

HEALTHCARE CONSTRUCTION: HOW'S YOUR IAQ?

FHEA 2014

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What Are The Issues?

- ▣ Sensitive population surrounding work area
- ▣ 1.7M HAI (74% adults/children outside of ICU)
– 2002 CDC
- ▣ Elderly/newborns HAI more likely fatal
- ▣ 100K deaths/year (estimated 5% construction related) - ASHE

- ▣ Party at fault in fatality?
 - Hospital
 - MDs
 - Contractor?

Understand the Problem

Infection Control Risk Assessment (ICRA)



**What
& Where?**



TEAM APPROACH

Owner

Contractor

Hospital IC (area work affecting)

Facilities

Design Team

Consultant

Periodic Monitoring

CDC (2003): 4 Sampling Reasons

- ▣ Support Epi investigations
- ▣ Research
- ▣ Monitor release from equipment / SBS
- ▣ QA
 - Procedure changes
 - Construction
 - HVAC??

Sampling: CDC/HICPAC 6/2003

□ In General

- Planned sampling only
- Coordinated with IC / Epi

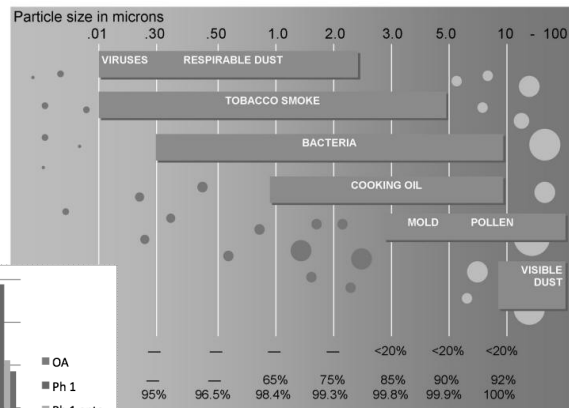
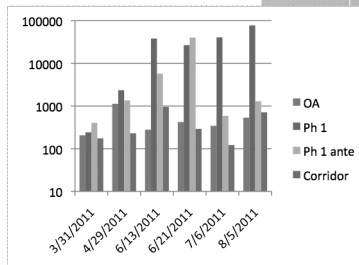


- ID related standards (none in USA)
- High volume samplers
- Use NO settle plates
- ID to species (min) or strain (preferred)
- Thermotolerant (depends)

Periodic Monitoring

During Construction

Particle counter
Real-time
Multiple class
sizes



Controlling Sources

Isolate WA

physical barriers – budget item (build & maintain)

Duration (plastic or ridged)



Controlling Sources

Isolate WA - physical barriers



Barrier Maintained?

Adjacent spaces?

Access to WA?



Controlling Sources

Isolate WA – Ventilation (Building's HVAC)

Type of return matters?

Size of duct and leakage (friend or enemy)



Controlling Sources

Isolate WA – Pressurization

- 0.03 in wc (7.0 Pascals) (FGI 2010)

Flow from clean to dirty (know path)

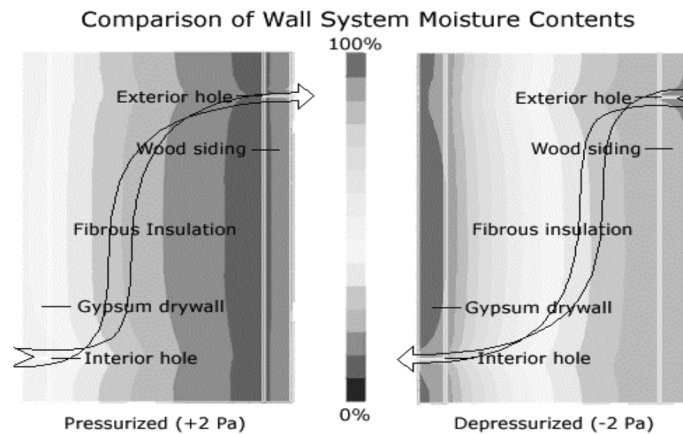
Where to discharge?

Maintenance



Comparing Wall Moisture Levels

(FL Solar Energy Center Photo)



Controlling Sources

Isolate WA – Pressurization (How?)

Barriers

Anterooms

AFDs (do the math + margin of error)

Surroundings (adjacent spaces/patient types)



Confirm & monitor

Controlling Sources

Isolate WA – Pressurization



Controlling Sources

Does my AFD work?

PHEAF Standard

ANSI/IESO (draft)

Device vs Filter

Particle Count

- 3 size classes
- Up/Downstream
- % reduction

Class

- 0 – MERV 13
- 3 – MERV 16
- 5 – HEPA



Controlling Sources

Isolate WA – dust & debris

Walk off mat

Debris Bins

Ridged (cleanable) top

Known path & timing



Daily Infection Control Plan Review and Checklist

Completed by: _____

Date : _____

Items to Note Daily

? Temperature	_____
? Relative Humidity	_____
? # NAMS Operating	_____
? OmniGuard 4 reading	_____ (" of water)

Items to Inspect/Observe Daily

? NAM /AFD filters cleaned, hoses clear, intake clear	Y	N
? Debris cart covers in place and clean	Y	N
? Ante-room vacuum, sticky mats in place	Y	N
? Ante-room door gaskets damaged	Y	N
? Egress route into hospital clear and clean	Y	N
? AHU intake protection in place (if req'd)	Y	N
? Coveralls, booties available in ante -room	Y	N

Items to Review with Crew s

- ? Dust control procedures with regards to the daily work plan
- ? Debris removal – route and procedures
- ? Proper use of cart covers, coveralls, sticky mats, wet/dry wal k off mats, etc.
- ? NAM /AFD operation and negative pressure operations
- ? Minimize traffic into the operating hospital unit
- ? Reporting procedure for any problems, issues, contamination concerns, etc.
- ? Observe and reporting of loss of negative pressure in the construction area
- ? Exterior openings (doors, windows, etc.) to be kept closed

Controlling Sources

Mechanical System

SMACNA

Advanced level of Cleanliness - hospitals

Project Specs



Controlling Sources

▣ Mechanical System

■ How Clean?

NADCA ACR 2013

$0.75\text{mg}/100\text{cm}^2$



Project Wrap Up

- ▣ Final clearance sampling after terminal cleaning (particle & microbial)
- ▣ Should occur at the end of each phase of work
- ▣ Occurs after terminal cleaning and prior to the removal of final containment barriers

- ▣ Results back to 'baseline' or better

Case Study #1

- ▣ ED Renovation
- ▣ Rural Hospital
- ▣ Long Term Maintenance Issues
 - Exhaust
 - Filtration

Case Study #2

- ▣ Shell space build-out
- ▣ Location...location...location
 - Neurological ICU below
- ▣ Containment difficulties

Case Study #3

- ▣ Lobby Renovation
- ▣ Outdoors effect the indoors?
- ▣ Handicapped transport re-routed
 - New path on the opposite side of building
 - OA intakes?

Some things in life are
pretty clearly mapped out...



IEQ is not yet one of them...

Thank You

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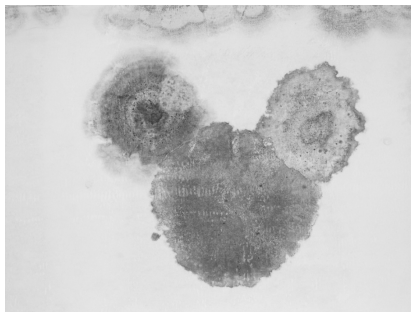
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**It's NOT mickey mouse
stuff, but It's not chicken
little either**