EI Education Division

2011 Shot Peening & Blast Cleaning Workshop

Orlando, FL

AGENDA

Class Schedule / Descriptions / Menu

Workshop Map - Exhibitor List

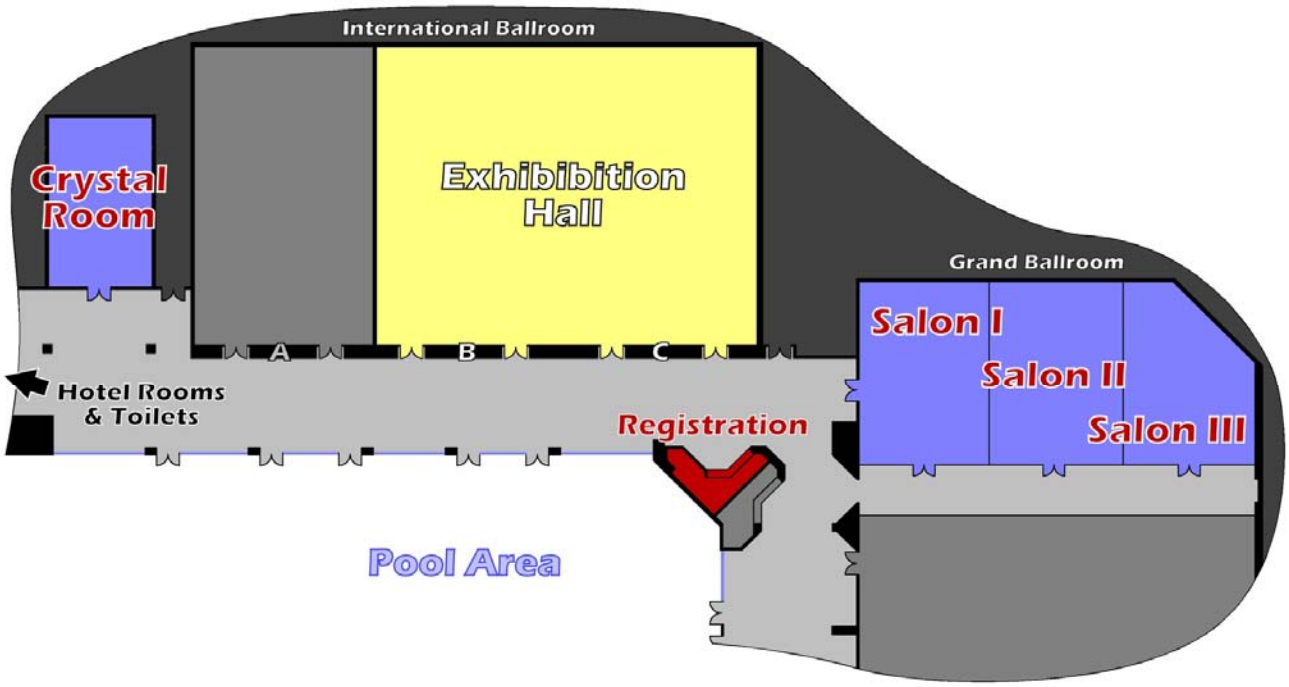
Electronics Inc.
Education Division

The Shot Peener

Visit **http://www.electronics-inc.com/workshops.html** for more information

Registration and Setup	
Time	**Monday, October 24, 2011**
9am - 5pm	**SAE Surface Enhancement Committee Meeting / J-Spec Conformance** (by invitation only)
Noon - 5pm	**Student Registration / Sign-in and Participant Packet Distribution** Registration Desk
Noon - 5pm	**Exhibitor Sign-in and Set-up** Registration Desk and Exhibition Hall

Workshop Map



WORKSHOP DAY 1

Tuesday, October 25, 2011

Time/Rooms	Salon I	Salon II	Salon III	Crystal
7:00am	**Breakfast - *Scrambled Eggs with Sausage*** - Exhibition Hall until 7:50am **Tradeshow** - Booths open all day			
8:00 - 8:35	Jack Champaigne's Opening Remarks			
8:35 - 8:45	**Group Photograph** - Please wear your workshop tee shirt			
8:45 - 9:25	• 100 • **Introduction to Shot Peening - The Basics** EIED Instructor L1 L2 FL			
9:25 - 9:55	• 110 • **Peening Media Overview** EIED Instructor L1 L2			
9:55 - 10:45	• 120 • **Peening Intensity Basics** EIED Instructor L1 L2 FL			
30 minutes	**TRADE SHOW BREAK**			
11:15 - 11:40	• 121 • **Simple Saturation Curve Generation** EIED Instructor L1 L2 FL			
11:40 - 12:30	• 130 • **Peening Coverage** EIED Instructor L1 L2 FL			
12:30 - 1:30	**LUNCH - Caribbean themed Buffet**			
1:30 - 2:20	• P08 • *Multiple* **Peening Process Characterization and Optimization** Kevin Young	• A01 • *Multiple* **Peening Applications** Jim Harrison	• M01 • *Multiple* **AMS-2431 Media Specifications** Joe McGreal	• E09 • **MagnaValve Applications for Wheel Blast Machines** EIED Instructor
2:25 - 3:15	• E02 • **Air Peening Machine Design and Setup** Bill Barker	• A02 • *Multiple* **Practical Approach to Shot Peening Applications** Herb Tobben	• M02 • **SAE Media Specifications & Abrasive Media Selection** Joe McGreal	• E08 • **MagnaValve Applications for Air Blast Machines** EIED Instructor
30 minutes	**TRADE SHOW BREAK**			
3:45 - 4:35	• E06 • *Multiple* **Nozzle Design and Applications for Air-Operated Blast Equipment** Herb Tobben	• E03 • **Wheel Machine Design and Setup** Ron Wright	• M03 • **Cut Wire Media** Dwight Lutsko	• K01 • *Multiple* **Nadcap Audit Preparation** John Cammett
4:40 - 5:30	• P4 • *Multiple* **Peening Parameters** Kumar Balan	• E05 • **Wheel Blast Machine Maintenance and Problem Solving** Ron Wright	• A07 • **Corrective Peening of Fighter Aircraft Components** Sylvain Forgues	FL • P01 • *Multiple* **Flapper Peening Theory and Applications** EIED Instructor
5:30 - 7:30	**Engineered Abrasives'** **Poolside Reception**			

Classes marked L1 & L2 are recommended as preparation for Level 1 and 2 exams respectively. Classes marked **FL** are recommended for flapper peening exam however "Flapper Peening Practice / Practical" is required for any persons sitting for the flapper peening exam. The word *Multiple* next to the course number indicates that the particular class is offered at other times during the workshop. All break out classes should be considered preparation for Level 3 exam as its questions concentrate on real world applications and on the job experience.

WORKSHOP DAY 2

Wednesday, October 26, 2011

Time/Rooms	Salon I	Salon II	Salon III	Crystal
7:00am	**Breakfast - *Petite Filet Mignon with Scrambled Eggs*** - Exhibition Hall until 7:55am **Tradeshow** - Booths open all day			
8:00 - 8:50	• 210 • **Peening Media Inspection and Maintenance** EIED Instructor			
8:50 - 9:40	• 220 • **Advanced Peening Intensity** EIED Instructor			
9:40 - 10:10	• 221 • **Advanced Saturation Curve Generation** EIED Instructor			
30 minutes	**TRADE SHOW BREAK**			
10:40 - 11:30	• 230 • **Advanced Peening Coverage and Masking** EIED Instructor			
11:30 - 12:00	• K02 • **SAE Spec Forum - Past, Present and Future** Jack Champaigne			
12:00 - 1:00	**LUNCH - All American Cookout Buffet**			
1:00 - 1:50	• E06 • *Multiple* **Nozzle Design and Applications for Air-Operated Blast Equipment** Herb Tobben	• A01 • *Multiple* **Peening Applications** Jim Harrison	• M01 • *Multiple* **AMS-2431 Media Specifications** Joe McGreal	• K04 • *Multiple* **Hands-On Media Size and Quality Inspection Practice** EIED Instructor
1:55 - 2:45	• K03 • *Multiple* **Residual Stress Measurement** Mike Brauss	• A08 • **Ultrasonic Peening on Jet Engine Parts** Holger Polanetzki	• P06 • **The Essentials of Blast Cleaning** Joe McGreal	• K04 • *Multiple* **Hands-On Media Size and Quality Inspection Practice** EIED Instructor
30 minutes	**TRADE SHOW BREAK**			
3:15 - 4:05	• A02 • *Multiple* **Practical Approach to Shot Peening Applications** Herb Tobben	• P03 • **Laser Peening** Jim Harrison	• E11 • **Dust Collectors** Dwight Lutsko	• K05 • **Almen Gage Calibration with R&R (Hands-On)** EIED Instructor
4:10 - 5:00	• E07 • **Intelligent Nozzle Motion** Dan Dickey	• A03 • **Custom Application of Shot Peening to Gearing** Jim Harrison	• E01 • **Convert your Blast Machine to Peen** Kumar Balan	• E10 • **Measuring Almen Strips to Generate Saturation Curves (Hands-On)** EIED Instructor

Classes marked L1 & L2 are recommended as preparation for Level 1 and 2 exams respectively. Classes marked **FL** are recommended for flapper peening exam however "Flapper Peening Practice / Practical" is required for any persons sitting for the flapper peening exam. The word *Multiple* next to the course number indicates that the particular class is offered at other times during the workshop. All break out classes should be considered preparation for Level 3 exam as its questions concentrate on real world applications and on the job experience.

WORKSHOP DAY 3

Thursday, October 27, 2011

Time/Rooms	Salon I	Salon II	Salon III	Crystal
7:00am	**Breakfast - *Cinnamon and Brown Sugar Apple Crepes with Bacon*** **- Exhibition Hall until 7:55am** **Tradeshow - Booths until 1:00pm**			
8:00 - 8:50	• A04 • **Peening in the Medical Industry** Scott Hatfield	• A05 • **Peening Techniques for Challenging Applications** Jim Whalen	• P09 • **Velocity Measurement / Intensity Verification** Holger Polanetzki	
8:55 - 9:45	• K03 • *Multiple* **Residual Stress Measurement** Mike Brauss	• P08 • *Multiple* **Peening Process Characterization and Optimization** Kevin Young	FL • P01 • *Multiple* **Flapper Peening Theory and Applications** EIED Instructor	
30 minutes	**TRADE SHOW BREAK**			
10:15 - 11:05	• M05 • **Ceramic Beads for Surface Treatment and Shot Peening** Jeff Girman	• A06 • **Peen Forming** Jim Harrison	FL • P02 • **Flapper Peening Practice / Practical** EIED Instructor & Sylvain Forgues	
11:10 - 12:00	• K01 • *Multiple* **Nadcap Audit Preparation** John Cammett	• P4 • *Multiple* **Peening Parameters** Kumar Balan		
12:00 - 1:00	**LUNCH - Little Italy themed Buffet**			
1:00 - 1:30	Level 1 Exam Prep	Early Level 2 & 3 Exam		
1:30 - 2:00	Level 1 Exam and Roto Flapper Exam			
2:00 - 2:30				
2:30 - 3:00	Level 1 Exam Review	Level 2 Exam Prep		
3:00 - 3:30		Level 2 and 3 Exam		
3:30 - 4:00				
4:00 - 4:30				
4:30 - 5:00		Level 2 Exam Review		

Classes marked L1 & L2 are recommended as preparation for Level 1 and 2 exams respectively. Classes marked **FL** are recommended for flapper peening exam however "Flapper Peening Practice / Practical" is required for any persons sitting for the flapper peening exam. The word *Multiple* next to the course number indicates that the particular class is offered at other times during the workshop. All break out classes should be considered preparation for Level 3 exam as its questions concentrate on real world applications and on the job experience.

Titles and Topics

LEVEL 1 PEENING CLASSES

Class Number	Class Name Instructor	Class Description
100 L1 FL	**Introduction to Shot Peening - The Basics** EI Instructor	This entry level class discusses the history and fundamentals of the peening process that we know today as terms used in the industry are introduced and explained. This session also defines when the peening process should be performed. This class is recommended for preparation for the FAA Level 1 certification exam.
110 L1	**Peening Media Basics** EI Instructor	The media is the real tool of the peening process. This session gives an overview of the four types of media commonly used in peening and their attributes. This class also briefly discusses what to look for when selecting the right media for your application. This class is recommended for preparation for the FAA Level 1 certification exam..
120 L1 FL	**Basic Peening Intensity** EI Instructor	This class will introduce the concept of peening intensity and how it is measured using Almen strips, holders and gages. The saturation curve and the 10% rule are explained and guidelines for new set-ups and verification trials for peening intensity are discussed. This class is recommended for preparation for the FAA Level 1 certification exam.
121 L1 FL	**Simple Saturation Curve Generation** EI Instructor	This session explores simplified saturation curves as workshop attendees are asked to plot arc height data in order to determine intensity. This class is recommended for preparation for the FAA Level 1 certification exam.
130 L1 FL	**Peening Coverage** EI Instructor	This session defines coverage and its importance in the peening process. It is often incorrectly associated with intensity and saturation curves. This class will discuss why intensity and coverage are two entirely different aspects of the peening process and how they do not effect each other. This class is recommended for preparation for the FAA Level 1 certification exam.

LEVEL 2 PEENING CLASSES

Class Number	Class Name Instructor	Class Description
210 L2	**Media Inspection and Maintenance** EI Instructor	Using the correct media and maintaining its quality is a must for a consistent process. This session discusses different media specifications and their requirements. Examples of both shape and size inspection are reviewed and on-machine devices that help meet specifications and maintain media quality are also examined. This class is recommended for preparation for the FAA Level 2 certification exam.
220 L2	**Advanced Peening Intensity** EI Instructor	This session looks at how other peening parameters can effect the intensity results in your process. Changes in the media and machine condition can cause undesired results. This class is recommended for preparation for the FAA Level 2 certification exam.
221 L2	**Advanced Saturation Curve Generation** EI Instructor	This hands on practical asks students to produce slightly more challenging saturation curves and determine an intensity value. This session also invokes the thought that the saturation curve can be more than just a means to determine an intensity value. This class is recommended for preparation for the FAA Level 2 certification exam.
230 L2	**Advanced Peening Coverage** EI Instructor	This session looks at problems with coverage including the effects of having too little or too much peening coverage. The concept of Lean-peening is also introduced. This class is recommended for preparation for the FAA Level 2 certification exam.

Classes marked L1 & L2 are recommended as preparation for Level 1 and 2 exams respectively. Classes marked **FL** are recommended for flapper peening exam however "Flapper Peening Practice / Practical" is required for any persons sitting for the flapper peening exam. The word *Multiple* next to the course number indicates that the particular class is offered at other times during the workshop. All break out classes should be considered preparation for Level 3 exam as its questions concentrate on real world applications and on the job experience.

Questions on the Level 3 exam are based primarily on real-world experiences. A student wanting to sit for the Level 3 exam should have complete understanding of all material presented in the Level 1 and Level 2 classes. Level 3 exam questions may also come from any class regularly scheduled at the US workshop that concentrate on the shot peening industry. This includes process applications, peening parameters, various equipment, media characteristics, inspection procedures and problem resolution.

APPLICATIONS

Class Number	Class Name Instructor	Class Description
A01	**Peening Applications** Jim Harrison	This session explores different components in the metal working industry that benefit from the shot peening process via improved fatigue life.
A02	**Practical Approach to Shot Peening Applications** Herb Tobben	This session covers project assessment, blast set-up parameters, and the variables that impact production rates, efficiency, and repeatability in a wide variety of automated shot peening applications.
A03	**Custom Application of Shot Peening to Gearing** Jim Harrison	Gears, due to their unique geometry, heat treatment and usage require special considerations when applying shot peening. Properly shot peened Gears can be up-rated by 15 to 30%. This presentation will discuss what makes gears unique and how shot peening can make them last longer under higher loads.
A04	**Peening in the Medical Industry** Scott Hatfield	This session will review some of the most popular components that are being shot peened in the medical industry, which will include a review of case studies that demonstrate the benefit of peening a medical device. Also included in this session, will be a look at what the FDA requires manufactures that shot peen their devices to demonstrate in product and process performance. This session will conclude by presenting a general layout of a process and equipment validation technique that is geared to help you understand what is needed to have a medically validated shot peening process that meets all of the FDA requirements.
A05	**Peening Techniques for Challenging Applications** Jim Whalen	Learn about tools and techniques to solve difficult peening configurations with emphasis on robotic parts handling.
A06	**Peen Forming** Jim Harrison	The majority of aircraft in production with aerodynamically formed aluminum wing-skins employ the peen forming process. It is a die-less forming process, performed at room temperature on skins with large variation in thickness. Residual compressive stress acts to elastically stretch the peened side to bend or even elongate an area to make the needed aerodynamic shape.
A07	**Corrective Peening of Fighter Aircraft Components** Sylvain Forgues	This class will present a study on rework alternatives following the poor peening of critical fighter components. The effect of coverage, Almen intensity and surface finish on fatigue life will be discussed. Rework alternatives will then be presented including direct re-peening, polishing + re-peening as well as multiple re-peening.
A08	**Ultrasonic Peening on Jet Engine Parts** Holger Polanetzki	Ultrasonic shot peening is an alternative special process to conventional shot peening with some advantages especially when it comes to peening thin walled parts or areas on jet engine parts. This class at first gives an overview on the technology of US peening concerning machinery, peening media etc. Process parameters are discussed to create a better understanding of the methods to influence the peening result. In the end a comparison between conventionally peened and ultrasonic peened Ti64 specimens is presented with a special focus on surface characteristics, residual stress profiles and fatigue life.

MEDIA

Class Number	Class Name Instructor	
M01	**AMS-2431 Media Specifications** Joe McGreal	This course goes through the AMS 2431 spec "slash-by-slash". Each media type will be discussed along with its properties and procedures of size & shape control, inspection and specifications. This presentations also includes a brief history of how MIL-13165 was replaced with AMS 2431.
M02	**SAE Media Specifications & Abrasive Media Selection** Joe McGreal	SAE and Abrasive Media Selection will discuss the “J” Specifications of Steel Abrasive and the wide spectrum of blasting medias for blast cleaning.
M03	**Cut Wire Shot** Dwight Lutsko	Learn more about the advantages and benefits of using cut wire media.
M04	**Ceramic Beads for Surface treatment and Shot Peening** Jeff Girman	Learn about shot peening applications . Topics will cover rudiment aspects of ceramic beads and their chemical properties, and various surface applications, all with emphasis on shot peening.

INSPECTION

Class Number	Class Name Instructor	Class Description
K01	**Nadcap Audit Preparation** John Cammett	This class will help you prepare your team for a Nadcap audit such as those conducted by Nadcap. including the inspection of equipment, paperwork, media, and the proficiency of the operators in the shot peen process.
K02	**SAE Spec Forum Past, Present and Future** Jack Champaigne	Specifications are a part of the shot peening process. They change out of the desire to insure consistent and desirable results. This session looks at the specs that are gone (and should be forgotten), what they've evolved into, and what topics are currently being discussed by the committees. - This is meant to be an interactive session where participants are welcome to address specification concerns and question how the current and future specs will effect their internal quality programs.
K03	**Residual Stress Measurement** Michael Brauss	X-ray diffraction (XRD) is the standard tool for measuring residual stress in shot peened components. This session will explain how XRD is used to quantitatively measure residual stress, the types of equipment that are available, the basic techniques and the type of information that can be obtained to optimize the shot peening process and ensure that peening has been correctly applied.
K04	**Hands-On Media Size and Quality Inspection Practice** EIED Instructor	This session is a Hands-On version of the Level 2 Lecture on Media Inspection and Maintenance. The lecture will be quickly reviewed and followed by demonstrations of a "RoTap" machine for media size inspection. A digital microscope for media shape inspection will also be demonstrated as well as a Spirolator for media shape maintenance.
K05	**Almen Gage Calibration with R&R (Hands-On)** EIED Instructor	This class will demonstrate the proper calibration of an Almen gage using a calibration kit with NIST traceable step blocks and a precision manufactured 9-hole template. It will also provide an explanation of procedures for gage R&R (Repeatability and Reproducibility) to verify the performance of an Almen gage.

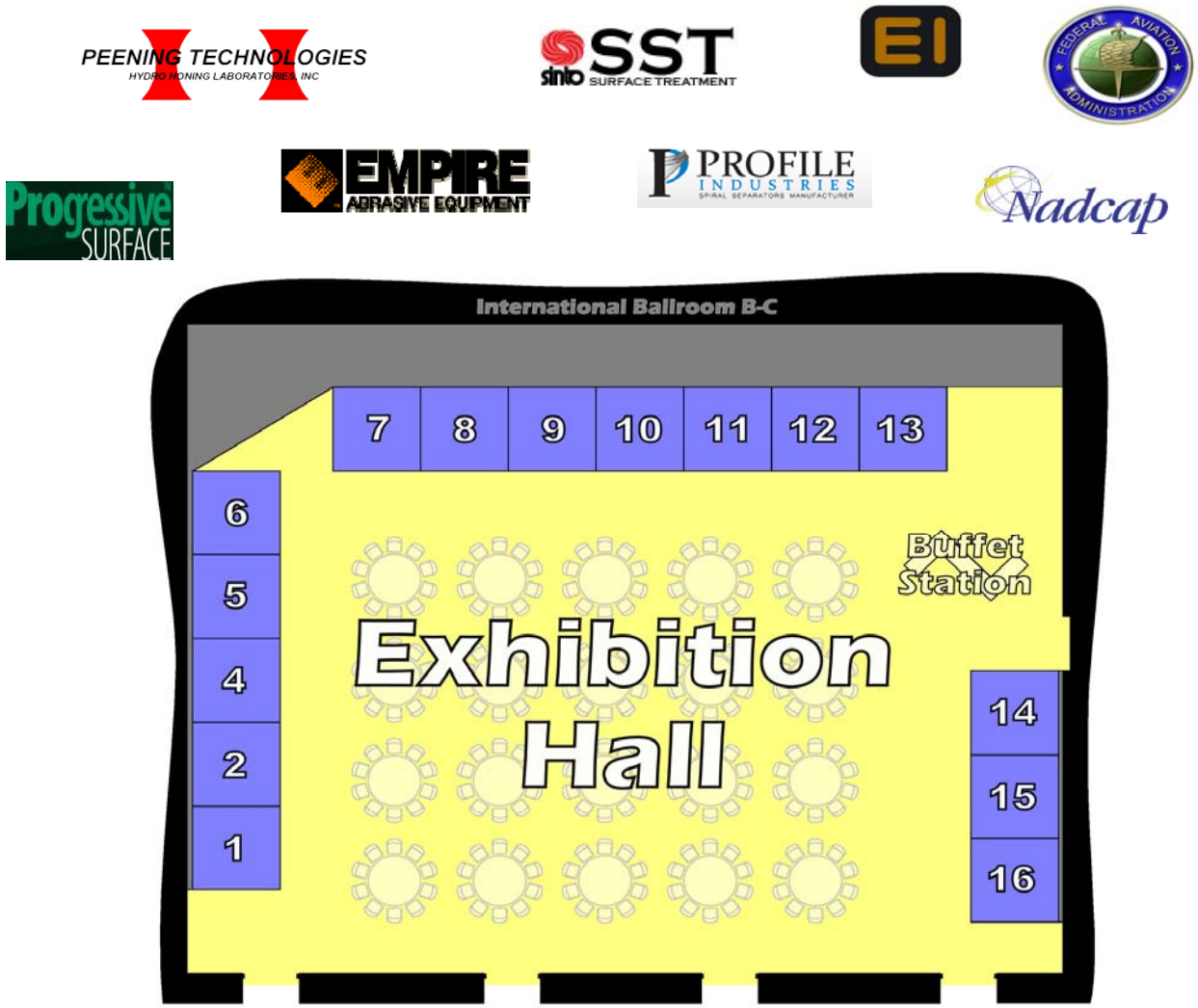
EQUIPMENT

Class Number	Class Name Instructor	Class Description
E01	**Converting your Blast Machine to Peen** Kumar Balan	Put your idle cleaning equipment to use in peening. Learn the modifications and costs involved, and expected results. We will also discuss 'premium cleaning' with your redundant peening equipment.
E02	**Air Peening Machine Design and Setup** Bill Barker	Learn an overview of the shot delivery, media reclaim and control devices common on air blast and peening machines. Learn about different nozzle types and how they can be used. Some basic troubleshooting techniques are also discussed.
E03	**Wheel Machine Design and Setup** Ron Wright	Wheel type machines can propel large volumes of shot for applications in both the blast cleaning and shot peening industries. This session goes over the features, design, function and setup of a wheel blast machine.
E04	**Air Peening Machine Maintenance and Problem Resolution** -	This course will detail methods, procedures and set-ups for the critical process controlling component of modern, automated and robotic peening and blasting, air delivery machines. This course will discuss automated PM programs. Students are encouraged to bring problem descriptions with them to this course.
E05	**Wheel Blast Machine Maintenance and Problem Resolution** Ron Wright	A properly maintained machine is one of the keys to a consistent and reliable process. This session reviews the basic design of a wheel type blast machine, high-lighting preventative maintenance. Both common and unique problems will be explored discussed offering corrective measures.
E06	**Nozzle Design and Applications for Air-Operated Blast Equipment** Herb Tobben	In this session, learn how to achieve highest performance from an air-blast system, both suction and pressure, through proper nozzle selection. Nozzle material, shape, and angle of impingement impact efficiency and productivity. Get tech tips from an industry expert, the man in the white coat.
E07	**Intelligent Nozzle Motion** Dan Dickey	This class presents how proper shot delivery can be obtained through intelligent mechanical nozzle movement and motion interaction.
E08	**MagnaValve Applications for Air Blast Machines** EIED Instructor	MagnaValves offer many advantages over mechanical valves in air blast applications, such as low maintenance and compatibility with computer control. Learn how to specify, install and maintain this new type of valve.
E09	**MagnaValve Applications for Wheel Blast Machines** EIED Instructor	MagnaValves are a popular replacement for abrasive "slide gates" or "dipper valves" because they offer low maintenance and improved process control. Now you can reduce your media flow rate thereby conserving media and reducing damage to the throwing wheel and the cabinet. Learn how to specify, install and maintain this new type of valve.
E10	**Measuring Almen Strips to Generate Saturation Curves (Hands-On)** EIED Instructor	This class provides basic hands-on training for the proper use of Almen gages to generate saturation curves. The students will measure Almen strips, plot saturation curves, calculate intensities and confirm the results using Dr. Kirk's Curve Solver program. The course will also explain the use of prebow compensation as well as highlight common errors that can occur with construction of saturation curves.
E11	**Dust Collectors** Dwight Lutsko	Can a blasting or peening machine's dust collector explode? This presentation will answer that question along with discussing other health and safety hazards. You will also learn proper methods for the collection and disposal of dust in blasting and peening machines.

PROCESSES

Class Number	Class Name Instructor	Class Description
P01	**Flapper Peening Theory and Applications** EIED Instructor	Flapper Peening is becoming more accepted as a reliable peening process for spot-repair. It is an inexpensive way to apply the peening process in small areas without having to use large blast cabinets. This session discusses the origins of flapper (roto) peening and outlines how it uses a slightly different set of rules from conventional peening. A supplemental hands-on class is also offered (see schedule) for those wanting to take an extended look. Flapper Peening Certification is offered. Candidates are required to take a written exam as well as show proficiency in a Flapper Practical session. Attending sessions marked with a "FL" will prepare candidates for the written examination.
P02	**Flapper Peening Practice / Practical** EIED Instructor	This is a supplemental class to the "Flapper Peening Theory and Applications" course. This class is hands-on and students can test their technique by generating a saturation curve via Flapper Peening. Since testing can be time consuming, students taking the Flapper Peening exam have priority with the equipment. Flapper Peening Certification is offered. Candidates are required to take a written exam as well as show proficiency in a Flapper Practical session. Attending sessions marked with a "FL" will prepare candidates for the written examination.
P03	**Laser Peening** Jim Harrison	Laser peening can impart a compressive stress of 4X and often deeper than conventional shot peening. This is very important in metal components that are subject to damage from fretting, corrosion and foreign objects. Learn about the space age technology used for critical peening applications.
P04	**Peening Parameters** Kumar Balan	Peening process is characterized by three major parameters – shot size, intensity and coverage. Though these parameters are dictated by OEM specifications, non-conformance can happen, and will lead to detrimental results. Let's discuss the effects, and avoidance techniques through some practical case studies and examples.
P06	**The Essentials of Blast Cleaning** Joe McGreal	This session will help you learn and understand all the necessary knowledge for how select the proper abrasive, the methods for lowering blast cleaning time, reducing machine maintenance and safety in the blasting environment. We discuss cleaning methods to prevent blasting damage, improving abrasive life and understanding specifications of surface cleanliness. Both centrifugal wheel and compressed air blasting methods are covered.
P08	**Peening Process Characterization and Optimization** Kevin Young	This course gives a overview of how to predict your shot peening process so you can optimize existing setups and reduce time in the development of new parts. Tools and software are also discussed to aid in this process.
P09	**Velocity Measurement & Intensity Verification** Holger Polanetzki	The currently used method for determining shot peening in serial production is to use Almen strips and saturation curves. This lesson gives insight in an additional/alternative process to Almen measurements. After a short introduction of the technology which is needed to perform these velocity measurements, test results are presented which were carried out to demonstrate the equality of velocity measurement to conventional Almen strip measurements. An overview is given on how parameter variations influence the velocity measurements. Based on trial results it is demonstrated how this new process can be used to increase the productivity. Potentials are shown and examples are given how this process can be included in serial production also by means of having an online process control to ensure consistently high peening quality.

Workshop Exhibitors



1. Premier Shot
2. Shockform
4. Clemco Industries Corporation
5. Wheelabrator Group
6. Innovative Peening Systems
7. Progressive Surface
8. Empire Abrasives
9. Peening Technologies
10. PeenMet
11. Sinto
12. Profile Industries
13. Electronics Incorporated
14. Proto Manufacturing
15. Engineered Abrasives
16. The Shot Peener / FAA