Toluene

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Occupational Uses

- Gasoline Mixtures
- Paint Solvents
- Benzene Production
- Adhesives
- Plastic production
- Nail Polish

Occupational Exposure

- Nail Technicians
- Construction Workers
- Print Shop Workers
- Shoemakers
- Auto repair technicians
- Painters

Toxicological Data

- Routes of Exposure:
  - Ingestion
  - Skin Contact
  - Inhalation
- Acute Effects:
  - Dermatitis
  - Eye, nose & respiratory irritation
  - Dizziness
  - Headache Euphoria
  - Numbness/Tingling of Skin

Chronic Effects:
- Liver Damage
- Kidney Damage
- Birth Defects
- Central Nervous system Damage
- Damaged color-vision

Case Study

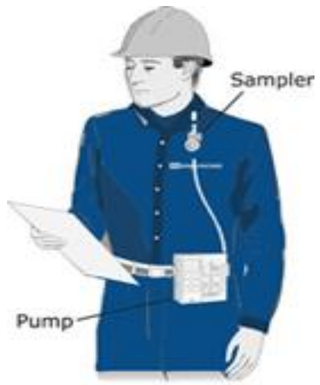
- Kao et al. (2014)
  - A 49-Year-old man was exposed to extremely high levels of toluene during a lacquer thinner explosion.
  - A fire ignited while stripping a floor with lacquer thinner which caused 2nd and 3rd degree burns of the face and extremities.
  - Patient suffered from structure alteration of brain white matter and slipped into coma. Patient then died of multiple organ failure.
  - Conclusion: The lacquer thinner explosion exposed the patient to an extraordinarily high concentrations of toluene which resulted in severe neurologic deterioration and disruption of the blood brain barrier.
- Lin and Liu (2015)
  - 61-year-old material processing factory worker suffered from deteriorating mental status and unsteady gait for 2 months.
  - Painted for 5 days in a poorly ventilated room
  - Suffered from toluene intoxication which caused acute brain damage from exposure to painting chemicals.

Sampling Methods

OSHA Sampling Method 2535:
Sampler: Tube w/reagent-coated glass
Flow Rate: 0.2 to 1 L/min
Equipment
- Flexible Tubing
- Personal Sampling Pump
- Glass tube Containing wool
- Sorbent Tube (Coconut Shell Charcoal)

Analytical Methods

- Gas Chromatography (GC) using a flame ionization detector (FID).



Control Measures

Engineering Controls
Exhaust Ventilation System
Overspray Filters

OSHA: 1910.94, Ventilation. Specifies construction, capture velocities and ventilation volumes for spray finishing operations, such as those in which toluene might be used.

Personal Protective Equipment (PPE) :

Respirators ,Gloves. Safety Glasses, Protective clothing

Administrative Controls: Proper labeling of Toluene ,Available SDS and written hazard communication program, Training on Chemical Hazards, Confined Space Training, Worker Rotation, Proper Chemical Storage

Occupational Exposure Limits (OELs)

- OSHA Permissible Exposure Limit (PEL) (29 CFR 1910.100 Table Z-2)
  - 8-hr TWA: 200 ppm
  - Ceiling Limit: 300 ppm
  - Peak: May not exceed 500 ppm for a single time period up to 10 minutes during an 8-hour shift.
- NIOSH Recommended Exposure Limit (REL)
  - TWA: 100 ppm (375 mg/m3)
  - STEL: 150 ppm (560 mg/m3)
  - IDLH: 500 ppm
- ACGIH TLV
  - 20 ppm (75mg/m3)

Epidemiological Studies

- NC Community TDI Report
  - 1997 - a foam plant in NC was closed because it was labelled as a public health nuisance. The plant released Toluene and other chemicals into the air and people in nearby communities complained of health problems.
  - The study examined residents in 5 areas near Toluene plants (Hickory, Asheboro, Cornelius, Conover).
  - 1 ppt was detected in air samples which is lower than the safe lifetime exposure level (10ppt).
  - Residents had antibodies for TDI in target and comparison areas.
  - There were no significant findings of a relationship between poor health and Toluene processing plants. However, in some areas the were higher rates of breathing problems like asthma.

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