

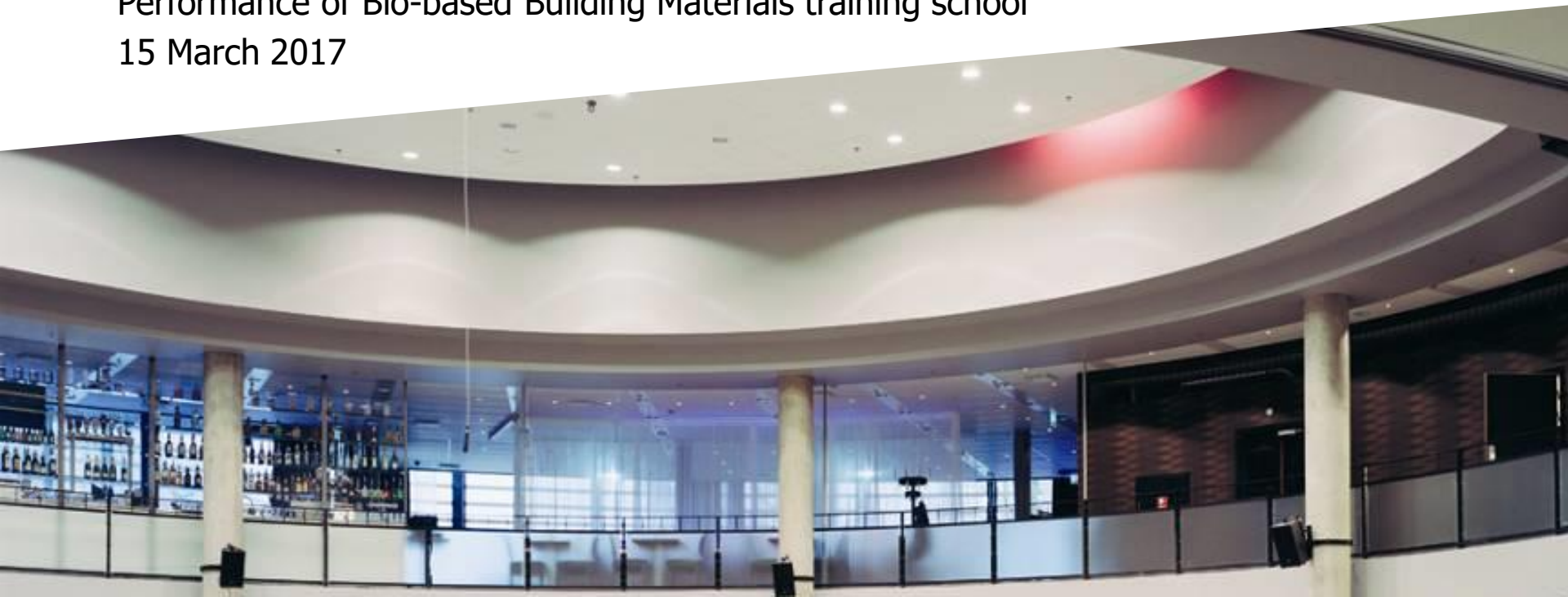


DANISH
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Building Materials and Emissions

Thomas Witterseh, senior specialist, PhD

Performance of Bio-based Building Materials training school
15 March 2017





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Buildings & Environment





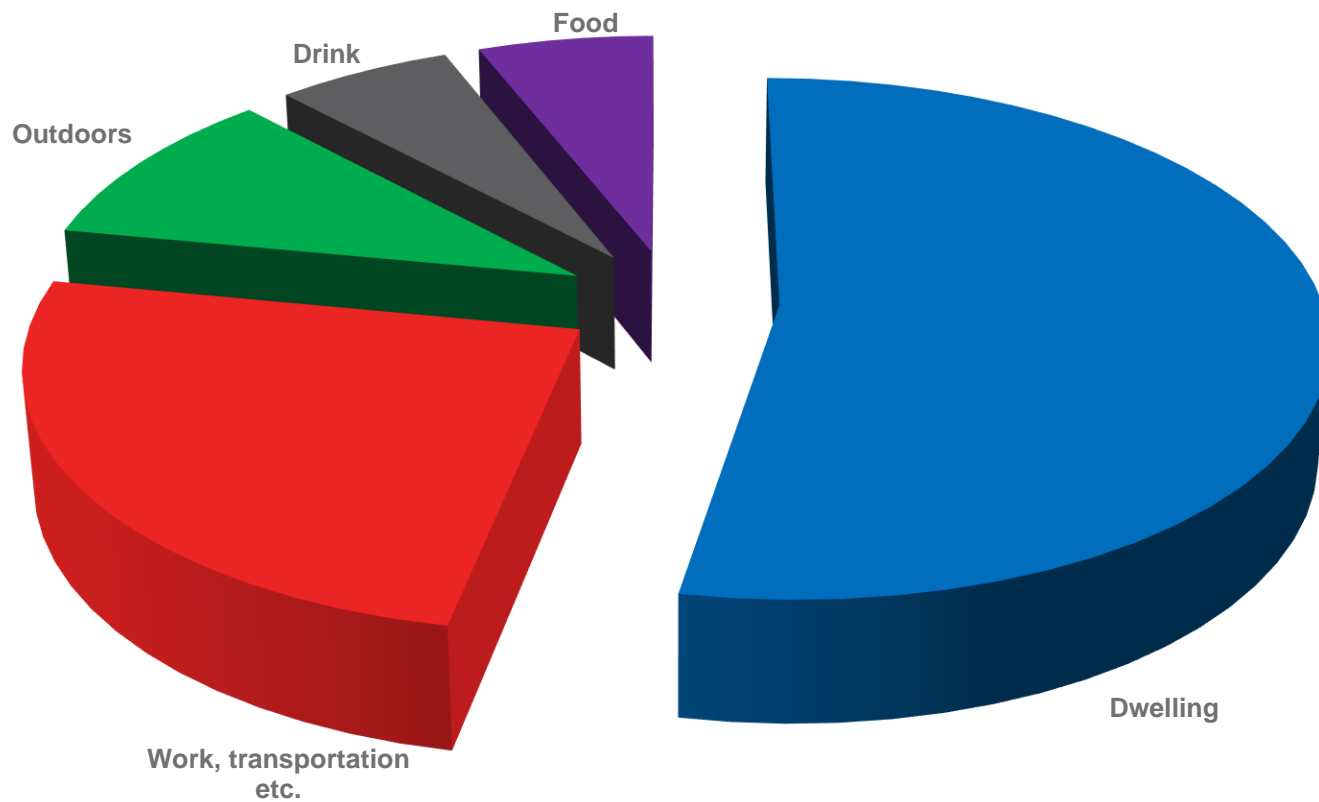
Content vs Emissions

Chemical substances *in* materials vs
emissions *from* materials into indoor air



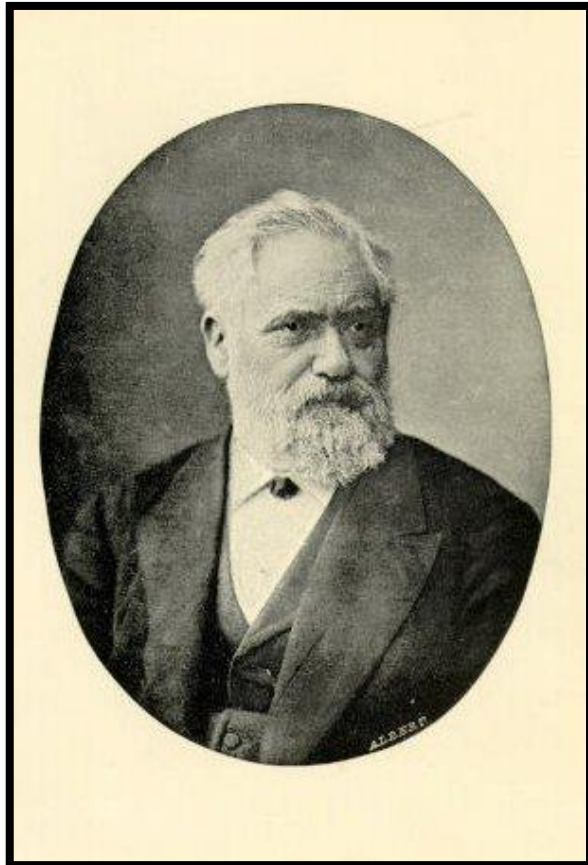
Indoor Air

Relative intake during a normal life





Source Control



Pettenkofer (1858)

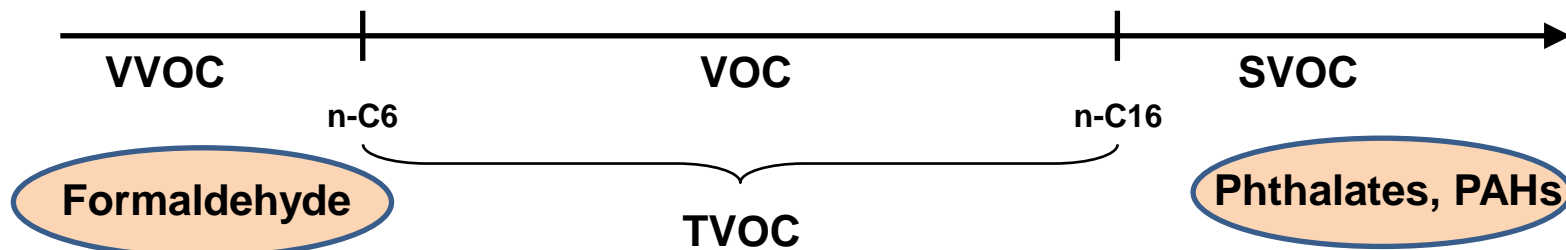
”If there is a pile of manure in a space, do not try to remove the odour by ventilation.

Remove the pile of manure”



Substances in Indoor Air

- Volatile Organic Compounds (VOC)
- Very Volatile Organic Compounds (VVOC)
- Semi Volatile Organic Compounds (SVOC)
- Total Volatile Organic Compounds (TVOC)



Sources

Building materials
Furniture
Electric equipment
People and their activities
cleaning agents
"air fresheners"





Substances in Indoor Air

- | | |
|----------------------------|-------------------------------------|
| Fillers and paints | → Glycols |
| Carpets with latex backing | → 4 PCH |
| Lacquers | → (Formaldehyde), alcohols, glycols |
| Wood based panels | → Formaldehyde, aldehydes, terpenes |
| Massive wood | → Terpenes, acids, aldehydes |
| PVC | → Phenol, phthalates |
| Air "fresheners" | → e.g. Limonene |





Health effects of emissions

- Odour (pleasant or unpleasant)
- Irritation of mucous membranes in eyes and airways
- Neurotoxic (headache, dizziness)
- Carcinogenic, mutagenic, reprotoxic





UmweltBundesAmt – New HQ in Dessau

"Only materials which respond to high health- and environment compatibility standards in regard to source, transport, manufacture use and disposal shall be used"



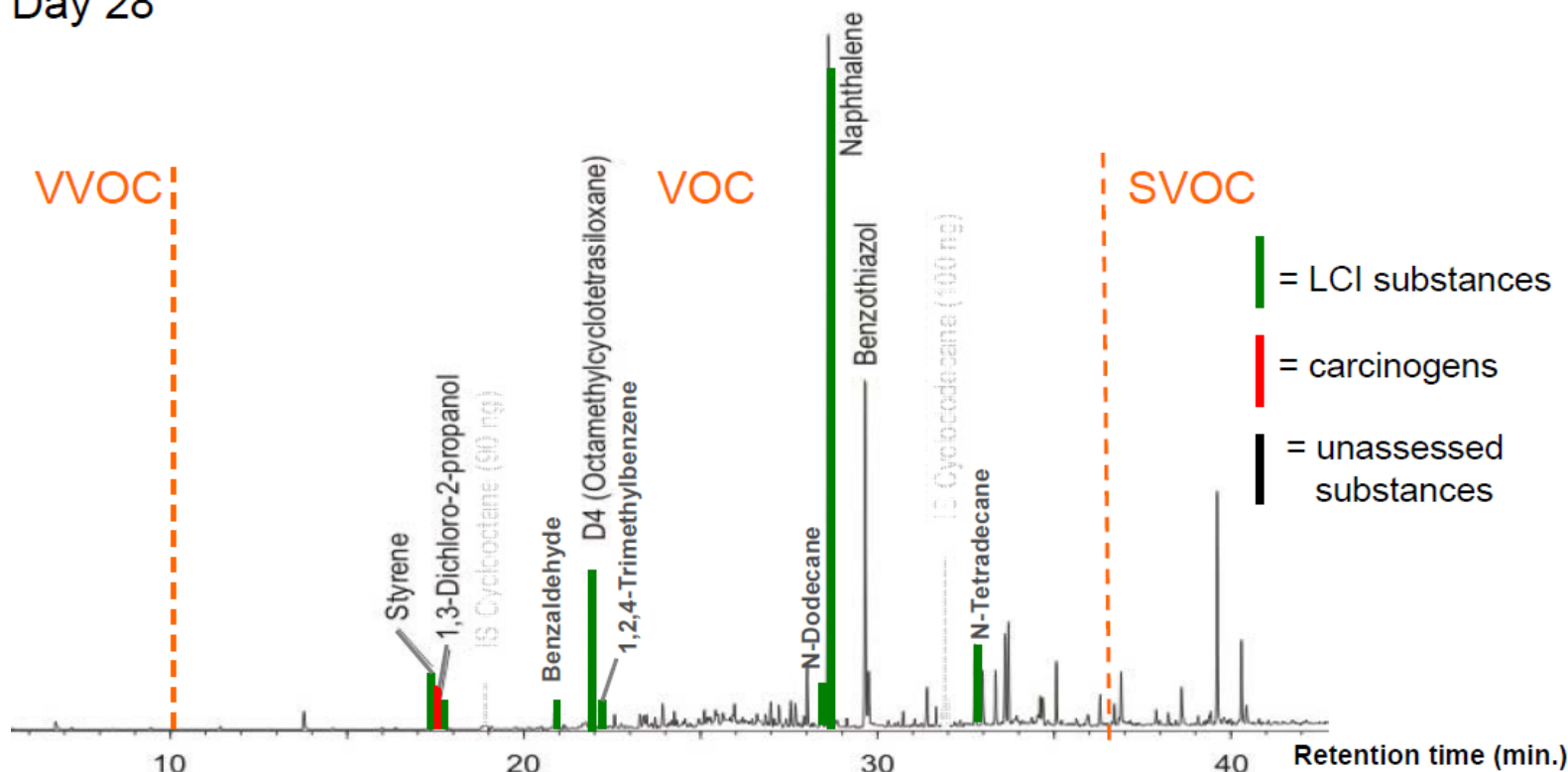
18.600 m² rubber flooring

First indicator:

Odour

UBA – Indoor Air Quality

Day 28



	(NIK-) limit ($\mu\text{g}/\text{m}^3$)	Result ($\mu\text{g}/\text{m}^3$)	Classification
1,3-Dichlor-2-propanol	≤ 1	22	EU Carc. Cat. 2
Naphthalene	≤ 10	136	EU Carc. Cat. 3
Non-assessables	≤ 100	172	



Healthy Indoor Air

Healthy indoor air with as low emissions as reasonably achievable

Architects and other specifiers need clear and practical information when designing healthy indoor environments using multiple materials

