



Effective remediation of PCB contamination in buildings

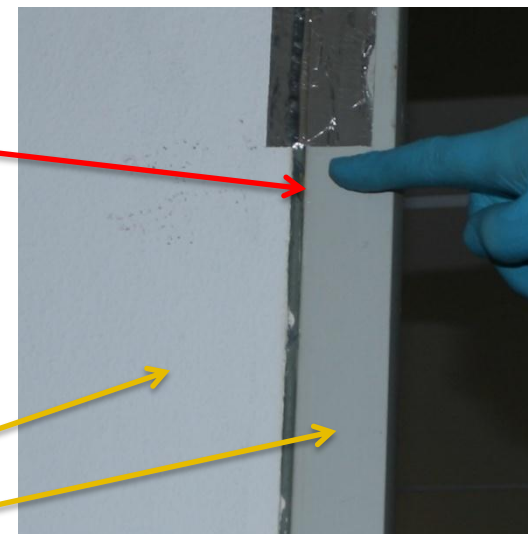
Bake out experiment in climate chamber

Barbara Kolarik

PCB sources in homes

- Primary sources

- Old elastic sealants
- The removal of primary sources is often a straight forward process
- But usually it does not solve the problem



- Secondary sources

- Adjacent concrete, wood or other materials and air

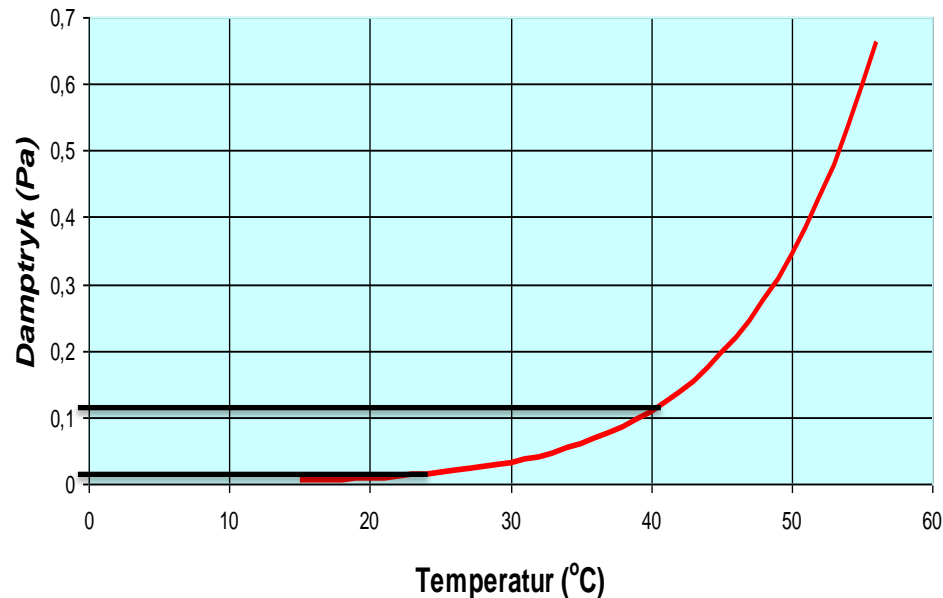
- Tertiary sources

- Walls, floors, furniture, that were contaminated due to reabsorption

Objectives



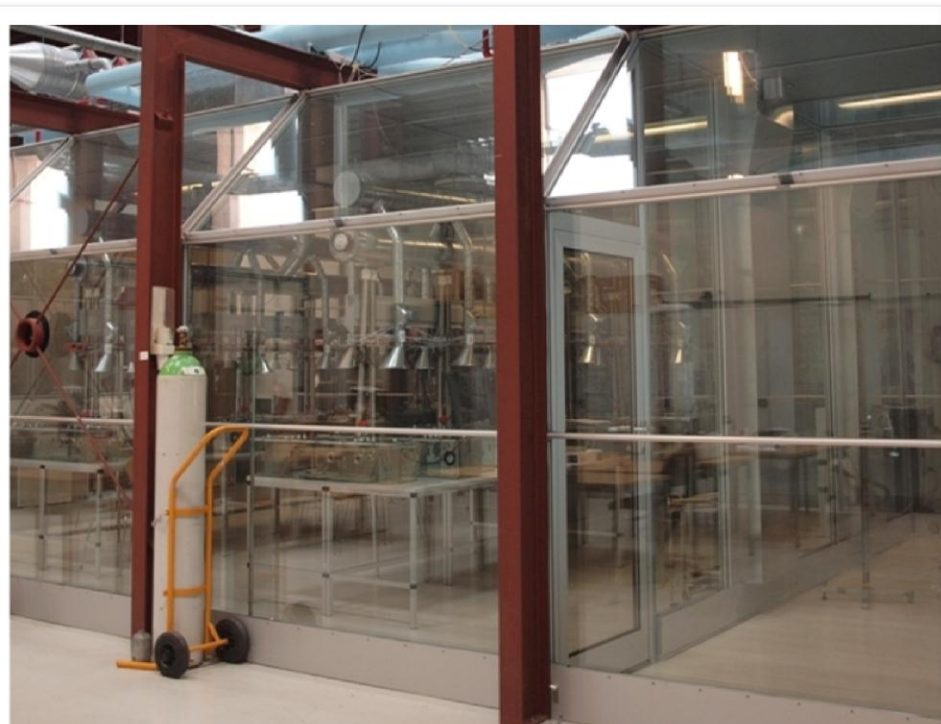
PCB 28



- To study the effect of temperature on PCB remediation from secondary and tertiary sources
- Temperature increase from 23 to 40°C
- Vapour pressure increase by factor 12
- Speeding up the process from more 1 year 1 month
- How this process will influence indoor air concentrations?

Methods

- 24 small scale CLIMPAQ chambers (Chamber for Laboratory Investigations of Materials, Pollution and Air Quality)
- 50.9 L glass chamber
- Max airflow: $6.5 \text{ m}^3/\text{h} = 127 \text{ h}^{-1}$; temperature: $10\text{-}40^\circ\text{C}$, RH: 30-70%



Methods

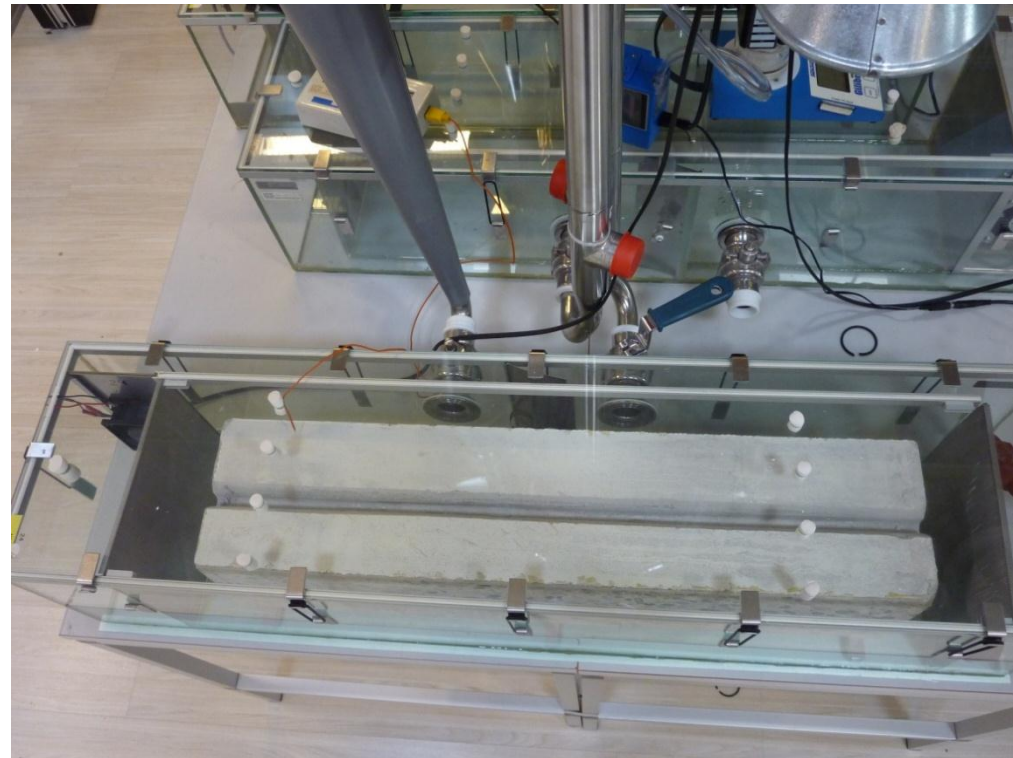
Block of concrete

- from a contaminated school in Odense
- 16x17x71 cm
- sealant removed

Experimental conditions

- 0.180 m³/h of fresh air

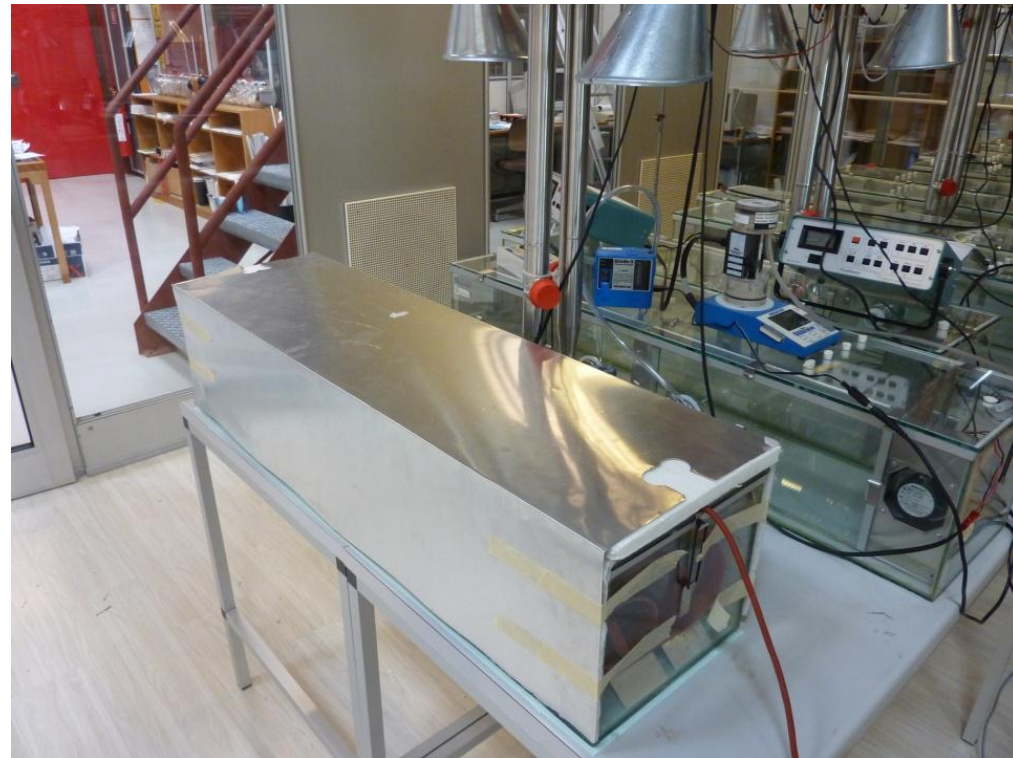
Corresponds to air change rate 0.5h⁻¹ in a model room (3.2x2.2x2.4 m), with loading factor 1.41 m²/m³ (ISO 1600-9:2006)



Methods

Measurements

- PCB – 7 congeners: 28, 52, 101, 118, 138, 153 and 180.
- Baseline at 23°C
- At 40°C (day 0)
 - after 1, 2, 3, 4, 6, 8, 11, 15, 22, 29 and 36 days.
- At 23°C (day 0)
 - after 2, 9 and 30 days.





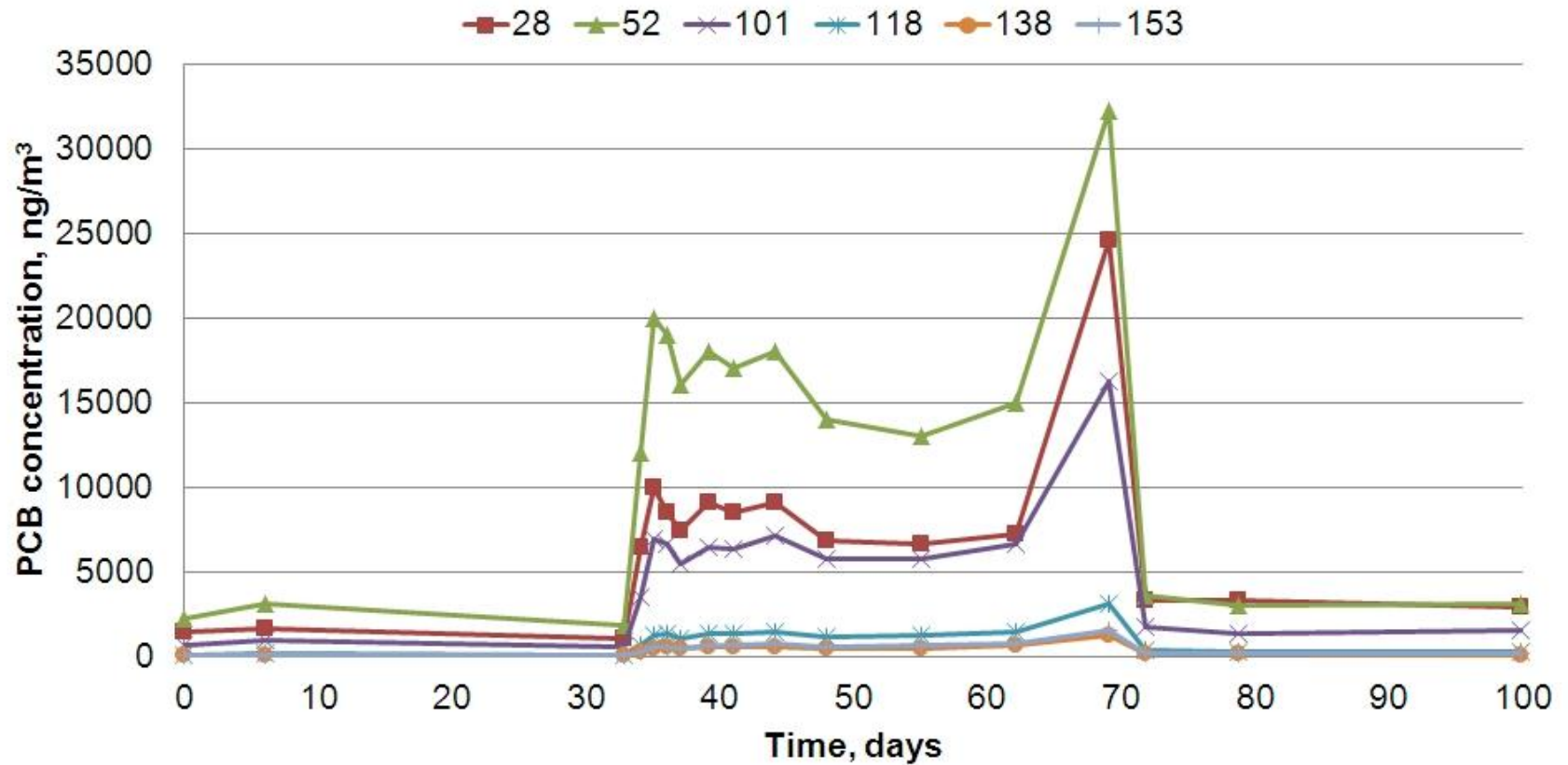
Results – baseline measurements

PCB concentration, ng/m ³								
PCB 28	PCB 52	PCB 101	PCB 118	PCB 138	PCB 153	PCB 180	Sum	PCB _{tot}
1010	1800	560	98	40	43	< DL	3600	17755

~ 6 x 3000 ng/m³

National Board of Health upper limit value
(Sundhedsstyrelsen) – immediate action

Results – increased temperature



Conclusions/Next steps

- We are planning to continue this experiment in order to investigate the nature of the last pick
 - No explanation so far!
 - Analytical mistake?
 - Not a continuous and uniform diffusion of PCB into the block...
 - Higher PCB levels at a certain distance into the block...
 - We have reached that high concentration region during the last measurement...
- The positive effect of bake out cannot be confirmed
 - But only secondary sources in worse case scenario were tested
- We do not deny that the bake out of tertiary sources can be possible
 - More experimental work is needed – with different surfaces

Thank you for attention



Source: www.alectia.com