

5.7 CASE STUDY 6 - SMART SOLUTIONS FOR COSMETICS - SMART AUTOMATED SOLUTIONS FOR THE COSMETICS INDUSTRY

By: FANUC Europe Corporation

Smart solutions for cosmetics - Smart automated solutions for the cosmetics industry

Exporting to over 90 countries in five continents, Istanbul-based Erkul Cosmetics is a leading producer of beauty products such as foundation cream, compact powder blush, eye shadow, mascara, lipstick, lip-gloss and nail varnish.

To fill eyeliner, nail polish and face powder containers and bottles, Erkul had traditionally used conventional human-operated filling machines. But consistency issues were impacting quality and output. To resolve these problems, FANUC modelled and evaluated three new automated solutions using its offline FANUC ROBOGUIDE simulation software. By looking at robot access, type of arm and cycle time values, FANUC was able to finetune and live test the solutions.

Automating the eyeliner line

Comprising eight FANUC robots, the new automated solution for eyeliners eliminates the quality issues the company was facing and increases output to 90 eyeliners per minute – a 30 percent improvement. The system includes a conveyor tracking application that transfers the finished products straight onto the belt.

A lot of care was taken in selecting the right grippers. These needed to be capable of running at high speeds but also be sensitive enough not to crush the delicate eyeliner containers.

Using the gripper, the robot retrieves an empty eyeliner container from a magazine and places it precisely into the filling machine. To ensure the containers are filled completely without gaps, the robot completes a precise downward movement during the filling process.

FANUC achieved this precise synchronous motion by supplementing its standard line tracking software with a special Karel program. Thanks to high-speed skip input, the volumetric filling signal from the system filling machine is accurate to a millisecond and results in products being transferred quickly from the filling machine into the eyeliner magazine. At the end of the conveyor, a robot uses line tracking software to transfer the eyeliners onto the packaging line.

Picking the right color with iRVision

For the next task – to place nail polish bottles in the filling mold – a very different approach was taken. Since they come in different shapes and colors, nail polish bottles would normally pose a problem for most vision systems. However, when used with RGB type backlight lighting technology, FANUC iRVision recognizes the bottles as they arrive for separation on a vibrating circular table. Used in combination with three M-2iA/3S delta type robots located in different cells, the system recognizes and handles 70 parts per minute.

Two of iRVision's command tool features play a key role in detecting the location and angles of the parts in around 80 msec. These are the CSM Locator Tool [Curved Surface Locator Tool] for detecting cylindrical and curved surface parts and the GPM Locator Tool [Geometrical Pattern Model] for detecting bottle types with sharp lines.

Silicone type vacuum pads are used to hold the bottles firmly and prevent the risk of scratching. The robot also uses these pads to wrap and pack the bottles.

To ensure the line runs as smoothly as possible, alarm messages received from the robot are conveyed to the supervisor system and recorded. Data such as the product, cycle time, productivity, total stance, etc. are actively incorporated into production planning.

Thanks to its maintenance reminder feature, the robot also exports the mechanical and electrical servicing information required by the maintenance schedule.

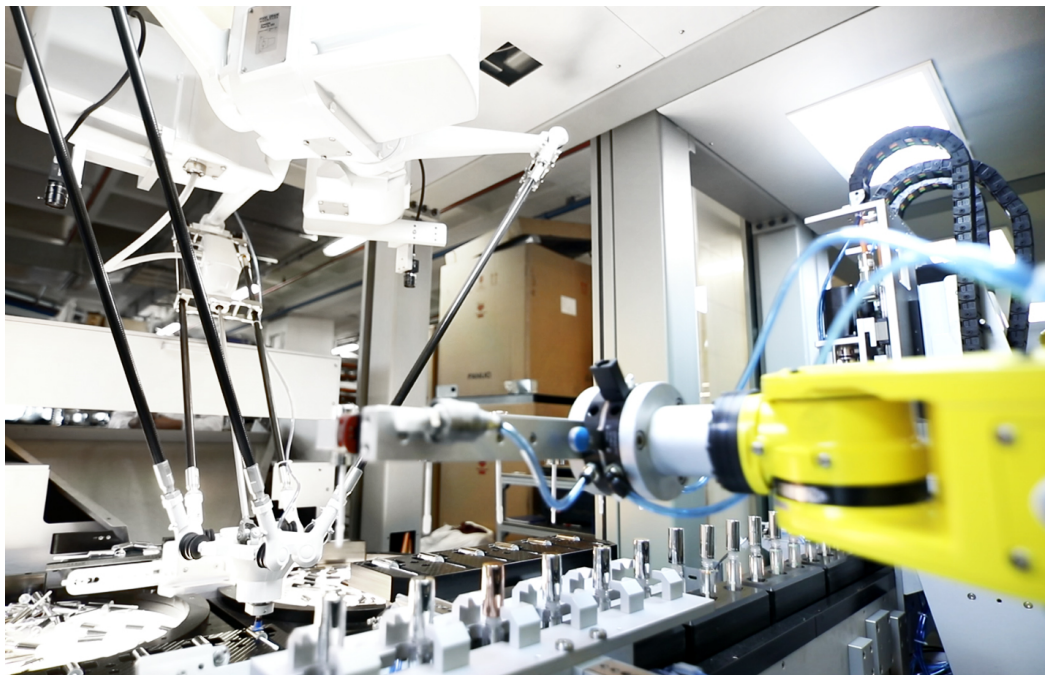


Figure 5.21: Combination of six axis robot and delta robot for nail polish application using iRVision ©Fanuc Europe Corporation

Picking and placing

Finally, a FANUC LR-Mate 200iD/7L robot was installed to load the face powder container lids into the filling station and transfer the filled containers to the output conveyor. Previously, this had been done by human operators, with both production loss and quality problems occurring. Installing the robot eliminated these issues and resulted in products being transferred at a rate of 75 units per minute.



Figure 5.22: Part handling between robots – FANUC LR Mate 200iD/7L ©Fanuc Europe Corporation

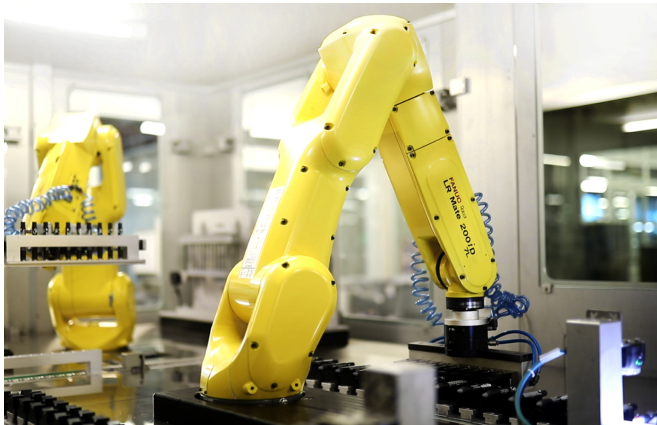


Figure 5.23: Robot picking in cosmetics industry by using vision systems ©Fanuc Europe Corporation

The smart solution

Key to the Erkul Cosmetics solution are FANUC iRVision (integrated imaging systems) and FANUC ROBOGUIDE Simulation Software. But compared to the alternatives, the solution also offers the benefits of:

- Advanced image processing thanks to in-built-iRVision control software (no need for 3rd party software and hardware).
- Simple and easy to understand programming structure and customizable UIF menus
- Advanced programming infrastructure (Karel language)
- Precise positioning capability (0.01 mm repeatability)
- Fast and precise line tracking software
- Stable and fast robot cycle times.

- Low maintenance costs, versatile and advanced training and technical support, lifetime spare parts supply warranty.

One platform, many solutions

FANUC's One FANUC approach also meant that Erkul Cosmetics was able to benefit from other automation solutions such as FANUC ROBOSHOT plastic injection machine, ROBODRILL machining center, PM-iA control unit. Thanks to FANUC's common control system, using these is just like using any other FANUC product and requires a minimum of training for staff already familiar with FANUC controls.

The technical support provided to install and adapt these machines resulted in a production ecosystem that operates smoothly and efficiently with a bare minimum of downtime. Providing a full set of performance data, the system also offers Erkul Cosmetics high traceability and sustainable production volume on both robots and other machines. In addition, the lines have been designed to adapt to a wide range of different products with a minimum of setup time required.

To implement the solution FANUC Turkey, worked with Erkul Cosmetics' technical and manufacturing team. FANUC training and support enabled Erkul to dispense with the services of a system integrator and train their own staff in the robot automation process. This reduced the cost of installing and implementing the solution considerably.

Erkul Cosmetics currently produces cosmetics around the clock using 25 FANUC 6-axis robots, 4 FANUC 3-axis delta robots, 36 FANUC ROBOSHOTS (full servo injection molding machines), 1 FANUC ROBODRILL (machining center) and 4 FANUC control units (PM-iA).

The key benefit automation provides Erkul Cosmetics is the ability to minimize the problems and issues that were arising from the manufacturing process. This has enabled the company to spend more time on product development and R&D activities. By doing so, Erkul Cosmetics have reduced their manufacturing costs and have become more competitive.