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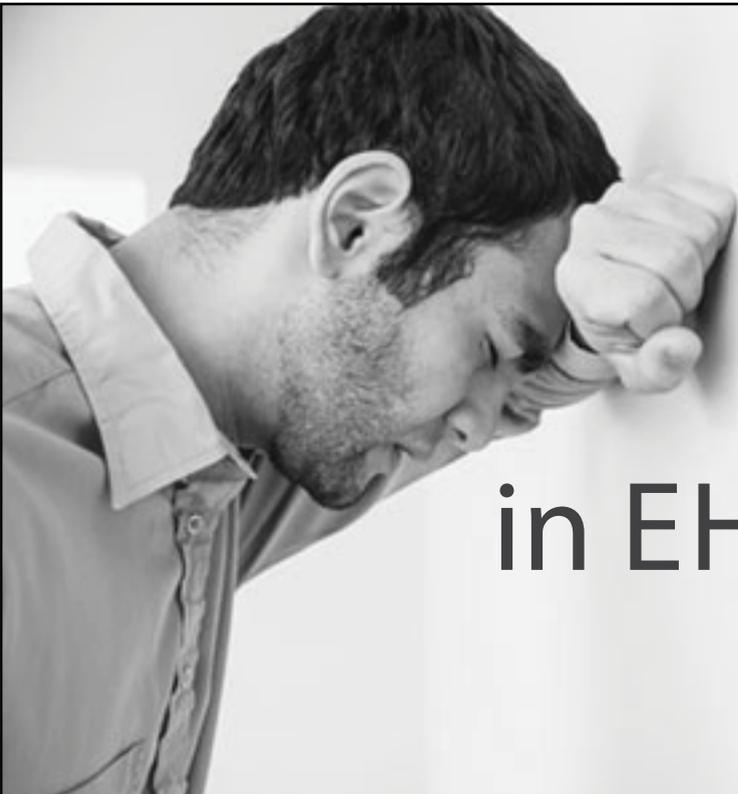
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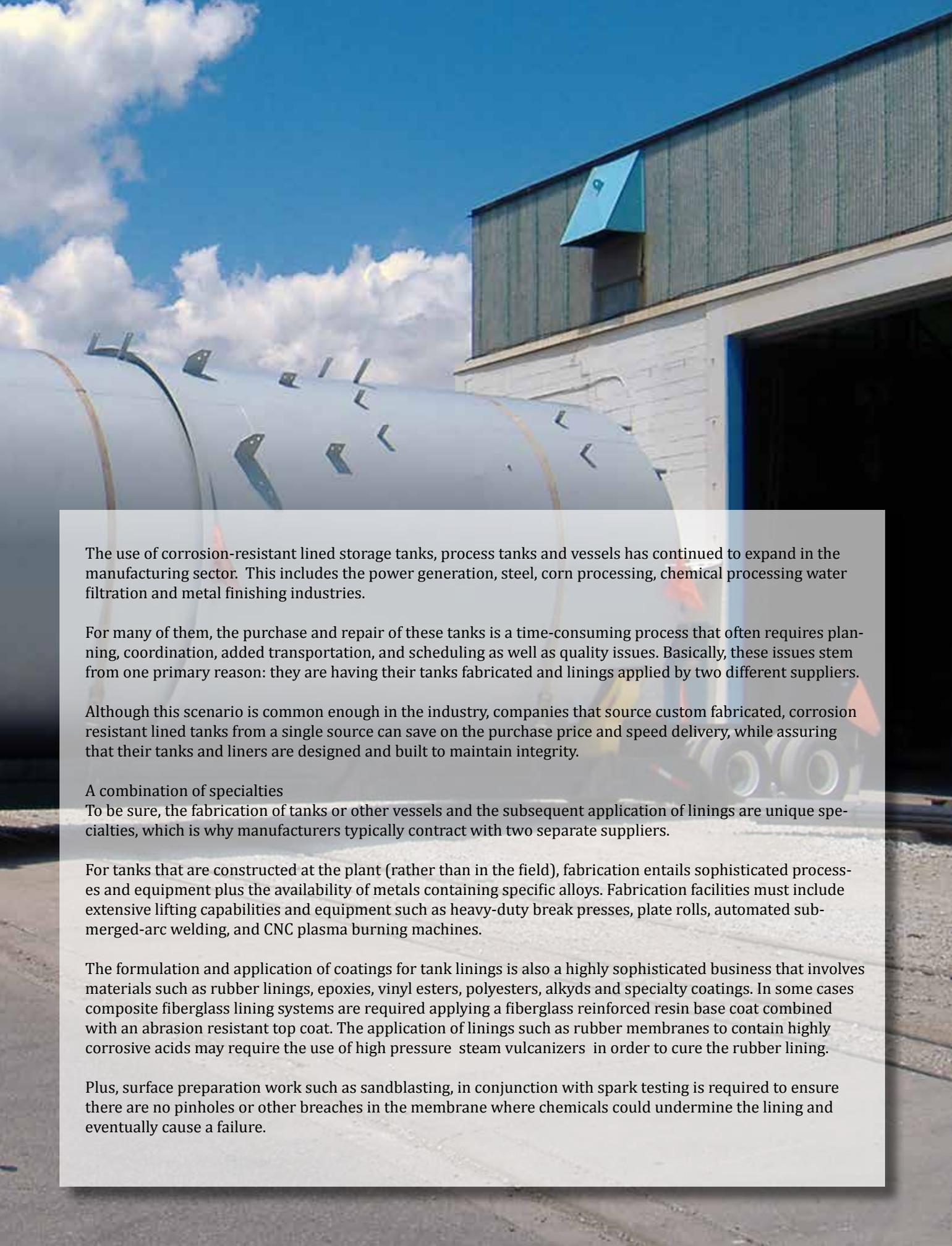
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The Synergies of Single-Sourcing Tanks and Vessels, Complete with Linings



Purchasing a tank and liner from a one-stop shop can save on purchase price, turnaround time and unplanned downtime costs.



The use of corrosion-resistant lined storage tanks, process tanks and vessels has continued to expand in the manufacturing sector. This includes the power generation, steel, corn processing, chemical processing water filtration and metal finishing industries.

For many of them, the purchase and repair of these tanks is a time-consuming process that often requires planning, coordination, added transportation, and scheduling as well as quality issues. Basically, these issues stem from one primary reason: they are having their tanks fabricated and linings applied by two different suppliers.

Although this scenario is common enough in the industry, companies that source custom fabricated, corrosion resistant lined tanks from a single source can save on the purchase price and speed delivery, while assuring that their tanks and liners are designed and built to maintain integrity.

A combination of specialties

To be sure, the fabrication of tanks or other vessels and the subsequent application of linings are unique specialties, which is why manufacturers typically contract with two separate suppliers.

For tanks that are constructed at the plant (rather than in the field), fabrication entails sophisticated processes and equipment plus the availability of metals containing specific alloys. Fabrication facilities must include extensive lifting capabilities and equipment such as heavy-duty break presses, plate rolls, automated submerged-arc welding, and CNC plasma burning machines.

The formulation and application of coatings for tank linings is also a highly sophisticated business that involves materials such as rubber linings, epoxies, vinyl esters, polyesters, alkyds and specialty coatings. In some cases composite fiberglass lining systems are required applying a fiberglass reinforced resin base coat combined with an abrasion resistant top coat. The application of linings such as rubber membranes to contain highly corrosive acids may require the use of high pressure steam vulcanizers in order to cure the rubber lining.

Plus, surface preparation work such as sandblasting, in conjunction with spark testing is required to ensure there are no pinholes or other breaches in the membrane where chemicals could undermine the lining and eventually cause a failure.

Avoiding construction issues
When companies source lined tanks from two separate suppliers, they are likely to experience difficulties that can be avoided when a fully-lined tank is sourced from a single supplier.

Single-sourcing of a lined tank means one point of contact. This can be advantageous when construction issues need to be addressed. Dealing with two suppliers may lead to construction disagreements or the suppliers finding fault with one another, which usually places the buyer in the middle of such issues.

"Years ago I had a tank built by one supplier and then had it shipped to another supplier for rubber lining," says Jerry Cogar of Cogar Consulting Group (Columbia Station, OH), a provider of turnkey chemical solutions to the industry. "The liner installer complained that the lining was not going to get proper adhesion. On

another occasion, welds needed to be ground before the lining could be installed. These types of problems can seriously delay projects."

Cogar works with customers who store and handle hazardous chemicals such as hydrogen fluoride (HF) and nitric acids (HN03), typically 6,000-10,000 gal. capacity. He's been contracting tanks from Moon Fabricating Corp. (www.moontanks.com), a Kokomo, IN based company that is one of the country's largest suppliers of custom fabricated, fully lined, corrosion-resistant tanks. Founded in 1923, Moon Fabricating has built many types of lined tanks and other vessels for the industry throughout North America.

"Moon Fabricating is consistently reliable" Cogar says. "They do it all from fabrication and weld testing to the finished liner. If it's not right, they make it right before going on to the next step. I've been recommending

tanks from Moon for over 20 years."

Moon fabricates tanks weighing up to 60,000 pounds from carbon steel, stainless steel, and specialty alloys and installs a wide variety of protective linings composed of rubber linings, Koroseal, Carboline, Plasite, Tnemec and many other specialty coatings. In addition, installation of abrasion resistant rubber, abrasion resistant ceramic tile, alloy wear plates and abrasion resistant alloy hard facing is available.

"Moon is currently building two hydrogen fluoride tanks for me that are going to require several special manufacturing steps," Cogar says. "The tank material is a specific grade of steel, (A516-70 grade) which is readily available from this supplier. Also, they provide 100 percent X-ray imaging of all tank welds, which is a valuable quality assurance step."

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Another company that has found synergy in single-sourcing fully lined tanks is Haynes International, Inc. (Kokomo, IN), a leading developer, manufacturer and marketer of high-performance nickel- and cobalt-based alloys used in corrosion and high-temperature applications.

We have two pickling facilities with acid dip tanks which we use to remove impurities from our metals, and also Kolene "salt" tanks where contaminants such as scale are removed from metals," says Dick Foster, Superintendent of the North Mill Operations for Haynes International. "All of these are very caustic environments, and we are naturally concerned about tank integrity as well as other design considerations."

Foster, who has been with Haynes International for 35 years, has relied on Moon Fabricating when new lined tanks are built or older liners repaired or replaced in the field. He adds that he looks to this supplier in part because of its technical support

capabilities.

"Moon has consulted with us on several designs, and they are very well versed on both the tanks and the various types of linings," Foster explains. "If we tell them what type of environment we're going to have with the tanks, they can help us make sure we choose the right material for the tanks and linings."

Foster adds that in a recent acid storage project, Moon coated both the outside and inside of the tank and also installed bumpers to create an internal cushion. "They brought it in as a complete unit, then got us hooked up and ready to get online," Foster says.

Savings on turnaround and freight When a company commissions the fabrication of a tank in one location and application of a liner at a plant perhaps hundreds of miles away, there will obviously be added freight costs involved and most likely addi-

tional delivery time.

"Having a single-source supplier is a real benefit," Cogar says. "If I have a tank made in Cleveland and have to ship it to Kokomo to get it lined, I get a sizable freight charge in addition to the time consumed during shipping. Dealing with Moon Fabricating, they just move the tank from one room at their plant to the other, and install the lining at the same facility."

At the same time, single sourcing saves time from a purchasing perspective, on inspections, in engineering, and in the communication of specifications or drawings.

"One-stop sourcing saves headaches and delays on scheduling, and paperwork and communications," Cogar adds. "Moon provides me with drawings in a heartbeat, so I know exactly what we're talking about in terms of specifications and everything else. Avoiding red tape is a big advantage."

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RegScan understands that staying in compliance is critical. But it doesn't have to be complicated. That is why we host webinars several times throughout the

year that help our clients tackle ever-evolving problems in the EHS industry. Prior topics covered included regulatory overviews, the Changing Role of the EHS Manager, and ISO 14001:2015. Such topics specifically address the newest industry standards while banishing compliance confusion, provide necessary tools to manage today's EHS challenges and reduce time and money spent on compliance activities.

Tutorials

RegScan also produces a number of helpful videos for our users. They answer most commonly asked questions on using the RegScan One interface. You may wish to visit our Informational & Tutorial Videos Page prior to submitting a ticket to see if your question can be answered with the assistance of one of these videos.

Conference

And now RegScan has gone beyond the computer screen to bring partners and clients their first ever Inaugural Regulatory Conference. Government officials, regulatory experts and executives from Fortune 1000 companies will gather on Capitol Hill in Washington D.C. on May 24th-25th, and be among the first to learn what the Environmental Protection Agency has planned for 2017 and beyond. And with RegScan, sometimes it is all fun and games. We're taking everyone out to the ballgame with box seats for the Washington Nationals as they host the National League Champion New York Mets.

Tracking Regulatory Change

Strikethrough

Strikethrough allows you to effortlessly see the amendment history of a regulation by comparing the current regulation with an earlier or future version. Changes are easily identified by color-coding. Anything that has been added will appear in green, while anything that has been deleted will appear in red.

My WatchList

My WatchList is a custom regulatory change management tool that allows you to monitor change at various levels of detail. It gives you quick access to only the information you need, while providing a clear record of what you have and haven't reviewed. My WatchList is the easiest way for a Web Services user to build a custom regulatory register, which RegScan will automatically export to your online environmental management system.

LookOut Email Alert

By defining specific keywords or phrases, LookOut allows you receive daily Email alerts on State or Federal regulatory changes.

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As part of our ongoing commitment to improve the RegScan user experience, we use a ticketing system for customer support inquiries. This allows us to streamline requests and better serve you. Available 24/7, the ticketing system

allows you to immediately report an issue and track the support team's response to it. Every support request is assigned a unique ticket number. For your reference, we provide complete archives and history of all your support requests. A valid email address is required to submit a ticket.

Schedule a Demonstration

The RegScan team will gladly demonstrate any of our products or services for free. Our online demonstration sessions can accommodate up to 25 people, and we will schedule a meeting whenever it's convenient for you. During these interactive demonstrations, our experienced staff will go through whatever products or services interest you. You'll also have the opportunity to ask questions, and discuss licensing options that are tailored to your needs. If you decide to purchase, we can take of your training and support needs too. We frequently update our library of training videos, and we'll be happy to arrange online or in-person training sessions. Furthermore, our in-house technical support team is always available on weekdays (except for holidays) between 8 a.m. and 8 p.m. Eastern time, and online 24/7.

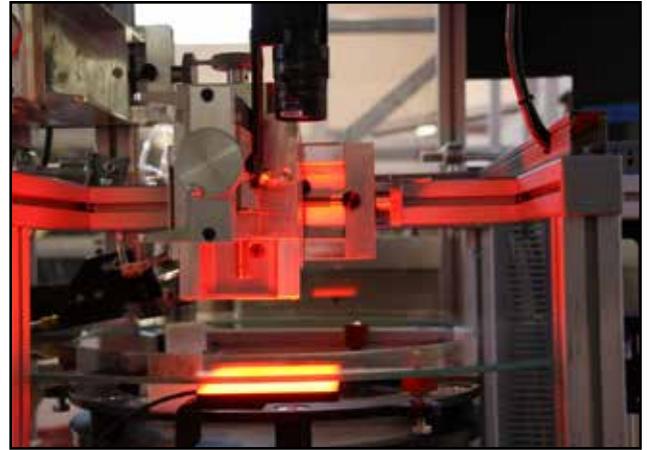
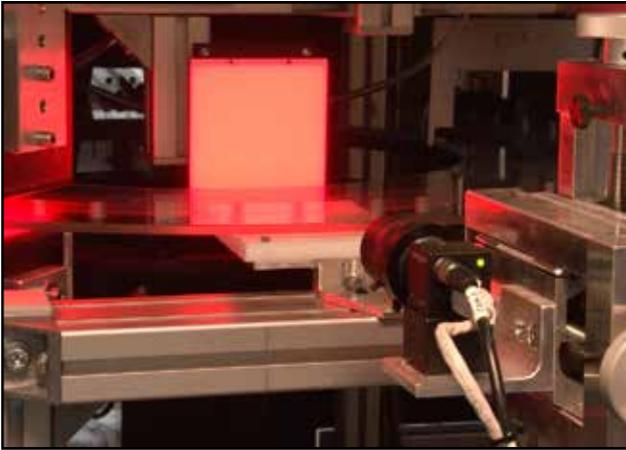
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The screenshot shows the RegScan ONE web application. The top navigation bar includes a search bar, user profile, and language settings. The left sidebar contains a hierarchical menu for navigating through regulatory databases. The main content area is titled 'RegScan ONE' and 'One World, One Platform'. It displays several sections: 'RegScan Solicits Alerts' with 'No Updates Today', 'ELR Global Update' with 'No Updates Today', and 'LookOut Update Federal' which lists a 'Table of Contents/Federal Register Vol. 81, Issue 48, Friday, March 11, 2016' for the 'CENTERS FOR DISEASE CONTROL AND PREVENTION'. Below this, there are 'NOTICES' sections for 'Proposed OIRB Collection' and 'Agency Information Collection Activities: Submission for OMB Review, Comment Request'. Each notice includes a 'View Full Article Matching: Medicine' link and a summary of the regulatory action.

Ensuring Zero Internally Threaded Fastener Defects



New high-speed sorting technologies, including vision based hole and thread detection, are making traditional methods obsolete

It is critical to inspect formed metal fasteners to ensure zero defects whether for safety, mission critical performance, or to optimize the manufacturing process. Conventional methods to do this exist, such as sorting mechanically for size or hand sorting with optical comparators. Yet traditionally, it has been difficult to inspect internal threads for tiny defects such as chips, tears, weld splatter, as well as short or missing threads.

Inspecting the vertical walls of a fastener hole and its threads is difficult for the human eye due to its small size as well as lighting and viewing issues. Not only is such an inspection process slow, labor intensive, and subject to interpretation, but also prone to human error – particularly over long periods when fatigue can degrade accuracy.

“Because many of our parts such as small fuel fittings and unions for the auto industry are safety parts, our customers will not accept anything but 100% quality, so we carefully check key areas including internal threads,” says Chuck Abbate, Vice President of Operations at H&L Tool, an ISO-TS 16949:2009 registered manufacturer of precision turned

and cold formed fastener products. “We needed a way to make sure that all the internal features were perfect and within the print.”

However, even typical cameras and laser-based equipment have difficulty detecting required features inside of parts, and the deeper the hole or recess the more challenging this becomes.

“One of the problems that arises when looking at internal features on a machine is the different color in the plating and different lighting,” says Abbate. “It is very important to get a machine that determines what it is looking at, that it is truly looking at the part and not at glare or a shadow.”

Now to help manufacturers ensure zero defects in their fasteners, a number of advanced high-speed sorting technologies are making slower, less reliable, traditional methods obsolete.

In order to make certain that its couplers, tube nuts, and internal female nuts contained zero defects, for instance, Abbate turned to a high-speed vision based measuring machine called the GI-100DT from

General Inspection, a developer of high-speed measuring and sorting fastener inspection systems.

The device uses a series of front and backlit cameras to calculate a part’s height, profile as well as inner and outer diameters. As configured for H&L Tool, the device also has a number of advanced options. This includes cameras to check for internal threads, an axial viewer that detects surface imperfections on multiple sides of a part at once, and eddy current capability, which enables checking for metallurgical defects along with plating or hardness variations.

With 360° internal thread inspection capability, the General Inspection device incorporates hole inspection optics to specifically image and measure both the bottom of a hole and its vertical walls. This allows great detail of I.D. threads and the detection of very small defects like weld splatter, torn threads, reamed threads, chips in threads, short or missing threads, as well as a single damaged thread.

“It is the only sorting machine I have seen that has the capability to totally look inside the part,” says Abbate.

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Wow! My trip to the NECA Convention and Show last year was a real eye-opener. I had no idea that I would learn so much, see so many new products, and talk with so many industry experts about my specific business issues. I should have made this a 'must-attend' event many years ago.

—“Aloha Joe” Kaluhiokalani, Aloha Communications Contractors Inc.

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“The different types of special lenses on these cameras are very good at looking at all the internal features, which we could never get on a machine before.”

According to Abbate, the machine does a good job of distinguishing the interior part features from glare or shadow. He appreciates a dial table style glass top, which stabilizes the parts during inspection while allowing viewing of the top and bottom at

once. Such part stability improves image analysis, data capture and precision, while simultaneous top and bottom viewing speeds the process.

“It is all about the presentation, of how the machine presents the part to the cameras,” says Abbate. “Because the parts stand straight up on the glass dial style table that the parts ride around on, cameras with convex lenses can look straight down at the parts and see 360 degrees around

from either side. That way with 100% sorting, you don’t miss anything.”

Abbate says that a conventional V-track model inspection machine, with a 30 degree incline to drop the part, would have limited how much of the part interior is visible.

“Other machines cannot look at the sealing surfaces of a coupler, for instance, because they view it at an angle,” says Abbate. “You have to be able to see down in it, which the General Inspection machine has a capability to do.”

“With the glass dial style table that the parts ride around on, we can view the top and bottom of a part at the same time,” adds Abbate. “On a double featured piece like a union, this allows us to run it through once instead of twice.”

According to Abbate, an axial viewer also allows detection of any surface discontinuities on six sides of a part at once. With such a capability, the camera could, for instance, simultaneously “see” the top and sides of a fastener.

Along with the device’s eddy current capability, which detects any metallurgical defects including plating or hardness variations, Abbate has found the device provides the efficient, zero defect fastener sorting required.

“We have found our new system to be at least 10 times faster than hand sorting and much more effective than typical sorting machines that look only on the outside of a part,” concludes Abbate. “It is a must for those who make internally threaded fasteners or connectors.”

For more info, call 248-625-0529; Fax 248-625-0789; visit www.generalinspection.com; or write to General Inspection, 10585 Enterprise Dr., Davisburg, MI 48350.



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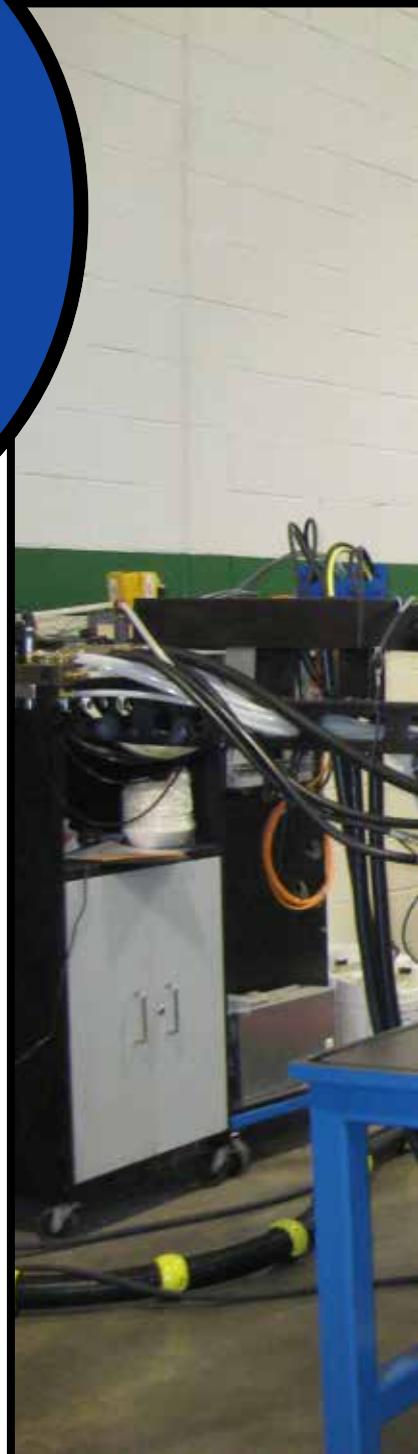
Ways to

*Early attention to
procedures*

For most manufacturers, the productivity of their CNC equipment can be measured in fractions of seconds, including not only the cutting or grinding cycle times, but even the intervals between tool changes. The performance of the spindle – the workhorse of the CNC machine – has a dramatic impact on that productivity.

When operating problems, such as excessive vibration or chatter, hinders machining efficiency, productivity may be crippled until the spindle is replaced. If no spare is available, repairing or remanufacturing the spindle could take weeks effectively putting a machine out of business in the meantime. Hence, getting longer life and optimum operating performance from spindles is a worthwhile economic goal for manufacturers.

The solution to getting higher performance and extended life from spindles on CNC machines is a combination of practices aimed at (1) preventing premature spindle failure and (2) after a failure occurs, insisting that the remanufacturer provides not only comprehensive CNC spindle repair services but can also provide modifications and operational recommendations that can ensure longer spindle wear life - even when run at higher speeds.



to Extend CNC Spindle Life

*o performance issues and insisting on painstaking rebuild/remanufacturing
ures can help machine tool operators keep their spindles on the job.*



The following guidelines can help machine operators achieve those goals:

Identify when to repair – before failure
Normally when a customer pulls a spindle it is because of part quality issues and/or intensified noise level.

“Noise often results from damaged bearings creating vibration that may eventually lead to chatter, a more severe vibration that feeds upon itself,” explains David Kirkpatrick, president of Superior Spindle Service (Taylor, MI), a company that specializes in rebuilding, grinding and machining of machine tool spindles. “Chatter often creates waves in machined surfaces to the point where the parts being are out of tolerance and must be scrapped.”

Another immediate and serious consequence of chatter relates to spindle efficiency. Many manufacturers deal with chatter by setting their machining parameters low. Therefore, instead of tool strength and spindle horsepower defining the metal removal rate, chatter becomes the limiting factor that keeps the process from reaching its potential.

Kirkpatrick, a CNC machine spindle expert with more than 30 years of experience adds, “Cutting tool chatter and spindle vibration are indicators that a spindle requires attention or a catastrophic failure can occur.”

In some cases when vibration does not cause a part quality

problem, operators have been known to run the machine until it catastrophically fails – a very expensive decision.

The solution for operators of CNC equipment is predictive maintenance. This requires regular monitoring of operating parameters and maintaining disciplined, detailed records. For example, vibration analysis should be monitored and recorded at appropriate intervals, perhaps quarterly or even monthly.

“The frequency of vibration analysis depends on the application,” Kirkpatrick says. “The temperature of the spindle should also be monitored. It is important that an expert determine that the spindle should be switched out before parts go out of tolerance or motor damage occurs. Plus, if the spindle can be changed out over a weekend, the shop can avoid critical downtime.”

Look to a remanufacturing specialist
When CNC spindle repair or replacement is needed, a remanufacturing specialist can often provide more comprehensive spindle services, sometimes also including repair of related motors, encoders, proximity sensors and drawbars.

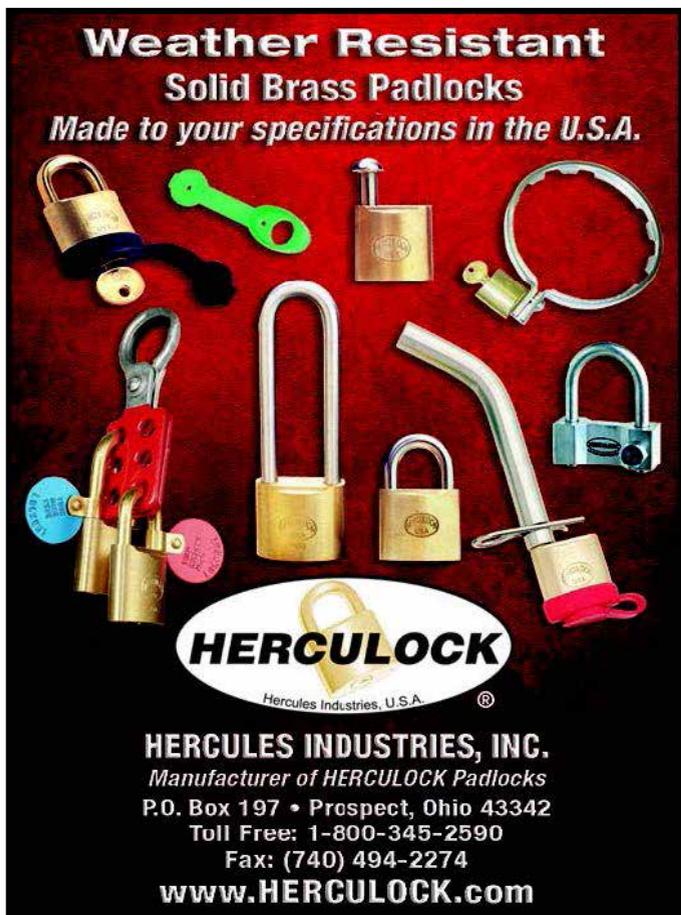
Some spindle remanufacturers, such as Superior Spindle Service, offer one-stop repair services. Because there is a direct relationship between spindle performance and the proper function of these other components, it is critical that the precision spindle repair facility be able to evaluate and service all spindle components.

The evaluation process begins with disassembly of a spindle that is out of spec or failed. In the evaluation it could include the motor – surge test, drawbar – retention force and all electronics (encoders, proximity sensors, bearing sensors, etc.).

“Service technicians meticulously should disassemble and check each spindle for adherence with the original manufacturer’s specifications,” Kirkpatrick explains. “This is followed by a geometric inspection using electronic measuring equipment that is repeatable within a micron. It is advantageous that a digital photo record be kept to insure that all repair quotes and failure analysis reports are as accurate as possible. Next, grinding, machining and balancing should be performed by experienced technicians using advanced manufacturing equipment.”

It is essential that spindles are reassembled in a clean work environment. For example, at Superior Spindle Service a class 10,000 clean room is used for inspection and assembly. The clean room is designed to prevent any airborne contaminants and humidity from affecting spindle quality and performance and further ensures that each spindle is returned to precise OEM specifications.

Look for Kaizen-type innovation and improvements



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Kirkpatrick says there is much room for Kaizen-type improvement throughout the remanufacturing process. In one case his firm was working with a major automotive manufacturer who was experiencing excessive downtime – over 31 hours - each time they had to change a spindle.

Superior Spindle Services was able to extend spindle life by incorporating specific modifications. As a result, the customer’s average spindle downtime was reduced to less than 10 hours, an accomplishment for which the spindle remanufacturer received a Kaizen Award.

“In the manufacturing environment, if you can reduce the cycle time even a fraction of a second can make a big difference. So, with respect to a 20-plus hour downtime savings, that is monumental.”

Require failure reports

For every CNC spindle repair, customers should expect to have a detailed failure report including text and photos. “This process provides the customer with documentation of the rebuilder’s findings concerning the causes of failures,” says Kirkpatrick. “This is vital because it can help customers take corrective actions to prevent future failures.”

Kirkpatrick says that his firm also provides customers with recommendations that may increase spindle service life. In some cases, application engineers might suggest ceramic (silicon nitride) ball bearings be used to replace conventional steel ball bearings. The ceramic ball bearings have 30% more mass than steel ball bearings and allow spindles to operate at higher speeds.

Expect advanced testing and verification

After spindles are remanufactured, it is vital they be thoroughly tested and verified. If related assemblies are in question, such as electronics or motors, those should be tested and verified as well.

“Advanced testing includes vibration analysis and running the spindle closed-loop on a Siemens or a Fanuc drive,” Kirkpatrick explains. “Our technicians also align encoders using special software. We also test motor thermistors, bearing thermistors and proximity sensors.”

Each rebuilt spindle needs to be thoroughly “run in” at the operating speeds as they were designed. Vibration analysis and temperatures are monitored throughout the run in procedure and may take up to 18 hours to complete. Before leaving the testing facility, detailed reports should be generated for verification by Quality Assurance Technicians.

To ensure minimal downtime and maximum productivity, the above mentioned procedures will increase mean time between spindle failures.

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more competitive cycle times, thanks to their high processing speed, and they accurately maintain this for up to 5 times longer than alternative solutions based on ball screws. This operative method decreases the number of machining centers required, which results in a reduced cost per piece. It also reduces the space occupied by the machines, thereby optimizing the plant layout.

SmartDriveComau 800L can perform processes with extreme flexibility, thanks to its circular interpolation. This allows the machining of bores with a standard high-speed cutter, using the same tool for manufacturing bores of different dimensions, which helps save time and costs. In addition, its renovated ergonomic design, compared to previous models, ensures easier and faster management and maintenance.

Furthermore, thanks to the “get help” icon, the operator can interact with the machine, interpreting and anticipating its requests much more easily. This results in reduced time required for diagnostics and, consequently, in an optimization of the production.

To meet the increasing market needs in terms of processes with low environmental impact, and to operate in compliance with the machining modalities of lean manufacturing, SmartDriveComau 800L is also available in a MQL (Minimum Quantity Lubrication) version, in which through-tool oil mist replaces the coolant traditionally required by the cutting process. The new design of the working chamber allows a more efficient disposal of shavings, while the vacuum and

air filtration system guarantees more internal cleanness. The MQL version also includes an integrated system to monitor the temperature of the pieces and the machine, which guarantees greater process quality and the complete conformity of the pieces. SmartDriveComau 800L is also designed to deliver a significant cost reduction in terms of energy consumption, thanks to an energy saving package that grants savings of 15% compared to the previous version.

With 20 years of experience in industrial automation systems and more than 2,300 machining centers featuring linear motors installed all over the world, Comau is able to offer itself as a strategic partner for the integration of machining systems intended for any branch of the manufacturing sector. Such consolidated know-how has enabled Comau to develop the latest versions of its SmartDriveComau machining centers, not only by optimizing and enhancing the performance of the single centers, but also by improving the logistics needed for the installation and maintenance at the clients’ plants. For these reasons, the hardware and software interfaces that manage the transport and loading/unloading systems are pre-configured, in order to cut the time needed for the integration and final adjustments. The advantages are clear: when Comau integrates a system with SmartDriveComau 800L, the Overall Equipment Effectiveness, a coefficient measuring total efficiency of a plant, improves by 5% compared to competitive solutions.

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