

# Exposure to chemical agents in aluminium potrooms

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## KEY WORDS

Chemical hazards; modernization; aluminium smelter

## SUMMARY

**Objectives:** *To assess the effects of modernization of aluminium production on reducing the chemical health hazards in the working environment in aluminium potrooms (smelter). Modernization included the introduction of a technique of point feeding of alumina and aluminium fluoride into the pots, semi-automatic equipment and computerized control. Methods:* Periodical environmental measurements of chemical substances, dusts containing alumina and fluorides, and gases, i.e., carbon monoxide, carbon dioxide, sulphur dioxide, hydrogen fluoride, nitrogen dioxide, and difluorosulphide, were performed at the same workplaces before (1986–1988) and sixteen years later, after modernization (2004). The measured values were compared with the recommended occupational safety and health standards. **Results:** *The concentrations of total dust (alumina and fluorides) and gases, i.e., carbon monoxide, carbon dioxide, sulphur dioxide, hydrogen fluoride and phenol, were above the recommended standards in 76.6% (95/124) of the samples before modernization and in only 23.8% (57/240) of the samples tested after modernization. Before modernization in almost all jobs the workers were simultaneously exposed to higher concentrations of all chemical agents present in the working environment. After modernization high concentrations of hydrogen fluoride were the primary pollutant in this plant (GM=4.5451 ppm), while the presence of other gases was significantly reduced. Dusts containing alumina and fluorides and hydrogen fluoride gas were still present in considerable concentrations in the working environments of jobs such as changing and covering of anodes. Conclusion:* *The modernization of the aluminium smelter plant reduced the concentrations of the most harmful substances in the working environment and reduced the number of jobs where workers were simultaneously exposed to a variety of health hazards.*