

Daren T. Slee, P.E., CRE
Senior Managing Engineer

Professional Profile

Mr. Daren Slee is a Senior Managing Engineer in Exponent's Electrical Engineering and Computer Science practice. Mr. Slee specializes in electrical engineering issues such as electrical failure analysis, preproduction circuit safety and functional analysis and testing, electrical reliability analysis, electrical root cause of fire evaluation, arc flash explosion investigation, and printed circuit board and electrical component failure analysis.

Mr. Slee is heavily involved in Exponent's battery failure analysis activities and has performed many failure analyses of lithium ion batteries, as well as failure analyses of batteries of other chemistries, such as nickel metal hydride and lead acid batteries.

Mr. Slee's experience includes printed circuit board failure analysis specifically as a result of failure of the insulating materials of the printed circuit board. He is familiar with the many possible root causes of the insulating material failures, from degradation due to long-term heating or humidity, to conductive anodic filament formation, to electrical component failure. He has experience in failure analysis of other electrical insulating systems that lead to overheating failures.

Mr. Slee has performed many projects testing electronic systems for safety and functionality. He has performed many investigations focused on reliability and is an American Society for Quality Certified Reliability Engineer and as such is very familiar with the tools of reliability engineering, such as Failure Modes and Effects Analysis, Mean Time Between Failure Calculations, Single Point Failure Analysis, and Parts Derating evaluation.

Academic Credentials and Professional Honors

B.S., Electrical Engineering, San Jose State University, 1999

1st Place on San Jose State University's Electrical Engineering Senior Skills Audit Exam; two consecutive years as Dean's Scholar at San Jose State University

Licenses and Registrations

Registered Professional Engineer, California, #17506
American Society for Quality, Certified Reliability Engineer, #6435

Publications

Slee D, Stepan J, Wei W, Swart J. Introduction to printed circuit board failures. Proceedings, 2009 IEEE Symposium on Product Compliance Engineering, Product Safety Engineering Society, October 2009.

Slee D, Loud J, Swart J. Arcing and fires. Proceedings, 2009 IEEE Symposium on Product Compliance Engineering, Product Safety Engineering Society, October 2009.

Swart J, Slee D, Hu X. Failure analysis methodology for battery powered product incidents. Proceedings, 2008 IEEE Symposium on Product Compliance Engineering, Product Safety Engineering Society, October 2008.

Slee D. Printed circuit board propagating faults. Proceedings, 30th International Symposium for Testing and Failure Analysis (ISTFA), November 2004.

Presentations

Slee D. Introduction to printed circuit board failures. Presentation to 2009 IEEE Symposium on Product Compliance Engineering, October 2009.

Slee D. Arcing and fires. Presentation to 2009 IEEE Symposium on Product Compliance Engineering, October 2009.

Swart J., Slee D. Failure analysis methodology for battery powered product incidents. Presentation to 2008 IEEE Symposium on Product Compliance Engineering, October 2008.

Slee D. Presentation to the California Conference of Arson Investigators on battery safety issues and failure analysis; presentation included information on electrical circuit concerns as well as battery exothermic reactions, March 2008.

Slee D, Martin RJ, Slee D., Christiansen E. Vehicle and vessel fires: When to retain an engineer. International Association of Special Investigation Units – Southern California Chapter Meeting, January 2008.

Slee D. Presentation to the Cellular Telephone Industry Association on battery failure analysis methodology, December 2007.

Slee D. Presentation to the San Fernando Valley Chapter of ASM International on printed circuit board propagating faults, April 2006.

Slee D. Presentation to the California Conference of Arson Investigators on battery safety issues and failure analysis; presentation included information on electrical circuit concerns as well as battery exothermic reactions, July 2006.

Slee D. Presentation to the San Fernando Valley Chapter of ASM International on battery safety issues and failure analysis, presentation included information on electrical circuit concerns as well as battery exothermic reactions, October 2006.

Slee D. Presentation to the 30th International Symposium for Testing and Failure Analysis (ISTFA), Printed circuit board propagating faults, November 2004.

Prior Experience

Engineering Project Manager, CRT projects, Precision Imaging Corporation, 1997–2000

Project Experience

Performed failure analysis and testing of battery packs and battery life testing on handheld and notebook computers. For the latter he developed an automated test protocol, representing various use patterns, which will allow standardized battery life testing of many notebook computers at once.

Performed root cause analysis of propagating faults on printed circuit boards, as well as evaluation of soldering quality on printed circuit boards and printed circuit board reliability analyses.

Performed electrical characterization and analysis of high and power frequency fluorescent lamp ballasts.

Performed electronic reliability prediction analyses using the Bellcore and MIL217 HDBK standards. The electronics analyzed were state of the art telecommunications products using many of the latest microcontrollers and digital signal processors.

Performed failure analysis of switching power supplies and DC-to-DC converters. He has also performed preproduction acceptance testing of switching power supplies. This testing covers a variety of issues, including ripple voltages, phase-gain analysis, and timing, and required modification of the power supplies for testing.

Performed failure analysis of semiconductor amplifiers that required decapsulation of the amplifiers, and determination of the integrated circuit's internal structure from scanning electron microscope photos and information gained from an electrical curve tracer.

Performed numerous lithium ion battery failure analyses. Involved in preproduction acceptance testing of lithium ion batteries. Involved in vehicle lithium ion battery design review and reliability analyses. Many projects involving aqueous based battery chemistries.

Performed recovery of deleted and lost data from hard disk drives.

Performed electrical cause of fire investigations.

Involved in Consumer Product Safety Commission (CPSC) related investigations.

Performed electronic safety interlock and control system investigations.

Designed and executed reliability test programs for electronic systems.

Performed electrocution & electric shock investigations.

Performed electronic remediation analyses in cases of fire or water damage.

Performed marine related electrical failure analyses and investigations. Examples include failure of battery banks, drive related control system failures, failure analyses and coordination of shore power, generator power, engine power, and battery power.

Performed analyses of electronic failures in vehicles related to lemon law and tampering.

Performed arc flash explosion investigations.

Professional Affiliations

- Institute of Electrical and Electronic Engineers (member of the Reliability and Product Safety Engineering Societies)
 - Member of the leadership for the Forensics and Failure Analysis and Risk Assessment (Vice-Chair) Technical Committees under the Product Safety Engineering Society of the IEEE
- American Society for Quality