

AGENDA

E.I. Shot Peening Training

2024 **Shot Peening & Surface Treatment Workshop**
Colorado Springs, Colorado



**Shot Peening
Training**

Class Schedule / Descriptions / Menu
Workshop Map - Exhibitor List

**The
Shot Peener**



**E.I. Shot Peening
Training**



Registration and Setup	
Time	Monday, October 14, 2024
3pm - 5pm	Early Student / Instructor Sign-in and Material Distribution Exhibitor Sign-in and Booth Setup Event Desk - Ballroom Foyer

Event Map

Coming Soon

PRELIMINARY

WORKSHOP DAY 1
















Tuesday, October 15, 2024

6:00 - 8:00

Breakfast Buffet

8:00 - 8:25






Opening Remarks / SPOTY Award / Group Photo
Please gather **beforehand** in the *Exhibition Hall* wearing your workshop tee shirt

Time/Rooms	TBA	TBA	TBA	TBA
8:30 - 9:10	Shot Peening Introduction EI SPT Instructor   			
9:10 - 9:40	Peening Media EI SPT Instructor  			
9:40 - 10:40	Peening Intensity EI SPT Instructor   			
30 minutes	Morning Trade Show Break			
11:10 - 11:40	Saturation Curve Generation EI SPT Instructor   			
11:40 - 12:30	Peening Coverage & Masking EI SPT Instructor   			
12:30 - 1:30	Lunch Buffet			
1:30 - 2:20	Air Peening Machine Design and Setup* Coralic	Wheel Machine Design and Setup Wright	Peening Applications* Breuer	
2:25 - 3:15	Peening Techniques for Challenging Applications Whalen	Wheelblast Peening Applications and Techniques Wright	Laser Peening Breuer	
30 minutes	Afternoon Trade Show Break			
3:45 - 4:35	Abrasive Grit Blasting as a Surface Treatment Process* Green	Rotary Flap Peening (Lecture)  Kernan	AMS-2431 Media Specifications Waser	
4:40 - 5:30	Computerized Curve Solving via. PeenSolver Pro Derucki	Cast Steel Shot Waser	Differences Between Blast Cleaning and Shot Peening Balan	
5:45 - 7:45	Evening 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. 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 16, 2024

6:00 - 8:00	Breakfast Buffet			
Time/Rooms	TBA	TBA	TBA	TBA
8:00 - 9:00	Peening Media Inspection & Maintenance EI SPT Instructor 			
9:00 - 10:00	Advanced Intensity & Parameter Adjustments EI SPT Instructor 			
30 minutes	Morning Trade Show Break			
10:30 - 11:00	Saturation Curve Analysis EI SPT Instructor 			
11:00 - 12:00	Advanced Coverage & Surface Texture EI SPT Instructor 			
12:00 - 1:00	Lunch Buffet			
1:00 - 1:50	Peening Applications* Breuer	Part Coverage Development* Kernan	Operating your Automated Peening Machine Safely and Efficiently Balan	Media Quality Inspection* Chevrie / Painter <i>Hands-On</i>
1:55 - 2:45	Abrasive Grit Blasting as a Surface Treatment Process* Green	Cut Wire Media Maddy	Shot Peening Plus* Balan / Kernan	Media Quality Inspection* Chevrie / Painter <i>Hands-On</i>
30 minutes	Afternoon Trade Show Break (Open exhibition 3:30-5pm)			
3:15 - 4:05	Case Studies, Applying Peening Theory: Automotive and other industries Balan	High Density Ceramic Beads for Shot Peening Girman	Study of Fatigue Bandini	Rotary Flap Peening Practical Testing*  Kernan <i>Certification Candidates Only</i>
4:10 - 5:00	Shot Peen Process Development Beach	Blast Cleaning and Abrasive Media Selection Waser	Ultrasonic Peening Processes Cossio	Daily Tutoring (Español Disponible)

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WORKSHOP DAY 3

Thursday, October 17, 2024

6:00 - 8:00	Breakfast Buffet, <i>plus Gift Card \$\$\$ Giveaway</i>			
Time/Rooms	TBA	TBA	TBA	TBA
8:00 - 8:50	Air Peening Machine Design and Setup* Coralic	Fine Particle and Unconventional Peening Bandini	Shot Peening Plus* Balan / Kernan	Nozzle Design and Selection for Shot Peening Peterson
8:55 - 9:45	Operating Costs, Cleaning & Peening Balan	Peen Forming & Super Finishing Doherty	Residual Stress Measurement Brauss	Rotary Flap Peening Practical Testing* Kernan FL <i>Certification Candidates Only</i>
30 minutes	Morning Trade Show Break			
10:15 - 11:05	Part Coverage Development* Kernan	Dry Airblast & Wetblast Techniques Wright	Linking Peening Media and Process Impacts Gruninger	
11:10 - 12:00	Nadcap Audit Preparation Hunkele	MagnaValve Systems for Air and Wheel Blast Machines Ingram	Solid Film Lubricants Breuer	
12:00 - 1:00	Lunch Buffet			
1:00 - 1:15	Level 1 Exam Prep	Level 3 & Early Exams (NO Reviews)	* Written and practical testing is required for Rotary Flap Peening Certification.	
1:15 - 2:00	Level 1 Exam			
2:00 - 2:15	Level 1 Exam Review			
2:15 - 2:30	Level 2 Exam Prep			
2:30 - 3:30	Level 2 Exam			
3:30 - 4:30	Optional Level 2 Personal Exam Review			

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FAA LEVEL 1 PEENING COURSE

Class Name Instructor	Class Description
Shot Peening Introduction EI SPT Instructor L1 FL	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 Level 1 and Rotary Flap certification exams.
Peening Media EI SPT Instructor L1	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 Level 1 certification exam..
Peening Intensity EI SPT Instructor L1 FL	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 Level 1 and Rotary Flap certification exams.
Saturation Curve Generation EI SPT Instructor L1 FL	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 Level 1 and Rotary Flap certification exams.
Peening Coverage & Masking EI SPT Instructor L1 FL	This session outlines Coverage requirements for the peening process. We discuss why Coverage is important, how to inspect for proper Coverage, and how to prevent peening with various masking options This class is recommended for preparation for the Level 1 and Rotary Flap certification exams.

FAA LEVEL 2 PEENING COURSE

Class Name Instructor	Class Description
Peening Media Inspection & Maintenance EI SPT Instructor L2	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 Level 2 certification exam.
Advanced Intensity & Parameter Adjustments EI SPT Instructor L2	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 Level 2 certification exam.
Saturation Curve Analysis EI SPT Instructor L2	This hands on practical asks students to produce slightly more challenging saturation curves. It shows that saturation curves can tell us more about the process than just the peening intensity, and warns about having blind-faith in curve solvers. This class is recommended for preparation for the Level 2 certification exam.
Advanced Coverage & Surface Texture EI SPT Instructor L2	For the process engineer, this session discusses how to determine part processing time to insure proper coverage and how avoid peening parts for too long. We examine coverage problems and offer solutions for hard to peen locations. Surface texture options are also discussed This class is recommended for preparation for the 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. 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.

Specialty and Advanced Topics

Class Name Instructor	Class Description
Abrasive Grit Blasting as a Surface Treatment Process <i>Scheduled Twice</i> Green	Much more than just sandblasting, abrasive blasting uses a wide variety of materials to achieve process goals. We will discuss blasting media, equipment features unique to abrasive blasting, protective masking methods, and operator techniques that affect surface finish.
Air Peening Machine Design and Setup <i>Scheduled Twice</i> Coralic	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.
AMS-2431 Media Specifications Waser	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 presentation also includes a brief history of how MIL-13165 was replaced with AMS 2431.
Blast Cleaning and Abrasive Media Selection Waser	SAE and Abrasive Media Selection will discuss the "J" Specifications of Steel Abrasive and the wide spectrum of blasting medias for blast cleaning.
Case Studies, Applying Peening Theory: Automotive and other industries Balan	Bring all your theoretical knowledge and practical experiences to this highly interactive interchange based on at least two real-life case studies. The two cases will be presented to the audience, followed by a discussion of available data and development of a solution. The suitable machine type will then evolve from the discussions. These case studies will also help you understand how a process specification is developed and the manner in which it differs from a general peening specification.
Cast Steel Shot Waser	Produced from select steel scrap, controlled Atomization process and a quench & temper thermal treatment, Cast Steel Shot is the most widely used media in the Shot Peening Industry for its durability, true-sphere shape and economic cost. Come learn more about how it's made and controlled.
Cut Wire Media Maddy	This presentation discusses in detail what cut-wire media is and how it may be incorporated into your peening process.
Computerized Curve Solving via. PeenSolver Pro Derucki	Learn about the new PeenSolver Pro saturation curve solver offered for free from Electronics Inc.
Daily Tutoring (Español Disponible)	Having trouble understanding saturation curves, coverage times, or other FAA course material? This time slot will be staffed with one or two E.I. SPT Instructors for questions and personalized help. <i>This is not a presentation . Spanish Speaking Instructors available</i>
Differences Between Blast Cleaning and Shot Peening Balan	Often, we encounter an intentional 'peening' operation that is in fact just 'cleaning' the component. Therefore, primarily it is important to understand the differences between these two operations from the basics and the distinct features. Progressing along this path, it isn't uncommon to inherit a cleaning machine and tasked to use it to peen a new component. Let us understand what this conversion entails, its limitations and possible issues that might be encountered.
Dry Airblast & Wetblast Techniques Ron Wright	Learn more about the specific architecture of these equipment for ensuring an accurate surface preparation or peening process with sample of applications in Aerospace.

Specialty and Advanced Topics

Class Name Instructor	Class Description
<p style="text-align: center;">Fine Particle and Unconventional Peening Bandini</p>	<p>Starting from the basic concepts on shot peening, the presentation shows what happens if peening is applied using fine shots or unconventional parameters in a different way to interact with crystalline structure of metals and how those modifications can be used to improve fatigue performance. This presentation gives a glance on the state of the art of new peening applications.</p>
<p style="text-align: center;">High Density Ceramic Beads for Shot Peening Girman / Bouttes</p>	<p>Learn about shot peening applications for ceramic media, including the new High Density Ceramic (HDC). Topics will cover rudiment aspects of ceramic beads and their chemical properties, and various surface applications, all with emphasis on shot peening.</p>
<p style="text-align: center;">Laser Peening Breuer</p>	<p>Laser peening (LP) utilizes energy from a pulsed laser to drive compressive stress into a metal's surface. Laser peening is applied on an individual spot basis and is 5-10x deeper than shot peening making it more effective than shot peening for certain types of fatigue failure.</p>
<p style="text-align: center;">Linking Peening Media and Process Impacts Gruninger</p>	<p>The Center for Surface Engineering and Enhancement (CSEE), an industrial funded consortium at Purdue University supporting over 15 faculty and students on a variety of surface engineering projects, is coupling the ability to characterize peening media with the peening process and the resulting impact on surface finish and residual stress profiles on peened parts.</p> <p>We will highlight how variations in coverage change the point-to-point variation in stresses in peened parts, how to incorporate additional statistics about variations into the mechanical performance, and how to predict the stress profiles and link those to standardized Almen strips.</p>
<p style="text-align: center;">MagnaValve Systems for Air and Wheel Blast Machines Ingram</p>	<p>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.</p>
<p style="text-align: center;">Media Quality Inspection <i>Scheduled Twice</i> Chevrie / Painter <i>Hands-On</i></p>	<p>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. Make sure to bring your magnifier for media shape inspection. A microscope will be available for greater magnification. Representatives from classifier manufacturers will be on hand for questions/demonstrations.</p>
<p style="text-align: center;">Nadcap Audit Preparation Hunkele</p>	<p>This class will help you prepare your team for an audit such as those conducted by PRI/Nadcap, including the inspection of equipment, paperwork, media, and the proficiency of the operators in the shot peen process.</p>
<p style="text-align: center;">Nozzle Design and Selection for Shot Peening Peterson</p>	<p>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.</p>
<p style="text-align: center;">Operating Costs, Cleaning & Peening Balan</p>	<p>Whether your process involves cleaning or peening components, you will be faced with a steady challenge to minimizing operating costs. We will discuss different cost elements involved in running your air or wheelblast process and the influence each has in controlling the overall cost. This is not an accounting exercise. Our discussions will revolve around the technical aspects of each cost element with practical hints to keep them in control.</p>

Specialty and Advanced Topics

Class Name Instructor	Class Description
Operating your Automated Peening Machine Safely and Efficiently Balan	This class will discuss the safety considerations associated with the major components of a modern automated/robotic shot peening machine. Best practices for part trajectory generation will be presented along with several validation criteria. Part visual inspection, manipulation and masking will also be looked at to optimize your peening performance.
Part Coverage Development <i>Scheduled Twice</i> Kernan	Coverage considerations to avoid over-peening. Shot peening at intensity and not at intensity. Part set up with nozzle types, traversing, robotic, single and multiple. Application with part geometry and turntable. Discuss coverage maps.
Peen Forming & Super Finishing Doherty	<p>Shot peening's compressive stress is used for applications beyond fatigue life enhancement. Peen forming is a technique that forces a predictable distortion on parts that have large surface area relative to cross sectional thickness. The most common application of peen forming is aluminum wing skins for aircraft. It can also be used to correct parts that are out of contour.</p> <p>Super finishing is a technique primarily used for gears and blades. Both applications require compressive stress and excellent surface finishes.</p>
Peening Applications <i>Scheduled Twice</i> Breuer	This session covers shot peening theory at a technical level and explains the benefit of peening a variety of different components in different industries. Attendees are encouraged to 'Stump the Presenter' with their peening related questions.
Peening Techniques for Challenging Applications Whalen	Learn about tools and techniques to solve difficult peening configurations with emphasis on robotic parts handling.
Residual Stress Measurement 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.
Rotary Flap Peening (Lecture) FL Kernan	<p>Rotary Flap Peening has become a popular industry process. With a relatively small investment in the proper tools it can satisfy many requirements for small area peening without the need for a blast cabinet and without the mess of open-area peening. This session discusses the origins of Rotary Flap peening and outlines how it uses a slightly different set of rules from conventional peening. Various equipment requirements and recommendations are also discussed. A supplemental Practical Preparation class is also offered (see schedule) for those seeking certifications.</p> <p><i>This session is required for all those seeking Rotary Flap Peening certification, but is also open to those wanting to learn more about the process.</i></p>
Rotary Flap Peening Practical Testing FL <i>Scheduled Twice</i> Kernan <i>Certification Candidates Only</i>	<p>This session is for those seeking Rotary Flap Peening Certification. Each candidate must complete practical testing as required by SAE's AMS2590. Each candidate will also take a written exam as required by the FAA.</p> <p>Due to time restrictions, the number of candidates for Rotary Flap Peening Certification is limited. Please schedule testing with instructor during lecture</p>

Specialty and Advanced Topics

Class Name Instructor	Class Description
Shot Peen Process Development Beach	This class delves into the requirements of a shot peening process from purchase order review to end product certification. Covering not only what is required, but offers some best practice tips along the way.
Shot Peening Plus <i>Scheduled Twice</i> Balan / Kernan	For process engineers and managers, this session contains more topics that time allows so selection is determined by the class collective. Topics can include: Example of finding a target intensity, Caution with single point intensity verification, Efficiently verifying intensities of multiple Almen test strip locations with a single time, Explaining residual stress profile generation and why we do it, optional secondary processes that further improve fatigue life, Estimating coverage time, Extreme lean-peening example, Two vs. three exponent selection for saturation curve generation, and Vibratory Peening.
Solid Film Lubricants Breuer	Unlike greases and traditional oils, a solid film lubricant (SFL) provides lubrication in a dry environment. SFL's are able to lubricate in much harsher environments than traditional wet lubricants.
Study of Fatigue Bandini	Peening process is characterized by three major parameters – shot, intensity and coverage. Through knowledge of fatigue damage mechanism, this presentation shows how peening parameters can be optimized for best fatigue performance. 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.
Ultrasonic Peening Processes Cossio	Ultrasonic peening uses a vibrating surface to provide kinetic energy to spherical medias (Ultrasonic Shot Peening) or cylindrical pins (Ultrasonic Needle Peening and Ultrasonic Needle Forming). This class will cover theoretical aspects, key parameters and examples related to this unique peening technique.
Wheel Machine Design and Setup 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.
Wheelblast Peening Applications and Techniques Wright	Using a wheelblast machine is a way to quickly peen large components. At one time they were simple machines with a limited range of work they could perform. Innovation in design has opened up many other applications. This class will explore these advances. (Description of class submitted by EI SPT)