The perfect art of the Porsche paint shop

17/01/2025 Robots, artificial intelligence – and a human touch. How the Porsche plant in Leipzig ensures only the finest finishes leave the paint shop.

For decades, robots have been used to apply paint to new cars during manufacture, improving safety for employees while yielding the benefits of increased efficiency and more consistent paint application. But even with the precision and reproducibility of robot-applied finishes, vehicles still need to be visually checked in order to identify any potential paint defects.

This is how technology streamlines this process

Until relatively recently, these labour-intensive and time-consuming inspections would have to be carried out manually – and, even with the keenest of eyes, always with the natural risk of human error. With modern technology, however, this process in the paint shop at the Porsche plant in Leipzig has been significantly streamlined. Team members in the inspection area are assisted by an automatic

defect detection system featuring two robots, although these examples are configured a little differently to their cousins on the painting line. Equipped with powerful sensors, these robot arms scan the entire outer surface of the body shell of every series-production car produced at Leipzig.

An image is captured every 2.5 millimetres, resulting in about 100,000 pictures being gathered during the 72-second inspection cycle. These extensive scans are analysed by a network of 10 powerful image-processing computers searching for even the smallest of imperfections. Pinholes, craters and particles of dust or other debris (known as 'inclusions') are identified with precision and total objectivity, which presents a major advantage over the subjective nature of manual visual inspections.

If a defect is found, its exact location is recorded with millimetre accuracy. The complete data is then forwarded to the finishing line, where the skilled team carries out the necessary paint corrections. The location of the defect is presented to the team members via a detailed 3D model, which is enhanced with high-resolution close-up images and details of the category of defect. This enables the team to quickly target the issue and choose the appropriate method of rectification.

AI supports high quality standards

Each issue is automatically recorded, categorised and analysed using a deep learning module. This allows any gradual trends in defect type or location to be identified. This ensures that any unwanted process variation is detected at an early stage, enabling continuous optimisation of the painting process.

The technology greatly increases efficiency while also ensuring the high quality standards of each Porsche. What used to be a slow and labour-intensive inspection process is now carried out automatically, with the entire scanning and evaluation process taking less than 100 seconds.

MEDIA ENQUIRIES

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