The Role of the Industrial Hygienist in Green Building: Principles, Problems and Performance

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INTRODUCTION

- Principles
  - Application of Industrial Hygiene Principles

- Problems
  - Application / Case studies

- Performance
  - Design vs. Performance
PRINCIPLES

- Industrial Hygienist
  - Protecting the health of workers and the public from health hazards

- Application to Green / Sustainable Building
  - Indoor Environmental Quality (IEQ)
PRINCIPLES

Assumption:

Green Building = Good IEQ = Healthy Workers
PRINCIPLES

Green Building Metrics Based on Rating Systems

Ratings based on credit/point systems

– LEED
  ▶ Prerequisites: ETS Control, Minimum ASHRAE Ventilation Rates (1 credit each)
  ▶ IEQ = 15 points out of 69 (22%)

– Green Globes
  ▶ IEQ = 200 points out of possible 1000 (20%)
PRINCIPLES

Green Building $\neq$ Good IEQ

(Not necessarily)
Can choosing certain credits = less healthy workers?
  – E.g. Developing Brownfield Site

Do IEQ credits = healthier workers?
PROBLEMS

- Phased Occupancy
- Variable Zones
- Scheduling
- Outdoor Concentrations
- Credit Mining
  - Low Hanging Fruit
- Lack of Knowledge of IH principles
  - Applicability of short-term area sampling
  - Manipulation of environment to meet sampling objectives
PROBLEMS

Case Study #1

- New Construction
- Suburban Area
- Office Building
- Unoccupied
- Retained to conduct Baseline IAQ Sampling prior to occupancy (LEED Credit 3.2)
As required, sampled for: CO, TVOC, HCHO, PM10

Observed:
- Area with several large copy/print machines, no dedicated exhaust, immediately adjacent to work stations (didn’t try for LEED Credit 5).

Results of sampling OK

In full operation will occupants be affected by copy machines??
PROBLEMS

Case Study #2

- New Construction
- High Density Urban Area
- Office Building
- Unoccupied
- Retained to conduct Baseline IAQ Sampling prior to occupancy (LEED Credit 3.2)
PROBLEMS

- As required, sampled for: CO, TVOC, HCHO, PM10 (also sampled outdoors)
- Failure: Formaldehyde concentration
- Outdoor levels very high (smog / traffic)
- Client requested re-sampling at time of lower outdoor influence (less traffic / smog)
- Are we manipulating sampling data to meet sampling objectives??
Problems

Case Study #3

- 150,000 sq. ft. call center
- Trying to achieve a Gold LEED rating
- Pressure from corporate to phase the construction and occupancy
- Retained by future building owner to conduct Baseline IAQ Sampling prior to occupancy (LEED Credit 3.2)
Problems

- Communication between future building owner, contractor, and consultant poor
  - Building was not in a phase appropriate to conduct the baseline testing
  - Contractor behind schedule
- As required, sampled for: CO, TVOC, HCHO, PM10 (also sampled outdoors)
- Failed PM10 due to active construction
- IAQ tests never re-done and occupancy occurred two weeks later despite construction
- Additional problems with water intrusion present
PERFORMANCE

- Rating Systems are primarily design based
- Not enough performance metrics
- Builders concerns stop after handover
- Possible to have poor IEQ in certified building
  - Copier example
  - Building not performing to design
PERFORMANCE

Perceptions:

- Study (2006) indicates architects rank daylight views and thermal comfort highest association with productivity

- IH’s work typically deals with pollutant source control, CO2 monitoring, etc. ( Ranked at bottom by architects).
THE FUTURE

- IH’s More Involved in Green Building Rating Systems
- Push for monitoring of performance as relates to occupant health
- Systems for complaint response and resolution
Thank You!!

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