

Welding on Epoxy Coatings Can Cause Irritating Fumes

Title: Welding on Epoxy Coatings Can Cause Irritating Fumes

Date: December 17, 1998

Identifier: 1998-RL-HNF-0036

Lessons Learned Statement:

Failure to remove epoxy coatings in hidden areas such as joint seams prior to welding may result in generation of hazardous fumes.

Burning epoxy paint can produce large amounts of smoke containing carbon monoxide, carbon dioxide, nitrogen oxides, hydrogen chloride, iron oxides, chlorine, aldehydes, acrylic monomer fumes, sulphur oxides, aromatic amines, ammonia, isocyanates, hydrogen cyanide, and, at high temperatures, trace amounts of 3,3' dichloro-benzene.

Discussion of Activities:

On March 20, 1998, a construction employee was welding on a metal doorframe being installed between a crane bay and a corridor in the 105 KW Basin. The doorframe had been coated with two 2-part mixtures of epoxies. The epoxy coatings were ground off the face of the doorframe before welding began. When welding commenced, an irritating smoke was produced. Doors were opened to ventilate the immediate area allowing circulation of the smoke and fumes to adjacent areas. Several days later, employees became concerned about their potential exposures to the epoxy coatings. A total of 18 employees were examined at HEHF.

Analysis:

The requirement to remove coatings from metal surfaces for 2" on both sides of the intended welds before welding was met but some coating material was left in the creases of the doorframe.

Opening doors to increase airflow resolved the problem in the immediate area, but created problems for others in adjacent areas.

Work was stopped on more than one occasion to address employee concerns related to smoke and fume inhalation from the welding process.

The applicable Material Safety Data Sheets (MSDS) focused on the epoxy application process instead of the welding decomposition process.

When an employee remembered a similar situation with this product involving "sensitizers", a thorough industrial hygiene evaluation was conducted and additional PPE and controls implemented.

The ISMS Core Function *Analyze Hazards and Requirements* may have prevented this incident had it been more effectively implemented. If the planners had known of the

hazards of burning the epoxy coating, they may have required more diligence in removing all traces of the coating.

Recommended actions:

Remove all traces of epoxy products from identified areas prior to heating or welding. If that cannot be accomplished, then administrative controls must be implemented and appropriate personal protective equipment must be prescribed and used.

An effective program for reporting Health and Safety concerns can result in increased worker awareness and participation and effective resolution.

Personnel responsible for the maintenance of facility ventilation should be included in job planning when hazardous gases can be generated.

Whenever any hot work (welding, grinding, soldering, brazing, etc.) is performed on any painted surface, an industrial hygienist should review the work package or AJHA to evaluate potential hazards and to prescribe corrective measures.

Estimated Savings/Cost Avoidance: N/A

Priority Descriptor: YELLOW/Caution

Functional Categories (DOE): [Occupational Safety and Health](#)

Functional Categories (Hanford specific): [Mechanical/Structural](#)

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References:

FDNW Construction Lessons Learned 98-006
FDNW Welding Manual, 134.500.8102, WS-1.