Industrial Hygiene Exposure Assessment

Presented by:
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Chicago, IL

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Bio – Catherine E. Simmons, CIH

Catherine E. Simmons is the owner and Principal Consultant at Simmons Environmental & Occupational Health Solutions, Inc. Ms. Simmons is a Board Certified Industrial Hygienist (CIH) in both comprehensive industrial hygiene and indoor environmental quality practice. She has over 30 years of experience consulting on a wide variety of environmental health, occupational health and safety issues. Ms. Simmons’ experience includes working for local and state government agencies, private industry and consulting. Her work currently focuses on exposure assessment and reconstruction, modeling, and risk assessment.

Catherine is active on the American Industrial Hygiene Association's Exposure Assessment Strategies Committee and is the Leader of the Modeling and Data Quality Project Teams. She is a published author on mathematical and time/activity modeling of industrial hygiene exposures, asbestos exposure assessments, and is editor of the 2009 2nd edition of the Mathematical Models for Estimating Occupational Exposure to Chemicals published by the American Industrial Hygiene Association. Ms. Simmons received the AIHA Fellow Award on May 22, 2013 at the Montreal, Quebec AIHCE. Only five percent of the AIHA membership can qualify for the award which is given to those individuals who have made significant contributions to the field of industrial hygiene. Catherine is currently working on the 4th edition of A Strategy for Assessing and Managing Occupational Exposures.

Learning Objectives

• At the conclusion of this presentation, participants will be able to:
  – Identify available resources from the AIHA.
  – Understand how an exposure assessment strategy is developed and implemented.
  – Able to incorporate this information when making decisions about resources needed to conduct an exposure assessment.
Industrial Hygiene

- Industrial Hygiene is a process for managing the health risks associated with workplace exposures to chemical, physical, and biological agents to prevent occupational illness and disease.

Exposure Assessment Definition

- The process of defining exposure profiles and judging the acceptability of workplace exposures to environmental agents

Outcomes of an Effective Exposure Assessment Program

- An assessment of the potential health risks faced by all workers
- Demonstration of compliance with government and exposure guidelines
- The establishment of a historical record of exposure for all records
- Efficient and effective allocation of time and resources
Industrial Hygiene Imperative:
Know and Control All Exposures

Successful and Sustainable Approach to Occupational Hygiene:

- Assurance that all processes/materials reviewed
- Consistent approach to making exposure judgments
  - Assurance
- Systematic documentation of exposure judgments
  - Low exposure judgments
  - Qualitative judgments
- Uncertainty management—Including unpredictable changing knowledge of the health effects of chemicals
- Focused and prioritized follow-up
  - Monitoring and other information gathering
  - Controls
- Management of Change
What is the process for managing exposures?

• Recognize exposures
• Differentiate “acceptable” from “unacceptable” exposures
• Control “unacceptable” exposures
Basic Characterization

• Workplace Information
  - Process
  - Equipment
  - Controls
  - Materials
  - Local Ventilation

• Workforce Information
  - Job Titles
  - Job Functions
  - Tasks

• Other Considerations
  - Building type
  - Energy inputs
  - Equipment
  - Ventilation

• Agent Information
  - Exposure Pathways
  - Stressors (chemical, physical, biological)
  - Health Effects
  - OELs
  - Monitoring Results

Basic Characterization

• General Considerations
  - Building type
  - Energy inputs
  - Equipment
  - Ventilation

Basic Characterization

• Workplace Information
  - Process
  - Equipment
  - Controls
  - Materials
  - Local Ventilation
  - Potential emission and control points
Workforce Factors

• Understand the division of labor and work practices
• Considerations
  – Exposure patterns (jobs and tasks)
  – Routine vs. non-routine
  – Exposure
  – Frequency and duration
  – Personal protective equipment
  – Potential for skin contact

Workplace Factors

• Additional considerations
  – Routine versus auxiliary operations
  – Maintenance
  – Start-up/shut-down
  – Changes over time

Basic Characterization

• Workforce Information
  – Job Titles
  – Job Functions
  – Tasks
Workforce Factors

• Sources of information
  – Plant rosters/organizational charts
  – Job descriptions
  – Workplace observations
  – Operating procedures
  – Interviews
    • Workers
    • Management

Environmental Agents

• Identification of agents
  – Chemical
  – Physical
  – Biological
• Potential health effects
• Exposure routes - Pathways
• Quantities
• Materials inventory/MSDSs
• Monitoring Results

Environmental Agents

• Chemicals
  – Physical properties
  – Exposure limits
Environmental Agents

• Considerations
  – Raw materials
  – Intermediates
  – Products
  – Additives
  – Maintenance/construction materials

Environmental Agents

• Considerations
  – Lab chemicals
  – Hazardous waste
  – Physical agents
    • Noise/vibration
    • Radiation
    • Temperature extremes
  – Biologic agents
    • Pathogens

Establishing Exposure Limits

• Occupational exposure limits (OELs)
  – Regulatory OEL
  – Authoritative OEL
  – Internal OEL
  – Working OEL
Basic Characterization

Basic Characterization

Basic Characterization
Basic Characterization

Traditional Manufacturing Environment (past)

Traditional Industrial Operations:
- Static Production Lines
- Static Workers
- Slow Change

Full-Shift Monitoring
New Manufacturing Environment (present)

Dynamic Process Lines (Continuous Quality Improvement)
Worker Movement and Cross Training
Accelerated New Product Introduction

Full-Shift Monitoring
Task Exposure Understanding and Management

Exposure Assessment Strategy

• Basic characterization
• Exposure assessment
  – Define the similar exposure groups (SEGs)
  – Define the exposure profile
  – Judge acceptability of the profile for each SEG
• Further information gathering

Define Exposure Profile Using All Available Information

• Qualitative
• Semi-Quantitative
• Quantitative

Exposure Profile
Exposure Assessment

• Exposure assessment is a judgment
  – Acceptable health risk
  – Unacceptable health risk
  – Undetermined risk

Exposure Assessment Strategy

• Control measures
• Re-assessment
• Communication and documentation
• Implementation

Prioritization Based On:

• Exposure
• Health Effect
• Uncertainty
Continuous Improvement

Exposure Assessment Strategy

• Reflects iterative “continuous improvement cycle” or real-world assessment programs
• Assessment includes a combination of qualitative and quantitative information

Comprehensive Strategy

• Comprehensive strategy
  – Directed at assessing all exposures for all workers on all days
• Why?
  – Exposures occur whether we’re there or not
A STRATEGY FOR ASSESSING AND MANAGING OCCUPATIONAL EXPOSURES

3rd Edition - 2006

AIHA
Exposure Assessment Strategies Committee
4th Edition will be out in 2014

Exposure Assessment Tools
AIHA Exposure Assessment Strategies Committee

Tools and Links for Exposure Assessment Strategies

- Basic Exposure Assessment and Sampling Spreadsheet
- New IHSTAT with multi languages
- IHSTAT Macro Free Version
- IH MOD (program available in: English, French, German and Korean)
- IH MOD General Help
- IH SkinPerm
- IH SkinPerm Manual

http://www.aiha.org/get-involved/VolunteerGroups/Pages/Exposure-Assessment-Strategies-Committee.aspx
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