Economic Evaluation of EIFS Energy Retrofit

Jennifer Keegan Kovach, Western Waterproofing
John Edgar, Sto Corp.
Jordan Ruzz, PE

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Outline

- Introduction
- EIFS – brief history
- Life Cycle Costing - Maintenance costs
- Lido Beach Towers retrofit (salvation)
- Energy savings
EIFS Brief History

- EIFS
- Energy conservation
- Aesthetics
- Water intrusion
- Drainage and air barriers
- Energy conservation

Sun Peaks Resort, British Columbia, Canada
Microphone switch

JENNIFER
EIFS Maintenance
Staining and Growth
Cleaning and Recoating

Sto  Building with conscience.
Sealant Joint Failure
Window Perimeter Sealant
## EIFS Life Cycle Analysis

<table>
<thead>
<tr>
<th>EIFS Maintenance Cycle and Cost</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning</td>
<td>5 years</td>
</tr>
<tr>
<td>Coating</td>
<td>10 years</td>
</tr>
<tr>
<td>Joint replacement</td>
<td></td>
</tr>
<tr>
<td>Urethane</td>
<td>5-7 years</td>
</tr>
<tr>
<td>Silicone</td>
<td>20 years</td>
</tr>
</tbody>
</table>
EIFS Repairs
Exposed Foam
Parapet Damage
Impact Damage
Impact Damage
Impact Damage
Impact Damage
Lamina Damage
Cracking in Aesthetic Joints
Inside Corner Cracks
Surface Cracks
Outside Corner Cracks
Overbanding Cracks
Resurfacing

- Can be more economic approach
  - Excessive surface cracking
  - Repetitive surface deficiency
# EIFS Life Cycle Analysis

<table>
<thead>
<tr>
<th>EIFS Repair Cycle and Cost</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repair</td>
<td></td>
</tr>
<tr>
<td>Parapet Repairs</td>
<td>$6-8/SF</td>
</tr>
<tr>
<td>Impact Damage</td>
<td>$15-20/SF</td>
</tr>
<tr>
<td>Lamina Damage</td>
<td>$10-12/LF</td>
</tr>
<tr>
<td>Surface Crack Repair</td>
<td>$4-6/LF</td>
</tr>
<tr>
<td>Outside Corner Cracks</td>
<td>$10-12/LF</td>
</tr>
<tr>
<td>Inside Corner Cracks</td>
<td>$18-20/LF</td>
</tr>
<tr>
<td>Cracks in Aesthetic Reveals</td>
<td>$4-6/LF</td>
</tr>
<tr>
<td>Obscure Dynamic Cracks</td>
<td>$14-16/LF</td>
</tr>
</tbody>
</table>
EIFS Life Cycle Analysis

Baltimore Washington Medical Center
### EIFS Life Cycle Analysis

<table>
<thead>
<tr>
<th>Life Cycle Cost Comparison</th>
<th>EIFS</th>
<th>GFRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial cost of system</td>
<td>$670,272</td>
<td>$2,228,758</td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleaning and Coating</td>
<td>$105,087</td>
<td>$32,897</td>
</tr>
<tr>
<td>Joint replacement</td>
<td>$30,000</td>
<td>$30,000</td>
</tr>
<tr>
<td>Total LCA 25 yrs</td>
<td>$805,359</td>
<td>$2,291,655</td>
</tr>
</tbody>
</table>

65% Savings
EIJS Life Cycle Analysis

More Data

- Focus on EIJS restoration in one region
- Programs to track production and costs
- Work with clients to obtain energy savings
EIFS Life Cycle Analysis

- Catalog Data
  - Previous maintenance
  - Quantity of damage
  - Extent of repairs
  - Energy savings

- Develop average life cycle cost of EIFS buildings via case studies
Microphone switch – back to

JOHN
Lido Beach Towers
Lido Beach Towers
Existing Conditions

**Construction**
- Hollow clay tile
- Poured concrete
- Coatings
- More coatings
- Single pane windows
- Air leaks
Lido Beach Towers

- Converted into condominiums 1984
- Prior repairs were cosmetic
- Gradual deterioration followed
Lido Beach Towers

Conditions

- Building in distress
- Water penetration
- Structural issues
- Increasing energy costs
- Declining property value
- Cost of repair …
- $3,000,000
  - Coatings only
Renovation

Wall assembly

- Repair of existing
- Angle at 16” on center
- Alignment angle
- 1” EPS
- Sheathing
- Moisture barrier
- 3” EIFS
Work in Progress
Work in Progress
Air Barrier at Window

Assembly

- Rough opening
- Leveling angles
- 1” EPS insulation
- Sheathing
- Air / waterproofing membrane
- Barrier membrane
- Precast Concrete sill
Work in Progress

New parapet caps
Costs

- EIFS: 100,000 s.f.
- EIFS Retrofit: $5,000,000
  - Included substrate stabilization
- Total renovation: $13,900,000
  - Included new windows, doors, roof and balconies
Scope

- Number of units: 184
- One meter per unit
- Electric heat pumps
- Number of units reporting: 5
  - Not statistical but better than zero
- Units on the north side of the building
# Energy savings

<table>
<thead>
<tr>
<th>Location</th>
<th>Aug 07-July 08 KW</th>
<th>Aug 08-July 09 KW</th>
<th>Reduction KW</th>
</tr>
</thead>
<tbody>
<tr>
<td>6th Floor</td>
<td>26,010</td>
<td>18,363</td>
<td>7,647</td>
</tr>
<tr>
<td>6th Floor</td>
<td>27,487</td>
<td>17,286</td>
<td>10,201</td>
</tr>
<tr>
<td>5th Floor</td>
<td>19,615</td>
<td>12,749</td>
<td>6,866</td>
</tr>
<tr>
<td>4th Floor</td>
<td>22,183</td>
<td>14,419</td>
<td>7,764</td>
</tr>
<tr>
<td>3rd Floor</td>
<td>33,720</td>
<td>24,278</td>
<td>9,442</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>129,015</strong></td>
<td><strong>87,095</strong></td>
<td><strong>41,920</strong></td>
</tr>
</tbody>
</table>

**Reduction: 32.5%**

Approximately 42,000 KW reduction for 5 units
Edgar Math

- Lets assume average for building is only 20%
- Therefore savings per unit of 5,200 KW
- Times 184 units = 956,800 KW / year
  - Almost a megawatt of power!
- Consider alternative of solar generation …
- Requires approximately 70,000 s.f. panels
- Won’t fit on roof
Imponderables

- **Value of saving the building**
  - Historical value
  - Environmental cost of destruction, land fill, etc.

- **Cost of replacing the building**

- **Alternative of adding insulation to interior**
  - Incomplete coverage
  - Disruption to occupants
  - Exterior would still require repair and maintenance
  - Exterior would be subject to thermal shock
QUESTIONS?