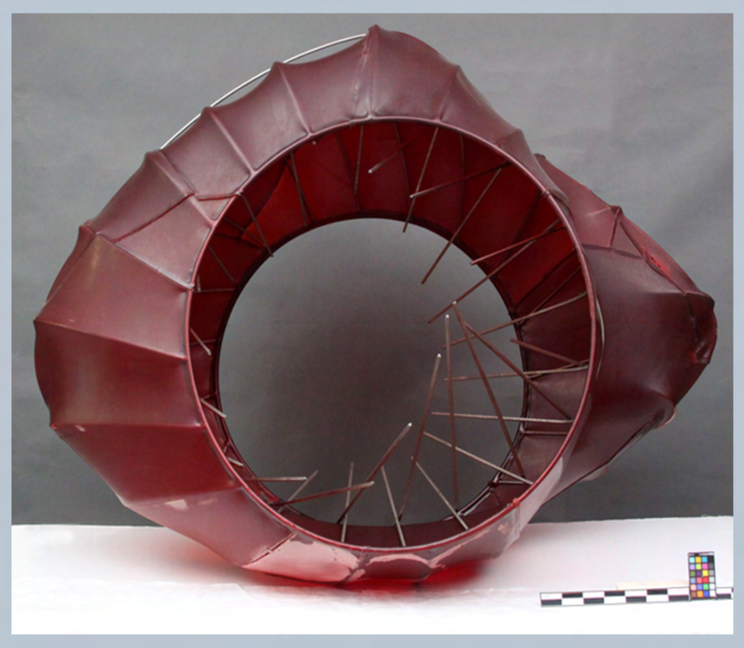
Investigations in the conservation of an art piece with stretched rubber latex

Julia Sawitzki



Axel Anklam's "shine", 2006

Introduction

"shine" is a sculpture by Berlin artist Axel Anklam, which dates from 2006. It consists of a stainless-steel frame structure with a membrane-like covering made of weakly cured natural rubber. Its red colour was created by a mixture of monoazo dyes dissolved in water and added to the liquid rubber latex, before pouring it out to dry and cure. The delicate frame structure in combination with the translucent, coloured covering creates a dynamic, glowing effect.
The sculpture is part of the art collection of the European Patent Office, Munich, and exhibited in one of the office buildings of the former Pschorr-Höfe. Through contact with Axel Anklam, the materials used and the artists supply source could be determined. To get further information about the composition and degradation, the covering was examined closely and analysed with Fourier-transform infrared spectroscopy (FTIR) and a scanning electron microscope with energy dispersive X-ray spectroscopy (SEM-EDX). Since natural rubber is in most cases not very resistant to aging and the sculpture has been consistently exposed to light, the covering shows advanced degradation caused by photo-oxidation. The latter combined with the constant mechanical stress of the tension of being stretched over the metal frame resulted in strain induced holes, cracks or yellowing. Hardening and softening of the covering can be observed simultaneously. Furthermore, oxidative processes partially lead to surface crazing, turning it white and opaque.

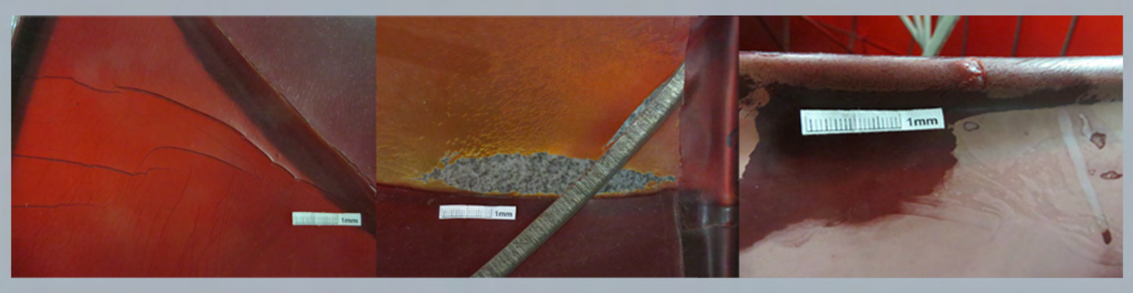
Aims

1) **Documentation** of the artwork

2) Analysis of the **materials used** and investigations concerning the **degradation**

3) Discussion of possible **conservation treatments** and recommendations for **preventive conservation**

4) Investigations concerning **subsequent stabilization** of coloured, stretched natural rubber with the phenolic antioxidant Irganox® 1520 L



Deterioration signs due to photo-oxidation and strain: cracks, hole, yellowing and surface crazing

Materials and Composition

Metal structure:

- V2A-steel: a rust-free stainless steel with good mechanical properties and an excellent corrosion resistance over a large temperature span
- Used in two modifications: industrial round steel and plasma cut bars
- An electrical mending process was used to fixate the structure.

Natural rubber covering:

- Pre-cured liquid rubber latex stabilized with ammonia, used for the production of the natural rubber covering and as a glue for the fixation
- Colourant: red, water soluble wood stain by Clou®
- Indeterminable antioxidant
- Silicone oil to prevent the natural rubber films from sticking together during storage

Investigations in the subsequent stabilization of coloured, stretched rubber latex with Irganox® 1520 L

Four specimens (L1, L3, L4, L5) with a similar composition to the artwork and natural rubber strips with defined strain were artificially light-aged in a xenon test chamber for 39 days. Some of the test objects were subsequently stabilized with Irganox® 1520 L emulsified in water:

L1: **not** stabilized

L4: stabilized **before** the artificial aging

L5: stabilized **after 13 days** of artificial aging

L3: stabilized **after 26 days** of artificial aging

Before, in between and afterithe test periods, the specimens were examined and analysed with FTIR-ATR spectroscopy, UV-VIS measurements, light microscopy and swelling tests to detect changes of the test objects' properties and aging characteristics.

Specimen L5 before (left) and after (right) artificial light-aging

Results and Conclusion

The experimental set-up revealed that a subsequent stabilization of stretched rubber latex with antioxidants does not support the material's preservation. One of the main issues is the swelling that is necessary for the antioxidant to migrate into the natural rubber to form a near-surface protective layer against oxidative processes: it weakens the already deteriorated material. The method holds various risks and can cause more harm than good. Further research in different directions is necessary to develop new ways to preserve natural rubber objects.