# Investigation of Materials and Deterioration of Michael Snow's *Flight Stop*

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## Introduction

*Flight Stop* is a sculptural installation by artist Michael Snow located at the Eaton Centre in Toronto. The installation is composed of life-sized sculptures of geese that have deteriorated over time. This degradation includes delamination, blanching, and chalking of the surface layers of the geese. The installation was recently treated by Toronto Art Restoration, Inc. (TARI). Using samples taken from sculptures of the installation displaying various levels of degradation, this research determined the structure and materials of the layers and identified likely reasons for degradation thus providing knowledge for future treatment of this and other similar objects.

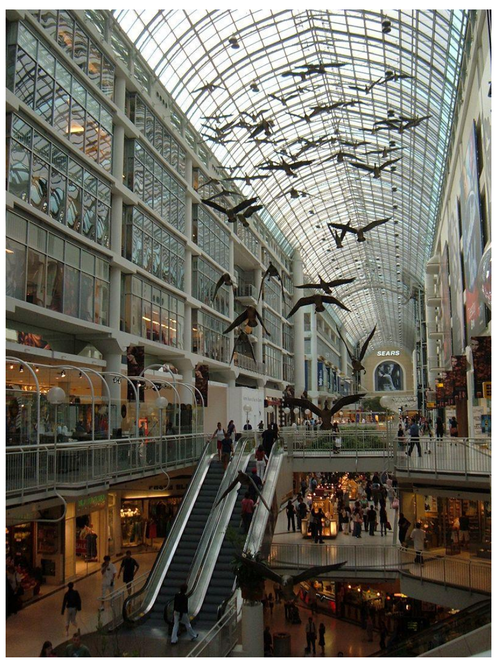

*Figure 1.* Image of *Flight Stop* installation at the Eaton Centre in Toronto, ON. Courtesy of Wikipedia.

*Figure 2.* Image of goose 26B. Courtesy of TARI.

*Figure 3.* Image showing the chalking present on goose 26B. Courtesy of TARI.

*Figure 4.* Image of the delamination present on goose 6A.

## Experimental

Three geese from *Flight Stop* were chosen as representative samples of the sculptural installation. Samples were removed with scalpels from goose 6A, 11A, and 26B, as marked by conservators in the treatment process. Three samples were taken from each of the geese for a total of nine samples.

**Table 1. Description of Samples Taken From *Flight Stop***

| \ | Goose | Sample Location | Color | State of Degradation |
|---|---|---|---|---|
| 1 | 6A | Bottom of the foot | Multicolored, mainly brown with yellow, green, and black variations | Delaminating from the surface, no blanching or hazing |
| 2 | | Recto of the right wing | Yellow green | Good condition |
| 3 | | Recto of the right wing | Multicolored, yellow with areas of black | Good condition |
| 4 | 11A | Recto of the left wing | Brown with black variations | Delaminating, no blanching or hazing |
| 5 | | Recto of the left wing | Brown, black, yellow-green | Delaminating, no blanching or hazing |
| 6 | | Recto of the right wing | brown | Good condition |
| 7 | 26B | Recto of the tail | brown orange | Blanching visible |
| 8 | | Recto of the tail | brown | Blanching visible |
| 9 | | Recto of the back between the wings | grey | Powdered, heavily degraded |

## Results and Discussion

### Infrared Spectroscopy

Layer Structure

Epoxy resin coating
- Based on diglycidyl ether of bisphenol A with amine hardener
- Silica gel present in some samples

Cellulose nitrate
Gelatin
Phenolic resin
Paper
Adhesive resin
Additional adhesive
- some samples show evidence of previous delamination and re-adhesion

### Cross Section Analysis

Layer Structure

1 & 2. Two layers of clear, non-fluorescent material
3. Non-fluorescent layer
4. Slightly fluorescent clear layer
5. Non-fluorescent layer, likely the image layer
6. Fluorescent layer, contains optical brighteners
7. Clear layer adhered to the fiberglass resin shell

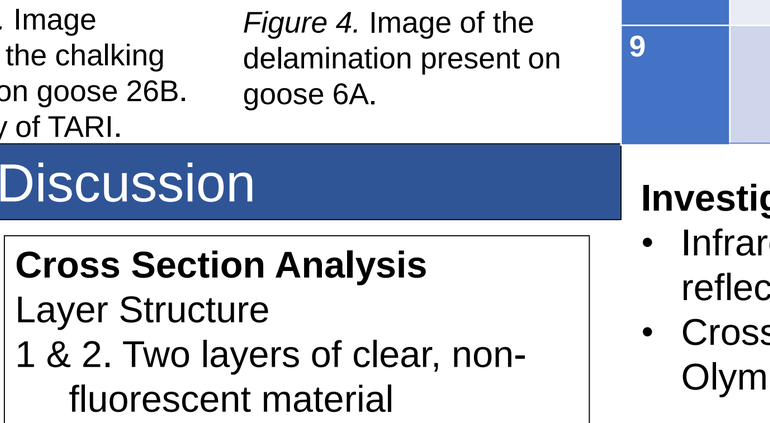


*Figure 5*. Cross section of Sample 1 viewed with reflected light (left) and wide UV excitation (right) under 20x magnification with layers labeled.

### Investigative Techniques

- Infrared spectroscopy: Nicolet iS5 spectrometer, iD7 attenuated total reflectance (ATR) attachment.
- Cross section analysis: Leica DM750P microscope, Leica ICC50 camera; Olympus BX51 fluorescence microscope, Olympus DP72 Camera.

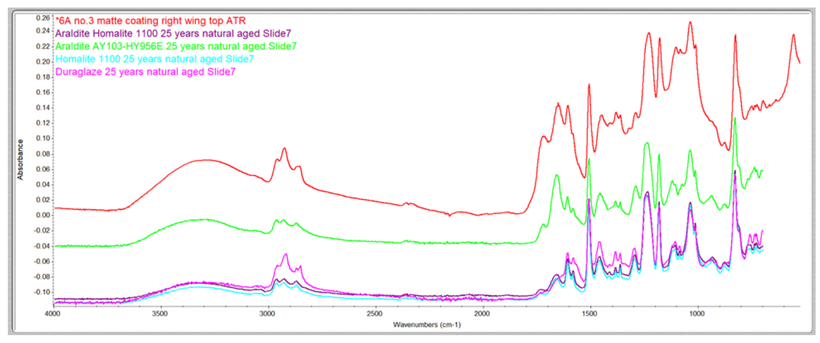


*Figure 6.* FTIR spectrum of Sample 2 (red line) compared to spectra of various epoxy resins. Courtesy of Scott Williams.

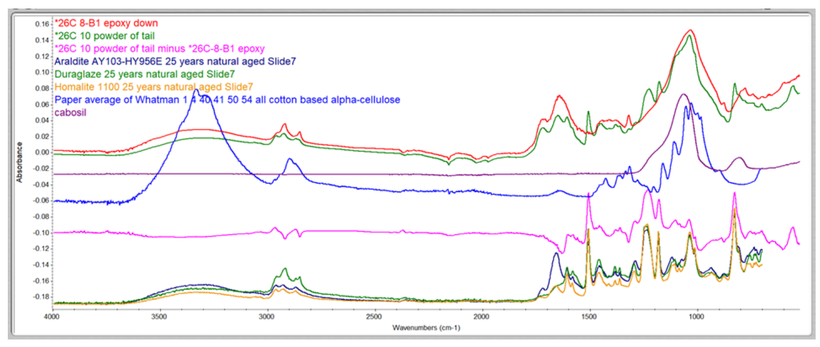


*Figure 7.* FTIR spectra of Samples 8 (red line) and 9 (green line) compared to spectra of various epoxy resins as well as silica gel. Courtesy of Scott Williams.

## Conclusions

- Layer structure of each goose is composed of an epoxy resin coating, photographic layers, and adhesives on top of the fiberglass base.
- Visible degradation of samples is mainly noted in the epoxy resin layer.
- Delamination and powdering likely related to light and heat aging.
- Greater degradation noted in geese which are located closer to the glass ceiling in the installation could be due to environmental effects or composition differences.

## Selected References


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