



NEVTEX2

Advanced Vehicle Training
Standards for Technicians
working with High-voltage and
High –Pressure Systems

Thank You to our supporters



Ken Mays, Central
Oregon Community
College, Bend, OR
John Frala, Rio Hondo,
Whittier, CA

Advanced Vehicle Training
Standards for technicians
working with high-voltage and
high-pressure systems.

What we found,

Currently there are NO uniform
Standards for technicians who are
working with High Voltage or High
Pressure systems.

Several existing training formats
that are available are out dated by
technology changes.

Where is
transportation
headed?

Full Electric Plug-in

Hydrogen Fuel cell

100% autonomous
vehicles

Class 8 Full Electric

Material handling

Full Electric

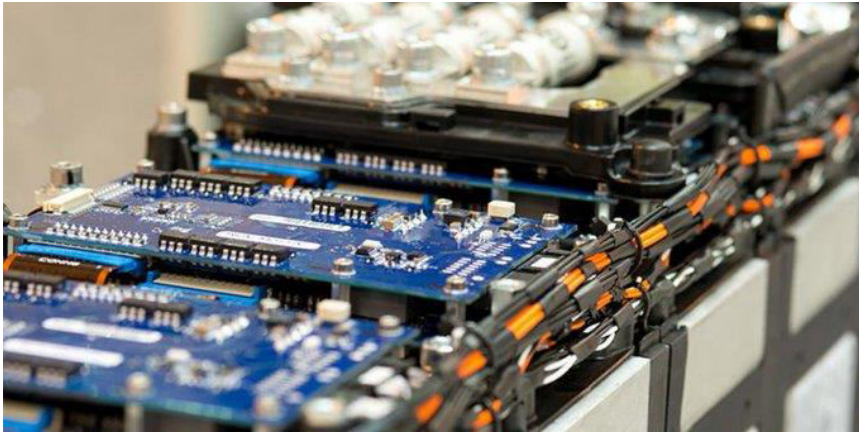
Material handling H2





Who is committed to the new Green/Clean technology?

- Newflyer Transit Buses
- El Dorado Transit Buses
- PROTERRA Buses
- Gillig Battery electric bus
- BYD Buses, Forklifts and Trucks
- Cummins Inc. take over of Hydrogenics Fuel cells & Air Liquide, and battery giant Battery Innovation Center (BIC)



Technician Safety Standards

Involved Safety Planning

SAE Society of Automotive Engineers

OSHA Occupational Safety Health Administration

Department of Transportation

Department of Energy

CSA Canadian Safety Administration

NFPA National Fire Protection Administration

Hoke/ CiCor

Swedgelock

Several meetings with the Alternative Energy Transportation Team at CSA Group

- Establish the need for Hydrogen fuel tank inspection standards
- Establish the need for high pressure piping certification

Meetings with

- Establish the need for technician high voltage certificate training

High-Voltage Precautions Training

(proposed training content)

- 1.0
 - What is High-Voltage
 - a. Defining high-voltage
 - b. Personal protection Equipment (PPE)
 - c. ACH FLASH dangers
- 2.0
 - Product Specifics
 - a. Eldorado
 - b. Newflyer
 - c. BYD
 - d. Proterra
- 3.0
 - High-Voltage circuits
 - a. NewFlyer
 - b. Eldorado
 - c. BYD
- 4.0
 - High Pressure Fuel Systems
 - a. Over view of fuel systems
 - b. Handling High-pressure Fuel Systems
 - c. Certification of Technicians
 -
- 5.0
 - First Responder Information
 - a. Disconnects
- 6.0
 - Service Cautions working with high voltage
- 7.0
 - Service Cautions working around high pressure piping

Sample Training on line

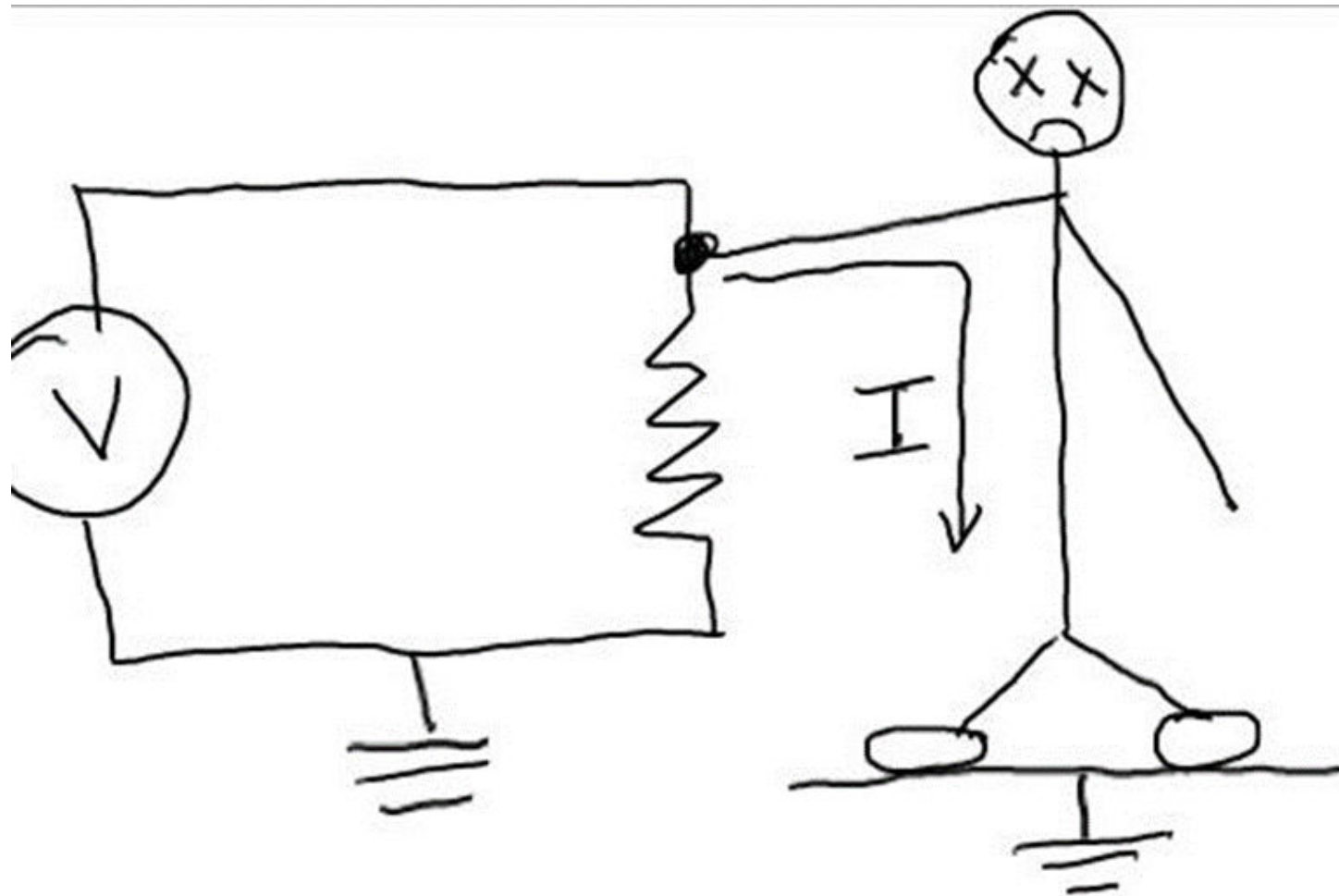


www.access-ondemand.com

On-Demand Vehicle Electrification Training

Course Preview of: 3-Phase Power Inverter Systems

What's next?

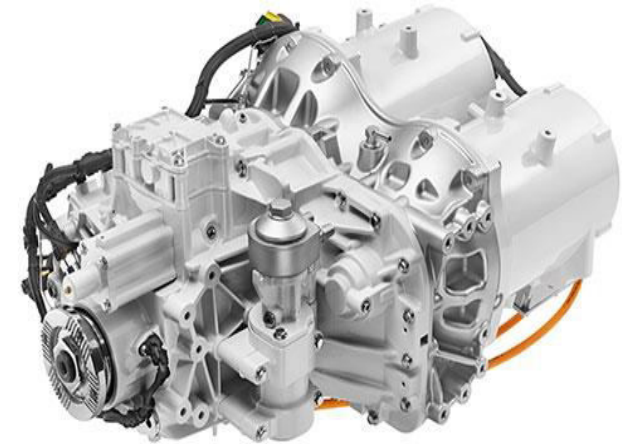


Employee's Task	Without training	HV 1 Training	HV 2 Training	HV 3 Training	SHV 1 * Training	SHV 2 ** Training
Driving a production vehicle containing a HV system that has not undergone any HV training	X					
Driving and evaluating a HV vehicle		X				
Test driving and evaluating a HV vehicle for service			X			
Testing to component level, (switch testing from laptop)			X			
Perform any non-HV work on a vehicle with a HV system				X		
Perform any work on a vehicle with a HV system					X	
Decommissioning a HV vehicle before repair/ Commissioning a HV vehicle after repair					X	
HV troubleshooting and modification of HV systems					X	X

*/** SHV: Specialist High Voltage can only be achieved after ALL levels of training have been obtained and verified by a qualified instructor

New Partnership with Volvo Trucks

- The California Air Resources Board (CARB) has preliminarily awarded \$44.8 million to SCAQMD for the Volvo LIGHTS (Low Impact Green Heavy Transport Solutions) project.
- The Volvo LIGHTS project will involve 16 partners, and transform freight operations at the facilities of two of the United States' top trucking fleets.
- Volvo LIGHTS is part of California Climate Investments, a statewide initiative that puts billions of Cap-and-Trade dollars to work reducing greenhouse gas emissions, strengthening the economy and improving public health and the environment – particularly in disadvantaged communities.



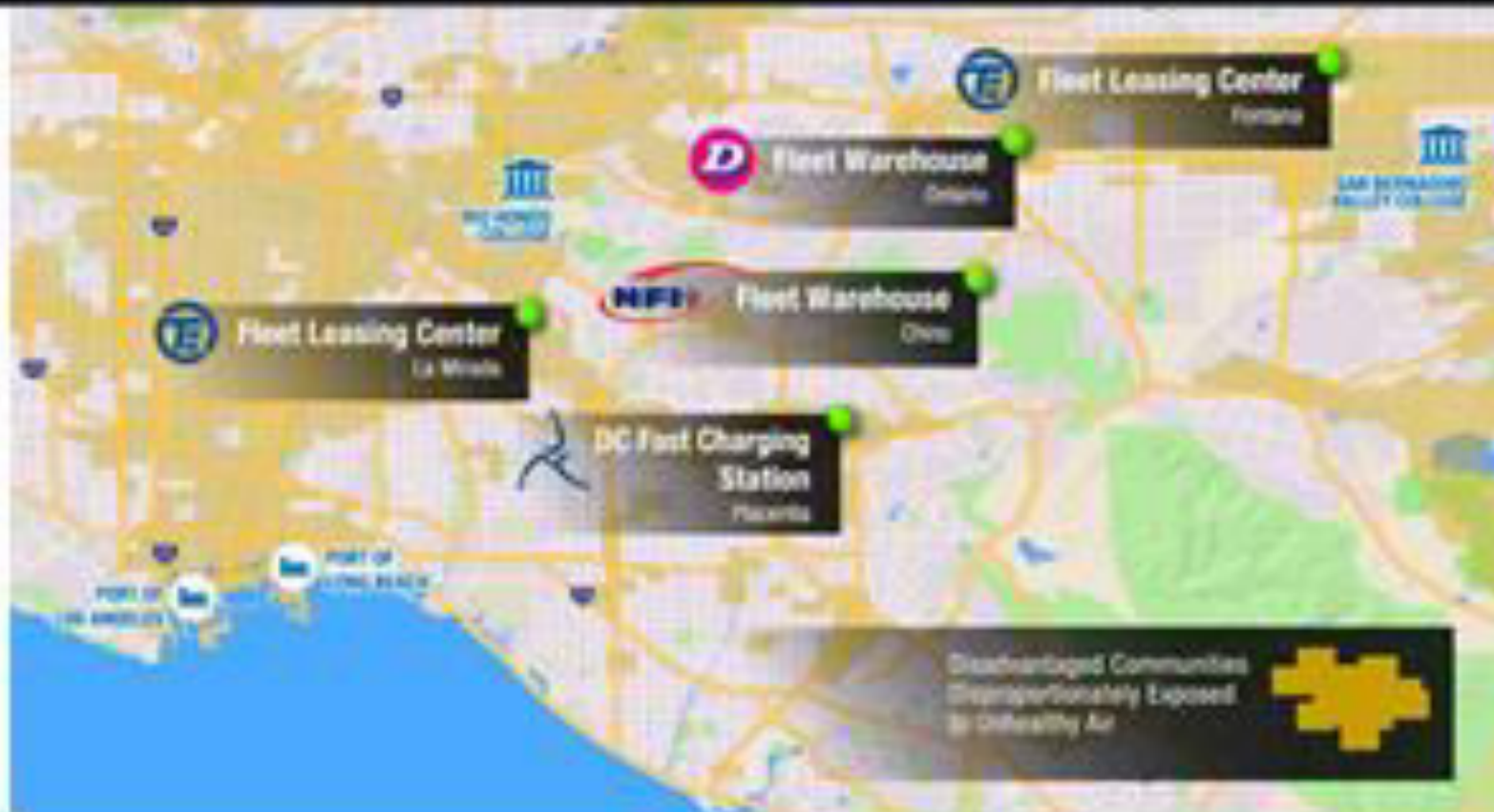
Volvo Trucks will introduce all-electric truck demonstrators in California (left) next year, and commercialize them in North America in 2020.



Demonstrating innovations critical to the commercial success of battery electric trucks and equipment for goods movement
LIGHTSproject.com



PROJECT PARTNERS



23 Battery Electric Heavy-Duty Trucks

29 Battery Electric Equipment

58 Public & Private Chargers

2 Colleges Designing Electric Truck Maintenance Programs

1.8 Solar Energy Generation

2 Ports Providing Infrastructure Planning

Milestones in this grant so far

- This Project Grant has helped to build relationships with essential Advisory partners throughout the country. These members are truly representative of the vehicle electrification systems dealing with high-pressure storage and handling of fuels and high-voltage storage and creation.
- The Consultants and Advisory are committed to the three year project and be will leading the process with the PI and Co-PI
- A sample template and list of Advanced Standards categories have been established as we plan for refinement of the standards criteria.
- An initial discussion has taken place as we select the first 10 test sites for the first 2 standards to be “proofed”.
- A result of community colleges who have invested in vehicle electrification systems is the developing partnerships with manufacturers such as Tesla Motors.
- Co-PI John Frala at Rio Hondo College has collaborated with the Tesla START! Program – just graduating the fifth cohort .
- Other NSF / ATE Project Grant recipients have received a site visit from Senior Manager of Tesla START: Columbus State CC, Shoreline CC, Truckee Meadows CC, and Central Oregon CC. Macomb CC (CAAT Center) has also received a site visit from Tesla.
- The requirements for the new technicians are a new skill set as we transition from legacy knowledge.

For More Information

Northwest Engineering and Vehicle Technology Exchange (NEVTEX)
(NSF ATE award #1700708)

PI Ken Mays kmays@cocc.edu

Central Oregon Community College Automotive Technology

Bend, Oregon

541-383-7753

Advanced Vehicle Training Group NW

www.avtgnw.org



CO-PI Professor John Frala jfrala@riohondo.edu

Rio Hondo Community College Alternative Fuels Education

Whittier, CA.

562-463-7473

<https://faculty.riohondo.edu/jfrala/>