NACAT NEWS

VOL 36 JUNE 2022 NO.3

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In This Issue:

NACAT News is Published SIX Times per Year!

DEADLINE DATES

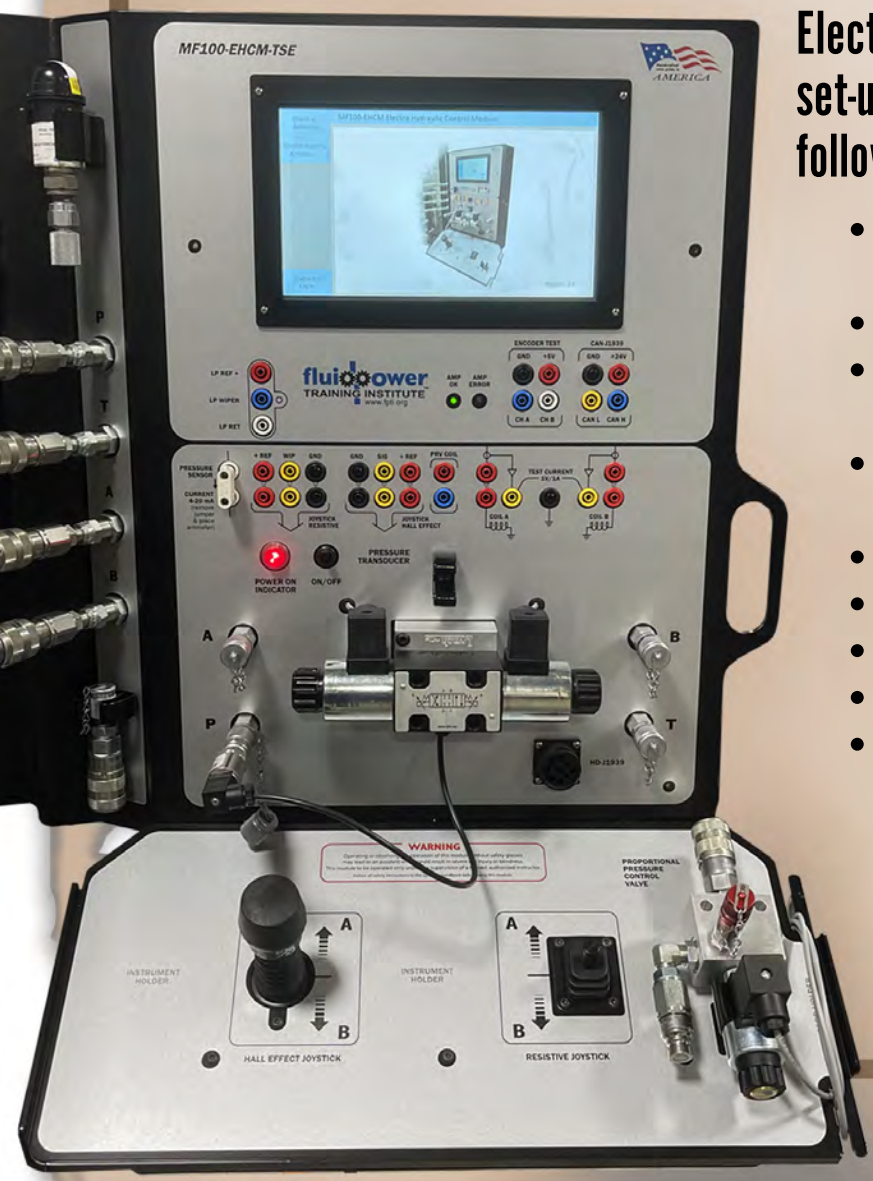
August 2022 issue - July 10, 2022
October 2022 issue - September 10, 2022
December 2022 issue - November 10, 2022
February 2023 issue - January 10, 2023
April 2023 issue - March 10, 2023
June 2023 issue - May 10, 2023

The latest advertising size and rate information can be found at www.nacat.org.

Officers

Appointments

WANTED DESPERATELY



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NACAT PRESIDENT'S UPDATE

TOM MILLARD

WARREN TECH

Greetings all,

This has been a very busy year for all of us. Students back with us in person, the ability to visit with fellow educators and attend training conferences like Vision Hi-Tech Training and Expo, having to put in budget requests, and planning for the future. Hopefully your crystal ball is more accurate than mine has been. Working at Warren Tech has been a great experience for me just like I'm sure that all of you enjoy working with your students, being a mentor and a trainer to those from the past, and those that will continue looking to you for friendship, and guidance.

Being able to return to instructor training conferences helps me communicate with other instructors that will be attending the SkillsUSA NLSC in June, the ASE Conference in July, and the NACAT Conference in August. At these conferences we renew friendships, make new contacts, and help teachers. We also gain an opportunity to understand that we at NACAT are mentors and friends to all instructors, both new and old, whether they are from North and South of the border. We get the chance to share our opinions and experiences with other instructors and find out that we all have situations with admin that drive us crazy. Attending the training sessions are a benefit to all of us and help us keep our finger on the pulse of the future of the automotive industry.

Attending these conferences allows our families time to visit new sites and enjoy family specific activities while we interact at trainings. At the NACAT Conference, they can also experience great fellowship at the BBQ and during the annual valve cover races.

We have been adding more information on NACAT on the NACAT Facebook page. Members of the NACAT board are updating activities and events frequently. This group page has more information available to you on activities that members have chosen to partake in while at the conferences.

Our guest speaker is a great friend to NACAT. Jorge Menchu, of AESWave has agreed to join us. Jorge has led a very interesting life, has given a lot of instruction at previous events, and we feel honored having him attend.

If you are a new teacher, and have not previoiusly attended a NACAT Conference, I would like to reiterate that this is one of the best opportunities available. Please take a moment to learn about the NACAT Conference and join us. When this is published, we will have only 66 days until we will be meeting again on August 7 - 11, 2022.

We, your NACAT officers and board, are looking forward to future conferences over the next few years, and will hopefully have a site for the 2023 conference available to share to all of you at the 2022 Conference in August.

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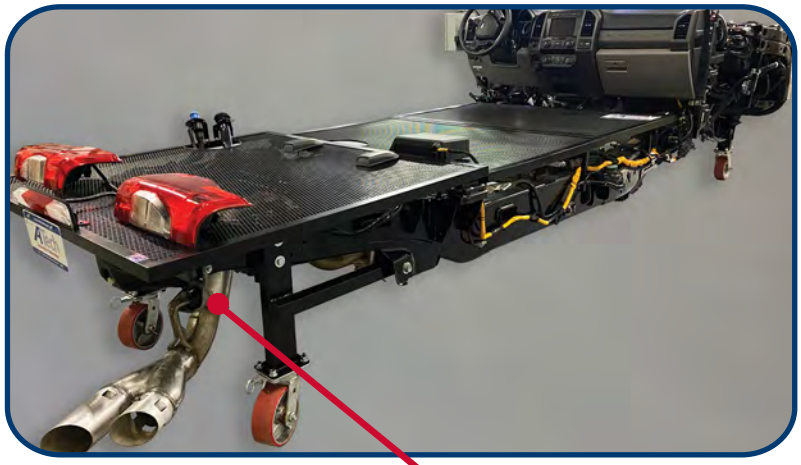

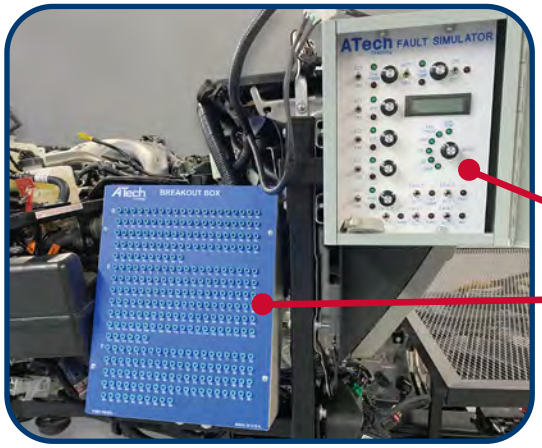

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ConsuLab
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CONSULAB IS GROWING
New building in Fall 2022




CONSORTIUM FORMED TO CREATE THE NEXT-GENERATION OF INNOVATION AND TALENT FOR THE ELECTRIC VEHICLE INDUSTRY

Four South Carolina schools have formed a consortium, named “Collaborative Research: REVVED,” short for Revolutionizing Electric Vehicle Education, which is receiving $2.83 million from the National Science Foundation to fund the project. The project is driven by the unprecedented need to develop a workforce which can build and service electric and autonomous vehicles and develop the cybersecurity to protect them.

Trident Technical College *(1989 and 1999 NACAT Conference host)* is working in partnership with Greenville Technical College *(2014 NACAT Conference host)*, Spartanburg Community College, and Clemson University as part of the consortium. Several workforce development centers and industry partners are also involved.

The consortium will conduct evidence-based research studies to investigate integration of virtual and augmented reality systems to support electric vehicle manufacturing and education. The digital learning tools will be based on industry needs and be available at EducateWorkforce.com.

Industry partners involved are BMW, Michelin, Bosch, Daimler, Proterra and Volvo.

National Science Foundation consortia members are: Indian River Community College, the National Cybersecurity Training & Education Center, the National Center for Autonomous Technologies, the Center for Advanced Automotive Technology, the Northwest Engineering Vehicle Technology Exchange, the South Carolina Technical College System, Upstate Alliance and the South Carolina Manufacturing Partnership Extension.

View the video: Collaborative Research: Revolutionizing Electric Vehicle Education

Preparing Students for the Future of the Transportation Industry

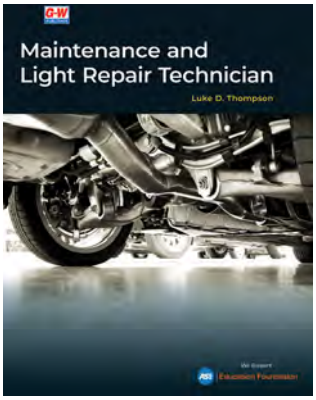
Entry-Level Skill Competency, EV Technology, and Using Digital in the Shop

By: Abby Hess, Marketing Manager and Erin Brennan, Senior Acquisitions Editor, Goodheart-Willcox (G-W) Publisher

Monkey Business Images/Shutterstock.com

As the transportation industry continues to evolve, so has G-W Publisher (since it first published *Dyke's Automobile and Gasoline Engine Encyclopedia* more than one hundred years ago). With its mission, "We Build Careers," Goodheart-Willcox continues to support student training and the educators that instruct them. The transportation industry desires technicians with entry-level skill competency—whether they be competent with regards to the MLR task list in automotive, or the IMMR task list in medium/heavy truck. With more than nearly 800,000 auto/diesel/collision technicians needed by 2025[1], it is critical that students receive the training that industry requires, as outlined in the standards provided by the ASE Education Foundation.

G-W Ignite
Skillful Digital Learning



G-W Ignite for *Maintenance and Light Repair Technician*, featuring *Hands-On Maintenance and Light Repair*

Maintenance and Light Repair Technician, an all-new textbook written to the updated MLR Task List, published this month. Author Luke D. Thompson has been a technical training instructor for Tesla, Inc. and previously taught for over a decade as a secondary Auto Technology teacher in Michigan and Washington. For classes using digital resources, G-W Ignite for *Maintenance and Light Repair Technician* is an online, self-paced program that provides 60 step-by-step hands-on shop lessons packed with videos, photographs, and clear explanations of service procedures. When paired with Thompson's new textbook, *Maintenance and Light Repair Technician*, the print/digital or all-digital package includes this new textbook with the added theory teachers have been asking for—concise, easy-to-read, and loaded with high-quality images. The G-W Ignite digital platform also helps students prepare for certification—both entry level and professional. The *MLR Technician* package offers theory content, hands-on lessons for self-guided practice in the shop, ASE sample review questions, technician interviews, and videos, while also tracking student progress versus the MLR task list with a robust report.

While the print textbook is ready now, educators can request a sample of the G-W Ignite online course once it's ready mid-June of this year by contacting their G-W Educational Consultant at www.g-w.com/consultant.

How are you incorporating Electric Vehicle (EV) coverage? Considering national trends, it's been estimated that at least half of vehicles sold in the U.S. by 2030 will be electric[2]. Many states may take advantage of federal incentives as shown on the U.S. Department of Energy's website, or enact new laws that focus on the need for electric vehicles, similar to how Massachusetts and California are looking to ban the sale of gas-powered vehicles in those states by 2035[3].

G-W expert authors and the many schools G-W services have made it clear that to prepare students over the next decade, transportation programs will need to incorporate coverage of EV technologies and safety.

SunLine Transit Agency

CONTINUED ON PAGE 13

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Family Event: Ark Encounter

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HAVE YOU EVER WONDERED . . .

HOW BIG WAS NOAH'S ARK?
HOW DID NOAH FIT ALL THE ANIMALS?
HOW DID NOAH CARE FOR ALL THE ANIMALS?
HOW DID NOAH BUILD THE ARK?

WEDNESDAY
AUGUST 10, 2022

Register Today!

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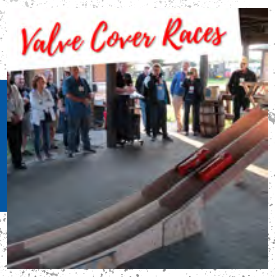
Special Events

Tuesday, August 9
Join us as we gather for a family BBQ!



Tuesday, August 9
Don't miss out on the annual Valve Cover Races!

Thursday, August 11
Celebrating individuals achieving excellence.

There is an additional fee for Special Events

DID YOU SEE?

A Mercedes-Benz 300SLR Uhlenhaut Coupe sold for

$143 Million

The price more than doubled the previous record of $70 million paid in 2018 for a 1963 Ferrari 250GTO.

ULTRA WIDE BAND DIGITAL KEYS: AN ECOSYSTEM LOOMING

In a simple explanation, Ultra Wide Band (UWB) is a fast, secure, and low power wireless communication protocol which uses radio waves. It functions by sending billions of radio pulses across the wide spectrum frequency (3.1 - 10.6 Gigahertz) between a transmitter and a data translating receiver. The technology can be used to accurately locate distances between transmitters much in the same way animals such as bats and Beluga whales use echolocation to learn their world. Short bursts yield more precise measurements, and the frequency of pulse, roughly 1 per nanosecond, provides great accuracy.

In July 2021, the Car Connectivity Consortium (CCC) officially issued the **CCC Digital Key Release 3.0 specification**, which enables passive keyless access and engine start from a compatible device using UWB in combination with Bluetooth® Low Energy (BLE) wireless technologies. Apple, utilizing Release 2.0, began including the Car Key feature as an integral of iOS 13.6 in 2020. Presently, numerous automotive manufacturers have started to launch models with UWB Digital Key technology. It is technology which will become more integrated into production as OEMs strive to create a smart mobility ecosystem which will allow additional personalized applications for consumers.

What are some of the highlights of Digital Key Release 3.0 specification?

CCC Digital Key is a standardized ecosystem that enables mobile devices to store, authenticate, and share Digital Keys for vehicles in a seamless, secure and privacy-preserving way.

Release 3.0 addresses security and usability by authenticating the Digital Key between a vehicle and the mobile device over Bluetooth Low Energy. Mobile devices create and store the Digital Keys in a Secure Element that provides the highest level of protection against hardware or software-based attacks. UWB offers secure and accurate distance measurement allowing cars to locate authenticated mobile devices so that Release 3.0 not only prevents attacks, but also adds a new level of convenience when entering, interacting, and starting the car.

One trainer . . . endless possibilities!

Adapt any of these Plug-and-Play modules to the side of your trainer

MF100-ACC
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MF100-LE-TS
Logic Element

MF100-MDCV
Mobile Directional Control Valve

MF100-EHCM
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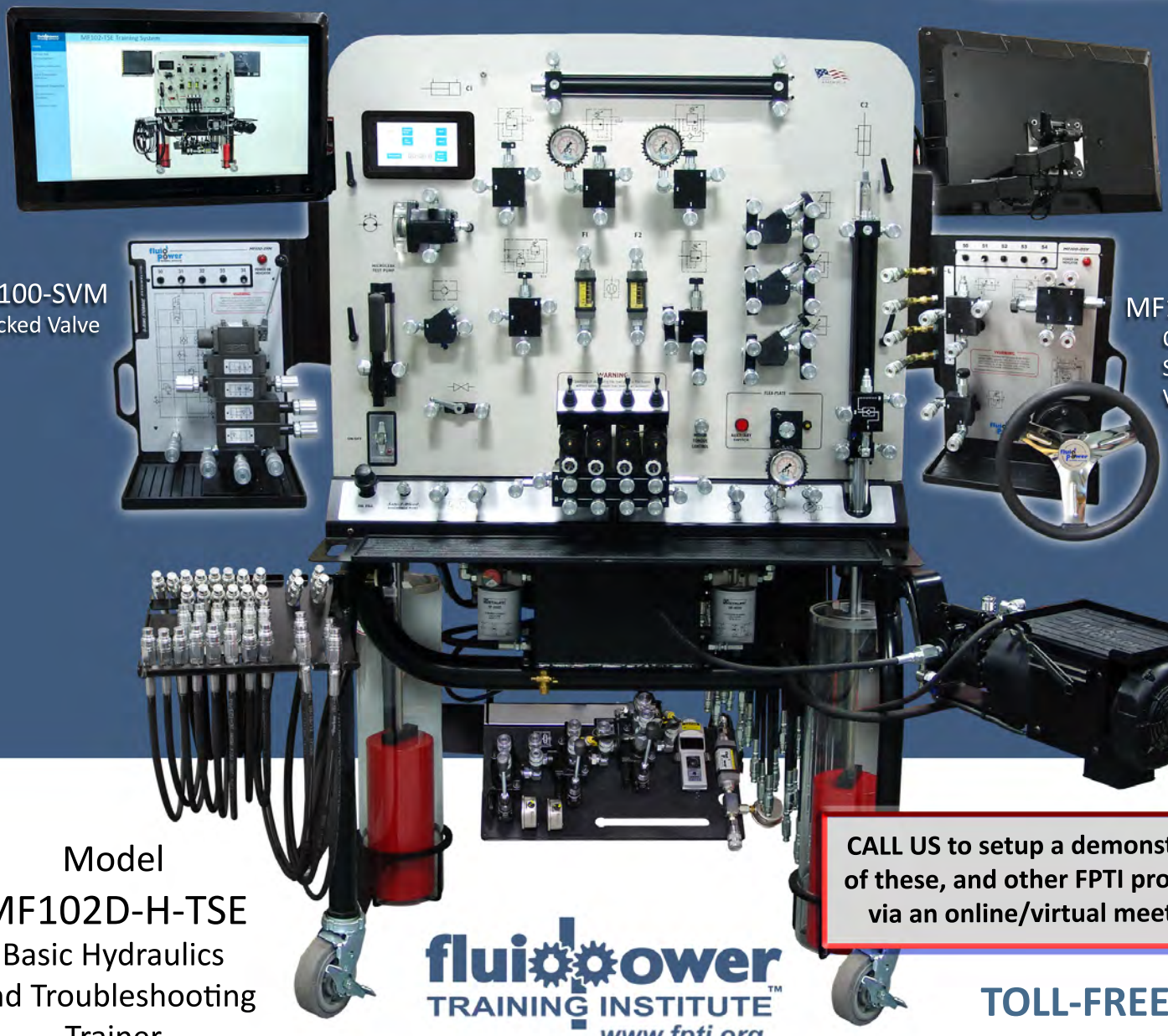

MF100-SVM
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MF100-OSV
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Model
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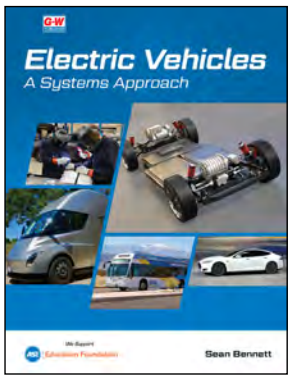
In September 2022, G-W will publish an all-new EV curriculum written by Sean Bennett, author of multiple best-selling textbooks. Sean has spent many decades in the industry—both as an industry trainer and college program coordinator. Fifteen chapters will cover an introduction to electric vehicle drivetrains, high-voltage safety, fuel cell source power, and electrical energy storage systems, as well as tools, specialty training, qualifications, and service and diagnostic routines.

Q&A with Sean Bennett, author of *Electric Vehicles: A Systems Approach*, First Edition



1. Why do you think transportation programs should start building out EV courses or incorporating these skills now?

SB: Every major domestic and import original equipment manufacturer (OEM) now has both hybrid and battery electric vehicles in production...these traditional auto and commercial vehicle manufacturers have been joined by numerous start-ups, all competing for sales in this emerging market. The result is that vehicles with high-voltage electric drivetrains are currently being serviced in repair facilities alongside internal combustion engine-powered vehicles. For this reason, some EV safety and familiarization training should be mandatory for all current and future auto and commercial vehicle technicians.

2. How does your new book help students practice electrical safety in the shop?

SB: Every vehicle technician trainee graduating into the modern workplace should have received some electric vehicle training, whether or not they are actively working on them. *Electric Vehicles: A Systems Approach* has two chapters dedicated to EV safety—one that deals with general shop safety and addresses OSHA-required, lock-out, tag-out (LOTO) procedure, and a second that exclusively addresses high-voltage vehicle safety. In addition, other chapters that deal with hands-on repairs contain a wide range of alerts and precautions, along with reminders of the high-voltage personal protection equipment (PPE) required.

3. What do you think students will find the most exciting about learning EV skills?

SB: Understanding electric vehicle technology should provide younger technicians with an incredible opportunity for rapid advancement in the automobile repair industry. The focus of *Electric Vehicles: A Systems Approach* is on the high-voltage electric drivetrain, so it addresses the learning requirements of students who have undergone some basic vehicle system training. Unlike its competitors, no chapters and text are devoted to auxiliary vehicle systems (i.e., brakes/steering/HVAC, etc.) meaning that the contents are devoted entirely to the study of Hybrid Electric Vehicles (HEVs), Plug-in Hybrid Electric Vehicles (PHEVs), Battery Electric Vehicles (BEVs), and Fuel Cell Electric Vehicles (FCEVs). The primary objectives of this book are to:

Yves Racette, Y.Racette Consulting

a) Navigate the complexities of high-voltage drivetrains using simple language to make the technology understandable for aspiring vehicle technicians.

b) Prepare students to effectively service and repair EVs. Manufacturer vehicle-specific training should be a requirement; however, this book endeavors to provide a solid foundation for EV students so that they can focus on a specific vehicle when participating in an OEM training course.

c) Stimulate learners using a wide range of photographic, author-original, and manufacturer schematics, all accompanied by explanations in simple language.

d) Challenge aspiring learners at a higher level, using critical reasoning questions at the conclusion of each chapter.

Interested educators can contact their G-W Educational Consultant for the full table of contents and to sign up for a sample once available. Find your consultant at www.g-w.com/consultant.

[1]TechForce Foundation. "2021 Transportation Technician Supply & Demand Report."

[2]Wayland, Michael. "Auto Executives Say More than Half of U.S. Car Sales Will Be Evs by 2030, KPMG Survey Shows." CNBC, CNBC, 30 Nov. 2021

[3]Silvia, Michael. "Massachusetts Poised to Ban New Gasoline-Powered Vehicles by 2035." New Bedford Guide, New Bedford Guide, 12 Mar. 2022

Sponsored Content

NACAT 2022 CONFERENCE & EXPO Agenda

Sunday August 7, 2022

Registration (click to register)	4:00pm - 7:00pm
Welcome Reception	7:00pm - 8:30pm

Monday August 8, 2022

Breakfast on Own	Morning
Registration	8:00am - 11:30am
Family Meeting	9:00am - 9:30am
Membership Meeting and Keynote Speaker	9:00am - 10:30am
Morning Refreshment Break	10:30am - 10:45am
Continued: Membership Meeting and Keynote Speaker	10:45am - 12:00pm
Lunch on Own	12:00pm - 1:30pm
Training Sessions	1:30pm - 3:00pm
Expo Setup PM	2:00pm - 6:00pm
On Own	Evening

Tuesday August 9, 2022

1st Time Attendee Breakfast	7:00am - 8:00am
Breakfast on Own	Morning
Training Sessions	8:00am - 9:30am
Morning Refreshment Break	9:30am - 10:00am
Training Sessions	10:00am - 11:30am
Lunch & Expo	11:30am - 2:30pm
Training Sessions	2:30pm - 4:00pm
Afternoon Refreshment Break	4:00pm - 4:30pm
Training Sessions	4:30pm - 6:00pm
Family BBQ*	6:30pm - 8:00pm
Valve Cover Races*	8:00pm - 9:30pm

Wednesday August 10, 2022

Breakfast on Own	Morning
General Session and Keynote	8:00am - 9:30am
Expo	9:30am - 1:00pm
Lunch & Expo	12:00pm - 1:00pm
Training Sessions	1:00pm - 2:30pm
Afternoon Refreshment Break	2:30pm - 3:00pm
Training Sessions	3:00pm - 4:30pm
On Own	Evening

Thursday August 11, 2022

Breakfast on Own	Morning
Training Sessions	8:00am - 9:30am
Morning Refreshment Break	9:30am - 10:00am
Training Session	10:00am - 11:30am
Lunch on Own	11:30am - 1:00pm
Training Sessions	1:00pm - 2:30ppm
Afternoon Refreshment Break	2:30pm - 3:00pm
Training Sessions	3:00pm - 4:30pm
Dinner & Awards*	6:00pm - 9:30pm

*These events are available for an additional charge.

Want to know more about

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JOIN US
Friday, June 3, 2022
11am Central

for a *Live Interview*

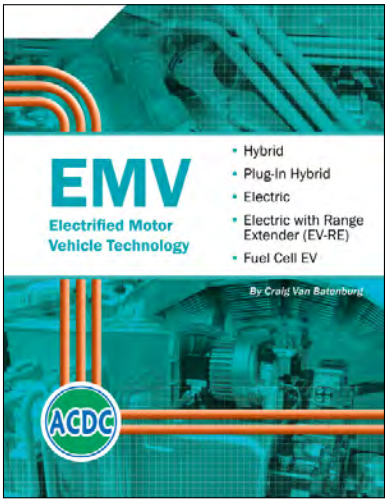
with Pete Meier

MotorAge

New HEV, EV, FC Textbook

ACDC Automotive Career Development Center

Written by Craig Van Batenburg with other contributing writers.



Monthly Train-the-Trainer Classes

Education Support Program (ESP) was designed during Covid-19. In 2020/2021, ACDC had time to form a group of 5 Colleges to create a turn-key program. Educational Institutions of all types now have access to a well thought out program to deliver a comprehensive HEV-EV classes. To learn more, go to www.FIXEV.com and click on ESP. This may be what you were looking for. The Book is included in ESP plus alot more!

Craig@fixhybrid.com 508.826.4546

www.fixhybrid.com

NACAT2022 CONFERENCE & EXPO *Training*

Download Course Descriptions

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Lyle Taylor
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Craig Van Batenburg
ACDC

Curt Ward

Darcy Wedel
Electude

Jim Wilson
ATech Training

16.5 Available Hours of Training

HYBRID & ELECTRIC VEHICLE CORNER

CURT WARD

PROFESSOR AT JOLIET JUNIOR COLLEGE

High-Voltage Battery Basics

As I was preparing for our summer hybrid and electric vehicles class, I came across several components related to high-voltage batteries that led to the content of this article. In this article I want to share some basic information related to high-voltage batteries and the high-voltage battery disconnect.

As always, when we are working around high-voltage components, we need to exercise the proper cautions to make sure everyone remains safe and there is no damage to the vehicle. This includes the use of proper PPE, including high-volage gloves when working around potentially live high-voltage circuits.

The high-voltage battery in either an electric or hybrid electric vehicle is used to power the electric drive or traction motor. The motors in some electric vehicles can be rated as high as 450 kW and as a result they consume large amounts of electricity. These energy requirements make the 12-volt system impractical as a power source. Hence the need for a the high-voltage battery system. The high voltage batteries in use today are largely nickel-metal hydride or lithium-ion.

The nickel-metal hydride (NiMH) battery is primarily used in vehicles that do not plug-in. In other words, they are used in hybrid electric vehicles. Nickel-metal hydride batteries are being used for these applications because of their performance characteristics, such as specific energy, cycle life, and safety. It is not uncommon for a battery of this construction type to last more than 250,000 miles. From a manufacturing perspective, the NiMH battery is attractive because the materials used in its construction are plentiful and recyclable.

Nickel-metal hydride (NiMH) batteries have a positive electrode made of nickel hydroxide. The negative electrode is unique, in that it is a hydrogen-absorbing alloy, also known as a metal hydride. The electrolyte is an alkaline, usually potassium hydroxide. The nominal voltage of an NiMH battery cell is 1.2 volts. The cell can be constructed in a cylindrical or prismatic design. Six cells are grouped together to create a single module. The example shown is a prismatic type from a Toyota Prius (see **figure 1**).

Figure 1: Prismatic cell construction from a Toyota Prius

The lithium-ion battery has been used extensively in consumer electronics for many years and is the battery used in most electric and plug-in hybrid electric vehicles. In lithium-ion cells lithium ions move between the positive and negative electrodes when discharging and recharging. The module pictured is from a Nissan Leaf (see **figure 2**). The module contains multiple cells. The types and designs of the lithium-ion batteries varies as it has high specific energy and good mechanical stability. The cells may be cylindrical, prismatic or pouch type.

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Continued From Page 16

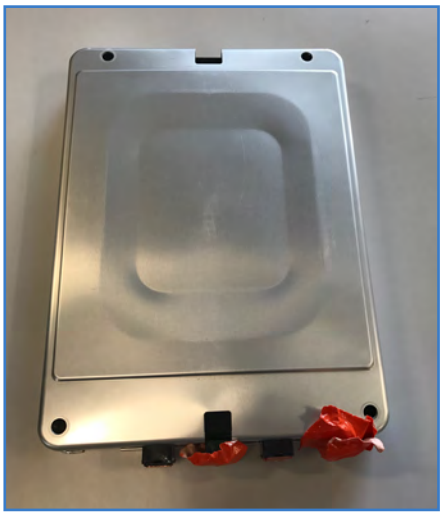


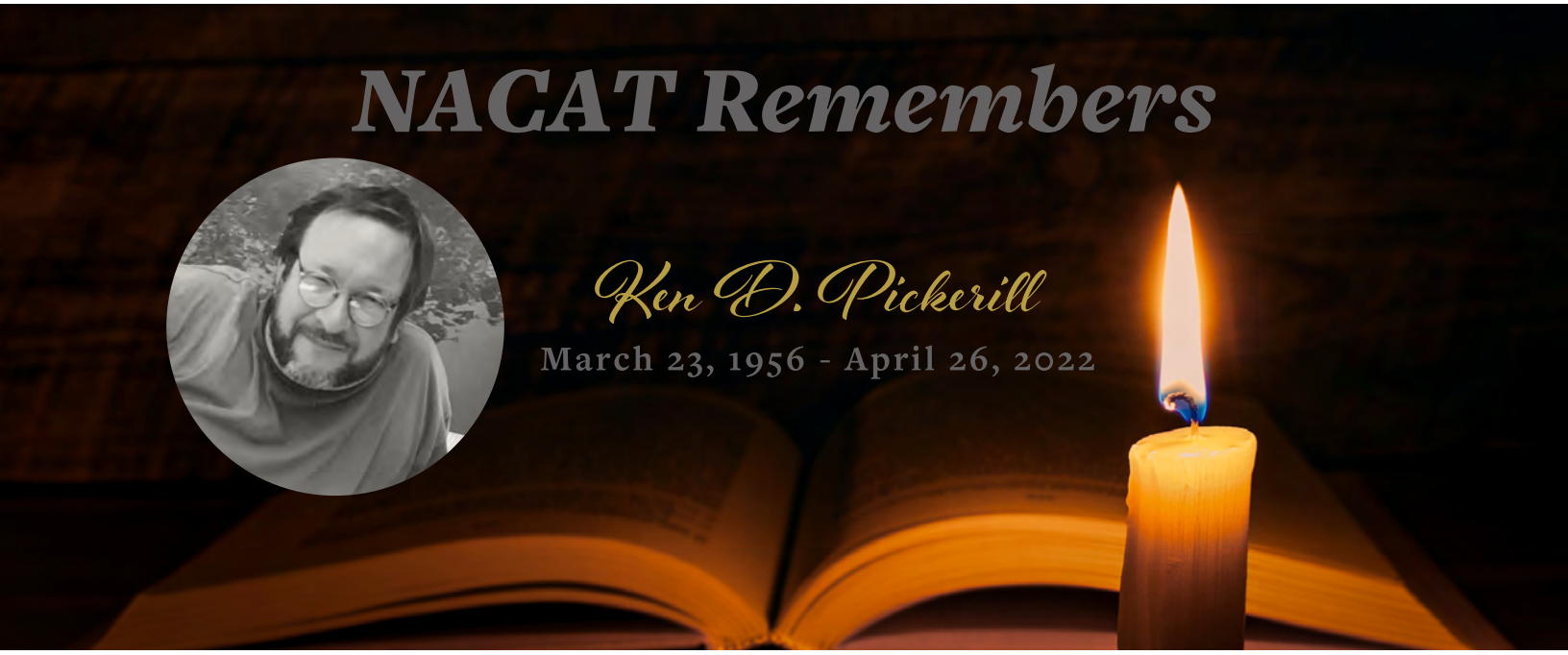
Figure 2: Module from Nissan Leaf

Both battery cell examples which are pictured in this article are from high-voltage batteries that were being rebuilt, rather than being replaced. The nickel-metal hydride cell was from a Prius battery that was being rebuilt by a shop in the aftermarket repair business. Toyota does not specify a rebuild process for this battery, only a replacement. The lithium-ion module from the Nissan Leaf was being replaced by a dealer. Nissan details a specific module replacement and battery rebalancing procedure in their service procedures. The process of rebuilding the battery extends the service life at a cost significantly lower than a replacement unit.

Figure 3: High-voltage battery disconnect from a Chevrolet Bolt

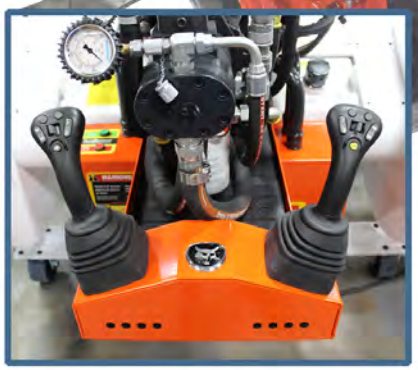
The high-voltage battery disconnect pictured in this article is from a Chevrolet Bolt (see **figure 3**). Although the designs vary, all high-voltage batteries have a disconnect. The disconnect contains the fused latching mechanism that connects the two sections of the battery together. Additionally, the disconnect contains a low-voltage battery monitoring circuit (the small two wire connector). This circuit runs between all the high-voltage components and when interrupted, it causes the contactors in the high-voltage battery to immediately open which immediately removes the voltage from the system. It is imperative that the service procedure be followed when removing this component from the battery. Most manufactures do not supply the individual components that make up the disconnect and the unit in its entirety can be expensive.

Would you like to know more? Reach out to Pearson and ask for a review copy of the all-new Electric and Hybrid Electric Vehicle text that Jim Halderman and I co-authored. It is a comprehensive text covering all the latest information on the subject.



Bobcat empowers people to accomplish more

Bobcat Company operates a training center near Denver, Colorado. Expert instructors use Bobcat machines and state-of-the-art training systems to empower service technicians by increasing their professional capability and confidence.



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