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Lights Out at Makuta Technics: Automation, Attitude Make High- Volume Unmanned Production Possible

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Running a plastics processing facility “lights out”, or without personnel on the manufacturing floor, requires all the elements – people, technology and product – to be perfectly in sync. Makuta Technics, Shelbyville, IN, has successfully maintained that balance since 1996, molding millions of parts each month with a staff of 10 and only one manned shift.

Stu Kaplan, president of Makuta Technics, answered questions about what is required to effectively implement a lights-out strategy.

Describe “lights out” at Makuta Technics.

Makuta Technics produces millions of micromolded parts each month for the medical, electronics and automotive industries. Running 7 days a week, 24 hours a day, the facility performs at 90-percent uptime even though no staff is on-site for the traditional second or third shifts. On weekends, an employee is assigned to check material supplies, part quality and production rates, but those duties take very little time.

The manned shift starts each morning at 7 a.m., Monday through Friday, with a meeting to review production numbers, equipment issues or quality concerns from the prior day. By 3:30 p.m., mold changeovers have been accomplished, alarms have been set and the machines are prepared to run without staff oversight.

What processes/controls allow Makuta to run lights out?

Because of the precision molding requirements, need for process repeatability and mandated tight tolerances of molded parts (to +/- 5 microns), the facility plays a large part in maintaining quality control. Built in 2006, the Shelbyville facility was designed by Makuta employees to meet the unique requirements of the operation, which included an open molding floor that allows equipment to be moved as needed, portable cleanroom space and an abundance of natural light.

The building’s temperature is controlled to avoid variables in part processing, set to 72 degrees at all times. Dual-line electrical feeds were added to avoid power interruptions, and the small amount of resin required for the micromolded parts reduces large batch ordering, which circumvents potential inconsistencies in resin batches.

Custom-built systems utilize robotics to separate production runs while the facility is running without personnel support, and parts which do not meet quality standards also are captured. “Our high efficiency can be attributed to our custom-designed automation processes,” Kaplan said. “Every machine accommodates automated material handling systems, quick mold change systems, automated sprue/part removal robots and packaging systems designed by Makuta employees.”

How is lights out production set up for success?

“Our success relies on consistency throughout the entire system,” explained Kaplan, “and that begins with part design and molds.” From concept through to production, Makuta prefers to be involved from the beginning, working with the customer to be sure the part design is optimized for the production scenarios. Once tooling work begins, Makuta calls in sister company Sansyu, located in Japan.

Sansyu and Makuta have the same injection molding machines in their shops, which means that samples created by Sansyu have been tested in the same conditions in which production will occur. First samples and quality information are provided to Makuta, and those samples are submitted to the clients. Once modifications are made, the molds are shipped – via Fed Ex or UPS, thanks to the small size of the tooling.

“Developing systems so the machine can run without anyone near is key,” Kaplan said. “From the beginning, it’s important to discuss automation possibilities.” Automation leads to repeatability, and once a part has run for a period of time, Makuta’s engineers often find a way to simplify the process or reduce the number of touches required.

Describe Makuta’s quality control procedures.

With parts destined for use in medical applications, quality is absolutely critical. However, despite the strict requirements, Makuta rarely performs visual inspections. Instead, it relies on data that has been collected throughout the process. “We won’t cut steel until each customer has signed off on the design of the mold,” explained Kaplan. “We know the critical dimensions that will be measured at that point.”

Those critical dimensions are checked on a scheduled basis, but no employee has to stand at a machine to monitor production. Makuta strives through automation to protect its’ customers from ever receiving a bad part, and the system is working. Kaplan points to customers with whom the company has zero ppm.

“We eliminate quality issues by understanding the machines’ capabilities and the ways the molds perform,” Kaplan said. Instead of relying on visual inspection to catch variances, Makuta prefers to ensure the mold and machine are processing correctly. “It sounds easier than it is,” laughed Kaplan, “but it

starts with bringing in a part that fits what we are already set up to do.”

How does the customer affect the success of the project?

Kaplan bears the responsibility for ensuring that new customers and projects fit the model that Makuta has perfected. “Does the customer fit with you? Does the part fit? Are these parts going to have the volume we need? Because of the level of automation that is required, there is a significant financial investment,” he said. “Bringing in the wrong customers has a negative impact in many ways.”

Another potential stumbling point comes when discussing quality control requirements. If the part requires staff to review each part, it obviously is not a fit for Makuta’s lights out production standards. “If we have people who need to stand at a machine, then it interrupts everything we do,” explained Kaplan. “The customer has to come in with an understanding of what they have to do to fit into the model, and I have to do a good job of qualifying the customer and qualifying the part.”

What makes Makuta successful with lights out production?

Kaplan said the automation often receives the most attention, but the real success factor is attitude. “The attitude of the customers and the people that we have here is so very important,” he explained.

Makuta’s pay-for-knowledge system plays a part in developing a workforce that, though small, has the ability to perform multiple functions within the facility. However, the employees have to initiate the training, asking to learn a new skill when they feel they are ready to perform the function to Makuta’s necessarily high standards. With so few employees on hand and such tight quality values to meet, Makuta’s employees are truly a pivotal part of the operation, and they are rewarded as such through a profit sharing arrangement.

Kaplan exhibits an almost parental pride in his employees. “The toys are just toys. I don’t mean to demean the automation, but a machine and a robot do not automatically translate into a profitable lights out facility.” Kaplan expanded, “Anybody can buy toys, but having employees and customers who truly understand the business plan and the piece each part plays in that plan is crucial.” ■