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The Myth of Free Air

By Ed Sullivan

The air we breathe may be free but the notion that this applies to the compressed air that drives processes and production tools is a myth that no plant can really afford. Although the costs of air compressors may appear minor when compared to pricey production equipment, air systems should be properly scrutinized; otherwise plants may face higher electrical costs, maintenance, premature failures and, worst of all, unplanned downtime.

True, there was a time when compressed air systems could be more or less taken for granted. Compressor technology was somewhat rudimentary, energy costs were low, processes less sophisticated and just-in-time deliveries was a thing of the future--not to mention lights-out manufacturing.

But for many companies today, all of that has changed. Air compressor design has a great bearing on efficiency and reliability, electric power is expensive and even penalizing, on-time deliveries are often critical and 24-7 demand on systems is commonplace. Today, an inefficient, inadequate, unreliable or failed compressed-air system can take down millions of dollars of automated equipment and waste precious production time as well as putting customer relationships at risk.

“Any equipment failure we experience usually occurs because of compressed air problems,” says Hans Hermann, purchasing manager at Magor Mold (San Dimas, Calif.). “We may have been planning on running the equipment lights-out overnight. But when one of the technicians comes in to set up a new job, he has to re-start and finish the job from the night before. So we’d be behind, as much as a day, and that is a big expense.”

That sort of problem seldom occurs at Magor Mold, which has been designing and building precision injection molds for over 30 years. A leader in producing molds for injection molders serving the medical industry, Magor Mold uses the latest in manufacturing technology, including robotics and automated runnerless systems, to maximize production and ROI for its extensive capital investments. Much of this hinges on having reliable compressed air available when and where it is needed.

The company uses rotary-vane units from Mattei Compressors. These units represent a shift from traditional piston-style systems, says Hermann. “The piston compressors go up to a pressure, shut off, let the tanks go down, and then the compressor starts again until they go back up. So, if you want to keep your shop pressure 120 at psi, then your

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piston compressor has to run from 150 to 130 (psi) and you regulate the shop to 120.” Rotary compressors, on the other hand, run constantly at 125 psi, “and you don’t need to have regulated air in the shop.” He adds that every 2-psi reduction “equates to a one-percent savings in power consumption.”

Hermann adds that rotary vane compressors can run continuous at full pressure or in the automatic mode where it cycles internally. If the compressor controls sense a drop in pressure, as when a machine goes down, it automatically shuts off.

The primary compressor that Magor Mold uses is a 30-hp model. As the company continues to expand and add machinery, Hermann started to see issues with production timing when the Mattei required service. So he contacted his distributor, Lans Co. (Glendora, Calif.), a major provider of compressed air systems.

“We told Lans what we wanted a backup compressor for when ours required maintenance, in order to minimize downtime,” Hermann explains. “They had been providing us with a diesel powered unit for that purpose. But if you are going to schedule maintenance around the availability of your vendor’s backup compressor, that doesn’t always fit your production schedule, and could put you at risk of a failure.”

In order to avoid maintenance scheduling difficulties due to the unavailability, Magor Mold decided to purchase another 30 HP compressor. Now if the primary compressor requires service, Hermann switches over to the auxiliary unit. Today, a service call does not affect the production schedule.

While the cost of electric power needed to drive its compressors is not a major issue with some users, excessive use of power may be a significant cost that is often swept under the rug. For example, older models of compressors often cause a spike in the electric power load during peak usage periods, resulting in a demand profile that could cost many thousands of dollars per year.

Lans’ Stuart Silverman advises that oil or water in a compressed air system can present major problems to even smaller shops. Hermann says Magor Mold is very conscientious about keeping moisture and oil out of their expensive systems. “The pneumatics of the machines would foul and deteriorate pretty quickly if we didn’t use preventive measures,” he says. All air is run through a tank where moisture is collected and drained daily. The air is also routed through an air drier. Although the Mattei compressors have very little oil carryover, Hermann also runs the air through an oil removal filter.

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Silverman attributes many in-plant air system problems to leaks and negligent maintenance. He has seen many an operation where punctured hoses and improper repairs have not only caused system inefficiencies, but have also led to the purchase of additional compressors that were not actually needed.

“A 1/8-inch hole in a hose is going to cost as much air as put out by a 10 horsepower compressor,” he explains. “We had a customer with a 50 horsepower Mattei, and the manager said he needed another one. I knew the operation, and just couldn’t believe it was necessary. So, I went to the shop and found that there were leaks everywhere that had been fixed with tape and sometimes not fixed at all. So I went in there with a spool of hose, and for about \$2,000 I eliminated probably 75 percent of the leaks. And after that, the compressor was usually running at 60 to 70 percent. Of course, there could have been a lot more unnecessary maintenance cost, or even premature failure of the compressor.”

Overall, Silverman sees inadequate maintenance as creating heat problems--the main enemy of air compressors of all types. “If you run them dirty or run the oil low or don’t change the oil often enough, they’ll run hot. If you have a leaky system, it will make them run harder, which means hot. If your air filter is clogged or belts are out of adjustment, you’ll be running slower and hotter. The outcome will be inefficient systems, high maintenance costs, premature failures and, worst of all, unscheduled downtime.

Editor’s Note: Ed Sullivan is a technology writer based in Hermosa Beach, Calif.

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