

Lethal Exposure to Methylene Chloride during Bathtub Refinishing

U.S. Department of Labor

Occupational Safety and Health Administration

www.osha.gov (800) 321-OSHA (6742)

INCIDENT SUMMARY

Incident type:Chemical exposure
 Weather conditions/Time of day: Afternoon
 Type of operation: Paint stripping
 Size of work crew: 1
 Worksite inspection conducted: Yes
 Competent safety monitoring on site: No
 Safety and Health program in effect: No
 Training and education for workers: No
 Occupation of deceased worker: Painter
 Age/Sex of deceased worker: 30/M
 Time on job: 2 years
 Time at task: Daily/shift
 Time employed/classification (FT/PT/Temporary): Temporary
 Language spoken: English
 Union/Non-Union: Non-Union



Photo courtesy of California Department of Public Health

Workers use a methylene chloride-based stripper to remove paint from a bathtub prior to refinishing.

You Have a Voice in the Workplace

The *Occupational Safety and Health Act of 1970* affords workers the right to a safe workplace (see OSHA's **Worker Rights** page, www.osha.gov/workers). Workers also have the right to file a complaint with OSHA if they believe that there are either violations of OSHA standards or serious workplace hazards.

How OSHA Can Help

For questions or to get information or advice, to report an emergency, fatality, hospitalization, amputation or loss of an eye, or to file a confidential complaint, contact your nearest OSHA office, visit www.osha.gov or call our toll-free number at 1-800-321-OSHA (6742), TTY 1-877-889-5627. It's confidential.

More Information

OSHA standards and regulations:
www.osha.gov/law-regs.html

OSHA publications:
www.osha.gov/publications

OSHA-approved state plans:
www.osha.gov/dcsp/osp

OSHA's free On-site Consultation services:
www.osha.gov/consultation

Training resources:
www.osha.gov/dte

Help for Employers:
www.osha.gov/employers

BRIEF INCIDENT DESCRIPTION

A temporary worker died while removing the coating from a bathtub in a residential building. The worker was alone in a small bathroom where he poured paint remover containing 85-90% methylene chloride into the bathtub and began scraping. The only ventilation was a partially open window. Two hours later, the apartment resident found the worker unconscious and slumped over the bathtub. The resident pulled the worker away from the bathtub and called an ambulance. The worker was taken to the hospital, where attempts to resuscitate him were unsuccessful. The coroner determined that asphyxiation, combined with acute methylene chloride toxicity, caused the worker's death.

Likely Causes

Exposure to methylene chloride during bathtub refinishing is extremely hazardous. In small spaces and poorly ventilated settings, methylene chloride vapors rapidly reach toxic levels and reduce oxygen levels through displacement. Nationwide, 17 workers died between 2000 and 2015 while using methylene chloride paint stripping products to refinish bathtubs.

Records show that the employer had previously taken the worker to the hospital after a similar incident. The employer, though knowledgeable about the chemical's hazards, did not institute and enforce safe work practices, or adhere to OSHA's methylene chloride standard requirements. The following employer actions contributed to this worker's death. The employer did not:

- Consider safer alternatives as a substitute for methylene chloride.
- Evaluate methylene chloride exposures prior to beginning the work.
- Evaluate and implement feasible engineering controls.
- Provide a supplied air respirator where engineering controls were infeasible or ineffective.

- Provide personal protective equipment (PPE) to prevent exposure through skin absorption.
- Train workers to recognize the hazards and the protective measures needed when working with methylene chloride.

When used as a stripping agent in poorly ventilated spaces, methylene chloride vapors can build to high levels, causing direct harm to the brain and central nervous system, and could potentially lead to asphyxiation. The worker's blood/methylene chloride level was 89 micrograms per milliliter (mg/ml), indicating the atmospheric exposure was likely over the concentration considered Immediately Dangerous to Life and Health (IDLH) set by the National Institute for Occupational Safety and Health (NIOSH). The worker's carboxyhemoglobin level was elevated to 14%, likely resulting from methylene chloride that was metabolically converted to carbon monoxide.

INCIDENT PREVENTION — SAFER ALTERNATIVES

Employers are strongly encouraged to provide safer alternatives to methylene chloride paint stripping products, such as water-based and vegetable-based products. The California Department of Public Health provides some information on safer [alternatives](#). If a safer alternative is not available or feasible, then employers must implement the requirements in OSHA's Methylene Chloride standard at [29 CFR 1910.1052](#) and all other applicable OSHA standards to protect workers. To prevent worker fatalities when using methylene chloride paint stripping products, employers must:

- Perform monitoring and air sampling to determine worker exposure to methylene chloride, [§1910.1052\(d\)\(2\)](#).
- Provide and maintain effective engineering and work practice controls to reduce worker exposure to at or below 25 ppm as an 8-hour time-weighted average PEL or 125 ppm as determined over a 15-minute STEL, [§1910.1052\(f\)\(1\)](#).
- Establish and implement a respiratory protection program in accordance with [§1910.134](#). The program must cover issues such as proper respirator selection, medical surveillance, and worker training, to include proper respirator use, maintenance and cleaning. A full-face, atmosphere-supplying respirator is currently the only acceptable respirator for methylene chloride.
- Provide adequate ventilation, [§1910.94](#). **Bathroom fans and/or open windows do NOT provide adequate ventilation.**
- Provide workers with appropriate personal protective equipment and enforce its use, [§1910.132](#) and [§1910.1052\(h\)](#).
- Provide essential training to workers on methylene chloride hazards as required by OSHA's Hazard Communication standard, [§1910.1200](#), and Methylene Chloride standard, [§1910.1052\(k\)](#) and [\(l\)](#).

NOTE TO HEALTH CARE PROVIDERS AND MEDICAL EXAMINERS

In cases where methylene chloride exposure is suspected, it is important to draw blood for dichloromethane (i.e., methylene chloride) and carboxyhemoglobin. In several fatal cases, workers went to the emergency department with solvent over-exposure symptoms but were released, went back to the same work, and died. Ask for Safety Data Sheets (SDSs), counsel workers to follow safe work practices, and provide work restrictions when appropriate to prevent such fatalities. Call OSHA at (800) 321-OSHA (6742) if you suspect that a workplace is not protecting workers from this hazard.

Medical Surveillance, Emergency Treatment and Medical Removal

- Employers must make medical surveillance available to workers who are or may be exposed to concentrations at or above the Methylene Chloride standard's 12.5 ppm action level (AL) for 30 or more days per year, or above the standard's 8-hour TWA of 25 ppm PEL or 15-minute 125 ppm STEL for 10 or more days in a year ([§1910.1052\(j\)\(1\)\(i\)](#)).
- Appendix B of the standard describes the toxicology of methylene chloride and provides clinicians with useful information on medical evaluation.
- Employers must ensure the availability of appropriate emergency medical treatment and decontamination ([§1910.1052\(j\)\(6\)\(i\)](#)).
- Employers must provide medical removal protection benefits when a medical determination recommends removal because the worker's exposure to methylene chloride may contribute to or aggravate the worker's existing cardiac, hepatic, neurological (including stroke) or skin disease ([§1910.1052\(j\)\(11\)](#)).

ADDITIONAL RESOURCES

The following resources provide additional information on how to protect workers using methylene chloride in paint stripping operations and related workplaces.

- OSHA Safety and Health Topics Page: [Methylene Chloride](#)
- OSHA-NIOSH Hazard Alert: [Methylene Chloride Hazards for Bathtub Refinishers](#)
- OSHA Fact Sheet [HIPAA and OSHA Whistleblower Complaints](#)
- California Department of Public Health: [Preventing Worker Deaths from Paint Strippers Containing Methylene Chloride](#)
- Center for Construction Research and Training (CPWR): [Construction Solutions-Safer Alternatives to Paint Removers Containing the Solvent Methylene Chloride](#)

Note: The described case was selected as being representative of improper work practices which likely contributed to a fatality from an incident. The incident prevention recommendations do not necessarily reflect the outcome of any legal aspects of this case. OSHA encourages your company or organization to duplicate and share this information.

This Fatal Facts is not an OSHA standard or regulation and it creates no new legal obligations. The recommendations contained herein are advisory in nature and are intended to assist employers in providing safe and healthful workplaces. The Occupational Safety and Health Act of 1970 (OSH Act) requires employers to comply with safety and health standards promulgated by OSHA or by an OSHA-approved state plan. The requirements of OSHA-approved state plans can be reviewed by selecting the state's website at: www.osha.gov/dcsp/osp. The OSH Act's General Duty Clause, Section 5(a)(1), requires employers to provide employees with a workplace free from recognized hazards likely to cause death or serious physical harm.

For assistance, contact us. We can help. It's confidential.



www.osha.gov (800) 321-OSHA (6742)



U.S. Department of Labor

DTSEM FF-3883 8/2016