

# Fragile Roofs: Skylights/Rooflights

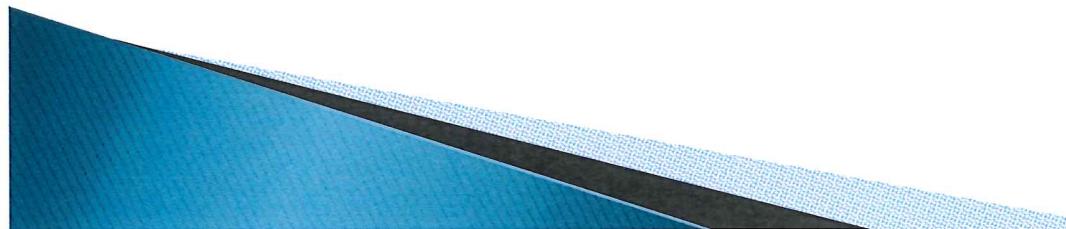
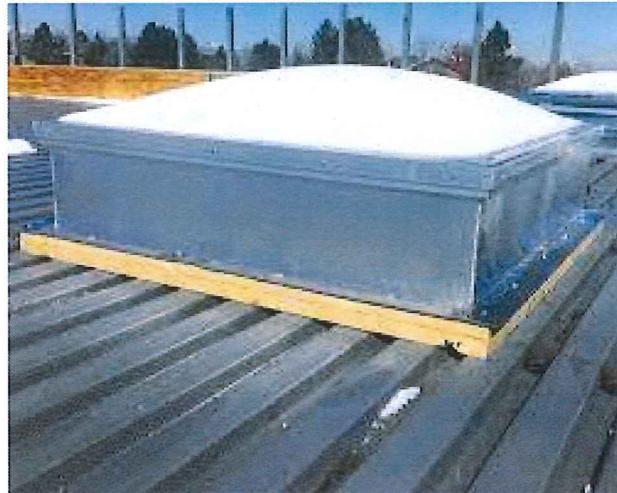
## The future of Plastic domes

J. Nigel Ellis  
Ellis Fall Safety Solutions LLC  
Wilmington, Delaware

Falls: The Way Forward  
London 4–5 October 2016

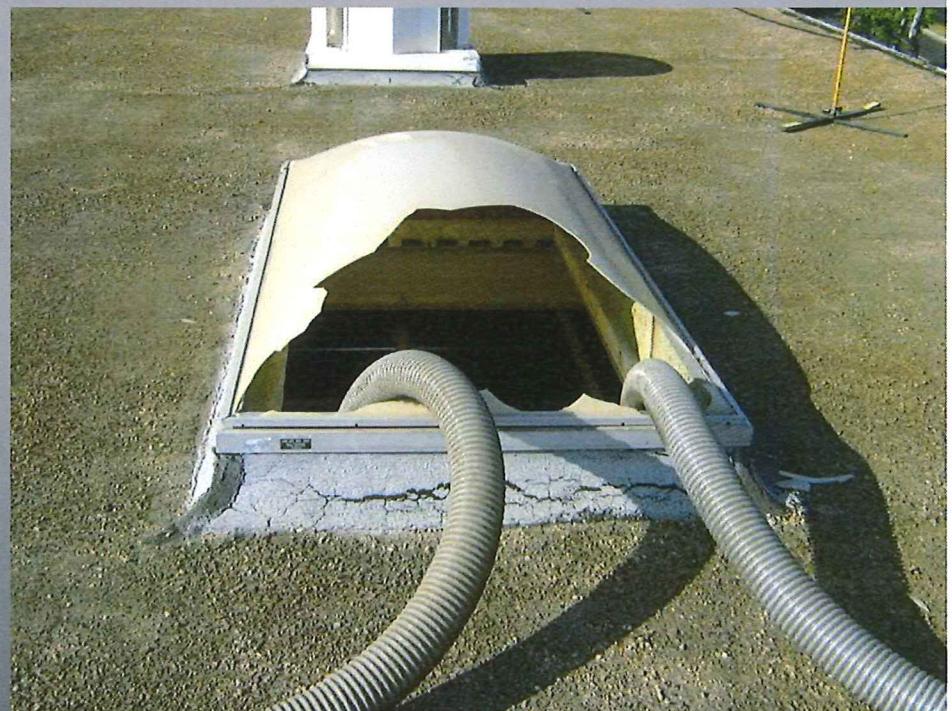
# Plastic Skylights

- ▶ Public at risk 5–20+ years:



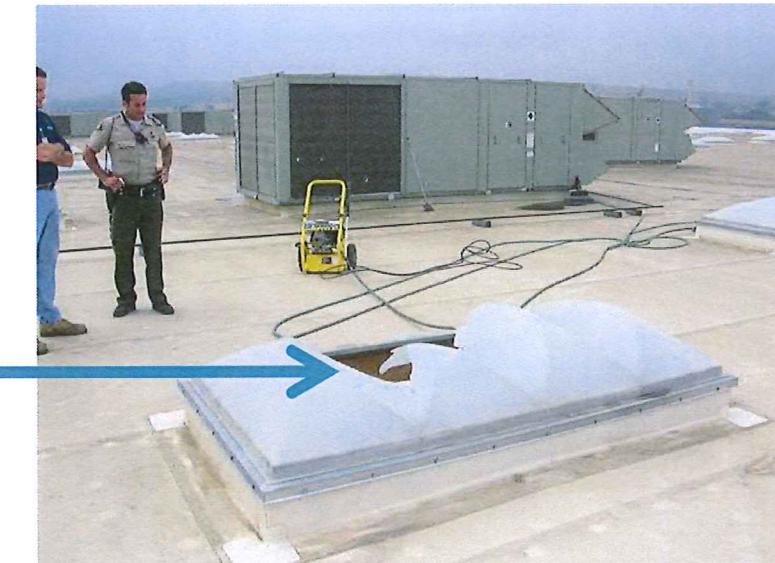
# Plastic Skylights break under Human Weight

Often tripping while pulling hoses or electrical cords

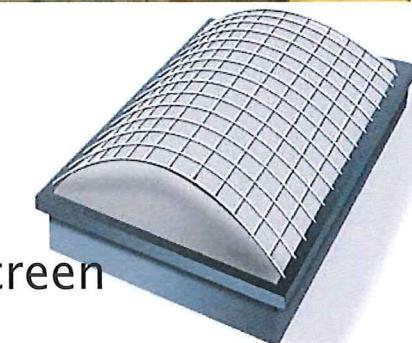


Results are usually fatal from falls up to 30 ft  
Fatalities 25/year in USA (BLS/USDOL)

# Backward falls are lethal, even for new plastic skylights



Screens available from skylight  
mfrs to install over 4'x8' dome



# Ultra violet Degradation of Plastics

## Weathering (Florida, Arizona)

Warranty 5 years typical product  
usually acrylic or polycarbonate

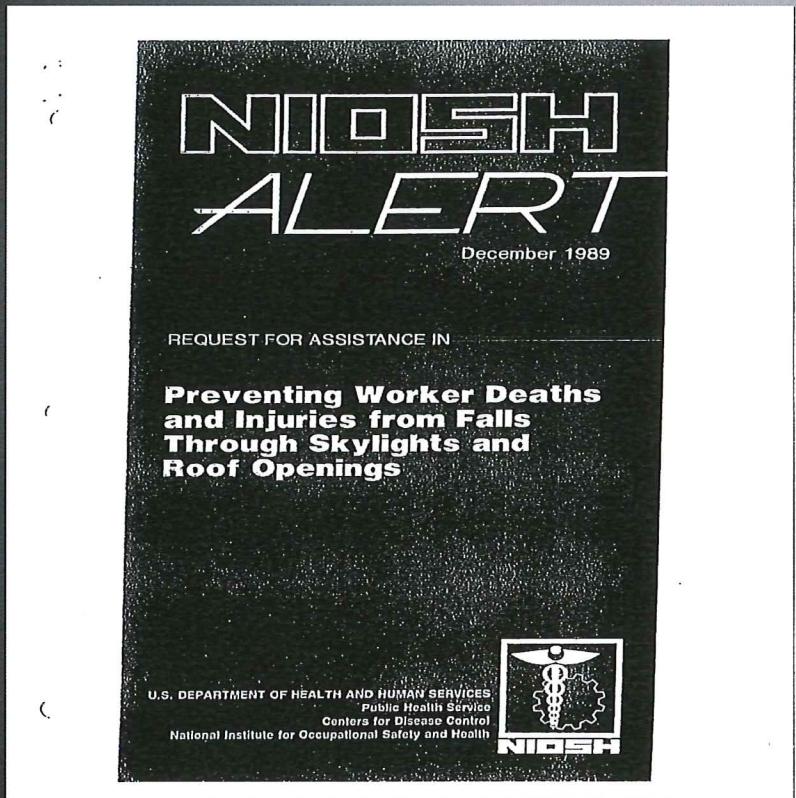
Goal 20 years for a roof including  
component parts (JNE)

Miami Dade weathering test: 5 yrs FL exposure or  
4500 hours Xenon arc exposure

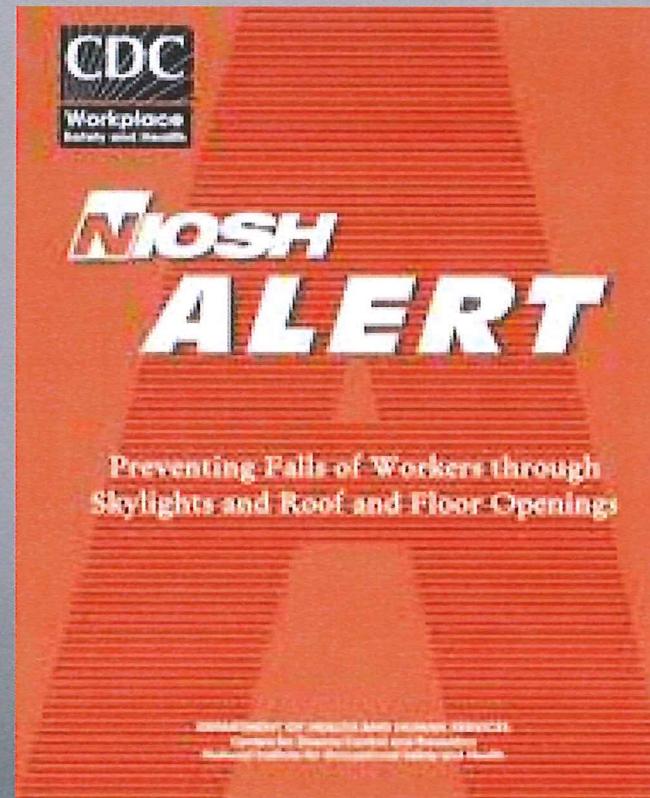
Concern for 28 trades safety  
plus firefighters

DHHS (NIOSH) Publication No. 90-100 DHHS (NIOSH) Publication Number 2004-156

# NIOSH Hazard Alerts



December 1989



August 2004

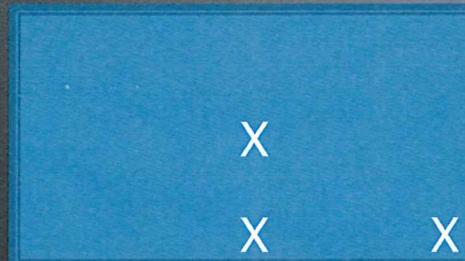
National Institute of Occupational Safety & Health

# Testing Skylights for human safety

## ASTM E06.51.25 Skylight Human Impact

300 lbs lead weights dropped 3x  
through 3 ft at center, corner and  
edge of a skylight (or smoke-vent)

300 lbs bag  
10" dia



# Plastic Skylight Solutions

Use Steel Screens

Use Guardrails

Use Nets (temporary)

Use Laminated Glass/no screen

Fire resistance

Hail resistance

Hurricane resistance



# Fragile Roof Possible Solutions

Increase dome thickness of plastic (UK) to slow degradation

Add second plastic sacrificial lens (USA Draft Std ASTM E06.51.25 extends life)

Eventually all plastic skylights will crack: Do not use plastic for dome, use laminated glass eg VTech bonded aliphatic polyurethane

Use metal screens for all plastic skylights (outside or inside dome and hailstone protection)

# Double Dome Skylight

“Outer dome protects inner dome”  
Q: For how long?  
Should failure cause a death?

