Industrial Hygiene and Occupational Health: Exposure Assessment and Control

6 – 17 September 2027
London - Central London four-star



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Introduction:

Industrial hygiene decisions go wrong when exposure data is thin, sampled on the wrong workers or compared with a limit nobody has interpreted. Sites then over-rely on respirators, miss chronic dust, solvent, noise and heat exposures, and discover occupational disease years later. This Core Concept course trains specialists to anticipate, recognise, evaluate and control workplace agents: toxicology, exposure limits, similar exposure groups, air, noise and heat measurement, ventilation, respiratory protection and health surveillance. Participants build a Workplace Exposure Assessment and Control Plan for their own site.

Course Objectives:

- Characterise chemical agents by route of entry, dose-response and target organ to set sampling priorities
- Define similar exposure groups and design a sampling strategy judged against ACGIH TLVs and BEIs
- Measure gases, vapours, particulates, noise and WBGT heat stress with calibrated personal and area instruments
- Specify and verify engineering controls, local exhaust ventilation and a respiratory protection programme
- Interpret exposure datasets statistically and link results to health surveillance and occupational health programme decisions
- Produce a Workplace Exposure Assessment and Control Plan for a real site

Target Audience:

- Specialists responsible for workplace exposure surveys and sampling campaigns
- Occupational health advisers responsible for health surveillance and fitness-for-work programmes
- HSE engineers responsible for ventilation, enclosure and process controls on chemical and dusty operations
- Occupational physicians and nurses responsible for interpreting exposure and biological monitoring results
- Technical staff responsible for respiratory protection, hearing conservation and heat stress programmes

Course Outline:

Day 1: Industrial Hygiene Foundations, Toxicology and Routes of Entry

- Anticipation, Recognition, Evaluation, Control and Confirmation Cycle
- Routes of Entry: Inhalation, Skin Absorption, Ingestion and Injection
- Dose-Response Curves, Target Organs and Acute Versus Chronic Effects
- Agent Profiles for Organic Solvents, Metal Fumes, Crystalline Silica and Irritant Gases
- Walkthrough Recognition Survey and Process Chemical Inventory

Day 2: Occupational Exposure Limits and Exposure Assessment Strategy

- ACGIH TLV Categories: Time-Weighted Average, Short-Term and Ceiling Values
- ACGIH BEIs and Biological Monitoring Alongside Air Sampling
- Extended Work Shift Adjustment and Additive Mixture Calculation
- Similar Exposure Group Definition by Process, Task and Agent
- Exposure Judgement Categories: Acceptable, Unacceptable and Uncertain

Day 3: Air Sampling for Gases, Vapours and Particulates

- Personal Sampling Pump Calibration and Sampling Train Assembly
- Charcoal and Silica Gel Sorbent Tubes with Gas Chromatography Analysis
- Passive Diffusive Badges and Direct-Reading Gas Detectors
- Inhalable and Respirable Dust Fractions Using Cyclone Samplers
- Field Blanks, Chain of Custody and Concentration Calculation in mg/m3 and ppm

Day 4: Noise, Hearing Conservation and Heat Stress Measurement

- Sound Level Meter and Noise Dosimeter Surveys of Daily Personal Exposure
- Octave Band Analysis for Noise Control and Hearing Protector Selection
- Hearing Conservation Programme: Audiometric Testing and Threshold Shift Review
- WBGT Measurement and Work-Rest Assessment Under ISO 7243:2017
- Hot Climate Heat Strain Controls: Acclimatisation, Hydration and Physiological Monitoring

Day 5: Week-One Integration: Guided Exposure Survey Cases

- Guided Case: Degreasing and Spray Paint Shop Solvent Exposure Groups
- Guided Case: Quarry and Cement Plant Respirable Dust and Noise Survey
- Guided Case: Outdoor Maintenance Crew Heat Stress Evaluation
- Sampling Plan Worksheet: Sample Numbers, Duration and Worst-Case Selection
- Week-One Exposure Findings Summary and Peer Critique

Day 6: Vibration, Radiation, Ergonomic and Biological Agents

- Hand-Arm and Whole-Body Vibration Measurement with Triaxial Accelerometers
- Ionising Radiation at Overview: Dose Quantities, Personal Dosimetry and Specialist Referral
- Non-Ionising Radiation at Overview: Ultraviolet, Laser, Radiofrequency and Optical Sources
- Ergonomic Risk Factors: Posture, Force and Repetition Scoring Tools
- Biological Agents: Legionella in Water Systems, Bioaerosols and Mould Assessment

Day 7: Hierarchy of Controls, Local Exhaust Ventilation and Respiratory Protection

- Control Option Appraisal: Elimination, Substitution, Enclosure and Process Change
- Local Exhaust Ventilation Design: Hood Selection, Capture Velocity and Duct Transport Velocity
- LEV Commissioning and Periodic Testing: Pitot Traverse, Anemometry and Smoke Visualisation
- Respiratory Protection Programme: Assigned Protection Factors and Respirator Selection
- Respirator Fit Testing, Cartridge Change Schedules and Programme Audit

Day 8: Health Surveillance, Occupational Health Programme and Risk Communication

- Health Surveillance Design: Pre-Placement, Periodic and Exit Medical Assessments
- Biological Sample Timing, Interpretation and Worker Confidentiality Rules
- Occupational Health Programme Roles: Hygienist, Physician, Nurse and Line Management
- Exposure Result Briefings for Workers, Supervisors and Safety Committees
- Occupational Disease Case Investigation and Return-to-Work Coordination

Day 9: Exposure Data Statistics, Programme KPIs and Improvement

- Lognormal Exposure Distributions: Geometric Mean and Geometric Standard Deviation
- Upper Tolerance Limits and 95th Percentile Exceedance Fraction Analysis
- Bayesian Exposure Category Updating with Professional Judgement
- Exposure Database Structure and Trend Tracking by Similar Exposure Group
- Industrial Hygiene Programme KPIs: Survey Coverage, Control Effectiveness and Overdue Actions

Day 10: Capstone: Workplace Exposure Assessment and Control Plan

- Capstone Scoping: Selecting a Workplace and Priority Agents from Own Organisation
- Similar Exposure Group Register and Sampling Strategy Build
- Exposure Assessment Report with Statistical Interpretation of Results
- Prioritised Control, LEV Upgrade and Health Surveillance Action Schedule
- Workplace Exposure Assessment and Control Plan Presentation and Peer Challenge

Skills You Will Gain:

- Toxicological Hazard Characterisation
- Similar Exposure Grouping
- Personal Air Sampling
- Occupational Noise Dosimetry
- Heat Stress Evaluation
- Ventilation Performance Testing
- Respirator Programme Management
- Exposure Data Statistics

Why Attend This Course:

- Return with a Workplace Exposure Assessment and Control Plan built around your own processes, agents and workforce
- Defend a sampling result, exposure judgement or control recommendation when management or a physician questions it
- Spend the second week on vibration, radiation, biological agents, LEV testing, surveillance and statistics that a one-week course leaves out
- Compare survey and control practice with peers from oil and gas, petrochemicals, mining, manufacturing and healthcare

Conclusion:

Exposure control only protects workers when the right people are sampled, results are interpreted against a sound limit and controls are proven to work. The first week builds toxicology, exposure limits, similar exposure groups and measurement of air contaminants, noise and heat. The second week adds vibration, radiation, ergonomic and biological agents, ventilation and respiratory protection, health surveillance and exposure statistics, and closes with a Workplace Exposure Assessment and Control Plan for each participant's site.