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The Human Element

When most of us think of "paint," we think of the organic finishing liquids with high VOCs that were used for years. Today, many of those have been replaced with high-solid finishes and powder coatings. Most of us still call it "painting," unless someone corrects us.

Today, there are automated process systems that do a better job of using modern chemicals for finishing lines. Engineers have designed automatic controlling systems that provide conveyors, chemical feeds, temperature regulators, spray application control, and recovery/recycling. But, we still must be concerned about the "human element," or those people responsible for operating the automated lines.

A Case History

About three years ago a completely automated system that included hand-touch application guns was installed at a surface finishing jobshop. The system gave the shop capabilities of increasing production significantly. Business grew so fast that the shop had to run three shifts for five, and sometimes six, days a week. As production increased, however, so did problems.

Small Things Can Make a Difference

The first problem came when an operator for the chemical processes used a pipette for testing and dropped the solution while the tube was in a horizontal plane. This caused an incorrect low reading, but based on the reading the automatic control pumps were increased to produce a higher level of feed. This resulted in parts streaking because of rinse contamination, and created excessive chemical use. When the source of the problem was discovered, the operator asked: "Why does it make a difference how I hold the pipette?" A

demonstration was conducted to show a comparison of test results.

Equipment Doesn't Think

Another problem concerned the shape and size of the parts being processed. Long and heavy metal parts needed a higher temperature to cure the powder coating. Because the line operator had been told the control system was fully automatic, he never checked or adjusted temperatures. Some of the operators thought "fully automatic" meant that the equipment would do their thinking for them and adjust the temperatures for the production being processed. The powder did not cure properly on some parts. Just like in the old days, this caused parts to stick together and created rejects that could not be sanded and re-coated satisfactorily.

To correct the problem, the temperature was adjusted higher for the heavier work. It was not readjusted, however, when lighter parts were processed and that created overbake.

When the rejected parts were sanded for reworking, operators were told to watch the filter system to keep the chemical tanks and rinse tanks clean of particulates and free-floating oils. Operators thought this meant not to run contaminated parts (such as sanded rework) while the washer was spraying to avoid filling the filters. The spray pumps were turned off, and because it was a powder coating, the new powder was supposed to blend and bake properly. This was a mistake. The old sanded powder showed up as dust and caused even worse rejects that had to be sent out for stripping before being re-processed. This doubled the cost of processing and equaled the original cost for stripping.

Operators now turn the washer on to remove the sanded dust, but turn off the final DI rinse, which causes some water streaking under the coating. Each operator was also assigned a partner to help evaluate the proper steps needed on each job.

Always Double-check

The first time the washer was cleaned and nozzles were replaced, another problem was created. One of the workers assigned to clean the washer said the equipment installer told him the nozzles had to be adjusted with a horizontal tilt. To him, that meant they should be spraying in a horizontal pattern, not vertical. This caused the parts to streak, and everyone was blaming others, or the equipment.

The company owner called for assistance from the chemical supplier and equipment manufacturer. They put on a half-day training course, and gave every employee an instruction manual that they were required to take home and study in preparation for an exam a week later. Even employees such as packers and material handlers who had nothing to do with the paint line were required to take the test.

All personnel at the jobshop are now trained in the process and are focusing on quality workmanship. Monthly training meetings are held to cover production schedules, quality control, operating procedures, safety, health, environmental needs, and customer relations.

The equipment and the personnel are now working as a team. ***P&SF***