



HETA 92-0174-2363 NIOSH INVESTIGATOR:
OCTOBER 1993 STEVEN R. SHORT, D.O.
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CLEVELAND, OHIO

I. SUMMARY

On January 9, 1992, the National Institute for Occupational Safety and Health (NIOSH) received a request through the Sentinel Event Notification System for Occupational Risk (SENSOR) Program, from the Ohio Department of Health (ODH) to assist them in investigating a death of a worker who died from silico-tuberculosis that was acquired from a **sandblasting** operation at the Commercial Steel Treating Company in Cleveland, Ohio. This sentinel occupational event of silicosis, was recognized by an infectious disease physician while treating the patient for *Mycobacterium kansasii*. The physician reported the case of end stage silicosis to the ODH who identified the case as a "sentinel" event and requested a more thorough evaluation of the worksite for other possible silicosis cases.

On January 22, 1992, a team of investigators from ODH and NIOSH went to the facility and obtained information regarding the operation of the plant. The Ohio Department of Health obtained a total of four air samples of the sandblasting operation. One personal sample was collected outside of the blaster's helmet. Three area samples were collected inside the sandblasting room, immediately outside on the back of the sandblasting room, and in the center of the facility. All of the samples were evaluated for airborne respirable silica. The time-weighted average (TWA) respirable quartz concentration of the personal sample was 11.5 mg/m³. The area sample TWA concentrations of respirable quartz were 24.4 mg/m³, 0.39 mg/m³, and undetected, respectively. All except the last are above the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) of 0.1 mg/m³, and the NIOSH Recommended Exposure Limit of 0.05 mg/m³.

Aware of the risk to current employees of excess exposure to the silica levels detected, on March 4, 1992, the ODH requested that NIOSH evaluate the respiratory health of the workers at the facility. NIOSH investigators reviewed the pathology specimens and chest radiographs of the initial case, to confirm the presence of silicosis, and on March 31 and April 1, 1992, conducted a medical evaluation of the workers at Commercial Steel Treating Company. The evaluation included a medical and occupational history questionnaire, pulmonary function tests, and a chest x-ray. There were 16 males who participated in this survey. Thirteen of the participants currently worked at the facility, while 3 were former employees. The workers ranged in age from 20-78; the average age was 42. Tenure at the facility ranged from 2 months to 51 years. The average tenure was 15 years. Eleven of the workers were current or former sandblasters in the facility.

Five individuals (31%) had abnormal pulmonary function results (three with mild obstruction, one with mild restriction, and one with severe restriction and moderate obstruction). Chest x-rays were obtained on all individuals and were read by three B readers. Four of the employees had opacities in the lung suggestive of tissue reaction to silica dust (profusion of 1/0 or greater), one with advanced silicosis (International Labour Organization category C). This last worker was also the worker who had severe restrictive disease on spirometry. All of the workers with pneumoconiosis were presently or had been a sandblaster at the facility for at least 1 year. Four out of sixteen (25%), of the workers had x-ray changes suggestive of tuberculosis scarring in the lung.



No large differences in the descriptions of breathing and the prevalence of symptoms/symptom groups were apparent when the workers with and without sandblasting experience were compared. Overall the participants reported a high level of respiratory problems (exertional dyspnea, chronic bronchitis, and wheezing). Due to the small number of men involved in this survey, it was not possible to compare their symptom prevalences with those found in other populations.

Based on the sentinel case and the environmental and medical results of this evaluation a serious and extensive problem with respect to respirable silica dust from a sandblasting operation is documented. One documented death from silico-tuberculosis led to an investigation of a sandblasting operation, where another worker was found to have advanced silicosis, (severe restriction and moderate obstruction on pulmonary function, and progressive massive fibrosis on chest x-ray). Pulmonary function and chest x-ray abnormalities consistent with silica-induced lung damage were identified in other workers with sandblasting exposure. Recommendations regarding medical screening and engineering controls are presented.

KEYWORDS: SIC, 3471 (Electroplating, Plating, Polishing, and Coloring), Silica, Pneumoconiosis, Obstructive Lung Function, Restrictive Lung Function, Silicosis, Silico-Tuberculosis, Respirable Quartz, Medical Screening, Mycobacteria, Chest X-ray, Sandblasting