

Building For Continuous Customer Service

> Family-operated Disco Inc. transitions to third generation of compressor repair services

BY NORM SHADE



Disco Inc. is beginning its 48th year of serving the gas compression industry. Aubrey Green started Diversified Industrial Services Co. in 1968 in Borger, Texas, after its predecessor, G & G Fishing Service, ran into hard times. "G & G, which dated back to 1946, did pretty well servicing the drilling industry of Texas, Oklahoma and Kansas until 1968," said Mike Haning, president. "But when drilling slowed down, the compression started up, and that's how Disco got its start."

By the mid-1970s, the small company had branched out to Liberal, Kansas. It then expanded into the Amarillo, Texas, area and opened sales offices in Elk City and Oklahoma City, Oklahoma.

A family-owned-and-operated company, Disco is transitioning to the third generation. Andy Green and Mike Haning, son and son-in-law, respectively, of the founder, took over operation of the company in the early 1980s. Preparing to take the reins is grandson Michael Haning. Other

than time away to obtain his MBA at Texas Tech University, Michael Haning has been involved with Disco since his high school days, starting as a cleanup hand, evolving into machining and mechanic work, and then into sales.

Disco's services include general industrial machine and mechanic work, but its well-known specialty is the repair of natural gas compressor cylinders, rotary screw compressors, and their components. "We can perform any repairs from the frame out to the variable volume pocket, and everything in between," said Michael Haning, operations director.

Repairs are offered for compressor cylinders, pistons, connecting rods, frames, valves, packing and wiper cases, and crossheads, as well as rotary screw and rotary vane compressors, air compressors, air starters, centrifugal and reciprocating pumps, and hydraulic pumps and motors. "We have the capabilities of manufacturing most parts in-house, and one of our key areas of expertise is the application of



■ A Disco Inc. technician sets up and aligns a customer's cylinder (far left) prior to turning damaged material from its bore (left) to prepare it for restoration back to original size.

HVOF [high-velocity oxy-fuel] tungsten carbide coatings, which can extend the life of the part," Michael Haning said. "We have had almost a 0% failure rate with parts that have been coated in tungsten carbide."

Disco focuses primarily on petrochemical plants, natural gas transmission companies, and gas gathering companies. "One thing that sets us apart is our machine capacity." Mike Haning said. "We have some of the largest machine capabilities in the area. One of our large machines is a horizontal boring mill with a 25,000 lb. (11,338 kg) table capacity that can handle parts up to 96 in. (2438 mm) in diameter. Our machines attract other industries because they have large parts that need to be machined. Our niche in the CNC (computer numerical control) department is in building complicated, short-run parts. We are able to build an order of five parts, but we will also take an order of 5000 parts."

Through the normal wear and tear of compression, cylinder-running bores lose their integrity. Disco has been reconditioning natural gas compressor cylinders and components since its inception. The company has extensive experience with two methods for reconditioning compressor cylinders: metalizing (commonly referred to as "metal spraying") and relining. In cylinders with marginal wall thickness that cannot be bored oversize to accommodate a liner, metalizing is a way to restore the cylinder bore back to size and extend the life of the cylinder. "With over 30 years of experience, we have perfected the art of metalizing to repair compressor cylinder bores," Mike Haning said. "Metalizing restores them and prolongs their use, increasing durability and lowers maintenance costs."

The metalizing process involves depositing a mechanical bond coating of mostly nickel and aluminite on the compressor cylinder bore surface. The bore is sprayed undersize to allow enough finish material for a honing process, which establishes the desired finished bore

size and surface finish. The honing process is typically finished with the application of carbon-filled Teflon powder, which provides a surface condition that helps avoid premature piston ring wear when the cylinder is first returned to service.

The equipment that Disco uses for the metalizing process can provide a very precise and desired coating thickness in the running bore. An electric arc and compressor air system melts and atomizes the coating materials into a spray, which is deposited into the substrate. Stainless steel is the most common metalizing material chosen, but others are available, including Babbitt, brass, carbon steel and aluminum, depending on the compressor application or service. Cylinder metalizing and reconditioning is done at the company's headquarters in Borger, Texas. A pickup and delivery service is offered for customers outside of that area.

Lining or relining compressor cylinders is another common repair method. It is a delicate process and must be performed very carefully so that the integrity of the cylinder is not compromised. If the compressor cylinder already has an existing liner, replacing it usually involves machining out the existing liner and machining and installing a new one.

Disco can provide both shrink-fit and wet liners. Shrink-fit liners are interference fitted to the bore of the cylinder body. The previous shrink-fit liner is removed by using a boring mill to make a single cut over the length of the liner bore. This process weakens the liner's wall thickness until it finally breaks and relieves the interference fit, so that the liner can be removed. After machining a new liner, dimensioned to provide the proper interference fit, the new shrink-fit liner is chilled in liquid nitrogen and installed into the cylinder body. After installation, the valve ports in the liner are cut out using a hole saw.

Wet liners are slip-fit liners, typically with O-ring seals on the outer diameter of the liner that seal it to the cylinder



■ A Disco Inc. technician hones a compressor cylinder (left) to finish a bore that has been metalized (metal-sprayed) to restore its size and finish. The result is ready for return to service (below).



bore. Anti-rotation pins or a flange, captured by the cylinder head, hold the liner in place. The valve ports for a wet liner are cut prior to the liner being installed in the cylinder. Disco said it is able to duplicate original equipment manufacturer (OEM) wet liners.

Disco maintains an inventory of compressor valve parts, archived by customer location and cylinder. "That way, the next time a compressor valve comes in, the parts are in stock and we know what they need," Mike Haning said. "The typical turnaround time for compressor valves in our shop is a matter of days."

"Disco has been rebuilding screw compressors since 1991, when they were first introduced to the gas fields in our area," said Andy Green, vice president. "We can take a rotary screw compressor and tear it down, clean it out, and do an inspection of all of the components to come to a conclusion about what caused its failure. After that, a detailed report, with pictures, is sent so that the customer can make an informed decision. If the screw compressor is beyond economic repair, we have relationships with almost all manufactures to find a replacement. We also stock a number of parts for Ariel, Sullair, Atlas Copco, Frick, LeRoi, I/R, Quincy, and many other models, to help minimize the time that the screw compressor will spend in the shop, allowing

us to have it back out in a faster time period."

Bearings are the most common screw compressor component failure. This usually requires machine work because of damage to either the bearing areas of rotors or the heads. Typical rotary screw compressor repair work includes sleeving the air gap and preparing, metalizing and machining the input shaft, along with other component work. Green said that the normal turnaround time for rotary screw compressor servicing can be from two to four weeks, but if the process needs to be done faster and overtime is approved, turnaround time can be shorter.

Disco offers a number of industrial pump repair services, including seal upgrades, pressure testing, sandblasting, wear coatings, dynamic balancing, Inpro seal modifications and proprietary materials for certain customers. The turnaround time can vary anywhere from a few hours to a week, depending on the extent of repairs and how the pump is configured. Disco maintains a supply of bearings and seals that are common to many of the pumps in service in the immediate area.

"We can repair or replace any part within any brand of pump to standard specifications or to special unique demands," Green said. "We have specific experience in upgrading and modifying older pumps for more current applications."



■ A Disco Inc. technician installs the twin rotors into a repaired Frick model 355 screw compressor casing. Disco has been rebuilding screw compressors since 1991, when they were first introduced to the gas fields in the mid-continent area.

The tungsten carbide coating process, which has been a Disco specialty for more than 40 years, includes pre-machining parts that are ground and honed to 0.005 to 0.007 in. (0.13 to 0.18 mm) undersize for coating. The parts are then aluminum oxide grit-blasted and built up with tungsten carbide, followed by grinding to 0.0005 to 0.0010 in. (0.013 to 0.025 mm) over finished size. The parts are then honed to a finish of 8 to 12 $\mu\text{in.}$ (0.2 to 0.3 μm). Pump plungers and compressor piston rods are the most common parts to be coated.

Disco operates in five locations. Its Borger, Texas, headquarters includes a full-service machine shop, mechanic shop and metalizing process for reconditioning and repair of compressor cylinders. It also works on compressor components, including connecting rods, frames, etc. The Borger mechanic shop is also able to overhaul rotary screw compressors, various pumps, gearboxes and blowers.

Disco's Amarillo, Texas, location primarily serves the meatpacking industry with a separate fabrication division that is able to travel to customer sites and fabricate and install any requested projects. The Amarillo shop also repairs various pumps, motors and cylinders, and it has a waterjet metal cutting machine to support fabrication.

The Liberal, Kansas, location offers some of the same services as Borger. It also carries an inventory of compressor valve parts to allow for a quick turnaround and provides tungsten carbide coating, as well as gearbox and pump repair and general machine shop services. The Elk City

and Oklahoma City, Oklahoma, sales locations also house small inventories of gas compressor parts.

Disco's growth has been steady, and the company has maintained customer service at the center of its focus. A number of employees have spent their entire working careers at Disco and are approaching retirement. Preparing throughout for the next generation, Michael Haning explained that in every key position the company has hired a replacement that is currently training with their predecessor. For example, in three of its four sales territories, a new salesperson is training with and helping the current salesman cover his area and becoming familiar with customers.

Similarly, there are essentially two shop managers at each location, as one is training the other. For example, Glen Klotz, who has been with Disco for 36 years, runs the Borger shop. As he approaches retirement age, he works side by side with his replacement, Donny Raney. The same holds true for the Liberal shop, where 38-year-veteran Doug Heathman is working closely with his replacement, Chris Davis.

"As you can see, Disco has invested in and is well prepared for the next generation to come along," Michael Haning said. "Our company is highly regarded throughout the industry, especially for compressor cylinder reclamation. We have very good relationships with our customers and there is less red tape that our managers have to worry about because the company is privately held. Everything goes back into the company for the growth of the company." CT2