Compressor Works

ACI Services, Inc.

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Using Performance Software Beyond Standard Analysis

One feature that many users may not know about their performance software is its ability to output tabled performance, and not just point reports and/or curves. This tabled data can then be entered into other software (e.g. Excel) for additional analysis, trending, comparisons, etc. Performance software packages for reciprocating compressors that offer this feature include eRCM Viewer™ (Ajax, Knox Western, eRCM models) via the Generate Performance Data feature (Figure-1), and Ariel via its MultiRun/CVS feature. For other OEM software, contact that OEM to see if this feature is available for use.

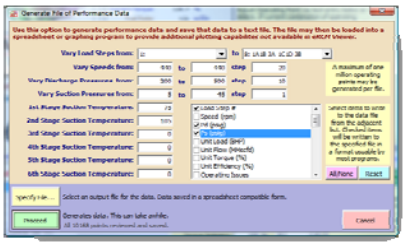

Figure 1

For example, if you wanted to plot Flow against Load, you would not find that graph format available in any performance software. However, you could use the tabled data feature to output results (flow and load) for various suction pressures and discharge pressures (at a fixed load step, fixed speed and fixed suction temperatures). Then, load the results into Excel and create the desirable plot (See Figure-2).

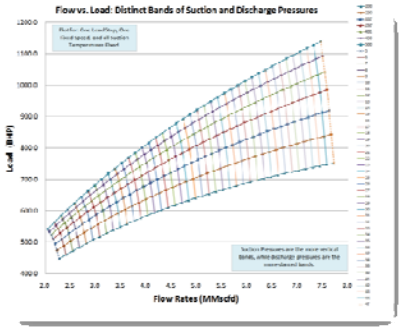

Figure 2

Another use can be the creation of curvefit functions for use in PLC software. For example, it is often possible to accurately determine interstage pressures per Load Step based strictly on current suction and discharge pressures. This route is sometimes required when using an older PLC that lacks computing power to directly run code for flow/mass balancing routines.

Once the data is imported, Excel's Data Analysis - Regression feature (Figure-3) can be used to determine the curvefit of the data per load step. In this case, for Load Step #1, the curvefit is:

NStage(Ps, Pd) = 2.975*Ps + 0.066*Pd + 33.666.

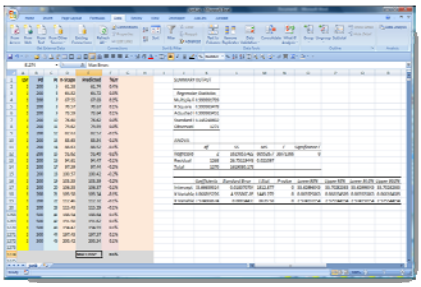

Figure 3

This curvefit is then checked, and subsequently proven to match the original data within about ±0.5% for all 10,000 points. Thus, given the current suction pressure (P_S) and the current discharge pressure (P_D), the PLC can estimate the interstage pressure per Load Step X using a simple formula such as $N_X = A_X*P_S + B_X*P_D + C_X$, where the A's, B's, and C's are just predetermined constants per load step. This allows the PLC to estimate the interstage pressure prior to changing load steps – a desirable feature if one wants to avoid running the unit in safe rod load and/or pin non-reversal areas.

With the power to generate tables of performance results for hundreds, thousands, and even millions of operating conditions, your ability to create new plots, compare predicted with measure data, review trends, create curvefit functions, etc. is significantly increased.

Inside this issue:

Look for ACI at these Events in 2009:

Feb 3-4, Compressor Optimisation 2009; Aberdeen, UK

Feb 22-25, Gas Compressor Association Expo; Galveston, TX

Mar 16-18, Gulf South Machinery Symposium; Baton Rouge, LA

May 12-14, Eastern Gas Compression Roundtable; Coraopolis, PA

Sept 24-26, Gas Compressor Conference; Norman, OK

Sept 9-12, Turbomachinery Symposium;; Houston, TX

Oct 5-7, Gas Machinery Conference; Atlanta, GA

Oct 27-29, Louisiana Gulf Coast Oil Exhibition; Lafayette, LA

Project Success Story — Another Valve-In-Head Cylinder Replacement

The new ACI custom engineered cylinder has a one piece Valve-In-Barrel body designed to "bolt-in" to existing foundations, pulsation bottles and piping connections.

The new cylinder has offset manual clearance pockets to facilitate easy removal and a front end head that allows removal of the piston and rod assembly without disturbing other flanges.

In the early 1960's, rumor has it, NiSource needed a new unit for one of its compressor stations at let's say a "remote" location. When the first tractor trailer failed to negotiate the first turn down a winding two mile road, a large Cat 9N bulldozer was called to lead the way. The five C-B GMV-8TF engines each with four C-B C3B-14 cylinders were soon in place.

Nearly 50 years later an opportunity to sell more gas required some serious plant modification to include cylinder modification to increase the MAWP. ACI was tasked to increase the MAWP and provided a solution that kept installation costs to a minimum while eliminating many of the previous maintenance concerns.

ACI optimized, designed and built the C2C-14-1 Valve-In-Body compressor cylinder assembly.

ACI's bolt-in-replacement technology is a very methodical, detailed design process where ACI engineers consider both existing limitations and new requirements to provide the desired solution. The ACI C2C-14-1 cylinder is a valve-in-barrel, water cooled, cast ductile iron cylinder designed from scratch to fit the existing envelope and meet the increased MAWP of 2000 psig. The existing valves, valve cages, rod packing assembly, and unloaders were reconditioned and reused.

The ACI cylinder also solved several maintenance concerns:

- The old three piece cylinder had problematic vertical sealing faces, excessive bolting and cumbersome maintenance access that was completely eliminated with the new design.
- The old design did not allow the piston and rod assembly to be removed without the partial disassembly of the cylinder and disconnection of bottle flanges. Not only was additional maintenance time required but additional wear on the flanges was obvious and made all maintenance more difficult. The new design allows for easy access to the piston and rod assembly through the new head end head which can be removed without disturbing piping or bottle flanges.
- The manual clearance pockets were offset on the new design to allow removal without disconnecting the manual hand wheel as previously required.

Compressor Products International and ACI Services, Inc. Announce Alliance Agreement

Houston, TX – July 15, 2008: Compressor Products International (CPI) and ACI Services Inc. announced today the two companies are forming an international sales, marketing and development alliance to expand services and product availability to each company's customers - worldwide.

Under the agreement, CPI gains access to ACI's custom-designed cylinders and compressor engineering capabilities; and ACI obtains CPI polymer alloy materials and radius disc valves for use in product development.

"Having access to ACI's specialized products and highly-regarded engineering expertise enhances CPI's capability to provide high-quality solutions to our customers' reciprocating compressor problems," explained Robert J. Wizeman, director of Sales - Americas for Compressor Products International. "Strategically, this alliance reinforces our R&D commitment to break new ground in the search for more reliable and efficient performance of reciprocating compressors worldwide."

"CPI's extensive sales organization significantly broadens the worldwide reach for ACI's unique compressor products and problem solving capabilities," said Chad D. Brahler, Vice-President of Sales and Marketing for ACI.

About ACI Services

ACI Services, headquartered in Cambridge, Ohio, is a leading provider of performance optimization, automation systems, and engineered products and solutions for reciprocating compressors. Its products and services include a wide range of compressor performance control and unloading devices, custom cylinders, components, modeling software and replacement parts. http://www.aciservicesinc.com

Headquarters:

125 Steubenville Ave.

Cambridge, OH 43725

Phone: (740) 435-0240

About Compressor Products International

Compressor Products International, an EnPro Industries company, is headquartered in Stafford, Texas. CPI is a worldwide industry leader with over 100 years of experience in the design and manufacture of critical sealing components for reciprocating compressors and gas engines. http://www.c-p-i.com

Headquarters:

4410 Greenbriar Lane

Stafford, TX 77477

Phone: (281) 207-4600

In Memoriam—Tom Drenan

With sadness, we note the passing of Thomas Drenan, at the age of 52, on July 19, 2008 after a valiant two-year battle with a malignant brain tumor. Prior to his declining health, Tom was Director of Compressor Connection for ACI Services Inc. in Cambridge, Ohio, U.S.A. He knew integral engine compressors inside and out, and was instrumental in the development of ACI's resource CompressorConnection.com and the underlying used compression equipment business.

Prior to joining ACI in January 2005, Tom spent more than 24 years with Tennessee Gas Pipeline in various engineering and supervisory positions. A native of Huntington, WV, Tom had a BSME degree from West Virginia Tech. He was an avid racing fan and enjoyed working on his classic 1969 Plymouth Road Runner.

A friend to everyone he met, Tom was a caring, Christian family man who leaves behind wife, Karen, son, Tyler, and daughter, Courtney.

Personal condolences may be sent to the family at www.thorn-blackfuneralhomes.com.

There's little traffic on the extra mile. — Naval Undersea Medical Institute

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The Innovation Resource for Reciprocating Compressors

www.ACIServicesInc.com

Don't Let Good Equipment Slip into Early Retirement

Why didn't someone think of this before? Compressor Connection™ is a vast Internet resource of used compression equipment where buyers and sellers can connect.

Buyers search CompressorConnection.com to find a huge inventory of good, serviceable, equipment– everything from *cylinders and frames* to *crankshafts and engines*; and *complete compressor packages* too.

Compressor Connection is carefully managed by ACI Services, Inc. with staff support to promote and sell the equipment offered online. ACI can also provide engineering *know-how* to reapply used equipment– to help you replace inefficient compressor cylinders with re-engineered cylinders at a considerable savings.

Point your browser to www.CompressorConnection.com today, or contact Chuck Kerr (ckerr@ACIServicesInc.com) at (740) 435-0240, extension 526.

www.CompressorConnection.com ACI Services, Inc.

Norm's Notes

Thanks to our motivated staff, our network of alliance partners and distributors, and many loyal customers, ACI is enjoying its 4th consecutive year of record sales! Our team also continues to grow as we have welcomed John Bazaar in engineering, Nak Nortey in marketing, Carolyn Moses and Jerry Tainter in materials, and Trent Knabb in production since our last issue of *Compressor Works*. Our excitement is dampened, however, by the recent passing of Tom Drenan. Our thoughts and prayers are with Tom's loved ones.

Our momentum continues to build in supplying optimization, automation, software, reliability improvement, unloaders, custom cylinders, replacement parts, cylinder reapplications and other engineered solutions for reciprocating compressors. We continue to invest in the development of new products and technologies such as EnviroLine® cylinders and packing leakage monitors, our patent-pending AutoPocket™ pneumatic variable volume clearance pocket, and our patent-pending PulseBuster™ pulsation attenuation systems. We expect to announce more exciting new products in the future as ACI Services Inc. continues to build on its history of *Reciprocating Compressor Experts* and *The Innovation Resource for Reciprocating Compressors*.

We are making continual business process improvements to keep pace with rapid growth and varied demands. We are completing detailed mapping, documentation and improvement of all internal processes, so that we can handle even more volume, cost-effectively, without compromising our responsiveness, lead-time and quality. The operations side of our business, under Larry Burnett, has been reorganized with several recent promotions: Derrick McIntire – Director of Manufacturing, Joe Reiheld – Director of Materials, Lou Brahler – Purchasing Manager, and Mark Mayberry – Inventory Control Supervisor. We are now using Solid Edge 3-D solids software for new designs, and we recently added an MRP software module for better production scheduling and management. In the 4th quarter we will be expanding our crane capacity and our project staging area.

We are pleased to announce an alliance with Compressor Products International, which greatly expands our sales coverage. Our products and business specialties are largely complimentary, and we view this alliance as a win-win opportunity for both our companies and our customers.

Quality means doing it right when no one is looking. — Henry Ford