

The FIHRP *Forest Industry Health Research Program* has published a report titled "*Metal Fume Concentrations during Welding in Confined Spaces*". The report is available to members on the Pulp and Paper Forum's web site at www.paperforum.com or contact **Agi Lee** by phone (604) 777-1533, by fax (604) 777-1567, or by e-mail at alee@paperforum.com. Non-members of the Forum may be charged for the report.

Area or personal samples were collected at five pulp and paper mills during welding or grinding in confined space vessels. Two mills submitted samples collected during shutdowns in 2000 and three mills in 2001. The results indicated that:

1. Airborne concentrations of metals in confined space vessels appear to be related to specific welding operations, and do not show a relationship with vessel volume or ventilation rate. Samples collected at Mill A suggested a possible trend with higher metal concentrations measured in smaller vessels. This trend was not seen when results for five mills were examined.
2. Gouging on either stainless or mild steel appears to produce the highest metal concentrations and the highest exposures for welders to mixtures of metals.
3. Chromium concentrations exceeded the 8-hour exposure limit during stick welding stainless to mild steel, stainless steel overlay on carbon steel, and gouging on stainless or mild steel. The exposure limit of 0.025 mg/m³ for chromium (VI) compounds, water soluble, was chosen for comparison with the results based on information from a review of welding fumes done by the International Agency for Research on Cancer.
4. Overall, respiratory protection worn by welders was adequate to protect them from excessive exposure to mixtures of airborne metals. Most welders wore a half-face respirator with P100 cartridges.
5. Three samples from a total of 35 showed that respiratory protection worn by welders was not always adequate. The three situations involved gouging operations. One welder had a total exposure ratio of 83 based on the mixture of metals in the air. A full-face, air-purifying respirator with filter cartridges would provide adequate protection up to a total exposure ratio of 50.

METAL FUMES IN CONFINED SPACES

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