On-Site Training

Shot Peening Level 1-3

Basic L1 / Intermediate L2 / Advanced L3

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www.mfn.li

FAA accepted
MFN offers training that is accepted by the FAA

Concept of the on-site training:

The target group for this education program are organizations, most likely in the automotive, aviation and spring industries, which have several peening machines and a team of operators. For such an audience MFN will offer a shot peening training for a minimum of 5 people per course per day. The training can last 1-4 days.

Who shall attend?

This training is designed to give operators and supervisors theoretical and hands-on(*) training for their activities within a workshop surrounding. For that group of people MFN likes to offer a platform to periodically update and refresh their shot peening knowledge. The intermediate course assumes that a fundamental knowledge of shot peening is available.

(*): The hands-on training depends on the facilities at the customer's site.

Who designed this training?

A team of MFN trainers from 19 different countries was selected and companies within the peening industry were contacted from around the globe to donate training material and exhibit items. The creation of this program has been a real team effort, not just by the MFN trainers, but also by a number of companies which normally compete against each other. And this is especially worthy of mention - the common understanding that there is a need within the peening industry to establish a qualified training program and to create the spirit to do this together.

FAA accepted Courses:

All 3 courses offered during the training are FAA accepted. Participants who passed the optional examination receive a "Certificate of Achievement", which has the related FAA identification number on it. The FAA acceptance gives the courses a general credibility. However, there are a lot of aviation repair and overhaul stations, which do receive frequent FAA audits. Especially those companies will appreciate to have access to a FAA accepted shot peening training.

Courses in German, English, Turkish, Portuguese, French, Italian, Japanese, Chinese and Spanish!

General information:

- duration 1-3 days
- €650/person and course, minimum 5 persons per course
- €130/person for optional FAA certificate of achievement indicating FAA Ref. No.
- including trainings material
- date depends on customer and MFN trainer availability
-price excluding travelling and subsistence

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Other Topics on Request! Pictures show training centre in Altena, Germany.

MFN Topics of the Shot Peening Training Level 1-3

LEVEL 1 (BASIC)	LEVEL 2 (INTERMEDIATE)	LEVEL 3 (ADVANCED)	DURATION
Level 1 is the minimum requirement for shot peen operators and is the foundation for level 2. The level 1 course provides training in peening workshop operations & inspections.	Level 2 is the minimum requirement for shot peen supervisors & technicians. Level 2 builds on the knowledge gained in level 1 to provide further capability in:	Level 3 is the recommended standard for auditors, trainers & specifying engineers Level 3 provides greater breadth and depth of knowledge to enhance the competence gained from the previous levels.	
Introduction to Peening: Fundamental Theory; How does peening work? History; Applications; Life Cycle Enhancement; Residual & Applied Stress Diagrams; Resulting Weight Reduction Advantage; Stress Corrosion Cracking.	**Intensity L2:** Intensity & Stress Depth, Constructing a Saturation Curve, Analysing Saturation Curves, Almen Strips, Holders and Gages, Pre-bow Compensation, Shaded Strips & Hole Peening.	**Residual Stresses & their Measurement:** Definition of Stresses; Measurement Techniques and their Limitations; "Walk-through" of X-Ray Diffraction Technique, Barkhausen Effect.	8:25-9:10 45 minutes
Intensity L1: An understanding of Intensity; how it is determined and verified in Production; how to measure Intensity; what influences Intensity, Measurement Equipment, Requirements.	**Coverage L2:** Definition of Coverage, Development of Coverage, Visual Inspection, Influencing Factors, Topography of Peened Surface, Planning & Simulation of Coverage, Life-cycle Enhancement.	**Fatigue Stress Corrosion in Metals:** Fracture Mechanics; Stress Intensity Factor; S-N Curves, Fatigue Measurement; Fatigue Life & Limit.	9:10-9:55 45 minutes
Coverage L1: Definition of Coverage, Development of Coverage, Coverage vs. Intensity, Visual Inspection for Degree of Coverage.	**Wheel Peening Machines & Equipment:** Wheel Blasting Principle, Blade Shapes, Characteristics, Intensity Curves, Power and Throughput, Arrangement Blast Wheels, Dosing, Wheel Unit, Shot Circuit, Air Wash Separator, Adjustable Parameters, Media, Work Pieces, etc.	**Optimization Of Shot Peening.** Residual Stress, Influence of Different Parameters, Concept of local Durability, Different Ways of Peening Examples for increasing the Fatigue Strength, Applications, Warm Peening, Stress Peening, Dual Peening, Cavitation Damage, Fretting, Decarburization.	10:30-11:15 45 minutes
Engineering, Planning, Documentation: Planning; Drawing Requirements, Process Development, Data Cards / Procedures: Intensity Verification, Pre- & Post Inspection, Masking Methods / Documentation: Particular Request for Documentation.	**Air Peening & Nozzle:** Pneumatic Equipment, Basics, Advantages, Disadvantages, Machine Styles, Application Examples, External Nozzles, Special Nozzles & Hole Peening.	**Shot Peening Process Improvement:** Internal Audits & Auditors, Process Approach, Job Audits, Checklists, Personal Audits, Statistical Process Control, Run Charts, Mean-range Charts, Eliminating Process Variation.	11:15-12:00 45 minutes
Masking: Masking Options, Tapes. Caps & Plugs, Purpose Formed Masks, Conformal Coatings, Examples of Combined Masking, Selection Criteria, Application and Removal Methods.	**Flap Peening:** Review of Current Practices and Options, Process, Controls and Technique, Specifications, Demonstrations of Set Up, Intensity Control, Coverage, Capability Evaluations.	**New Technologies:** Laser Peening, Ultrasonic Peening, Cavitation Peening.	13:00-13:45 45 minutes
Peening Media L1: Composition of Media, Size, Weighing, Measuring, Inclusions, Shape, Sieve Analysis, Equipment and Procedure.	**Peening Media L2:** Types of Media and Related Specifications, Chemical Composition, Hardness, Microstructure Inspection, Magnetic particles, Density, Internal Defects.	**Introduction to Deep Rolling:** Process Characteristics / Advantages, Required Machines / Equipment, Tooling, Process Control, Plunge-in / Feed Mode / Free-form Methods, Application Examples.	13:45-14:30 45 minutes
Preparing for Shot Peening Audits: Types & Level of Audit; What to expect during Audits; Preparing for Audit; Quality System, Documentation, Control Maintenance, Programme Material, Control Certifications, Calibration, Specifications & Standards, Job Audits, Non Conformance Report, Corrective Action Report, etc.	**Shot Peening in the Automotive Industry:** Examples, Influence of the Material, Peening of Con-rods, Crankshafts, Helical Barrel Springs, Leaf Springs, etc.	**Nanostructured Surfaces Obtained by Severe Shot Peening:** Definition of Nanostructured Surfaces, Severe Plastic Deformation, Nanocrystallization, Severe Shot Peening, Grain Refinement & Measurement, Surface Properties, Bio-med Applications.	15:00-15:45 45 minutes
Repetition & Questions Will depend on the specific requirements and means of the class. Can be used for repetition, questions, hands-on training, etc.			15:45-16:15 30 minutes
Optional Test for Certificate of Achievement Participants who pass this optional test receive a certificate containing the FAA Reg. No. issued for the approval of this course.			16:15-17:00 45 minutes

Students are recommended to start with level 1 to provide a suitable foundation for subsequent levels. Tests for level 2 & 3 certification shall contain questions on previous level content.

Certification for level 2 can only be awarded to level 1 holders. Certification for level 3 can only be awarded to level 2 holders.

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Registration:

Name of Person placing the Order:	
Company:	Street:
Postal Code:	City:
Country:	Phone:
E-mail:	Fax:
For Europe only - Company VAT Number:	

BASIC/Level 1 Course (min. 5 Pers.): No. of People ____ x €650 = _____
Optional Test for Certificate of Achievement (FAA recognized): No. of People ____ x €130 = _____

INTERMEDIATE/Level 2 Course (min. 5 Pers.): No. of People ____ x €650 = _____
Optional Test for Certificate of Achievement (FAA recognized): No. of People ____ x €130 = _____

ADVANCED/Level 3 Course (min. 5 Pers.): No. of People ____ x €650 = _____
Optional Test for Certificate of Achievement (FAA recognized): No. of People ____ x €130 = _____

Total for courses and tests: _____

Travel Expenses of Trainers (economic class ticket, hotel, taxi, expenses): _____

MFN
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For questions call +41.44.831 2644 or E-mail: info@mfn.li

More details at www.mfn.li/trainers


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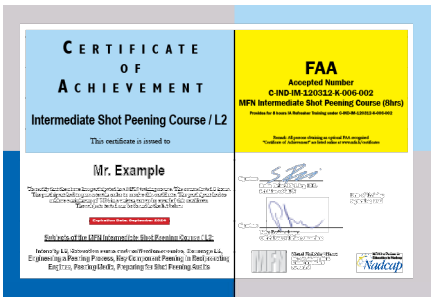
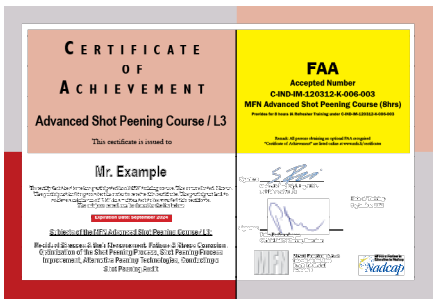
Remark:
- Not all trainers teach all levels of MFN courses
- Trainer selection depends on country and availability
- Not all courses levels are available in 9 languages
- Find other training means at www.mfn.li/workshops

BASIC/Level 1 Certificate indicating FAA Ref. No.



INTERMEDIATE/Level 2 Certificate indicating FAA Ref. No.



ADVANCED/Level 3 Certificate indicating FAA Ref. No.

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