

## **Why Buildings?**

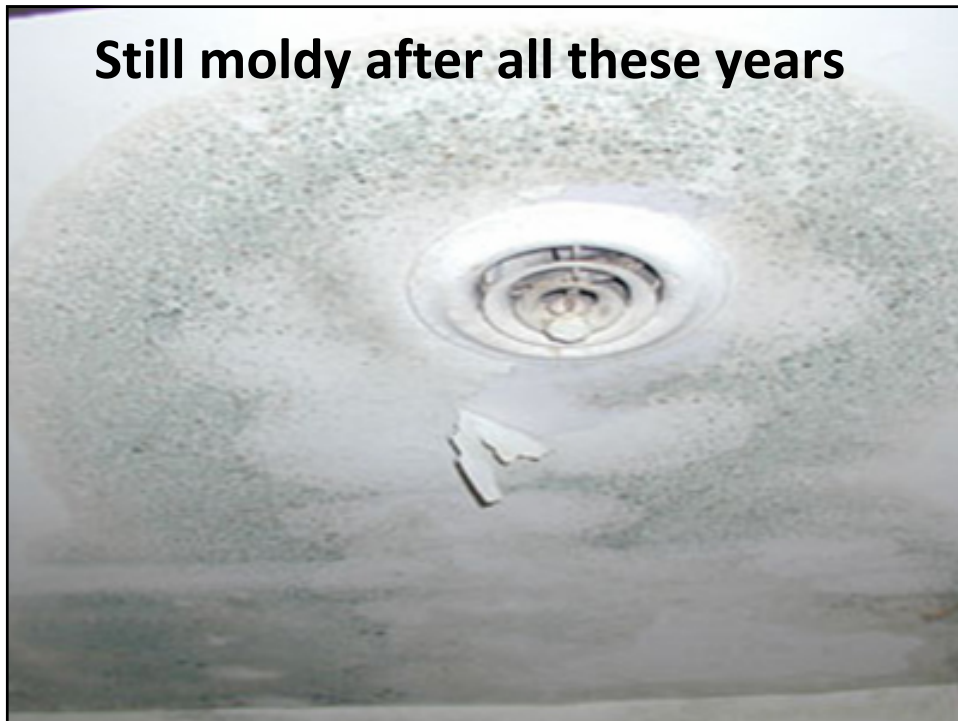
## **Why Buildings?**

- A way to transport a dry Mediterranean climate to every god-forsaken-spot on the planet (and space as it turns out)
- Keep out annoying creatures
- A place to put my stuff

## Make a building

- Make an enclosure
- Add Heating, cooling, dehumidifying, humidifying
- People (and their stuff) move in and the fun begins

**Still moldy after all these years**



**Studies Link Dampness and Mold to Significant Respiratory Problems and to High Costs of Medical Treatment**

- *Meta-Analyses of the Associations of Respiratory Health Effects with Dampness and Mold in Homes*
- *Public Health and Economic Impact of Dampness and Mold - Indoor Air Journal*
  - 30 percent to 50 percent increase in respiratory and asthma-related health outcomes.
  - ~4.6 million of the 21.8 million reported cases of (21 percent) linked to dampness and mold in homes.
  - ~ \$3.5 billion to treat asthma linked to dampness and mold in homes.
- Keep it dry.



## **Indoor ozone – it brings good things to life**

- Breaks double carbon bonds – turns some VOCs into more VOCs
- In airplane study people were the biggest source of ozone reaction VOCs – Wargocki
- 3 meta-studies – 0.85% increase mortality for each 10ppb increase ozone – Weschler
- BASE analysis links ozone to 33% - 45% reported symptoms – Apte
- Unpainted gyp board soaks up ozone
- **Ozone plus VOC - bad**

## **Off Shore Products**

- **Lead paint – toys, toys, toys**
- **Illegal pesticides – still out there**
- **Formaldehyde – 10 ply plywood**
  - **130 ppb – 350 ppb closets – 900 ppb highest – Bailey**
  - **CARB study - offerman**



### **Sanitizers, disinfectants and pesticides**

- EPA and pesticide use in ductwork
- 39,000 injuries from household bleach 2004  
Poison Control Centers
- Resistant staph
- Guidelines for Environmental Infection  
Control in Health-Care Facilities - CDC

## Maintenance-cleaning

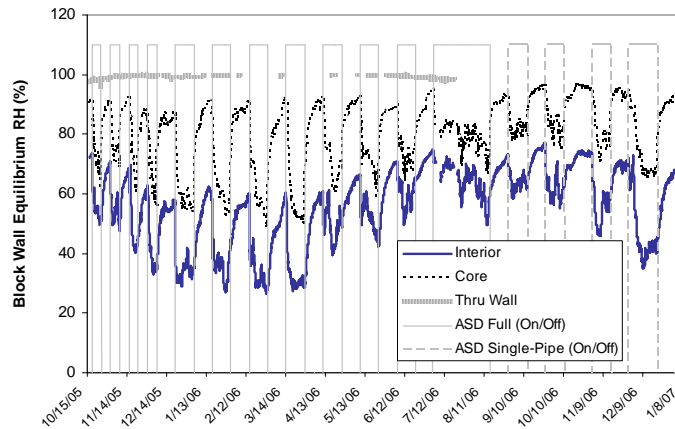


## Windows are not a reliable source of ventilation – bud offerman



Survey of Ventilation Behavior and Housing Characteristics  
in New California Houses

## Radon and humidity control - brad



## Combustion from unvented fireplaces P. Francisco

**7 of 15 houses greater than 250 ppb NO<sub>2</sub>  
(Canadian threshold)  
11 of 15 greater than 110 ppb (WHO threshold)**

## CO and generators



## Filters

- Filter efficiency (MERV)
- MERV applies to media filters
- Filter bypass – if it doesn't go through the filter it doesn't get filtered

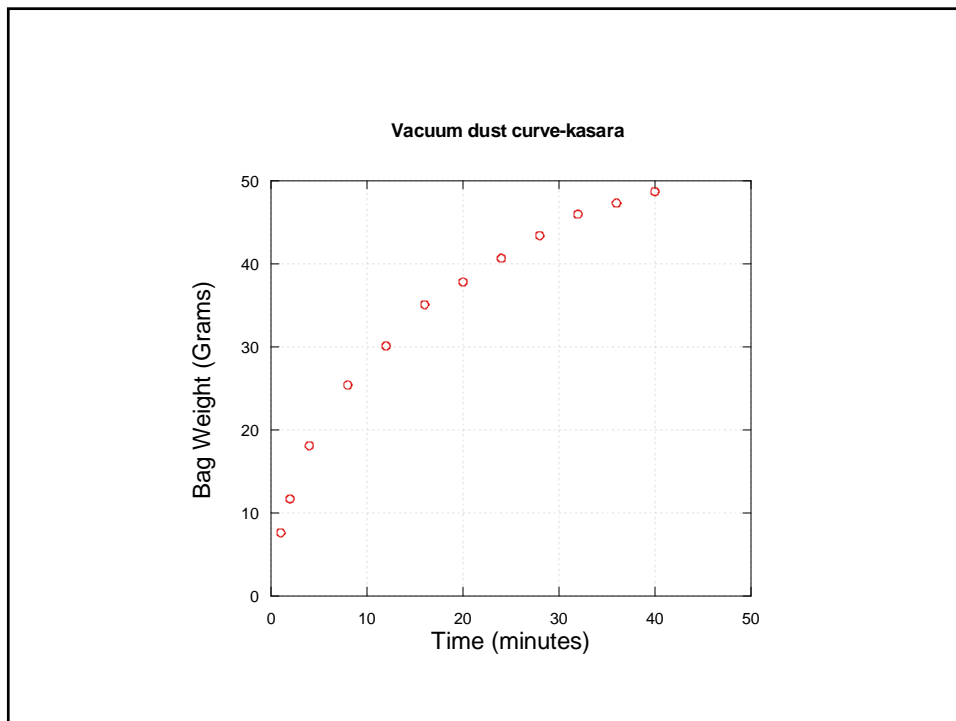
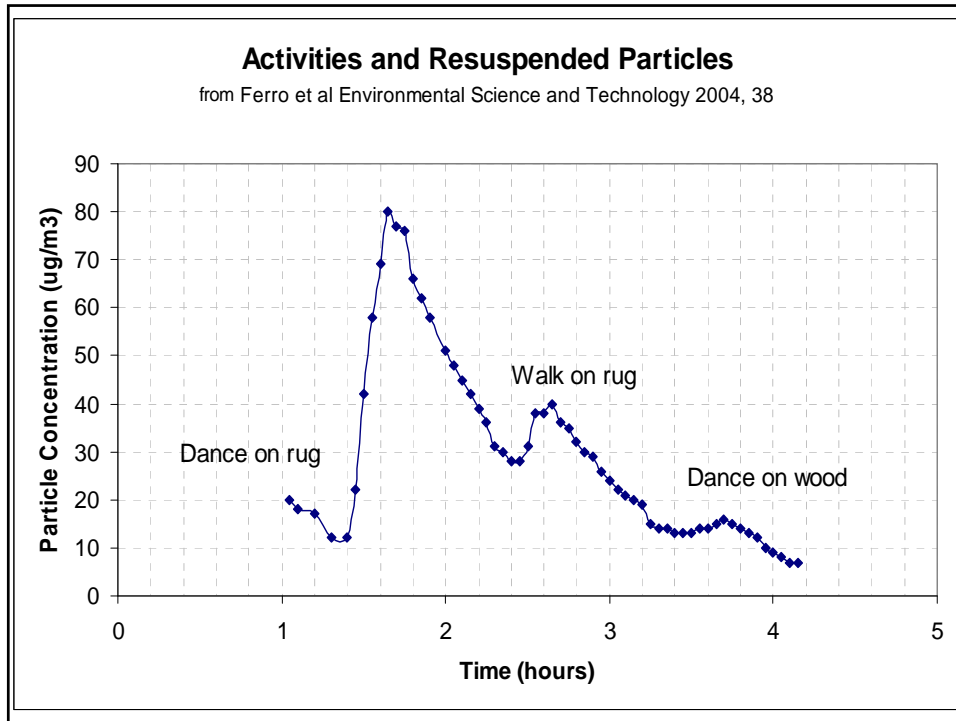
Cures consumption, shakes,  
rheumatis' and foul humours of  
the blood...

- 

## Fine Particles

- a 10 mg/m<sup>3</sup> rise in PM<sub>10</sub> is associated with a 1% increase in mortality
- 10 mg/m<sup>3</sup> rise in PM<sub>10</sub> hospital admissions for asthma rise by ~2%

Top 10 Issues in Building Science  
Terry Brennan – Camroden Associates



**Border Communities**  
**Miller - Shaughnessy – Turk**