PRESS RELEASE

Automotive industry and color changes:
PaintSave: Who wants to make millions?

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Forced to multiply the number of tint changes on their production lines, car manufacturers lose thousands of liters of paint every year. Can we limit this cost and save tens of thousands of euros per year? Recent innovations seem to show that it is.

In a perfect world, car factories would produce white cars on Mondays and Tuesdays, gray cars on Wednesdays, silver cars on Thursdays, and the other colors on Fridays. Color changes would be rare events whose unit cost (40 cubic centimeters, or about 48 euro cents*) could be considered negligible.

20,000 to 30,000 euros of lost paint per year and per robot applicator
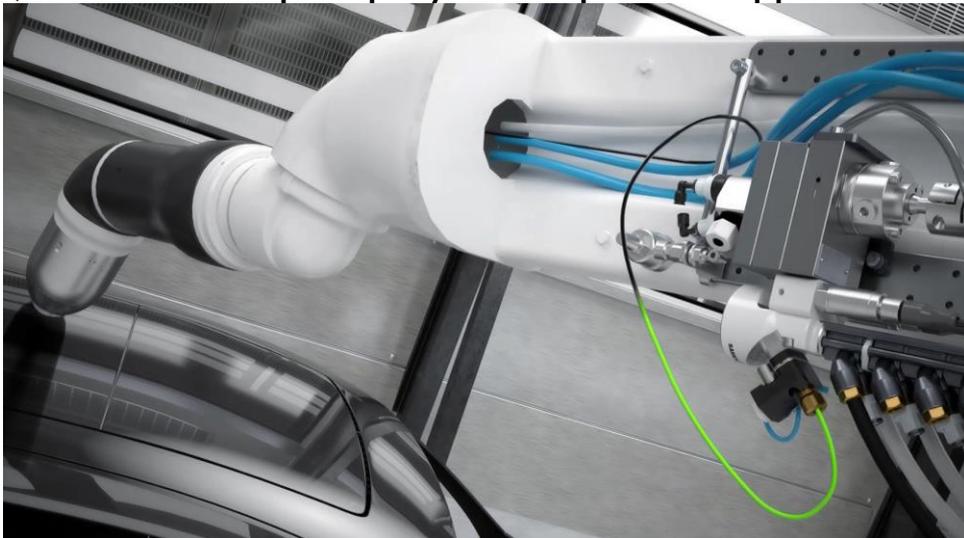
But this fantasy organization does not hold water. It is incompatible with the manufacturers' industrial plans which do not manufacture in batches of colors, instead according to orders, to deliver quickly and limit their stocks.

Color changes are omnipresent, every (5) cars or even every (2) or (3) and are very expensive. Simple calculation: if a line that produces 16,800 vehicles/month changes color every five cars, it throws away the equivalent of 19,350 euros worth of paint every year. Or even 32,200 euros if the changes are made every three cars!

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Moreover, the trend today is to multiply the number of colors and options. The "standard" vehicle no longer exists. This strategy is justified by marketing issues and frustrates any desire to produce a single color in volume.

Paint recovery systems for 20 years

But since the cost of paint losses is substantial, automotive line equipment suppliers are looking into this situation.

For the past 20 years, they have been limiting these losses to 40 cc by chasing residual paint from the end of a color with air and solvent, between the color changer block and the sprayer.
The evolved process was pushing the paint directly with solvent, process called "push-out":
The solvent flows faster in the center of the hose than on the edges - a principle of fluid mechanics - and applies a strong push. This simple, easy-to-use system recovers about 50% of the paint.

The limits of pigging systems

At the same time, the so-called pig systems have appeared. They send a cylindrical plastic part, the "pig", into the pipe, propelled by compressed air. Thanks to its joints, the pig rubs the edges and carries away the paint to the sprayer. It is very efficient: the total paint loss is less than 10 cc.

However, this performance has not led to a wave of investment on the robot process arm. Scraping systems are used in less than 5% of the world's automotive plants. They are expensive, complex to install and maintain. The pig wears out quickly, or wears out the inner wall of the hose, as it travels in one direction (paint removal) and then in the other (return to its starting point). Particles of material can come off and contaminate the paint. Also, the pig is so tight to the size of the hose that it can get stuck. While the pig is being located and retrieved, the applicator robot and line are at a standstill.

A frictionless shuttle pushed by solvent

A new system proposed a few months ago by SAMES KREMLIN overcomes these difficulties with a disarming ingenuity. The pig is replaced by a cylindrical "shuttle" with a slightly smaller diameter (3.85 mm, as opposed to 4 mm for the inside of the hose), which eliminates friction and the risk of blockage.
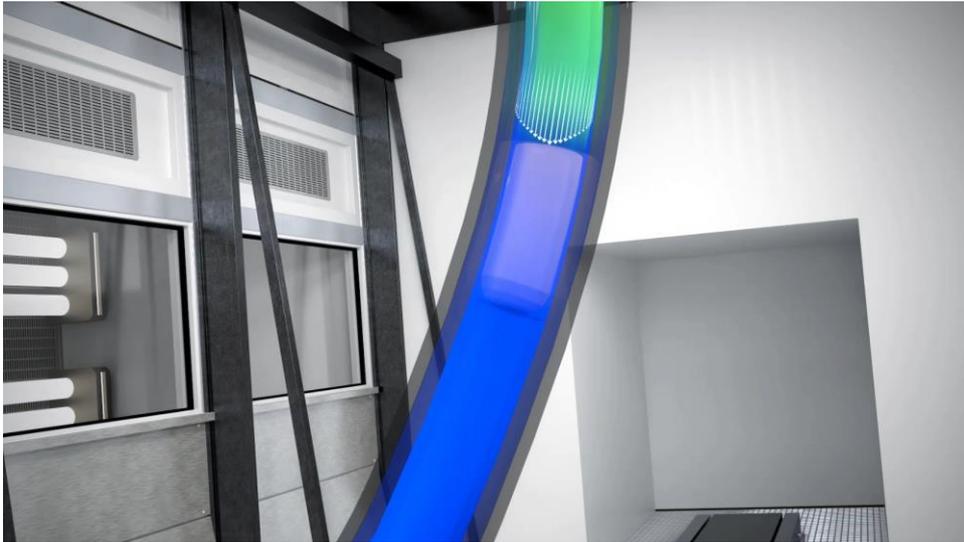
Logically, it recovers less paint than the pig: 18 cc of loss instead of 10 cc. But 18 cc instead of 40 cc is already a 55% saving. Moreover, the reliability of this shuttle is exceptional. Endurance tested in the SAMES KREMLIN's laboratory, it has withstood 600,000 cycles, i.e. 7 to 12 years of color changes on line.

Another innovation: the shuttle is not pushed by compressed air, but by... solvent! This saves a few seconds on the tint change cycle: the solvent cleans paint hose while pushing the shuttle during the last few seconds of spraying paint.

This solvent cannot pass through the sides and pollute the paint: as explained above, it is in the center of the tube that it circulates most rapidly. In other words, it carries the shuttle and the paint faster than it can flow around the edges.

When the shuttle arrives at the sprayer, it stops the paint sprayers. The color change starts by returning the shuttle to its starting point by flushing trains that alternate between compressed air and solvent. The entire cycle takes 10 seconds, compared to 15 seconds with a pig.

No wear and tear and an ROI of 6 to 12 months

Finally, it should be noted that the shuttle includes a magnet. It can thus be propelled in the flow towards the sprayer by activation of a counter-magnet, and be located thanks to a magnetic sensor in the Start station. No moving parts, no wear, no risk of breakdown.

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The system, called PaintSave, is extremely simple, lightweight and compact enough not to slow down or strain the robot's arm, and reliable enough to handle high speed capacity. And above all, it cuts the cost of lost paint volume by more than half. That's an annual saving of €10,000 to €16,000 per robot applicator, based on the examples cited above.

The PaintSave ROI is thus achieved in 6 to 12 months. In the United States, an automotive production site has been using it daily since December 2020, and the OEM already ordered several more PaintSave systems for its factory in India.

* The cost estimates in this article are based on a paint price of 12 euros/liter

Link to video :
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