Extending Building Lives

Georgia Chapter of APPA
Extending Building Lives

Typical wall materials and assemblies
- Mechanisms of weathering and deterioration
- Best Practices: maintenance & renovation
Extending Building Lives

• How long?
• Challenges?
  • $$$
HOW LONG IS LONG  ???????????
How many $$
How many $$

Cost/ SF

$0.00 $50.00 $100.00 $150.00 $200.00 $250.00 $300.00 $350.00 $400.00

0 SF 10,000 SF 20,000 SF 30,000 SF 40,000 SF 50,000 SF 60,000 SF 70,000 SF 80,000 SF 90,000 SF
<table>
<thead>
<tr>
<th>Construction</th>
<th>vs.</th>
<th>Maintain/Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>site clearing</td>
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<tr>
<td>excavation</td>
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<tr>
<td>foundations</td>
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<tr>
<td>superstructure</td>
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<td>shell</td>
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<tr>
<td>cladding</td>
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<td></td>
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Construction

Dollars spread far

Steel – China

Windows – Wisconsin

Aluminum – S. America

Manufactures – USA
Construction vs. Maintain/Repair

Dollars spread far • Dollars stay in town

Steel – China
Windows – Wisconsin
Aluminum – S. America
Manufactures – USA
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<tr>
<td>50% labor</td>
<td>•</td>
<td>70% labor</td>
</tr>
<tr>
<td>50% materials</td>
<td>•</td>
<td>30% materials</td>
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</tbody>
</table>
Who Cares?
Who Cares?

- no excavation
- no structure
- local dollars
- local labor
- local economic stimulus
- lower carbon footprint
Who Cares?

no excavation
no structure
local dollars
local labor
local economic stimulus
lower carbon footprint

• More Bang for Your Buck!
Extending Building Lives

typical wall materials & assemblies

mechanisms of weathering & deterioration

best practices
masonry
joint sealants
glass
paint
Masonry

- solid bearing wall
- cavity bearing wall
- veneer over infill
- veneer over studs
Solid Bearing Wall

- massive
- thick walls
- sponge – barrier
- evaporation
- cracks – capillaries
Reduced Evaporation

- interior/exterior coatings & sealers
- Portland cement
Reduced Evaporation

- interior/exterior coatings & sealers
- Portland cement
- water intrudes - cannot evaporate
- impervious coatings
- water-sensitive gypsum plaster
Best Practices

- no exterior coating
- highly breathable exterior & interior coatings (mineral silicate)
- high-lime mortars and pointing
- avoid indiscriminate “sealers”
Cavity Bearing Wall

- massive
- thick walls
- open cavity
- evaporation
Veneer

- one wythe, mechanically anchored
- clear cavity
- drainage
- evaporation
Veneer Problems

- cavity clogged with mortar
- flashing breached
Best Practices

- Avoid mortar mesh products
- Insist on clean, clear cavities
- Restore clear drainage
- Flashing integrity
Steel Corrodes
Best Practices

- remove masonry
- clean steel
- corrosion protect
- new flashing
- install masonry
Veneer

- steel wire anchors
- median life to red rust = 37.5 yrs.
Veneer

- steel wire anchors
- median life to red rust = 37.5 yrs.
- 127 buildings
Masonry Joint Issues

- masonry cracks
- mortar erodes
- masonry cement bond issues
- masonry moves
- masonry expands
Masonry Moves
Masonry Moves
Best Practices

- diagnose the problem
- fix the underlying problem
  - fix the symptoms
Masonry Joint Repair

caulk is temporary

clear “sealers” (water repellants) are a tool, not a cure
Masonry Joint Repair

- Caulk is temporary
- Clear "sealers" (water repellants) are a tool, not a cure
- Accurately diagnose the root cause
- Solve the cause
- Repoint the joints
- Make it whole
- Make it like-new
- Match the existing
Re-Pointing

- wrong mortar material
- wrong pointing tools
- wrong workmen
- wrong architect
Masonry Repointing

Wrong:
use a bag of mortar mix
Masonry Repointing

Wrong:  
• use a bag of mortar mix

Right:  
• understand the existing mortar
• clean the masonry first
• match the existing mortar
• train the masons
Masonry Efflorescence

- Water enters, moves through, and exits
Best Practices

- Stop the water entry
- Clean the surface
- Buffered chemical cleaners
Water Intrusion

- trapped by impervious surfacing
Water Intrusion

- buttress unprotected horizontal ledge
Water Intrusion

- roof leak at valley flashing
Best Practices

- restore evaporation
Best Practices

- restore evaporation
- prevent absorption
Best Practices

- restore evaporation
- prevent absorption
- fix the leak
Joint Sealants

- urethane
- silicone – 3 x’s life
Best Practices

- full mechanical abrasion
- apply top-quality silicone
Best Practices

- full mechanical abrasion
- apply top-quality silicone
- decades of life vs. early failure
Glass / Aluminum Framing

glass & aluminum: eternal
IGU seals: 5-40 yrs?
gaskets: 5-40 yrs?
anodizing: variable
paint: 7-10 yrs
Kynar: 20+ yrs
perimeter sealant: 7-30 yrs
Glass / Aluminum Framing

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aesthetics
energy efficiency
Best Practices

glass & aluminum:
- eternal
IGU seals: 5-40 yrs?
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- reglaze
- replace/reglaze/wet seal
- field-apply FU coating
- ditto
- ditto
- reseal
Operable Windows
Operable Windows

- repainting
- glazing compound
- weatherstripping
Best Practices

- best quality paint
- weatherstripping
- storm windows
Paint

- type
- quality / cost
- life
- surface prep
- labor to apply
- cost
Paint

- type
- quality / cost
- life 2 ys - 20 ys - ?
- surface prep
- labor to apply
- cost
Paint

polyvinyl-acrylate (latex)
100% acrylic (latex)
alkyd

epoxy & urethane (water-borne)

epoxy & urethane (2-part)

- emulsification
- emulsification
- solvent evaporation / oxidation
- self emulsifying / self cross-linking // dispersion
- fully catalyzed
Paint cost / gallon

- polyvinyl-acrylate (latex) • $8 - $18
- 100% acrylic (latex) • $18 - $28
- alkyd • $15 - $30
- epoxy & urethane (water-borne) • $25 - $50
- epoxy & urethane (2-part) • $30 - $90
- epoxy & urethane (2-part) • $120 - $180
Paint Life to Recoat

• 2 years
• 12 years
• 20 years
• more?
# Applied Cost

<table>
<thead>
<tr>
<th>Material</th>
<th>Labor</th>
<th>Access</th>
<th>Total</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.10</td>
<td>$0.90</td>
<td>-0-</td>
<td>$1.00</td>
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## Applied Cost

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<td>$0.90</td>
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<td>$0.19/yr</td>
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<td>$0.90</td>
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<td>$1.20</td>
<td>$0.13/yr</td>
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Best Practices

• best paint money can buy

• adequate surface preparation
Surface Preparation - Labor
Best Practices

- clean and dry
- tightly adherent
- surface “tooth” or profile
Back to Grade School

- A+
- A
- B
- C
- D
- F
SCAD – Old Freight Depot / Museum of Art
SCAD – Old Freight Depot / Museum of Art
Georgia Military College - Old State Capitol
University of Georgia – Candler Hall
QUESTIONS?
thanks for coming!