Moisture Safety in highly insulated constructions

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Cold Attic

Ventilation

Heatflow
Vapour barrier
Air- and vapour tightness

Sky radiation
Cold Attic

Possible action
• Reduce ventilation
• Insulate outer roof
• Increase temperature
• Smart ventilation

Airtightness in the attic floor very important
Calculation

Reference
Thermal insulation on outer roof
Extra heatsource
Reduced ventilation

Beräkningar: HAM-tools
Isoplet – reduced ventilation
Outer walls
Two steps tightening

Rain tightness and wind tightness in different layers

Outside

Inside
History

Winter 2000
Large moisture damages in
"one-step" tightened facades.
Plaster on thermal insulation
Rain tightness and wind tightness in the same layer

Rendering
Thermal insulation
Board (gypsum, plywood, mdf, Minerit)
Thermal insulation between wooden studs
Air and moisture barrier
Board
## Examined houses and damage frequency

<table>
<thead>
<tr>
<th>Type of Building</th>
<th>Number of buildings</th>
<th>Number of buildings with damages</th>
<th>Damage percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>One family houses</td>
<td>59</td>
<td>33</td>
<td>56 %</td>
</tr>
<tr>
<td>Multifamily houses (two floors)</td>
<td>54</td>
<td>43</td>
<td>80 %</td>
</tr>
<tr>
<td>Buildings with more than two floors</td>
<td>5</td>
<td>5</td>
<td>100 %</td>
</tr>
</tbody>
</table>
Outer wall – plaster on thermal insulation

- EPS
- Mineral wool between wooden studs
- Gypsum board
- Vapour barrier
- Plaster
Isoplet
Plaster on thermal insulation
Window connections
Connections...
Balcony

After removal of facade
Typical moisture damages
Sunscreen Fastening
Puts på isolering + 1% regnläckage

Ort: Lund; LTH Data;

Beräkningar: WUFI Pro 4.2

Puts på isolering + 0,2% regnläckage
Isoplet
Plaster on insulation + rain penetration
Crawl space
Crawl space - Problem
Crawl space ventilated with air from outside
Conclusions
Outdoor ventilated crawl spaces

DON’T BUILD THEM!

Measures in existing crawl spaces
• Engage an expert

Exemples of actions
• Remove organic material from the ground
• Prevent evaporation from the ground
• Insulate the ground
• Rebuild into a ”warm” crawl space
• Install dehumidifiers