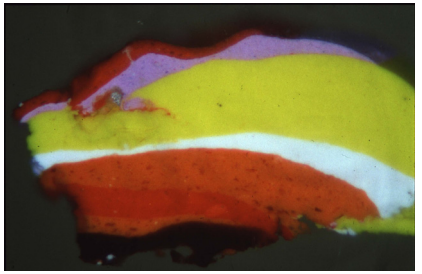


A cross section of paint from 'Interior with a Picture', Patrick Caulfield, 1985-6, acrylic emulsion on canvas

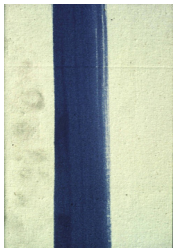
Tate AXA Art Modern Paints Project

Evaluating the Effects of Cleaning Acrylic Paintings

Bronwyn Ormsby[1], Tom Learner[1] and Thomas Wessel[2]
1. Tate 2. AXA Art

Detail from 'Saracen', John Hoyland, 1977, acrylic emulsion on canvas

Potential concerns from cleaning acrylic emulsion paints



- Paint film softness
- Solvent sensitivity
- Easily swollen by aqueous systems
- Ingrained dirt and fingerprints (*see image*)
- Extraction of soluble components
- Surface changes: uneven gloss, tide lines
- Burnishing
- Unknown long-term effects
- Lack of training

Methodology

Sample preparation – > 600 samples prepared
Four brands, four pigment types and gesso, gloss and diluted

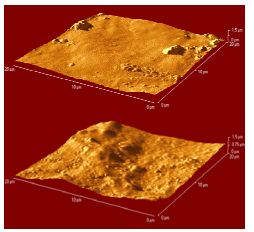
Assessment of paints after cleaning and ageing:

PHYSICAL properties:
flexibility, stiffness, response to RH
CHEMICAL properties:
surface chemistry, extracted material
OPTICAL properties:
colour, gloss, surface morphology

Findings from previous research

- Acrylic emulsion paints are flexible and degradation-resistant with accelerated ageing compared to oils and alkyds
- Acrylic emulsion paints are very responsive to changes in temperature and RH
- Swabbing with aqueous systems removes surface surfactant, but has little effect on physical properties
- Cleaning with non-polar organic solvents does *not* remove surfactant from the paint surface or bulk film
- Removal of bulk film surfactant (by immersion in polar solvents or thermal ageing) renders paints less responsive to moisture, with increased film stiffness and decreased flexibility
- Visual changes caused by surface cleaning are minimal, with only some potential for minor changes in gloss

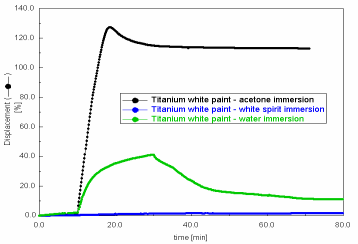
OPTICAL: AFM
Removal of surfactant layer



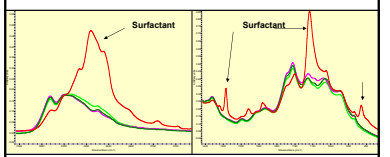
Control

Water immersed for 2 hours and dried

PHYSICAL: IMMERSION DMA
Swelling in polar solvents



CHEMICAL: FTIR-ATR
Surfactant removed by aqueous cleaning and accelerated ageing



Red = naturally aged control
Pink = light aged
Light Green = 1m water swabbed
Dark Green = thermal aged

Aims for TAAMPP

- Cleaning efficacy – dirt removal, assess effects using model paints
- New/improved cleaning methods – non-polar, aqueous systems, dry methods, new developments
- Case Studies – Evaluate the cleaning of 5 acrylic emulsion paintings in Tate collection
- Soiling – explore relationship between surfactant layers and soiling; surfactant removal and soiling
- Evaluate cumulative effects – multiple treatments, ageing, monitoring of surfactant layers over time with treatment
- General properties – swelling, permeability, surface morphology, mechanical testing, identification of extracted materials

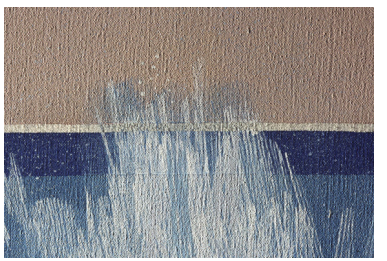
Research benefits

Preventive Conservation

- Further clarification of long term effects of surface cleaning treatments and ageing on properties;
- Exploration of dirt deposition and retention will help prevent soiling
- Understanding of how surface cleaning affects re-soiling

Practical Conservation

- Assessment of cleaning efficacy enables conservators to choose and modify cleaning systems
- New treatment options to tackle some of the difficult cleaning issues
- Case-studies will take research directly to practicing conservators



Raking light detail 'A Bigger Splash', David Hockney, 1967, acrylic emulsion on canvas

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