



Science.
Applied to Life.

Automated paint repair
is more than possible—
it's essential.

The role of automation in a changing automotive industry.

In pursuit of the “perfect finish.”

The commercialization of the automobile in the early 1900s brought about a new wave of independence in travel, but it also represented something far more personal: a new way to express one’s personal aesthetic. As car manufacturers proliferated over the course of the century, more choices meant more personalization, and by the 1980s the market demand for longer-lasting cars also meant demand for more durable automotive topcoats that maintained their showroom looks.

The introduction of new topcoat technologies gave manufacturers what people were looking for—stunning visuals and long-term durability—but it came with a cost. Virtually every car coming off the paint line had defects that required manual inspection and repair to ensure the level of quality customers expected.

To this day, many manufacturers rely on dozens of highly skilled operators, some of which may inspect up to 140 vehicles per shift. This makes top-coat defect repair one of the most highly manual operations in the industry, introducing a litany of challenges: a large footprint, high energy consumption, and the reliance on multiple operators bringing with it an inherent variance in inspection, repair techniques and data entry.

Despite these challenges, this model has remained largely dominant for decades, but not for much longer.

The automotive industry is undergoing a significant transformation.

Incredible challenges often invite opportunity. Never before has this been more apparent for automotive OEMs who face some of the most significant, make-or-break challenges in the history of the industry. Rising costs, changing technologies, safety concerns and the ever-increasing need to deliver higher quality parts on shorter timelines are all driving automotive OEMs to capitalize on an imperative to innovate now and thrive into the future.

At a surface level, it may seem impossible to implement and scale any solution that addresses all of these challenges at once—much less for a process as manually intensive as a traditional finishing operation in an automotive assembly plant. And yet, due to advances in technology and development from companies like 3M, more businesses are seeing success through the power of automation.

Industrial robotics market size

(including peripherals, software, and system engineering)

will grow from
\$48.7B in 2019
to
\$75.6B by 2024.¹

1. GlobeNewswire, 2019.

Discovering the automation advantage.

For most businesses that implement a comprehensive automated paint repair system, there are two interconnected benefits that can ultimately result in the ROI you need: consistency and cost reduction. Here’s how automation delivers on both for automotive paint repair processes.

1 Consistency

Regardless of your job title or position in the paint repair process, the greatest advantage to automation is simple: predictable consistency. It is the one characteristic from which the myriad other benefits cascade.

From identification of a defect, to how it is remedied, each task is performed to the exact same degree of effectiveness every time.

Like an operator honing their eye and their repair talents over time, vision systems can collect each defect data point, including classification and location, to help refine the quality and consistency of inspections and repairs or even potentially identify the source of recurring defects in a process.

Most importantly, despite the many variables introduced across different color lines of vehicles and across shifts of individual operators, the same quality of repair will be executed day after day with consistency.



With automation, you can transform your paint repair operation to achieve levels of consistent quality higher than ever before.

2 Cost reduction

The concepts of automation and the reduction or elimination of specific costs are so closely linked that you can likely imagine many of them—labor and overhead being the most obvious. As one of the most intensive manual operations on the entire assembly line, the skilled labor required to maintain quality and output is substantial, but that only scratches the surface.

OEM’s may see improvement in other areas as their existing workforce is redeployed to more high value tasks. Vision systems can streamline inspections and reduce cycle times. Increased part quality protects and enhances brand perception while reducing dealer rework and warranty claims. Better safety means less operator fatigue or workplace injuries. Greater consistency means less wasted consumable materials and less time spent on rework—virtually everything that typically drives costs up in an automotive paint repair operation can conversely be realized as savings through automation.

Best of all, as the upfront implementation costs of automation continue to decrease, the potential ongoing cost savings outlined above are generally increasing as external factors like COVID-19 and its impact on the global workforce create unprecedented safety and production constraints.

What makes automated inspection and repair possible.

Of course, automating both paint inspection and repair sounds good in theory, but until recently, it was considered unrealistic and infeasible—especially due to the complexities of the paint repair process. But thanks to advances in four key areas, it is now possible to automate more of the inspection and repair process than ever before.

1 Inspection and Classification

With the reliance on vision systems to detect and accurately classify defects, the significance of their recent technological advancements and ability to surpass the capabilities of their human counterparts can't be overstated. A speck of dirt, paint drop, sand scratch, dust nib, fiber, crater, water drop, air bubble or boiling bubble—automated inspection can yield a higher rate of identification of most common defects, all without concern for operator fatigue, turnover or training. In fact, some newer systems have reached positive detection rates as high as 95-99.9% across multiple colors and body types. The result is highly precise defect data, including type and location, which can then be automatically assigned to different robots based on their optimal position and availability—and now this entire process can be completely uniform throughout your plant.

2 Repair Capability

In addition to solving many of the complexities of defect identification, automation has also leap-frogged manual processes in its ability to repair defects.

Where a manual repair is prone to variables like human error, which can lead to the creation of secondary defects, an automated system relies on precise speed control and active force compliance to achieve increasingly better repairs. Beyond the ability for the robots to perform repairs in a consistent manner, they also have the capability to vary their techniques based on defect characteristics or the type of substrate and even perform advanced repair techniques that generally cannot be executed consistently in a manual process.

3 Competency

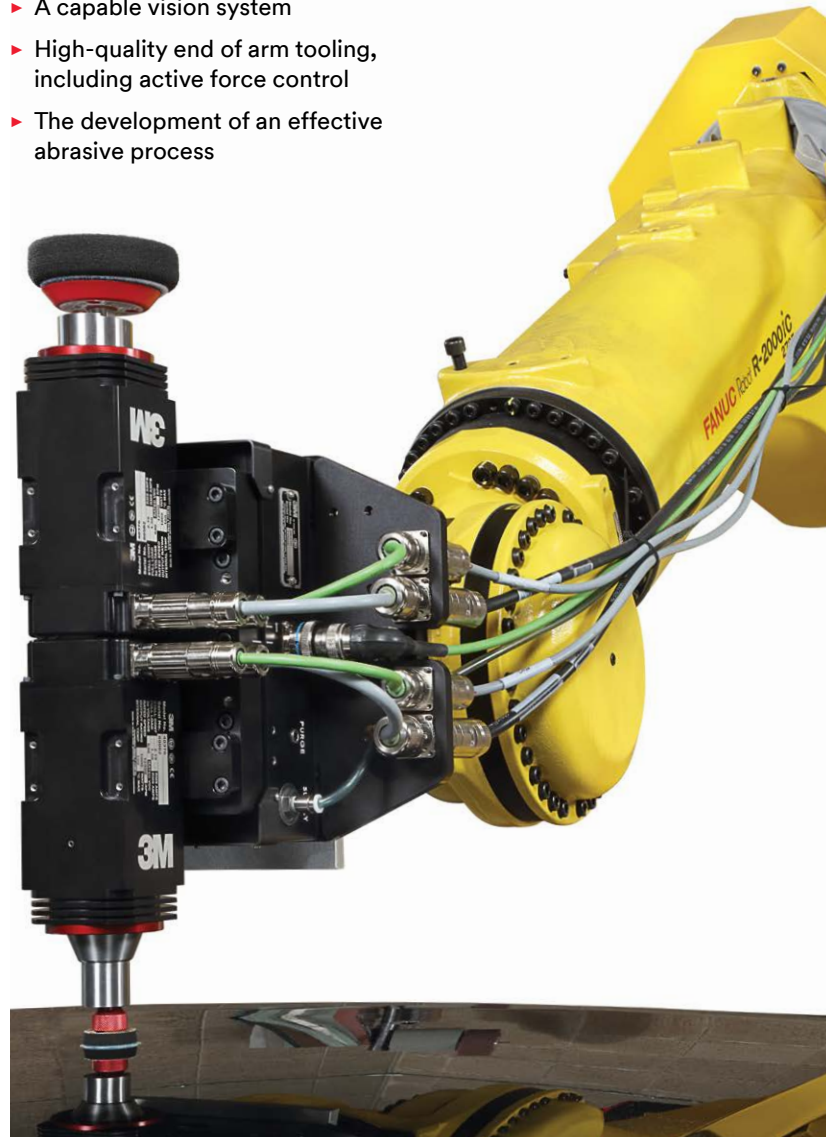
No two plants are the same. Any automated solution in a complex industry must account for untold variables and overcome obstacles unique to the environment at hand—and that's why their implementation requires a deep competence not only in automation, but process itself. Each component in an automated paint repair system, including competence not only in automation, but process itself. Each component in an automated paint repair system, including all the consumable

materials as well as the hardware and software, requires fine-tuning to ensure a successful installation. To efficiently and effectively achieve this, companies can rely on the likes of 3M, which brings deep experience to the table thanks to a combination a global team of application engineers, decades of experience developing abrasives for the automotive industry and more than 30 years of robotic process experience.

4 Collaboration

Part of 3M's expansive automation skillset is our partnerships with knowledgeable systems integrators (SIs) and manufacturers that help deliver a complete solution. After all, recreating the union of an operator's ability to detect a defect, evaluate and then effectively repair it requires a well-engineered system consisting of the following:

- ▶ Adequately sized industrial robots
- ▶ A capable vision system
- ▶ High-quality end of arm tooling, including active force control
- ▶ The development of an effective abrasive process



The 3M™ Finesse-it™ Robotic Paint Repair System features the 3M™ Active Compliant Tool, 3M™ Finesse-it™ Servo Random Orbital Buffer, 3M™ Finesse-it™ Servo Random Orbital Sander, 3M™ Finesse-it™ Paint Repair Controller and 3M™ Abrasives, Compounds & Accessories.

The value of each of these integral components is amplified when combined—and they come together through 3M's partnership with leading System Integrators. Combining their expertise in inspection and integration with our deep experience in paint repair is how we developed the 3M™ Finesse-it™ Robotic Paint Repair System for customers around the world.

The true value of these relationships is in their ability to adapt our system to meet the unique needs of your manufacturing environment. To see the benefit of these systems for yourself, you can visit 3M or one of its System Integrators' facilities. There, you can see for yourself the full potential and discover the fullest extent of what is possible with the right automated solution for your operation.



Begin your automation transformation today.

The reality is there has never been a better time to begin automating your paint repair process. From a cost, quality, and safety perspective, you owe it to your organization and to your customers to step into the future of finishing vehicles. There are several ways to get started.

- ▶ **Schedule a demonstration:** Let us show you what is possible with automation. You can even send a sample part to see how a complete automated inspection and robotic repair process could work for you. Email a 3M automation expert at 3MCAMCenter@mmm.com today.
- ▶ **Learn more: Visit [3M.com/Robotics](https://www.3m.com/Robotics)** to see videos and webinars, explore products and find other resources on 3M Abrasive Solutions for Robotics.



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