

FIU PROJECT 4 - 2012 FACT SHEET

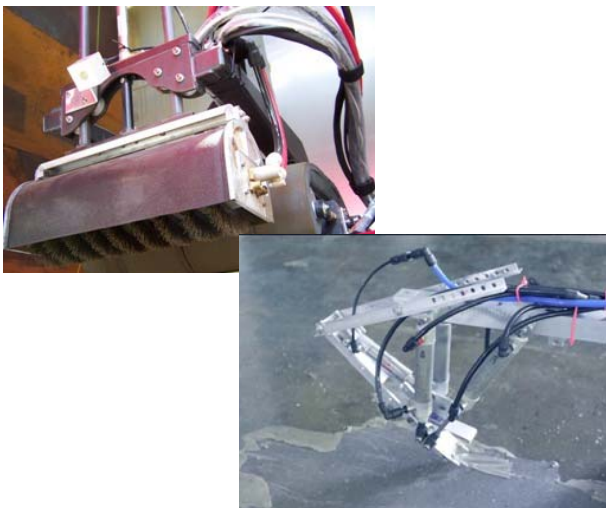
Initial Feasibility Study for Remote Removal of Strippable Coatings

FIU's Applied Research Center (ARC) is supporting the U.S. Department of Energy Headquarters in its mission to develop D&D tools and methodologies to limit uncertainty within D&D operations.

Many facilities slated for deactivation and decommissioning (D&D) across the DOE complex pose hazards (radiological, chemical, and structural) which prevent the use of traditional manual techniques for performing D&D activities. These facilities will require the use of remotely operated technologies to safely and efficiently perform D&D. In addition, the D&D of a radioactive facility often requires that surfaces be cleaned and stabilized to allow demolition to occur while maintaining worker radiation exposure ALARA and without spreading radioactive contamination. One typical step in the D&D process consists of applying a fixative or strippable coating to stabilize or remove loose contamination before demolition. Florida International University (FIU) has demonstrated this step by spraying fixatives (November 2008) as well as strippable coatings and decontamination gels (June 2010) via a remote sprayer platform. The next challenge is to determine if a remote platform can be used to remove strippable coatings and decontamination gels.

Project Objectives

FIU worked with the technology provider, International Climbing Machine (ICM), to conduct a feasibility study to identify the requirements for the remote removal of strippable coatings or decontamination gels using a remote controlled platform as well as to analyze the technical challenges of developing such a device. The feasibility study included the following: 1) Identification of suitable tools for remote removal of strippable coatings; 2) Preliminary bench-scale testing to determine the feasibility of using the tool(s) to perform remote removal of strippable coatings; 3) Testing to evaluate whether selected tools could function via remote control; and 4) Development of a conceptual design for how the selected tool(s) could be used in conjunction with the ICM platform to remotely remove strippable coatings.



ICM Prototype Strippable Coating Removal Brush (top) and Arm (bottom).

Project Benefits

The integrated remote removal of coatings technology platform:

- Closes an identified technology gap.
- Reduces worker risk – protects workers by performing D&D activity remotely and contributes towards keeping worker exposure to radiation as low as reasonably achievable (ALARA).
- Presents cost savings associated with not having to utilize multiple human entries using personal protective equipment; supports D&D activities that will reduce S&M costs.
- Reduces environmental risk – by using strippable coatings to remove transferrable contamination, there is a reduction in radiation exposure and risk of contamination spreading beyond its contained area.

Project Accomplishments

Two different approaches to accomplishing remote removal of strippable coatings were identified early in the study. One approach was to mimic the human hand with a scraper tool; in effect, to duplicate with remote-control the conventional manual method to remove strippable coatings. The second approach was to use a mechanical brush, an “abrader” in a vacuum shroud, to break up the coating into pieces while immediately vacuuming the pieces away to a collection container. Bench-scale sized models/prototypes of the two basic approaches were made in order to verify the feasibility of each. The polymer brush with vacuum capture was very effective. The bench testing was performed with a 5½” brush and resulted in removal rates of approximately 6 sq ft/min and the particle capture of near 100%. The scraper with gripper method was also successful. While this method was found to be sound and viable, the prototype used was small and productivity would be enhanced by simply using a larger scraper/gripper or even using two scraper/grippers working together from the same robot. The level of operator skill needed was higher with this method although that is something that would increase over time with experience. A feasibility study report was prepared to document the findings.