

DLS 2 Days – Industrial LSO, Administrative - Agenda

Scope: This 2-day workplace laser safety training course is purposely developed to meet the needs of all persons responsible for and working with lasers in the manufacturing environments. Where lasers are used in industry for cutting, welding, brazing, marking or other materials processing applications, this course is tailored to fit the needs of those assigned the duties of Laser Safety Officer **who are not required** to perform detailed exposure limit or hazard analysis calculations.

Course materials supplied:

- Course notes
- ANSI Z136.9 "Safe Use of Lasers in Manufacturing Environments"
- OSHA Laser Hazards Technical Manual (e-files)
- CDRH Laser Product Forms and Notices (e-files)
- USB jump drive with reference laser safety documents, resources and templates
- Certificate of completion

Course Agenda:

Day 1:

- Introductions and objectives
- Pre-training Quiz – to benchmark the unknowns
- Workplace Safety
 - General Duty of Care, Due Diligence
 - Regulations and Standards
 - Consensus Standards
 - Ensuring Safety in the Workplace
- Lasers as a Recognized Hazard: (OSHA, ILO and ANSI Z136.9)
 - Summary Bioeffects
 - Summary Exposure Limits
- Essentials of lasers and optical radiation: (OSHA and ILO)
 - The Electromagnetic Spectrum
 - L.A.S.E.R.
 - Lasing Process
 - Types of Industrial Lasers

- The Laser Safety Officer: (OSHA and ANSI Z136.9)
 - Summary Role and Relationship in an Organization
 - Summary Responsibilities
 - How to Effect Laser Safety in the Workplace
- Laser Accidents and Lessons:
 - Statistics and Databases
 - Past and New Trends
 - Common Root Causes
 - Accident Response Planning and Execution
- The State of Laser Safety: (OSHA, US CFR, IEC, ANSI)
 - Modes of Use: Operation, Maintenance and Service
 - Summary Hazard Classification Scheme
 - Equipment Build Standards and Regulations
 - US 21CFR1040.10 "Federal Laser Product Performance Standard"
 - IEC 60825-1
 - Laser Equipment/Product Compliance Requirements
 - US: FDA/CDRH
 - Rest of the World
 - Workplace User Safety Standards and Regulations
 - OSHA
 - ANSI Z136 Series
 - IEC 60825-14
 - Demonstrating "General Duty of Care"
- Review, Questions and Answers

Day 2:

- Laser Hazard Classification and Assessment: (Section 3, Appendix B, Appendix C)
 - The Process in General, Using and Understanding Z136.9
 - Summary Laser Bioeffects and Maximum Permissible Exposures (MPEs)
 - Wavelengths, Intensities and Bioeffect domains
 - Point Source vs Extended Source Exposures
 - Continuous Wave, Repetitive Pulse (Point Source)
 - Using MPE Tables 5 and 7 with Table 6 Correction Factors
 - Accessible Emission Limits (AELs) and Laser Hazard Classification
 - Laser Beam Exposure Conditions

- Hazard Analysis: Hazard Distances, Optical Densities
- How to Interpret and Relate the Scale and Strength of these Hazard Values
- Safety Control Measures: (Section 4, Appendix A, Appendix D)
 - Understanding the Hierarchy of Safety Control Measures (Table 10e)
 - Engineering (Table 10a)
 - Administrative and Procedural (Table 10b)
 - Personnel Protective Equipment (Table 10c)
 - Special Considerations (Table 10d)
 - OSHA, ANSI Z535 and Z136 Safety Alert Signal Words
 - Relationship of DANGER, WARNING, CAUTION, NOTICE
 - Structure of Area Warning Signs and Labels
 - Area Warning Devices and Signs (Table 11a)
 - Labelling Requirements (Table 11b)
 - Protective Equipment Labelling (Table 11c)
 - Addressing Residual Risk (Section 5, Appendix A, Appendix E)
 - What is the Risk to Personnel (Operators, Maintenance, Service, Incidental)?
 - Standard Operating Procedures
 - Training of Affected Personnel
- Non-Beam Hazards: (Section 7, Appendix G)
 - Z136.9 Guidance
 - Summary NBHs and Resources
- The Laser Safety Program (OSHA, Appendix A, Appendix E)
 - Scope, Requirements and Responsibilities
 - The Written Laser Safety Program – Tying it all Together
 - Policy (Laser Equipment Life Cycle)
 - RFQ/FRP Essentials
 - Acceptance
 - Service Techs
 - Disposal
 - Procedures (Standard Operating Procedures)
 - Administrative Operations
 - Inventory
 - Authorized Personnel

- Safety Audits
- Training (Initial and Refresher)
- Laser Safety Committee (?)
 - Medical Examinations
 - Continuous Improvement
- Post-training Quiz: To demonstrate competency
- Closing:
 - Questions and Answers, Discussions
 - Review of student USB jump drive materials
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 - If time allows a working example is reviewed

R. Paura, P. Eng., CLSO

Summary Qualifications

Laser safety consensus standards active participation, includes:

ANSI Z136 ASC (Accredited Standards Committee)

ANSI Z136 SSC-9 Vice-Chair (Safe Use of Lasers in Manufacturing Environments)

ANSI Z136 SSC-5 Vice-Chair (Safe Use of Lasers in Educational Facilities)

ANSI Z136 TSC-2 Chair (Hazard Evaluation)

ANSI Z136 SSC-1 Active Member (Safe Use of Lasers)

ANSI Z136 SSC-6 Active Member (Safe Use of Lasers Outdoors)

ANSI Z136 SSC-8 Active Member (Safe Use of Lasers in Research, Development and Testing)

ANSI Z136 SSC-10 Active Member (Safe Use of Lasers in Entertainment, Displays and Exhibitions)

ANSI Z136, Technical Subcommittees and Working Groups:

- EWG Editorial Working Group
- TSC-1 Laser Bioeffects
- TSC-2 Hazard Evaluations and Classification
- TSC-4 Control Measures and Training
- TSC-7 Analysis and Applications

IEC TC 76 Standards Council Canada Member (IEC 60825-1)

Please reference summary CV regarding industrial laser applications experience.

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