

TOP TEN ROBOTIC AUTOMOTIVE PAINTING TECHNIQUES


TOP TEN PROCESS ISSUES TO CONSIDER WHEN ROBOTICALLY PAINTING AUTOMOTIVE SURFACES

The paint shop is one of the most critical areas of the assembly process. The paint finish is usually one of the first things that a customer sees on their new vehicle. To provide the best possible appearance on the vehicle and to improve robot efficiency, there are certain techniques to use during the painting process.



1. The use of a “pre-spray” process can eliminate paint defects such as spitters. After a paint applicator completes a cleaning cycle, the applicator may have residue or solvents in the nozzles. The next time the applicator is “triggered” or turned on, the droplets will be sprayed on the vehicle. By creating a simple robot program that moves between two points, and triggers the gun spraying into the booth grates below, the residue will be removed from the applicator.

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2. When using an air atomizer or “gun”, never reverse directions of the robot while the paint applicator is “on” over the vehicle because this causes an excessive buildup of paint on the surface. Instead the robot should “fan off” the part, and then turn around and “fan on” to the part. It may use more material to spray off the part but the quality improvements are worth the extra material.
 3. The order of your robot processes or paths can minimize quality defects. Always paint vehicle interiors such as the inner door ring or under the hood before painting exterior panels such as the fenders or doors. When painting exterior surfaces, horizontal panels, such as the hood and roof should be sprayed before the “vertical” surfaces such as fenders and door sides. This will reduce overspray from the sides getting onto the hood.
 4. Do not allow the robot arm and paint applicator to hang out over the vehicle unless necessary. Overspray from the paint booth collects on the robot. This paint becomes tacky and is a good place where dirt can settle. This dirt eventually falls off the robot and down to whatever is below the arm. If it falls on the vehicle it may stay there and become part of the paint job, ruining the paint appearance. Also, minimize the motion of the robot wrist, as the constant spinning of axes 4, 5 and 6 is a cause of dirt and debris as well.
 5. Never turn a gun applicator on over a part. Triggering the gun on over a part will cause spitters with a gun applicator. Bell applicators, however, rarely cause spitters and can be triggered on over a surface.
 6. Preventative maintenance. Make sure that the paint applicator’s gun air caps or bell cups are cleaned regularly; this prevents dirt, spitters, and e-stat faults.
 7. Keep the robot painting. Avoid long extended non-painting moves. This allows paint to load up in the applicator which may cause spitters and metal flakes in metallic paints to form “virtual wires” which may cause electrostatic faults. Also, if the robot is moving and not painting, it is wasted cycle time.
 8. The paint applicator's fan or cone should be perpendicular to the painted surface at all times. Having the paint fan at an angle to the surface being painted will result in uneven painting, and will show up as heavy and thin streaks on the vehicle.
 9. Minimize trigger points and preset changes, which allows for better flow control and will give a more consistent paint thickness. Turning the paint applicator on and off, or triggering, excessively will have adverse effects on the consistency of the paint thickness. Also, changing presets often during the painting path could cause spikes in the paint flow.
 10. Lower the electrostats around corners and edges of the vehicle or increase the target distance to avoid fatty edges. Some applicators provide an electrical charge to the paint as it leaves the nozzle. This positive charge on the paint allows it to attract to the metal surface of the vehicle, which is grounded. When painting around an edge, there is more surface area, thus the paint is more likely to build up there.



The process of painting a vehicle involves many critical steps. With so many variables that affect the painting process, these ten items listed above are just some of the ways to get a better finish on a vehicle.

The founders of Applied Manufacturing Technologies, Inc. (AMT) were central in the commercial development and use of offline paint robot programming and paint simulation. Experts in engineering disciplines for paint systems AMT offers expertise in all areas of robotic painting including paint system controls engineering, off-line programming and paint simulation, paint system start-up support and paint robot software application and system software development.

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