Total Building Commissioning of Health Care Facilities

Commissioning for Patient Safety

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Introduction

- Total building commissioning
- Where to start
- Evidence?
- The important areas
- Commissioning inspections
- Indoor air quality
- Biological sampling

Total building commissioning

- The total building commissioning approach
  - Commissioning planning starts at concept design and extend to handover
  - Whole of building approach
  - Focus on critical systems

Total building commissioning

- Independent validation of system performance
- Systematic process for validation of commissioning
- Independent inspections prior to handover
- Includes infection control

Where do we start?

- Where to start
  - Roles and responsibilities
  - Agreement on standards Agreement on scope of works
  - Lines of communication
  - Risk management / mitigation

Where do we start?

- Adequate time required to complete all tasks
- IC training on services commissioning tasks
- Services training on IC commissioning tasks

Evidence

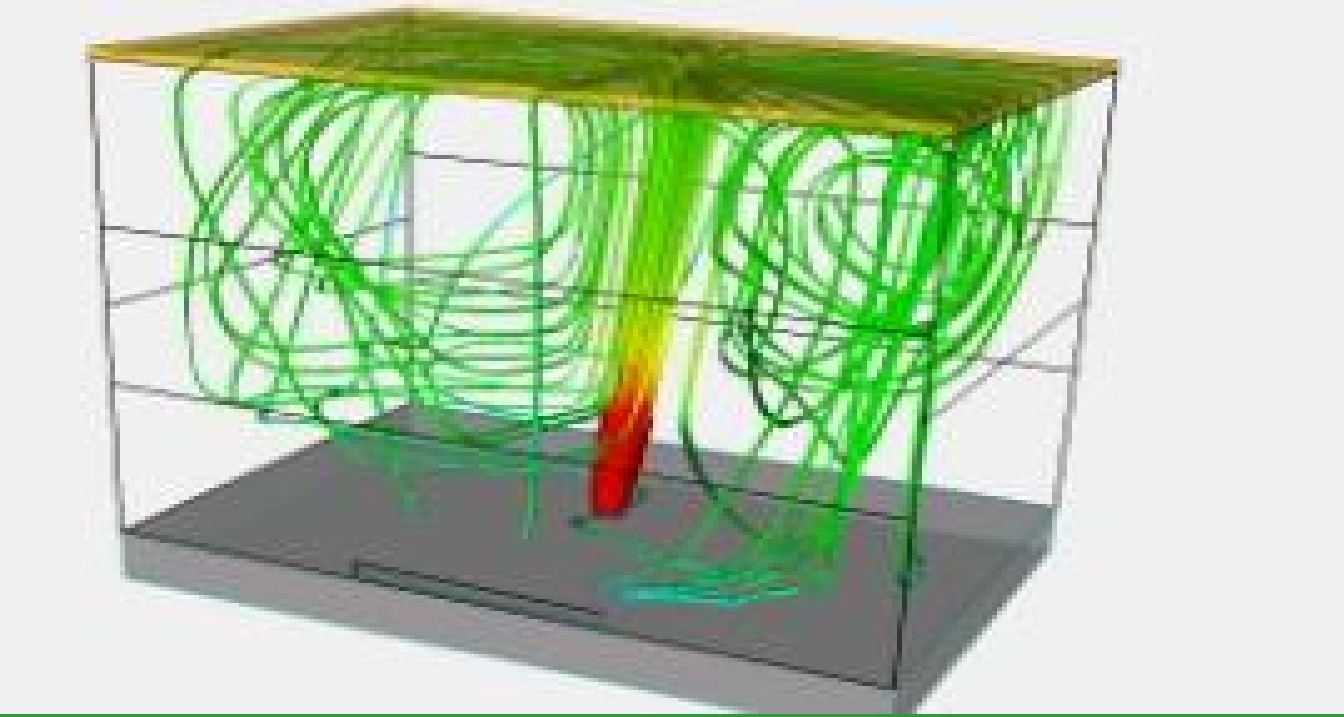
- Limited evidence exists in relation to building commissioning
- Most tasks are an extension of common building or engineering practice which is not evidence based
- Is evidence relevant or necessary?
- NHMRC levels are clinically based

The important areas

- Critical high risk areas
  - Theatres
  - ICU / CCU / HDU
  - Oncology / haematology
  - Infectious diseases / thoracic
  - Outpatients
  - Emergency
  - CSSD
  - Laboratories

Commissioning inspections

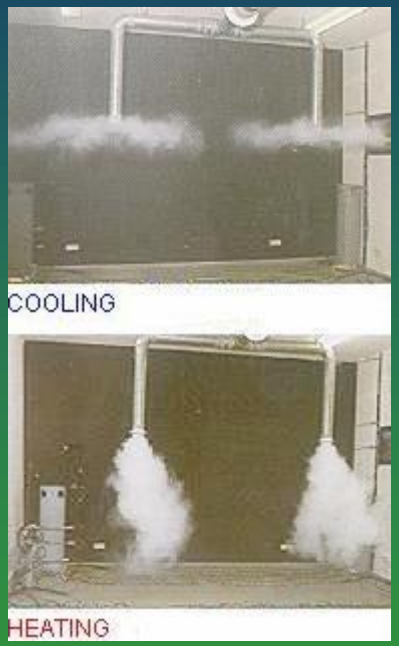
- Airflow direction
  - Turbulent air flow



Smoke testing

Large scale smoke testing

Test techniques



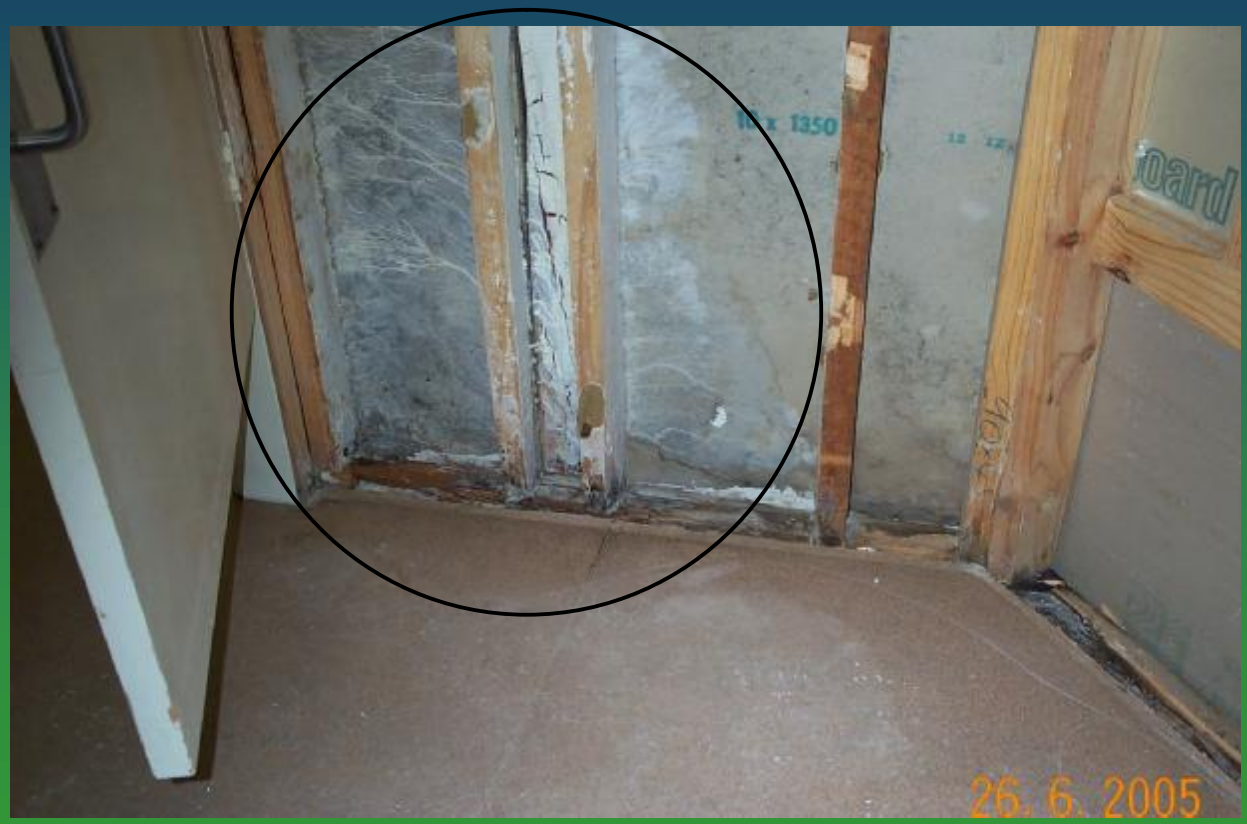
Test techniques

Commissioning inspections

- Air change rates
  - calculated
- Water damage
  - Plasterboard
  - Ceiling tiles
  - Service ducts and risers
  - Wet areas
  - Flood / water damaged areas

Water Damage

Water Damage



Water Damage

Water Damage

Water Damage

Water Damage

Commissioning inspections

- Duct inspections
- Air leaks
- Water sampling
  - Verify water systems flushed
  - Legionella
  - Pseudomonas
- Hand basins

Commissioning inspections

- Alarm systems
- Interior finish – quality and type
- Isolation rooms (use checklist)
- Air and surface sampling
- Standard of cleaning

New building indoor air quality

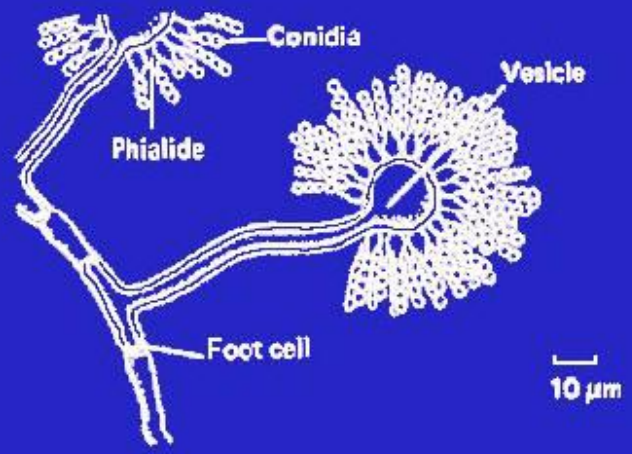
- NH&MRC guidelines IAQ
  - provides limits on gaseous & non viable particulates.
  - we need limits on viable particles.
- Outdoor air quality will impact on IAQ
- Internally generated contaminants impact on IAQ

Biological sampling

- CDC state airborne sampling is problematic
  - lack established safe level of exposure
  - lack of standard testing protocols

Biological sampling

conidiophore + conidia (Aspergillus species):



Biological sampling

- Baseline data should include seasonal variations
- Only conduct regular sampling for a reason
  - Establishment of baselines
  - during an outbreak of Aspergillus
  - during construction

Aspergillus *sp* on ceiling tiles

Biological sampling

- Consider establishing indoor baseline data
- VICPA need to be involved in setting some standards for baseline levels

Aspergillus *sp* on ceiling tiles

Biological sampling

End Note

The TBC process should include a feedback mechanism that can be incorporated into the networks post evaluation process to enhance future facility designs

- AIA Guidelines for the Design and Construction of Hospital and Health Care Facilities

References

- AIA Guidelines for the Design and Construction of Hospital and Health Care Facilities 2001
- CDC MMWR Guidelines for Environmental Infection Control in Health Care Facilities 2003
- HIS Microbiological commissioning & monitoring of operating theatres 2002
- DHSV Design guidelines for hospitals and day procedure centres 2004
- ASHRAE HVAC design manual for hospitals and clinics