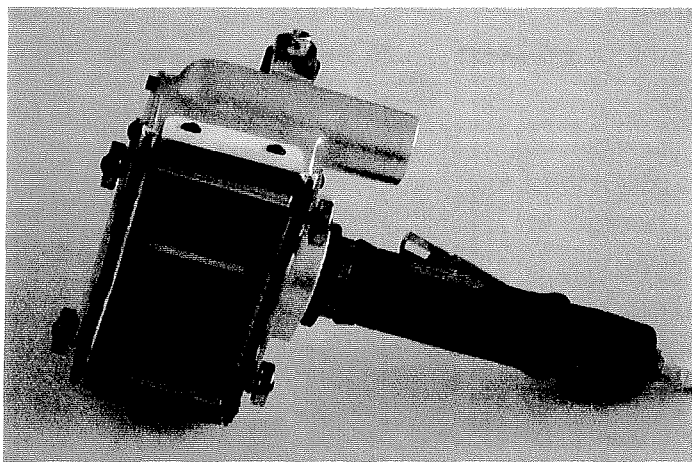


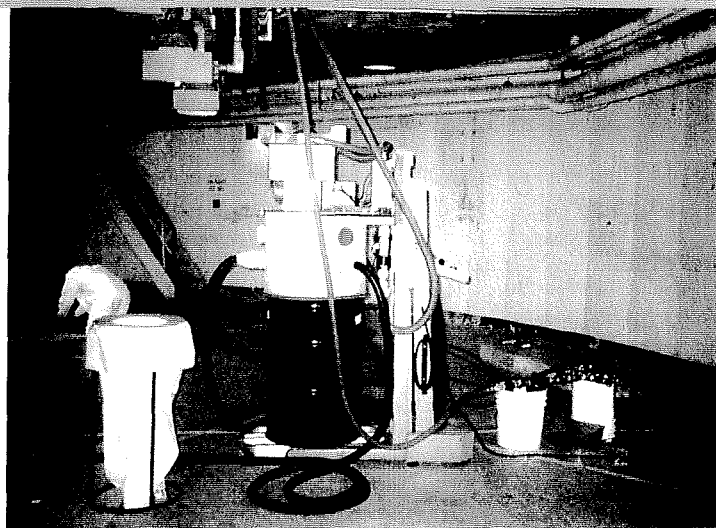
Roto peening technology used in dustless decontamination of nuclear facilities

The roto peening flap is one of the most versatile tools in the surface finishing industry. Many of our readers in the aerospace industry are familiar with it—military and civilian aviation mechanics use roto peening flaps in small hand-held tools to remove and stress relieve gouges, scrapes and corrosion in critical, hard-to-reach areas like helicopter rotors. Now we would like to introduce you to an application for “heavy duty” roto peen flaps—removing radiologically contaminated coatings from concrete surfaces in nuclear reactors.

Pentek, Inc., an innovative leader in providing decontamination technology for the lead abatement and nuclear/chemical remediation industry, has designed its dustless Roto-Peen Scaler using 3M™ Heavy Duty Roto-Peen Flaps. The flaps consist of tungsten carbide shot attached to a patented flexible, heavy-duty material. When rotated at high speed, they mechanically fracture surface coatings in a safe and controlled manner. The flaps provide the same benefits here as in aircraft maintenance: Because the shot remains captive to the tool, safety margins and dust control are optimized and the cleaning method is highly portable. Complete dust control is achieved by connecting the Roto-Peen Scaler to a Pentek VAC-PAC Multi-Tool HEPA Vacuum Collection System capable of accommodating multiple Roto-Peen Scalers at operating distances of up to 200 feet. The combination



Heavy duty roto-peen flaps are used to remove tough coatings and substrate from steel and concrete.



The Pentek Roto-Peen Scaler in the Argonne National Laboratory's CP-5 reactor. This vacuum-assisted mechanical cleaning process removes radiologically contaminated coatings from concrete floors so that areas can be released for unrestricted use.

provides an engineered dust control scheme that captures debris at the point of removal, and effectively transports the debris to a 55-gallon waste container in a single step process.

Pentek has been applying this technology in facilities worldwide including the United States Department of Energy (DOE) and Nuclear Regulatory Commission remediation sites, and in Canada, Europe and Asia.

Pentek demonstrated the Roto-Peen Scaler at the Argonne National Laboratory's CP-5 reactor in Chicago. Argonne is one of the U.S. Department of Energy's largest research centers. Argonne is a direct descendant of the University of Chicago's Metallurgical Laboratory, part of the World War Two Manhattan Project. It was at the Met Lab where, on Dec. 2, 1942, Enrico Fermi and his colleagues created the world's first controlled nuclear chain reaction in a squash court at the University of Chicago. Argonne still occupies a site in Illinois, about 25 miles southwest of Chicago's Loop. After the war, Argonne was given the mission of developing nuclear reactors for peaceful purposes. Over the years, Argonne's research expanded to include many other areas of science, engineering and technology.¹

The demonstration was part of a project, funded in part by the DOE, to benchmark processes for the mechanical removal of radiologically contaminated coatings from concrete floors. The technology tested had to reduce the potential for exposure to workers and the environment while satisfying regulatory criteria to release the areas for unrestricted use. The Roto-Peen Scaler accomplished this by fracturing the contaminated coatings, while a vacuum attachment collected and contained the waste.

Pentek's work scope required the removal of about 650 square feet (60 square meters) of up to 40-year old epoxy coatings, representing approximately one quadrant of the CP-5 reactor floor. Pre-decontamination surveys identified four locations where radiation levels exceeded the guidelines set forth in DOE Order 5400.5. Removal of just the surface

¹Source: <http://www.anl.gov/OPA/vtour>

coatings decontaminated two of the locations so that their radiation levels no longer exceeded the guidelines. The Roto-Peen Scaler was then re-employed to remove an additional 1/8-inch (3 mm) of concrete substrate at the remaining isolated 'hot spots' to achieve the desired release criteria for all locations.

A Pentek VAC-PAC Model 24 High Efficiency Particulate Air (HEPA) filtered and waste recovery system, with self-cleaning primary filtration system and dustless waste container transfer features, was utilized to support the safe and successful control of waste debris of this work scope. Production time averaged 125 square feet per hour (10 square meters/hr) and allowed project completion during a single shift. The production rate was well within the estimated range of 90 to 150 square feet per hour (8 to 14 square meters/hr) to be expected in the CP-5 application. When operating at full capacity, the VAC-PAC Model 24 is capable of supporting the operation of up to 10 Pentek power tools to remove coatings at maximum production rates of up to 300 to 500 square feet per hour (27 to 45 square meters/hr).

Pentek's dustless decontamination system also performed as advertised in terms of protecting occupational health and environmental safety. Health physics personnel confirmed the lack of detectable airborne contamination during coatings and concrete removal, providing the opportunity for future reductions in personal protection requirements. Reduction of workers' respiratory burden will result in dramatically higher labor productivity at DOE sites. These benefits are well documented and are based upon experience reported by users of Pentek systems at DOE sites such as Rocky Flats and Savannah River.

2.5 cubic feet (67 litres) of waste in the form of powdery concrete and paint chips was generated for the entire 650 square foot (60 square meters) demonstration area. This value correlates exactly with the anticipated single drum (55 US gallons/208 litre) waste generation rate for every 2,000 square feet (180 square meters) of epoxy coatings removed with the Roto-Peen Scaler from the concrete surfaces.

Pentek's demonstration with the Roto-Peen Scaler effectively proved:

- Contaminated epoxy coatings can be removed efficiently without the need to erect temporary containment structures and without the mandatory use of respirators.
- Waste is automatically collected and packaged into standard 55-gallon (208 litre) drums.
- Media waste is minimized due to the completely mechanical nature of the technology embodied in the Roto-Peen Scaler with roto flaps.
- Pentek's mature, commercially available Roto-Peen Scaler and VAC-PAC systems contribute to reliable and predictable decontamination operations, thus assuring adherence to project schedules.

In addition to removing radiologically contaminated coatings from concrete, the Roto-Peen Scaler removes hazardous protective coatings (including lead-based paints) from steel, concrete, brick and wood in an environmentally safe manner. For more information on Pentek, visit www.pentekusa.com or contact: Mr. Craig Herbster, Pentek, Inc., 1026 Fourth Avenue, Corapolis, PA 15108 (412)262-0725

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