



Let Windrock train your Engine & Compressor Analysts

Instructors: Mike Jones | Gary Jones | Warren Laible | Kent Petersen

2009 Domestic On-site Training Schools

No other company in the Analysis Industry offers a staff with more analysis training experience..

6310/PA Start-up Assistance

Analyzer Hardware Orientation
Database Basics
Machine Geometry Setup
Sensor Point and Collection Point Setup
Engine Balancer and Spark Setup
Route Based FFT Setup
Transferring and Maintaining Setups
Data Collection (phased data, ignition survey, balancer operation, FFT, temperature, panel information)
Viewing Reports and Data in the Analyzer
Transferring Collected Data to a Personal Computer
Viewing Reports and Data in the Win6310 Software
Using the Help System
The instructor will assist in setting up as many units as possible.

Duration: 5 Days
Location: Continental US
Cost: \$6,250.00
Instructor travel time, transportation and living expenses are extra and will be quoted upon request

Prerequisites: 6310/PA Analyzer User
Requirements: Laptop Computer with Windows
Windrock 6310/PA Analyzer Kit
Time: 8 AM Monday - 5 PM Friday
Three (3) Student Maximum for Hands-on Portion
Three (3) Manuals Included
Additional Classroom Students: \$250.00 / week

6310/MA Start-up Assistance

Analyzer Hardware Orientation
Database Basics
Machine Geometry Setup
Sensor Point and Collection Point Setup
Engine Balancer and Spark Setup
Transferring Setups to the Analyzer
Data Collection (phased data, ignition survey, balancer operation, temperature, panel information)
Viewing Reports and Data in the Analyzer
Transferring Collected Data to a Personal Computer
Viewing Reports and Data in the Win6310 Software
Using the Help System
The instructor will assist in setting up as many units as possible.

Duration: 4 Days
Location: Continental US
Cost: \$5,000.00
Instructor travel time, transportation and living expenses are extra and will be quoted upon request

Prerequisites: 6310/MA Analyzer User
Requirements: Laptop Computer with Windows
Windrock 6310/MA Analyzer Kit
Time: 1 PM Monday - 12 Noon Friday
Three (3) Student Maximum for Hands-on Portion
Three (3) Manuals Included
Additional Classroom Students: \$250.00 / week

Basic Compressor Analysis

Data Collection Review
Analyzer Setup Review
Compressor Construction and Theory
Data Collection Techniques
Measuring Performance
Pattern and Data Analysis Procedures
Systematic Detailed Basic Pattern Interpretation
Case Studies and Example Problems

Duration: 4 Days
Location: Continental US
Cost: \$5,000.00
Instructor travel time, transportation and living expenses are extra and will be quoted upon request

Prerequisites: Basic Mechanical Knowledge
Familiar with using an Analyzer
Time: 1 PM Monday - 12 Noon Friday
Five (5) Students Included in Price
Additional Classroom Students: \$250.00 / week

431 Park Village Drive, Suite R, Knoxville, TN 37923

TO ARRANGE FOR ON-SITE TRAINING: PHONE 865-539-5944 ext 22 • E-MAIL WLAIBLE@WINDROCK.COM



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Basic Engine Analysis

Data Collection Review
Analyzer Setup Review
2-Stroke and 4-Stroke Cycle Engines
Engine Construction and Theory
Data Collection Techniques
Measuring Performance
Pattern and Data Analysis Procedures
Systematic Approach to Troubleshooting
Case Studies and Example Problems

Duration: 4 Days
Location: Continental US
Cost: \$5,000.00
Instructor travel time, transportation and living expenses are extra and will be quoted upon request

Prerequisites: Basic Mechanical Knowledge
Familiar with using an Analyzer
Time: 1 PM Monday - 12 Noon Friday
Five (5) Students Included in Price
Additional Classroom Students: \$250.00 / week

Advanced Compressor Analysis (Annual Refresher)

Data Verification, Reduction and Manipulation
Diagnostic and Report Software Review
Advanced Compressor Theory
Advanced Analysis Procedures
Advanced Pattern Interpretation
Student Case Studies
Power Loss Analysis
Rod Loads and Reversal
Rod Runout Measurements
Reports
Unit Acceptance and Load Curve Verification Techniques
Systematic Approach to Troubleshooting Review

Duration: 4 Days
Location: Continental US
Cost: \$5,000.00
Instructor travel time, transportation and living expenses are extra and will be quoted upon request

Prerequisites: Basic Compressor Analysis Training
Experienced analyzer user
Requirements: Computer with Collected Compressor
Time: 1 PM Monday - 12 Noon Friday
Five (5) Students Included in Price
Additional Classroom Students: \$250.00 / week

Advanced Engine Analysis (Annual Refresher)

Data Verification, Reduction and Manipulation
Diagnostic and Report Software Review
2-Stroke and 4-Stroke Cycle Engines
Includes Diesel Engines
Theory and Mechanical Geometry Review
Advanced Level Analysis Procedures
Advanced Pattern Interpretation Techniques
Examination and Discussion of Student Supplied Data
Ignition Survey and Balancing Procedures
Systematic Approach to Troubleshooting Review

Duration: 4 Days
Location: Continental US
Cost: \$5,000.00
Instructor travel time, transportation and living expenses are extra and will be quoted upon request

Prerequisites: Basic Engine Analysis Training
Experienced Analyzer User
Requirements: Computer with Collected Engine Data
Time: 1 PM Monday - 12 Noon Friday
Five (5) Students Included in Price
Additional Classroom Students: \$250.00 / week

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FFT Vibration Analysis for Reciprocating Equipment Analysts

Basic Understanding of Vibration
Setup of 6300/6310 FFT Analyzer Mode
Data Collection
Routine Monitoring
Troubleshooting
Amplitude, Frequency, Direction, Phase
Pulsation
Identifying Excessive Vibration Levels
The Causes of Excessive Vibration
Route Based Collection Procedures

Duration: 4 Days
Location: Continental US
Cost: \$5,000.00
Instructor travel time, transportation and living expenses are extra and will be quoted upon request
Prerequisites: Basic Compressor Analysis Training
Experienced analyzer user
Requirements: Computer with Win6310 Software
Time: 1 PM Monday - 12 Noon Friday
Five (5) Students Included in Price
Additional Classroom Students: \$250.00 / week

Software Training (Engine, Compressor, Economics)

Advanced Setup Techniques
Gas Composition Setup
Load Step Setup
Setting Analyzer Options
Using Nozzle Traces
FFT Route Based Setup
Setting Up the O-scope Mode
Balancer Setup and Balancing Routines
Spark Survey Setup and Data Collection
Performance Report Details
Discussion of Latest Software Features
Transferring Databases Between Analyzers
Theoretical PV's and Theoretical Clearance Calculation Diagnostics
1st and 2nd Derivatives
Statistical Analysis
Adjusting Toe Points and VE
Offset Adjustment to Improve Data Accuracy
Pressure Pattern Pulsation Filtering
Customizing Spreadsheets for Exported Data and Advanced Reporting Procedures
Fuel Curves, Economic Reporting and By-pass Leakage Calculations and Reporting
Customizing Reports
Using Theoretical Clearance Calculations as an Analytical Tool
Using Direct Channel Read for Troubleshooting

Duration: 4 Days
Location: Continental US
Cost: \$5,000.00
Instructor travel time, transportation and living expenses are extra and will be quoted upon request
Prerequisites: Experienced 6310/PA or 6310/MA Analyzer user
Requirements: Computer with Win6310 Software
Windrock Analyzer w/ Keyboard and Power
Time: 4 On-site Days
Five (5) Students Included in Price
Additional Classroom Students: \$250.00 / week

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High Speed Engine and Compressor Package Analysis

Data Collection Review
Analyzer Setup Review
4 Stroke Cycle Engines
Engine Construction and Theory
Compressor Construction and Theory
Data Collection Techniques
Pattern and Data Analysis Procedures
Systematic Approach to Troubleshooting
Measuring High Speed Compressor Performance
Case Studies and Example Problems

Duration: 3 Days
Location: Continental US
Cost: \$3,750.00
Instructor travel time, transportation and living expenses are extra and will be quoted upon request
Prerequisites: Instructor Interview
Requirements: Computer with Win6310 Software
Time: 8 AM to 5 PM
Five (5) Students Included in Price
Additional Classroom Students: \$200.00 / week

Using On-Guard Software for Engine and Compressor Diagnostics

Using the Help System
Advanced Setup Techniques
Gas Composition Setup
Load Step Setup
Software Configuration
Performance Report Details
Discussion of Latest Software Features
Trending Features
Theoretical PV's and Theoretical Clearance Calculation Diagnostics
1st and 2nd Derivatives
Statistical Analysis
Adjusting Toe Points and VE
Offset Adjustment to Improve Data Accuracy
Pressure Pattern Pulsation Filtering
Customizing Spreadsheets for Exported Data and Advanced Reporting Procedure
Fuel Curves, Economic Reporting and By-Pass Leakage Calculations and Reporting
Using Theoretical Clearance Calculations as an Analytical Tool

Duration: 3 Days
Location: Continental US
Cost: \$3,750.00
Prerequisites: On-Guard Software User or Supervisor
Requirements: Computer
Time: 8:30 AM - 4:30 PM Daily
Five (5) Students Included in Price
Additional Classroom Students: \$200.00 / week

For more information or to arrange for Windrock On-site Training Classes, please call Warren Laible at (865) 539-5944 ext. 4022 or e-mail at wlaible@windrock.com

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“What makes us different?”

Our staff of instructors (combined total of over 167 years of industry experience) are dedicated to the education of mechanics, operators, and engineers of reciprocating machinery. You will receive a level of individual instruction and attention unsurpassed in the industry. Truly, the best value for your training dollar (plus we're located in beautiful East Tennessee)!



Gary L. Jones, *Senior Analyst / Consultant*

Gary has been involved in the Oil and Gas industry for over 43 years and has been an equipment analyst for 26 years. Gary has extensive experience analyzing engines, compressors, turbochargers, turbines, centrifugal compressors and support equipment. He participated in developing his previous company's equipment analyst qualification and training. Gary also participated in developing unit load curves, fuel air mixture and ignition timing grids. He has taught several classes on compressor operations. Gary joined Windrock in August 2006.



Mike Jones, *Senior Analyst / Consultant*

With 38 years of engine and compressor experience including maintenance, overhaul, and diagnostics, Mike joined the Windrock Technical Services Team in 2005. He has run several different types of analyzers during his career and had input into the development of the CARMA, EnSpect, Recip-Trap™ and Windrock analyzers. His experience covers analysis services to the marine, oil, and gas industries implementing predictive maintenance programs, analyst reviews and selections, training in both electronic engine/compressor and spectrum vibration analysis. Other duties included training and generation of military “how to” manuals for electronic diesel combustion analysis while under contract with the U.S. Coast Guard.



Warren Laible, *Technical Services Manager*

Warren has performed more than 4,000 mechanical condition, performance, vibration, and pulsation tests in his 33 years in the engine and compressor diagnostics field. Providing over 20 years of contract analysis services and training to the marine, oil, and gas industries, Warren has extensive experience in high speed design and spectral vibration troubleshooting. Warren has been providing analysis training since 1976 and is recognized as an industry leader. Involved in the development and testing of many analyzer systems, Warren has been using Windrock analyzers since 1997 and also participated in our product development before joining Windrock in 2000.



Kent Petersen, *Product Manager – Online Systems*

Kent has worked in the instrumentation and controls industry for over 29 years. For the last 11 years, he has been involved in condition monitoring of rotating and reciprocating machinery. He was responsible for the design and development of numerous online condition monitoring systems and software packages. Kent has participated in the planning, design, installation and startup of over 100 online condition monitoring systems for industrial applications. He has developed and taught numerous training classes for online vibration monitoring systems. Kent joined the Windrock team in February 2007.

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