

Fundamentals of Off-Highway High and Low Voltage Electrical Design

Training Topics



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The following is a summary of potential training topics that can be delivered to suit your company's or organization's specific requirements. Customization may include unique circuits, materials or conditions, particular problems, or other topics the client provides.

Introduction to Electrical Systems Architecture

- *Electrical Systems Design*
- *Traditional Off Highway Machine Architectures*
- *High Voltage Standards*
- *Hybrid EV Machine Architecture*
- *Battery EV Machine Architecture*
- *Tethered EV Machine Architecture*

Introduction to Electrical System Components

- *Traditional Machine System Architecture*
- *High Voltage Power Train / Implement Control Architecture*
- *DC Alternators*
- *HV Generators*
- *HV / LV Battery Packs*
- *Lead Acid Batteries*
- *Lithium-Ion Batteries*
- *HV Battery System Architecture*
- *HV Battery Management*
- *HV Battery Charging*
- *Electrical Circuit Protection / Distribution*
- *Electric Power Conversion Components*
- *Electrical Control Components*

Basic Electrical System Calculations

- *Common Electrical Signal Waveforms*
- *RLC System Analogy*
- *Simple Circuit Calculations*
- *Power Calculations*
- *System Efficiencies*

Introduction to Routed System Design

- *LV Wire / Cable Selection*
- *HV Wire / Cable Selection*
- *Battery Cable Selection*
- *HV Bus Bar Connection System*
- *Electrical Termination Designs*
- *Electrical Connector Designs*
- *Harness Retention Design Options*
- *Wire / Cable Sizing*
- *Wire Color Key*
- *Connector Selection / Application*
- *Harness Protection*
- *Electrical System Environmental Considerations*
- *Material Specifications - Ingress*
- *Material Specifications - Flammability*
- *Electrical Magnetic Interference (EMI)*

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- *SAE J1939 Physical Layer*
- *Harness Failure Modes*
- *Cable / Routing Assembly Design Considerations*

High Voltage Routed Systems Manufacturing & Test

- *Routed System Design Manufacturing Overview*
- *Routed System Tools / Automation*
- *Ultrasonic Welding*
- *Routed Systems Electrical Test Overview*
- *HV Electrical Tests & Equipment*
- *Routed System Mechanical Tests*
- *Harness Test Specification Example*
- *Routed System Environmental Tests*
- *HV Harness Fabrication / Test Safety Reminders*

Emerging Consensus Standards for High Voltage Systems

- *Emerging Consensus Standards Overview*
- *Sample NA Standards*
- *California AB1346 (SORE Standard)*
- *Module 2006 Quiz*
- *Course Conclusion*

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- *1987 – 88: Douglas Aircraft – Long Beach, CA – Served as an electrical design engineer in the MD-80 commercial twinjet program.*
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- *1994 – 20': Deere & Company – Dubuque, IA – held various roles in electrical & system engineering, hydraulic and electrical/software test, product support, and R&D. Development work in diagnostic service tools, asset tracking systems, site management products, and virtual reality simulator systems. Extensive work with off-shore development partners – Finland, New Zealand, and India.*
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