Experience with Dust Measurements in Three Dutch Museums

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Objectives

• NOT to define what “too much dust” is

• Development of a simple method for monitoring dust accumulation, e.g.:
  - before, during, and after construction
  - visitor impact

• Assist in defining what “too much dust” is
Museum Gevangenpoort and Galerij Prins Willem V

http://www.gevangenpoort.nl/
Gevangenpoort/Galerij Willem V
National Museum of Ethnography
Leiden
Dust monitoring technique

(Gevangenpoort)

Change of gloss

Area coverage; chemistry
Glossmeter

$\Theta = 20, 60, 85^\circ$
Measurement of change in gloss

- **Rate of change** in gloss: horizontal and vertical surfaces; paintings = varnished (vertical) surfaces

- How and how often?
  - Slides cleaned with “dust-free” cloth
  - Once a week/month with “new” glass slide
  - “Permanent” slides (once in several months)

- Statistics?
  - Slides cleaned with “dust-free” cloth
  - Reusing slides
Measurement of coverage area and chemistry

- Use of standard carbon stickers in SEM
- Semi-automated EDS analysis of particles
- Image J area analysis of standard area on sticker
(15 photo’s at 200x)
Gevangenpoort

5 rooms, open air, regular tours
Galerij Prins Willem V

5 positions, empty, no visitors, air conditioned
National Ethnografic Museum Leiden

various positions throughout museum, inside and outside showcases

air conditioned, spotlights
Willem V pos 1 85H

Fraction change in gloss (cum)

Number of days

painters in hall

razing
Gevangenpoort Pos 4 85H

Fraction change in gloss (cum)

Number of days

razing
Gevangenpoort Pos. 4

Number of days

Number of particles (cum)

Concrete
Iron
Gypsum
Chalk
Clay
Sand
Salt
Gevangenpoort Pos 5 85H

Fractie verandering in glans vs Aantal dagen

instituut collectie nederland
Gevangenpoort Pos. 5

Cumulative area coverage vs Number of days
Some Preliminary Conclusions

• Gloss measurements appear to be useful as simple method for monitoring dust collection rates

• Air conditioned museum: dust brought in by people (Leiden)

• Relationship between inside and outside (Willem V)?

• Additional chemical analyses required for “open-air” museums / “aggressive” situations (Gevangenpoort, Willem V)
What is “too much dust”?

• Definition of “too much dust” is subjective and is NOT DIRECTLY measurable
• Relate subjective definition to measurable quantity (e.g. rate of accumulation to given amount)
• 3% loss of gloss in historic house (textiles) = major cleaning
• 0.2% area coverage by dark particles on white background is “noticeable”
• 33% loss of gloss on gray metallic shelf = not visible until object was removed (Leiden)
Work to be done

• Direct relationship between rates of change in gloss and area coverage (simple monitoring)

• Indirect relationships between rates of change in gloss, area coverage, and chemistry

• Statistics