Learning Objectives

- Review initial signs of mortar failure
- Discuss typical moisture management of masonry veneer wall assemblies
- Discuss approach for assessing friable mortar and loose brick
- Identify potential failure mechanisms in a lab building with elevated interior humidity levels
First Signs of Failure

- Friable mortar required investigation and intervention within 6 years of construction (2014)
First Signs of Failure

- Masonry and mortar
- Coping cover
- Flashings
- Continuous Air and Vapor Barrier
- Insulation

Moisture Management Components
Moisture Management Components

- Masonry and mortar
  - Brick – porosity
  - Mortar – porosity, mix design, water/cement ratio, bond line

Moisture Management Components

- Coping cover (components)
  - Continuous
  - Projections
  - Terminations
  - Materials
Moisture Management Components

- Flashings (components)
  - Water pathways
  - Terminations
  - Projections
  - Tie-ins at windows and various wall profiles

Moisture Management Components

- AVB (components)
  - Continuity
  - Material
  - Substrate
  - Humidity
Typical Moisture Management Components

- Insulation
  - Continuity

Assessment of Friable Mortar and Loose Brick

- Visual survey
  - Identify patterns
  - Locate potential inspection openings

- Inspection openings
  - Representative locations with and without distress
  - Back to AVB
  - At penetrations, terminations, flashings

- Laboratory testing
Visual Survey

[Images of exterior building damage]

Visual Survey (Interior)

[Images of interior building damage]

WJE Solutions for the Built World
Inspection Openings

- Water Behind AVB
Inspection Openings

- Warm air in cavity (fogged camera lens/mirror)

![Image of warm air in cavity](image1)

- No deterioration observed

![Image of no deterioration](image2)
Laboratory Testing

- Microscopic examination of mortar and brick
- Mortar compositional analysis
- Physical testing of brick

Failure Mechanisms

- Breaches in AVB
- Excessive liquid water penetration
- Improper detailing of water management cladding elements
- High interior relative humidity
Next Steps

- Additional targeted investigation
- Reclad or partial reclad
- Who is responsible?