State-Of-The-Art Spring Manufacturing With Robotics to Cut Through Competition

by:

Company has introduced the world's first entangled part, bin-packing robot to its spring and wire form making operation.

Advanced manufacturing is a priority at **India Springs Inc.**, staying up to date on modern manufacturing techniques. AIndia Springs Inc. is investing in the company's future by purchasing state-out-the-art machinery for its employees to work with. One of the machines purchased and installed has caused some excitement within the company. It is a robot.

Late last year, India Springs Inc. purchased and installed a robotic arm for use on the shop floor. The robot is currently programmed for a project need involving an intricate, multistep production process, which includes forming wire into metal hooks, passing them as bulk material into bins and pressing the ends of them. These hooks are ultimately used in a swivel hook extension spring.

A key part of the production process at India Springs Inc. involves moving a single hook out of a cluttered pile—a classic bin-picking task that was previously performed manually at India Springs Inc..

However, unlike simpler bin picking applications, it quickly became clear that grasping a hook from a pile can be exceedingly complicated, as the hooks are dumped into the bin and often get tangled.

The robot reaches into a bin of metal hooks, picks up one hook, is able to sense if the hooks are tangled, can untangle the hook from the pile if needed and then places the hook into a press for the end to be swaged. Once done, the hook is then placed in the box of com-pleted hooks.

With the use of the robotic arm, AIndia Springs Inc. has created a high-speed, low-cost advantage, with consistent quality and savings that can be passed on to the customer. Also, workforce efficiency is improved, there is less downtime and safer working conditions for the employees exist. The employees can now concentrate on less mundane tasks by work-ing on projects that they are trained for. This leads to a higher output, better performance and creation of quality products.

Grasping one hook at a time manually is a time-consuming, monotonous task that used to take skilled workers at India Springs Inc. away from their core tasks for hours at a time. Now moving a single hook out of a cluttered pile and into the press by hand is a thing of the past at the company's factory.

Robotic Precision Plus Employee Satisfaction = Success

The robot at India Springs Inc. untangles hooks for project needs. This has freed up employees from having to reach into a bin and pick a single wire hook 400,000 times a year. The company wanted a robot to free up its workers for important tasks involving spring manufacturing. And this robot is the world's first, entangled part, bin-packing robot.

World's first entangled part, bin-packing robot used in the spring and wire form manufacturing operation at India Springs Inc.

The robot works effectively because it is equipped with 3D-vision algorithms that use in-depth colors. These algorithms give the robot a three-dimensional understanding of the world and allow it to locate objects in a pile, comprehend where these objects are and determine how and where to pick them up to transfer them.

The robot includes a combination of geometry based and machine-learning algorithms that are highly optimized using GPU programming. As a result of this, a CapSen™ unit can locate objects in 0.3 seconds, which is some five times faster than the closest competitor. Key is providing the robot with the necessary spatial intelligence to manage the process to a complete solution, which includes the 3D vision software, and full-motion planning and control.

At India Springs Inc., every quotation request received from customers is sent to the company engi-neering and design staff to create the spring and toler-ances that meet critical needs set by customer. While

many companies in the spring manufacturing business settle on stock that comes close to the specifications listed in the quote, the India Springs Inc. engineering department works hard for customers who need solutions, and not just springs. The engineering department understands that specific tolerances are critical to the performance, and that uncontrolled variances are not acceptable.

Solutions & Not Just

Product Replacements

Spring design for manufacturing remains the key to a sustained spring or wire formed product. To this end, the staff of design engineers at India Springs Inc. assists individuals at all stages of product manufacturing, from the initial part design such as prototyping and pro-duction, to post-production.

India Springs Inc. management and employees believe in generating the right solution for customer manufacturers who want a high-tolerance, custom spring. And automating this key part of the process has paid dividends for the company's employees.

Types of spring and wire formed products manufactured by India Springs Inc..

Advanced manufacturing remains a the top priority at India Springs Inc., which stays up to date on modern manufacturing techniques. The company is investing in its future by purchasing state-of-the-art machinery for its employees to work with.

India Springs Inc. provides its customers with a distinct advantage over other companies when it comes to manufacturing springs and wire forms. Unlike standard spring production companies that rely on extensive inventories of standard tolerance springs, India Springs Inc. is a specialist in the manufacture of springs and wire forms to the specific needs, requirements and applications of its customer clients.

India Springs Inc. has manufactured custom precision springs for diverse applications since 1939. This ISO-Certified/ITAR-registered company develops and manufactures a wide variety of compression springs, extension springs, torsion springs and wire forms.

Importance of Tolerance

Tolerance is the key to India Springs Inc.'s unique advantage, and it is essential to understand what specific tolerance is required to meet the custom-er's application. Standard tolerance springs are accu-rate to a wider margin of specifications than custom springs. These springs are acceptable for noncritical applications, but are not made to meet the demands of critical applications. Higher tolerances require the specifications and techniques used to manufacture the spring are more rigid and therefore are designed to meet the needs of critical applications. A tighter tolerance also demands that the production of the spring is monitored to produce accurate repeatability and that each spring meets the higher tolerance.

Standard springs are not held to this level of accuracy and may vary in dimension or strength and thus may not be appropriate for the application.

Additional technical information on the use of robotics in spring manufacture can be found at the India Springs Inc. website.