Glossy Surfaces

Survey Report

MoMu - ModeMuseum Antwerpen
www.momu.be | @momuantwerp | #momuantwerp

Project Glossy Surfaces

Glossy Surfaces, a 3-year Flemish government-funded project initiated by MoMu, is composed of an international consortium of museums - Mode Museum (MoMu, Belgium) Museu do Design e da Moda (MUDE, Portugal), and The Metropolitan Museum of Art (MET, USA) – as well as scientific partners – Department of Conservation and Restoration from NOVA School of Science and Technology (Portugal) and Centexbel (Belgium).

Consortium

Department of Conservation and Restoration, MoMu Fashion Museum Antwerp, Nationalestraat 28, 2000 Antwerp, Belgium (Kim Verkens, Dieter Suls, Eline van der Velde)

Department of Conservation and Restoration and LAQV-REQUIMTE, NOVA School of Science and Technology, NOVA University Lisbon, Largo da Torre, 2825-149 Caparica, Portugal (Susana França de Sá)

Department of Scientific Research, The Costume Institute, The Metropolitan Museum of Art, New York, 1000 5th avenue, New York, NY 10028, United States (Adriana Rizzo, Glenn Petersen)

Department of Conservation and Restoration, Cleveland Museum of Art, 11150 East Boulevard, Cleveland, OH 44106, United States (Sarah Scaturro)

Department of Conservation and Restoration, Museu do Design e da Moda (MUDE), R. Augusta 24, 1100-053 Lisbon, Portugal (Inês Correia)

Centexbel, Technologiepark 70, 9052 Zwijnaarde, Belgium (Sander De Vrieze)

Advising partner, Senior Conservation Scientist, Amsterdam, The Netherlands (Thea van Oosten)

Project start – end date: 1 July 2020 – July 2023

Date of publication: 25/08/2021

Version of document: 1.0

Webpage: https://www.momu.be/en/news/glossy-surfaces-2020-2023

Table of content

Survey Report of Project Glossy Surfaces year 1 July 2020- July 2021

Introduction

The Survey of the Glossy Surfaces project was published in October 2020 with the purpose of investigating the knowledge surrounding issues related to TPU (thermoplastic polyurethane)-coated objects inside institutions with costume collections. We wanted to understand how many synthetic-coated objects institutions have in their collection; if these objects experienced degradation; and how the institutions handle both degraded and non-degraded synthetic-coated objects.

The survey started with general questions on the participants location, work field and experience. The survey continued with a section A and B, tailored to the experience of the participants.

The difference between leather and imitation/artificial leather is very difficult to see with the naked eye. Coated objects often have a glossy surface, however sometimes these coatings don't have a shine at all. The most common synthetic coatings are plasticised polyvinyl chloride (PVC-P)- and thermoplastic polyurethane (TPU)-based. These two materials are not easily distinguishable by visual inspection alone.

TPU coated fashion objects: examples

These images below are an example of TPU coated fashion silhouettes. On the left an older object out of the MoMu collection. This iconic coat of André Courrèges dating out of the seventies s has an aromatic ester based TPU coating.

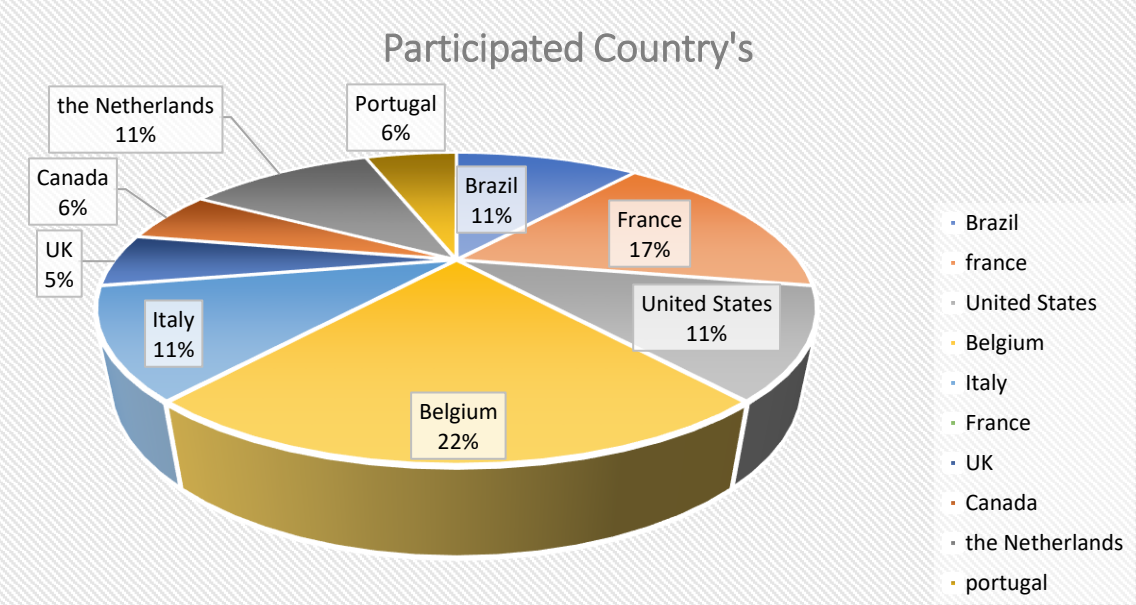
The silhouette on the right side is a more recent one out of the collection of MoMu, Raf Simons for Dior, Fall winter 2015-2016. A laser sintered leather top and skirt with an aromatic ester based TPU coating. These both fashion objects give a clear visual of a matte and a glossy coating, with both of them aromatic ester based but yet so different in appearance.

Matte coated TPU:
Image © Collection Modemuseum Antwerpen André Courrèges, T21/5, photo Stany Dederen.

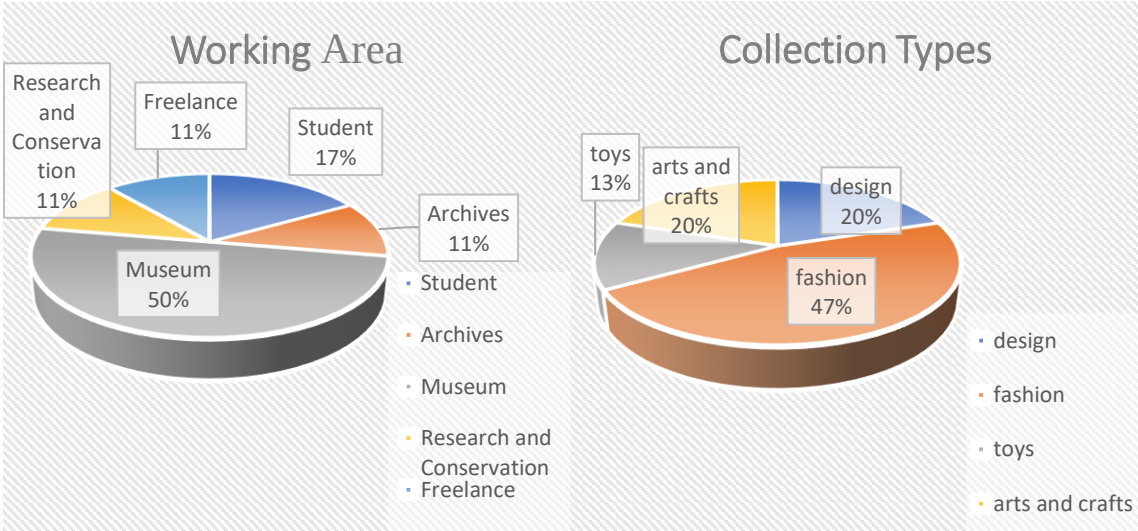
Glossy coated TPU:
Image © Collection Modemuseum Antwerpen Raf Simons, FW15-16, T15/763AB, T15/656, photo Stany Dederen.

Report

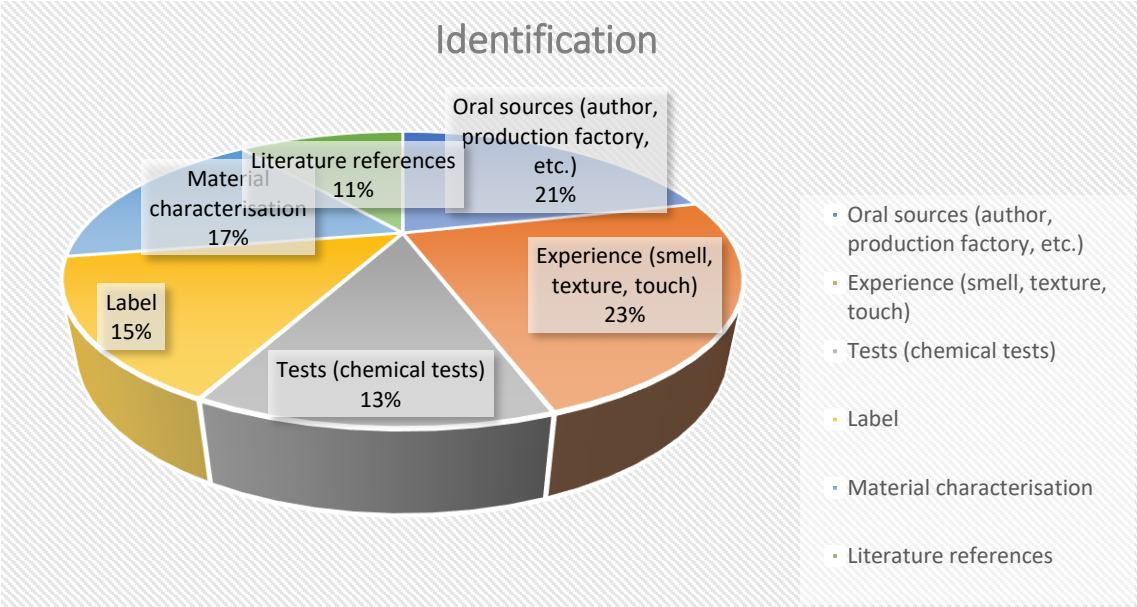
The survey was distributed via e-mail to different institutions; in total there were 18 responses. Several countries participated which gives a geographically broad and general overview of experiences. Of the participants, 36% stated to have no experience with plastic conservation, 28% considered themselves intermediate and 36% high/advanced with plastics.



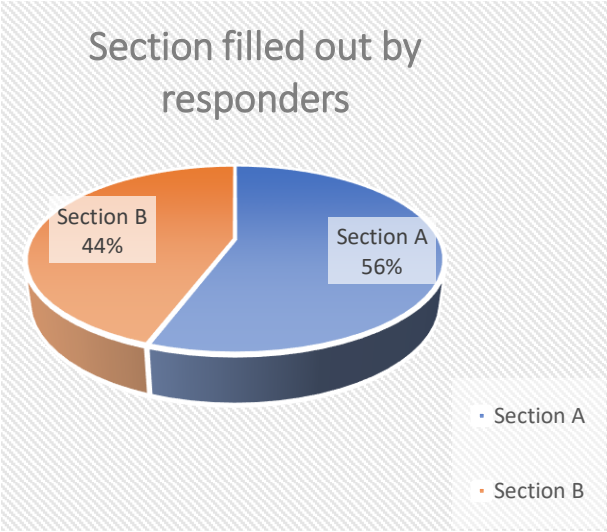
Most of the participants work in a museum or archive; in general, this was the largest group from which we hoped to receive results. The highest percentage of the participants work on fashion collections, which was the target audience of this survey.



The most common way of identifying TPU or PVC-P was by oral sources and the professional's own experience. Testing and literary reference were the lowest percentage.



The analytical instrumentation most used according to the survey were FTIR- and Raman- spectroscopy.



Two versions of the survey where made:. Section A was intended for a more experienced group familiar with the chemistry and degradation of TPU and PVC-P. Section B was for the less experienced group. The questions of section A were more in depth compared to the questions in section B. To obtain more specific information, separate questions were made about TPU and PVC-P.

Respondents self-selected themselves to be in either group. The highest percentage of participants filled out section A.

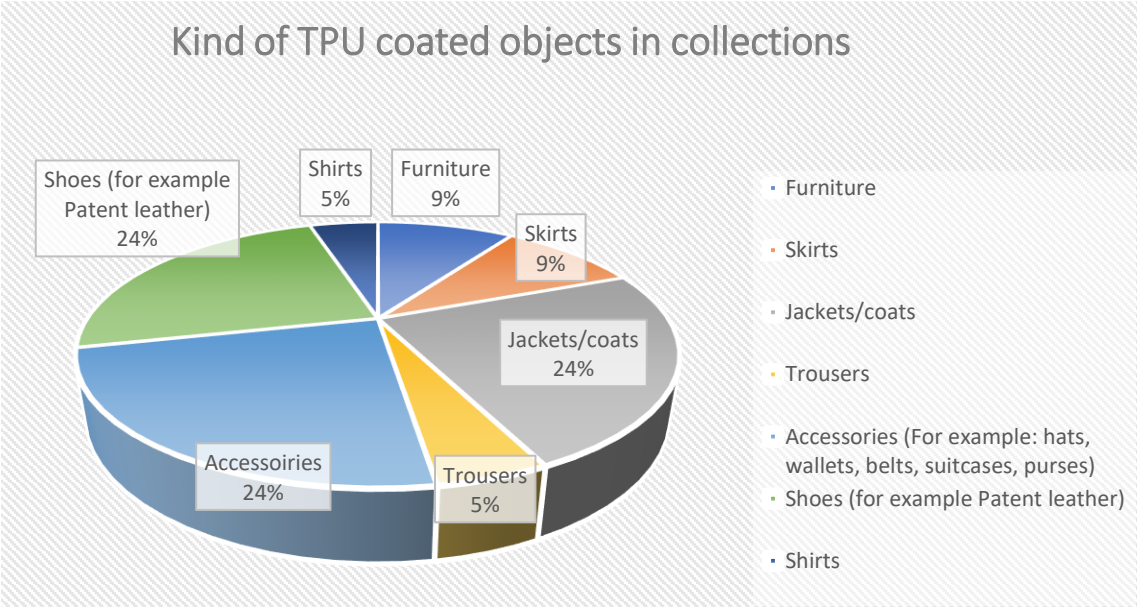
Results for section A

Most of the participants who filled out section A can identify the difference between real leather and imitation/artificial leather. This is accomplished by means of microscopic analysis and visual identification, like texture, appearance, the presence or absence of air -bubbles. Other sensorial data like smell and touch are also used. Another visual indicator was the type of degradation.

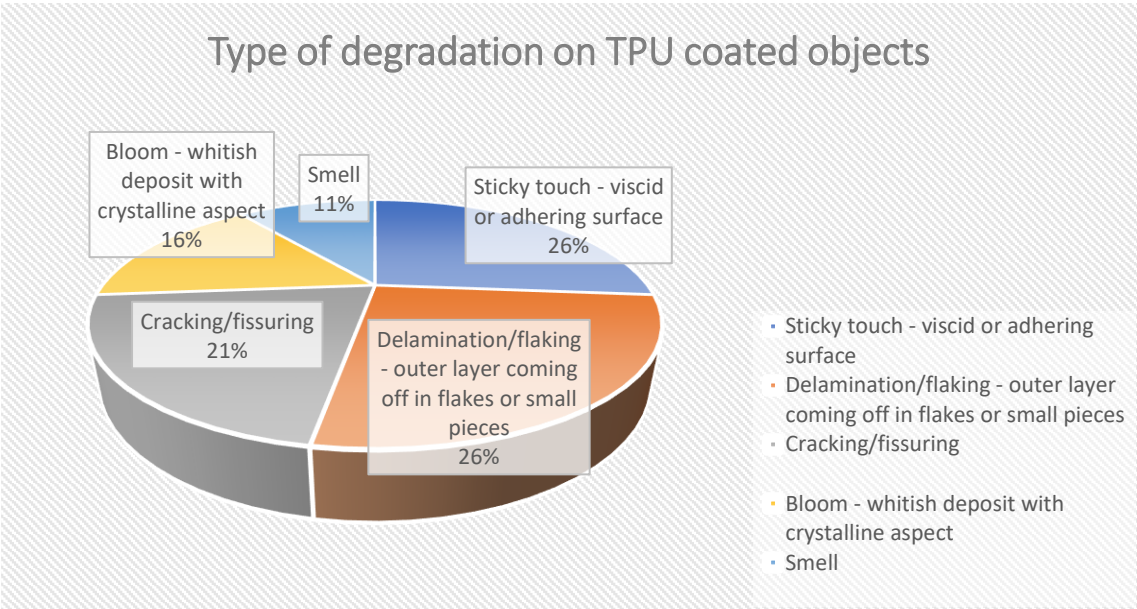
Only half of the participants have, as far as they know, TPU and or PVC-P coated objects in the collection. The further questions in section A were divided in specific questions concerning TPU coated objects and PVC coated objects.

TPU Coated objects

The type of TPU coated objects is very diverse, as is also the case for the collections of MoMu, MUDE and the Met. The most common type of material are accessories (other than shoes), shoes, and coats.



0-50% of the TPU coated objects show signs of degradation for all the participants; one participant stated 50% to 100%. The most common types of degradation are stickiness and delamination/flaking.



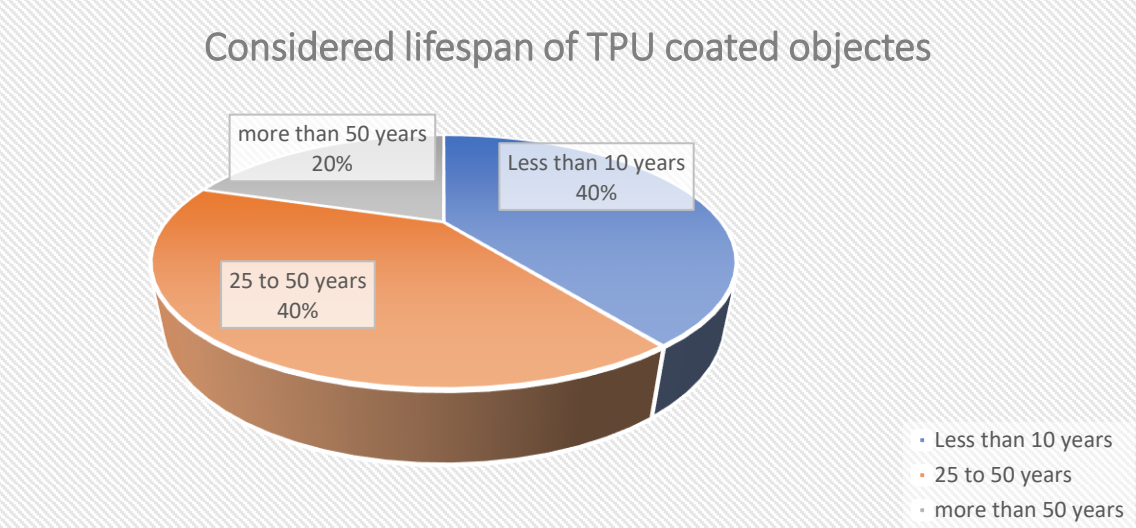
The objects in the collections date from the 1950s to 2000.

90% of respondents state that there is a difference between an used and an unused/unworn coated object. Wear, tear and fluctuating environments contribute to the degradation. Only one respondent stated seeing a difference in the damage of TPU ester-coated objects through the decades.

Ester-based TPU's are considered to be the most fragile/unstable. However, there is little distinction in terms of degradation between those containing aromatic or aliphatic isocyanates, as only on respondent specified that those containing aromatic isocyanates also seem to be the most unstable.

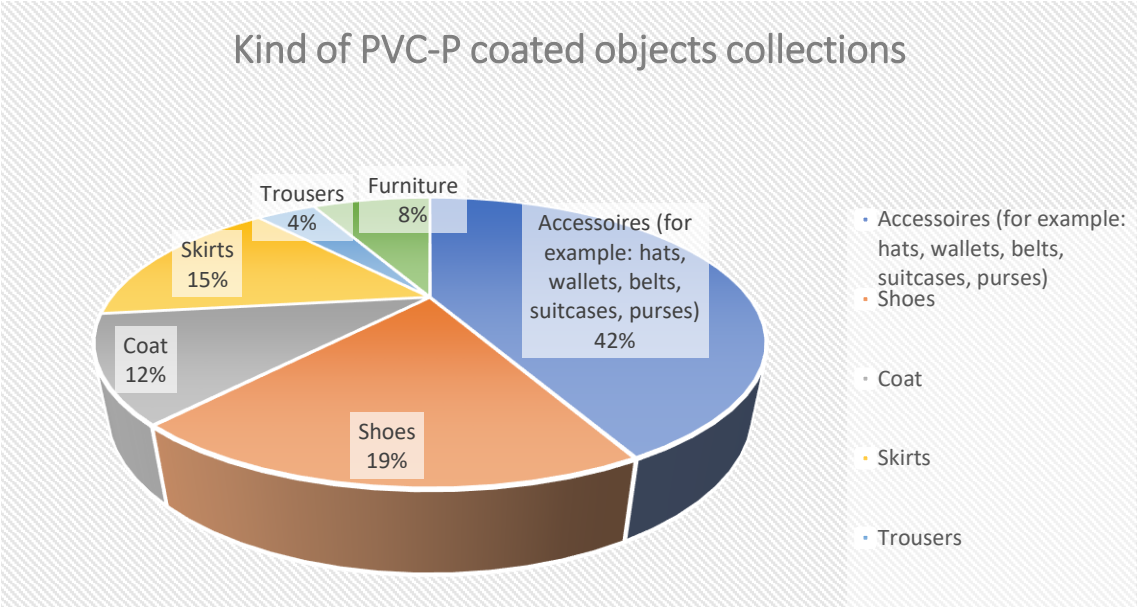
The ability to distinguish the difference between an ether and an ester-based TPU in the collection is only possible for half of the participants. Only one participant uses FTIR spectroscopy. Other stated using a different approach, based more on a visual/empirical approach for identification.

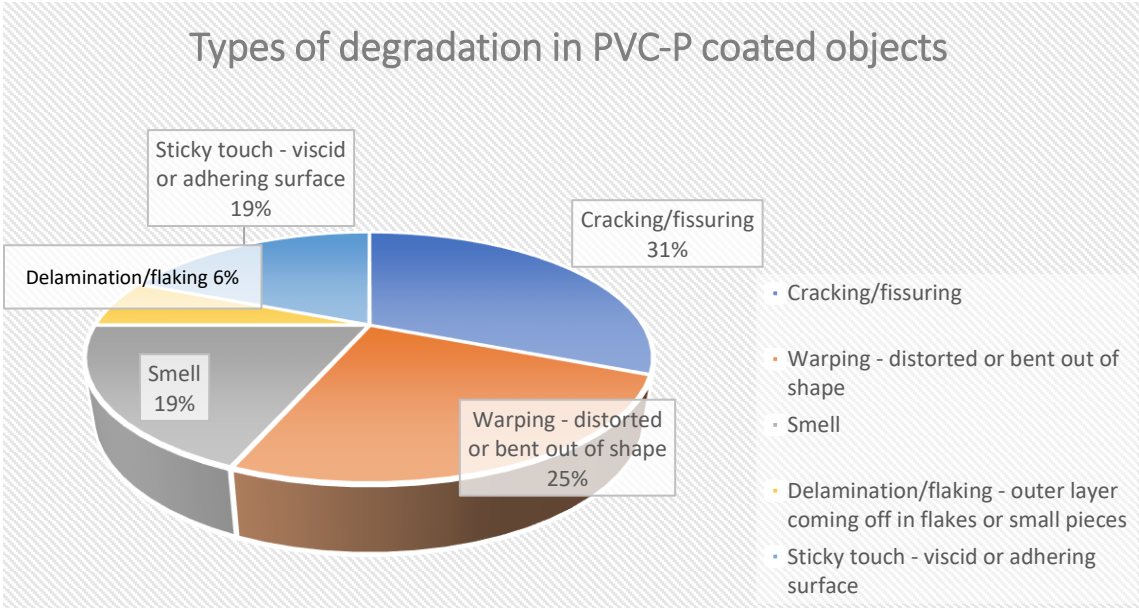
The experience of the participants with degradation of TPU coated objects that are in exhibitions for less than 6 months is that 90% find that there is no noticeable degradation. A participant stated that noticeable degradation was visible with an object in open display under museum conditions and that there seemed to be a connection between being used and being more degraded.



PVC-P coated objects

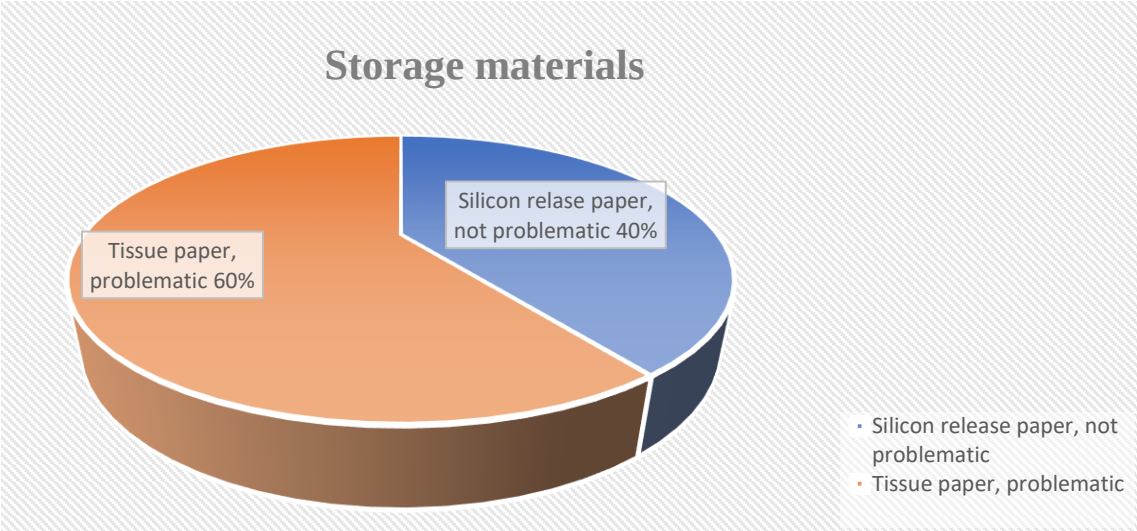
The type of PVC-P coated objects is very diverse, as is also the case for the collections of MoMu, MUDE and the Met. The most prevalent types of objects are shoes and other accessories.

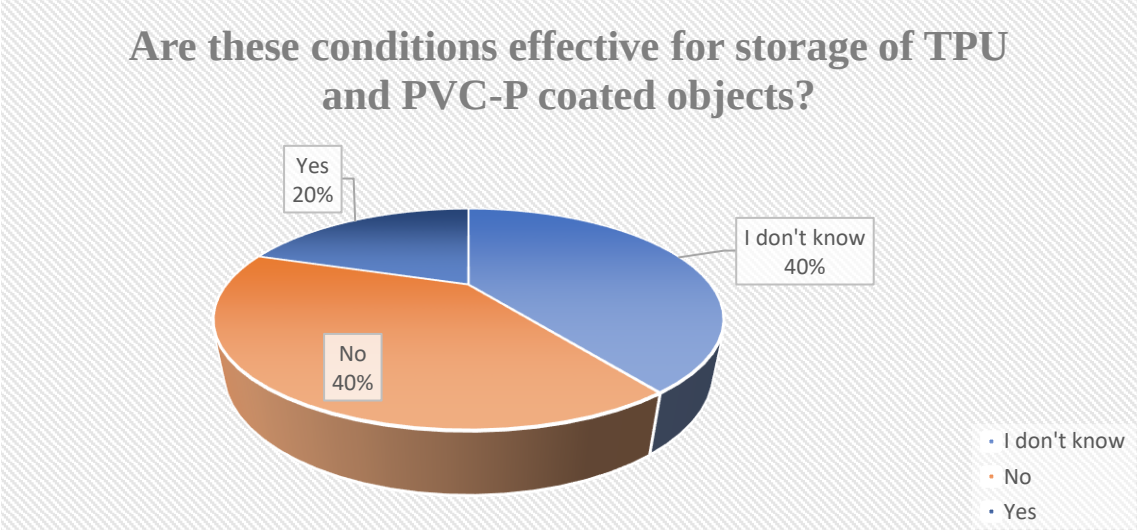




0 to 50% of the PVC-P coated objects show signs of degradation according to all the participants, only one respondent states that about 50-100% showed degradation. The most common form of degradation is cracking/fissuring. The objects are dated from the 1960s to 2000.

Most of the participants noticed a difference between used and unused PVC-P coated objects.



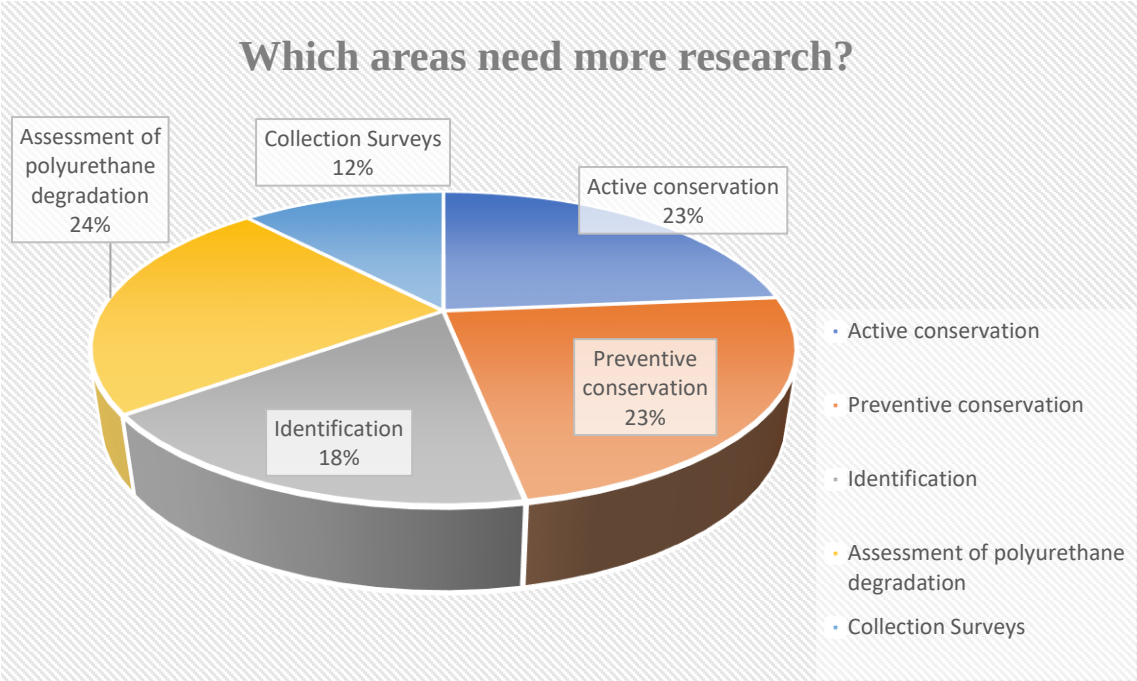


TPU and PVC-P coated objects are not routinely stored separately. Some respondents do this if space allows; however, mostly space is an issue that precludes separate storage.

The question concerning the storage conditions for TPU-based objects and PVC-P objects was answered with a lot of variation. The conclusion is that, for now, clearly there is no standard way to store this type of material. For the most cases, the standard museum storage conditions are maintained: in the dark with a temperature of 21°C and relative humidity of 50 -55%.

One of the participants stored certain shoes in a sealed container without oxygen.. The materials used here are Tyvek or acid free tissue paper in a temperature of 18°C. Another participant mentions the development of cold storage, without specific parameters.

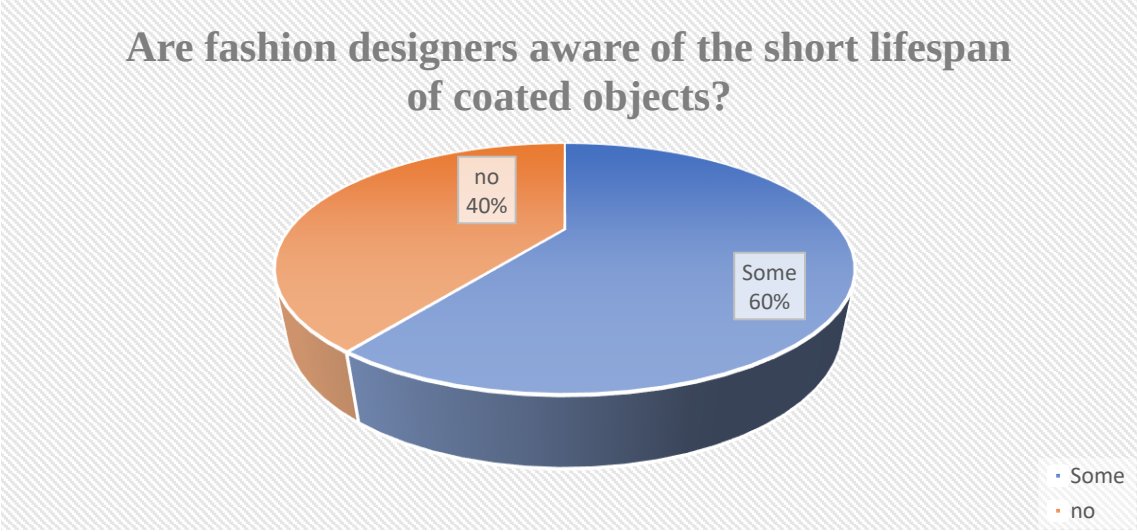
The use of materials in storage varies. From the cumulative data, it is clear that the use of tissue paper is problematic in combination with coated objects. The most common choice is silicone-release paper.



More research is necessary in all the aspects of conservation.

90% of the participants stated having come across total losses of TPU coated objects.

Some of this is due to improper storage, where the coating is sticking to the tissue paper. Other objects are so far degraded that they are beyond recognition. There is a safety concern for the staff that must handle these chemically unstable objects.



It is not very clear if Fashion designers are aware of the short lifespan of coated objects. The question was for example asked at the archives of Courréges, where is stated that the designer is aware of this. IF we want to know this for certain more designers would have to be interviewed.

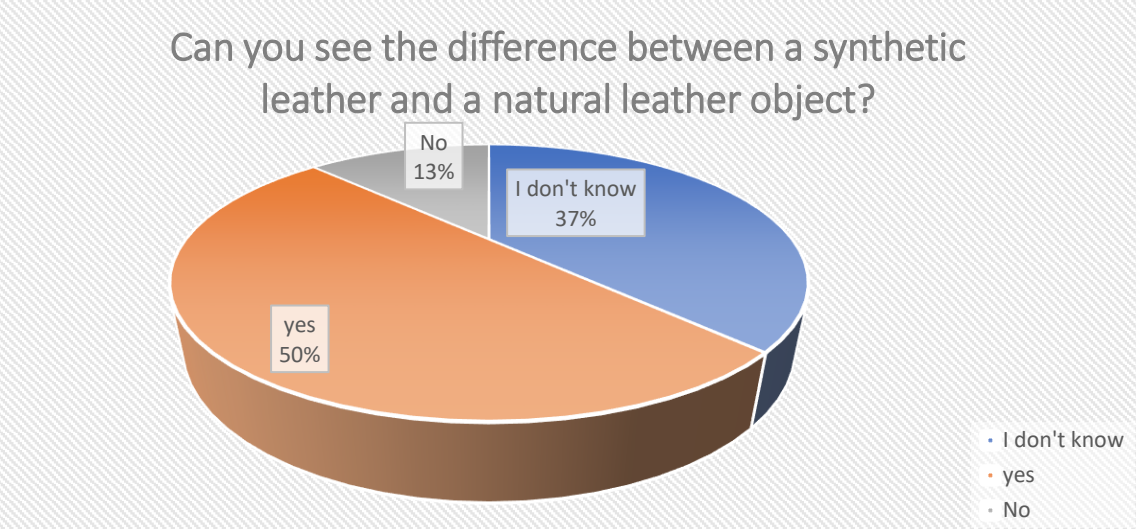
Considerations on making a replica of a TPU-coated object has been made by 50% of the participants, however it has never actually been carried out.

100% stated that the lifespan of TPU is an ongoing problem in the conservation strategy of museums.

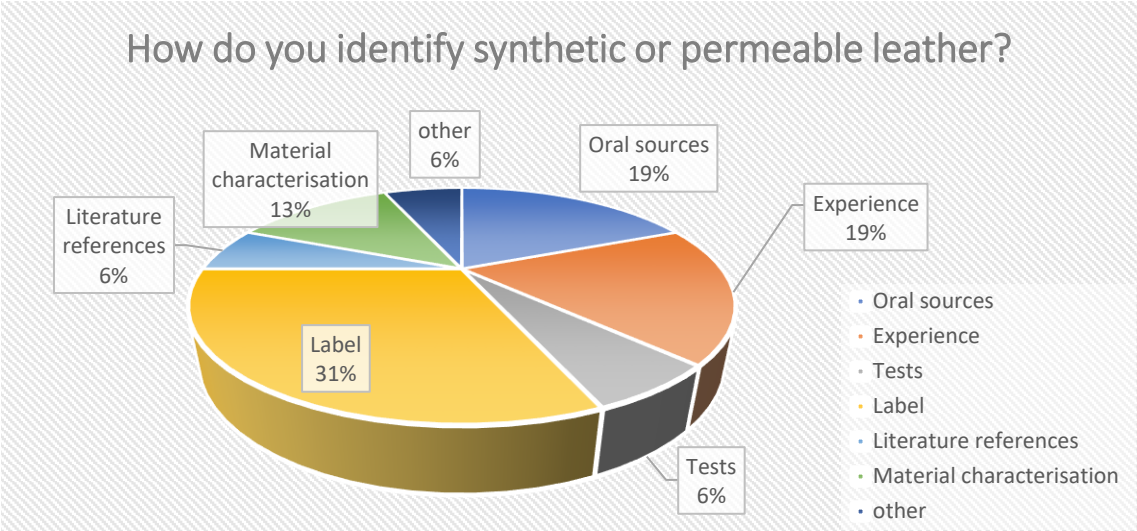
Only 10% report that they participate in the decision-making process of acquiring/purchasing a TPU coated object. The ephemeral nature of the polyurethane was the crucial factor in the decision-making. However 50 % states that probable degradation of polyurethane was the reason not to acquire an object.

Results for section B

Section B was for the less experienced group and started with a question concerning impermeable fabrics and synthetic leather like materials. If the participant had none of these materials in their collection, the survey ended here.

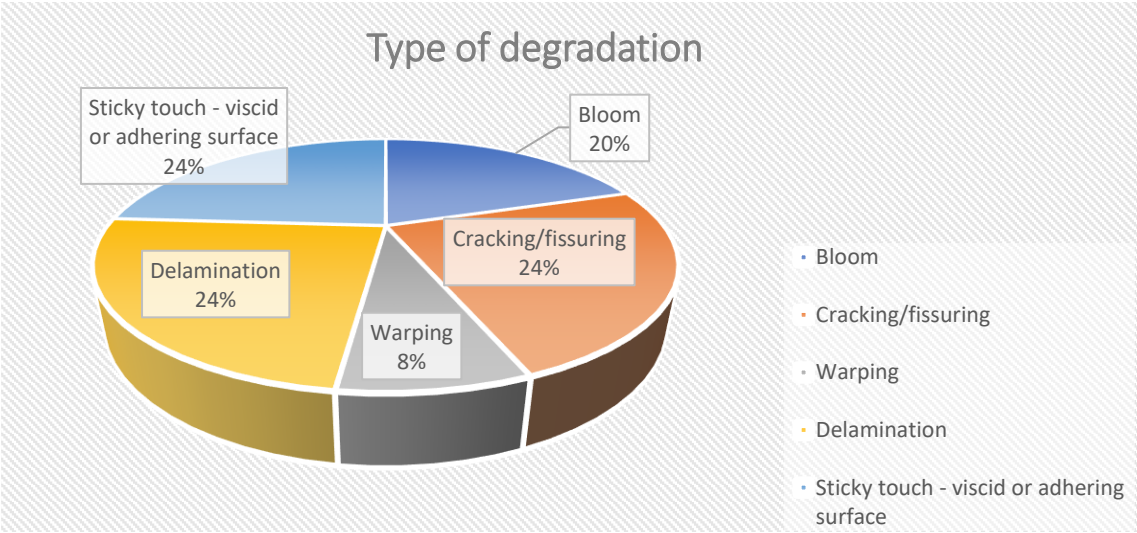


50% of respondents are able to see the difference between a synthetic leather and a natural leather object. The difference is visible by smell, touch, wear and tear, label, and the point of degradation.



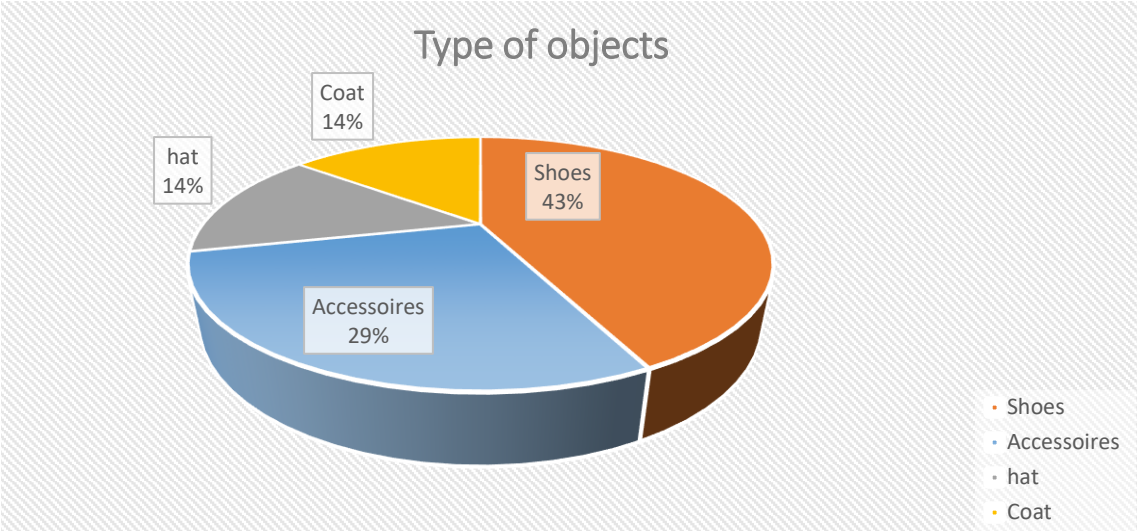
Identification is possible most of the times due to the label, secondarily by oral sources and experience.

0 -50% for all participants state that synthetic leather objects show degradation due to the presence of polyurethane, he objects are dated between 1950 and 2010.

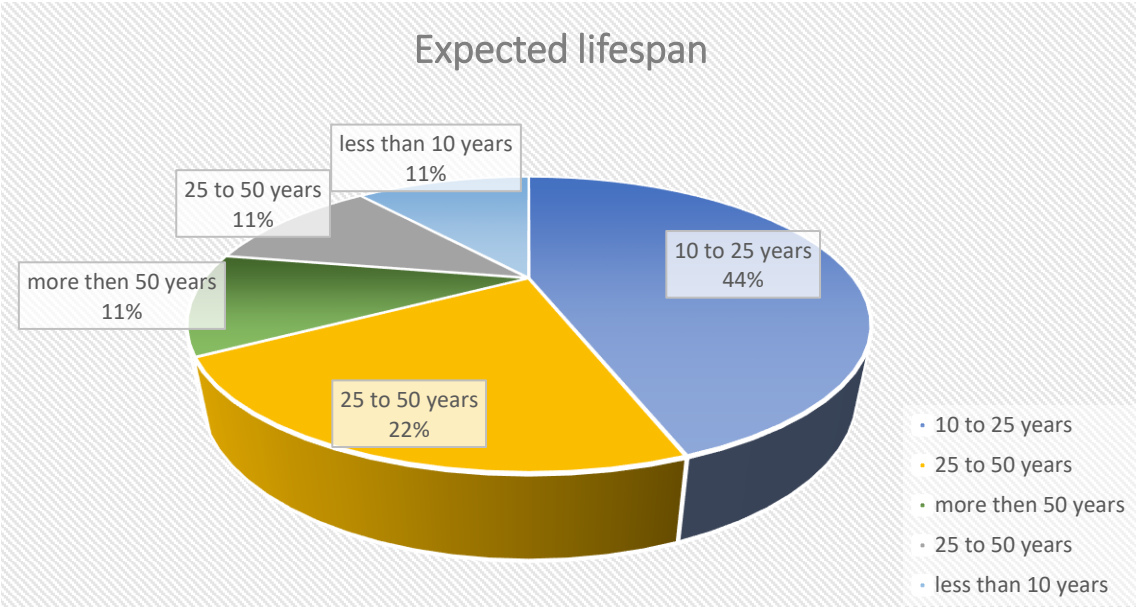


The most common types of degradation are stickiness, cracking and delamination.

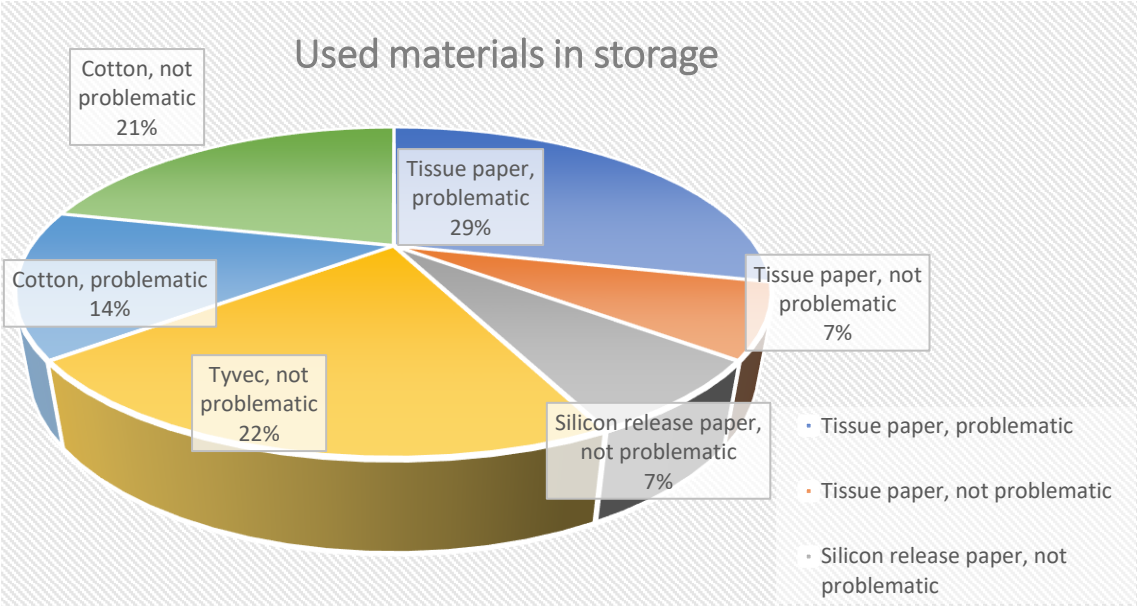
These synthetic leather objects are not considered more fragile than textiles, however it depends on a case-by-case basis. Differences between a used and an unused synthetic leather object are not visible, in most cases.



The most common objects are shoes.



The highest percentage states that the lifespan of synthetic leather objects is 10 to 25 years.



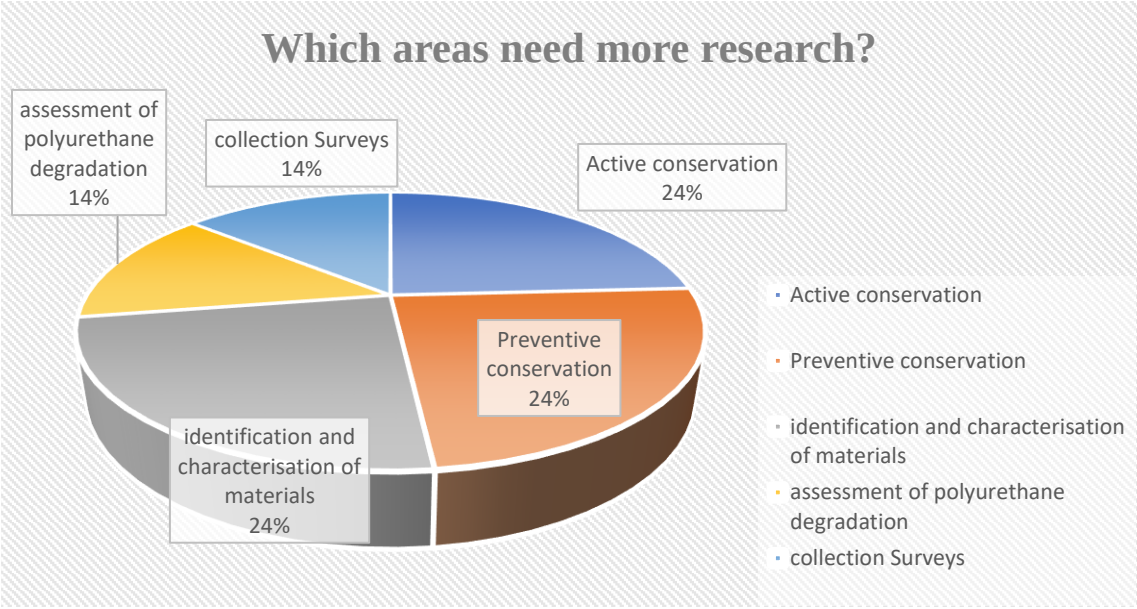
Tissue paper is stated as the most problematic storage material, probably due to stickiness.

The largest group states that there was no visible damage after putting a coated object on display. Some have never displayed a coated object before.

50% have come across a synthetic leather that has been considered a total loss. Objects are completely altered and unidentifiable and can no longer be manipulated. Crumbling of shoes and bloom on a jacket were given as examples that completely changed the appearance of the objects.

Most collections are stored in the dark in non-climatized conditions or under very fluctuating values, and mixed with other materials.

100% of the participants agree that the lifespan of a coating is an ongoing problem in the conservation strategy. Museum Directors are presumed not to be aware of the short lifespan.



There is a need to move forward on identification, preventive and active conservation for these kinds of objects.

Conclusion

In total the survey was viewed 259 times, there have been 107 starts in total and there were only 18 responses. The number of responses might seem small; however, the authors feel that this is a very good number given the landscape of costume museums holding such pieces and knowing about these materials.. Also, it was possible to collect an international overview about the degradation and conservation knowledge of these materials, as well as the daily museum practice for the preservation of these cultural objects.

Both versions of the survey indicate a substantial need for more research into active and preventive conservation. This happens to be the main goal of the project ‘Glossy Surfaces’.

Also, there is a lot of interest in material identification, however the identification of TPU and PVC-P coated objects is not an easy task. The Project’s “Damage Atlas” will thus be a helpful tool, as almost half of the respondents were not familiar with the chemistry and degradation of these materials.

The need to test wrapping materials has come out as one of the most urgent matters to investigate, as the use of improper wrapping materials has been one of the causes most often mentioned by the respondents as the reason some coated-objects ware considered total losses.

This survey gave more insights into the needs of collections with these types of objects. It confirms that the project we are working on is truly relevant and necessary. With the continuation of this project, we will be able to give more insights into the needed research areas. Additionally, there were a lot of positive reactions and connections with new possible partners to the project.