

Technical Courses – Hands-On Training – GSRMS 2017

Monday - Wednesday, April 24-26 – Crowne Plaza, Baton Rouge, LA.

TC1 – Laby - Reciprocating Compressor Maintenance - (Hands On)

Instructor: Lou Boothe, Arkos Field Services

Course date/time:

Monday, April 24 - 1-5 pm

Tuesday, April 25 - 8 am - 5 pm;

Wednesday, April 26 - 8 am - 12 pm

Course Cost: \$725 by March 31, 2017; \$775 thereafter. Includes GSRMS All-Inclusive Registration

Description: A two day hands-on mechanical technical course covering selected maintenance procedures on Laby Compressor units.

1. Compressor Maintenance - Disassembly of compressor cylinders - Inspection and qualification of components - Documentation of as found conditions - Documentation on forms - Reassembly of compressor cylinders - Documentation of reassembly and as left conditions - Documentation on forms
2. Compressor – Inspection and documentation of the crankcase, main and conn-rod bearings and running gear.

TC2 - Alignment I - Dial Indicators (Hands - On)

Instructor: Mitch LeBlanc, Arkos Field Services

Course date/time:

Monday, April 24 - 1-5 pm

Tuesday, April 25 - 8 am - 5 pm

Wednesday, April 26 - 8 am - 12 pm

Course Cost: \$725 by March 31, 2017; \$775 thereafter. Includes GSRMS All-Inclusive Registration

Description: Course of instruction in alignment, including precision tools, basic math, couplings, chocks, foundations, rotating equipment installation, coupling alignment, and specific equipment alignment requirements. (Power Point with Hands-on training using a simulator)

Short Courses (4 hr.) and Tutorials (2 hrs.) - The following programs included in price of conference registration

Short Course 1 - Gas Turbine Performance (Measuring, Maximizing, and Maintaining)

Monday, April 24 – 1 – 5 p.m.

Speaker: John Peterson, BASF Corporation

This introduction to gas turbine performance provides the attendee with a basic understanding of the cycle theory, its calculation, and the variables that most significantly affect output and efficiency. It also provides the methodology to use actual field data, along with the manufacturer's design data, to assess or predict gas turbine performance in a practical way. Such knowledge is a significant step toward an improved operational outcome with regard to output, efficiency, reliability, availability, and overall cost of ownership. Powerpoint slide presentations are used throughout, and an Excel-based cycle evaluation or prediction calculation is demonstrated.

Topics include the value of air and fuel filtration, and fuel conditioning that help maintain expected

performance, as well as various techniques (steam, water, or air injection) that enhance performance. In addition, the significance of certain mechanical conditions (clearances, wear, etc) in the compressor and the turbine's hot gas path are explored. These are important in managing the inevitable deterioration in gas turbine output over time due to wear and degradation, and decision-making with regard to performance restoration through targeted component replacement.

Finally, practical techniques to establish a continuous ongoing gas turbine performance assessment program will be suggested, as well as how to leverage just a few key measurements into a comprehensive check-up of your gas turbine operation. Case studies of significant performance restorations are also included.

Short Course 2 - Gas Turbine RCFA: Blade Failures

Monday, April 24 – 1 – 5 p.m.

Speakers: John Macha & Hector Delgado, SWRI

Gas turbines blade failures can have a major economic impact due to downtime and corrective maintenance costs. Failure analysis is required to reduce the cost of operation by preventing future failures. The goal of root cause failure analysis (RCFA) is to identify the cause and to avoid recurrence. High cycle fatigue plays a major role in a good number of failures and in some cases accounts for more mechanical failures than any other mechanism. This paper presents typical methodologies carried out to conduct failure analysis of gas turbine blade failures due to high cycle fatigue. Specific analyses are referenced to steps in the RCFA process. Tools available for assisting failure analysis are also provided in this technical course. The Machinery program at SwRI is internationally known for its expertise in gas turbine technology, rotordynamics, and design audits. SwRI has helped develop and operate reliable, safe turbo and reciprocating machinery for more than 50 years. SwRI combines custom consultations, extensive field experience, with world leading analytical, computational, and test capabilities. SwRI has completed contract work for all major oil and gas, power generation, and manufacturing companies.

Short Course 3 - Predictive Maintenance PDM

Monday, April 24 – 1 – 5 p.m.

Speaker: Don Sanger, IVC Technologies

PDM Awareness training is meant to highlight the different Predictive Maintenance technologies found in today's industrial environment and to explain their uses for Condition Monitoring purposes. There are also basic discussions on maintenance Best Practices and how they effect the life span of your rotating equipment. This short session is designed for people new to plant maintenance, all the way up to seasoned veterans who might have never been exposed to Predictive Maintenance technologies or Condition Monitoring techniques. Predictive Maintenance Programs have been proven in industry to be a far better method of managing rotating equipment rather than relying solely on time based Preventative Maintenance techniques. This short session is designed to highlight the different PDM technologies commonly found in today's industrial environment and give you the why & how to apply them at your facility.

Short Course 4 – TBA

Short Course 5 - Introduction to Vibration Analysis

Tuesday, April 25 – 8 a.m. – 12 p.m.

Speaker: Allen Bailey, IVC Technologies

This training session is an introduction course into the world of vibration analysis as it related to industrial applications. The main focus will be to explain the theory behind vibration analysis, the progression of its capabilities over the years due to technology improvements, and to provide examples of real world applications. Many terms, plot types, and concepts will be explained through the course of this session to help attendees be more comfortable with the technology

Short Course 6 - Basic Thermodynamics of Reciprocating Compression

Tuesday, April 25 – 8 a.m. – 12 p.m.

Speaker: Greg Phillippi, Ariel Corp.

This short course will cover the fundamental thermodynamic principles that govern reciprocating compressors. This will include discussions of pressure-time and pressure-volume diagrams, capacity, volumetric efficiency, power and compression efficiency. In addition, it will cover the effects of changing conditions, gas analysis, temperature, and pulsation. Mechanical design details will not be covered in any significant detail. An understanding of the basic thermodynamics is vital and forms a good foundation for a deeper understanding of the mechanical aspects. This short course is intended to provide the very basic fundamentals of how a reciprocating compressor works. This knowledge then provides a solid foundation on which to learn more intricate details.

Short Course 8 -The New OSHA: Adapting to Changes in OSHA Enforcement

Wednesday, April 26 – 8 a.m. – 12 p.m.

Speaker: Ken Wells, Lifeline Strategies

Prosecutors are increasingly hitting managers and executives with criminal charges for company OSHA violations. New OSHA reporting rules mean that the chances of an incident putting a company under OSHA's spotlight have increased. This discussion-focused presentation will explore new OSHA trends, what they mean to participants and why companies that don't focus on compliance before an incident may find it hard to escape the agency's scrutiny.

Short Course 9 - Ultrasound 101 - An Introduction to Airborne & Structure-borne Ultrasound

Wednesday, April 26 – 8 a.m. – 12 p.m.

Speaker: Adrian Messer, UE Systems, Inc.

Ultrasound has become a must have technology for any plant and facility's maintenance & reliability program. This short course will provide a thorough overview of ultrasound technology and how it continues to enhance condition monitoring, equipment reliability, and energy conservation efforts. From compressed air, gas, and steam leaks to mechanical and electrical systems, ultrasound technology has been used to reduce energy waste, reduce greenhouse gas emissions, eliminate equipment failure, increase production while decreasing downtime. Ultrasound technology, instrumentation, and software will be discussed, along with best practice information on creating routes, establishing baselines and alarm levels, and reporting and documentation. Sound file examples of electrical anomalies such as corona, tracking, and arcing will be used. Along with sound examples of bearings and bearings in the process of being lubricated. Learn the many benefits of using ultrasound technology to improve

reliability efforts. From compressed air/gas leak detection, steam traps, bearings, condition based lubrication, and electrical inspection, ultrasound is the most versatile PdM tool available.

Tutorial 1 - How Lubricant Cleanliness Affects Machine Life and Reliability

Speaker: Gregory Gaubert, Gaubert Oil

Tuesday, April 25 – 8-10 a.m.

Particle contamination in lubricants is the No. 1 cause of lubricant-related equipment failure, according to industry experts at Noria Corporation. Machinery Lubrication magazine says particle contamination is the No. 1 cause of hydraulic system failures and estimates 82 percent of component wear is particle-induced, with abrasion wear accounting for two-thirds of that figure. Worse, particles in contaminated lubricants can stop equipment by damaging the individual components that keep equipment running. Money spent repairing the effects of particle contamination is money lost. This presentation will highlight the benefits and challenges of creating a focus on lubricant cleanliness.

Tutorial 2 - Operators, An Under Utilized Resource

Speaker: Julien Le Bleu, Sage Technologies, LLC

Tuesday, April 25 – 8 – 10 a.m.

Every plant has operators. They are an untapped resource to improve reliability at a marginally low cost. The operator believes his job is to make good product, do it safely, and prevent environmental excursions. Management expects them to also detect problems early and do troubleshooting. The operators are not usually taught about things like pump curves and troubleshooting skills. This should be remedied.

No matter how good your pump rebuilding capabilities are nor how correctly the overhaul is done the operator, through lack of knowledge, can cause equipment to wreck. This 2 hour class will touch on items that can be taught to operators to improve their observation skills as well as how their centrifugal pumps produce pressure and flow. Also taught will be various items that can cause a pump to not produce desired flows and pressures that overhauling a pump will not fix. The pump curve will be explained in the simplest of terms so that troubleshooting can be demonstrated.

Tutorial 9 - Technical Advancements for Re-rating or Replacing Rotating Equipment.

Speaker: David Bucci, Elliott Group

Tuesday, April 25 – 1 -3 p.m.

This presentation will take into consideration aerodynamic design, mechanical limitations, machine life assessment, and physical space limitations both inside the casing of the machine and on the compressor deck when a plant operator is considering new operating conditions for compressors and/or steam turbines. It will help the operator determine whether it is more beneficial to re-rate an existing machine, or replace it with a new drop-in machine. Additionally, the difference in the time it takes to install a re-rate and the time it takes to install a new drop-in machine will be evaluated with an eye toward minimizing the duration of a plant turnaround.

Tutorial 3 - Compressors & Pumps Piping Systems - Vibration & Pulsation Basics, Rules of Thumb, & Case Studies

Speaker: Buddy Broerman III, SWRI

Tuesday, April 25 – 2 - 4 p.m.

Basics of pulsation and vibration control will be explained while presenting various case studies. The case studies will include piping systems that are attached to compressors or pumps. Both reciprocating and centrifugal compressor piping systems will be discussed. There will be more discussion regarding reciprocating compressor piping systems than centrifugal systems due to the fact that recip compressors inherently generate relatively high-amplitude, low-frequency pulsations that can cause vibrations. Plunger/recip pump piping systems will also be discussed. Rules of thumb will be discussed as relevant during the case studies.

Tutorial 10 - Corrosion, Erosion & Fouling Prevention and Protection

Speaker: Matthew Konek, Elliott Group

Wednesday, April 26 – 3 – 5 p.m.

Corrosion, erosion and fouling have long been problems for rotating equipment. Corrosion is caused by impurities such as hydrogen sulfide, which can be found in the process gas of compressors. These impurities can attack the components, even to the point of failure. Corrosion is often found in steam turbines too, due to impurities in the steam. Fouling occurs when a solid substance, usually polymers, adheres to the internal rotating and stationary surfaces of a compressor in contact with the process gas. It can block the flow path of the compressor, gradually reducing its efficiency and it can cause increased vibration levels in the rotating element. This presentation will explain what these problems are, how they arise, and how to solve them using specialized fluid injection systems and anti-fouling coatings.

Tutorial 4 - How To Anticipate And Minimize Occurrence of Fires on Petrochemical Pumps

Speaker: Chris Zielewski, Exxon (Retired)

Wednesday, April 26 – 9 – 11 a.m.

Show reasons for application of high speed equipment; Show current application standards for bearings; What other risk factors are involved in fires; Introduce PF intervals; Show how speed reduces the PF interval; Recommend mitigation steps. Machinery and reliability people have for a long time observed that when it comes to long life and high reliability, operating at higher speeds compares poorly to operation at lower speeds. One of the primary reasons for having high-speed devices is economics. With high speed you can have smaller equipment sizes with fewer stages. While capacity and pressures developed do improve, this often occurs at the cost of increased wear, vibration, noise and maintenance. This presentation will show empirically what elements of pump construction and service are influential and can be altered to reduce the pump catching on fire.

Tutorial 5 – Field Balancing Tips and Tricks

Speaker: Dan.Stilp, PRUFTECHNIK

Wednesday, April 26 – 9-11 a.m.

Starting with a review of the fundamentals of field balancing, we will cover many of the different conditions that look like unbalance but have outer causes. In addition we will cover the various tips and tricks one can use to get you through difficult field balancing problems such as resonance.

Tutorial 6 – Digital Solutions for Gas Compression

Speaker: Bhupinder Dayal

Wednesday, April 26 – 2 - 4 p.m.

Tutorial 7 - Microprocessor Surge Control

Speaker: Allen Gilson, Solar Turbines

Wednesday, April 26 – 2 – 4 p.m.

This tutorial will cover the basics of surge control and how it protects the compressor. It will identify common issues, and how to distinguish a problem with the surge control as opposed to a problem elsewhere. Not only is surge in the compressor poorly understood, but the effects the surge control system has in other areas, such as process control, are also overlooked.

Tutorial 8 - Environmentally Acceptable Lubricants -Uses and Applications

Speaker: Darren Lesinski, Total Specialties US, Inc.

Wednesday, April 26 – 2 – 4 p.m.

This presentation will be geared toward applications in refineries and chemical plants and will cover defining environmentally acceptable lubricants, targeted applications, and key governmental legislation. Key performance attributes of all available EAL technology will be discussed toward maximizing return on investment, (“ROI”) in suitable applications.