



Workplace Quality News



Number 12, January 2000

NIOSH and RCFC Team Up To Promote Airborne Fiber Reduction Strategies

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In fall of 1998, researchers from the National Institute for Occupational Safety and Health (NIOSH) initiated a partnership with the member companies of the Refractory Ceramic Fibers Coalition (RCFC). The purpose of this coalition was to promote strategies to minimize worker exposure to airborne fiber in the workplace.

NIOSH, through the Centers for Disease Control and Prevention (CDC), is the only federal agency responsible for conducting research and making recommendations for the prevention of work-related illnesses and injuries. The RCFC, through the implementation of a comprehensive product stewardship program (PSP), has established a strong track record for assisting the end users of RCF-containing products with the identification, evaluation and control of airborne fibers. With these common interests in mind, a "partnering" agreement between NIOSH and the RCFC was a natural evolution.

The first phase of the NIOSH/RCFC partnering initiative centered around a joint information exchange. Each organization hosted numerous site visits with NIOSH touring RCFC manufacturing and secondary processing facilities and RCFC visiting various NIOSH

research facilities. Each party provided the other with research data, study results and technical information in addition to helping foster a better understanding of organizational goals and objectives.

The first actual "joint research" conducted under this collaboration was an engineering research study designed to identify, evaluate and communicate cost-effective methods of controlling workplace exposures to airborne RCF within specific unit operations found at end-user manufacturing plants. The first unit operation selected for evaluation was grinding and sanding of vacuum formed RCF-containing parts. Commonly referred to as "finishing" within the industry, grinding and sanding operations were targeted for additional research through the evaluation of workplace exposure monitoring results. While grinding and sanding operations have demonstrated the potential for generating elevated levels of airborne fiber, they are also well suited for the installation of engineering controls. When properly designed and installed, these controls can be extremely effective at controlling dust generation.

Recently, a pedestal grinder/sander

was shipped to the NIOSH Pittsburgh Research Labs (PRL) to evaluate the effectiveness of specifically designed local exhaust ventilation (LEV) and continuous water-misting controls. Initial results indicate that the LEV significantly reduced personal breathing zone concentrations of airborne fiber during both the grinding and sanding of RCF Fiberfrax® Duraboard®. Water misting also showed significant reductions during grinding operations. Preliminary results indicate that when properly designed and operated, engineering controls can cut exposure to airborne fiber emissions from grinding and sanding operations by as much as 99% using LEV. A full analysis of the data by NIOSH and RCFC engineers is currently underway, the results of this study are targeted for publication in the near future.

The collaboration of NIOSH and RCFC researchers to identify and evaluate engineering control strategies is just one more way of helping the end users of RCF-containing products to manage the potential risks associated with the inhalation of respirable airborne fiber. Look for additional information on NIOSH and RCFC activities in the months ahead.

Overview of Airborne Fiber Monitoring: Past, Present and Future

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Production of Refractory Ceramic Fiber (RCF) began in the United States in the early 1950's. At that time, the field of "Industrial Hygiene" was in its infancy and early exposure monitoring efforts consisted primarily of random samples for particulate matter. It wasn't until the Occupational Safety and Health Act was passed in 1970, that more attention began to be focused on the assessment of occupational exposures to airborne dusts.

In the early 1970's, RCF manufacturers began to focus additional attention on workplace exposure monitoring and the control of airborne dust. It was during this time that engineering controls, designed specifically to control airborne dust, began to be installed. This was also a time when industrial health professionals began to differentiate between dusts of various particle size and shape (e.g., respirable vs. total particulate) and focused greater attention on particle morphology (e.g., spherical vs. fibrous).

The first truly comprehensive study of workplace exposures to airborne fiber within the RCF industry was published in 1979. This study shed new light on a number of key areas, such as; 1) airborne fiber size and length distributions; 2) the correlation between average exposure to suspended particulate matter vs. fiber and 3) average workplace exposures to airborne fiber within various manufacturing jobs (later referred to as homogenous exposure groups). Even as the knowledge base for airborne

fiber exposure monitoring and particle characterization was growing throughout the early to mid-1980's, it wasn't until 1987 that the first comprehensive long-term cross-functional exposure assessments within the RCF manufacturing were undertaken.

In 1987, the Thermal Insulation Manufacturers Association (TIMA) contracted with the University of Cincinnati's School of Industrial Health for the implementation of a long-term airborne fiber exposure assessment plan. Designed around standardized sample collection and analytical protocols, the data collected under this new exposure assessment strategy was merged with historical data and used in support of an industry-wide epidemiological investigation which continues to this day with funding from the Refractory Ceramic Fibers Coalition (RCFC).

On May 4, 1993, RCFC member companies and the U.S. Environmental Protection Agency (EPA) signed an agreement (Consent Order) establishing a program to monitor exposures to airborne fiber both within RCF manufacturing plants as well as within their customers and end-user facilities. This "first of its kind" collaborative effort between industry and Federal regulators generated one of the most extensive industrial hygiene databases in existence. Through the end of this 5-year study (June 1997), the data generated from this program played an integral role in; 1) the evaluation of long-term exposure trends; 2) the

study of differences in airborne fiber concentrations among employees performing different jobs and 3) the relationship between workplace exposures and such things as engineering controls, use of respiratory protection and the effectiveness of airborne fiber reduction efforts.

The future of workplace exposure monitoring within the RCF industry and throughout the life cycle of RCF products promises to be even more valuable and revealing. The RCFC is beginning discussions with representatives from three separate Federal agencies [(e.g., the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH)] regarding future Product Stewardship initiatives, including continued exposure monitoring efforts. Without doubt, a proactive airborne fiber monitoring program will play a key role in assessing relative occupational exposure as a precursor to continued efforts to reduce potential exposure risks.

For more information on airborne fiber monitoring and workplace exposure assessments, please contact the Unifrax Product Stewardship Health Hotline at (800) 322-2293.

Findings From a European RCF Health Study

Jim Cason, Vice President, Risk Management

Since 1987, employees at Unifrax have been participating in an epidemiology study which is being conducted by researchers at the University of Cincinnati (“UC”). Similar studies have been undertaken in Europe. At the request of the European Ceramic Fibres Industry Association (“ECFIA”), a second cross-sectional study has been carried out involving workers at six European RCF manufacturing plants. The second study was conducted by researchers from the Institute of Occupational Medicine (“IOM”), in Edinburgh, Scotland.

Study results have been published by IOM under the title “Epidemiological Research in the European Ceramic Fibre Industry 1994-1998 - Volume 1: Workplace Concentrations of Airborne Dust and Fibres and Volume 2: A Study of the Respiratory Health of Workers in the European RCF Industry.” This study followed an earlier cross-sectional study that was conducted in the 1980’s; results were published by Trethowan et al., in 1989. These studies were carried out as a part of a research program aimed at identifying any possible associations between workers’ respiratory health and their long-term exposure to airborne dusts or fibers.

A total of 774 individuals participated in some or all of the most recent study, which represented about 90% of current workers and 37% of the former worker population. The findings from

the IOM study appear to be similar to those of UC. A synopsis of the overall conclusions from the IOM study include:

- ❖ It has been difficult to find a coherent explanation of the varied evidence for and against associations between estimated RCF exposures and respiratory health.
- ❖ In current smokers, there is evidence of a restrictive effect, on average probably mild, of long-term exposure to RCF fibers.
- ❖ It would therefore be prudent to continue measures to keep [airborne fiber and dust] concentrations as low as practicable, and to encourage smoking cessation.
- ❖ Evidence for a real relationship between exposure and small opacities (an opaque spot in the lung) is, at most, ambiguous.
- ❖ Some of the uncertainties might be reduced or resolved by further investigation, including a longitudinal study.

The IOM study examined other issues which were evaluated by UC. For example, the IOM study found that the prevalence of self-reported respiratory symptoms was low; the incidence of pleural plaques was similar to that found in the UC study, however IOM

attributed all of the plaques to other factors such as age, body mass index, and past asbestos exposure; and, there was no decrement in lung function identified, except for current smokers, who showed a mild decline.

Overall, the findings and conclusions from the European study are similar to those produced by the UC study involving Unifrax employees. It is reassuring to know that other health researchers have made similar findings after studying another RCF-exposed population.

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- NIOSH and RCFC Team Up To Promote Airborne Fiber Reduction Strategies
- Overview Of Airborne Fiber Monitoring
- Findings From European RCF Health Study



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