Windows: To Repair or Replace, That is the Question

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Agenda

• Glossary
• Common Issues and Complaints
• Potential Retrofits
• Indicators for Replacement
• How to Decide – Next Steps
Glossary

Operable Windows

Removable Glazing
Glossary

Window Sash

IGU or Sealed Unit

Two Sash Slider

Four Sash Slider
Common Issues and Complaints

- Drafts / Air Leakage
- Water Leakage
- Operation
- Comfort and Rattling
- Aesthetics
- Acoustics
- Condensation
- Energy Efficiency
Potential Retrofits - Air Leakage

New Fin-Seal Weather Stripping

New Dust Plugs
Potential Retrofits - Air Leakage

- Seal Sash Frame Joints
- New Perimeter Seals
Potential Retrofits - Air Leakage

Lower values represent less air leakage (i.e. better)
Potential Retrofits - Water Leakage

Exterior Joint Sealant at Window Perimeters, Metal-to-Metal Frame Joints, and Metal-to-Glass Seal Drainage Track Joints
Potential Retrofits - Water Leakage

Notches in Inverted U-Channels to Improve Drainage

Pry Open Weep Holes to Improve Drainage
Potential Retrofits - Operation

- Re-Glaze Sashes That Don’t Lock
- Replace Rollers
- Replace Frame Fins
- Replace Sash Skates
Potential Retrofits – Rattling & Comfort

- Stiffeners
- New weather stripping
- New gasket spacers
- Re-setting glass in sash frames
- New glazing or films to address overheating
Potential Retrofits - Aesthetics

Frame & Spandrel Painting
Possible Retrofits - Acoustics

Ministry of the Environment and Climate Change (MOECC) provides recommendations for indoor sound level limits

<table>
<thead>
<tr>
<th>Room Type</th>
<th>Recommended Sound Level (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedroom</td>
<td>40</td>
</tr>
<tr>
<td>Living Room</td>
<td>45</td>
</tr>
</tbody>
</table>

MOECC provides qualitative ratings for change in sound level

<table>
<thead>
<tr>
<th>Change in Sound Level (dB)</th>
<th>Qualitative Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 3</td>
<td>Insignificant</td>
</tr>
<tr>
<td>3 to 5</td>
<td>Noticeable</td>
</tr>
<tr>
<td>5 to 10</td>
<td>Significant</td>
</tr>
<tr>
<td>10 and over</td>
<td>Very Significant</td>
</tr>
</tbody>
</table>

*Tables courtesy of Aeroustics Engineering Ltd.*
Potential Retrofits - Acoustics

Sound Transmission Class (STC) –
How well a partition reduces sound

<table>
<thead>
<tr>
<th>Assembly</th>
<th>STC Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Window</td>
<td>29</td>
</tr>
<tr>
<td>Good Window</td>
<td>32</td>
</tr>
<tr>
<td>Very Good Window</td>
<td>35+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior Partition, ½&quot; Drywall on Both Sides, Wood Studs, No Insulation</td>
</tr>
<tr>
<td>33</td>
</tr>
<tr>
<td>Interior Partition, ½&quot; Drywall on Both Sides, Wood Studs, Batt Insulation</td>
</tr>
<tr>
<td>39</td>
</tr>
<tr>
<td>Typical Exterior Walls</td>
</tr>
<tr>
<td>45-50</td>
</tr>
</tbody>
</table>

Some options to improve window STC

<table>
<thead>
<tr>
<th>STC Rating</th>
<th>Glazing Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>3mm pane – 6mm air gap – 3mm pane</td>
</tr>
<tr>
<td>32</td>
<td>3mm pane – 10mm air gap – 3mm pane</td>
</tr>
<tr>
<td>35</td>
<td>6mm pane – 13mm air gap – 6mm pane</td>
</tr>
<tr>
<td>39</td>
<td>6mm laminated pane – 13mm air gap – 6mm pane</td>
</tr>
<tr>
<td>41</td>
<td>6mm laminated pane – 19mm air gap – 6mm pane</td>
</tr>
</tbody>
</table>

*Table courtesy of Aercoustics Engineering Ltd.*
Strategies – Condensation

- Air and heat delivery to windows
- Balance corridor supply and check exhaust fan flows
- Remove w/s on corridor doors
- Check suite ventilation
Energy Efficiency

Forecasted Annual Energy Savings

<table>
<thead>
<tr>
<th>Retrofit</th>
<th>Up to 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement</td>
<td>Up to 20%</td>
</tr>
</tbody>
</table>

Results will vary with types of heating, cooling, and ventilation systems and replacement glazing types.
Indicators for Replacement

• Full height sliders – difficult to operate
• Acoustics/noise issues
• Change in aesthetics or configuration desired
• Inconsistent repair results
• High forecasted repair costs
Indicators for Replacement

Repair Cost (excl. Soft Costs & H.S.T.)

Retrofit $6,000/Suite
(large suite, many items, interior access only)

Retrofit $500/Suite
/small suite, few items, interior access only)

Replacement $40,000/Suite
(Large Suite, High End)

Replacement $7,000/Suite
(Small Suite, Low End)
How to Decide – Next Steps

Survey

Response Rate

- Unique Suite Responses: 41%
- Non-Responses: 59%

Frequency of Condensation or Ice Build-up

- Often (16+ Days per winter): 55%
- Sometimes (6-15 Days per winter): 28%
- Rarely (1-5 Days per winter): 17%

How Would you Rate the Overall Aesthetics or the “look” of the Current Windows

- I Like Them: 52%
- I Don't Like Them: 40%
- I'm Indifferent: 8%

Residents Who Indicate Noticeable Air Leakage

- Yes: 31%
- No: 69%
How to Decide – Next Steps

Mock-ups

– Confirm scope of work and feasibility
– Measure performance before and after

Compare budgets, adv./disadv. for retrofit and replacement
Questions

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