tests demonstrated that each colour and paint texture responded differently to aqueous systems: while finally a low-percentage ethanol solution (1–2% v/v in deionised water, pH 6) proved most effective overall, some passages, especially those containing the green organic pigment (PY3), showed notable pigment transfer and frothing (Ormsby et al. 2009, 12). This underlines

⁴ Tate AXA Art Modern Paints Project (TAAMPP): 2006-2009

the material heterogeneity within a single artwork and the need for highly tailored, locally adjusted cleaning strategies. The case also highlights the critical importance of testing and documentation prior to treatment and illustrates the risks posed by seemingly minor compositional variations within acrylic paint films.

While the broad differentiation between oil and synthetic binders is an important first step in guiding conservation decisions, it is ultimately insufficient on its own. The precise identification of the binding media, ideally supported by instrumental analysis, is crucial, as small differences in composition can lead to significant variation in cleaning response, physical integrity, and long-term ageing behaviour of the paint film (Learner 2007, 7).

3. State of research

The following subsections provide a summary of key research findings related to the cleaning of synthetic paint layers, with a particular focus on acrylic emulsion films.⁵ As those in comparison to other synthetic binding media based paints are the ones with most in-depth researched paint properties and highly tailored cleaning strategies (Novak 2023, 19).

This review focuses in particular on research into wet cleaning methods, as these are frequently regarded as essential for the removal of surface soiling, aged varnishes, grease, and other accretions that cannot be effectively addressed through dry cleaning alone (Ormsby et al. 2007; Learner et al. 2014, 57). In parallel, concern was raised about undesired adverse effects of dry cleaning, such as surface abrasion, changes in gloss, redeposition of dirt, and uneven cleaning patterns, particularly on soft or unvarnished paint surfaces, (Daudin-Schotte et al. 2013; Learner et al. 2014, 57). Therefore, wet cleaning systems became an increasingly researched topic. However, the use of aqueous systems remains a particularly challenging task, which must also be approached with caution. Especially on synthetic paint films, which often are highly sensitive to swelling, leaching of additives, and changes in surface morphology (Zumbühl et al. 2008; Ormsby 2007 and Learner 2009).

As explained in chapter 2.2.1., Conventional cleaning techniques based on solvent mixtures, are generally unsuitable for the treatment of synthetic paint films. The limited

⁵ A diploma thesis addressing the cleaning challenges of acrylic paintings was completed at the Department of Painting, University of Applied Arts Vienna, in 2016. The full thesis is accessible via the PHAIDRA publication platform: Pöll, Katharina 2016. „Die Gemälde der Installation *Not everyone will be taken into the future* von Ilya&Emilia Kabakov, MAK: Reinigungsproblematik von Acrylmalereien.“diplom. Universität für angewandte Kunst Wien. <https://phaidra.bibliothek.uni-ak.ac.at/detail/o:7391>.

controllability of these solvents poses a significant risk of swelling or dissolving parts of the original paint layer. A more detailed examination of acrylic emulsion films emphasises their high vulnerability to many organic solvents, which cause long-term damage to their delicate surfaces (Ormsby, 2007). Rapid swelling of acrylic emulsion films occurs across a wide range of polarities upon contact with solvents. Sensitivity is especially high towards chlorinated solvents and aromatics, which cause changes in the inner microstructure of the paint films and lead to rigid films with less mechanical strength (Zumbühl et al. 2008, 259). The solvents located at the extremes of the polarity scale, are the least harmful to acrylic paint layers, making both highly polar solvents like water and non-polar solvents like aliphatic hydrocarbons less dangerous cleaning agents (Zumbühl et al. 2008, 259). But also highly polar solvents like water can cause the leaching of mobile materials, such as non-ionic surfactants, e.g. polyethylene oxides (PEOs) which are a commonly used additive in acrylic emulsion films. They are often found at the painting surfaces as they migrate during aging. Being highly hygroscopic the PEOs are likely to be eliminated during aqueous cleaning (Ormsby et al. 2009), which changes the paint film properties and can cause loss of mechanical strength in the bulk film (Dillon et al. 2014).

Recent research efforts aim to develop cleaning systems that can swell and remove unwanted surface layers without altering the microstructure of the paint film itself. In alignment with the European Union's Green Deal, which promotes the development and application of sustainable, eco-friendly, and non-toxic materials (Casini et al. 2023, 2163), this thesis focuses on studies involving low-toxicity solvents and aqueous cleaning solutions.

Given the challenges of limiting solvent action to a specific material or layer, particular emphasis is placed on cleaning systems that attempt to mitigate such effects. Two main strategies for limiting solvent impact will be discussed: first, increasing selectivity to improve the chemical targeting of cleaning agents; and second, restricting solvent movement through confinement, thereby limiting their spatial diffusion. In this context, particular attention is given to recent developments in more sustainable approaches, especially the work by Dillon et al. (2014) on aqueous solutions, as well as studies by Casini et al. (2023), which focus on low-toxicity solvents confined in bio-based gel matrices.

As mentioned above, the literature review has primarily focused on cleaning systems developed for acrylic emulsion paint films, as these remain the most extensively studied synthetic binders in conservation research. However, some of the general treatment strategies can likely be applied to polyvinyl acetate (PVA) emulsion paints as well. One approach that has proven highly beneficial for acrylic films is the confinement of solvent volume, which helps to limit solvent penetration and reduce the risk of swelling.

This strategy may also offer advantages when cleaning PVA films, as they exhibit a similar sensitivity to swelling especially with polar solvents (Novak 2023, 4;19).

3.1 Cleaning with increased selectivity

Adapting the selectivity of a solvent, means taking precise control over its chemical properties to achieve targeted cleaning effects. This can be accomplished in a traditional manner by mixing different solvents to adjust the system's overall polarity. Alternatively, selectivity can be further enhanced by modifying the solvent's chemical environment—such as adjusting the pH, altering conductivity, or introducing additives like surfactants or chelating agents that influence the interaction between the solvent and specific types of soiling. This method is especially useful to increase the selectivity of aqueous solutions.

It is furthermore possible to create buffered aqueous solution, by adding a weak acid with its conjugate base, or a weak base with its conjugate acid, in the solution. The buffered solutions created in this way, can maintain a stable pH level. This is particularly important when cleaning surfaces that are sensitive to certain pH ranges. These solutions can be further refined by adding additives such as chelating agents and surfactants, or by incorporating them into physically confined solvent gels.

Building on previous research findings, that were able to demonstrate, that acrylic emulsion paint films tend to be less sensitive to highly polar and non-polar solvents (Zumbühl, et al. 2008, 259), the study by Dillon, et. al. 2014, focuses on aqueous solutions with enhanced selectivity. The research examines how adjusted aqueous systems, modified in terms of pH, conductivity, and specific ion effects, influence the swelling behaviour and surfactant extraction of acrylic paint films. The study found that variations in pH within aqueous solutions did not have a significant impact on controlling the swelling behaviour of acrylic paint films. In contrast, adjusting the conductivity and managing the presence of specific ions proved more effective in reducing physical changes within the film as well as the extraction of surfactants. The targeted use of isotonic and slightly hypertonic solutions has proven particularly effective in reducing both the swelling of the paint film and the extraction of surfactants (Dillon et al., 2014).

Another way to improve the selectivity and efficiency of cleaning systems is the use of nanostructured fluids as microemulsions, a territory explored in conservation science since the 1980 by Ferroni and Baglioni (Casini et al. 2023, 2165). In contrast to regular emulsions, microemulsions are thermodynamically stable and significantly increase the interfacial area of the dispersed solvent, improving the solvent's ability to interact with

and solubilize specific types of soiling (Baglioni et al. 2014, 362). With the help of a surfactant, two otherwise immiscible solvents can be combined. The dispersed phase of one solvent is encapsulated in nanosized droplets and distributed within the continuous phase of the second solvent (Casini A, et al. 2023, 2165). Both hydrophobic and hydrophilic components of soils can be effectively removed using these biphasic systems, without leaving excessive moisture on the surface of the paint film due to the aqueous phase (Ormbsy et al. 2016, 13).

For the cleaning of water-sensitive acrylic binding media, Casini et al. (2023) recommend the use of microemulsions following a water-in-oil (w/o) system. The continuous phase consists of non-polar solvents, usually hydrocarbons or ethers. Those alone would exhibit less cleaning efficacy with regards to hydrophilic soiling. To create a more selective and effective cleaning agent water droplets are dispersed in the non-polar continuous phase. The aqueous phase can be enriched with chelators to achieve even better removal of hydrophilic soil (Chelazzi et al. 2023, 10749). The encapsulation of the water droplets within the non-polar solvent reduces paint film swelling, while maintaining good cleaning results, as the apolar solvent prevents the water from directly interacting with the surface (Ormbsy et al. 2016, 13). The selectivity can be even more increased by using the before mentioned Ion and conductivity-controlled solutions as suggested by Dillon et al. (2014), further decreasing the risk of paint film swelling.

A major issue with w/o systems is the need for high concentrations of surfactants to create stable microemulsions, which often exceeds 10% and can reach up to 50% (Chelazzi et al. 2023, 10749; Casini et al. 2023, 2165). This can lead to residues on the paint film and the subsequent need for extensive rinsing. To minimize this, Casini et al. (2023) suggest the use of biodegradable or self-cleavable surfactants, such as gemini surfactants, which can reduce both rinsing requirements and potential health risks. Another factor to be considered is the elevated apolar solvent concentrations in (w/o) systems. To counteract the elevated toxicities, current conservation research increasingly concentrates on the finding of “green” solvents. The main challenge it to find less toxic and more sustainable solvents with the same versatility and efficacy (Chelazzi et al. 2023, 10749).

3.2 Confinement methods

Confinement is a crucial step for more solvent control since targeted selectivity of solvents is difficult and often impossible to achieve, and non-confined solvents can lead to swelling of the paint film as well as penetration of dissolved soil into paint film and substrate. Confining cleaning agents refers to the physical restriction of solvent mobility to regulate the surface interactions between the solvent and the substrate. This localized and controlled action can be accomplished by incorporating solvents into

retentive networks, such as gels. Additionally, the encapsulation of solvents within a gel matrix creates a less harmful working environment, as the toxic solvent fumes emissions are significantly reduced (Passaretti, et al. 2021, 3). In their study to assess the aqueous cleaning of acrylic paint films, Cardaba, I. et al., (2024) found out that gel cleaning proves to be more sensitive than cotton swab cleaning, with regards to the surface changes. With the proviso that this does not necessarily make it the more sensitive cleaning method as it does not consider changes on the bulk of the paint film which finally can lead to less thermal stability of the film (Cardaba et al., 2024, p. 300). Nevertheless, gel cleaning remains one of the most sensitive possibilities, its effectiveness however, depends heavily on selecting an appropriate confining network and solvent, targeted for the specific substrate. The properties of the confinement network are determined by the chemical nature of the polymers used, including their molecular weight and hydrophilic or hydrophobic character, as well as the type and concentration of the polymeric network. The properties are furthermore influenced by the chemical composition of the liquid phase, the presence of additives and the process of gel formation (Chelazzi et al. 2023).

The classical solvent gels promoted by Wolbers in the 1990s and since then widely utilized in conservation treatments, typically use high-viscosity polymer dispersions (HVPDs). They work with Ethomeen® surfactants to thicken a wide range of solvents, making them accessible and promotes their universal use. However, Casini et al. (2023) advise against the use of HVPDs. These systems, composed of high molecular weight polymers dispersed in a solvent to increase viscosity, form mechanically weak confining networks with limited retention capacity. They also do not meet the structural criteria of true gels, as they lack the interconnected polymeric network that defines them. As a result, they offer inferior solvent control, are less retentive compared to fully cross-linked gel matrices, and often leave residues, making rinsing necessary after use (Casini et al., 2023, p. 2169).

In contrast to HVPDs, Gels are formed through the interaction of polymers within a fluid phase featuring a full three-dimensional network capable of retaining liquids and thereby reducing their evaporation and release. The polymers create cross-linked bonds, which can be weak and reversible, like hydrogen bonds or van der Waals bonds, resulting in the formation of physical gels (Passaretti et al. 2021, 4), or strong irreversible and covalent bonds which result in the formation of chemical gels. The type of bonding significantly influences the properties of the gel. For instance, chemical gels are generally easier to remove from treated substrates due to their stronger internal cohesion, which results in a more compact structure and reduced adhesion to external surfaces. The distinction in bonding also plays a key role in determining a gel's mechanical strength and retention capacity. The classification between strong and weak gels is primarily influenced by the degree and type of cross-linking, which directly

impacts their rheological behavior and ability to confine solvents (Casini A, et al. 2023, p. 2169).

Another important aspect regarding the classification of gels concerns the nature of the liquid phase, the solvent, retained within the gel matrix. If the gel contains an aqueous phase, it is referred to as a hydrogel. In contrast, if the gel incorporates organic solvents, it is classified as a solvent gel or organogel (Passaretti et al. 2021, 3).

A traditional and still often used thickeners in the context of hydrogels, are cellulose ethers. Although they form physical gels, Casini et al., (2023) noted they are not ideal when it comes to the cleaning of sensitive surfaces. As they tend to exhibit low retention capacity and often leave residues on the treated surface which need after cleaning with solvents (Casini et al., 2023. 2169). Since paintings with synthetic paint layers are highly sensitive to swelling, the introduction of moisture must be carefully avoided. For this reason, the use of highly retentive gels is preferred, as they release less liquid and leave no residues, thereby eliminating the need for rinsing.

A more retentive, equally simple to produce and affordable alternative is offered by gels based on polysaccharides, such as gellan gum or agar. These materials form significantly firmer gel sheets that demonstrate high retentiveness even at low concentrations from 1%-5%. Among others Passaretti et al. (2021), investigated on this bio-based hydrogels, focusing on the formulation of ridged gel sheets made from polysaccharides like agar, gellan, xanthan, and chitosan, to avoid residues on the artwork and to reduce the ecological impact. Investigations by Kanth et al. (2018), showed that Gellan creates more flexible sheets than Agar, with a higher water retention capacity also at low concentrations (Kanth et al. 2018, 453). The selectivity of this bio-based hydrogels can be improved by loading them with different additives such as chelating agents, surfactants, enzymes and o/w microemulsions (Casini et al. 2023, 2170). As well as using the before mentioned Ion and conductivity controlled aqueous solutions. A disadvantage of the bio-based hydrogel sheets is their rigidity, which makes them not particularly appropriate for the work on contemporary paintings, despite their excellent retention capacity. As such gels may lack the flexibility to work on rough or highly textured surfaces, making it difficult to achieve a direct contact between surface and gel (Passaretti et al. 2021; Kanth et al. 2018, 453).

For the use on especially sensitive surfaces, Casini et al. (2023) highlight the development of synthetic polymer hydrogel networks with enhanced retention capacity, mechanical strength, and more controlled delivery. These have been explored in various compositions specifically for conservation-related cleaning treatments, to avoid the uncontrolled wetting on water-sensitive surfaces.

One of this particularly effective system is a hybrid system, based on pHEMA/PVP semi-interpenetrating networks (SIPNs). The resulting gels are composed of a chemically crosslinked polymer, poly(2-hydroxyethyl methacrylate) (pHEMA), and a non-crosslinked, physically entangled polymer, polyvinylpyrrolidone (PVP). This structure allows the combination of the favorable mechanical properties of pHEMA with the high hydrophilicity and water-retention capabilities of PVP, resulting in a gel that is both structurally stable and highly retentive (Baglioni et al. 2015). However, like rigid hydrogels made from agar or gellan, the pHEMA/PVP SIPNs can be unfavorable on textured and topographically irregular surfaces. Their high elastic moduli makes them very ridged and might impair intimate contact with rough surfaces (Casini et al. 2023, 2170-2171).

To address these limitations in surface adaptability, researchers developed a novel class of polyvinyl alcohol (PVA) cryogels. These materials achieve high viscoelasticity and tunable flexibility through a physical gelation process based on freeze-thaw (FT) cycling, rather than chemical crosslinking. During freezing, phase separation occurs as water crystallizes and expels the polymer chains into increasingly crowded regions, where they organize into crystalline domains stabilized by hydrogen bonding (Casini et al. 2023; Baglioni et al. 2020, 70112). To further enhance flexibility and surface conformity a Twin-Chain Polyvinyl Alcohol (TC-PVA) gel made from two types of PVA with different molecular weights and degrees of hydrolysis was developed, especially for conservation cleaning treatments (Casini et al. 2023, 2172). This dual-chain system undergoes microphase separation during gelation, resulting in a porous, spongy, heterogeneous microstructure, that enhances soil uptake through capillary forces and evaporation-driven mechanisms. Furthermore, the controlled release of cleaning agents from these gels is governed by osmotic equilibrium, which ensures a localized and regulated action restricted to the contact interface between the gel and the surface (Baglioni et al. 2020, 7012). Allowing for spatially and temporally controlled cleaning processes without undesired fluid spreading. For increased targeted selectivity the TC-PVA gels can be loaded with different aqueous cleaning solutions with enhanced selectivity, including oil-in-water (o/w) nanostructured fluids and Ion and conductivity controlled aqueous solutions (Baglioni et al. 2020, 7012; Cardaba, et al. 2020, 2).

The research of Cardaba et al. (2020) on the effectiveness of cryogels loaded with highly selective aqueous solutions demonstrated that these systems are not only more effective but also more sensitive than traditional swab methods using the same solutions. Moreover, the research showed that the physical bonds formed within the cryogel networks, are strong enough to provide structural coherence and prevent the deposition of residues on the paint surface (Cardaba et al., 2020, p. 6).

Another method for the cleaning of highly water-sensitive surfaces are organogels. Unlike hydrogels, which use water as the liquid phase, organogels employ organic solvents, making them suitable for materials that are incompatible with moisture. Organogels are typically formed by physical or chemical crosslinking of synthetic polymers, creating a three-dimensional gel matrix that can confine organic solvents. However, recent research efforts are increasingly focused on developing more sustainable alternatives. Which work with bio-derived polymers and waste-based materials, following green chemistry principles (Baglioni et al. 2015). A major concern with conventional organogels is their toxicity, caused by the use of traditional organic solvents. The solvent toxicity is significantly reduced through the confinement in a gel matrix, as evaporation is limited, but a certain health risk for conservators and environment persists. Consequently, research into safer, "green"⁶ solvents, such as γ -valerolactone (GVL), ethyl lactate (EL), and dimethyl carbonate (DMC), has gained traction, aiming to minimize environmental and health risks (Casini et al. 2023, 2173). Those "green" solvents can be loaded in bio-based systems, using polyhydroxy butyrate (PHB), the resulting gels are less toxic and more sustainable. Although not originally tested on synthetic paint films, these systems were successfully applied to water-sensitive tempera paintings (Casini et al. 2023, 2173), indicating their potential for broader application to films with similar sensitivity to water.

4. Findings from conservation practice

This chapter presents the empirical findings derived from interviews and questionnaires conducted with both practising conservators and contemporary artists. The aim is to gain an base of actual conservation approaches in Europe and Asia, which than can be compared to theoretical and scholarly perspectives. Thereby identifying areas of alignment or divergence from the established literature on the cleaning of synthetic paint films and at the same introduce contemporary artists perspective on the conservation of their work.

The following section, 4.1 outlines the sample characteristics, including demographic details, geographical distribution, and institutional affiliations, thereby offering essential context for the interpretation of the subsequent data.

Section 4.2 elaborates on the responses provided by conservators, structured around the thematic categories employed in the questionnaire, namely: sources of information,

⁶ The term green solvents refers to solvents with low toxicity, biodegradability, and renewable origins. Supporting their classification as environmentally friendly alternatives.

material-identification practices, preferred cleaning methods, and ethical considerations. Relevant quantitative trends are illustrated through graphs and tables, while selected quotations from participants are used to provide more detailed insights into the considerations underpinning their approaches.

Section 4.3 shifts focus to the artist interviews. Seven practitioners working with synthetic binding media reflected on their motivations, strategies for preventive care, and perspectives on longevity and ethics in relation to their own works. While exploratory in nature, these responses offer valuable perspectives on how artists conceptualise the preservation of their work and the extent to which they wish to be involved in its conservation.

The empirical strands explored in this chapter, when viewed alongside the literature discussed in Chapter 3, provide a basis for identifying areas of alignment and disconnect between theory and practice. These insights will inform the practical comparison and recommendations outlined in Chapter 5.

4.1 Sample description

This study is based on two sets of interviews: one conducted with conservators and another, more exploratory, series conducted with artists working with synthetic binding media. The conservator interviews aimed to gather both qualitative insights and more solid quantitative tendencies, despite a relatively small sample size of 12 participants. The artist interviews were intended primarily to provide preliminary, indicative perspectives, finally 6 artists participated.

An attempt was made to distribute the questionnaires for Conservators evenly between Germany-Austria region (DE-AT) and South and Southeast Asia (SASEA) achieve a regional balance and comparable data set. However, complete regional balance could not be reached, as not all conservators contacted agreed to participate in either an interview or the completion of the questionnaire. Efforts were also made to include a variety of institutional contexts. Despite this, most of responses came from conservators working in project-based studios or operating as freelance professionals. Responses from in-house conservation studios, such as those affiliated with museums or galleries, were comparatively fewer. An overview which illustrates both the geographical distribution and institutional affiliations of the respondents is provided in Table 2.

Table 2: Number of participating conservators, distributed by geographical area, country and Institutional affiliation.

Nr.	Geographical area	Country	Institutional affiliation
1	DT-AT	Austria	Freelance / Inhouse conservation studio (museum)
2	DT-AT	Germany	Projectbased conservation studio
3	DT-AT	Germany	Projectbased conservation studio
4	DT-AT	Germany	Inhouse conservation studio (museum)
5	SASEA	India	Freelance
6	SASEA	India	Projectbased conservation studio
7	SASEA	India	Institution (in-house conservation studio conducting project-based work)
8	SASEA	Thailand	Inhouse conservation studio (Gallery)
9	SASEA	Thailand	Inhouse conservation studio (Gallery)
10	SASEA	Cambodia	Inhouse conservation studio (museum)
11	SASEA	Singapor	Projectbased conservation studio
12	SASEA	Buthan	Inhouse conservation studio (museum)

The artist interviews were conducted in an exploratory manner, with the aim of gaining an initial insight into possible perspectives from contemporary artists. Again, attempts were made to balance Germany-Austria region (DE-AT) and South and Southeast Asia (SASEA) participants to identify possible regional differences and to avoid a one-sided perspective. However, this could only be partially achieved, due to the limited availability of participants in a relatively short period of study. No further subdivision into artist profiles was made. However, from the beginning, only artists who demonstrably work with synthetic binding media in their paint layers were contacted.

Six questionnaire-based interviews with conservators and four questionnaire-based interviews with artists were conducted from 1 January 2025 up to and including 3 May 2025. The duration of the interviews varied greatly, ranging from 09:12 minutes to 46:33 minutes. None of the interviews were terminated due to time constraints; rather, the need to talk was met at different times. In addition to the interviews, a total of eight questionnaires were completed and returned either via email or in person within the same timeframe.

Participants were contacted through a variety of channels, including email, WhatsApp, Telegram, Instagram, and LINE. All interviews followed the same structure and question sequence as the written questionnaire, allowing for direct comparison between data sources. However, interviews also allowed for follow-up questions, enabling further elaboration and clarification where appropriate.

The interviews were conducted in person, via telephone or WhatsApp audio call, or through video conferencing (Zoom). In a small number of cases, technical limitations

(e.g., time restrictions on Zoom) required resuming the conversation via alternative platforms. While most of the interviews were successfully carried out under good conditions, it should be noted that the quality of two artist interview, conducted via Zoom, was significantly affected by poor audio and the necessity of consecutive translation. This has influenced the depth and precision of some responses, which is why those are marked as no response.

Following the description of the sample distribution, the results of the interviews and questionnaires are presented in two categories, conservators and artists. The evaluation of the responses was structured according to the thematic blocks addressed in the questionnaire, the most important trends and observations are summarised in each section. Some individual statements made by the interviewees were cited or textually elaborated to highlight details, clarify statements or divergent points of view.

4.2 Interview results (conservators)

The first thematic question was designed to explore which information resources conservators use in practice to keep themselves updated on conservation methods. The aim of this question was to generate a basic understanding of whether conservators engage with scientific research as part of their continuing education, and to identify other possible channels for knowledge acquisition. It was also intended to see if there are differences in the answering patterns regarding the profile of the interviewees.

Several rather general answers were given to this question, referring to the use of articles and papers as well as publishing platforms such as JSTOR. Additionally, institutions like the Getty Conservation Institute, the American Institute for Conservation (AIC), as well as professional networks like ICOM-CC, were highlighted as important sources. Beyond these general references, specific journals such as *Studies in Conservation* by the International Institute for Conservation (IIC) and professional magazines like *Conserva* published by the German Association of Conservators (VDR) were also cited. Some conservators further mention conversations with colleagues as valuable information source. Moreover, certain conservators referred to technical publications provided by private companies, such as CTS and others talked about continuing education in the form of conferences, workshops, lectures etc.

No clear trends emerged regarding the different professional profiles. Regarding regional profiles, a slight tendency can be observed among conservators from South and Southeast Asia to rely more heavily on classical academic research. Papers and articles were mentioned most frequently, the wording is somewhat unspecific and generally refers to scientific publications, regardless of whether they are read via

platforms such as JSTOR or directly in specialist journals. In this work, it was assigned to the category of Academic platforms & journals, which has had the most mentionings in total.

In contrast, conservators from DE-AT region, especially those from Germany, disproportionately referenced informal peer exchange as a source of information. The data summarised in Table 3 provide a categorisation of all information sources mentioned, along with the frequency of both total and singular citations, differentiated by the geographic profiles of the participants.

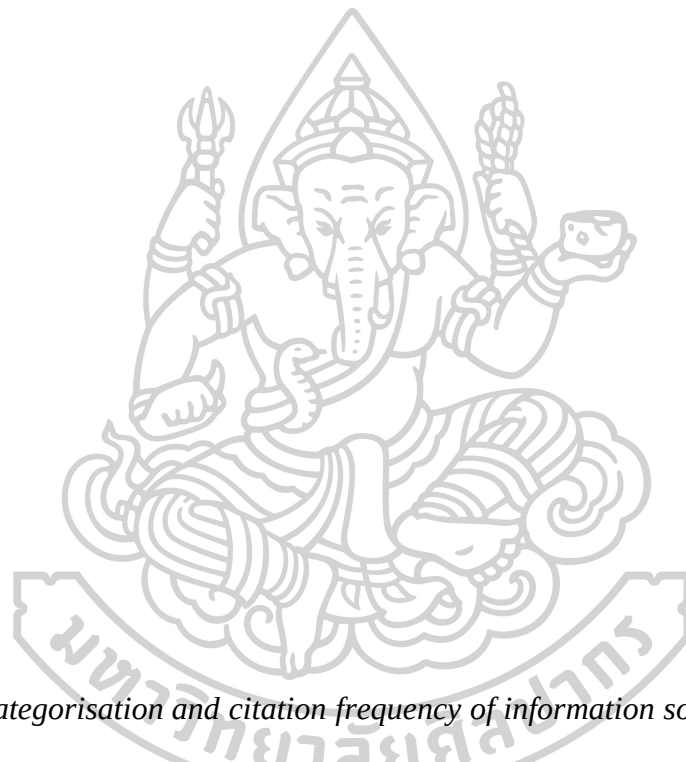


Table 3: Categorisation and citation frequency of information sources by geographic region.

Resource Category	Specific Examples	Frequency of Mention				
		Total	German-speaking		South and Southeast Asia	
Academic platforms & journals	<i>Papers, Articles, Studies in Conservation, JSTOR</i>	10	Studies in Conservation	I	Article	IIIIII
			Literatura	I	JSTOR	I
					Journals	I
Professional institutions & networks	Getty Conservation Institute, AIC, ICOM-CC	8	Getty	I	Getty	III
			AIC	I	IASC	I
					ICOM-CC	II
		4	VDR-Conserva	I		

Books and Professional magazines	Textbooks, Conservation magazin		Books		Books	III
Informal peer exchange	Discussions with colleagues, Interns	7	Interns	II	Colleagues	III
			Colleagues	II		
Information by suppliers	CTS, Deffner & Johann, technical sheets	1			CTS	I
Digital tools or platforms	ChatGPT, Instagram	2			Chat GPT	I
					Instagram	I
Continuing education	Workshops, conferences, online webinars	9	Conferences	II	Online webinars	I
			Symposiums	I	International talks	I
					Workshops	III

One particularly revealing result from the survey concerned the question of whether participants were always aware of the binding medium present when cleaning paint layers. Only three respondents answered ‘yes,’ while eight answered ‘no’ (see Figure 1). This finding highlights a critical issue: conservators often appear to lack precise knowledge of the specific binding media involved during cleaning interventions. Given the varying solvent sensitivities of synthetic binders, as discussed in Chapter 2.2.1, such uncertainty could have serious implications for conservation practice. It underscores the need for further research, as well as the development of more robust standards and best practices in the identification and treatment of modern paint surfaces.

This knowledge gap is likely even more widespread than the initial responses suggest. In fact, without conducting instrumental analysis, conservators can rarely be certain about the exact nature of synthetic binding medium. This concern led to the subsequent survey question, which asked whether any form of preliminary analysis⁷ is carried out prior to cleaning. The intention was to investigate whether those who felt confident about the binding medium based their certainty on analytical data or other, potentially unreliable, sources of information.

⁷ It is important to note that in the first four interviews, the question was very specific, asking whether instrumental analyses of the paint film were conducted. All respondents answered no.’ From the fifth interview onward, the question was revised to ask more broadly whether any kind of analysis is performed to account for non-instrumental techniques.

Interestingly, among the few respondents who claimed to be aware of the binding medium during cleaning, only one conservator indicated occasionally conducting “*chemical and spectroscopic analysis*.” This likely refers to methods such as FTIR or Raman spectroscopy, which are widely recognized in conservation science for their ability to identify both natural and synthetic binding media.

Other conservators mentioned performing solubility tests or making microscopic examination observations, as well as using UV or infrared light. However, these approaches are not suitable for determining the composition of synthetic binding media and therefore do not provide reliable insight into the materials present.

One conservator who claimed to be aware of the binding medium during cleaning, referred instead to existing documentation, such as artist or gallery-provided information, which if not based on first-hand or scientific data, can be inaccurate. Cases of mislabeled media, later detected by analytical techniques such as FTIR, have been documented in institutions like MUSA and Tate, highlighting the potential unreliability of such sources (Gupta et al. 2017, 188).

The following figures summarise the results of question if conservator know the binding media they are treating. While figure 1 shows the distribution of responses to whether conservators are always aware of the binding medium present during cleaning procedures. Figure 2 presents an interpretation of whether instrumental analysis was carried out prior to cleaning. The classification into ‘yes’ or ‘no’ was based on the type of analytical methods described by the participants, with non-instrumental methods (e.g. solubility tests, UV light) categorised as ‘no’.

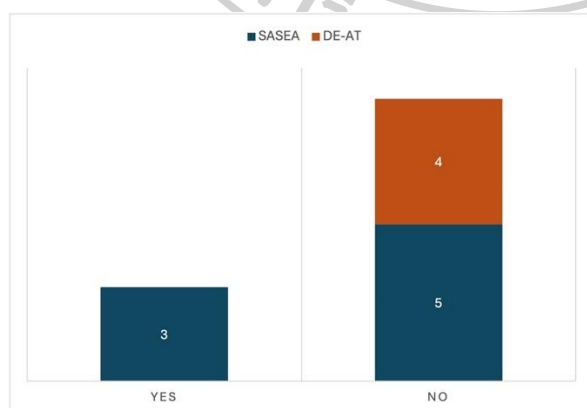


Figure 1: Distribution of responses on conservators' awareness of binding media when cleaning synthetic paint films.

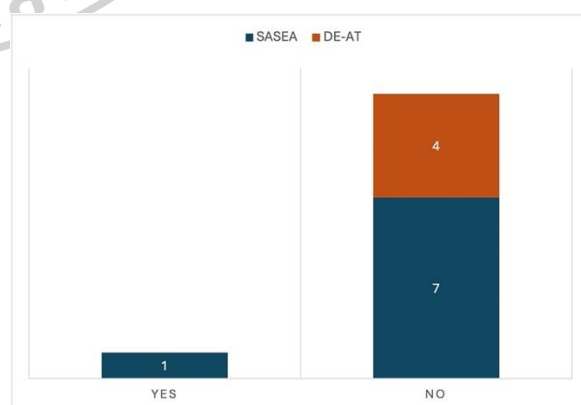


Figure 2: Distribution of responses if conservators' where doing instrumental analysis of the paint films bevor cleaning.

Building on the previous findings regarding binding media awareness and analytical practices, the survey then turned to another key aspect of conservation practice: the choice of cleaning method for synthetic paint films. To gather consistent and comparable responses, participants were asked to select one or more options from a predefined list: dry cleaning, wet cleaning, and the use of confined solvents (e.g. gels).

The results clearly show a preference for dry cleaning with 12 out of 12 (all) participants selecting it as their method of choice, see Figure 3. Several respondents additionally emphasised that they consider dry cleaning to be the safest option, particularly noting the use of polyurethane sponges or, in one case, eraser. One participant explained, *“Acrylic paint layers swell quickly and are very sensitive. In some cases, I actually feel safer working with dry cleaning methods. You always have to make sure that the surface remains intact and doesn’t shift. Even with dry cleaning, you have to be careful, because it can create gloss.”* (Interview, personal communication, January 2025)

Some participants marked a secondary option, two participants reported using gel-based cleaning techniques, and two using wet cleaning. Follow-up questions revealed that gels were often applied in combination with a final rinsing step. In this context, bio-based hydrogels, such as those prepared with agar, were specifically mentioned.

To determine specific wet cleaning systems employed in practise and to find out if wet cleaing methods were generally empolyed, the participants were then asked, which cleaning agent they use for the wet cleaning of synthetic paint films. The responses revealed a wide range of approaches, though a clear preference emerged for avoiding wet cleaning when possible or limiting it to very targeted areas. Among the techniques mentioned were the confinement of solvents and the use of pH-adjusted water. Some conservators reported cleaning with a damp cotton swab using pure deionized water or carbonated water. Others described using ethanol-water mixtures or combinations of petroleum ether and ethanol. Aqueous cleaning solutions with added non-ionic surfactants, such as Marlipal[®], were also referenced.

One participant, who had previously attended an acrylic cleaning workshop led by Bronwyn Ormsby, highlighted the variability in paint responses due to differences in commercial formulations. She emphasised that her main take away from the course was that each paint behaves differently depending on the manufacturer. And she stated that as conservator you are required to continuously adapt your cleaning strategy accordingly.

Given that many conservators reported not always being aware of the exact binding media present when cleaning and considering the clear tendency to favour dry cleaning, due to its perceived safety, it was not surprising to find that a majority of participants, 9 out of 12, expressed feelings of uncertainty regarding the cleaning of modern paint films. Two of them noted that they only occasionally experience such insecurity. The remaining three selected no as a response, expressing that they do not feel uncertain regarding the cleaning of modern paint films. No consistent pattern could be observed in relation to the participants' workplace or geographical location.

Some participants explained that the complexity of modern paint films contributes to this insecurity, as the materials involved are often unknown or unpredictable. As one participant puts it, *"artists can use anything in the world to put on the canvas."* Others referred to more material-specific concerns, noting that the unpredictability of both, materials and techniques play a significant role. One conservator commented, *"they are very sensitive, and dust can adhere very firmly at times."* A further participant highlighted challenges at a conceptual level, noting that synthetic paint films are often associated with monochrome surfaces, *"which are especially difficult to clean uniformly."*

The following two figures provide a closer look at conservators' practical approaches and emotional responses to the treatment of synthetic paint films. Figure 3 illustrates the preferred cleaning methods identified by participants. While Figure 4 reflects the number of conservators who reported experiencing uncertainty when cleaning modern paint films.

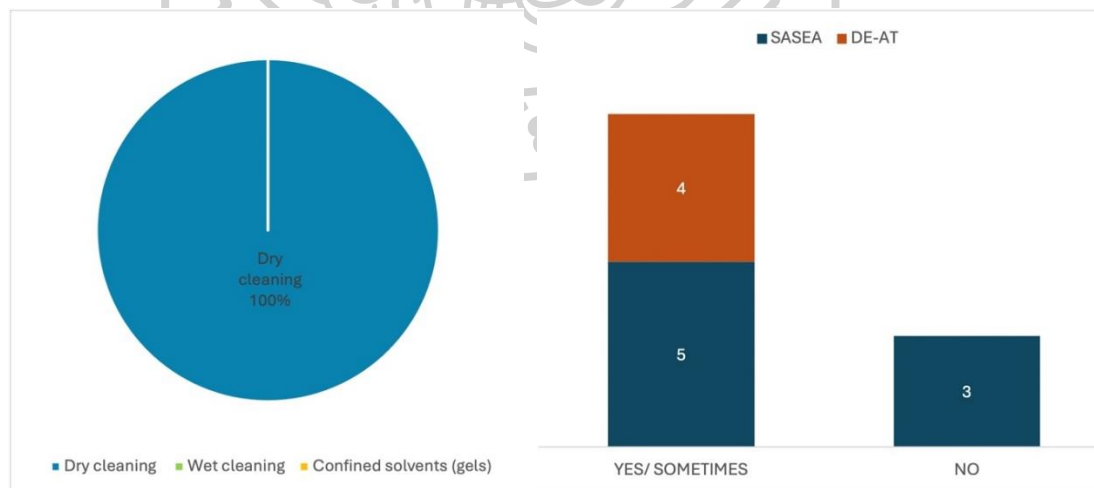


Figure 3: Preferred cleaning methods for synthetic paint films. All respondents (n = 12) selected dry cleaning

Figure 4 : Distribution of responses to whether conservators feel uncertain when cleaning synthetic paint films.

The question of whether participants had encountered any unexpected results during the cleaning of synthetic paint films was deliberately open-ended. Its purpose was to explore potential challenges, surprising outcomes, or other noteworthy experiences related to the conservation of synthetic paint films. Most participants responded with ‘no,’ or rather general phenomena as sheen and streaks.

A subsequent question pursued a similar objective: to determine whether, beyond cleaning, other techniques or interventions were employed to restore a painting’s original aesthetics. This question was more structured, aiming particularly to assess whether conservators might resort to retouching or extensive overpainting when cleaning alone failed to achieve a satisfactory visual result. Participants were given four answer options: retouching, large-scale overpainting, ‘no,’ and ‘other.’ The ‘other’ category was included to capture any additional methods that may be applied in such situations. This question was further intended to provide insights into the extent to which traditional conservation ethics are applied in the treatment of contemporary paintings.

Six participants indicated that they would consider retouching under specific circumstances. One conservator primarily referred to explicit demands made by clients or commissioning institutions. Although stating, to generally advises against retouching to preserve the originality of the artwork, they acknowledged that they would carry it out if strongly requested. Another conservator explained that retouching might be an option if cleaning proves impossible or yields unsatisfactory results. However, only under the condition that the original appearance of the affected area is clearly known, and always depending on the context, following a similar strategy as the one used for classical retouching of loss areas.

One participant, responding via a written questionnaire, did not select one of the answers but instead stated “*not unnecessarily.*” As it was an answer written in a questionnaire and not during a interview, further clarification was not possible. The phrasing suggests the interpretation, that either retouching or extensive overpainting may be employed if deemed unavoidable. The four other participants clearly rejected the use of any other technique, in the context of cleaning issues, to recover a paintings original aesthetic.

In response to the question of whether there is any specific practical knowledge within their respective countries regarding the cleaning of synthetic binding media, all participants answered negatively. It was noted by two conservator that in their countries, it is generally difficult to access information from colleagues. One reinforced that senior conservators sometimes tend to withhold knowledge to keep professional opportunities for themselves. The other said that knowledge sharing sometimes is not that easy, stating that many conservators fear of being judged for the use of specific

materials. A further participant commented that they „*dont have many experts relate to painting conservation*” (Interview, personal communication, May 2025).

As part of the broader topic of contemporary art conservation, participants were asked to assess the importance they attribute to collaboration with artists. A numerical scale from 1 to 10 was provided, with 1 indicating low importance and 10 indicating high importance. The clearly quantifiable results yielded a median of eight, suggesting that collaboration with artists is generally considered important in this context.

However, it became evident during the interviews that the term “collaboration” is interpreted differently among conservators. While most participants expressed support for increased communication between conservators and artists in a general sense, some conservator from the DE-AT region showed greater caution when it came to direct collaboration. This hesitation seems particularly rooted in the potential conflicts between professional conservation ethics and the preferences or expectations of living artists. None of the conservator from DE-AT region gave a clear numerical answer, see Table 4. One explicitly declined to assign a numerical value, stating that the importance of collaboration depends entirely on the specific context. Emphasising that while interviews with artists can offer valuable insight, artists occasionally recommend treatments that may not be in the artwork’s best long-term interest.

Table 4: Responses regarding the importance of collaboration with contemporary artists in conservation.

Geographical area	Numerical value	Comment
DT-AT	4-10	„It depends on the project, ...primarily for complex installations“
DT-AT	1-10	„Depends on the case ... sometimes extremely necessary“
DT-AT	/	„Depends on the case ... sometimes artists don’t recommend best treatment“
DT-AT	/	„Neutral, depends on conservator and artist...“
SASEA	8	„It is very important“
SASEA	6	„Collaboration with the artist can make the conservation process easier..., I deducted 4 ... I helped a contemporary artist figure out what type of paint they had used ... something they had forgotten themselves!“
SASEA	10	„To get more information“
SASEA	8	/

SASEA	10	/
SASEA	/	„Yes“
SASEA	7	„I understood that... if they say they're using acrylic, it doesn't mean that they are only using this and not mixing acrylic with something else.“
SASEA	10	/

The final question is somewhat more complex, as it addresses the ethical foundations of conservation practice, particularly the possible adaption of principles such as minimal intervention and reversibility, when dealing with contemporary artworks. Resolving such a fundamental issue within the scope of a single interview question is, of course, not feasible. However, the aim was to identify general tendencies or attitudes among conservators. Due to the complexity of the topic, the question was designed to allow both a simple yes/no response and space for elaboration. All participants chose to provide extended answers, offering rich qualitative insight beyond a binary choice.

Most participants answered with yes, expressing that while the foundational ethical principles remain important, their application should be approached with greater nuance in the context of contemporary art. Some supported a more flexible interpretation, acknowledging that the dynamic nature of contemporary materials, as well as the active role of the artist's intent, may require adjusted strategies. Others augmented more on a practical base, stating that traditional ethics should serve as a guiding framework but must be evaluated case-by-case, especially in situations where strict adherence may not be possible.

Interestingly, even participants who affirmed the validity of traditional ethics did not reject the idea of situational flexibility. Rather, they advocated for a careful and reflective application of those ethics, shaped by the specific conditions of each artwork.

The need for reversible solutions, wherever feasible was highlighted. However, if reversibility was not possible, they emphasized the importance of thoroughly documenting decision making. With regards to the decision-making process, interdisciplinary collaboration was also stressed, one conservator stated that curators, scientists, and art historians should be involved when ethical decisions become complex.

One respondent from Asia stood out by firmly opposing the adaptation of ethics, citing regional challenges in their country where untrained individuals often apply conservation measures without professional understanding, leading to excessive interventions. This perspective underscores how local context can influence ethical concerns and interpretations.

No strong geographical divide was observed in the answers, besides a slight tendency of the Asian participants to provide more detailed reflections, especially regarding decision-making processes and contextual challenges. European responses tended to be more concise but revealed a similar openness to flexibility and case-specific reasoning. There was a shared recognition that traditional ethical frameworks remain essential yet must be applied with sensitivity to contemporary practices and conditions.

4.3 Interview results (artists)

When asked why they chose to use synthetic materials in their work, most artists cited practical reasons. Four of the six explicitly stated a preference for acrylic paints due to their rapid drying time, which aligned with their personal working styles or a tendency towards impatience. One participant additionally elaborated on other properties, such as versatility and vibrant colour intensity, also mentioning preservation relevant characteristics, like aging resistance, comparing acrylics to oil-based paints in terms of greater durability and reduced yellowing in time.

Most of the artists interviewed do not use synthetic binders exclusively, nor do they limit themselves to traditional painting on standard supports. One artist reported using both synthetic and oil-based layers, while another mentioned working with silicone, resins, and enamel. The mixing of UV prints, window films, acrylic glass, vinyl-coated elastic textiles, acrylic paint, and acrylic ink was also described.

In response to the question of whether they perceive specific challenges related to the preservation of synthetic paint films, a wide range of answers was given. Some noted extreme sensitivity to heat, which can cause deformation or flaking of the paint layer. Others pointed to colour fading and general uncertainty regarding the aging of materials. Notably, some artists already take intuitive preventive conservation measures. For example, Narate Jung, an artist from Thailand, reported that after finishing a work, he avoids touching the paint surface directly and ensures that during storage, artworks do not lean against one another to avoid surface contact. He also stores his works in a cool environment, considering the high temperatures in Thailand.

In contrast, Gianluca Vernizzi stated that he does not perceive material-related issues as the primary challenge. Instead, he emphasized the importance of adequate education for conservators and the willingness of artists to share knowledge about their creative processes. He suggested that conservation training should include modules on contemporary chemistry, functional materials, and physics.

When asked whether they consider the longevity of their artworks a priority, most artists initially responded with yes. As Jung remarked, *“Everyone wants their paintings to live long.”* However, further elaboration revealed that for some, especially conceptually driven artists, longevity does not necessarily refer to the physical preservation of the paintings. For instance, Adisak Somkong deliberately integrates decay as part of his artistic concept, wishing for the artworks to change over time through environmental influences. Such examples raise further questions and point to the need for deeper philosophical inquiry, which could be explored through more extensive artist interviews.

In response to the question, “What values do you want to be conserved in your artworks?” participants were offered the choices: originality of the material, original aesthetics of the object, or other, with the option to elaborate. Given the diversity of artistic motivations, and the prominence of conceptual art in contemporary practice, responses varied significantly. And almost none of the artists gave a clear answer. Nevertheless, two of the interviewed artists indicated that preserving the original aesthetics of their work was most important, as it reflects the visual manifestation of their intention.

German artist Iris H. stated, *“It depends on the specific artwork, but I think for most of my works, I want them to look and keep looking the way they did when I considered them done.”*

The Bangkok-based Italian artist Gianluca Vernizzi stated that, while conceptually all aspects of the artwork are important, from a technical standpoint *“everything should remain as it is today, the colour, the material, the composition, the luminosity.”* He later nuanced this view, remarking: *“The object doesn’t have to remain exactly as it is, but it has to age with its own skin. So if I have used this specific type of nano-acrylic, then the intervention has to be made with this specific type of nano-acrylic.”* This highlights the significance that the artist attributes to the original visual appearance of the artwork as an essential value to be preserved. Such statements underscore how artists may prioritise the perceptual experience — in this case, as an expression of the concept of the work — over other aspects such as material ageing or historical authenticity.

The artists Narate Jung and Adisak Somkong adopted a more open stance, explicitly accepting — or even welcoming — material change over time as part of the artwork’s conceptual or historical narrative. Jung noted that he wouldn’t mind if the artwork changed over time, seeing such transformation as *“a kind of journal [...] a memory of*

when it was painted.” Adisak Somkong went even further, clearly prioritising the conceptual idea over physical permanence: “What matters is that what remains is the concept [...] the essence of all those processes and experimentations. He doesn't mind if the physical artwork eventually falls apart, because that impermanence is consistent with his artistic concept.”⁸

A follow-up question explored whether artists consider traditional conservation ethics — such as minimal intervention and reversibility — to be relevant for preserving their artworks, or whether these principles should be reconsidered. However, it proved difficult to obtain clear or distinct answers on this issue. Most responses merely reiterated previously expressed views, particularly regarding the importance of preserving original aesthetics. For instance, Iris again emphasised that maintaining the original visual appearance remains her priority. Given the limited depth of new insights, this topic will not be discussed further in detail.

Only one of the artists interviewed had previously collaborated with a conservator during the conservation of his work. However, all expressed openness to future collaboration and a willingness to share detailed knowledge about their creative processes, techniques, and materials. It is important to consider that the artists answer to the question with regards to collaboration with conservators may have been predisposed towards an positive answer, as they had already agreed to participate in this study.

Nevertheless, the interviews revealed a genuine interest in the subject and, in some cases, a clear recognition of knowledge gaps. One artist noted, *“I think that would be very interesting and important, especially after this questionnaire revealed to me how little I know about the materials and binders I use [...]. I am secretly scared my works won't look like what I want them to look like anymore in a few years”* (Iris H., questionnaire, May 2025). Another participant similarly acknowledged: *“Working more closely with a conservator could help me reflect more intentionally on my choices.”* (Ashima Bansal, questionnaire, May 2025). These statements underline the potential of conservation engagement not only to safeguard material longevity but also to contribute to a more deliberate and sustainable artistic practice.

Gianluca Vernizzi further emphasised the responsibility of artists in supporting the future care of their work by suggesting that specifications about materials should be

⁸ The following statements were translated simultaneously by Kiki during the interviews and are therefore rendered in the third person.

made accessible, either publicly or through a trusted conservation body. „*An artist who cares about the longevity of his work should provide, publicly or to a trusted conservation entity, the specifics about the materials that are used [...]*.“ This statement reflects a broader understanding among some interviewees of the potential role they can play in the long-term preservation of their work.

5. Discussion

This chapter discusses the empirical findings presented in Chapter 4 in relation to the academic literature reviewed in Chapter 3. The aim is to identify areas where current conservation practice aligns with or diverges from research recommendations concerning the cleaning of synthetic paint films. In doing so, the discussion seeks to contextualise the cleaning decisions and challenges reported by conservators, highlighting both practical constraints and broader ethical considerations.

The discussion focuses on the use and understanding of wet cleaning methods, the technical and time constraints faced by conservators, and the extent to which innovations in research have been adopted in practice. It also reflects on potential regional or cultural differences, not only in practical cleaning approaches, but also in broader conservation ethics and attitudes toward collaboration with artists. Finally, the role artists could play in the conservation of their own work is evaluated, considering their own perspectives, the views of conservators, and existing initiatives.

5.1 Comparison: research vs. practice

In the following section, selected results from the interviews and surveys are compared with the current state of research. The focus here is on those aspects that make a particular contribution to answering the research question or reveal conspicuous similarities or discrepancies between theory and practice.

One particularly important insight confirmed through the questionnaire is that most conservators lack precise knowledge of the exact type of binding medium present in the paint film. Which means in practice conservators often don't know which polymer is the main component of the paint film they are cleaning. In contrast, scientific studies are highly specific, typically focusing on the behaviour of solvents or cleaning systems in relation to well-defined binding media.

Moreover, it is often the case that a specific cleaning method cannot be reliably applied even to paints that share the same synthetic polymer base, due to differences in brand formulation, pigment composition, and binder-to-pigment ratios. As Cardaba et al.

(2024, p. 300) emphasize, these variables can significantly influence both the effectiveness and the sensitivity of the cleaning process and thus, a common cleaning system cannot even be defined within the same binding media.

This discrepancy highlights the inherent difficulty of applying research-based cleaning systems in practical settings, where the foundational step, accurate identification of material composition, is frequently unavailable due to time or financial constraints. Nevertheless, general trends and recommendations regarding the cleaning of highly swelling- and extraction-sensitive paint films can still be adapted from the literature to inform practice. Such as gel cleanings enhanced sensitivity, regarding surface changes of acrylic paint films, compared to cotton swab cleaning (Cardaba I. et al., 2024, p. 300). Which is most probably also valid for polyvinyl acetate (PVA) films (Novak 2023, 4;19).

The literature review section of this thesis focuses primarily on research concerning high-selectivity solvent systems and spatially controlled methods used in wet cleaning processes. These techniques are recommended by researchers as some of the most sensitive and effective methods for cleaning synthetic paint films. In contrast, the practical section addresses the broader question of which cleaning methods are most frequently used by the interviewed conservators. This comparison was intended to reveal whether practical approaches align with scientific research, a correspondence that as it turns out, does not exist.

Several scientific publications emphasize the necessity of wet cleaning, noting that dry cleaning can lead to changes in gloss or even cause deformations in the paint film (Daudin-Schotte et al. 2013). Moreover, dry cleaning is often insufficient in removing deeply embedded dust particles. The analysis of the questionnaire responses revealed that dry cleaning remains the preferred method among practicing conservators. All participants named dry cleaning as their first choice, with only a few mentioning wet cleaning or confined solvent systems as secondary methods. This clearly highlights a discrepancy between current research and conservation practice.

Throughout the interviews, several reasons for this discrepancy became apparent. However, before examining these in more detail, a limitation with regards to this topic must be acknowledged. A issue, that lies not in the questionnaire design, but in the foundations of conservation training itself. Conservators are generally taught to first attempt dry cleaning before proceeding to wet cleaning, following a traditional systematic approach. As such, the question about the "preferred cleaning method" may have been interpreted as referring to the initial step in this procedure, rather than indicating a true preference. Although this interpretation is not fully supported by the

responses given in follow-up question. The overall trend suggests that conservators strive to rely on dry cleaning as much as possible, likely due to its perceived safety.

To enable a more specific comparison between the wet cleaning methods used in practice and those advocated in recent scientific literature, participants were asked to indicate which specific wet cleaning solvents they apply. The responses revealed that some conservators work with targeted selectivity by adjusting the pH of aqueous solutions, or by incorporating surfactants such as Marlipal®.

Both techniques are classical approaches to increasing the selectivity of aqueous cleaning systems. However, they are not among the most sensitive cleaning strategies identified in current conservation research. For instance, the study by Dillon et al. (2013), investigated several variables affecting acrylic emulsion paint films, including ionic species, conductivity, and pH. Their findings showed that pH-controlled solutions do not significantly reduce swelling or extraction of non-ionic surfactants. In other words, while such solutions may not be more harmful than pure deionised water, they also do not mitigate the water's impact on the swelling behaviour and extraction of paint layer components (Dillon et al. 2013, 52).

Throughout the survey and interviews it became evident, that many conservators know of several solvent confinement techniques promoted in the literature, and to a lesser extent of conductivity control methods. However, this knowledge appears to remain largely theoretical, as these techniques are rarely applied in practice by the participants. The reasons mentioned included a lack of time, limited financial resources, and insufficient familiarity with these often highly specific and sometimes technically complex production procedures. One conservator also expressed skepticism towards certain commercially available products, such as Nanorestore Gel®. Based on the participants experience, even gels that claim high retention capacities still leave a noticeable amount of surface moisture on the paint layer. Moreover, the high cost of such commercial systems was identified as a major limitation, particularly when large-scale treatment of a painting surface is required.

Another conservator reported to have used ion and conductivity-controlled aqueous solutions within the context of educational workshops, but never in actual conservation practice, although stating, to be open to use them if project budgets and timeframes allowed. The conservator notably, added that none of their colleagues employed conductivity control either. This response was particularly striking given that it came from a conservator working within an institutional setting, where greater economic and temporal resources might typically be expected to support the use of such refined cleaning systems.

5.2 Regional and cultural differences

While this study does not primarily focus on structural or institutional differences between regions, it is important to acknowledge that such disparities, in areas such as conservation training, material availability, and professional frameworks, do exist and became apparent in some of the participants' responses. These underlying contextual differences provide valuable background for understanding the nuances in how conservators from different regions interpreted and responded to the questionnaire.

For instance, a conservator from SASEA mentioned the limited number of trained professionals working in the field of painting conservation, particularly in relation to contemporary works. A conservator mentioned that in India the conservators are educated in multiple materials reaching from organic over inorganic materials without strict specialization, the work with different materials then also remains like that during professional live. This is highly different to the education in the DE-AT region where conservators are trained in one specialization e.g. painting conservation, paper conservation etc.

Another conservator from SASEA drew the attention to varying levels of formal education in conservation, noting with concern that in some contexts, conservation tasks are performed by individuals without academic training, often approaching their work with differing ethical frameworks. Access to materials was also frequently mentioned: while certain conservation-grade products are readily available and affordable in countries like Germany and Austria, their acquisition is often far more expensive or logistically difficult or even impossible in parts of South and Southeast Asia. Although India benefits from local distributors, participants from other regions highlighted significant barriers to obtaining specialised materials. An assistant registrar of a private collection in Bangkok explained, for example, that many conservation products, such as solvents like Shellsol T⁹, cannot be imported into Thailand. Nor is there a substitute available that matches its boiling point range of 180–220°C. (Tam Laovichaya, personal communication, May 2025)

These contextual remarks do not aim to generalise or reduce the complexity of each national situation, but rather to inform the comparative reading of the survey results. Despite these differences, many of the challenges and concerns expressed across regions showed remarkable similarities, underscoring shared needs and prompting calls

⁹ Shellsol T is a dearomatised hydrocarbon solvent commonly used in art conservation due to its relatively low toxicity and high boiling range (approx. 185–210 °C).

for more universally accessible conservation materials suited to diverse economic and climatic conditions.

While such structural and contextual disparities across the participating regions provide useful background, the focus of the following section lies in the comparative analysis of participants' practical responses. In particular, it examines whether regional patterns emerge in the choices of cleaning methods, materials used, and the perceived value of collaboration with artists.

Based on the evaluation of responses provided by the participating conservators, no significant regional differences could be identified between DE-AT and SASEA with regard to preferred cleaning practices for synthetic paint films. All respondents, regardless of location, indicated a general preference for dry cleaning methods.

A slight regional tendency emerged in response to the question of whether conservators were always aware of the binding media present when cleaning. None of the DE-AT participants answered this question affirmatively, while two respondents from SASEA indicated that they were indeed aware of the binding medium in such cases.

Regional differences became more apparent in the responses to the question concerning the solvents used for the wet cleaning of synthetic paint films. European respondents exclusively referred to aqueous cleaning methods, either plain distilled water, water with added surfactants such as Microemulsion (e.g. Marlupal®), or even saliva as a supplementary agent. One participant mentioned "Nanorestore," although it remains unclear whether this was used in an aqueous context or in combination with organic solvents. Overall, water-based systems were clearly preferred in the DE-AT group.

In contrast, responses from SASEA region revealed a broader spectrum of cleaning agents. In addition to water-based methods, petroleum ether was mentioned by two respondents, while ethanol, either diluted with water or used in small quantities, was mentioned in three responses. Only two respondents from the SASEA region reported using exclusively distilled or pH-adjusted water for wet cleaning.

Regarding the question of whether conservators employ alternative methods to recover the original aesthetics of an artwork, a slight geographical trend was observed. Among DE-AT respondents, there appeared to be a comparatively greater openness to consider retouching as a possible approach to improve a painting's visual integrity. However, most who supported this option emphasized that retouching, particularly in cases of a

more extensive intervention, would only be carried out in close consultation or collaboration with the artist.

It is important to note, that the interpretation of this question may have been relatively broad, potentially limiting the precision of the responses. The questionnaire did not clearly indicate that such interventions were intended specifically for cases where cleaning was either not feasible or failed to produce a visually satisfactory result. While this ambiguity could introduce some analytical uncertainty, it was mitigated during the course of the interview, where the question was explained in more detail, making the related answers more meaningful and context specific.

Furthermore, since the entire questionnaire focused on the cleaning of paint films, it is reasonable to assume that participants understood the context accordingly. This assumption is supported by one participants response who clarified to consider retouching only in very specific cases, such as small surface blemishes, e.g., flyspecks, which are clearly surface accretions and not areas of loss.

A more pronounced geographical divergence became evident in response to the question regarding the perceived importance of collaboration between conservators and artists. Participants were asked to rate on a scale from 1 (not important) to 10 (very important). All conservators from the DE-AT region tended to avoid assigning a specific numerical value. Instead, some provided a broad range, others declined to give a number altogether. Several explained that the importance of such collaboration depended heavily on the specific artwork, the individual artist, or the context of the conservation treatment.

Additional insights drawn from interviews, including anecdotal responses and comments shared during interviews, suggest that this caution may stem from more extensive experience working with contemporary artists. This familiarity with the challenges of such exchanges, ranging from productive to time consuming and sometimes fruitless, may explain their reluctance to generalize the value of collaboration.

This hypothesis is further supported by the response of a conservator from the SASEA region who did provide a specific numerical value (6), but also reflected critically on her choice. Explaining the substration of four points due to a recent case in which the artist was unable to recall which materials had been used in his own work, asking the conservator to help with the identification. This comment underscores a more general issue: the value of collaboration depends not only on willingness, but also on the artist's technical literacy, memory, and interest in the material aspects of their practice.

A similar experience was shared by a conservator from the DE-AT region, although with a different emphasis. The conservator described a high-profile case involving an internationally renowned artist who likewise could not recall what type of paint had been used. The conservator noted that in some cases when renowned artist are involved, meaningful technical collaboration might be more realistically achieved through communication with studio assistants than with the artist themselves.

Taken together, these findings suggest that the perceived importance of collaboration may not be fundamentally different across cultures. Instead, the variability in answers may reflect a more cautious stance in DE-AT region, potentially shaped by more frequent or complex prior experiences with artists.

In contrast, SASEA conservators gave specific numerical answers, with an average score of 8.4, only one did not give a numerical value, instead answering with yes. Many explicitly stated that collaboration is crucial for gaining additional information about the artwork. This may indicate a more pragmatic understanding of collaboration as a means of knowledge acquisition, whereas respondents from DE-AT region may have interpreted it more literally, involving co-responsibility or decision-making.

5.3 Role of artist involvement

The conservation of artworks by living artists presents unique opportunities, while also introducing significant challenges. In contrast to historical objects, contemporary works often enable direct dialogue with their creators. Such communication can be crucial for generating knowledge that significantly contributes to both the interpretation and long-term preservation of an artwork. Nevertheless, as discussed in the evaluation of the interviews, collaboration with living artists is not uniformly regarded as essential or of the highest priority, by the participating conservators, see 5.2 Interview Results (conservators).

In the context of contemporary works that incorporate synthetic paint films, two key aspects come into focus. First, the creative process, artistic intent, and the artist's perspective on aging and transformation are critical to understand the conceptual framework of the work. Second, it is essential to obtain detailed and reliable information about the materials and techniques used. When artists are willing and able to share this information, it might enable conservators to make more informed decisions, which can not be provided by pure scientific material analysis.

The more detailed the flow of information, the more likely it is that conservators can gain reliable insight into material compositions without having to rely solely on instrumental analysis. This is particularly relevant given that, as this study revealed, most conservators do not have access to such analytical methods in everyday practice. At the same time, many cleaning agents recommended in conservation literature are tested on very specific binding media, making accurate material identification essential. In this context, artists can play a vital role, presumed they possess detailed material knowledge and are both willing and able to communicate it accurately. Without this level of precision, such information cannot be considered a reliable substitute for scientific analysis. It also requires that both conservators and artists have the time, resources, and institutional support to initiate and sustain such communication.

Encouragingly, the artist interviews conducted as part of this research revealed a clear openness to such collaboration. Many artists expressed a strong willingness to share detailed information about their materials, techniques, and creative processes. One artist remarked that “an artist who cares about the longevity of his work should provide [...] the specifics about the materials that are used,” underscoring a shared sense of responsibility for long-term preservation. This positive attitude reinforces Laurenson’s (2006) argument—originally made in the context of time-based media—that artist–conservator dialogue can enrich both technical understanding and conceptual insight. Such exchange is particularly vital in the case of artworks made from synthetic materials, which are often selected precisely for their transient or unstable qualities.

As mentioned earlier in the analysis of the artist interviews, one artist described how the questionnaire made her realise how little she actually knew about the materials and binders she was using. Raising the concern that her works would age badly and expressing interest in considering the materials used more consciously. Her reflection shows that collaboration isn’t just beneficial for conservators seeking technical insights, revealing the possibility that it can also encourage artists to think differently about their practice and take greater care in material decisions.

One artist proposed the idea of a “birth certificate” for artworks, which would include key material characteristics, process details, and technological information, to create a comprehensive archive combining physical documentation with advanced digital imaging. Such an archive would capture the artwork’s characteristics at the time of creation, providing conservators with essential reference material for future preservation decisions. As the artist put it, *“Like you have when you go to a doctor, you have an MRI or you have an echo Doppler... resonating imagery that actually gives a sort of picture of the work when it was done and showing different characteristics”* (Gianluca Vernizzi, April 2025).

Such a certificate is still not existing but practically speaking, at least the importance of artist interviews reflects a long-standing recognition in contemporary conservation. As early as the 1970s, Erich Gantzert-Castrillo pioneered systematic artist interviews to collect detailed information about materials and techniques used in contemporary art. His research culminated in the publication of *Archiv für Techniken und Arbeitsmaterialien zeitgenössischer Künstler – Band 1* (1979),¹⁰ which laid foundational groundwork for artist dialogue as a formal part of conservation research.

Since then at least two major initiatives, the online platform artemak+X and a International Network for the Conservation of Contemporary Art (INCCA)¹¹ have systematically collected artist interviews to support conservation practice.

Artemak+X offers an open-access archive of artist interviews, making them available to the professional community. It represents a significant advancement in documentation practices, reflecting how conservation methodologies are adapting in response to digital transformation.

In parallel, the International Network for the Conservation of Contemporary Art (INCCA), has become a cornerstone institution in the field. A central activity of INCCA's network members is conducting artist interviews and making the resulting professional insights publicly accessible. INCCA not only acknowledges the value of technical information but also emphasizes the artist's voice as an integral part of ethical and conceptual conservation practice.

Despite the clear benefits, collaboration with living artists is not without complications. Artists may express wishes that conflict with established conservation principles, for instance, requesting post-hoc changes, replacement of original materials, or complete reconstructions. Such requests can generate ethical tensions between the artist's authority and the conservator's responsibility to uphold professional standards.

¹⁰ This initiative was continued digitally from 2005 by the Hochschule für Gestaltung Karlsruhe and has since evolved into the online platform artemak+X, currently hosted by the Hochschule für Bildende Künste Dresden.

¹¹ International Network for the Conservation of Contemporary Art (INCCA) was established in 1999 as a European initiative led by the Netherlands Institute for Cultural Heritage (ICN) in collaboration with Tate. Its mission is to develop, preserve, and disseminate knowledge about the conservation of contemporary art.

This tension was reflected in several conservator interviews. Some participants clearly emphasized the need to distinguish between communication and full collaboration, and advocated for decisions to be made on a case-by-case basis. One conservator explicitly stated that artists do not always propose treatments that are in the best interest of the artwork.

A perfect example for this conflict, can be seen in the previously analysis of the Section 4.2, analysis of the Artist interviews, where some artists attribute primary importance to the preservation of their work's original aesthetic qualities or even reject conservation altogether as part of the conceptual idea behind the artwork.

Such expectations illustrate the potential for tension between artistic intent and professional conservation ethics. While collaboration with artists can offer valuable insight into material choices and conceptual frameworks, it may also lead to conflicting priorities, particularly when artists' preferences challenge core ethical principles of reversibility, minimal intervention, or material authenticity.

5.4 Reflections on limitations (interpretive perspective)

In addition to the methodological limitations previously discussed in the (see chapter 1.4 Limitations), further limitations emerged at the stage of data interpretation, many of which are directly linked to questionnaire distribution, design and phrasing. However, it is also important to acknowledge the limited treatment of broader structural differences between the geographic regions involved, as well as the necessary, but ultimately reductive, grouping of these regions into broader categories.

In particular, it must be recognised that the term SASEA encompassed a highly diverse group of nationalities, spanning a vast and heterogeneous geographic area. This region is marked by considerable variation in cultural practices, economic conditions, conservation education, and access to materials and resources. The decision to treat it as a single analytical region was made primarily for practical reasons, including the structure of the study and the feasibility of data interpretation. Nevertheless, this grouping inevitably oversimplifies significant regional distinctions that could not be fully explored within the scope of this thesis.

A further limitation lies in the unequal representation of conservators from individual countries within each regional group, which may have affected the accuracy of behavioural and attitudinal insights. This is particularly true for the SASEA region, where participation rates varied considerably across countries. A similar issue exists

within the more narrowly defined DE-AT group: although limited to Germany and Austria, participant distribution was also uneven. This imbalance reflects both differences in response rates and the limits of the researcher's professional network, particularly in less represented countries.

Turning to the more practical interpretive constraints, it should be emphasised that these are not purely methodological in nature, but also reflect the ways in which the structure of the inquiry may have shaped the kind and depth of the responses received.

Some questions lacked sufficient specificity, leaving them open to broad and divergent interpretation. A notable example is the question concerning the perceived importance of collaboration between conservators and artists. While the use of a numerical scale offered a general overview, it also introduced inherent limitations. The complexity and contextual variability of this topic cannot be adequately captured through a single quantitative value.

Participants likely differed in how they understood the term “collaboration.” Some may have interpreted it broadly as general communication or shared understanding, while others viewed it narrowly as direct, project-specific cooperation. This ambiguity in interpretation likely influenced how participants positioned their responses on the numerical scale. Furthermore, reducing such a nuanced concept to a number risks flattening the ethical, practical, and experiential dimensions that many participants later elaborated on in interviews.

These limitations highlight the value of supplementing structured questions with opportunities for open-ended elaboration. In this study, the qualitative responses often provided richer insights into participants' motivations, experiences, and ethical reflections. More precise phrasing or the inclusion of follow-up questions, such as clarifying the type and frequency of previous collaboration with artists, could have strengthened consistency and interpretive clarity across responses.

Nevertheless, the depth and diversity of qualitative data collected suggest that individual professional experience played a critical role in how participants engaged with the questions, especially those involving abstract or ethically charged topics.

A second example of insufficient specificity can be found in the response options offered for the question regarding preferred cleaning methods for synthetic paint films. The available answers—dry cleaning, wet cleaning, and confined solvents (e.g. gels)—may have been too broad and not sufficiently precise. Ideally, as discussed in the

research chapter of this thesis, the wet cleaning category should have been differentiated into traditional solvent-based methods, high-selectivity solvent systems, and confined solvent techniques. This would have enabled a more accurate comparison with current literature and allowed for clearer, more differentiated responses.

Nevertheless, the result was very clear, and was supported even further by the answers elaborated in the next question. This emphasises the importance of basing the questionnaire on a mixed methods approach of qualitative and quantitative questions.

5.5 Implications for future conservation practice

A key priority for future conservation practice should be the reduction of the evident gap between scientific research and practical implementation, as highlighted by the present study. The successful application of preservation methods depends heavily on the integration of validated, yet not overly specific, research-based knowledge into everyday conservation work.

Cleaning systems developed within scientific research contexts are often highly specialised, requiring precise identification of the binding media to ensure their safe application. In practice, however, such detailed material knowledge is frequently lacking, rendering the implementation of these methods paradoxically difficult despite their proven efficacy.

So this study advocates for the improvement in three main areas. One is the directed to the research itself which should basically be adapted more to practical issue faced by conservators. Two is the communication of this research and the final need for conservators to implement these research advancements. And the third is an improved communication with contemporary artist to gain a deep insight into materials, technology and creative process.

The adaptation of research to the needs of practicing conservators could help to bridge the gap between research and practice. Future studies should not only target individual paint formulations but also systematically test promising cleaning agents—such as certain water-based or gel-based systems—across a spectrum of synthetic binding media. By cross-referencing results on different compositions, researchers could provide sensitive cleaning systems for a broader range of materials. Equally beneficial would be the development of rapid, non-invasive techniques to identify the different synthetic binding medium directly on the artwork. As a more precise understanding of the material composition, could allow conservators to take more informed, targeted

decisions. However these solutions are highly unlikely. As for now, detailed information about synthetic material composition can by now only be given through instrumental analysis. Given the relative slow pace of technological development and the unprobable prospect to find a universal cleaning solution, other immediate routes need to be explored.

A practical and immediately implementable strategy to enhance material certainty in conservation practice is to foster stronger collaboration between conservators and contemporary artists. Systematising artist interviews, or at the very least, the use of standardised material questionnaires, would significantly improve documentation and could help decision-making. Such forms, completed during or shortly after the creation of an artwork, would record key technical information such as material choices and methods of application. A prerequisite for this approach is that artists maintain accurate records of the exact materials they employ; to achieve this, the importance of such information for subsequent conservation work must be conveyed to them, for example through training or educational programmes. Additionally structured interviews should become more widely established as a professional norm, to gather a more comprehensive understanding of the artist's conceptual intentions. This would embed the artist's voice into the ethical framework of conservation and help with practical conservation through deeper material knowledge.

These efforts could be supported by existing platforms such as Artemak+X and INCCA, but also through increased institutional commitment from conservation departments, museums, and research institutes.

Furthermore, conservation education should proactively foster mutual understanding between conservators and artists during training. Interdisciplinary projects or shared modules, such as those focusing on materials and techniques, could help establish a foundation for long-term dialogue and collaboration. The fundamental precondition for the success of such initiatives is a willingness on both sides to engage in meaningful exchange. As this study has shown, there is a general openness among conservators towards collaboration with artists, and vice versa. However, as noted in Section 4.2, conservators must be able to rely on the information provided. This, in turn, presupposes that artists possess sufficient knowledge of the materials they use, document and can communicate it accurately.

Finally, the communication and practical implementation of already identified, less invasive cleaning methods must be improved. For these approaches to be meaningfully adopted, it must be clearly conveyed which materials are both readily available and broadly applicable across various conservation contexts.

Certain cleaning strategies, like the confinement of solvent flow, have shown to be less disruptive on a broad range of swelling-sensitive materials. It would therefore be beneficial for conservators to incorporate such methods more routinely into their practice. Notably, highly retentive gel systems that do not require rinsing have demonstrated increased surface sensitivity when compared to traditional cotton swab techniques (Cardaba et al., 2024, p. 300).

To support the wider uptake of these methods, the dissemination of relevant research must be strengthened. This includes incorporating them into academic curricula, training programs, and international conferences.

Equally important is the development of a structured lab-to-field transfer process. Digital platforms, open-access databases, and thematic newsletters could provide spaces for sharing well-documented case studies, encouraging the exchange of practical insights within the conservation community. Ideally, these efforts would be hosted and promoted by existing, internationally recognised institutions such as the Getty Conservation Institute, AIC, and ICOM-CC, which, as this study shows, are widely trusted educational resources in the especially in the SASEA, but also DE-AT region.

The objective in this context should not be, the promotion of specific proprietary products or overly material-specific solutions. Instead, efforts should focus on the development of formulations that are both sustainable and broadly accessible. Expanding access to such materials, or identifying suitable alternatives, especially for areas where conservation grade material is under-represented or must be imported at high expenses, represents a necessary step. A narrow focus on certain materials or commercial products is unlikely to be helpful in a global conservation context that demands flexibility, inclusivity, and resilience.

This study also advocates for a more open and collaborative culture within the conservation field, one in which insights gained through practice or research are not confined to individual institutions or small professional circles. Actively sharing knowledge and experiences, including uncertainties and limitations, should be seen as a strength rather than a vulnerability. Only by reducing the fear of judgement within the professional community we can ensure that constructive dialogue continues to drive the field forward.

Conclusion

This research set out to investigate the cleaning of synthetic paint films, a conservation challenge that is growing in urgency as works made with synthetic binding media continue to age. Through a comparative, mixed-methods approach combining surveys and interviews with conservators and contemporary artists, the study addressed three core questions: (1) What cleaning methods are currently used, and how do they align with or diverge from those proposed in research? (2) How do conservators assess the binding media of synthetic paint layers, and how does this affect treatment decisions? (3) What role do artists play in the conservation process, and how are their voices integrated into ethical and practical frameworks?

The findings highlight a clear and persistent gap between research and practice. While conservation science has developed increasingly specialised methods, especially those based on selective solvent action and confinement using aqueous gels, such techniques remain largely theoretical in day-to-day practice. Most conservators still rely on traditional dry-cleaning methods or broadly applied wet-cleaning strategies, occasionally using low-retention gels or broadly selected solvents. High-retention gel systems and solvent-specific strategies are rarely employed. This trend is consistent across both geographic regions studied (Germany/Austria and South/Southeast Asia), suggesting that the issue is global rather than context-specific.

The primary reasons for this disconnect are structural: conservators frequently lack the time, financial resources, and institutional support to explore and implement these more complex techniques. Additionally, much of the literature remains highly specialized, targeting specific synthetic polymers or commercial paint formulations, making the findings difficult to apply broadly in practical settings.

A second key finding confirms the initial hypothesis that conservators often do not know the exact composition of the synthetic binding media present in a painting before treatment. Analytical testing is rarely feasible due to constraints in time and budget. This lack of knowledge widens the gap between research and practice even further: many advanced cleaning methods are designed for very specific formulations and cannot be broadly applied without precise material identification. While the inability to identify the exact binding media is not the main reason for the lack of implementation, it does significantly complicate the practical application of research findings. As synthetic binders represent a highly diverse group, they differ significantly in their chemical composition, physical properties, and their response to cleaning agents. Incorrect or absent identification can therefore lead to inappropriate treatment choices, risking irreversible damage such as swelling, softening, pigment loss, or gloss change. This highlights the need for research to move toward the development of more

adaptable, broadly effective cleaning strategies that are less dependent on detailed compositional knowledge, without sacrificing safety or sensitivity.

Despite the challenges discussed, a growing body of research points towards broader trends suggesting that confined cleaning systems with high-retention properties are generally safer for moisture-sensitive surfaces, such as synthetic paint films. However, these systems are still not widely implemented in practice. The responsibility here lies clearly with conservators to adopt them where appropriate. To support this, general trends and practical insights must be more effectively communicated by researchers and disseminated within the conservation community.

The third major implication of this study concerns the role of contemporary artists. As experts on the materials and intent behind their own works, their involvement in conservation should be strengthened. For this to happen, more systematic communication channels must be established and integrated into both education and institutional practice. Structured efforts such as artist interviews, material data sheets, or databases (e.g. INCCA, Artemak+) should be expanded and professionalised. Artists should be offered greater awareness of material behaviours and preservation issues during their academic training. At the same time, conservation ethics, especially concerning the treatment of contemporary artworks, should be re-evaluated and developed collaboratively with artists, rather than being applied solely from a traditional perspective.

The findings presented here make it clear that responsibilities lie with all stakeholders involved: with practising conservators, who should aim to integrate recent research into their workflows more effectively; with conservation scientists, who must focus on developing cleaning systems that are not only effective but also realistic and widely applicable; with artists, who should engage with the long-term preservation of their work; and with institutions, which must foster cross-disciplinary collaboration and embed these practices into training, documentation, and policy.

In order to build upon the insights generated by this study, future research should aim to expand the scope and depth of empirical data collection. More extensive, globally scoped surveys utilising a standardised questionnaire could enhance the statistical robustness and international applicability of these findings. Such an instrument should be designed to yield both quantifiable data and rich qualitative insights. Wherever possible, the survey should be conducted in a hybrid format, combining structured questionnaires with follow-up interviews, to allow for targeted probing and clarification of responses.

Appendix I: Interview and Survey Templates

Questionnaire for Conservators:

Questionnaire: Cleaning agents and methods, for the cleaning of synthetic paint films

By synthetic paint films I refer to paint layers made with synthetic binders such as acrylics, polyvinyl acetate (PVA), or alkyds.

1. In which country (ies) have you been trained?

2. In which country (ies) have you worked?

3. What kind of training did you receive?

- Conservator
- Traditional arts and crafts
- Fine arts

Other:

4. Where do you work currently?

- Inhouse conservation studio (museum / art gallery)
- Project based conservation studio / freelance conservator
- Training and research-based conservation studio (university, conservation training and / or research institutes)

5. What are your information resources, to keep yourself updated about conservation methods?

6. Have you been always aware of what binding media was present, when you cleaned a painting? If yes, how did you find out?

7. Do you make any analyses of the paint film before cleaning?

- Yes
- No

If yes

how: _____

8. What is your preferred way to clean synthetic paint films?

- Dry cleaning
- Wet cleaning
- Confined solvents (Gels)

9. Which cleaning agent do you use for the wet cleaning of synthetic paint films?

Specify: _____

10. Do you feel insecure when it comes to cleaning of modern paint films?

- Yes
- No
- Sometimes

Why:

11. Have you encountered any unexpected results upon cleaning of synthetic paint films?

Please elaborate: _____

12. Are there other methods that you use to recover a paintings original aesthetic?

- Large over painting
- Retouching

Others: _____

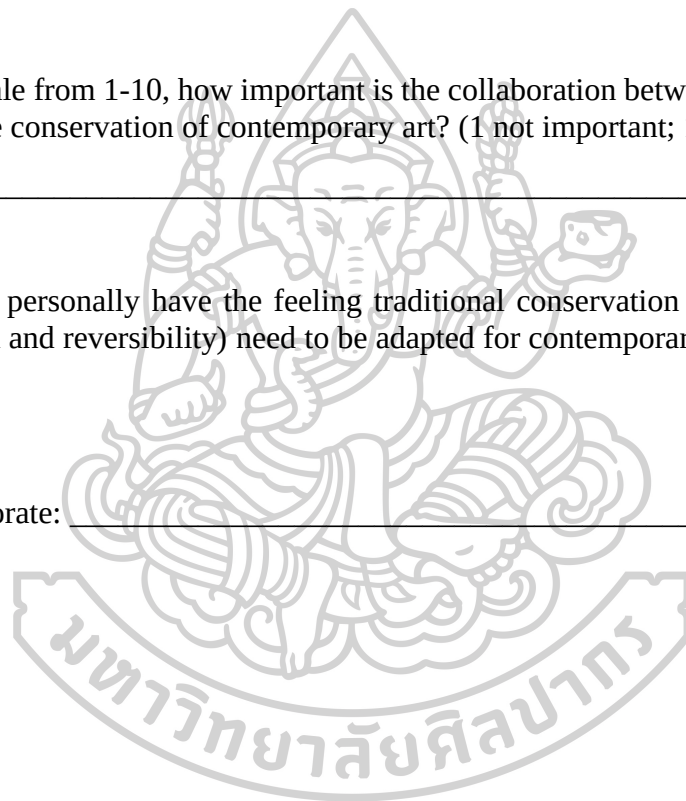
13. Is there specific practical knowledge in your country, with regards to the cleaning of synthetic binding media, which is passed on by more experienced conservators?

14. On a scale from 1-10, how important is the collaboration between conservators and artists in the conservation of contemporary art? (1 not important; 10 very important)

15. Do you personally have the feeling traditional conservation ethics (like minimal intervention and reversibility) need to be adapted for contemporary artworks?

- Yes
- No

Please elaborate: _____



Questionnaire for Artists

Questionnaire: Conservation of synthetic paint films, exploring artists perspective on the preservation of their works

1. In which country do you primarily work?

2. Which binding media do you used in your artworks?

Synthetic (acrylic, PVA, epoxy)

Natural (oil, bone glue, egg, etc.)

Specify if possible: _____

3. Why did you choose synthetic materials in your artworks?

4. Are there specific challenges you foresee in preserving these materials?

- Yes
- No

Please elaborate: _____

5. Have you been involved in conservation of paintings?

- Yes
- No

If yes, please elaborate, how: _____

why: _____

6. Do you consider the longevity of your art works as a goal?

- Yes, very important
- Yes, but not primary goal
- No

7. What values do you want to be conserved with regards to your art works?

- Originality of the material
- Original aesthetics of the object
- Others

Please elaborate:_____

8. Traditional conservation ethics emphasize respecting the originality of materials, favoring treatments that minimize intervention and ensure reversibility. The goal is to safeguard the artwork's authenticity while making sure it remains stable for future generations. Do you think these principles apply to your work? Do you feel they need to be adapted for contemporary artworks?

- Yes, traditional conservation ethics apply
- No, the principles need to be adapted

Please elaborate:_____

9. Have you ever worked directly with conservators to ensure the longevity of your work?

- Yes
- No

How many times and how, did this collaboration unfold?

10. Could you imagine to work more close to a conservator, share details and document your work (techniques, material and creative process)?

- Yes
- No

Please elaborate:_____

Appendix II: Conservator's answers (Anonymized)

Topic: Cleaning agents and methods, for the cleaning of synthetic paint films

The respondent's answers to questions 1–4 have been removed to ensure anonymity.

Interviewee A (Anonymized)

Q5: What are your information resources, to keep yourself updated about conservation methods?

A5: *Getty publications, searching engines, VDR magazine, Studies in conservation, AIC- American institute of conservation*

Q6. Have you been always aware of what binding media was present, when you cleaned a painting? If yes, how did you find out?

A6: *No, Process of elimination — what it could have been and what not — I couldn't say for sure. There are often mixed techniques as well, for example, in paintings by Kiki Kogelnik, where she used both acrylic and oil.*

Q7. Do you make any analyses of the paint film before cleaning?

A7: *No, never ; It's still rather the exception in many museums – I've personally never done it.*

Q8. What is your preferred way to clean synthetic paint films?

A8: *Dry cleaning ; wet cleaning - for specific types of stains; and confined solvents - for specific types of stains.*

Q9. Which cleaning agent do you use for the wet cleaning of synthetic paint films?

A9: *Back then, I participated in the acrylic cleaning workshop held by Bronwyn Ormsby.*

The main takeaway was simply that every paint reacts completely differently depending on the manufacturer, because the composition of colors varies so much. So you always have to adjust your approach accordingly.

- ***I try to carry out wet cleaning only selectively, for example, when there's a specific stain or strong yellowing. But I don't have a standard cleaning agent that I would routinely use.***

- *I've never done full wet cleaning on large-format paintings—only on isolated areas.*
- *In general, I prefer dry cleaning using polyurethane sponges.*
- *PU sponges are my go-to for dry cleaning.*
- *I also use Malipal.*
- *I try to avoid large-scale wet cleaning. Wet cleaning is something I only use for specific spots.*
- *Every paint and color formulation is different; there are often mixed media techniques involved.*

Interposed question: Have you worked with conductivity-adjusted cleaning solutions?

Answer: I've done it before—back during the workshops.

But in actual practice, I've never used it, and neither have any of my colleagues. So no, not in practice.

If I had a major project with a substantial budget and the possibility to do so, I would of course love to work that way and carry out all the necessary test series.

But so far, that's never been possible in my day-to-day work.

Acrylic paint layers swell quickly and are very sensitive. In some cases, I actually feel safer working with dry cleaning methods. You always have to make sure that the surface remains intact and doesn't shift. Even with dry cleaning, you have to be careful, because it can create gloss.

Q10. Do you feel insecure when it comes to cleaning of modern paint films?

A10: Yes, Sometimes.

Often, you don't really know exactly what you're dealing with. Matte, monochrome paint layers are unforgiving, so you have to be especially careful with them.

Q11. Have you encountered any unexpected results upon cleaning of synthetic paint films?

A11: No, fortunately not

Q12. Are there other methods that you use to recover a paintings original aesthetic?

A12: When it comes to local retouching, as always, it depends on the circumstances. But if the area is relatively small and it's clear or reconstructable how the visual appearance looked or is supposed to look, then I have no problem retouching it.

If cleaning turns out to be impossible or unsatisfactory, then I would consider retouching only if it's clearly known how the painting originally looked in that area.

Q13. Is there specific practical knowledge in your country, with regards to the cleaning of synthetic binding media, which is passed on by more experienced conservators?

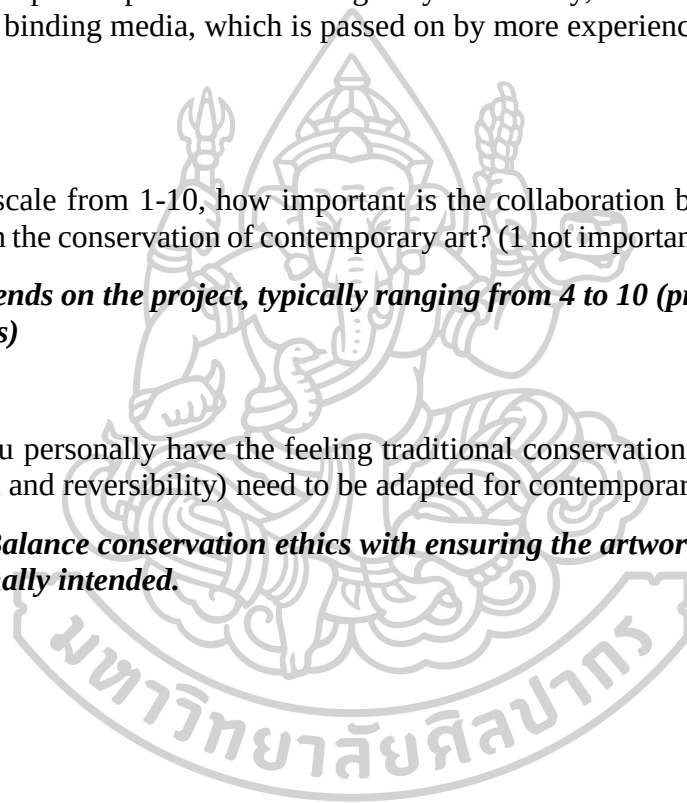
A13: No

Q14. On a scale from 1-10, how important is the collaboration between conservators and artists in the conservation of contemporary art? (1 not important; 10 very important)

A14: It depends on the project, typically ranging from 4 to 10 (primarily for complex installations)

Q15. Do you personally have the feeling traditional conservation ethics (like minimal intervention and reversibility) need to be adapted for contemporary artworks?

A15: Yes, Balance conservation ethics with ensuring the artwork is presented as the artist originally intended.



Interviewee B (Anonymized)

Q5: What are your information resources, to keep yourself updated about conservation methods?

A5: Papers; discussions with Friends, colloques related to conservation; CTS

Q6: Have you been always aware of what binding media was present, when you cleaned a painting? If yes, how did you find out?

A6: For oil paintings yes, but not for acrylic paintings with acrylics you don't know, acrylic is a very complicated medium, even after so much research it is mostly PVA or synthetic binding media, but I or people around me haven't done any research on that.

Q7: Do you make instrumental analyses of the paint film before cleaning?

A7: No, I don't have time for it and not the machines

Q8: What is your preferred way to clean synthetic binding media (acryl paint, PVA paint) ?

A8: Dry cleaning, is the safest ; if the painting has a lot of stains I would go for gels as it does not harm the painting at all it has optimal time for the solvent to get in contact with the surface. The only con is that you have to do rinsing afterwards.

Q9: Which cleaning agent do you use for the wet cleaning of synthetic binding media (acryl paint, PVA paint) ?

A9: If wet then only in confined form, petroleum ether and ethanol in small quantities.

In solvent Gels also Water.

Q10: Do you feel insecurity when it comes to cleaning of modern paint films?

A10: No, it is not that scary, it's very rare that you can feel oh it can get ruined or something.

Q11: Have you encountered any unexpected results upon cleaning of synthetic paint films?

A11: *Actually nothing happens to this paintings, because I don't use any chemicals / direct chemical on it, and the thing is I don't intervene much, I follow proper ethical rules and regulations so I don't ruin the painting. So I mostly use damp cotton and it doesn't have much of a difference, if it has a lot of dust and dirt on it then you can see a mayor result. But if it's not, if its clean and it just has a little bit of stains and dust and dirt, it doesn't make much difference. In this acrylic and PVA it does not make much difference.*

So oil paintings are (Antunes Ferreira) quit an old medium so we have lots of paintings which have quit some problems but now acrylics are very recent medium, you know this resin based, synteic medium based, bindingmedium based, these paintings are quit recent so you don't get much problems in this paintings nowadays, recently like in these days. I am sure after like 50 years or 60 years you might find some problems.

But yes, there is a problem, because of the weather fluctuation it melts, it has blisters on that.

Q12: Are there other methods that you use to recover a paintings original aesthetic?

A12: *No, retouching only in case of loss. It is very difficult to retouch it, very difficult to match the colors and plus to match the shine, gloss. I would go for a different medium not acrylics, something that is easier to revers it. I have used Watercolors for that, or acrylics with a mat or glossy medium.*

Q13: Is there specific practical knowledge in your country, with regards to the cleaning of synthetic binding media, which is passed on by more experienced conservators?

A13: *No*

Q14: On a scale from 1-10, how important is the collaboration between conservators and artists in the conservation of contemporary art? (1 not important; 10 very important)

A14: *8 , It is very important.*

Q15: Do you personally have the feeling traditional conservation ethics (like minimal intervention and reversibility) need to be adapted for contemporary artworks?

A15: Yes, minimal intervention and reversibility are the two key principles and ethics of conservation whether it's traditional conservation or contemporary conservation. It lets the object or artwork to retain its aesthetic value. Also, think that traditional ethics should be thought through. As the contemporary works are very contextual based with material instability and artist's intent. It's more about evolving them and introducing a situational and interdisciplinary approach that's sensitive to the unique nature of each work.



Interviewee C (Anonymized)

Q5: What are your information resources, to keep yourself updated about conservation methods?

A5: It's so funny. I update in Instagram. Many conservators around the world, they put

some a little bit of their work and then I see and feel like, oh, very interesting. And then I will find the research about it. I also use ChatGPT as a friend.

Q6: Have you been always aware of what binding media was present, when you cleaned a painting? If yes, how did you find out?

A6: No, sometimes I did not know.

If I want to know this, I find a history of of the artwork or artist, what did he do in the past. Find out, what in that that time mostly of artists used. If if artists are alive, I will ask him or ask some people that are curator or something,

then he will know about the artwork. I asked the people who know the artist.

Q7: Do you make any analyses of the paint film before cleaning?

A7: No

Q8: What is your preferred way to clean synthetic paint films?

A8: Dry cleaning

Q9: Which cleaning agent do you use for the wet cleaning of synthetic paint films?

A9: At the first we always use dry clean everything. And and then me when I finish dry cleaning I use wet but I use only dry water, less moisture content. / sometimes I use soda water with cotton swab

Q10: Do you feel insecure when it comes to cleaning of modern paint films?

A10: Yes, all the time because, I think modern painting and contemporary painting, the

artist can be used everything in, in the world to put on the canvas.

Q11. Have you encountered any unexpected results upon cleaning of synthetic paint films?

A11: No

Q12. Are there other methods that you use to recover a paintings original aesthetic?

A12: Retouching. Once a collector asked me if I could retouch, I said, if you want to me to retouching, the original will be changed. I asked him first for I can do, but the original will be changed. And he said, okay.

Q13: Is there specific practical knowledge in your country, with regards to the cleaning of synthetic binding media, which is passed on by more experienced conservators?

A13: No, mostly in Thailand - which is kind of bad thing- the senior conservator, always keep secrets, to keep the opportunity for the job, for themselves.

A14: On a scale from 1-10, how important is the collaboration between conservators and artists in the conservation of contemporary art? (1 not important; 10 very important)

A14: 6, because collaboration with the artist can make the conservation process easier. Conservators are able to decode hidden elements or understand things that might otherwise remain unanswered. I deducted 4 points because, recently, I helped a contemporary artist figure out what type of paint they had used in a painting—something they had forgotten themselves!

A15: Do you personally have the feeling traditional conservation ethics (like minimal intervention and reversibility) need to be adapted for contemporary artworks?

A15: No — Because conservation work should preserve the value and ethical standards of the profession, avoiding unnecessary interference with the original work. This benefits both the artist and the artwork's owner. In Thailand, many people without conservation knowledge—so-called “craftsmen” who repair artworks—tend to intervene excessively due to their lack of understanding of proper conservation principles

Interviewee D (Anonymized)

Q5: What are your information resources, to keep yourself updated about conservation methods?

A5: Articles, books, JSTOR, icoom, getty

Q6: Have you been always aware of what binding media was present, when you cleaned a painting? If yes, how did you find out?

A6: Yes, most were documented , or traditional

Q7: Do you make instrumental analyses of the paint film before cleaning?

A7: No

Q8: What is your preferred way to clean synthetic paint films?

A8: Dry cleaning with sponges; sometimes confined solvents in gel form or solvents but very sensitive

Q9: Which cleaning agent do you use for the wet cleaning of synthetic paint films?

A9: No specific answer

Q10: Do you feel insecurity when it comes to cleaning of synthetic paint films?

A10: Yes, because they are very sensitive, dust is attached very firmly sometimes

Q11: Have you encountered any unexpected results upon cleaning of synthetic paint films?

If so, could you elaborate:

A11: No

Q12: Are there other methods that you use to recover a painting's original aesthetic?

A12: No

Q13: Is there specific practical knowledge in your country, with regards to the cleaning of synthetic binding media, which is passed on by more experienced conservators?

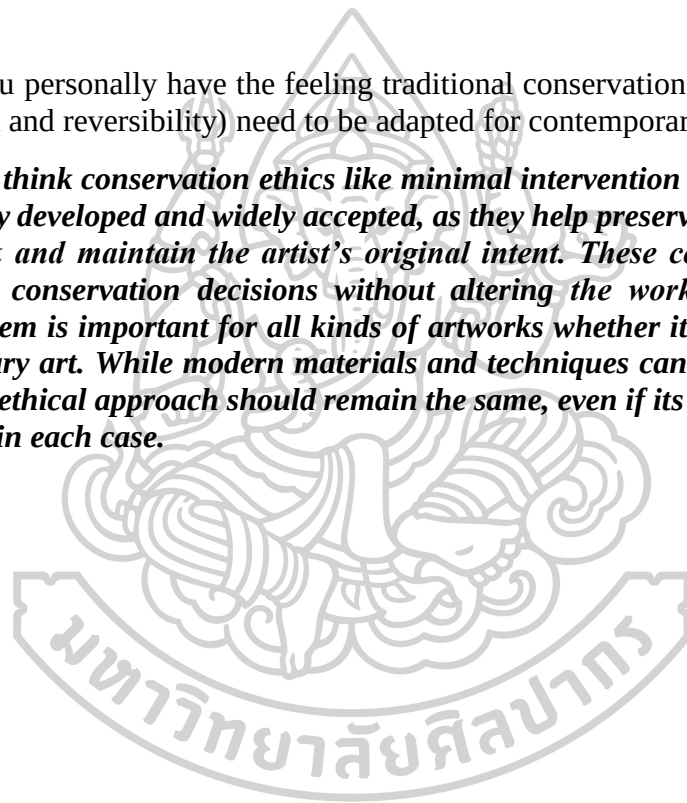
A13: No

Q14: On a scale from 1-10, how important is the collaboration between conservators and artists in the conservation of contemporary art? (1 not important; 10 very important)

A14: 10, to get more information. Once I repaired a tear and mad the filling, then I asked the artist and he did the retouching. He retouched with same material taht he used originally.

Q15: Do you personally have the feeling traditional conservation ethics (like minimal intervention and reversibility) need to be adapted for contemporary artworks?

A15: Yes, I think conservation ethics like minimal intervention and reversibility are thoughtfully developed and widely accepted, as they help preserve the authenticity of the artwork and maintain the artist's original intent. These core principles guide responsible conservation decisions without altering the work itself. That's why adapting them is important for all kinds of artworks whether it is traditional art or contemporary art. While modern materials and techniques can be challenging, the underlying ethical approach should remain the same, even if its application needs to be adapted in each case.



Interviewee E (Anonymized)

Q5: What are your information resources, to keep yourself updated about conservation methods?

A5: IIC, IASC-Indian, Getty, Research Article, International Talks

Q6: Have you been always aware of what binding media was present, when you cleaned a painting? If yes, how did you find out?

A6: No

Q7: Do you make any analyses of the paint film before cleaning?

A7: Solvent tests

Q8: What is your preferred way to clean synthetic paint films?

A8: Dry cleaning, the main concern is in loss areas

Q9: Which cleaning agent do you use for the wet cleaning of synthetic paint films?

A9: deionized water

Q10: Do you feel insecure when it comes to cleaning of modern paint films?

A10: Yes, mostly because of sensitivity, to merge the area will never match.

Q11: Have you encountered any unexpected results upon cleaning of synthetic paint films?

A11: Petroleum ether, once which gave a good result, on a fire exposed painting stuth depot

Q12: Are there other methods that you use to recover a painting's original aesthetic?

A12: Retouching, retouched yes, pigment mixed with a gum.

Q13: Is there specific practical knowledge in your country, with regards to the cleaning of synthetic binding media, which is passed on by more experienced conservators?

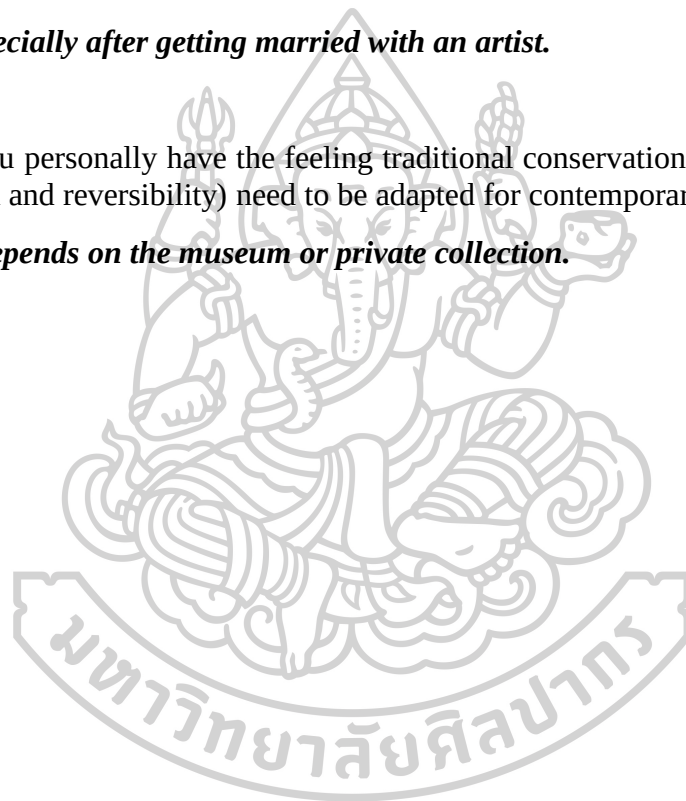
A13: No, so far, knowledge sharing is sometimes not easy in my country. I have the feeling I don't know if it's true or not, but if we go to conferences whether they are national or international, nobody would talk about cleaning because there's always a chance that someone could criticise so knowledge sharing doesn't happen that transparently.

Q14: On a scale from 1-10, how important is the collaboration between conservators and artists in the conservation of contemporary art? (1 not important; 10 very important)

A14: 7, especially after getting married with an artist.

Q15: Do you personally have the feeling traditional conservation ethics (like minimal intervention and reversibility) need to be adapted for contemporary artworks?

A15: No, depends on the museum or private collection.



Interviewee F (Anonymized)

Q5: What are your information resources, to keep yourself updated about conservation methods?

A5: *Colleginnen, world of mouth, Vorträge*

Q6: Have you been always aware of what binding media was present, when you cleaned a painting? If yes, how did you find out?

A6: *Not through material analysis. Based on visual experience, documentation, or few times consultation with a local research laboratory.*

Q7: Do you make any analyses of the paint film before cleaning?

A7: *No, análisis sometimes but not often 1-2 times.*

Q8: What is your preferred way to clean synthetic paint films?

A8: *Dry cleaning, and then wet.*

Q9: Which cleaning agent do you use for the wet cleaning of synthetic paint films?

A9: *Water, saliva, petrol and water with emulsifier.*

Q10: Do you feel insecure when it comes to cleaning of modern paint films?

A10: *Yes, one has to be very careful — especially with monochrome, uniform surfaces.*

Q11: Have you encountered any unexpected results upon cleaning of synthetic paint films?

A11: *No*

Q12: Are there other methods that you use to recover a painting's original aesthetic?

A12: *Local retouching, only if the consent of the artist is given*

Q13: Is there specific practical knowledge in your country, with regards to the cleaning of synthetic binding media, which is passed on by more experienced conservators?

A13: *Not that I know of, but there must be more in the junger generations.*

Q14: On a scale from 1-10, how important is the collaboration between conservators and artists in the conservation of contemporary art? (1 not important; 10 very important)

A14: *Neutral, It depends on the artist and the restorer, If an artist has technical questions. Especially in the case of highly sought-after artists and works created several decades ago, it is quit possible for the artist themselves to no longer remember exactly which materials were used. In this cases it can sometimes be helpful to speak with the studio assistants of such artists, particularly when it comes to technical questions about materials or methods of execution.*

** Conservator elaborated on an experience with a highly renowned artist who was unable to provide information about the binding media they had used. The exact example won't be describe further for anonymity reasons.*

Q15: Do you personally have the feeling traditional conservation ethics (like minimal intervention and reversibility) need to be adapted for contemporary artworks?

A15: *Yes, in many cases*

** Conservator puts example of exchanging parts of an artwork as is ist original asthetics had changed unrecuperable, the exact example wonde be describe further for anonymity reasons.*

Survey G (Anonymized)

Q5: What are your information resources, to keep yourself updated about conservation methods?

A5: Training course, scientific manuscripts.

Q6: Have you been always aware of what binding media was present, when you cleaned a painting? If yes, how did you find out?

A6: Yes, i did understand about the binding media in the painting that i used to clean. By doing some testing.

Q7: Do you make any analyses of the paint film before cleaning?

A7: Only doing test, we dont have any equipments for Paint film analyses.

Q8: What is you preferred way to clean synthetic paint films?

A8: Dry cleaning and wet cleaning.

Q9: Which cleaning agent do you use for the wet cleaning of synthetic paint films?

A9: Distilled water, Acetone, ethanol, AC, EDTA tetrasodium.

Q10: Do you feel insecure when it comes to cleaning of modern paint films?

A10: No.

Q11: Have you encountered any unexpected results upon cleaning of synthetic paint films?

A11: //

Q12: Are there other methods that you use to recover a paintings original aesthetic?

A12: Retouching.

Q13: Is there specific practical knowledge in your country, with regards to the cleaning of synthetic binding media, which is passed on by more experienced conservators?

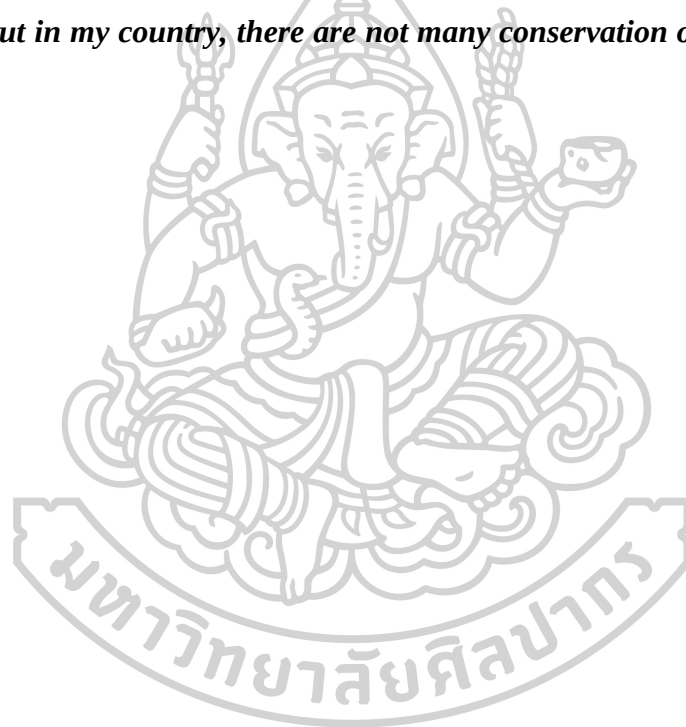
A13: No, we don't have many experts relate to painting conservation.

Q14: On a scale from 1-10, how important is the collaboration between conservators and artists in the conservation of contemporary art? (1 not important; 10 very important)

A14: Yes.

Q15: Do you personally have the feeling traditional conservation ethics (like minimal intervention and reversibility) need to be adapted for contemporary artworks?

A15: Yes, but in my country, there are not many conservation on the contemporary artworks.



Survey H (Anonymized)

Q5: What are your information resources, to keep yourself updated about conservation methods?

A5: Education, Books, Articles. Discussions with other conservators.

Q6: Have you been always aware of what binding media was present, when you cleaned a painting? If yes, how did you find out?

A6: Not necessarily, most of the time, information provided by the artist/gallery/curator. If required to find out, we will send it for testing in a lab.

Q7: Do you make any analyses of the paint film before cleaning?

A7: No (not unless required).

Q8: What is your preferred way to clean synthetic paint films?

A8: Dry cleaning.

Q9: Which cleaning agent do you use for the wet cleaning of synthetic paint films?

A9: pH adjusted water.

Q10: Do you feel insecure when it comes to cleaning of modern paint films?

A10: Sometimes, I wouldn't say insecure per se, but more of approaching it with precaution. We are aware of the implications of swelling the paint layer especially working in more humid environments. And in a private studio, it would also involve educating clients that it is not so straightforward.

Q11: Have you encountered any unexpected results upon cleaning of synthetic paint films?

A11: Not presently.

Q12: Are there other methods that you use to recover a painting's original aesthetic?

A12: Not unnecessarily.

Q13: Is there specific practical knowledge in your country, with regards to the cleaning of synthetic binding media, which is passed on by more experienced conservators?

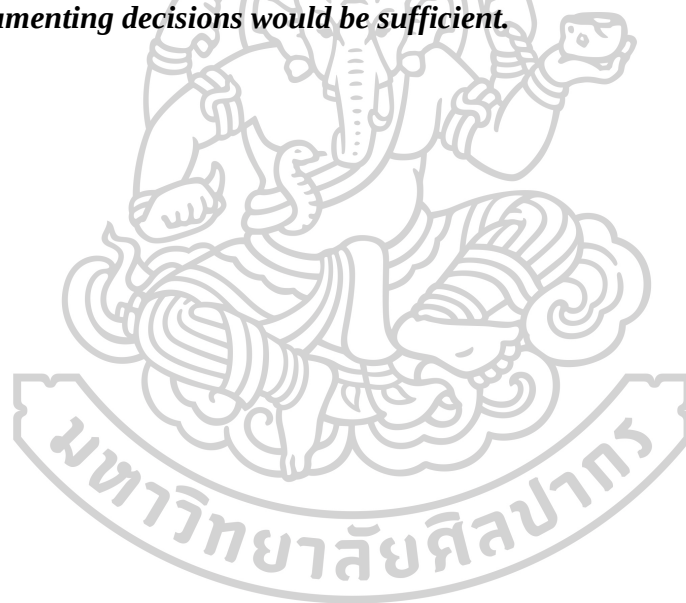
A13: No.

Q14: On a scale from 1-10, how important is the collaboration between conservators and artists in the conservation of contemporary art? (1 not important; 10 very important)

A14: 8

Q15: Do you personally have the feeling traditional conservation ethics (like minimal intervention and reversibility) need to be adapted for contemporary artworks?

A15: Yes, I wouldn't necessarily use the words tradition conservation ethics, but if there is a solution that can be reversible vs a solution that is permanent, I would prefer working with the reversible one. But if there are no other options, then of course documenting decisions would be sufficient.



Survey I (Anonymized)

Q5: What are your information resources, to keep yourself updated about conservation methods?

A5: Journals , Books, workshops, online webinars etc.

Q6: Have you been always aware of what binding media was present, when you cleaned a painting? If yes, how did you find out?

A6: Yes, by solubility tests and at times some more tests.

Q7: Do you make any analyses of the paint film before cleaning?

A7: Yes. Microscopic examination and solubility tests. Sometimes, we also do different types of chemical and spectroscopic analysis.

Q8: What is your preferred way to clean synthetic paint films?

A8: Dry cleaning.

Q9: Which cleaning agent do you use for the wet cleaning of synthetic paint films?

A9: pH adjusted water and/or ethanol-water mixture.

Q10: Do you feel insecure when it comes to cleaning of modern paint films?

A10: Yes, because most of the times the material and technique is unpredictable.

Q11: Have you encountered any unexpected results upon cleaning of synthetic paint films?

A11: Yes. I have found different kinds of material mixed in some portions of an acrylic painting.

Q12: Are there other methods that you use to recover a painting's original aesthetic?

A12: No.

Q13: Is there specific practical knowledge in your country, with regards to the cleaning of synthetic binding media, which is passed on by more experienced conservators?

A13: Nothing specifically unusual.

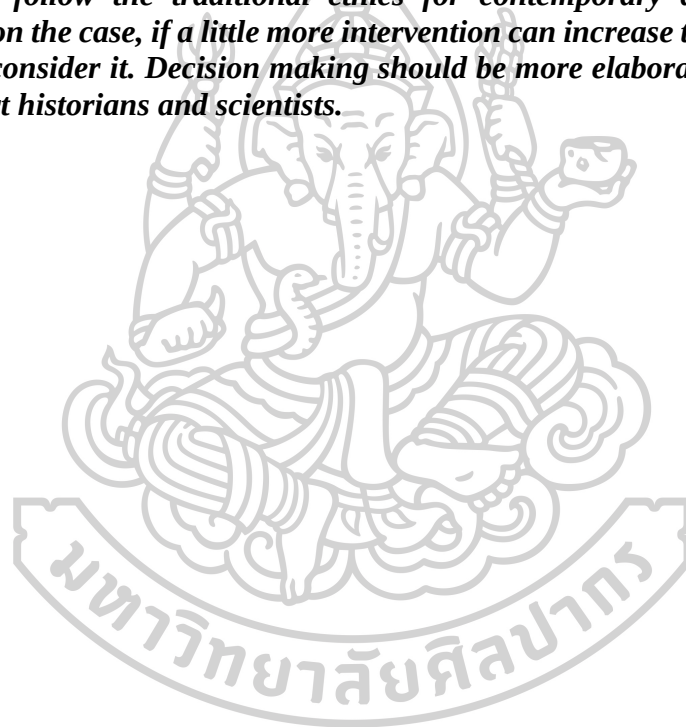
Q14: On a scale from 1-10, how important is the collaboration between conservators and artists in the conservation of contemporary art? (1 not important; 10 very important)

A14: 10.

Q15. Do you personally have the feeling traditional conservation ethics (like minimal intervention and reversibility) need to be adapted for contemporary artworks?

A15: (are you saying **adapted or **adopted**?)**

We should follow the traditional ethics for contemporary art works also, but depending on the case, if a little more intervention can increase the life of a painting, we should consider it. Decision making should be more elaborate process involving curators, art historians and scientists.



Survey J (Anonymized)

Q5: What are your information resources, to keep yourself updated about conservation methods?

A5: Meet with several colleagues of known or in contact.

Q6: Have you been always aware of what binding media was present, when you cleaned a painting? If yes, how did you find out?

A6: Always testing first or with the technique of painting.

Q7: Do you make any analyses of the paint film before cleaning?

A7: No.

Q8: What is your preferred way to clean synthetic paint films?

A8: Dry and wet both.

Q9: Which cleaning agent do you use for the wet cleaning of synthetic paint films?

A9: Water base for synthetic.

Q10: Do you feel insecure when it comes to cleaning of modern paint films?

A10: No, because we damage something when doing cleaning.

Q11: Have you encountered any unexpected results upon cleaning of synthetic paint films?

A11: Overcleaning to get better result.

Q12: Are there other methods that you use to recover a painting's original aesthetic?

A12: Always by retouching.

Q13: Is there specific practical knowledge in your country, with regards to the cleaning of synthetic binding media, which is passed on by more experienced conservators?

A13: Using akapad.

Q14: On a scale from 1-10, how important is the collaboration between conservators and artists in the conservation of contemporary art? (1 not important; 10 very important)

A14: 10.

Q15: Do you personally have the feeling traditional conservation ethics (like minimal intervention and reversibility) need to be adapted for contemporary artworks?

A15: Yes, we cannot overdo others work. We can preserve but not overdo others work.



Survey K (Anonymized)

Q5: What are your information resources, to keep yourself updated about conservation methods?

A5: *Colleagues, Symposiums, students (interns).*

Q6. Have you been always aware of what binding media was present, when you cleaned a painting? If yes, how did you find out?

A6: *No, just by testing with solvents (Acrylic or Oil).*

Q7: Do you make instrumental analyses of the paint film before cleaning?

A7: *No.*

Q8: What is your preferred way to clean synthetic binding media (acrylic paint, PVA paint) ?

A8: *Dry cleaning.*

Q9: Which cleaning agent do you use for the wet cleaning of synthetic paint films?

A9: *Nanorestore*

Q10: Do you feel insecurity when it comes to cleaning of modern paint films?

A10: *Yes, alteration of surface sheen (paintlayer), blooming, streaks, irregularity*

Q11. Have you encountered any unexpected results upon cleaning of synthetic paint films?

A11: *Streaks.*

Q12: Are there other methods that you use to recover a painting's original aesthetic?

A12: *No.*

Q13: Is there specific practical knowledge in your country, with regards to the cleaning of synthetic binding media, which is passed on by more experienced conservators?

A13: *No.*

Q14: On a scale from 1-10, how important is the collaboration between conservators and artists in the conservation of contemporary art? (1 not important; 10 very important)

A14: *It depends on the case. Sometimes better not to collaborate, sometimes extremely necessary. 1-10.*

Q15: Do you personally have the feeling traditional conservation ethics (like minimal intervention and reversibility) need to be adapted for contemporary artworks?

A15: *I believe it is already adapted for contemporary art, very depend on individual cases.*



Survey L (Anonymized)

Q5: What are your information resources, to keep yourself updated about conservation methods?

A5: Literature, conferences, universities (interns).

Q6: Have you been always aware of what binding media was present, when you cleaned a painting? If yes, how did you find out?

A6: No.

Q7: Do you make instrumental analyses of the paint film before cleaning?

A7: No.

Q8: What is your preferred way to clean synthetic binding media (acryl paint, PVA paint) ?

A8: dry cleaning (PU-sponges, microfibre cloth).

Q9: Which cleaning agent do you use for the wet cleaning of synthetic binding media (acryl paint, PVA paint) ?

A9: Water.

Q10: Do you feel insecurity when it comes to cleaning of modern paint films?

A10: Yes, because of swelling, bleaching, gloss difference (sheen).

Q11: Have you encountered any unexpected results upon cleaning of synthetic paint films?

A11: Sheen.

Q12: Are there other methods that you use to recover a painting's original aesthetic?

A12: retouching, in collaboration with artists.

Q13: Is there specific practical knowledge in your country, with regards to the cleaning of synthetic binding media, which is passed on by more experienced conservators?

A13: Nanorestore Workshop.

Q14: On a scale from 1-10, how important is the collaboration between conservators and artists in the conservation of contemporary art? (1 not important; 10 very important)

A14: Depends on the case – artist interview is always recommended. Sometimes artists don't suggest best treatment for artwork.

Q15. Do you personally have the feeling traditional conservation ethics (like minimal intervention and reversibility) need to be adapted for contemporary artworks?

A15: Yes and no, depends on the artwork, the context, collaboration with the artist



Appendix III: Artist's answers

Topic: Conservation of synthetic paint films, exploring artists perspective on the preservation of their works.

Interviewee Artist A

* The following interview was partly (simultaneously) translated from Hindi into English.

Q1: In which country do you primarily work?

A1: Dehli, India.

Q2: Which binding media do you used in your artworks?

A2: Synthetic, acrylic. *I like to work with oil but if someone wants the painting to be ready in some days then I use acrylics.*

Q3: Why did you choose synthetic materials in your artworks?

A3: *Easy to carry, easy to dry.*

Q4: Are there specific challenges you foresee in preserving these materials?

A4: *No, cracks come after a long time maybe 15 years.*

Q5: Have you been involved in conservation of paintings?

A5: *Yes, I did fillings of cracks, with acrylic / synthetic based materials.*

Q6. Do you consider the longevity of your art works as a goal?

A6: *Yes, very important. He says if his work does not stay long then this is not good for selling them too.*

Q7: What values do you want to be conserved with regards to your art works?

A7: *Original aesthetics of the object.*

Q8: Traditional conservation ethics emphasize respecting the originality of materials, favoring treatments that minimize intervention and ensure reversibility. The goal is to safeguard the artwork's authenticity while making sure it remains stable for future generations. Do you think these principles apply to your work? Do you feel they need to be adapted for contemporary artworks?

A8: He says that if a conservator would work on his artworks, he would want the conservator to follow minimum intervention, as well as reversibility of this treatment. He wants that what he has made has to be retained in the way it is not that the conservator is adding what they feel is best for the object.

What he has made that should stay like it. He says that he wants the work to be in the same way that he has made it. If there is an aesthetic problem like a stain or something that must be cleaned, to go back to original aesthetics he would want that to be done. In case there is a loss of paint, and the conservator does not have a reference on how this part looked like, they should not work on it but leave it like is.

Q9: Have you ever worked directly with conservators to ensure the longevity of your work?

A9: Can I answer on behalf of him, yes, he has, I have cleaned his paintings.

It happens 3 or 4 times, mostly the cleaning of oil paintings with fungus on it.

Q10: Could you imagine to work more closely with a conservator, share details and document your work (techniques, material and creative process)?

A10: Yes, he would not have a problem with it. Of course, yes he did that. Artists are hired for retouching.

We meet at a project where I was doing the filling, and he was doing the retouching. At the time he was also doing the fillings he was given the material and then he would fill. That was on a wall painting site of a different artist.

Artists take less time than the conservators so mostly artists are hired on project base works like that, they would do the aesthetics. Because in certain places, at temples or church or some public place where. Art work is exhibited if a conservator maybe would say I'm not going to retouch it, then it would not be acceptable for the entity. So for example one case we did the filling the plaster studies etc but we said we would not do recreate the figures. Then the local community was not happy with our work, then some years later when we came back to the site we had seen that they had done heads and overpainted also. So it is better to have an artist with you, who can kind of make it in an aesthetic way but only on the exact filling area, because as a custodian they want to have it somewhat complete. For them it is inauspicious to have a headless deity so they want to have it complete. And they would not use the

correct materials to restore. So it is better to have an artist who can go through this in a controlled matter.

Interviewee Artist B

* The following interview was simultaneously translated from Thai into English by Kitty.

Q1: In which country do you primarily work?

A1: Thailand, bangkok.

Q2: Which binding media do you used in your artworks?

A2: Synthetic, silicon flect enamla resin fires.

Q3: Why did you choose synthetic materials in your artworks?

A3: Burning enamel, like to experiment with new material, contrebutes to his work.

Q4: Are there specific challenges you foresee in preserving these materials?

A4: No, Every thing that happens to the painting he considers part of the work.

Q5: Have you been involved in conservation of paintings?

A5: No

Q6: Do you consider the longevity of your art works as a goal?

A6: Yes, but with changes he does not mind if work falls a part. He does not do anything to prolong the life as changes are part of the concept.

Q7: What values do you want to be conserved with regards to your art works?

A7: What matters is that what remains is the concept, the outcome of all those processes and experimentations. He doesn't mind if the work eventually falls apart, because that impermanence fits with his conceptual intention.

Q8: Traditional conservation ethics emphasize respecting the originality of materials, favoring treatments that minimize intervention and ensure reversibility. The goal is to safeguard the artwork's authenticity while making sure it remains stable for future generations. Do you think these principles apply to your work? Do you feel they need to be adapted for contemporary artworks?

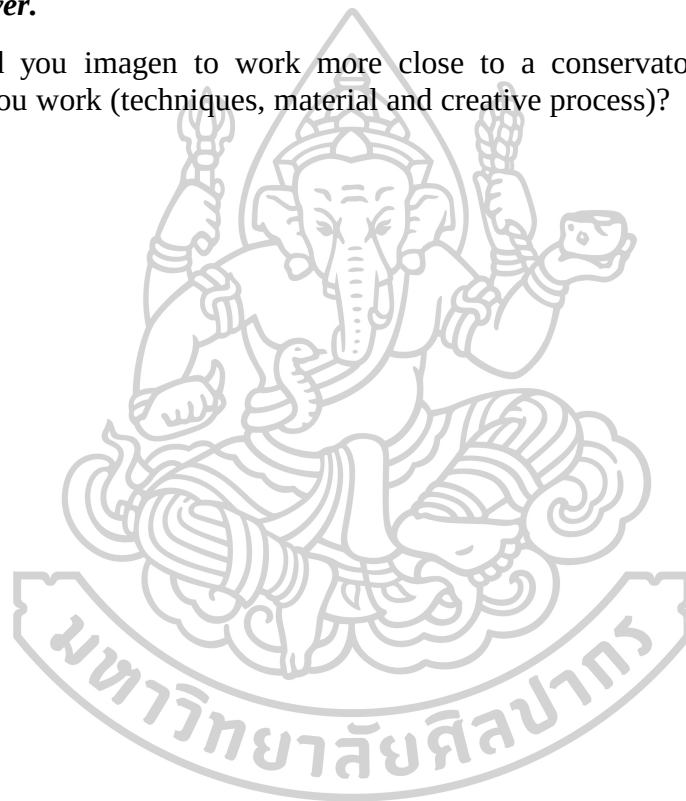
A8: No clear answer.

Q9: Have you ever worked directly with conservators to ensure the longevity of your work?

A9: No, never.

Q10: Could you imagine to work more close to a conservator, share details and document your work (techniques, material and creative process)?

A10: Yes.



Interviewee Artist C

*The interview was mainly conducted in Italian and later translated into British English. Only the questionnaire guided part of the interview is transcribed in the following.

Q1: In which country do you primarily work?

A1: Thailand.

Q2: Which binding media do you use in your artworks?

A2: Nano acrylics (polymer-based acrylics or water-based polyurethanes), acrylic-oil combinations with synthetic components, offer high durability, mechanical resistance, and self-cleaning properties due to the inclusion of nano titanium dioxide.

This compound exhibits photocatalytic properties, breaking down organic particles when exposed to UVB light.

They also possess a higher crosslinking capacity, forming denser films.

The nano acrylics used are combinations of various acrylic polymers and polyurethanes, sometimes enhanced with silver ions to provide antibacterial and anti-mould properties (bio-protective). Additionally, they show high water resistance.

Q3: Why did you choose synthetic materials in your artworks?

A3: Because I am impatient, Thailand helped me become more patient again, and for this series, I returned to using oil paints.

I use nano-acrylics as part of my personal and professional journey — a 40-year history that has evolved into full engagement with nanotechnology. Combining the world of traditional acrylics, which I regularly use, with nano-acrylics and more natural media such as oil or ink, is an orchestration of chemical evolution. It gives me the possibility to express what I conceptually aim to produce.

Q4: Are there specific challenges you foresee in preserving these materials?

A4: Yes, but it's not a technical issue — it's a matter of knowledge. In your field, I believe it's very important that the curriculum includes a new chapter dedicated to contemporary chemistry. That includes nanotechnology and functional materials. I also believe there should be a physics module, because all functional materials are deeply rooted in physics — this is physics. Moreover, there's the atomic-level challenge, and the dialogue between conservation experts like yourselves and the eternally eccentric minds of artists.

No, from the point of view of the materials, there is no issue. It's a matter of the restorer's training and the willingness of artists to share information.

Q5: Have you been involved in conservation of paintings?

A5: No.

Q6: Do you consider the longevity of your art works as a goal?

A6: Yes, but not primary goal.

Q7: What values do you want to be conserved with regards to your art works?

A7: It is difficult to give preference to one aspect over another. From a conceptual perspective, everything is important. On a physical level, I'm not interested in whether anything remains. But on a technical level, everything should be preserved – from the aesthetic appearance to the material quality. So, if I answer from a technical standpoint, then paradoxically, it should remain exactly as it is today: the colour, the material, the composition, the luminosity.

Le me explain myself better, the object doesn't have to remain always as it is but it has to age in its own skin. So if I have used this specific type of nano acrylic, then the intervention has to be made with this specific type of non-acrylic.

Q8: Traditional conservation ethics emphasize respecting the originality of materials, favoring treatments that minimize intervention and ensure reversibility. The goal is to safeguard the artwork's authenticity while making sure it remains stable for future generations. Do you think these principles apply to your work? Do you feel they need to be adapted for contemporary artworks?

A8: If the Conservators want to use the same material or use another material with the capacity to create what is missing this is ethic question that doesn't concern myself. And I say you're more it doesn't even mean for me to investigate the originality of the artwork. Talking from the perspective of the collector if this is on the way of decay and you help to conserve the conceptual spiritual of the work.

The second school of thoughts is the one more close to me, but I don't exclude especially going for in the years and using new materials also approach to the technology and to the code deontological of conservation different to the classic one. I mean if I use functional materials and non-acrylics the principal is different probably this pieces here won't stay on for long so intervention from your side maybe

makes the collection is happy. if an element that takes part in the narration of an artist is missing then part of the narration is missing the reproduction would not invade or in future the work of the artist.

If you save my concept through intervention, metric or chromatic...e viva dio! There would be the need of more conservators.

For me, it is important to save the the conceptual dimension of the artwork. and to do this, of course, considering the materials that I use the restoration or reimpridito of the artwork with the same materials or equivalent materials is fundamental.

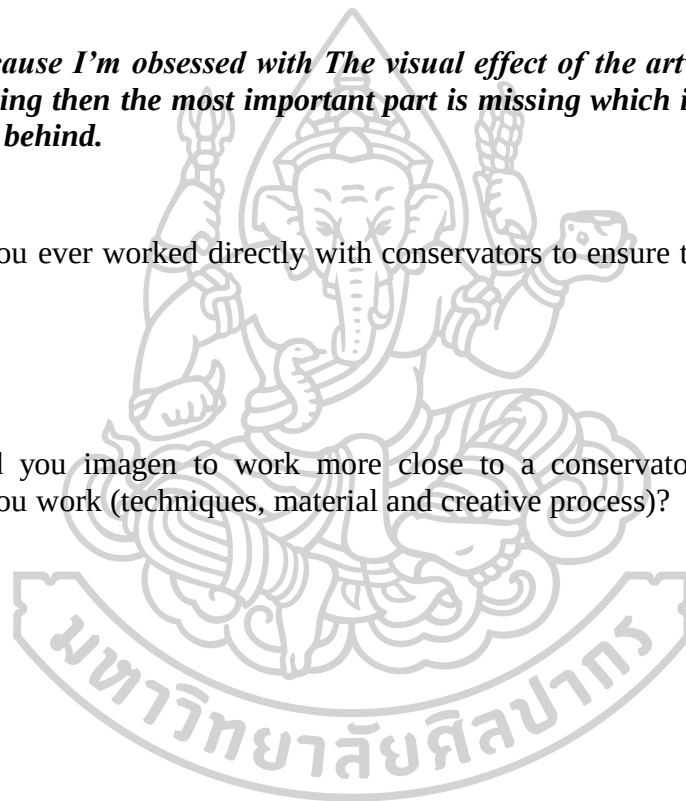
But not because I'm obsessed with The visual effect of the artwork but if a physic part is missing then the most important part is missing which is the intangible one the concept behind.

Q9: Have you ever worked directly with conservators to ensure the longevity of your work?

A9: No.

Q10. Could you imagen to work more close to a conservator, share details and document you work (techniques, material and creative process)?

A10: Yes.



Interviewee Artist D

* The following interview was simultaneously translated from Thai into English by Kitty.

Q1: In which country do you primarily work?

A1: Thailand, bangkok

Q2: Which binding media do you used in your artworks?

A2: Synthetic, acrylic

Q3: Why did you choose synthetic materials in your artworks?

A3: Accessible, the artist likes to work very fast.

Q4: Are there specific challenges you foresee in preserving these materials?

A4: Yes, The paint might peel of because of the heat and time, canvas might stretch, problems that the artist already faced; he also already took measures to prevent certain damage, tries to not touch the paint layer with his hand and avoids putting them in contact with each other while storing; stores them in a rather cold storage.

Q5: Have you been involved in conservation of paintings?

A5: Not really, he takes measures for prevention as already mentioned. If a collector has a problem with a painting he would go and paint over the problematic area, this already happened. He would also use a damped brush or brush of dusting of the paintings as this is a major problem he faces.

Q6: Do you consider the longevity of your art works as a goal?

A6:Yes, very important, everyone wants their paintings to live long.

**The paintings can face problems after 10 the problem he already faced is dustings
Ever one wants their paintings to life long.**

Q7: What values do you want to be conserved with regards to your art works?

A7:He said he wouldn't mind if the artwork changes over time, as he sees it like a kind of journal — a memory of the moment in which it was created. The ageing

becomes part of the work's history, showing how it looked back then and how it evolves over the years

Q8: Traditional conservation ethics emphasize respecting the originality of materials, favoring treatments that minimize intervention and ensure reversibility. The goal is to safeguard the artwork's authenticity while making sure it remains stable for future generations. Do you think these principles apply to your work? Do you feel they need to be adapted for contemporary artworks?

Q8: No clear answer

Q9: Have you ever worked directly with conservators to ensure the longevity of your work?

A9: No, never

Q10: Could you imagine to work more close to a conservator, share details and document your work (techniques, material and creative process)?

A10: Yes

Survey Artist E

Q1: In which country do you primarily work?

A1: India

Q2: Which binding media do you use in your artworks?

A2: Synthetic-Acrylic

Q3: Why did you choose synthetic materials in your artworks?

A3: I chose synthetic (acrylic) materials in my artworks primarily for their versatility, quick-drying properties, and vibrant color intensity. Acrylics allow me to experiment with a wide range of techniques, from thin glazes to thick impasto textures, while also offering the flexibility of blending and layering. They're also more durable and less prone to yellowing over time compared to traditional oils, making them a great choice for contemporary works that I want to maintain their freshness and vibrancy for years. The accessibility and ease of cleaning with acrylics also make them a convenient medium for my artwork work, especially when I need to transition between different materials and textures.

Q4: Are there specific challenges you foresee in preserving these materials?

A4: Yes, there are specific challenges in preserving synthetic (acrylic) materials.

While acrylics are generally durable, they are not without concerns. One challenge is that acrylic films remain flexible even when dry, which means they can attract dust and may stick to surfaces if stored improperly. Over time, environmental factors like UV light, humidity, and temperature fluctuations can affect their appearance—causing color fading or surface tackiness. Additionally, since acrylics are relatively modern, long-term conservation techniques are still evolving, and we're learning more about how these materials age compared to traditional media.

Q5: Have you been involved in conservation of paintings?

A5: Yes, I have been involved in the conservation of paintings, particularly during my academic training and personal artistic practice. During my BFA in painting, I developed a strong interest in the materials and techniques used in historical artworks. This led me to study the surface conditions of older paintings and sculptures, especially those displayed in public or religious monuments. I engaged in basic conservation efforts such as cleaning, surface stabilization, and documenting deterioration patterns in my preventive conservation course. My motivation stemmed from a desire to understand how materials behave over time and how artists in the past preserved the integrity of their work. This experience deepened my respect for the craftsmanship of historical art and informed my own material choices and techniques.

Q6: Do you consider the longevity of your art works as a goal?

A6: Yes, but not primary goal. While I do consider the longevity of my artworks important—especially when selecting materials and techniques—I view it as secondary to the expression of ideas and the creative process. My primary goal is to communicate concepts, emotions, and personal narratives, particularly around themes like time and memory. However, I do take steps to ensure that my works are durable and well-constructed, balancing artistic intent with practical considerations for preservation.

Q7: What values do you want to be conserved with regards to your art works?

A7: Original aesthetics of the object and Originality of the material are both important values I want to be conserved in my artworks. I aim to preserve the original aesthetics because they reflect the emotional and conceptual essence of the work at the time of its creation—its colors, textures, forms, and spatial dynamics are integral to the viewer's experience. At the same time, the originality of the material matters because I often choose materials intentionally—whether synthetic like acrylics or natural substances—based on their connection to my themes, especially time and

transformation. These material choices are not incidental; they carry meaning and are part of the artwork's identity.

Q8: Traditional conservation ethics emphasize respecting the originality of materials, favoring treatments that minimize intervention and ensure reversibility. The goal is to safeguard the artwork's authenticity while making sure it remains stable for future generations. Do you think these principles apply to your work? Do you feel they need to be adapted for contemporary artworks?

A8: Yes, traditional conservation ethics apply, but they also need to be adapted for contemporary artworks.

I believe in the core values of traditional conservation—especially respecting the originality of materials, minimal intervention, and reversibility—as they uphold the authenticity and integrity of the artwork. These principles are essential for preserving the artist's intent and ensuring the artwork's stability over time.

However, contemporary artworks often incorporate unconventional materials, mixed media, and ephemeral elements that challenge traditional methods. In my own practice, I sometimes use synthetic materials, resin, or non-traditional supports, which require conservators to be more flexible and innovative. Therefore, while the ethical framework remains valid, its application must evolve to respond to the complexities and experimental nature of contemporary art.

Q9: Have you ever worked directly with conservators to ensure the longevity of your work?

A9: Yes. I have worked directly with conservators a few times, particularly during exhibitions and while handling older works for study and display. These collaborations typically involved discussions around the best display conditions—such as lighting, humidity, and framing—for preserving the materials I used, especially acrylics. In some instances, conservators advised me on preventive measures like using UV-protective varnishes or archival-quality supports. The process was collaborative and educational, allowing me to better understand how to build longevity into my practice from the start.

Q10: Could you imagine to work more close to a conservator, share details and document you work (techniques, material and creative process)?

A10: Yes. I can definitely imagine working more closely with a conservator and see it as a valuable extension of my artistic process. Documenting the techniques, materials, and creative decisions behind each piece would not only support the long-term preservation of my work but also create a deeper understanding of its conceptual and material foundations. This collaboration would be especially meaningful in contemporary practice, where materials like acrylics, resins, and mixed media require thoughtful care. It would also allow me to reflect more intentionally on my choices and contribute to the evolving dialogue between artists and conservators.

Survey Artist F

Q1: In which country do you primarily work?

A1: Germany

Q2: Which binding media do you used in your artworks?

A2: Mainly synthetic media such as: acrylic paint, acrylic glass, UV print, acrylic and ink markers (binding media unknown), window films, and vinyl-coated elastic textiles.

Q3: Why did you choose synthetic materials in your artworks?

A3: Practical reasons, not a conscious decision, wanted to have things printed or use the tool of a felt pen and just did... acrylic glass is easier to handle, doesn't break as easy, less heavy for me to lift. Probably won't stick to synthetic materials though.

Q4: Are there specific challenges you foresee in preserving these materials?

A4: Yes, the fading of colour, not sure how the materials I use age, not sure if window films stick forever, the elasticity of fabrics I use etc. ...

Q5: Have you been involved in conservation of paintings?

A5: No

Q6: Do you consider the longevity of your art works as a goal?

A6: Yes, but not primary goal

Q7: What values do you want to be conserved with regards to your art works?

A7: Original aesthetics of the object Others; It depends on the specific artwork, but I think that for most of my works, it applies that I want them to look and keep looking the way the did when I considered them done..

Q8: Traditional conservation ethics emphasize respecting the originality of materials, favoring treatments that minimize intervention and ensure reversibility. The goal is to safeguard the artwork's authenticity while making sure it remains stable for future

generations. Do you think these principles apply to your work? Do you feel they need to be adapted for contemporary artworks?

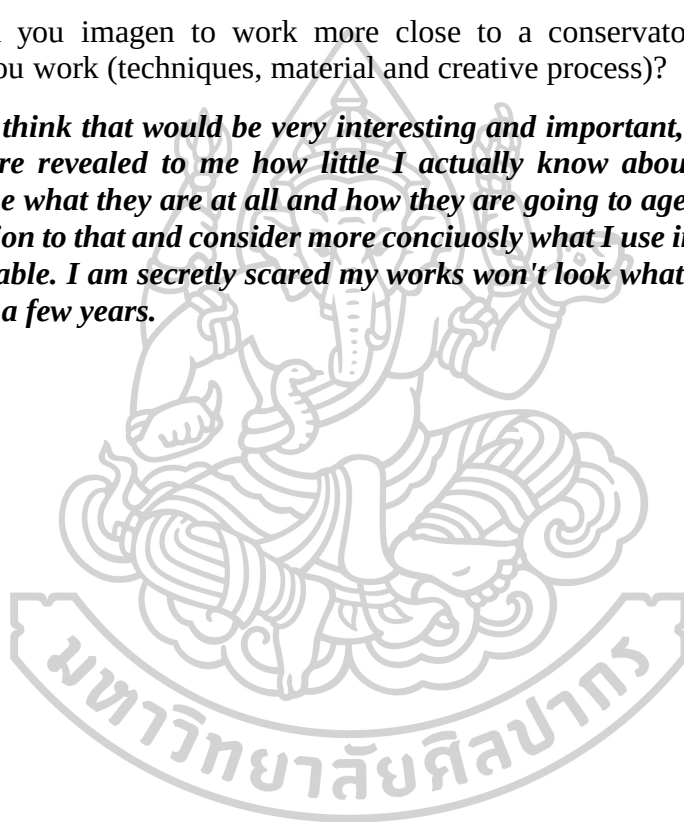
A8: Not sure, but I'd be glad if the original aesthetics could be preserved

Q9: Have you ever worked directly with conservators to ensure the longevity of your work?

A9: No

Q10: Could you imagine to work more close to a conservator, share details and document your work (techniques, material and creative process)?

A10: Yes, I think that would be very interesting and important, especially after this questionnaire revealed to me how little I actually know about the materials and binders I use what they are at all and how they are going to age. I would like to pay more attention to that and consider more consciously what I use in order to make sure it is preservable. I am secretly scared my works won't look what I want them to look anymore in a few years.



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Focus: basic design

