


Occupational H&S



**Workplace
Health & Safety**

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I. Definitions and Overview

A. Goal: The Occupational Health & Safety Professions work to

- > Recognize,
- > Evaluate and
- > Control

hazards to health and safety in the work place.

B. Current Perspectives: Current rates of occupational injury and illness are declining, but still not acceptable:

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I. Definitions / Overview
continued

C. Trends in demographics --> work force includes more women, more ethnic diversity

- Nature of work in USA changing toward service, high technology
- Growing use of temporary or contract workers: limited benefits and employer responsibility
- Emerging work-related health problems: musculo-skeletal disorders, work performance monitoring (eg, by computer), social isolation

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Occupational I njuries and I llness 2002

US workforce: 135,000,000 FTEs*

Fatal Injuries: 5524 total**
4.0 cases/100,000 FTE workers

- full-time equivalent workers

→ Highway accidents, intentional assault, struck by object, falls from elevation

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Occupational I njuries and I llness 2002 continued




- ❖ Total Injuries and Illness:
 - 7,290,000 total
 - 5.4 cases/100 FTE workers
- > Manufacturing, construction, agriculture -- includes fisheries & forestry.
(This statistic excludes government employees, self-employed workers, and farms with <11 employees)



- ❖ Illnesses:
 - 388,800 total newly diagnosed cases
 - 24.7/10,000 FTE workers
- > Manufacturing, agriculture, transportation
- > Noise-induced hearing loss, skin diseases, asthma

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Occupational I njuries and I llness 2002 continued



- ❖ Data Quality: It is widely agreed that these data underestimate the true incidence rates, especially for continuing chronic illnesses, but the extent of the error is not known.

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II. Hazard Recognition



A. Product identification: labeling (what's in that tank rumbling down the highway?), material safety data sheets (MSDS - everything causes cancer, or everything is safe)

B. Hazard communication: effectiveness of worker education is highly variable

C. Risk assessment: how do we balance magnitude of health hazard against cost and ease of prevention? Must we accept work-related hazards as "just part of the job?"


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Examples of Industrial Agents Associated with Cancer

- ❖ I. Confirmed Human Carcinogens
 - Asbestos Fibers (lung, pleura, GI tract)
 - Coke Oven Emissions (lung, kidney, skin)
 - Benzene (Bone marrow)
- ❖ II. Suspected Human Carcinogens
 - Isopropyl alcohol production (lung)
 - Benzo(a)pyrene (skin, lung, bladder)

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III. Hazard Evaluation




A. Air sampling: one principal function of the Industrial Hygienist

B. Biological monitoring: evaluates the workers' total exposure by all routes, and from all sources

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III. Hazard Evaluation



C. **Standards (Limits) for Occupational Exposure:** present status and controversies. OSHA, Washington Department of Labor & Industries

D. **Exposure measurement for epidemiologic studies -**
retrospective: is exposure that occurred 20 years ago associated with illness occurring today?
Prospective: will today's exposures be associated with illness in 20 years?

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EXPOSURE STANDARDS AND GUIDELINES

1. **General Characteristics**

- Assume that there is a threshold below which harmful biological effects are not detected
- Reflect the quality of the data used by the standard setting agency
- May not protect all people in all situations
 - Individual health status
 - Work rate
 - Work environment (temperature, humidity, multiple exposures)
- Compliance measurements may be imprecise, inaccurate

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EXPOSURE STANDARDS continued

2. **Basis for standards:**

- Biological Effect**
 - irritation
 - asphyxiation
 - anesthesia, narcosis
 - systemic poisoning
 - carcinogenesis, mutagenesis, teratogenesis
 - other reproductive effects
- Economic and political considerations, e.g., noise exposure
- Analytical convenience, e.g., asbestos

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EXPOSURE STANDARDS continued

3. Sources of the standards:

- a. American Conference of Governmental Industrial Hygienists: TLV
- b. OSHA (Occupational Safety and Health Administration) PEL
- c. State Agencies (Washington Dept. of Labor and Industries): State PEL
- d. NIOSH (National Institute for Occupational Safety and Health) Proposes standards for OSHA adoption, published as Criteria Documents; does occupational health research
- e. Others: US Dept of Energy, National Council on Radiological Protection and Measurement

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IV. Hazard Control

A. Legislative Basis:

- > Occupational Safety and Health Act (OSHA) of 1970;
- > built upon state workers' compensation and federal contract requirements begun early in 20th Century

B. Strategies:

- > source
- > transmission pathway
- > receptor

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IV. Hazard Control Continued

❖ **Hierarchy of Methods for Exposure Control**

1. Emission Control

- a. Administrative
 - 1) Emission permits, inspections
 - 2) Management practices
 - 3) Fees and penalties
- b. Technological
 - 1) Collection Efficiency: mass removed/mass presented
 - 2) Exhaust gas control

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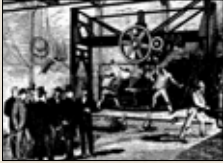
IV. Hazard Control continued

❖ Hierarchy of Methods for Exposure Control

2. Transmission Controls
 - a. Ambient Contaminant Limits
 - b. Dilution or Local Exhaust Ventilation
3. Receptor Controls
 - a. Clothing
 - b. Personal Protective Equipment
 - c. Time / Distances / Shielding
 - d. Behavior and Education
 - e. Medical and Epidemiological Surveillance

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IV. Hazard Control continued




C. Current Status & Controversies:

- Work place vs. Environmental regulation:
 - occasionally priorities are reversed and workers suffer

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Questions



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Next Lesson

**Energy
Production
& Health**

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