

Increased clumsiness in former welders

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This is a picture from the Gothenburg Historical Shipyard Society. Credit: Gothenburg Historical Shipyard Society

Welders who are exposed to manganese from welding fumes, risk developing increased clumsiness – and the result may remain decades after exposure has ceased. This is the finding of a study at the University of Gothenburg, Sweden, of former shipyard workers.

It is estimated that 35,000 people in Sweden work full-time with welding, while many more carry out welding as one of several workplace activities. Previous research has shown that the concentration of manganese in the air during welding often lies at levels that can give immediate negative effects on the central nervous system, but the long-term effects of exposure to manganese have been essentially unexplored.

Effects on fine motor skills

Scientists at the Sahlgrenska Academy, University of Gothenburg, have now shown in a study of former shipyard workers in Gothenburg that long-term exposure to manganese can give permanent effects on fine motor skills almost 20 years after the exposure has ceased.

Test on Gothenburg welders

Scientist Gunilla Wastensson of the Department of Occupational and Environmental Medicine at the Sahlgrenska Academy has examined 17 former shipyard welders who worked at the shipyards in Gothenburg. The average period that had passed since they stopped welding was 18 years. The average period during which the participants had worked with welding was 28 years. They were given several tests to measure manual dexterity and motor speed, eye-hand coordination, tremor and balance. Their test results were compared to 21 other shipyard workers who had worked with other tasks, such as filers and electricians.

Total individual mangan exposure

The investigation showed that shipyard welders performed less well than the other shipyard workers in a test of manual dexterity and motor speed. The scientists also calculated a measure of total manganese exposure for each individual.

"The investigation showed that individuals with higher total manganese exposure had a poorer performance. We interpret this as a possible remaining effect of previous exposure to manganese, which is remarkable, given that so long a period had passed since they stopped welding", says Gunilla Wastensson.

First study of long-term effects

The study is the first to examine the effects a considerable period after the exposure to manganese has ceased. The results are worrying, but Gunilla Wastensson emphasises that they must be confirmed in further studies. "Recent improvements in the work environment mean that the levels are lower now, but further measures to improve the situation associated with exposure to manganese at work are important", she says.

Manganese

Manganese is a metal that occurs naturally in the environment and in our bodies, where it is important in processes such as the turnover of carbohydrates and fats. People who are occupationally exposed for long periods to dust and fumes that contain high concentrations of manganese run the risk of developing, in rare cases, manganism. This is a disease with symptoms similar to those of Parkinson disease. It is caused by an accumulation of manganese in particular regions of the brain known as the basal ganglia, which are important for controlling body movement. Manganese is slowly excreted once exposure to the metal ends. The threshold limit value for manganese in air has been severely reduced in recent years, and is now 0.2 mg/m³ for total dust, and 0.1 mg/m³ for respirable dust. There is, however, a serious risk that the threshold limit value for [manganese](#) is exceeded at many [welding](#) locations. A proposal has been put forward in the US to reduce the threshold limit value to 0.02 mg/m³.

Provided by University of Gothenburg

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