CLEANING AND REFURBISHING INDUSTRIAL ROBOTS
DRY ICE BLASTING PROVES CRITICAL TO REFURBISHING PROCESS

COMPANY
Robot Worx

APPLICATION
Cleaning industrial robots

COLD JET SYSTEM
Aero Series

BENEFITS
Unlike steam cleaning or water, dry ice blasting allows RobotWorx to clean its electrical equipment without leaving a moisture blanket on or inside the robot.

Reduced cleaning time from 8 hours to 2 hours with a one-person cleaning crew.

Savings of more than $60 in labor costs per robot and a 75% reduction in solvents.

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THE SITUATION
Since 1992, RobotWorx has been refurbishing industrial robots, restoring the workhorses of manufacturing environments to like-new condition. Robots are commodities today, performing everything from welding tasks to more intrinsic materials’ handling in solar panel clean room environments. RobotWorx receives used robots from a variety of sources and in a variety of conditions. Some of the robots have been used on busy automotive lines while others may have only been required to perform infrequent routine tasks that did not result in significant wear and tear. For RobotWorx, opportunity begins when companies upgrade their plants or close their facilities, or when old robots are replaced with new shinier models. Regardless of their condition, RobotWorx gives used and old robots new life.

THE PROBLEM
When used robots arrive at RobotWorx, they typically show evidence of their past processes and environments. Many are covered in grime, welding residues, paint, grease and other debris; validation of their grueling applications. In order to prepare these robots for resell or integration into pre-engineered turnkey cells, they must be cleaned. A RobotWorx maintenance crew typically spends a full day per robot manually scrubbing them with traditional solvent-based cleaning solution and towels. While the process worked, it was not the most cost effective or efficient cleaning method, particularly for a company that buys and sells hundreds of used robots each year.

“In many cases, we are bringing in dozens of robots each week in a variety of conditions, and we need to be able to quickly clean them and get them ready for a potential buyer,” said Matt Schrift, RobotWorx shop manager. “Our cleaning process, while critical to our business, was presenting a challenge for us, and we needed to find a solution that could clean the robots without damaging electronic components.”

Many of the robots acquired by RobotWorx have been used non-stop for years, and as a result, exhibit significant build-up of...
grease and debris. RobotWorx needed a cleaning solution that could help remove the dirt from the robots’ hard metal surfaces, as well as from the more sensitive electrical components, controllers, cables and wiring. While the manual cleaning process helped RobotWorx avoid any issues with the electrical components or the metal surfaces, it was tedious and cumbersome.

THE SOLUTION
To speed up and simplify the cleaning and refurbishing process, RobotWorx replaced its traditional solvents and manual cleaning methods with a Cold Jet Aero Series dry ice blast cleaning system. The dry ice blast cleaning process is similar in concept to sand or soda blasting, where the respective media is accelerated through a pressurized airstream. The main difference is that rather than sand or soda, Cold Jet’s system use recycled CO$_2$ in the form of dry ice pellets to clean surfaces. The CO$_2$ pellets are accelerated at supersonic speeds through a specialized hose and nozzle. Once the pellets hit the surface of the robots, the combination of kinetic energy and thermal gradient effects of the dry ice blast breaks the bond between the surface and the residue. Upon impact with the robots’ surface, the CO$_2$ sublimates, returning to its natural gas form, and without leaving any secondary waste to clean up.

Since replacing its traditional cleaning methods, RobotWorx has dedicated an area of its 100,000 square foot headquarters to cleaning robots with the dry ice blast cleaning system. The company has also trained multiple people on how to use the system, which allows RobotWorx to clean robots as often as necessary. RobotWorx uses about 500 pounds of dry ice to clean four to five medium-sized robots and their controllers. “Dry ice blasting has made a significant impact on our entire robot refurbishing process,” said Schrift, “Cold Jet’s dry ice blast cleaning process allows us to clean effectively without damaging any of the robots’ components. It is much faster than the tedious and time-consuming solvent alternative and saves us time on the initial cleaning of the robots, which in turn speeds up the entire refurbishment process, allowing us to prepare more robots for customers.” Schrift added, “The major advantage of cleaning robots ahead of time is that they are much more attractive to buyers, particularly when most of our customers learn about our inventory from our website. If a clean robot sits in storage for too long, it has to be cleaned again, which makes having a fast and effective cleaning solution even more important.”

THE RESULTS
With dry ice blast cleaning, RobotWorx has dramatically reduced its cleaning time per robot. The company’s manual cleaning process required several employees to clean robots by hand, taking as much as eight hours per robot. With dry ice blast cleaning, RobotWorx has reduced the cleaning time to less than two hours with a one-person cleaning crew. Since dry ice blast cleaning produces no secondary waste, there is nothing to clean up except the debris that was blasted from the robot’s surface. RobotWorx estimates that it now saves more than $60 in labor costs per robot and was able to reduce its use of cleaning solvents by 75%, as well as the costs of other supplies needed to clean the robots by hand.
Unlike steam cleaning or water, dry ice blast cleaning also allows RobotWorx to clean its electrical equipment without leaving a moisture blanket on or inside the robot. Dry ice blasting dramatically reduces the need for solvents or chemicals, creating a safer work environment for RobotWorx employees.

The dry ice blast cleaning method is part of RobotWorx comprehensive reconditioning process, which helps to restore the used robots to like-new conditions, and in some cases, adds 15 years to the robot’s life. Unlike sand or soda blasting, dry ice blast cleaning is a non-abrasive process that will not damage manufacturing equipment, and saves companies time and costs by reducing the necessary cleaning resources.

For a remanufacturer like RobotWorx, dry ice blasting is helping to give years of service back to hundreds of robots each year. The dry ice blast cleaning process has provided RobotWorx with an efficient, user-friendly, environmentally responsible cleaning solution that is literally helping to bring robots back to life.