



Efficient Management of Automated Paint Booth Equipment Protection Programs

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abstract

This paper discusses the development of a protective covering program for an automated paint booth in the context of balancing quality, cost, and productivity.

conference

FINISHING 2002
May 6-8, 2002
Novi, Michigan

terms

Robot Covers
Protective Covers
Fiber

Contamination
Defect
Paint Protection

Developing an efficient program requires planning and a team approach from all interested parties. When developing the paint shop processes all too often covering the equipment in the booth is the last priority. Covering programs evolve as a piece meal process with little or no planning of how the entire covering system will work. A planned balance must be sought considering quality, cost, and productivity.

This paper will address these issues by presenting a basic plan for developing an efficient program designed to protect paint automation through an integrated approach using protective covers.

1. Assess current program and determine goals.

- a. Develop a plan to systematically work through each issue using appropriate data to identify the effect of proposed solutions

2. Quality

- a. Identify quality issues / source of defects
- b. Identify process related issues vs. cover related issues
 - i. Use of excess tape
 - ii. Use of tube wipers as covers
 - iii. Drips, paint chips, pepper mill
- c. Identify the major cost items
 - i. Maintenance costs
 - ii. Productivity of maintenance staff.
 - iii. Cleaning supplies
- d. Limit the human traffic in and out of the booth

3. Match proper fabrics, designs, and technology to type of paint and desired performance and longevity

- a. Use of absorbent fabrics or foam vs. non woven fabrics
- b. One piece designs vs. multi-piece
- c. Wrist and axis covers vs. grease
- d. Evaluate cost vs. performance for each cove

4. Determine proper change out schedule of covers

- a. Train staff to change covers only when necessary

5. Support from covering vender

- a. On site support
- b. Training
- c. Innovative designs & products
- d. New technology
- e. Delivery / Inventory
- f. Ability to develop and maintain an efficient program

Assessment & Plan:

The ability to successfully develop an efficient program hinges on the ability to execute a good plan with clear objectives and cooperation from the entire paint shop. Each issue once identified must be prioritized and a solution proposed. The objective of each proposed solution must be clearly stated along with the success criteria. The decision should be data driven. The data collected must be objective and reliable.

Quality:

In today's competitive environment cost is often the most important consideration. The goal of developing a program is to maximize quality while minimizing cost. The best way to do this is to factor in all the costs to produce a finished product. The cost of all consumables, manpower, and the rework of defects must be factored in to the equation. Increasing first time completions can significantly reduce the overall cost to deliver a quality paint job.

Identification of defects and the potential sources that can be addressed using covers requires experienced input from the cover vender. Proposed covers should be well designed. Properly fitting covers can reduce the amount of tape required to keep them in place. Reducing tape also reduces another possible source of contamination and a potential place for paint to collect and drip.

Eliminate the use of tube wipers as covers. Wipers are a known source of defects when used as covers.

Covers using absorbent materials or foam can eliminate drips and paint chips.

Pepper mill defects are the result of particulate falling from the rotating axis of robots. Covering the wrist axis of the robots can eliminate these defects. Also, by covering the moving parts of the robots, you are able to prevent paint and solvents from entering those joints and causing automation problems.

By using less masking tape, rags, and solvent, you also reduce the amount of foreign materials being introduced in your process, and therefore, defects.

In general using high quality protective covers can reduce the amount of particulate in the paint booth.

Once a cover program is established. The number of people in and out of the booth should be reduced. The largest source of contamination in the paint shop is people.

Costs:

By implementing a comprehensive covering program you are able to keep paints, solvents, and other debris away from the equipment, lengthening its useful lifetime, and reducing breakdowns and robot maintenance. It is widely recognized that paint, solvents, and other debris can collect inside the moving parts of the robots. Also, gaskets and seals deteriorate when in constant contact with paint and solvents.

A well-designed program with proper fitting covers will not only last longer before requiring replacement but will reduce the time required for installation and removal. Use of tape while installing covers is time consuming and therefore should be eliminated.

Since covers keep the equipment clean, there is less time required to clean the booth. Covers absorb over spray resulting in less time for cleaning between shifts. In some cases highly absorbent fabrics or foam can eliminate between shift changing of covers.

Additional savings can be realized because covers reduce the amount of solvent required to clean the paint booth. Less rags, tape and plastic are also required in a good cover program.

Fabric selection, design, & technology:

Selecting the appropriate fabric for the job is essential. Many things must be factored in to this decision; Type of paint, over spray pattern, desired length of service on the job, and time available to perform change out.

The design of the cover depends on the equipment. Robots require allowance to accommodate the robots path in addition to the above concerns. Savings can be realized through the use of simpler designs and the reduction of the number of individual pieces required to cover a piece of equipment.

Wrist and axis covers should be used where it is proven to improve quality.

In many cases a cost vs. performance issue will have to be addressed. Expensive fabrics or intricate designs can justify the cost if they remain in service longer or

are easier to install. These issues should be made on the basis of data collected while systematically testing each item and its impact on quality.

Change out schedule:

This issue is especially relevant in paint shops going through a new start up. The change out schedule is usually developed before the effects of full production are realized. As production ramps up the cover program should be periodically evaluated for potential savings and to address any new quality issues. During each daily scheduled maintenance period only the covers requiring changing should be replaced. This effort should be assisted by the cover vendor to ensure the paint shop is operating with the best cover for the situation.

The cover vendor:

The ongoing success of the cover program ultimately rests the shoulders of the vendor. This is only possible with the complete cooperation of the paint shop. Through 24 hour on site support they should be able to respond promptly to new product requests or problems. There should be adequate experienced support staff to deal with any situation promptly. They should be an integral part of the team attending dirt meetings and periodically visiting during all shifts. They should provide training on the installation and use of new products and keep the paint shop up to date with state of the art innovative products and materials that are proven in the field. Selecting a cover vendor that can work as a team member is an essential part of maintaining a successful program.

A paint shop cover program must be viewed in the context of how covers affect the entire paint shop and its operation. Only by viewing the protection of the paint booth equipment with as wide a scope as possible can it realize its full potential to facilitate a high quality paint finish at the best price.