DETERIORATION OF ARCHITECTURAL MATERIALS

Lecture 10
Evidence of capillary action/rising damp in a masonry wall found on a cinder block building (1940s) in the Winter Park suburb of Wilmington, N.C.
Evidence of capillary action/rising damp seen at the base of a chimney of a house in the Winter Park suburb of Wilmington, N.C.
Evidence of capillary action/rising damp in the wooden doors of the Pittman and Whitaker Store in Whitakers, N.C.
Efflorescence on the surface of a masonry surface on the steps at Stone Environment Sciences Building on the campus of UNC-Greensboro
Deteriorated mortar joints in a retaining wall at the northwest side of the Cotton Exchange complex at Wilmington, N.C.
Four phases of construction can be identified in this wall at the Cotton Exchange in Wilmington, N.C. The upper courses of brick are spalled. The brick and stone below it have deteriorated mortar joints.
This is a stress crack the northwest corner of the old Tileston School in Wilmington, N.C.
A vertical, structural crack in the east wall of the south bell tower at Saint Mary Church in Wilmington, N.C.
Another view of the same structural crack
These bricks at the Tileston School have been selectively repointed.
This granite wall at the site of the Wilmington & Weldon Railroad Depot at Wilmington, NC shows signs of exfoliation (also cracks and iron stains).
Deteriorated/ damaged glazed terra cotta tiles in the ceiling of the roundhouse at the Transportation Museum at Spencer. N.C.
This limestone surface of this bank building in Whitakers, N.C. is covered with sulfate deposits.
The left side of the overhanging roof on the front of this abandoned store in St. Helena, N.C. is sagging.
The metal roof on this abandoned dwelling in rural Halifax County, N.C. was damaged by a fallen tree.
Deteriorated/damaged slate roof on the Elm City Depot at Elm City, N.C.
Deteriorated/damaged wood siding on the Calypso Depot on US 117
Lapboard with “raised” grain on a garage in New Hanover County, N.C.
Deteriorated/damaged plaster found on the ceiling of the privy at Körner’s Folly at Kernersville, N.C.
Deteriorated/damaged wooden window sash inside a dwelling in the Winter Park suburb of Wilmington, N.C.
The door on the left in this photograph of the Elm City Depot is deteriorating more so than the door on the right.
Failing paint film on the wood railing of a balcony on a dwelling in Wilmington, N.C.
Failing paint film on an iron girder at the Pittman and Whitaker Sore in Whitakers, N.C.
Copper downspout with an oxidized patina on St. Mary Church in Wilmington, N.C.
Brass hardware discolored from use on a door at St. Mary Church
The floor of this porch was damaged from dampness rising through the masonry and sill.
The tile at the entrance to the Elm City Bank is good shape considering its age (1920s). It has lost tiles at its edges and the left corner of the threshold.
WHAT CAUSES DETERIORATION

- Water infiltration
- Differential expansion
- Sun and wind exposure
- Structural failure
- Shifting or undermined foundation
- Acid rain
CONT.

- Plant growth
- Fungus
- Improper drainage
- Oxidation
- Mechanical stress
- Insects
CONT.

- Fire
- Improper maintenance
- Vandalism
- Abandonment
- Deferred maintenance
- Flood
SOCIAL COST

- Urban blight/rural decay
- Decreased home values in neighborhood
- Fire hazard
- Public safety hazard
- Breeding ground for pests
- Lost tax revenue/private sector profits
RESPONSIBILITY OF THE PROPERTY OWNER

- Identify deterioration before it gets out of hand
- A program of routine maintenance
- Structures must used or occupied to prevent decay
- Moisture control
- Routine examination for pests
- Insurance
HEALTH HAZARDS

- Lead base paints
- Arsenic in wood preservatives (old wood)
- Mercury in paints (anti-mold agent)
- Formaldehyde in glues
- Asbestos
- Solvents
- Allergens
WORST PESTS

- Termites
- Roaches (they will destroy electronics)
- Rats and mice (other rodents)
- Fleas
- Bed bugs
- Dust mites
- Lice
OTHER HOUSEHOLD HAZARDS

- Piles of rotting wood
- Motor oil and gasoline
- Kitchen cleaners
- Garbage and clutter
- Animal waste
- Old car batteries, tires, and fluids
- Kitchen waste
THE DELL SCHOOL

An example of structural failure
ROOF DESTROYED
OVERGROWN WITH VINES
VEGETATION STRUCTURAL WEAKENING
ABANDONED IN THE 1970S
BEGINNING AS A BAPTIST SCHOOL IN DELLWAY, N.C.
ONCE A LARGE COMMUNITY
THE SCHOOL SUPPORTED THE LOCAL ECONOMY
BUILT IN 1912
CLASSICAL REVIVAL
WAS THEN THE DELLWAY TRADING COMPANY
THEN A CLINIC FOR SAMPSON COUNTY
ROOF DAMAGED BY HURRICANE FRAN
ANOTHER VIEW
METAL ROOF
NO SHEATHING BETWEEN RAFTERS AND METAL
MIDDLE SECTION COLLAPSED
PINE TREES
CAUSES OF STRUCTURAL FAILURE

- Neglect
- Breach of the roof (water damage)
- Wind damage
- Vegetation
- Progressive collapse
- Failure of wooden structural members
DISCUSSION QUESTIONS

- What are the underlying causes of neglect?
- Is the Dell School significant?
- What would have been the best course of action after the roof was breached?
- What should be done now?
- Did you notice any flaws in the building’s construction?