



Rising damp, a reoccurring problem in basements

– a case study with different attempts to stop the moisture

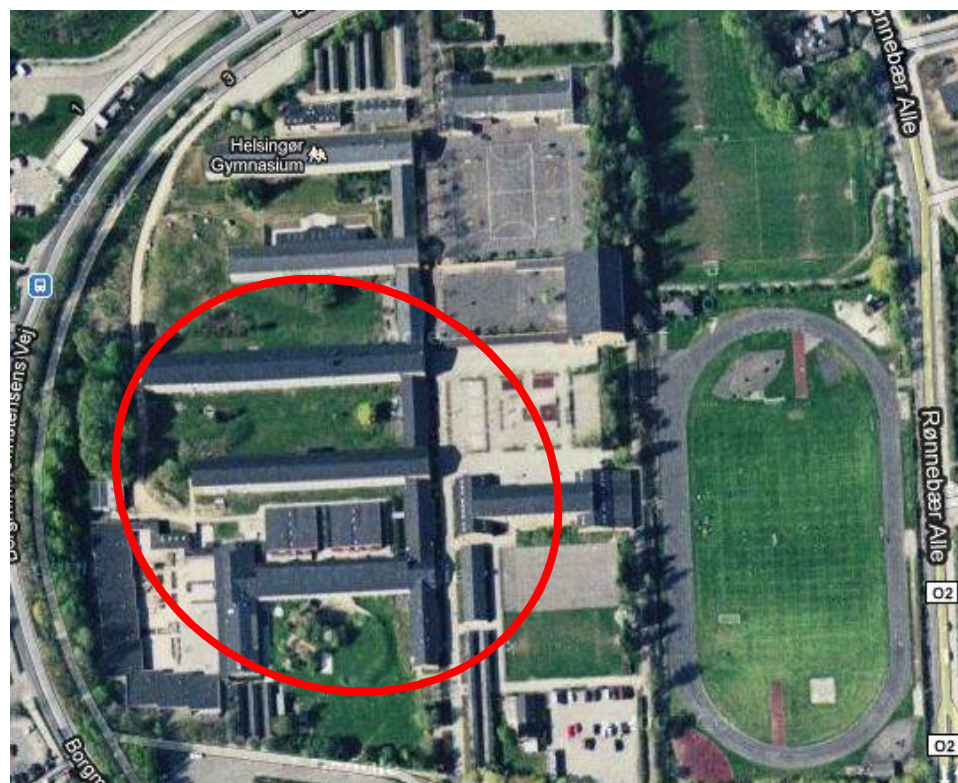


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Object

School from 1965:

- 2.900 m² basement
- 700 m concrete outer walls
- 700 m internal brick walls



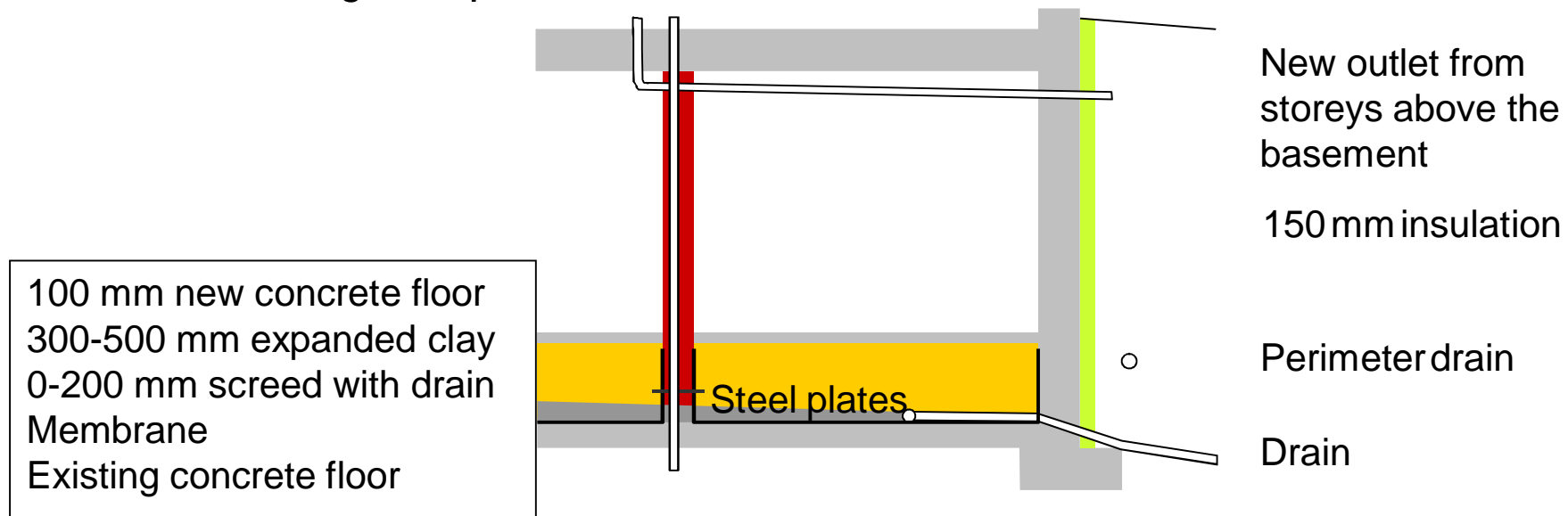
From Google maps



Original problems and 1st renovation

1998 Mould problems due to:

- Defect drainage
- Leaky sewage system under basement floor
- Capillary suction in concrete floors
- Rising damp in internal walls





2002 Rising damp in internal walls

- Higher groundwater level (above new floor)
- Steel plates do not stop water under pressure
- No anti-flood valve between the drains
- Drainage under new floor was blocked by ochre

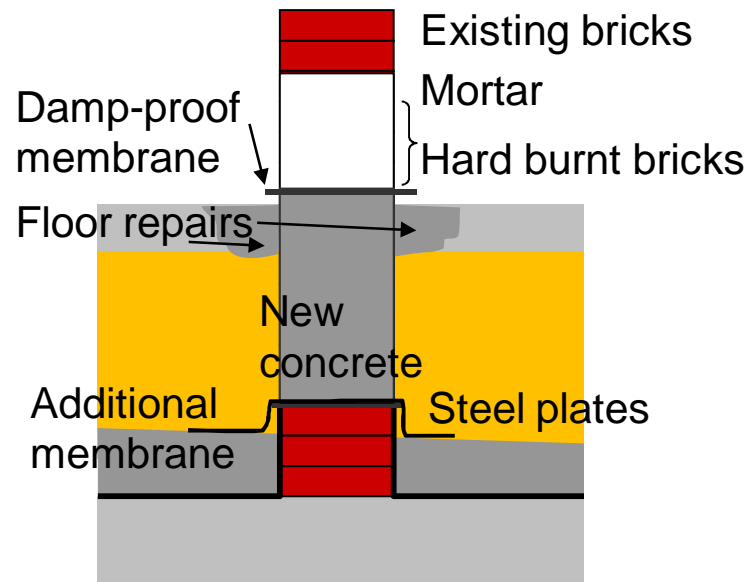




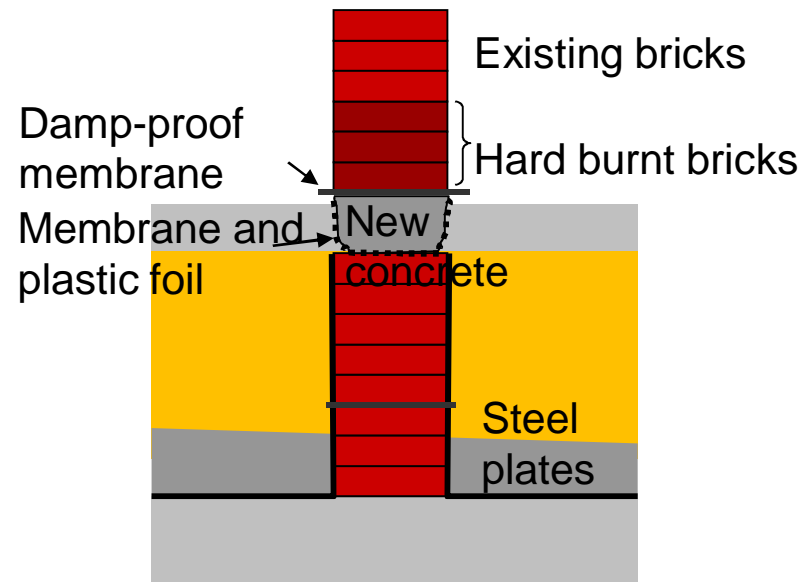
New solutions

Two test methods:

May 2003: Method 1

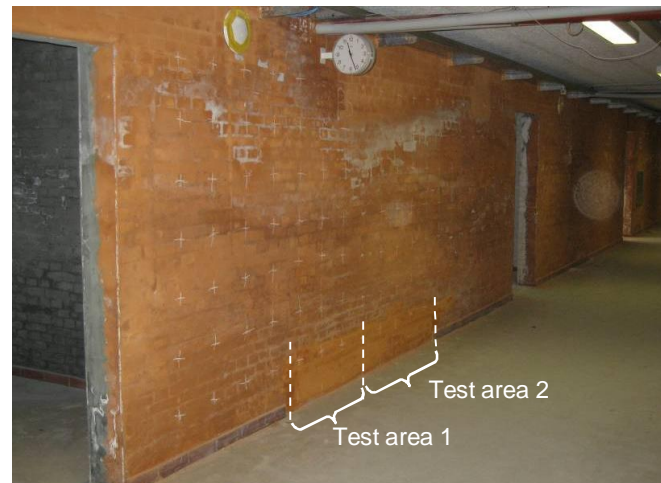
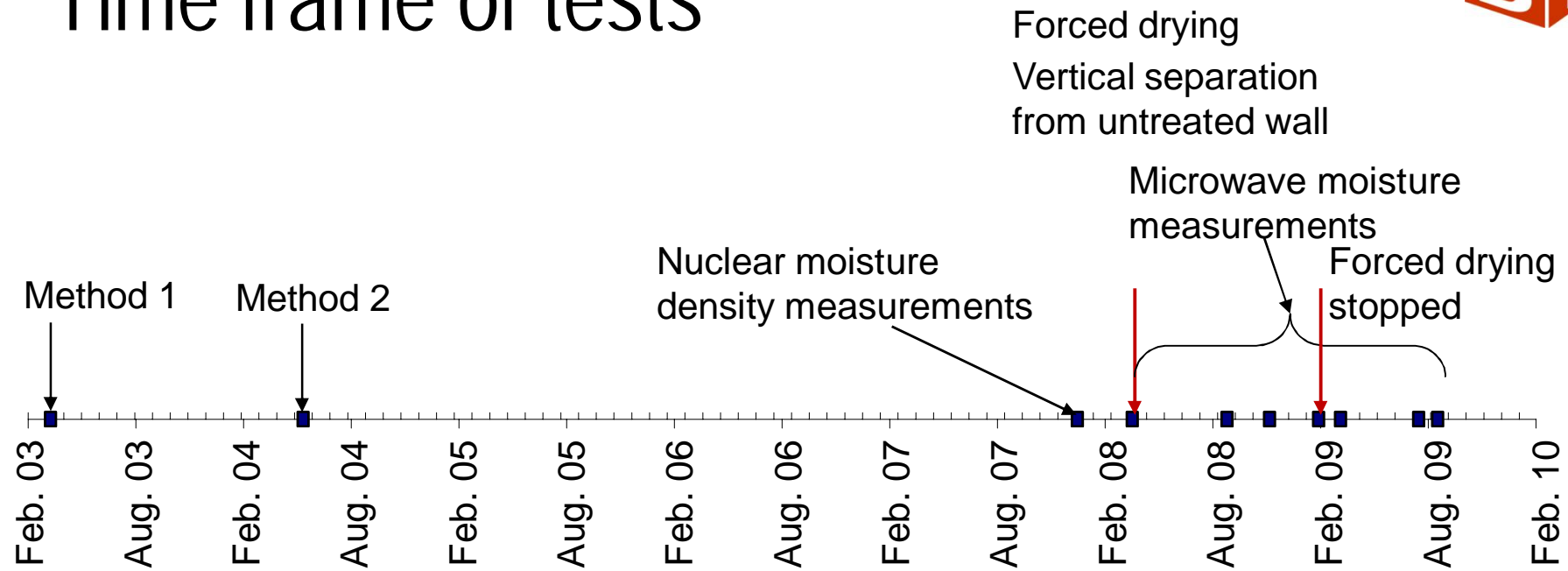


July 2004: Method 2





Time frame of tests



Moisture measurements

Nuclear moisture density gauge

Neutron radiation reflected by hydrogen atoms

(Troxler)



Microwave moisture measurements

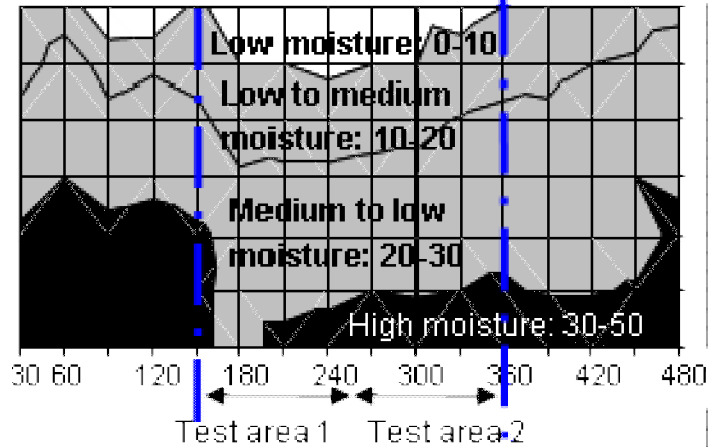
Reflected microwaves depend on dielectric properties of materials (high in water)

(hf-sensor)



Measurements

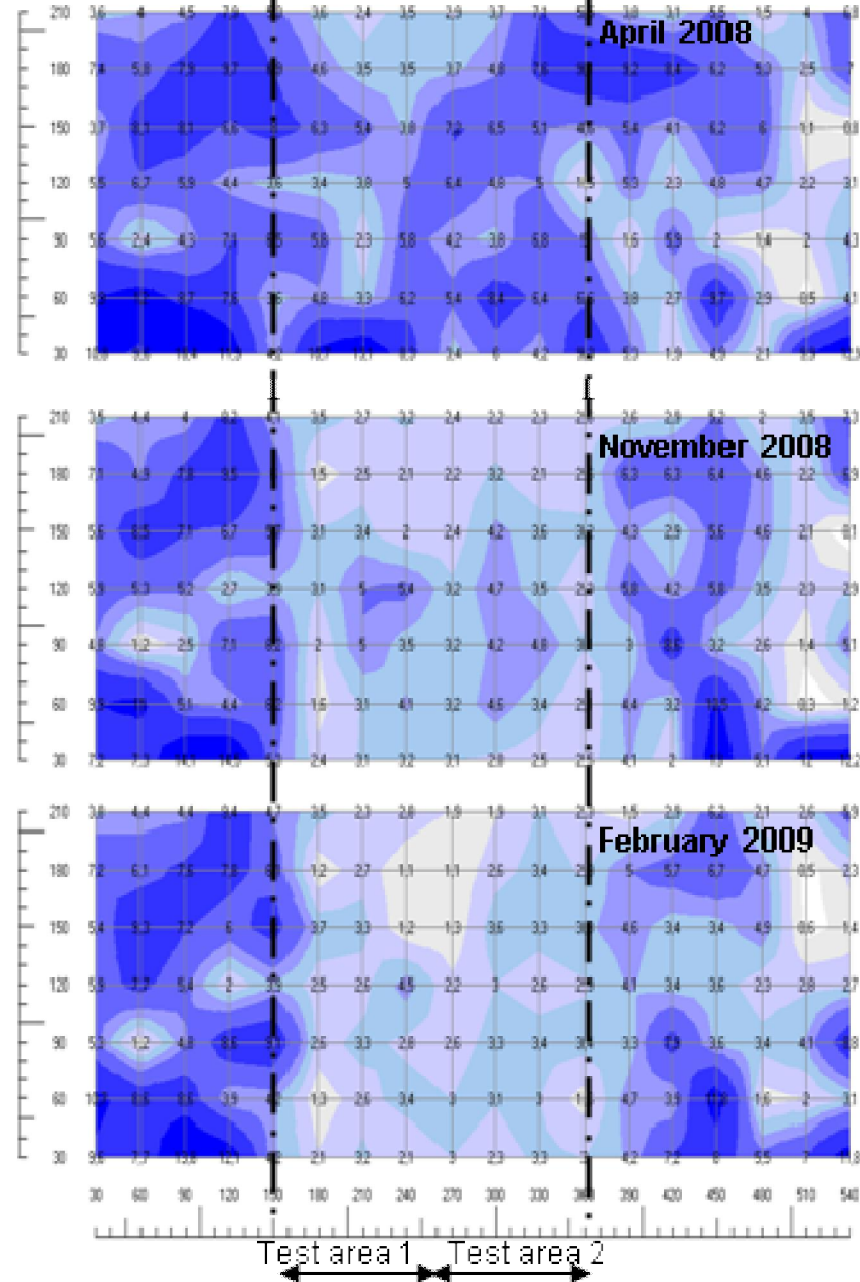
Nuclear moisture density gauge



December 2007



Microwave moisture measurements



Measurements

- Nuclear moisture density gauge:
High moisture: 21 weigh-% in brick and 6 weigh-% in mortar
- Microwave moisture measurements



Specimen	Location	Date	Weighing Mortar [Weigh-%]	Weighing Brick [Weight-%]	Microwave moisture measurement [Brick weight-%]
1	210/65	2008-09-09	3.0	6.46	3.3
2	315/50	2008-09-09	1.37	1.16	4.6
3	195/70	2009-02-11	0.33	0.48	2.6
4	285/95	2009-02-11	0.37	0.59	2.8
5	225/135	2009-03-20	0.34	0.53	2.9
6	190/20	2009-03-20	0.25	0.17	3.1

Conclusions

- Rising damp:
 - Steel plates do not stop water under pressure
 - Drainage is important
- Test methods
 - Capillary suction can be horizontal
 - Non-destructive methods show relative results, not actual moisture content
 - Non-destructive methods can be useful for visual understanding

