

Near-Dry Machining

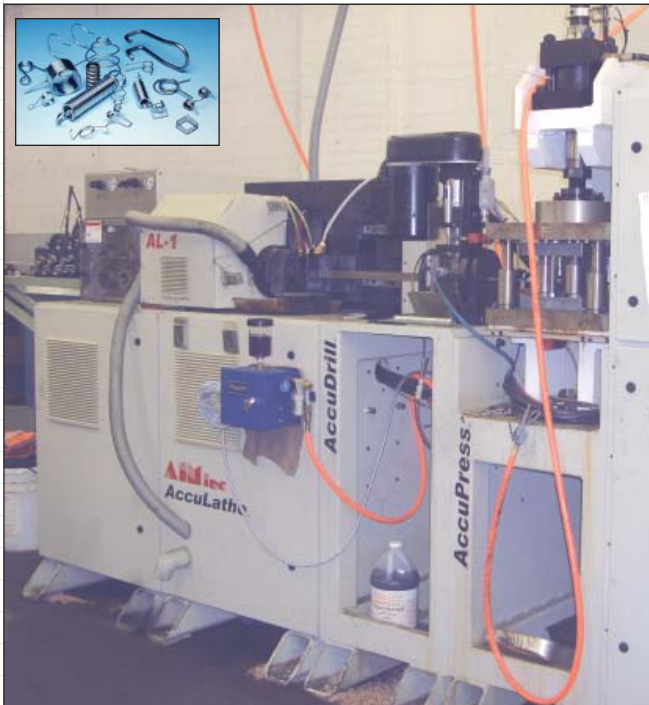
How one spring and wireforming company successfully implemented this process, saved money and created a safer work environment

By Catherine Fuhr
ITW Rocol Noth America

Located in the Chicago area, Master Spring & Wire Form Co. supplies custom springs and wire forms to many industries. The company specializes in small to medium quantity orders (one to 500,000 pieces) that require short lead times. It implemented the Accu-Lube system for near-dry machining on one of its CNC wire formers and has experienced substantial benefits from that installation, with significant cost savings and a cleaner, safer working environment.

Master Spring & Wire Form Co.

Emil Burda founded Master Spring in 1945. Working as a foreman and setup man at a large spring manufacturing plant, he was unhappy with the way small orders were handled. He decided to found his own company, starting with a homemade coiling machine. Emil Burda liked to say, "We can do the possible quickly. The impossible might take a



CNC wire forming machine with Accu-Lube near-dry machining system installed.



Steve Skolozynski, Silvano Corro and Carlos Rivera were instrumental in Master Springs' transition to near-dry machining.

little longer." He took great pride in Master Spring's ability to solve tough spring and wire form problems. As Master Spring's reputation for great and fast service on small to medium quantity orders grew, the company became a natural choice for the local growing pinball and gaming industry.

Master Spring currently employs 20 people and is registered to ISO 9001:2000 with a quality policy to continuously improve processes to make purchasing custom springs and wire forms as easy and fast as possible for the customer.

Steve Skolozynski, the founder's grandson and Master Spring's general manager, explains, "The industry has changed a lot since I joined in 1999. With all the pressures we are getting from China, a lot of our bigger competitors are being hurt. Most of the jobs we get cannot be exported to China, as they are either low volume or require fast delivery. More and more customers are looking at lean manufacturing. This latest trend helps us as our customers try to eliminate stock and select suppliers with short lead-times."

Coolant Challenges

The company manufactures wire forms with a wire diameter of 0.008" all the way up to 0.500" (0.20 mm to 12.7 mm). It offers secondary operations, such as thread, chamfer, swage, drill, tap, machine, and weld; and it will take care of any finishing required, such as plate, passivate, stress relieve, heat treat, shot peen and tumble.

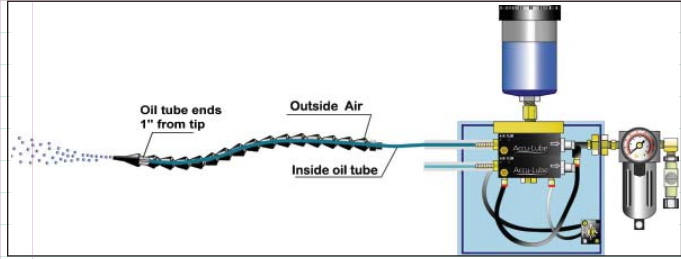
In this environment, Master Spring has always been looking for ways to improve productivity, cut costs and improve workers' safety. The company had used a water-soluble coolant system that would flood across the part. The two main challenges Master Spring faced were the cost of the cutters and the cost

of any machine downtime. Every 4,000 to 5,000 parts, workers would have to change the cutter. Another issue was the press. If the part was not lubricated enough, it would be dry and stick to the press. The operators were filling oil every day; they constantly had to watch the oil level. Using coolant made the entire process very messy, and chips would clog the coolant. Moreover, with a drum on the back and a big circulation pump, the coolant equipment took a lot of floor space.

Near Dry Machining for CNC wire forming

Master Spring started looking at alternatives to this coolant system and in particular at the Accu-Lube system of near-dry machining. This system works as follows: Accu-Lube applicators carry Accu-Lube fluid to the cutting edge, preventing heat buildup and enabling metalworking to perform better. It eliminates the flood coolant, saving time and cost. Accu-Lube lubricants are non-toxic, environmentally safe and can be applied to a variety of materials without fear of contamination and discoloration. As a result, the production process becomes more efficient, worker safety is increased and the bottom line is improved.

Master Spring started with a free trial and installed a two-nozzle aluminum pump applicator



The Accu-Lube applicator applies a precise amount of lubricant directly to the cutting edge of the tool.

with an on/off valve. It was installed on an AccuForm Modular 3DX CNC wire-bending machine from Aim Inc. (Addison, IL) with a circular cutter that cut into the wire. The on/off switch allows operators to manually regulate the flow of lubricant, which is good when setting up an application. Once the operator got more comfortable and knew exactly the amount of lubricant that should flow, the Accu-Lube applicator was upgraded to a system with an electric solenoid, where the lubricant is applied automatically when the machine is on.



The machinist at Master Spring did not like near-dry machining at first. He was very concerned that he could not see the coolant, that the part was no longer flooded. He asked, "Why is this going to be better, save us money and increase the cutter life?"

However, once the Accu-Lube applicator was properly set up to go right on the cutting edge of the tool with enough lubricant applied directly to that edge, the operator started to see the benefits and is now a main driver in getting the system installed on some other machines in the plant.

Steve Skolozynski explains: "The benefits did not take long to be seen and quantified. Since we started using Accu-lube, we have quadrupled the life of the cutter and the life of the die. We have a much cleaner work environment. We are looking forward to eliminating flood coolant wherever we can in the plant in favor of near-dry machining."

Catherine Fuhr is the marketing manager of ITW Rocol North America in Glenview, IL. Readers may contact her by phone at (847) 657-6185 or Web site at www.rocolnorthamerica.com.

A division of Illinois Tool Works, ITW Rocol North America is a supplier of coolants and environmentally safe lubricants, including metalworking lubricants and related application equipment. The company offers a complete line of natural-based lubricants along with specially developed, patented micro-lubrication systems for near-dry machining. ❖

The JSSE 60th Anniversary International Symposium is just around the corner!
Be sure and take advantage of this opportunity.
 (November 2, 2007 in Nagoya, Japan)

- Symposium : 8 countries (15 papers so far)
- Machine Show: 31 exhibitors

Visit our website: www.soc.nii.ac.jp/jssr/

We are the world's only technical society dedicated exclusively to spring research and engineering.

- Anyone working in the world-wide spring industry is welcome to join.
- Please send in your technical papers. We will gladly publish them in our publications.
- Our seminars are always open to members and non-members alike.

[jsse] Tel: 81-3-3251-5235
 Fax: 81-3-3251-5258
 Japan Society of Spring Engineers E-mail: jssse@spring.or.jp
 "The Japanese word for spring is 'Haru', pronounced 'Haru-nyū'"