RMS
Rotating Machinery Services, Inc.

The Finish Line

VOLUME 14 ISSUE 1 JANUARY - MARCH 2018

RMS CELEBRATES 20 YEARS

RMS NEWS

RMS CELEBRATES 20 YEARS

The vison began on a plane and the business plan on a placemat.

1998 - RMS was founded in Nazareth, PA

2004 - RMS employed 11 and reached $3.4 mm in sales

2007 - RMS relocated to current HQ in Bethlehem, PA with 9,000 ft^2 office

2008 - Bethlehem facility added 5000 ft^2 assembly and manufacturing center

2014 - RMS expanded its field service capabilities to enable full turn-key oversight and management.

RMS also expanded its shop 10,000 ft^2 and office 5,500 ft^2.

2015 - RMS aquired by Incline Equity Partners

2016 - Opened Appleton, WS office employing A-C Compressor experts

2017 - RMS aquired MEPCO in Houston, TX with 64,000 ft^2 manufacturing capacity.

2018 is already shaping up to be a very promising year for RMS.

We've added new team members and promoted others in a number of significant roles throughout the organization. These personnel moves have positioned us ideally for the needs of our customers and our business.

Our product teams continue to reinforce the message of RMS being the go-to source for all turbomachinery needs.

RMS NEWS

FCC POWER RECOVERY TRAIN ROUNDTABLE - 2018

By Don Shafer

Rotating Machinery Services is excited to announce that we will be hosting our 6th annual Power Recovery Train Roundtable on May 8th and May 9th, 2018.

A Welcome Reception will be held for attendees on Monday evening, May 7th, 2018 from 6 pm – 8 pm at the Marriott Courtyard Hotel, 2220 Emrick Blvd, Bethlehem, Pa.

Please RSVP soon.

We look forward to seeing you there!

HOTEL INFORMATION

MARRIOTT COURTYARD
2220 Emrick Blvd., Bethlehem, PA
May 7th – May 9th, 2018

We have a confirmed a block of rooms at the Marriott Courtyard in Bethlehem, PA. The rate is $110.00 per room, per night and includes breakfast.

Reservations must be made through the Marriott Courtyard. **Reservations: 610-625-9500**

Please refer to **GROUP CODE: ROTATING MACHINERY SERVICES GROUP** when calling for Hotel reservations. Check in time is 3 pm / Check out time is 12:00 pm All rooms have access to high speed internet connection.

If you need any assistance or have any questions, please feel free to contact **Kathy Ehasz at 484-821-0702 Ext. 301 or kehasz@rotatingmachinery.com.**

TOPICS OF DISCUSSION

Tuesday, May 8th

- *Introduction*
- *Process and PRT Overview*
  - *Train Power Balance*
- *Expander Reliability Overview*
- *Catalyst Deposition / Erosion / Corrosion*
  - *Isokinetic Testing / evaluation of results*
- *On-line Techniques to improve Expander Reliability (Blade Photography, Walnut Shelling)*
- *Axial Compressor Theory of Operation*
  - *Operating the PRT Axial Compressor*
- *Axial Compressor Typical Construction*
- *Axial Compressor Lessons Learned*
- *Expander / Axial Aerodynamics / Flow path Design Basics / Performance*
- *Expander / Axial Design Upgrades*
  - *Expander Cooling and Sealing*
- *Open Discussion / Q&A (time permitting)*

Wednesday, May 9th

- *Expander / Axial / Train Rotor dynamics Overview*
- *Expander / Axial / Train Structural Analysis Overview*
- *Motor / Generator and Steam Turbine Overview*
- *Compressor Basic Performance Concepts*
- *Field Service / Technical Advisor Support during outage*
- *Open Roundtable Group Discussion*

RMS SPRING 2018 TRAINING - PACIFIC NORTHWEST REGION

By Andy Janson

Rotating Machinery Services takes pride in providing our customers with the best-in-class customer service and support for all of their rotating equipment needs. As part of this service we are reaching out to our Pacific Northwest regional rotating equipment customers in an effort to gauge participation interest in a local one, or two day training session in the Anacortes/Bellingham area.

There will be no cost for this training.

Please distribute this to anyone within your organization whom you feel might benefit by attending this technical session event. Please do your best to respond within the next two weeks if possible.

If you have any further questions don't hesitate to contact:

Andrew E. Jansen
Services Account Manager – West Region
Rotating Machinery Services, Inc.
1981 Midway Road, Suite A
Menasha, WI 54952
Mobile: 920-460-3811
ajansen@rotatingmachinery.com

RMS NEWS

MVR COMPRESSOR RERATES

By Ryan Rottier

In the two years since Rotating Machinery Services opened its Appleton office, very good relationships have been developed between RMS and owners of legacy AC Compressor equipment. Specifically, RMS has had a lot of success over the last two years supporting a customer with their MVR compressors in a mutual beneficial arrangement.

RMS rerated one of the MVR compressors with a new rotating element and inlet nozzle. The rerated compressor will provide additional capacity at the same power. The increased capacity can also be used to recirculate addition hot discharge gas back to the suction of the compressor to superheat the gas upstream of the compressor. This superheat extends the longevity of the impeller as it reduces the amount of water present in gas reducing corrosion / erosion of the impeller.

RMS is in process of rerating a second MVR compressor with a new rotating element and inlet nozzle for the same site.

At the sister site, RMS is providing a new rotating element and inlet nozzle of the original geometric design to replace the used components.

In the above three cases, the inlet nozzles are cast stainless steel. The original material for the inlet nozzles was cast iron. The stainless steel is an upgrade that will last for many more years than the original cast iron components.

In addition to the above projects, RMS has also provided support for shop assemblies, replacement parts (backplate, bearings, seals, etc.), a new shaft end seal with reduced leakage and field service support. RMS has also provided engineering support such as an impeller FEA to review the longevity of a used impeller, on site blade frequency checks and recommendations for improved reliability.

Because of RMS's experience with steam turbines, we were also able to support the drivers for the three compressors.

With RMS's technical expertise, commitment to on-time delivery and desire to serve the customer we have become the first choice when in need of support for an AC Compressor unit.

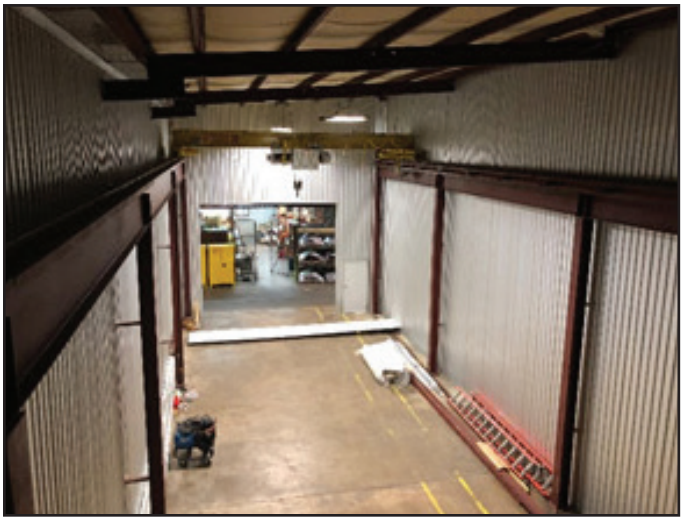
EXPANDING CAPABILITIES AT RMS/MEPCO

By Robert Tabb

RMS/MEPCO, located in the heart of Oil & Gas country, Houston, Texas, recently completed two much needed upgrades to the shop. The completion of our "clean room" for work on environmentally sensitive compressors and the installation of a new Schenck balance machine and run-out stand increasing our balancing capacity.

RMS/MEPCO was recently awarded a contract with a Gulf States region chemical company to perform an inspection and overhaul of one to their chlorine gas compressor. Given the unique operating environment of this compressor the need arose for the development and installation of a clean room to ensure process flow path cleanliness.

The staff at RMS/MEPCO was able to re-purpose existing shop floor space to create a clean room complete with overhead crane capacity of 15 tons and an independent HAVC system. The "clean room" size of 2000 sq. ft. allows for the servicing of multi stage split line and barrel compressors, previous unavailable at RMS MEPCO. This expansion opens the possibility of targeting new customers and new opportunities.



(Continued on page 11)

TECH TALK

Complete New FCC Expander Spare RBSA

By Don Shafer

One of our FCC Expander customers contracted RMS to provide a completely new, spare Rotor, Bearing and Seal Assembly (RBSA). They were experiencing high vibration levels on the unit in-service and also a chronic seal housing and inner exhaust casing horizontal joint leaking issue. The joint leakage was impacting the overall safety and reliability of the unit as well as making it impossible to take on-line blade photographs. The existing unit also had experienced several oil leaks.

RMS proposed the solution to the customer of having a spare RBSA. The spare assembly would utilize their existing spare rotor assembly. The spare RBSA would be manufactured and assembled while their current unit was running and would not impact operations at the refinery.

The customer also requested that RMS perform a power balance analysis for the power recovery train and provide a new Integral Stator Shroud. The goal was to evaluate whether additional power recovery from the expander was available. These results were used in the design of the new Integral Stator Shroud.

The work scope for the spare Rotor Assembly included cropping and coating a set of spare rotor blades the customer had in inventory. These were cropped to match the new RMS optimized integral stator shroud and installed in the RMS refurbished rotor assembly. The re-bladed rotor assembly was balanced and prepped for installation into the RBSA.

The new RBSA incorporate the latest design features for the inner exhaust casing and seal housing. The primary upgrade for the inner exhaust casing and seal housing was to increase the size and number of fasteners at the horizontal joint to address the existing unit's leakage issue. The new assembly incorporated new, redundant, vibration and speed pick-up instrumentation. All of the instrumentation was moved internal to the bearing housing to improve the reliability of these critical equipment health monitoring instruments.

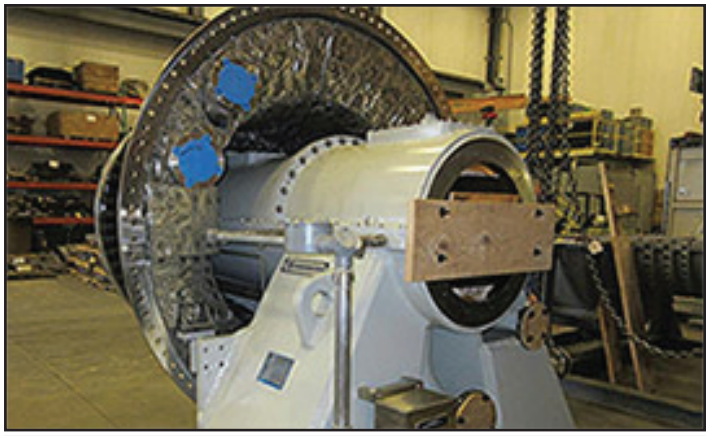
The new bearing pedestal fabrication and machining were optimized for ease of manufacture and assembly.

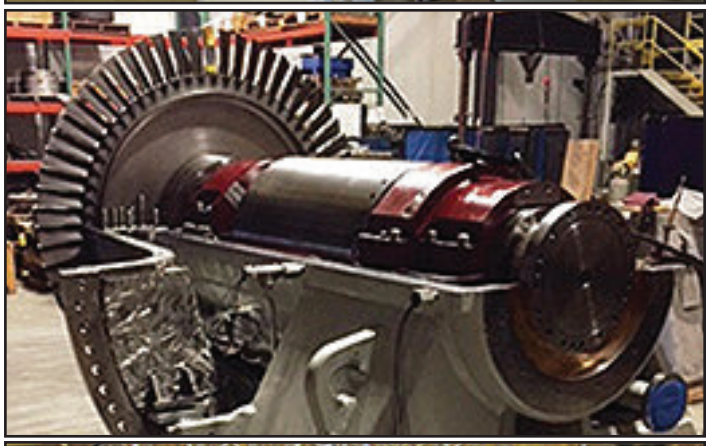
All new bearings were provided except for the existing spare active thrust bearing that the customer elected to use. Every seal, fastener and other internal components were upgraded to the latest designs.

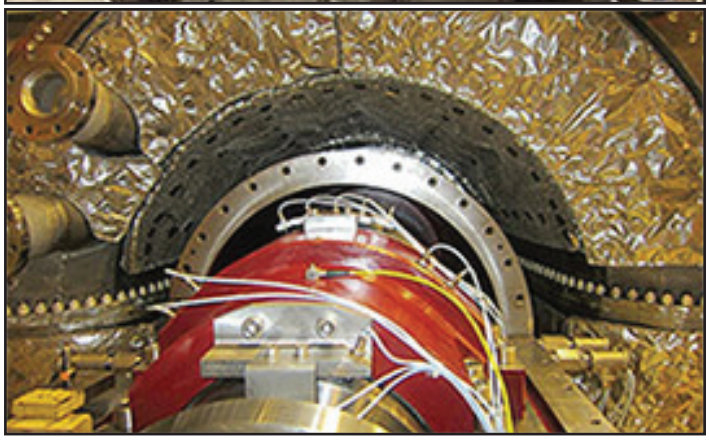
The RBSA was assembled with the rotor installed. All critical clearances and fits were verified and recorded to document the final as-built condition of the assembly.

Due to the poor condition of the in-service rotor, bearing and seal assembly, RMS was asked to compress the schedule of the new spare RBSA. RMS was able to achieve this and ship the completed assembly, with rotor installed, 6 weeks early with no additional cost to the customer.

The spare RBSA was installed in early December of 2017 and is operating per design with low vibration levels and no leaking joints.







TECH TALK

Volute Design And How It Can Affect Stability

By Ryan Montero

The final flowpath section of most centrifugal compressors is the volute; and although it is relatively simple in design compared to other flowpath components, it is always as critical to overall performance. The purpose of a discharge volute is to recover the radial velocity head of the flow exiting the diffusor before exiting the compressor. A well designed volute collects the flow while conserving the angular momentum of the flow. This is done by matching the area progression around the circumference of the volute according to the requirements of the discharge condition of the diffusor section. A volute that is oversized will incur losses due to over diffusion of the flow, and an undersized volute will fail to completely recover the dynamic pressure from the radial component of the flow entering the volute. In some cases these losses can hurt not only your efficiency, but also flow stability. There have even been examples of impeller failure due to poor volute design. Meanline, one-dimensional, performance codes have good correlations to predict volute performance based on circumferential area progression and diffusor discharge condition. However, to really capture what is going on in your volute, full 3D CFD is necessary.

In the example shown in Figure 1, the volute is constant area from the cut water through to the discharge pipe. This causes large areas of recirculation to form where the fluid has diffused too quickly. This leads to larger efficiency losses, and can result in loss of surge margin as well. The flow point for the model shown in Figure 1 is beyond the expected surge limit line, but small pockets of stall can still be seen in a few impeller blades. A close up of this is given on the right side of Figure 1. This is the direct result of poor volute performance.

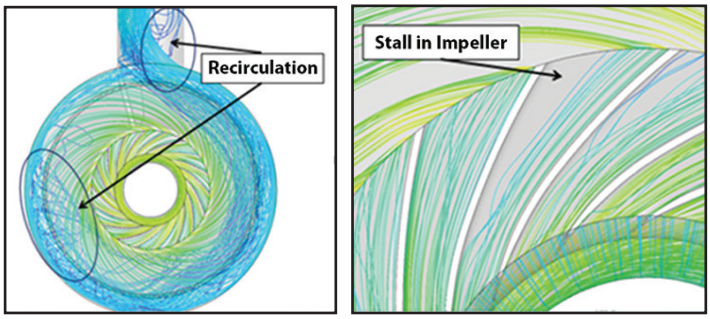


Figure 1: (LEFT) Constant area volute, note large areas of recirculation

(RIGHT) Close up of stall in impeller (volute domain hidden) due to poor volute performance

In order to correct this flow instability, a new volute can be designed that properly matches the diffusor discharge conditions. Instead of a constant area along the circumference, it will have a steadily increasing area from the inlet at the cutwater to the discharge pipe. This area progression is essential for volutes which are created for the purpose of recovering velocity head in the flow before entering the next section of the process. In this case, because the volute has a radial exit, there is recirculation in the pipe where the flow turns sharply to exit the volute. This is a common problem with radial volutes and, in some cases, guide vanes are employed to combat this. An updated design is shown below in Figure 2 with the changes mentioned above.

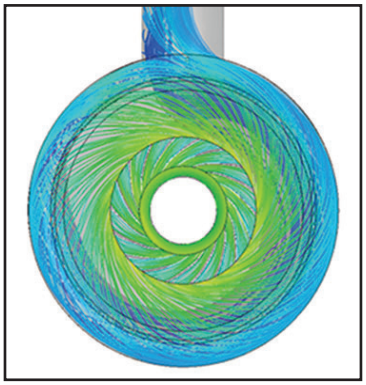


Figure 2: Upgraded volute design with proper flow matching area progression, guide vane at discharge pipe to smooth turning flow.

The flow point in Figure 2 is the same that is shown in Figure 1, but does not have the same large pockets of recirculation. The flow going through the impeller has also been smoothed, and there are no longer signs of stall in the impeller passages. The added turning vane near the radial discharge also smoothed the flow turning into the pipe. Flow stability is restored and surge margin maintained.

Good volute design is essential for high stage efficiency, and it can make or break compressor stability especially when operating near the surge control line.

JUST A REMINDER

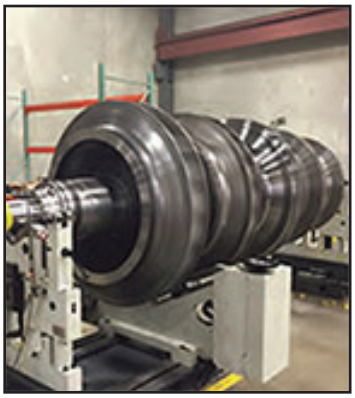
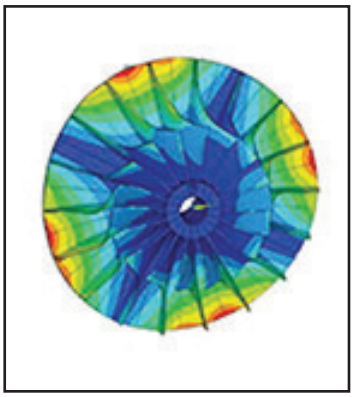
Centrifugal Compressors Services

Rotating Machinery Services is backed by decades of experience in Centrifugal Compressor design, analysis, manufacture and service. Our Key staff averages over 25 years of experience.

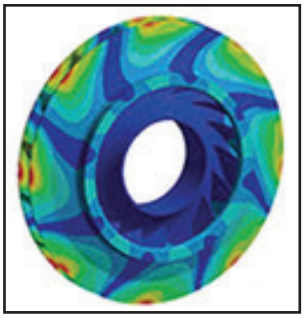
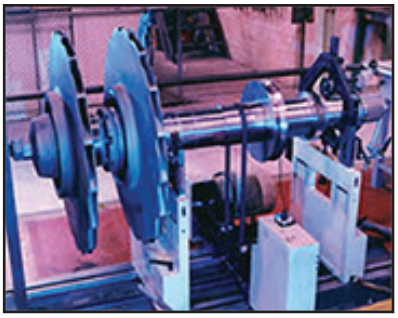
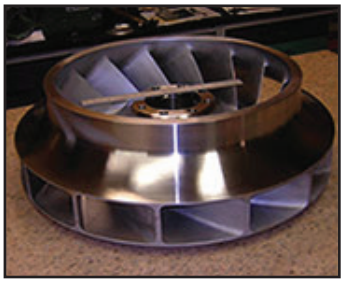
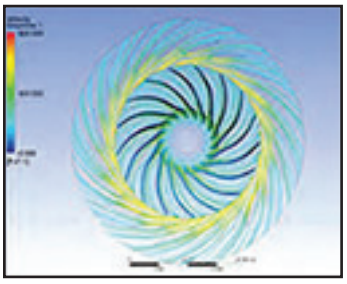
Rotating Machinery Services is available to our customers 24 hours, 7 days a week. To view all our capabilities, visit our web site at: **www.RotatingMachinery.com**.

Services included:

- *Rerates for increased performance*
- *Redesigns for improved reliability*
- *Surplus compressor trains*
- *Rotor overhauls & balancing*
- *Replacement impellers*
- *High Performance seal retrofits*
- *Troubleshooting & failure analysis*
- *Compressor overhauls*
- *Bearing upgrades*
- *Replacement parts*
- *Impeller & shaft repairs*
- *Turnaround support*
- *Engineering analysis*

Pipeline Centrifugal Compressors Services

Services included:

- *Compressor rerates for optimized performance and improved reliability*
- *Replacement parts, including impellers, that meet or exceed OEM quality*
- *API compliant overhaul and inspection services*
- *Process seal retrofits to minimize or eliminate seal oil carryover into pipelines*
- *Auxiliary systems reviews and rotor dynamic analyses to ensure reliable seal and bearing retrofits*
- *Bearing design optimization, manufacture, and retrofits*
- *Site inspections and machinery assessment*
- *Root cause failure investigations and engineered solutions to prevent reoccurrence*
- *Field supervision and support*

SPOTLIGHT ON:
Our New Staff Members

Glenn Adams - Senior Financial Analyst

Glenn is a CPA (Certified Public Accountant) with decades of experience in the accounting/finance industry. He brings a wealth of banking and overall financial experience to RMS.

Glenn's most recent role was with one of the leading North American cement producers where he held responsibilities as a capital budget controller, senior financial analyst and project management.

David Stewart – Vice President of Sales

David joins RMS with over 35 years of executive leadership and sales management experience with rotating equipment in the oil & gas industry. The majority of David's experience comes from his long career with the Cooper-Cameron Compression product lines.

David has held positions of progressive responsibility including Eastern U.S. Sales Manager, Western U.S. Sales Manager, North American Sales Director and most recently Sales Director of North America Key Accounts (with GE Oil & Gas following their acquisition of the Cameron Compression business). David also once owned and operated a Sandler Sales Institute franchise (in Pennsylvania) that offered sales and sales management training.

David earned a Bachelor of Science degree in Business from Westminster College, New Wilmington, Pa.

David will be located in Houston, Texas.

Behzad Abdollahi - Design Engineer II

Behzad Abdollahi received his B.S. degree in Aerospace Engineering from Sharif University of Technology in Tehran, Iran. He discovered his passion for turbomachinery and rotating equipment in 2012 and decided to further his education with an M.S. degree at Texas A&M University.

He worked for two years as a Graduate Research Assistant at the Turbomachinery Laboratory. His research primarily focused on computational analysis and testing of fluid film bearings along with rotordynamics. Before joining RMS, Behzad was working as a Mechanical Engineer at LobePro Rotary Pumps performing hands-on R&D projects.

Behzad will be joining the Axial Compressor Team.

Todd Koehler – Design Engineer I

Todd graduated from Lafayette College with Honors earning a B.S. in Mechanical Engineering. While there, he completed an original research thesis on tip leakage vortex breakdown in axial turbomachinery. Before joining RMS, Todd held a position with Flowserve Corp. as a Research and Development Engineer focusing his efforts on designing and developing hydraulic Power Recovery Turbines. Todd looks forward to continuing his career at RMS within the turbomachinery industry as a Design Engineer.

Patricia Hann - Master Scheduler

Patricia comes to us with a Mechanical Engineering degree from Lafayette College. She has varied scheduling experience in industries such as power generation along with water and waste water management for rotating equipment. Her 30 plus years of experience in the areas of cost tracking, budget analysis, maintenance planning, procedure development and implementation, and report writing make Patricia an overall asset to the Project Team

Patricia will be responsible for the implementation and organization of the RMS resource scheduling system and maintenance. This system will allow us to manage current and future resource capacities as our business grows.

Patricia will be located in our Bethlehem headquarters.

Stephen Begany - Senior Project Manager

Stephen comes to us with over 25 years of project management experience having worked for FLSmidth Inc. and Foster Wheeler. Some of the positions he has held are Project Control Specialist, Contract Manager and Project Manager. His diverse corporate background will be invaluable in meeting the departmental goals and objectives.

Stephen graduated from Lehigh University with B.S. in Industrial Engineering.

Debbie DeLara – Administrative Coordinator

Debbie brings with her 9 years' experience in the Administration and Accounting fields working at Altep, Inc. as an executive administrative assistant to the Chief Technology Officer and at Kellogg/ACS as a Customer Service Representative. She is also fluent in English and Spanish.

SPOTLIGHT ON:

Our New Staff Members

Chassidie Hall - Administrative Assistant

Chas joins the RMS Team in the Houston Office. She brings with her 10 years of experience in the purchasing, accounting and administrative fields. Most recently she worked as an Assistant Buyer and Accounts Receivable Assistant with TIW Corporation assisting the Director of Supply Change.

Robert "Bo" Schaller – Principal Engineer

Bo comes to us with over 23 years' experience having worked for CONMEC/GE, RMS (in our early days), and most recently Siemens/D-R. Bo brings to RMS an expertise in aerodynamic performance, applications engineering and software development.

Bo will be joining the Centrifugal Compressor Team.

James Lucas – Regional Sales Manager

James' responsibilities will be to grow the RMS/Mepco business while also developing RMS traditional business in Texas.

Prior to joining RMS, James worked for BHGE as an Application Engineer and prior to that was a Mechanical Package Engineer with Rolls Royce/Siemens.

James earned a Bachelor of Science degree in Mechanical Engineering from Clemson University and a Masters in Mechanical Engineering from Virginia Tech.

He will be located in Houston, Texas working primarily out of our RMS/MEPCO facility.

Ken Carey - Senior CAD Designer

Ken will be joining the Centrifugal Compressor Team and will report to Marc Rubino.

Ken comes to us with over 29 years' experience having worked for CONMEC, GE, and most recently Siemens/D-R. Ken has substantial experience in the design, inspection and assembly of Centrifugal Compressors.

Lori Bonser – CAD Designer

Lori brings to RMS extensive Cad Design experience in various industries. Her position will be CAD Designer and she will work with the FCC Expander Group.

John Feliu - Operations Manager - Houston

John will fill a dual role, supporting Robert Tabb with Operations and Chot Smith with Field Services.

John comes to us with over 16 years of experience having worked for MAN Roland, GE Energy, GE Oil & Gas and most recently JR Automation. John has held multiple positions from Project Manager to Area Coordinator – Middle East, Africa and Europe. His expertise in all levels of project execution and operations is sure to be a big asset to the RMS Team.

Joe Gross - Vice-President, Operations - Bethlehem, PA

Joe joins RMS with 23 years of technical management experience in the compression and oil & gas equipment industries. He has held roles of increasing responsibility including Director of Engineering & Product Management, Corporate Program Director of Research & Development, and Vice President of Operations in the organizations of Cameron, Schlumberger & VWR - Avantor.

Joe earned his Bachelor of Science in Engineering and Masters of Business Administration & Management from the Uni versity of Buffalo. He also received further executive education from Rice University's Jones Graduate School of Business.

Reporting to Joe will be the roles of Bethlehem manufacturing, operations & field service, sourcing, projects, engineering, design & product management.

CAREER OPPORTUNITIES

We are growing and always looking for talented individuals for the following positions in our Bethlehem, PA and Houston, TX offices.

- Senior Accountants - PA
- Purchasing Agents or Buyers - PA
- Machinists - PA, TX
- Mechanics - PA,TX

Please send your resumes to:
HR@rotatingmachinery.com

SPOTLIGHT ON:

Staff Promotions

Dirk Paraschos - Vice President of Operations - Houston

The acquisition of the Mepco business in 2017 was a critical step in the growth and overall success of Rotating Machinery Services. Having a first-class operation in Houston, Texas enables RMS to provide local service to customers who might be unwilling or unable to transport their equipment to our Bethlehem headquarters. In this new role, Dirk will be responsible to the total integration of RMS Houston into the core business processes and practices of RMS. Dirk has held roles of increasing responsibility within RMS including senior project manager, manager of project management and most recently, general manager which makes him ideally suited for this new position.

Robert Tabb will continue as General Manager of RMS, Houston with full responsibility to running the day-to-day business.

Colleen Hercik - Facility Coordinator/Indirect Buyer

Colleen joined RMS in September 2013 part-time as administrative support. In January2014, she took on the fulltime position of PurchasingAdministrator/Indirect Buyer.

Over the last four years,Colleen has managed our inventories for facilities operations as well as purchase our indirect office needs with great accuracy. She has also provided administrative support to purchasing and many departments whenever someone needed her assistance.

Colleen's new role will be the lead point of contact for facility services and communications with service suppliers.

Tony Rubino - Chief Engineer for RMS

Tony's well-deserved reputation for solid technical decision making has earned him the respect of his customers and colleagues. Tony's acceptance of this responsibility gives him the authority to approve engineering processes & standards. He will also oversee design reviews and resolve, through collaboration with RMS' subjects-matter experts, any matters relating to the engineering, development, and analysis of product designs which meet the function, cost, reliability, manufacturability and safety requirements of RMS. Tony will retain his current title and responsibilities as Director of Engineering and Product Manager of Axial Compressors. Tony has grown the Axial Compressor business with tremendous success, and allowing Tony to concentrate on that product line will only serve to solidify RMS as the market leader.

Marc Rubino - Principal Engineer, Centrifugal Compressors

The role of Principal Engineer is the 5th level of progression on the RMS Technical Career Ladder. Marc has held roles of increasing responsibility in his tenure at RMS with demonstrated expertise in centrifugal as well as axial compressor product lines. Marc's new position will focus on performance rerate as well as mechanical repair of the Centrifugal Compressor product line.

Carol Hamm – Manager of Project Management

Carol Hamm will be joining Rotating Machinery Services as a full-time employee in the position of Manager of Project Management.

Most recently, Carol was contracted to RMS in the role of a Senior Project Manager. Carol's 28 years of rotating machinery experience spans various companies such as Ingersoll-Rand, Ingersoll-Dresser Pump, Flowserve, GE-Conmec, Rotating Machinery Services and Elliott Group.

Our current RMS Senior Project Managers, Steve Begany and Jeremy Simpson will report to Carol in her new role.

Lori DeFiore - Engineering Administrator

Lori started RMS in September 2016 in a temporary part-time position. In 2017, she quickly grew into the full-time role as administrative assistant to Engineering. Over the past 2 years, Lori has shown remarkable skills and she continues to exceed expectations. She has over 30 years' of experience in the manufacturing environment and her professional contributions are a valuable asset to our Team.

THANK YOU!

RMS would like to thank all of our customers for being a part of our 20 years of success.

We are glad to have you as part of our team and look forward to working with and serving you another 20+ years.

EXPANDING CAPABILITIES AT RMS/MEPCO

(Continued from page 4)

As RMS/MEPCO expands on their capability to service larger and more complex rotating machinery similar to that of the Bethlehem location the necessity to upgrade the current balance machine and run-out capability became apparent.

RMS/MEPCO recently completed the installation of a new Schenck balance machine expanding the balance capacity to 40K pounds. The new run-out stand provides the shop with the ability to provide industry standard run-out testing previously not available at our Houston location.

These improvements all translate into enhanced customer experience and greater service offerings. RMS can continue to solidify the focus on growing our overall service portfolio by opening previously closed avenues of growth in the gulf states region. Future improvements currently in the works at RMS/MEPCO include the installation of a new HAAS horizontal machining center which will reduce lead times, reduce cost, and increase quality. This will enhance our machining capabilities for current and future work.

MARKETPLACE

RMS At SynGas 2018

By David Stewart

We at RMS are looking forward to being a part of the SynGas 2018 Conference presented by the SynGas Association on April 16 - 18 in Tulsa, OK.

Please be sure to stop by our booth, #39, and talk with our experts about your SynGas equipment.

These are exciting times at RMS/MEPCO as we continue to expand and enhance our facility.

John Feliu, Jeremy Simpson, and Marc Granger contributed to this report.

RMS Rotating Machinery Services, Inc.

The Finish Line

Volume 14, Issue 1

Rotating Machinery Services, Inc. range of products and services include:

**Axial Compressors,
Centrifugal Compressors,
Gas Turbines, Power Turbines,
Steam Turbines, FCC Expanders,
Nitric Acid Expanders**

- **Field Services**
- **Analytical Evaluations**
- **Dynamic Balancing**
- **Machinery Installation**
- **Machinery Redesign**
- **Reverse Engineering**
- **Third Party Inspection**
- **Consulting**
- **Orphan Equipment**
- **Labor & Labor Supervision**
- **Machinery Repair**
- **Spare Assemblies**
- **Remaining Life Assessments**
- **Design Engineering**
- **Machinery Commissioning**
- **Machinery Overhaul**
- **Machinery Rerates**
- **Spare Components**
- **Surplus Equipment Rejuvenation**

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