Denver Public Schools leverages robotic floor scrubbers to solve labor challenges and increased demand for cleanliness

BACKGROUND

Denver Public Schools, DPS, is one of the largest school districts in the United States with 226 schools for 90,000 students, and 10 administrative facilities that total more than 16 million square feet. Between 2021 and 2024, DPS purchased and deployed 20 Tennant T380AMR and three X4 ROVR robotic floor scrubbers, powered by BrainOS®.

Schools across the country are still grappling with increased hygiene responsibilities in their facilities due to post-pandemic expectations. That, coupled with staffing shortages that spanned the US and affected nearly every industry, including education, made meeting the increased demands even more challenging. Adding cleaning robots to their maintenance teams helped to close staffing gaps while increasing the efficiency and effectiveness of the cleaning programs for DPS. It also provided a trackable level of cleanliness that improved the safety and wellbeing of students as well as staff.

The T380AMR robotic floor scrubbers improved maintenance operations within DPS considerably. DPS initially deployed 14 robotic scrubbers in late 2021; based on initial results, they added 6 additional robots in the summer of 2022, bringing the total to 20 T380AMR scrubbers. In 2024, the district purchased three X4 ROVR robotic floor cleaning machines. These robotic floor scrubbers are helping clean hallways, gyms, and cafeterias across the district.

CHALLENGE

The cleaning challenges that DPS faced are the same ones that many businesses face: increased demand for cleanliness and labor shortages. "Reduced resources mean reduced capacity. Meeting customer service needs is an ongoing struggle that grows more challenging each year," says Richard Archuletta, director of facility operations for DPS.

The district's internal quality assurance program had shown a decrease in scores related to cleaning. "We anticipate our scores will go up with these machines, as they are used daily and nightly to help improve the overall condition of our spaces," says Archuletta.

Prior to the COVID-19 pandemic, the district's maintenance and cleaning department was experiencing serious funding gaps and was grossly understaffed. The pandemic exacerbated the issues, bringing them to a critical status. "When you don't have enough staff to meet all the needs of the facility due to funding, one of the things that drops off is floor reconditioning because health and safety cleaning tasks come first," Archuletta says.

With staffing shortages being a hot topic, Archuletta states recent economic changes have only worsened a decades-long problem in the janitorial industry. The district is always looking for ways to save on time and budget, and still deliver a quality product.

Necessary labor skills for maintenance employees, training expenses, and a competitive job market have left the district in a difficult position trying to keep up with demand. Presently, the school system shows many open cleaning and maintenance positions, a number that translates into about "75 percent of staff left to do 100 percent of the jobs," according to Archuletta.

Understaffed teams lead to overworked employees. Research shows that when employees are overworked it can lead to increased stress and burnout, which leads to low morale. This results in increased absenteeism. The lack of effective and adequate employee support has caused employee absenteeism to reach critical levels. Archuletta notes "in light of these challenges, the changes in technology have advanced to the point where this type of equipment would help us be more efficient."

SOLUTION

In an effort to address the staffing crisis for their maintenance teams while also providing a clean, safe, and healthy learning environment, DPS began exploring innovative solutions that would help increase productivity and cleaning effectiveness, while narrowing the staffing gap. After considering several options, DPS selected Tennant's T380AMR robotic floor scrubber. According to Archuletta, "this program will help us fill a staffing gap that most urban school districts face, which is limited resources and funding to meet the ever-growing need for facilities." Several factors strongly impacted DPS's purchasing decision, including:

- Quality & serviceability of Tennant cleaning equipment
- Easy for non-technical employees to train, deploy, and adjust cleaning routes
- Powered by BrainOS from Brain Corp, the machines provide "proof of work" metrics, which help verify and optimize performance, and also facilitate data privacy and security
- Regular software updates mean the machines have the latest technology and are safe to use while students and staff walk the hallways

"There are tons of robots out there," says Archuletta, "but they need an operator's guidance to stay on track." With the support of Tennant and Brain Corp., deployment of the 20 T380AMR machines went smoothly, and the benefits were noted and appreciated by DPS decision makers.

RESULTS

DPS has realized outstanding results and benefits since deploying the 23 robotic scrubbers. These units clean autonomously an average of an hour and a half each day per unit, that's nearly 35 labor hours per day! During this 90-minute robotic cleaning, each machine scrubs an average of nearly 21,000 square feet. Since the initial deployment, the 23 machines have over 8,000 hours of autonomous run time, robotically scrubbing more than 104 million square feet!*

Cleaning and maintenance employees are enthusiastic about this new technology: robotic scrubbers allow staff to level up their own skills by managing the robots. Furthermore, they are free to focus on other necessary tasks, meaning they can accomplish more in a day than they could before the autonomous scrubbers were deployed. This has improved employee morale as well.

Leadership were very pleased with the performance and benefits of the first 14 scrubbers, which led to the purchase of an additional 9 units. "These robotic floor cleaners are a critical technology investment that are helping us enhance cleanliness in buildings across our entire district. This is a huge benefit to our staff and students, while maintaining operating costs," says Archuletta. "These scrubbers can cover more area in a shorter time while freeing up the maintenance staff to take care of other necessary duties that may have been pushed to the backburner due to staffing shortages – it's a win-win."

In all, the Tennant robotic floor scrubbers have made a significant difference for Denver Public Schools, and will continue to yield significant returns on the district's investment going forward.

*Data is through March 2025