



Plant Operation Workshop

Job Specific Training... Operators, Managers, QC, Safety Directors, Financial, Mechanics, Electricians

NAPA
Member
16 YEARS

2012 Workshops

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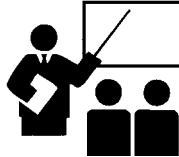
www.ClarenceRichard.com

Classroom 1-5 Day

Plant Operation and/or Electro-Mechanical Workshop
February, Philadelphia & Denver



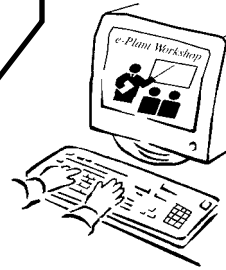
WE HAVE ANSWERS...



Required

Optional Bonus

On-Line - any time, any where, all year long, even rain days and slow days.



5 Day – *Plant Operation Workshop*
Maintenance-Trouble Shooting Workshop
Des Moines – Feb 13-17

3.5 Day – *Plant Operation Workshop*
Des Moines – Feb 13-16

1.5 Day – *Mix Quality Control Workshop*
Des Moines – Feb 13-14

1 Day – *Plant Safety Workshop*
Des Moines – Feb 15-16

1.5 Day – *Electro Mechanical Systems Maintenance and Trouble Shooting Workshop*
Des Moines – Feb 16-17

Lap tops recommended but not required
Private Workshops available in winter season.
Visit www.clarencerichard.com,
call 952-939-6000 or
email carrie@clarencerichard.com

- **On-Line** on the internet
- **On-Demand** when you want
- **Self-Paced** at the rate you want
- **At Your Place** on your computer
- **Convenient** when you want to pause training
- **You Design** pick what you want to learn
- **Review** before testing
- **Test** know which ones are wrong and why
- **Analyze** explanations to incorrect answers

Participant survey of new & experienced Plant Supers, Operators, Mechanics, QC
100% of the On-Line Participants responses:
Would you recommend this course? 100% Yes
Participants with over a year experience estimate the payback for cost of their time and training to be 2-3 months.

FREE

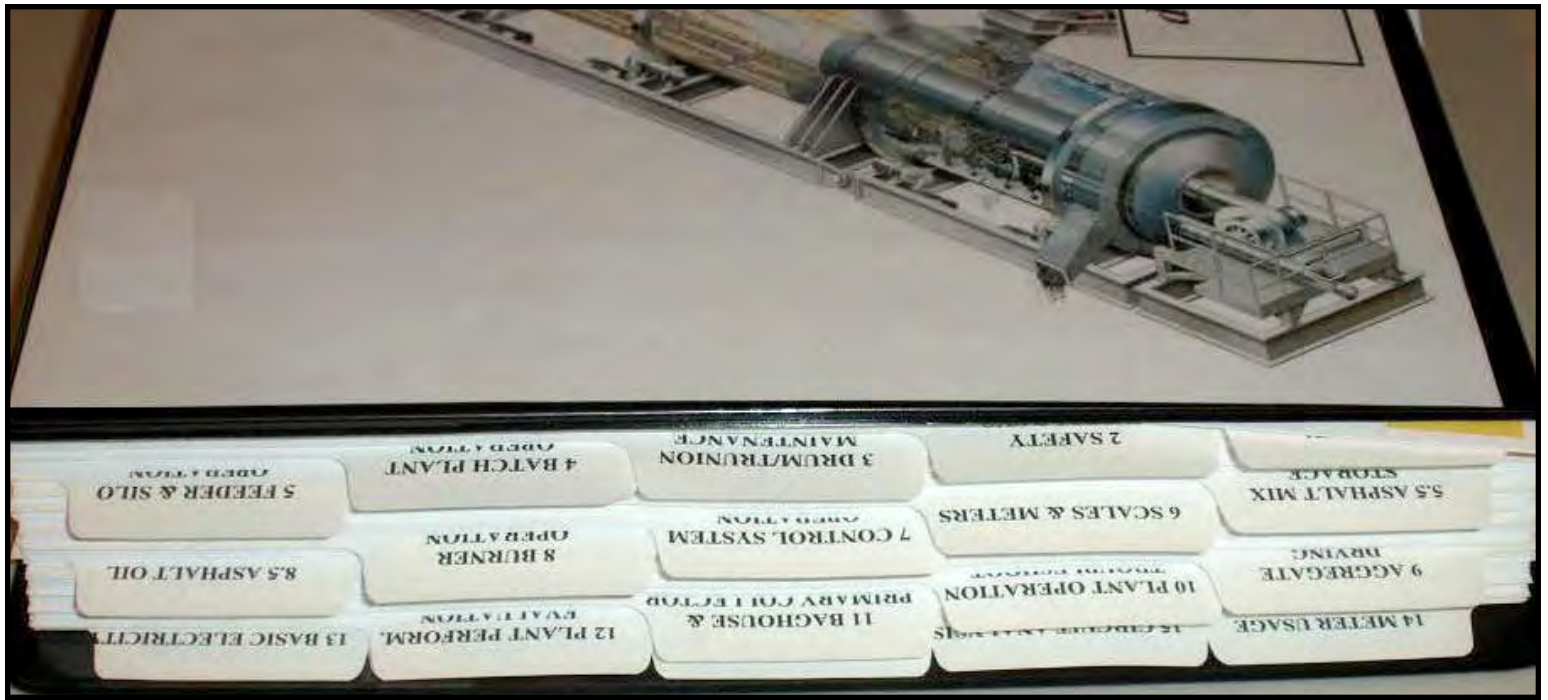
Experience the New, Engaging Training Method that Participants are saying "Yes" to. Log onto
www.clarencerichard.com



Asphalt Plant Operation Workshop



Electro-Mechanical Maintenance Troubleshooting Workshop



Participant survey of new & experienced Plant Supers, Operators, Mechanics, Quality Control
100% of the On-Line Participants responses:

I'll be able to perform my job better after taking this workshop. 87.5% Agree, 12.5% Somewhat Agree

Regarding e- Plant Operations Workshop Content;
 62.5% Excellent, 25% Perfect, 12% Expected

Regarding e- Plant Operation Workshop Reference Manual 75% Excellent, 25% Perfect

Considering time and money spent, how long will it take for this experience to recover the costs? 37.5% 30 days, 25% 60 days, 25% 90 days, 12.5% 1 year

Would you recommend this course? 100% Yes

~ Duane Stevenson, President, Broce Construction

"The company saved hundreds of dollars on travel time, travel expenses, lodging and meals. The class was excellent and pertinent to most all aspects of our plant operation. We made improvements in our operating procedures, efficiencies, mix quality, production rates, personnel safety, damage control and maintenance. The on-line workshop allows management to observe and evaluate both the seminar and the employee. We found our employees had a lot to learn that we were not aware of previous to the workshop. The workshop was well done, well presented and very relative. Excellent. The money was well spent."

Sampling of e-Plant Operation Workshop

<http://clarencerichard.adobeconnect.com/workshopdemo>

Sampling of e-Electro-Mechanical Workshop

<http://clarencerichard.adobeconnect.com/pl11825467/>

**e-Learning
 Evolution Revolution
 e-Workshop
 replaces Plant
 Operation Workshop**

- **On-Line on the internet**
- **On-Demand when you want**
- **Self-Paced at the rate you want**
- **At Your Place on your computer**
- **Convenient when you want to pause training**
- **You Designe pick what you want to learn**
- **Review before testing**
- **Test know which ones are wrong and why**
- **Analyze explanations to incorrect answers**



Who can benefit? Participants can pick and choose the classes they want to experience. CFO, QC, Safety Director, Equipment Buyer, Plant Manager, Plant Technician, Plant Mechanic, Operator, Trainee—all may choose something different based on their job responsibility and experience. See page 8

FREE
 Experience the New, Engaging Training Method
 that Participants are saying "Yes" to. Log onto
www.clarencerichard.com



e- Plant Operation Workshop



Sometimes your people cannot be trained at a specific time because of other commitments.

Or they register for a class and find they can't be there for unforeseen reasons.

Or the time and expense becomes too great to fly people, provide ground transportation, house them and provide meals. Sometimes flying is more difficult with cancellations, security issues and rescheduling.

Or you're left wondering what your people really experienced and retained from the training.

Your people may want the luxury to pick and choose what to learn, when they want to learn about it, and where they want to learn it. We can do *all* that. Considering the alternative, we make it a snap. Participants attend what they want to attend, when they want to attend them, at any location convenient to them. Slash your travel and living expense. Participants can be tested for what they know and retained.

Take what you need based on your job, your experience, your equipment. Don't sign up for a batch plant if you have a continuous mix. Sign up for the two safety modules if you're a safety director. Sign up for all of them if you are the plant mechanic and plant operator. Sign up for the instrumentation and controls if you're QC.

We engage your people and we send them to their plants with corrective actions and solutions.

The benefits from 'traditional' have not changed, we've just added more impact.

What can you possibly find as a better payback than teaching your people to safely make the highest quality asphalt, at the maximum production possible, while using the least amount of energy and reducing your operating costs.

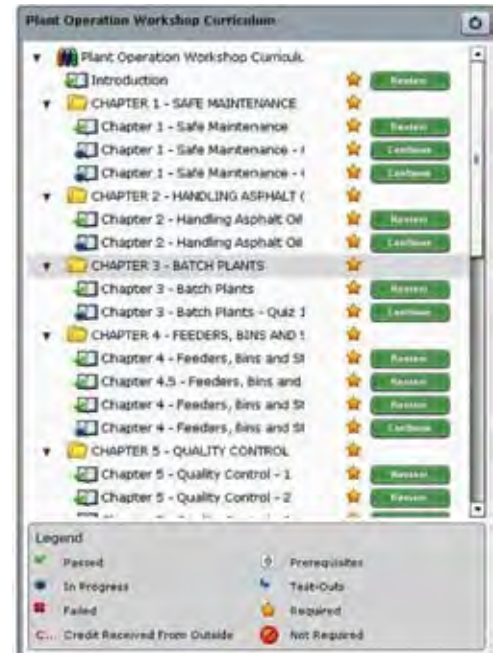
We're not just people teaching a class, we live in your industry and in your problems. We partner with you to find solutions. If you have a problem, we have a problem. We do not walk away from our problems. We walk the walk, we are entitled to talk the talk. Our Workshop has stood the test of time and has been around for a decade and a half. Our customers keep coming back. We are just making it so you do not have to trek so far.

The fee is nominal—the benefits are great. You control the scheduling. Come see where the bar has been risen to. Join us in our Workshop at www.clarencrichard.com and take the virtual classroom tour.

Clarence Richard Company offers their seminar tailored to significantly improving the skill level of plant operation personnel. Safety is number 1.

Damage control, accident prevention, proper lockout procedure, first aid, safety interlock checks are part of Safety. Operators will learn about Electrical Safety and Basic Electricity, including troubleshooting procedures and test meter usage. Other topics include Plant Operation Procedure, Calibration and Maintenance. The entire Exhaust Gas System from the Burner to the Stack is covered including: Pollution Control, Dampers, Flighting, Air Velocities, Combustion, Fuels, Excess Air, Test Preparation, and much more. This will be accomplished by focusing instruction on the Plant Process Sciences and the latest in state-of-the-art procedures. This successful workshop has been given the highest marks by past attendees.

Our track record has shown that both seasoned and rookie operators walk away with information and ideas that pay for this course over and over again.



Testimonial e- Plant Operation Workshop

Broce Construction President remarks about the training (*and consequential results*) of their two plant operators on computers at their corporate headquarters in Oklahoma. "The company saved hundreds of dollars on travel time, travel expenses, lodging and meals. The class was excellent and pertinent to most all aspects of our plant operation. We made improvements in our operating procedures, efficiencies, mix quality, production rates, personnel safety, damage control and maintenance. This workshop allows management to both observe and evaluate the seminar. We found our employees had a lot to learn that we were not aware of previous to the workshop. The workshop was well done, well presented and very relative. Excellent. The money was well spent."

~ Duane Stevenson

Workshop by the Module

Design Your Own Class • Check Off the Subjects You Want

1 Safety: Developing Confined Space-Lockout Written Procedure.

Safety is number 1. Accident prevention is key. This class defines the hazards around the plant and develops the written procedures required by OSHA . These procedures are designed for the plant operational people to easily write up the procedures for their particular application. Be Safe. Be Compliant.

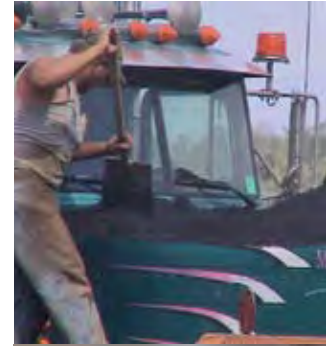
Safety Director, Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee



2 Safety: Handling Asphalt Oil, Proving Safety Interlocks, Electrically Safe Maintenance Procedures, Damage Control.

Many people in the industry know of people burned by asphalt oil. There is no excuse for it. Burner and Material Handling Interlocks sometimes fail. Don't find out by accident your interlock does not work. Many Interlocks can be checked just by how equipment is operated. Just because you tripped a breaker, does not mean the circuit is safe to work on. Insure your people know that. The drum mixer stops rotating and 2,000 degree gases rush to your baghouse. Asphalt oil saturates the inside of your drum. What do you do first, second, third... ?

Safety Directors, Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee



3 Drum/Trunnion Maintenance

Balancing the sloped drum on tires is a technique that requires understanding the various load dynamics on trunnions and bearings. Troubleshooting problems and making adjustments ahead of the time bearings, tires, trunnions, drives, motors and switchgear fail reduces preventable downtime. Amp gauges, trunnion and tire wear tell a story—what's happening—what needs doing?

Equipment Buyers, Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee



4 Batch Plant Operation

Some Batch Plants are unnecessarily running slow while producing lower quality mix. What do you check if you're too rich or too lean? Adjusting the plant running procedure will tell the story. Some plants will produce a dryer batch every now and then. Why, and what can be done?

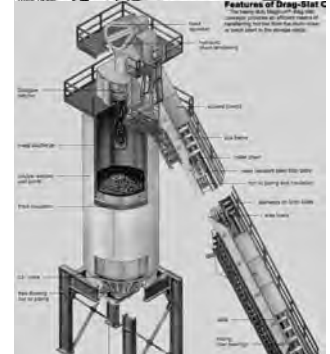
Equipment Buyers, Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee, QC



5 Aggregate Storage, handling and Feeder Systems 6 Asphalt Mix and Silo Operation

Cold feed Bins, Rap Bins are volumetric feeders and relatively easy to operate. Mineral filler and dust silos can be difficult if not equipped correctly. Now, with SMA and WMA, we are adding all sorts of material to our mix from wax beads to water, or fiber to powders, even liquid chemicals. Venting gets to be a problem with some weighing devices when blowing material in the silo and blowing material away from the silo discharge scale. The Exhaust Fan is a dust feeder. The more the damper is opened, the more dust is taken from the dryer. The dust makes a pit stop in the baghouse before being returned in spurts, partially returned or rejected. Some plants use a dust surge bin to even out the dust flow.

Equipment Buyer, Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee, QC



7 Scales and Meters

Continuous weigh scales are the most difficult to install, calibrate and maintain. Belt Scales, Flow Scales, Flow Meters etc may be made accurate for the rate the scale was calibrated at but may not be accurate at rates significantly different than that. Learn how to check for that and then correct it. Learn how to spot check problems as the plant is producing. Stop the process before making all that bad mix.

Equipment Buyer, Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee, QC



8 Control System Operation

Control systems are always changing. When something is wrong and they're not operating correctly, it can be hard to find the problem when you lack proper understanding of the dynamics. A step by step procedure from open loop control through the many closed loop control situations and theoretical plant control problems are introduced. Participants are asked for ideas of the symptoms of the control behavior. The role is reversed later when symptoms are presented and participants are asked what the problems may be. Control systems are made up of all types of electro-mechanical devices.

Understanding electrical helps one become a thorough troubleshooter.

Equipment Buyer, Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee, QC

9 Burner Operation 10 Hot Oil Heating

Combustion occurs when fuel, air and ignition unite. Complete combustion is achieved under the right conditions. Incomplete combustion reduces production, and increases energy and maintenance costs. Combustion efficiency can be monitored by the CFO when comparing energy bills and production. Learn what's acceptable and when a burner tune up is necessary. Plant Mechanics will learn how to tune the burner with or without a combustion analyzer, and to troubleshoot problems and learn how to fix them.

CFO, Equipment Buyer, Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee

11 Aggregate Drying

Learn how drying takes place under the many different conditions. Counter flow drying requires bigger and better pollution control equipment than parallel flow drying. Why? Learn about proper temperatures and pressures and compare them to what your plant is running at. Make adjustments or repairs to meet the proper criteria and raise your production. Learn how to measure effectiveness of the veiling flights. Some plants have the paint burned off one side of the stack. Why?

CFO, Equipment Buyer, Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee

12 Plant Production Troubleshooting

The plant behaves differently with various production rates and aggregates flowing through the dryer at different times of the year. Consequently, it becomes difficult to determine what's acceptable for the equipment and conditions. Learn to size up your situation for the production rate your plant *should* be able to attain, and for the energy consumption your plant *should* require. If you're not reaching these benchmarks, you're losing money. A lot of money is spent at the plant—don't make the operator the only one in charge of your purse strings. The plant is armed with many useful instruments. Teach your operator a profitable, safe way to manage it.

CFO, Equipment Buyer, Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee

13 Baghouse & Primary Collector Operation

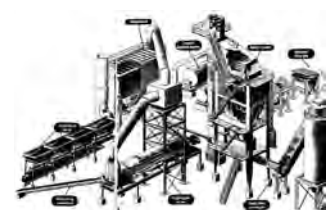
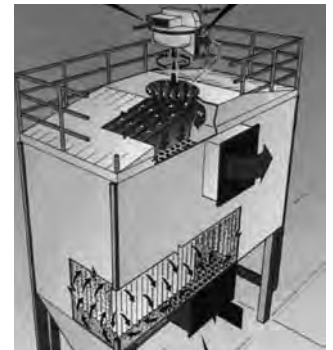
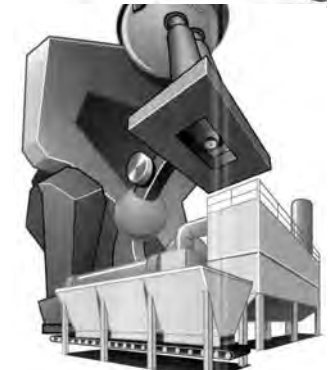
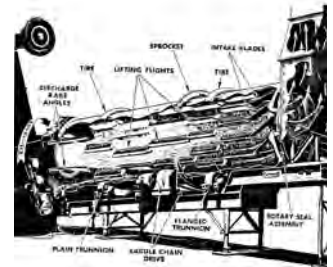
The purpose of this pollution control equipment is to keep the air clean and as discussed in Module 4.0, to return material back to the mix. Reverse Air Bag systems clean large sections of the baghouse over a long period of time compared to the Pulse Jet systems. How do these very different systems affect combustion, production and mix quality. How should these be maintained, operated and protected?

CFO, Equipment Buyer, Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee

14 Plant Performance Evaluation

Look at the big picture and then focus on the small details. Set up a program to measure daily plant performance while documenting the many variables affecting the plant situation. Make some changes and measure to see if it was a positive or negative. Set up your operation so it uses the least amount of energy while allowing max production. Take snap shots of the plant behavior in different situations. Piece them together for the big picture over time. Plant operation is not an art, it is a science and a business. Run it by the numbers.

CFO, Equipment Buyer, Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee



□ 1 Basic Electricity

'Understanding electricity has not been made so easy', is a common remark that has been made over the 15 years this Workshop has been performed. We approach this module as if the participant has no idea how electricity works. Many claim they only know enough to stay away from it. If you repeat these next six modules enough times, you will have a good foundation to work from. You will be able to pass along observations to plant controls people over the phone, trouble shoot and make some repairs yourself, working on equipment safely.

Plant Manager, Plant Technician, Plant Mechanic, Operator, Trainee

□ 2 Circuit Analysis

What measurements should we measure in a good working circuit? Once we know that, a circuit not working is again measured then analyzed on the different measurements between a good working circuit and a bad circuit. Directions are determined where to measure next until we make the determination of the fault. This may seem easy. Participants normally need coaxing to measure the circuit under the condition it failed. Participants are tested at the end of each module and are encouraged to repeat the module as many times to make one most proficient.

Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee

□ 3 Meter Usage

The meters measure resistance, voltage and amperage. Depending on the circumstances, one needs to set these up properly to safely read the value being measured. Some meters are auto ranging while other meters need to be ranged. Know when your meter is reading correctly and when it is not.

Plant Manager, Plant Technician, Plant Mechanic, Operator, Trainee

□ 4 Troubleshoot – Beginner

Every plant has many high voltage motors and motor starters that require troubleshooting, maintenance and repair. It's important the job is done right and safely. OSHA requires circuits to be measured for no voltage when a disconnect is used to isolate the voltage from employees. If your people are in motor control cabinets and rewire motors, this alone is reason enough to be taking this module.

Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee

□ 5 Troubleshoot – Advance

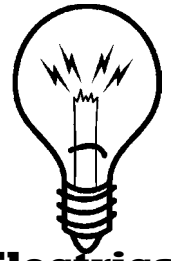
Electrical controls is more than supplying 480 vac or 120 vac to lights, motors and coils, etc. Equipment is also controlled from the varying AC and DC signals from load cells, VFDs, DC Motor controls, tachometers, potentiometers, etc. These circuits are explained and problems introduced into the circuits and then the Symptoms Game starts. This game is very effective in getting our point across and the challenge makes it fun for all.

Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee

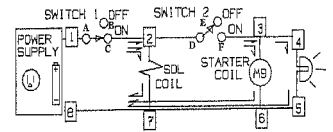
□ 6 Troubleshoot – Expert

A closed loop control system is studied, then analyzed for the resulting symptoms once the system has been given a problem. This Module requires all the knowledge and skill gained from the previous Electrical Modules plus. The problem may not be an electrical one or a mechanical one but parameters programmed on a VFD or Blending control or a Continuous Weigh Scale. The problem may be intermittent or continuous. The problem may be in the control house or at the equipment location or in the motor control room or the cable in between.

Plants Manager, Plant Technician, Plant Mechanic, Operator, Trainee



Electrical

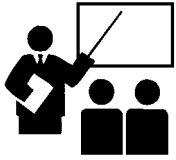


SWITCH 1 AND 2 ON
SOLENOID OFF
STARTER OFF
LIGHT OFF

FIND THE PROBLEM WITH YOUR TEST METER
WHERE IS OUR FIRST GOOD CHECK



WE HAVE ANSWERS...



Plant Operation Workshop Registration Form

Clarence Richard Company

952-939-6000

carrie@clarencerichard.com www.clarencerichard.com



Company Information

(*) Required Field

*Company Name _____	Date: _____
Address 1 _____	*Contact Name _____
Address 2 _____	*Contact Phone _____
*City _____	Contact Email _____
*State _____ *ZIP _____	*Fax Number _____

Payment Information

Amount Due From Totals Below \$ _____

Payment is due prior to workshop by check or credit card. Make checks payable to Clarence Richard Co. Mail registration to: 3908 Tonkawood Rd, Minnetonka, MN 55345 or Fax to 952-939-1026 or email to carrie@clarencerichard.com

Payment Method Check Visa Mastercard

Credit Card Num. _____ **Card Exp. Date** _____

Name on Card _____

Billing Address _____

Information Disclaimer: The information provided in workshops is considered by us as always being in a state of continuous improvement. This information is our opinion and the opinion of others gathered through knowledge, experience and research. The information here is true to the best of our knowledge. Your experiences and research may be different. This information is provided as a guide. Consult professional engineering for your application. CR Company liability for any costs incurred at anytime are limited to the course fee of a particular participant.

Participant Registration *(Place a checkmark by the course(s) and reference manual selection.)*

*Participant Name _____ *Phone _____

Title _____ *Email _____

Course	Modules	Class Room	To Include: Color Reference (200 to 1,350 Page) Manual On-Line Preview and Review Training
-Plant Operation Workshop and	(P1-P14)		\$1880 <input type="checkbox"/> Des Moines Feb 13-17
-Electrical Mechanical Systems and Troubleshooting	(E1-E6)		
-Plant Operation Workshop	(P1-P14)		\$1190 <input type="checkbox"/> Des Moines Feb 13-16
-Plant Quality Assurance	(P4-P8)		\$ 680 <input type="checkbox"/> Des Moines Feb 13-14
-Plant Safety	(P1, P2, E2)		\$ 340 <input type="checkbox"/> Des Moines Feb 15-16
-Electrical Mechanical Systems and Troubleshooting	(E1-E6)		\$ 680 <input type="checkbox"/> Des Moines Feb 16-17
Attendance/achievement certification or CEU's available upon request.		AGC to coordinate IDOT Training reimbursement with Clarence Richard Company. Based on participant certificate of attendance.	

TOTAL \$

Workshop Curriculum



Plant Operation Workshop P1 - P14: This course provides a comprehensive wide variety of topics aimed at broadening the students overall understanding on how asphalt plants work with an emphasis on safety. Plant Managers, Plant Technicians, Plant Mechanic, Operators, Trainees and Equipment Buyers will all benefit from this course.

Plant Quality Assurance P4 - P8: This course focuses on information that will benefit Quality Control Engineers, Bituminous Material Engineers and anyone focused on production and mix quality.

Plant Safety P1, P2, E2: This course concentrates specific safety related topics from the Plant Operation Workshop and Safe Meter Usage for Safety Directors and those wishing to focus on safety related material

Plant Financials P9, P12, P14: This course concentrates Plant Operation Workshop topics focused on financial concerns with purchasing, operating and maintaining a plant. This course is targeted towards CFOs, and Equipment Buyers.

Electrical Trouble Shootin E1-E6: Course focus is on developing safe electrical maintenance and troubleshooting skills for non-electricians working around plant production equipment. Plant Managers, Plant Technicians, Plant Mechanic, Operators and trainees would all benefit from this course.

Plant Operation Workshop P1-14

P1 Safety: Handling Asphalt Oil, Proving Safety Interlocks, Electrically Safe Maintenance Procedures, Damage Control.

Many people in the industry know of people burned by asphalt oil. There's no excuse for it. Burner and Material Handling Interlocks sometimes fail. Don't find out by accident your interlock doesn't work. Many Interlocks can be checked by how equipment is operated. Just because you tripped a breaker, does not mean the circuit is safe to work on. Insure your people know that. The drum mixer stops rotating and 2,000 degree gases rush to your baghouse. Asphalt oil saturates the inside of your drum. What do you do first, second, third... ?

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P3 Drum/Trunnion Maintenance

Balancing the sloped drum on tires is a technique that requires understanding varying load dynamics on trunnions and bearings. Troubleshooting problems and making adjustments ahead of bearing, tire, trunnion, drive, motor and switchgear failure reduces preventable downtime. Amp gauges, trunnion and tire wear tell a story—what's happening—what needs doing?

P4 Batch Plant Operation

Some Batch Plants are unnecessarily running slow while producing lower quality mix. What do you check if you're too rich or too lean? Adjusting the plant running procedure will tell the story. Some plants will produce a dryer batch every now and then. Why, and what can be done?

P5 Feeders, Filler silos and Dust Bins

Cold feed Bins, Rap Bins are volumetric feeders and relatively easy to operate. Mineral filler and dust silos can be difficult if not equipped correctly. Now, with SMA and WMA, we're adding all sorts of material to our mix from wax beads to water, or fiber to powders, and even liquid chemicals. Venting can be a problem with some weighing devices when blowing material in the silo and blowing material away from the silo discharge scale. The Exhaust Fan is a dust feeder. The more the damper is opened, the more dust is taken from the dryer. The dust makes a pit stop in the baghouse before being returned in spurts, partially returned or rejected. Some plants use a dust surge bin to even out the dust flow.

P6 Silo Operations

Controlling silo level helps reduce wear and segregation. Batcher operation is most important. Some Batcher controls are significantly more effective than others. Prevent the Silo Batch Master from dropping tons of mix on truck hoods. Loading techniques can help reduce segregation. What causes significant temperature drops between the drum discharge and the silo discharge and what can be done about it?

P7 Scales and Meters

Continuous weigh scales are the most difficult to install, calibrate and maintain. Belt scales, flow scales, flow meters, etc may be accurate for the rate a scale is calibrated for, but may not be accurate at significantly different rates. Learn how to check this and how to correct it. Learn how to spot check problems as the plant is producing. Stop the process before making all that bad mix.

P8 Control System Operation

Control systems are always changing. When something is wrong and they're not operating correctly, it can be hard to find the problem when you lack proper understanding of the dynamics. A step by step procedure from open loop control through the many closed loop control situations and theoretical plant control problems are introduced. Participants are asked for ideas of the symptoms of the control behavior. The role is reversed later when symptoms are presented and participants are asked what the problems may be. Control systems are made up of all types of electro-mechanical devices. Understanding electrical helps one become a thorough troubleshooter.

P9 Burner Operation

Combustion occurs when fuel, air and ignition unite. Complete combustion is achieved under the right conditions. Incomplete combustion reduces production, and increases energy and maintenance costs. Combustion efficiency can be monitored by the CFO when comparing energy bills and production. Learn what's acceptable and when a burner tune up is necessary. Plant Mechanics will learn how to tune the burner with or without a combustion analyzer, and to troubleshoot problems and learn how to fix them.

P10 Oil Heating

Oil heaters operate 24 hours a day, 7 days a week, the entire construction season. Heat Transfer Fluid breaks down like motor oil. Consequently, heat is not being transferred, energy is being wasted and production may be affected. Pipe insulation is one of your best paybacks. Oil heaters have a spring startup procedure. Direct fired and electrically heated tanks can be dangerous. Tank level instruments have several benefits.

P11 Aggregate Drying

Learn how drying takes place under the many different conditions. Counter flow drying requires bigger and better pollution control equipment than parallel flow drying. Why? Learn about proper temperatures and pressures and compare them to what your plant is running at. Make adjustments or repairs to meet the proper criteria and raise your production. Learn how to measure effectiveness of the veiling flights. Some plants have the paint burned off one side of the stack. Why?

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P13 Baghouse & Primary Collector Operation

The purpose of this pollution control equipment is to keep the air clean and as discussed in Module 4.0, to return material back to the mix. Reverse Air Bag systems clean large sections of the baghouse over a long period of time compared to the Pulse Jet systems. How do these very different systems affect combustion, production and mix quality. How should these be maintained, operated and protected?

P14 Plant Performance Evaluation

Look at the big picture and then focus on the small details. Set up a program to measure daily plant performance while documenting the many variables affecting the plant situation. Make some changes and measure to see if it was a positive or negative. Set up your operation so it uses the least amount of energy while allowing max production. Take snap shots of the plant behavior in different situations. Piece them together for the big picture over time. Plant operation is not an art, it is a science and a business. Run it by the numbers.

Sampling of e-Plant Operation Workshop

<http://clarencerichard.adobeconnect.com/workshopdemo>

Electrical Trouble Shooting E1-6

These courses focus on developing safe electrical maintenance and troubleshooting skills for non-electricians working around plant production equipment. Plant Managers, Plant Technicians, Plant Mechanic, Operators and trainees would all benefit from this course. Training topics and modules include:

E1 Basic Electricity

'Understanding electricity has not been made so easy,' is a common remark that's been made over the 15 years this Workshop has been offered. We approach this module as if the participant has no idea how electricity works. Many claim they only know enough to stay away from it. If you repeat these next six modules enough times, you will have a good foundation to work from. You will be able to pass along observations to plant controls people over the phone, trouble shoot and make some repairs yourself, working on equipment safely.

E2 Meter Usage

The meters measure resistance, voltage and amperage. Depending on the circumstances, one needs to set these up properly to safely read the value being measured. Some meters are auto ranging while other meters need to be ranged. Know when your meter is reading correctly and when it is not. Safe meter usage is important when exposed to higher voltages and current capacities. This module directs the participant on proper safety procedures including the protective gear now being dictated by OSHA as directed by the New Arc Flash NFPA 70 E requirements.

E3 Circuit Analysis

What measurements should we measure in a good working circuit? Once we know that, a circuit not working is again measured then analyzed on the different measurements between a good working circuit and a bad circuit. Directions are determined where to measure next until we make the determination of the fault. This may seem easy. Participants normally need coaxing to measure the circuit under the condition it failed. Participants are tested at the end of each module and are encouraged to repeat the module as many times to make one most proficient.

E4 Troubleshoot – Beginner

Every plant has many high voltage motors and motor starters that require troubleshooting, maintenance and repair. It's important the job is done right and safely. OSHA requires circuits to be measured for no voltage when a disconnect is used to isolate the voltage from employees. If your people are in motor control cabinets and rewire motors, this alone is reason enough to be taking this module.

E5 Troubleshoot – Advance

Electrical controls is more than supplying 480 vac or 120 vac to lights, motors and coils, etc. Equipment is also controlled from the varying AC and DC signals from load cells, VFDs, DC Motor controls, tachometers, potentiometers, etc. These circuits are explained and problems introduced into the circuits and then the Symptoms Game starts. This game is very effective in getting our point across and the challenge makes it fun for all.

E6 Troubleshoot – Expert

A closed loop control system is studied, then analyzed for the resulting symptoms once the system has been given a problem. This Module requires all the knowledge and skill gained from the previous Electrical Modules plus. The problem may not be an electrical one or a mechanical one but parameters programmed on a VFD or Blending control or a Continuous Weigh Scale. The problem may be intermittent or continuous. The problem may be in the control house or at the equipment location or in the motor control room or the cable in between.

Sampling of e-Electro-Mechanical Workshop

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