The use of building materials to moderate the climate
Temperature and humidity buffering

Harmonic cycles
Temperature within a 60 cm thick masonry wall subjected to a daily cycle of 10°C to 30°C
Periodical penetration depth (37%) for a 24 hours harmonic swing

- Wood: 0.07
- Light weight concrete: 0.09
- Brick: 0.11
- Concrete: 0.15
- Mineral wool: 0.16
- Granite: 0.21
- Steel: 0.65

1%
Airforce architecture. A shelter for fighter airplanes at Værløse Airfield.
The roof is 50 cm solid concrete covered with plastic paint.
The natural climate for a solid concrete structure over six months

T and RH of Værløse Shelter
For the 6 Month Period tirsdag jul. 04, 2006 to tirsdag dec. 05, 2006
Temporary storage for collection of furniture
Change in relative humidity within a 20 mm thick stack of paper exposed to a daily cycle of 40%RH to 80%RH
Periodic penetration depth (37%) for a 3 weeks cycle at 40% - 60% RH
Moisture buffer capacity for various material

- Brick
- Wood planks
- Concrete
- Gypsum board
- Porous lime silicate
- Padfieldite
- "Canosmose"
- End grain wood
Available moisture, 365 days cycle, 40% - 60% RH interval

- Wood, pine, T: 1.1 kg/m²
- Concrete: 1.2 kg/m²
- Clay: 2.0 kg/m²
- Padfieldite: 3.3 kg/m²
- Wood, pine, II: 7.0 kg/m²
- Porous lime silicate: 2.4 kg/m²
- Gypsum board: 1.4 kg/m²
- "Canosmose": 5.1 kg/m²
- Brick: 1.0 kg/m²
Room with 40 cm light clay walls

Air exchanges / hour

RH

Day
<table>
<thead>
<tr>
<th>Material</th>
<th>Dry density kg/m³</th>
<th>Effective moisture penetration depth mm</th>
<th>Moisture accumulation ability $10^{-7}$ kg·/(m²·Pa·s½)</th>
<th>Available moisture kg/m²</th>
<th>Flux amplitude g/m² day</th>
<th>Effectivity</th>
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<td>80</td>
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<td>100</td>
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<td>Clay</td>
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<td>1054</td>
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<td>0,05</td>
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Use perforated surfaces to increase the flux amplitude
The Segovia castle, Spain. Military archive is in the basement
The archive has immense thermal inertia and moisture buffer capacity
The climate in April and May is very stable, but too humid.
The condensating dehumidifier
The absorption dehumidifier
The revolving unit has a humidity absorbing interior.
The working principle of the heat pump