Air Knives Cut Paint Rejects

Michigan Seat Company installed air knives on its paint line to cut rejects and improve productivity . . .

Michigan Seat Company, Jackson, Michigan, is a leading manufacturer of lawn and garden tractor seats. There were times when its paint line's reject rate reached more than 15 pct. An investigation revealed that the source of the problem was the compressed air it used in the paint booths.

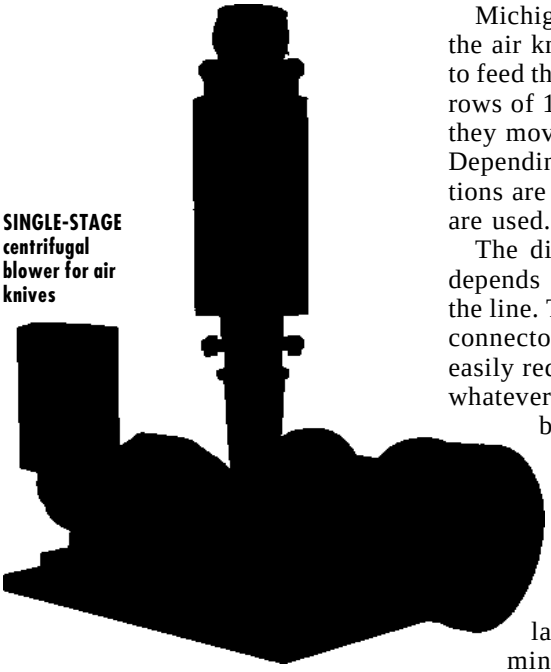
As parts exited the 62-ft-long, three-stage washer, painters used the compressed air guns to remove excess liquid from the parts. However, painters were unable to completely blow-off cleaner/phosphate solution from the steel seats because of clogged nozzles. There was also concern about oil and other contaminants that could get into the compressed air system. The conveyor runs at 16.5 fpm.

Also, it was costly to produce the compressed air. Maintenance Supervisor Bill Petrie stated, "Compressed air may be the most expensive product a plant produces using electricity." To Mr. Petrie, the compressed air for blow-off was "one huge air leak."

AIR KNIFE installation at the end of the wash cycle

Larry Douglas, Michigan Seat's paint line supervisor, had another problem to solve as well. There was not enough floor space to establish a normal drying line. Mr. Douglas had to find a blow-off method that could be installed in a minimum amount of space. He also needed to find a system that could be easily and quickly adjusted to handle a variety of seat configurations, since the company produces 19 styles. (Simply listing the bolt-hole configurations requires 25 computer pages.)

Also, Mr. Douglas needed to find a solution quickly. With 10,000 plus



SINGLE-STAGE centrifugal blower for air knives

parts moving through the two robotic paint booths each day, the 15 pct reject rate was unacceptable.

Mr. Douglas decided to install a 30-hp air knife system. Two separate banks of flexible coupled air knife nozzles handle the work. One bank is stationed at a 90-deg turn in the line where the seats leave the washer and move toward the infrared heaters. This first bank eliminates large pools of liquid.

Another bank of air knives immediately follows the 12-ft-long bank of infrared heaters. This rids the parts of any remaining traces of liquid before they enter the robotic paint booth.

Michigan Seat Company installed the air knife system using PVC pipe to feed the two banks of knives. Twin rows of 12 nozzles flank the seats as they move along the conveyor lines. Depending on which seat configurations are produced, different nozzles are used.

The direction of the nozzles also depends on the seats going through the line. The nozzles have articulated connectors, allowing employees to easily redirect blow-off air to handle whatever seat type is running. The blow-off system was made by Invincible AirKnife Systems, Baltic Ohio.

The company has cut its reject rate to below 0.005 pct. It has also eliminated compressed air and lowered labor costs. Maintenance is minimal. Filters are replaced monthly in about five min.

Bob Nelson, Michigan Seat's plant engineer, points out that when he installs the plant's new powder coating line and seven-stage stainless steel washer, he will move the air knife operation to serve on the new line. **PF**

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