

DOE LSO Workshop 2016

Abstracts

Risk Assessment for High Power Lasers

Risk Assessment is a positive tool for continuous improvement in safety and productivity of a high power laser system. Understanding Risk Assessment and Risk Management principles and terminology will allow the LSO to be member and contributor of the team responsible for developing, commissioning and operating a high power industrial laser system.

A precept of all user and equipment safety standards is that hazards are identified with appropriate safety controls measures applied to re-assess for the residual risk of that hazard being realized. This process is iteratively applied until the residual risk reaches an acceptable level. Current consensus user laser safety standards have simplified this process by grouping lasers according to their hazard and risk potential. For a certain hazard class, there is a respective set of safety control measures to be applied. Biological and risk potential breakpoints define the four major laser hazard classes, with Class 4 being the greatest: starting at 0.5 watts of continuous wave power without limit.

Within the consensus laser safety community, it is challenging to discuss the next breakpoint to encompass multi-kilowatt CW and ultrashort pulsed lasers for materials processing. Risk assessment methods can accommodate principled and scalable means to evaluate the potential for various beam and non-beam hazards being realized with appropriate safety control measures ensuring that light is applied safely efficiently and reliably. Understanding RA terminology can also facilitate the establishment of respective critical safety feature performance and reliability targets.

Material presented covers established risk assessment standards and practices and provides a reference methodology for conducting a RA for a high power industrial laser materials processing system. The importance of an effective risk assessment is reviewed, which provides prioritized actionable measures for addressing deficiencies (in equipment safety or capabilities). While a specific template is not prescribed in regulations, common principles for evaluating and controlling risks are discussed. The scope and depth of a risk assessment effort should be commensurate with the capital value and/or the application regime of the high power laser system.

This topic is directed towards technicians/engineers/managers that are responsible for the development, implementation and/or operation of high power laser systems.

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