

46

## PREVENTING COLLISIONS — SAVING LIVES

INSIDE: ANATOMY OF  
A PARTS CODE TABLE

Delving into the world of ADAS is not a question of "If," but rather, "How long will you wait?"

### 25 ADAS — A MOBILE TECH'S EXPERIENCE

Understanding proper diagnosis and calibration is vital

### 40 THE POWER OF PLASTIC

The latest steps for plastic repair



## NOTHING MATCHES TODAY'S COLORS BETTER

Ford Ruby Red. Inspired by the vivid hues of the ruby gemstone. Matching any color is easier when you're spraying with the best.

Learn more at [envirobase.com](https://www.envirobase.com)





## OPERATIONS

### 8 SELLING SAFETY TO YOUR EMPLOYEES

Nourish a culture of safety in your business to ensure the well-being of all

**TONY MARTIN** // Contributing Editor

### 11 THE COLLISION EXECUTIVE CREATING A CULTURE OF INNOVATION IN YOUR BUSINESS

Mapping out the steps to successfully build additional revenue sources

**STEVE FELTOVICH** // Contributing Editor

### 12 GARAGE TIME IS THERAPY FOR SHOP OWNER WHO OVERCOMES PHYSICAL OBSTACLES

Muscular dystrophy doesn't keep Scott Bisi from pursuing his SEMA Show dream

**JAY SICHT** // Contributing Editor

### 16 FINDING A FIX WHO KNOWS WHAT IS TO COME NEXT?

In unpredictable times, only the nimble and flexible will survive

**MARK OLSON** // Contributing Editor

### 18 THE IMPORTANCE OF TRACKING KPIS

Learn how to use the information to keep your business moving forward

**ALAN LUKENS** // Contributing Editor

### 20 ANATOMY OF A PARTS CODE TABLE

Use this tool to help with the accuracy of your damage appraisals

**JOHN SHOEMAKER** // Contributing Editor

### 22 HOW WE CREATED A NEW NORMAL

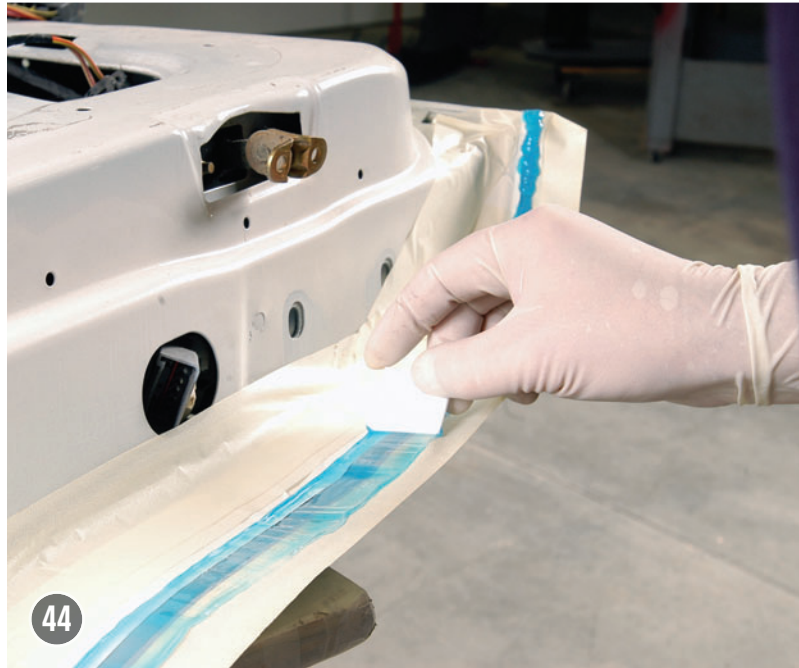
A look at the industry's actions to change business practices that meet new expectations

**JOHN SHOEMAKER** // Contributing Editor

### 52 THE LAST DETAIL LEARN HOW TO FACE YOUR CHALLENGES HEAD-ON

Look for unusual opportunities when facing times of crisis

**SHERYL DRIGGERS** // Contributing Editor



## TECHNICAL

### 25 ADAS — A MOBILE TECH'S EXPERIENCE

ADAS is tied to nearly every other electronic system on a vehicle today, so understanding proper diagnosis and calibration is vital

**MIKE REYNOLDS** // Contributing Editor

### 30 SHUTTER MOMENT

Damage to radiator shutters forced a diagnostic challenge

**JOHN ANELLO** // Contributing Editor

### 34 A DIVE INTO SQUEEZE-TYPE RESISTANCE SPOT WELDING

Understanding the basics and beyond

**DAVID BRINKLEY** // Contributing Editor

### 40 THE POWER OF PLASTIC

The latest steps for plastic repairs

**TIM SRAMCIK** // Contributing Editor

### 44 PUSHING THE PERFECT REPAIR

Part 2 in a two-part series of what you need to know about direct-to-metal seam sealing

**DOUGLAS CRAIG** // Contributing Editor

### 46 PREVENTING COLLISIONS — SAVING LIVES

Delving into the world of ADAS is not a questions of "If," but rather, "How long will you wait?"

**TRACY MARTIN** // Contributing Editor



IN EVERY ISSUE



### 3 INDUSTRY NEWS

**ONLINE OPTIONS FILL VOIDS LEFT BY LIVE TRAINING EVENTS**

**JAY SIGHT** // Contributing Editor

**SHOP FIRE SPURS INDUSTRY GENEROSITY, ASSISTANCE CSN, 1COLLISION ANNOUNCE MERGER**

### 50 COLLISION PRODUCTS GUIDE

### 51 AD INDEX

#### PODCASTS

#### AFTERMARKET PROS TALK TESLA

Listen in to this podcast to fill in the blanks on where the aftermarket stands as it comes to Tesla repair. [ABRN.com/Teslarepair](http://ABRN.com/Teslarepair)



## WEB EXCLUSIVES // ABRN.COM

### BUILDING AN EFFICIENT AND EFFECTIVE AR PROCESS WITH THE COLLISION REPAIR STORE

This webinar will be presented by Keith Manich of ATI on Aug. 26 at 2:30 p.m. This area of our business continues to be an opportunity area which if left unchecked can create immediate cash-flow issues. Developing a consistent and repeatable process that allows your staff to maintain a frequent review process that is scheduled into their regular business will keep the money flowing back to the business at a predictable rate.

This webinar will provide a roadmap that will lead to a successful monitoring and action plan for your Accounts Receivable.



[WWW.ABRN.COM](http://WWW.ABRN.COM)

Endeavor Business Media, LLC  
1233 Janesville Avenue, Fort Atkinson, WI 53538.  
Phone: 920-563-6388

#### EDITORIAL

**KRISTA MCNAMARA**

EDITORIAL DIRECTOR

[kmcnamara@endeavorb2b.com](mailto:kmcnamara@endeavorb2b.com)

**CHELSEA FREY**

SENIOR ASSOCIATE EDITOR

[cfrey@endeavorb2b.com](mailto:cfrey@endeavorb2b.com)

**DAN WARD**

ART DIRECTOR

**STALIN ANNADURAI**

GRAPHIC DESIGNER

#### CONTRIBUTORS

**JOHN ANELLO**

**SHERYL DRIGGERS**

**STEVE FELTOVICH**

**JAMES E. GUYETTE**

**WILL LATUFF**

**MARK OLSON**

**PATRICK PORTER**

**JAY SIGHT**

**TIM SRAMCIC**

**JOHN YOSWICK**

#### ENDEAVOR BUSINESS MEDIA

CEO — **CHRIS FERRELL**

CRO/CMO — **JUNE GRIFFIN**

EVP KEY ACCOUNTS — **SCOTT BIEDA**

COO — **PATRICK RAINS**

CTO — **ERIC KAMMERZELT**

VP, ACCOUNTING — **ANGELA MITCHELL**

VP, FINANCE — **JESSICA KLUG**

EVP, TRANSPORTATION — **LARRY GREENBERGER**

VP, DIGITAL BUSINESS DEVELOPMENT — **MONIQUE LEJIA**

VP, PRODUCTION OPERATIONS — **CURT PORDES**

CHIEF ADMINISTRATIVE AND LEGAL OFFICER — **TRACY KANE**

#### BUSINESS

**REGGIE LAWRENCE**

EXECUTIVE VICE PRESIDENT

**KYLIE HIRKO**

VP/GROUP PUBLISHER

**MICHAEL WILLINS**

BUSINESS DEVELOPMENT DIRECTOR

**BREANNE WARD**

MARKETING DIRECTOR

**JILLENE WILLIAMS**

SALES COORDINATOR

#### DOMESTIC SALES

MIDWEST & WESTERN STATES/

CLASSIFIED SALES

**MICHAEL PARRA**

[mparra@endeavorb2b.com](mailto:mparra@endeavorb2b.com)

(925) 307-8779

ILLINOIS, EASTERN & SOUTHERN STATES

**PAUL ROPSKI**

[propski@endeavorb2b.com](mailto:propski@endeavorb2b.com)

(815) 255-4118

OHIO, MICHIGAN & CALIFORNIA

**LISA MEND**

[lmend@endeavorb2b.com](mailto:lmend@endeavorb2b.com)

(949) 259-5654

#### PRODUCTION & ADMINISTRATION

**KAREN LENZEN**

SENIOR PRODUCTION MANAGER

**TRACY SKALLMAN**

CIRCULATION MANAGER

#### REPRINT SERVICES

Article Reprints — **Brett Petillo**

Wright's Media 877-652-5295 ext. 118

[bpetillo@wrightsmedia.com](mailto:bpetillo@wrightsmedia.com)

#### CUSTOMER SERVICE

Subscription Customer Service

877-382-9187; 847-559-7598

[ABRN@omeda.com](mailto:ABRN@omeda.com)

PO Box 3257

Northbrook IL 60065-3257

ABRN (USPS 437970) (Print ISSN: 2166-0751, Digital ISSN: 2166-2533) is published monthly, 12 times per year by Endeavor Business Media, LLC, 1233 Janesville Avenue, Fort Atkinson, WI 53538. Periodicals Postage paid at Fort Atkinson, WI 53538 and at additional mailing offices. Subscription prices: U.S. one year, \$72.45; U.S. two year, \$109.20; one year Canada, \$81.90; two year Canada, \$162.75; one year international, \$114.45; two year international, \$228.90. For information, call (877) 382-9187 or (847) 559-7598. POSTMASTER: Send address changes to ABRN, P.O. Box 3257, Northbrook, IL 60065-3257. Please address subscription mail to ABRN, P.O. Box 3257, Northbrook, IL 60065-3257, Canadian G.S.T. number: R-124213133RT001. PRINTED IN U.S.A.

©2020 Endeavor Business Media All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical including by photocopy, recording, or information storage and retrieval without permission in writing from the publisher. Authorization to photocopy items for internal/educational or personal use, or the internal/educational or personal use of specific clients is granted by Endeavor Business Media for libraries and other users registered with the Copyright Clearance Center, 222 Rosewood Dr., Danvers, MA 01923, 978-750-8400 fax 978-646-8700 or visit <http://www.copyright.com> online. For uses beyond those listed above, please direct your written request to Permission Dept. fax 847-564-9453.

Endeavor Business Media provides certain customer contact data (such as customers' names, addresses, phone numbers, and e-mail addresses) to third parties who wish to promote relevant products, services, and other opportunities that may be of interest to you. If you do not want Endeavor Business Media to make your contact information available to third parties for marketing purposes, simply call toll-free 877-382-9187 or email [ABRN@omeda.com](mailto:ABRN@omeda.com) and a customer service representative will assist you in removing your name from Endeavor Business Media's lists. ABRN does not verify any claims or other information appearing in any of the advertisements contained in the publication, and cannot take responsibility for any losses or other damages incurred by readers in reliance of such content. ABRN welcomes unsolicited articles manuscripts, photographs, illustrations and other materials but cannot be held responsible for their safekeeping or return.



TRAINING

## ONLINE OPTIONS FILL VOIDS LEFT BY LIVE TRAINING EVENTS

JAY SICHT // Contributing Editor

➔ The coronavirus pandemic caused widespread disruption, closing schools and manufacturer training centers, canceling conferences and slowing or shuttering businesses. Fortunately, technology solutions were ready to meet the need for alternative meetings and training. Do you or your staff have some spare time to get caught up on training? *ABRN* took a look at some resources collision repair technicians, management and other front-office staff can use to bolster their knowledge of industry trends and topics such as sales processes, product-specific procedures and more, and at no charge. Some are even eligible for I-CAR credit.

Generally speaking, manufacturers' sites require users to set up a profile to access the sites, and some require a verification login, so there may be a slight delay in accessing the training material. The courses can take as little as 10 minutes' time to complete. Check with your suppliers' representatives to see if they suggest additional training options not listed here.

### Collision student earns 95 training certificates during shutdown

When Mercer County Technical Edu-



**AFTER SUCCESSFULLY COMPLETING FIVE ELEARNING MODULES**, refinish technicians can receive ProLevel 3 I-CAR credits for one year.

cation Center (MCTEC) in Princeton, W. Va., closed mid-spring semester, Collision Repair Technology Instructor Daryl Barton searched for methods for students to learn remotely. The same PPG and 3M courses his students used are available anytime to collision repair shops for online learning. Each offers a printable certificate for each course upon successful completion. Although it was not a requirement to attend so much training, one student, Alex Pruitt, earned 95 such course-completion certifications to his portfolio before he graduated.

"A typical student might score three or four of those, and the more ambitious ones might go on to complete 10 or so,"

>> CONTINUES ON PAGE 4

BREAKING NEWS

TRAGEDY

## SHOP FIRE SPURS INDUSTRY GENEROSITY, ASSISTANCE

JAY SICHT // Contributing Editor

While Benjamin Hillman and his family, including seven children, were away for a day at the beach Saturday, June 20, flames licked at the building and equipment of his shop, Hillman Family Automotive, in the western North Carolina town of Sylva. A policeman noticed smoke from the building that afternoon before the fire claimed it. But because the fire started in the service bays, it destroyed most of the capital equipment and hand tools, and smoke and heat damaged the entire interior.

Although Hillman's operations are on hold as of this writing, he hopes to be open soon, aided by fellow shop owners and other members of the automotive aftermarket community. As of this writing, a GoFundMe fundraiser, organized by the Independent Garage Owners of North Carolina (IGONC) and the Facebook group Automotive

>> CONTINUES ON PAGE 6

TRENDING

### VERIFACTS PARTNERS WITH CARS COOPERATIVE

VeriFacts Automotive has been selected as the provider of independent, third-party collision repair coaching, evaluation and verification services for the CARS Cooperative and its members.

[ABRN.COM/CARSCOOP](http://ABRN.COM/CARSCOOP)

### CSN, 1COLLISION ANNOUNCE MERGER

CSN Collision Centres and 1Collision Network have merged their business operations, which allows the group to offer a unified collision repair experience and claims management solution.

[ABRN.COM/CSN1MERGE](http://ABRN.COM/CSN1MERGE)

### ASE TEST CENTERS, REGISTRATION OPEN

ASE test centers are open and registration for the summer testing window is available through September 30. More than 54 ASE certification tests are offered across six categories.

[ABRN.COM/ASEOPEN](http://ABRN.COM/ASEOPEN)

### CIECA COMPLETES 2020R1 STANDARDS

CIECA has completed the 2020R1 Release of the CIECA Standards for the collision industry. This will help ensure consistency and provide better quality assurance tools and processes.

[ABRN.COM/2020R1](http://ABRN.COM/2020R1)

### I-CAR TO PROVIDE EXPANDED AUDI TRAINING

In partnership with Audi's collision repair network, I-CAR will deliver expanded training to all network members to augment the knowledge of techs and shop management.

[ABRN.COM/AUDITRAIN](http://ABRN.COM/AUDITRAIN)

>> TRAIN CONTINUED FROM PAGE 3

Barton said. “But Alex had time and didn’t waste it. I guess the farther he went, the more he wanted to do, and he just kind of blew it out of the water.”

Barton said the certificates offer an advantage in a job market that is particularly competitive in his local area.

“Compared to some other states, West Virginia is kind of a depressed state,” he said. “Our county does OK, but there’s not huge opportunity here. So we encourage the students to really try and stand out. I tell my students, ‘If you go into an interview and you’re up against another graduate who went to the same school, neither of you really have a lot of experience. But when one applicant has 10 certificates and one has two, more than likely the employer’s going to look at the one who has 10.’”

### Axalta Learning Campus

The Axalta Learning Campus allows collision repair shop technicians and managers to create a Learning Path Creator Tool that helps narrow the training focus by role, paint brand and VOC area and with a suggested timeline.

The tool allows staff to plan their training at a Learning Development Center, online (eLearning,) virtual (live, instructor-led classes that are delivered via video online,) classroom (local, live, instructor-led classes,) and Axalta-led in-store or in-the-field certification.

Axalta offers 10 I-CAR-credited, instructor-led Refinish Performance Management (RPM) eLearning courses. These courses allow estimators to earn up to 13 I-CAR credit hours, and production managers can earn up to 17 hours for I-CAR’s Platinum designation in the Professional Development Program. As an example of available courses, group 10 in eLearning covers Paint and Material Gross Profit Improvement, and two parts of Paint and Material Cost Reduction. This grouping is eligible for two hours of annual I-CAR credits.

After successfully completing five

eLearning modules, refinish technicians can receive ProLevel 3 I-CAR credits for one year. To do so, refinish technicians must complete at least one eLearning module in each topic: surface cleaners, etch primers, primer/surfacer, basecoats and clearcoats.

### I-CAR adds Virtual Conference

Although I-CAR canceled its March 6-8 2020 conference in Arizona because of coronavirus concerns, its “New Era of Collision Repair Virtual Conference” is available online for free and offers three presentations totaling nearly two hours. In the first, Sean Carey, president of SCG Consulting, who spoke on “Claims and the Collision Repair Market,” said that although he had predicted insurance companies would be moving toward virtual claims management, the pandemic response likely accelerated that movement.

“As a result of this, I think we’ll see vehicle information packs coming as part of the the crash data,” he said. “I think we’ll see metrics and validation are going to be very important. Were those procedures pulled? Were those procedures adhered to? Did those repair procedures turn into a repair plan? and I think more and more, we’ll see a focus on the vehicle and the customer than we have previously.”

Jake Rodenroth, director of industry relations at asTech, spoke on the latest challenges of “Navigating a New Era of ADAS.” He said the company’s five metro-area calibration centers don’t stay as busy as one might expect.

“The reality is that most repairers don’t know when they need us; they don’t know when to call us or when to schedule in ADAS calibration.”

Rodenroth said collision repairers also often don’t seem to see the need to research repair information for issues other than structural repairs or airbag replacement.



I-CAR’S VIRTUAL CONFERENCE is available online for free and offers three presentations totaling nearly two hours.



### MCTEC INSTRUCTOR DARYL BARTON

(left) was wowed by the commitment of his student and recent graduate, Alex Pruitt, who attended 95 online courses, including for PPG and 3M, and received certificates for them.



CERTIFICATES for many online courses are available for immediate printing.

“When do you decide to go look? When do you decide that, ‘Maybe I don’t know how to fix this car, and maybe I need to go and read something?’ I find that most shops will only research structural repairs or airbag repairs, but they won’t research how to change a windshield, how to take a bumper cover off, how to change a core support, or maybe how to fix a quarter panel. And that’s the challenge.”

Mike Anderson, president/owner of Collision Advice, closed the virtual conference with, “Don’t Just Win; Dominate,”

>> TRAIN CONTINUES ON PAGE 7



# Blowtherm®

## USA

*There isn't a better time to buy Blowtherm than right now!*

## BLOWTHERM "WORLD S"



Dual skin wall panels joined by H channels with rock-wool insulation.



New SBC P1 Control Panel



Internal push bar on the front door and the side personnel door.



Eight 4-Tube LED light fixtures with hinged access for ease of cleaning and maintenance.



**Only  
\$42,900\***  
\*Excluding freight

### Standard Package:

- 2 Row Pit
- Solid Back
- Four 4-Tube LED Wall Lights
- Intake/Exhaust Turbo Fans w/VFD's
- Ductwork Package (15' Roof Height)



Heavy duty adjustable steel hinges with brass bushings open door to optimum position.



Twin 10HP direct drive centrifugal fans.



Hinged ceiling filter frames for easy replacement of 10 micron media filters.



Pre- and Post-filtration: Intake and Exhaust. Two direct drive centrifugal fans with 2 sets of 10 bag filtration for each.

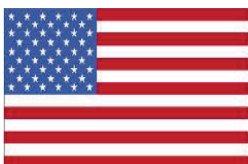


Paint-stop filter trays for balanced, pre-engineered air flow.

### Additional Options Available:

- Drive-thru
- Semi-Down Draft
- AQMD Compliance
- Choice of Booth Length
- Outdoor External Package
- 3 Row Pits / Lifts / Basements
- Zoned Air Speed / Flash-Off System

## The name you trust, the quality you deserve.



Proudly distributed in the USA

**Increased profits demand change.  
Learn the difference. Call now.  
1-855-463-9872  
www.blowtherm-usa.com  
sales@blowtherm-usa.com**

Jump to Blowtherm USA's website from your mobile device.





>> CONTINUED FROM PAGE 3

Shop Owners Group (ASOG), has raised nearly \$20,000 from more than 100 donors across the country. Other benefactors have pledged to donate requested tools and equipment to get Hillman up and running as he awaits the insurance company settlement.

"It's all about shop owners helping shop owners," said Lucas Underwood, owner of L&N Performance Auto Repair, in Blowing Rock, N.C., 136 miles northeast of Sylva. Underwood is an IGONC board member and ASOG moderator. "We often get the idea that we're competition. But you look at that and see that more than a hundred shop owners from all over the country reached out to help this person who, in many cases, they don't even know. And that's just a testament to this industry, in my mind. I think we're far more connected than we realize."

Fortunately for Hillman, his business was already in the process of expanding its facilities at the time of the fire. After previously renting the 3,000-square-foot concrete-block building, he bought it in November. In March, he began construction of a 2,500-square-foot, four-bay building to the rear of the original shop, and at the time of the fire it had been expected to be complete in two or three weeks.

Hillman and his two technicians still hope to be operational in the new building very soon. He originally hoped to ramp up the move-in date to June 30, although that is looking increasingly optimistic. To meet building codes, the new shop will need an exhaust system, so he is exploring those options. And the electric company may not be able to install electrical service to the new building by that date, so he is considering renting a large generator. He'll likely bring in a mini-barn shed to serve as a temporary office and reception area. The original building is full of soot, ash, and charred equipment (no cars were

in the shop at the time of the fire.) And it's even questionable whether it will be salvageable.

"The insurance adjuster seems to think it is, but there are some structural questions, some issues with the block work. It may be a situation where the repair is more expensive than replacing the building. An engineer will be by next week to determine that."

New lifts had already been ordered for installation in the new building, although they were not yet in stock at the company selling and installing them. So the company made a call to a shop a few hours away that was scheduled first for an installation. Would they mind giving their place in line for their new lifts to Hillman?

"That shop said, 'Actually, we already heard about that fire, so you go take care of him.' They were at my shop in less than 24 hours installing these lifts."

Hillman has been humbled by the industry's response in his time of need.

"It's been huge. I've been blown away by the support that is still constantly flowing. I'm getting text messages and phone calls all day and all night from people asking how they can help. With donations and tools, it's been quite a blessing. We're in a small town, and today the owner of the only dealership within 30 miles, Andy Shaw Ford, came by today to tell me if I need anything to give him a call. And he gave me his cell phone number. I've had other independent shops come in and offer to let me use one of their bays or offer to bring their entire personal toolbox to my shop and use it until I can get back on my feet. The list goes on and on."

Once his shop operations are fully restored, Hillman hopes to continue his vision of helping others in need. Some of those ideas include hosting an automotive basics class for foster children or local high school students. He envisions selecting a few of those interested young people for an on-the-job-training



program, including a scholarship to provide a basic first set of tools.

"It could also include getting a car for a single mom, because that's the only thing holding her back from another chance at life. And so those are part of my bigger vision. I feel forever indebted to the generosity of the many people who have stepped up and helped out. Now, my biggest challenge is coming up with a reasonable plan to execute."

Association members are helping Hillman develop that plan, Underwood said, including a veteran shop owner who's built multiple shops, and Bob Pulverenti, who's executive director of IGONC but had been in the insurance industry for years.

"The network can come together and stand behind you when things don't go as planned," he said. "They can see it from your perspective; they all understand what you're going through."

To donate to Hillman's fundraiser, go to: <https://tinyurl.com/ybe6euj2>; to see if you may be able to donate to Hillman's list of needed tools, equipment, and inventory (which can be edited by donors to show what has been pledged or provided, similar to a wedding registry), go to: <https://tinyurl.com/y7ed7kob>. 📧

>> TRAIN CONTINUED FROM PAGE 4

urging attendees to develop a business culture of trust.

“I often tell people if you had a large MSO, a dealership, an independent shop, and a banner franchise that all opened up the same exact body shop side-by-side with the same equipment, the same layout, and the same design, the shop that would dominate would be the shop that has the trust of the employees inside the four walls.”

Shop owners and managers must place importance on earning consumers’ trust, Anderson said.

“I believe that online reviews are the way consumers validate whether they trust us or not, and I believe online reviews will be the CSI of the future.”

Additionally, although not free, I-CAR offers 239 online courses that cover a large portion of the ProLevel 1 through ProLevel 3 training requirements, plus vehicle-specific, technology specific, ADAS, electrical, diagnostics, mechanical, and production management topics. It also now offers 20 virtual (instructor-led, as in a webinar) courses that cover ProLevel 1 through ProLevel 3 knowledge areas. All courses count toward either ProLevel Training or Annual Training requirements required for Platinum and Gold Class. For more information, go to <https://info.i-car.com/Supporting-Every>.

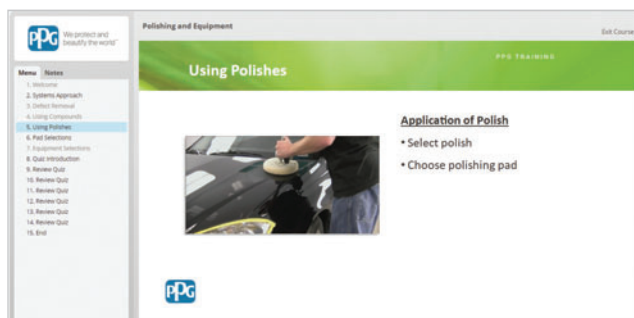
### PPG Refinish Online Learning Academy

The PPG Refinish Online Learning Academy includes technical and product training, professional development courses, videos, process documents and more. Online learning courses are arranged by catalogs. As an example, the Safety & Environmental catalog includes six courses: GHS Hazard Communication, Indiana 326 IAC 8-10 Technician Training, Isocyanates in Refinishing, Personal Safety, Volatile Organic Compounds, and Where to Get SDS Documents. There are more than 40 online learning courses available.

Other resources include tech tips and videos, products, color tools, PaintManager XI, Resources, Paint Defects — a library of images to assist in identifying and correcting them, Safety Data Sheets, and classroom training course availability and sign-up information.


### Sherwin-Williams Automotive Business Development Training

Sherwin-Williams’s prerecorded, expert-led, online courses are part of the A Plus EcoLean Virtual University. Topics include everything from “Process Driven Design” to “Three Steps to Improving Cycle Time.” As of this writing, there are 31 online presentations, available at no charge, covering topics such as in-process quality assurance, measuring and improving paint department performance, and using OEM-certification programs to their potential.



**CERTIFICATES FOR MANY ONLINE COURSES** are available for immediate printing.

### 3M Collision Repair Training Academy

The 3M Collision Repair Training Academy offers 28 training courses, including six I-CAR Industry Alliance courses that can be purchased at a discount for I-CAR credit. On-demand online modules include body/repair, paint/refinishing, detailing, front office/estimating, and foundation product knowledge. The company has also published more than 300 videos, including in Spanish, on YouTube. They range from five to 60 minutes. 3M also currently has 16 on-demand webinars, viewable via the Zoom application. The company plans to offer 50 sessions, with focuses on body repair, paint refinish, detailing, heavy-duty truck repair, and estimating. 

## TOSS YOUR TORCH

The Mini-Ductor® VENOM® HP is the highest powered Mini-Ductor available. Generating Invisible Heat® to release metals from corrosion and thread lock compounds without the dangers of an open flame and up to 90% faster than conventional methods.



#### Includes :

- > Carry Case (MD50-003)
- > 7/8" Pre-Formed Coil (MD99-601)
- > U-Form Coil (MD99-602)
- > Bearing Buddy Coil (MD99-603)



Available from your local tool distributor.

Follow us on: 

# SELLING SAFETY TO YOUR EMPLOYEES

Nourish a culture of safety in your business to ensure the well-being of all

**TONY MARTIN //** Contributing Editor

**A**s a business owner, you may be struggling with the role that safety should play in your day-to-day operations. By “safety,” I am referring to proactive measures you take as a manager to reduce the possibility of your employees getting hurt or killed at work. There is a spectrum of responses to that question, ranging from doing nothing to pushing for an overhaul of your company’s safety culture. The fact that you are reading this article is an indicator that you want to change the way you’ve approached this question in the past, and you recognize that your biggest challenge could be getting your employees on side with the changes.

Experience tells us that safety is often a tough sell. We should ask ourselves why this is so. Aren’t the benefits of safe work practice self-evident? For many of us, it seems as though the rewards aren’t a sufficiently compelling story. We remain convinced that safety will cost us more than we gain, and thus we hesitate to disrupt the status quo. Your employees are no different. Their skepticism will often be founded on an assumption that safety only serves to slow them down and will never directly benefit them.

Time to do some soul-searching. What was it that convinced you that changes need to be made in the way your company approaches safety? It could very well be that your insurance carrier had a big influence on this decision, and if this is the case, there is no need to apologize. The reality is that the majority of business professionals have decided to work safely because it is proven too costly to do otherwise. Your employees will be no different.

To nourish the safety culture of your business, your employees must believe that they are better off when they choose to work safely. You can enact rules and consequences that are intended to change their behavior, but what will they do if they think nobody’s looking? If the worker isn’t convinced that they will benefit from following the rules, they are just as likely to break them when they are left on their own. So how do you con-



vince the skeptics that safety does, indeed, pay off? This can be accomplished by engaging, equipping and partnering with your employees on how safety is implemented in your business.

## Engage

The first step is to engage your employees by providing them with relevant safety information. Start with this critical piece of data — 80 percent of workplace injuries are caused by unsafe acts, as opposed to unsafe conditions. While some of these injuries take place due to ignorance (perhaps a lack of training), the majority happen when workers who know better choose to act in an unsafe manner. This fact sets the tone of the conversation, because it establishes the role that personal responsibility plays into workplace safety.

I would suggest that an employee is in business the same way as their employer. Both parties are trying to maximize their revenues and minimize their expenses. Having said that, the reason that many workers don’t take safety seriously is because they have not taken into account what an injury could cost them. These costs go far beyond the financial, and will impact the worker in ways they never imagined.

Everyone needs to understand that they won’t be the only one affected if they get injured. There is a “rogue wave” of con-





# PICTURE THIS.

Business lining up in your CCC ONE<sup>®</sup> inbox.



## CCC<sup>®</sup> Engage Photo Estimate

drives more business to you. Customers can use their smartphones to upload pictures of vehicle damage and request an estimate through your site. And it's all managed inside of CCC ONE, making the tracking of jobs easier than ever.

Find out more at [www.cccis.com/photoestimate](http://www.cccis.com/photoestimate)



© CCC Information Services, Inc. All rights reserved.



sequences that will engulf their family, friends and coworkers if they get hurt at work. These aftereffects (known as indirect costs) can far exceed the financial costs of an injury.

Ask your employees this question: why are you willing to put yourself at risk to get your job done? Each individual in your organization should spend time struggling with this personal matter. Engagement on this subject can only lead to good things, because it will put everyone on the road to greater awareness of their own thinking when they make safety decisions.

## Equip

If you've succeeded in your efforts to engage your employees, now comes the time to provide strategies to help them make better safety decisions. This starts with a call to introspection — in other words, encouraging your folks to think about their personal mindset regarding safety. They will be shocked to discover that their own thinking can work against them in their efforts to keep themselves and their coworkers safe.

Complacency is a major issue in workplace safety. The basis for complacency in work practice is the assumption that since nothing bad has happened before, it never will. What must be made clear is that there are always a number of variables involved to complete a task. Just because all of the variables lined up in your favor in the past, doesn't mean that they always will. This is especially true with risky shortcuts. The first time a worker attempts a shortcut, they are careful to make sure nothing goes wrong because they don't know whether it will work or not. If they get away with it, their "fear factor" starts to go away and the willingness to try it again increases. Eventually, this leads to a worker saying "we've done it this way a thousand times," and they stop watching for changes in variables. This helps explain why many workplace fatalities involve highly experienced workers.

Your employees should also be made aware of a mindset called "self-imposed sense of urgency." As the day goes on, workers tend to put pressure on themselves as they strive to complete a job. This starts with creating a "budget" in their own mind of how much time the job will take. When it appears to be taking longer than they think it should, the worker becomes more willing to assume risk to get the job done. Fatigue also serves to skew the worker's judgement. These effects gain momentum as the end of the work day draws near, and even more so as the weekend approaches. Elevated risk-taking can eventually lead to an injury, which was often caused by the worker trying to meet a deadline that they had created for themselves.

Under these conditions, it is easy for a worker to overestimate the rewards for their risky behavior. The idea of getting off work on time becomes progressively more compelling as the day wears on. As the worker continues to push against their deadline, they also underestimate the risks of shortcuts they are now willing to take. This can create a recipe for disaster if the people working for your company aren't aware of their own thinking and how it can serve to compromise safety on the work site.

Here is one more point regarding equipping of your employees: they should be aware that taking care of their coworkers is the equivalent of taking care of themselves. We all need the perspective and accountability that our fellow employees bring to the table, and true workplace safety cannot be achieved without a cooperative effort among all members of an organization. Helping everyone understand this principle will go further towards building a functional safety culture than any other measure you can take.

## Partner

Once everyone recognizes their responsibility in maintaining a safe workplace, it becomes that much easier to partner with them in building a healthy safety

culture. To achieve that, there is no better way to demonstrate your sincerity than by sharing the wealth. Consider the idea of paying out a bonus for shop safety performance, a reward that could be offered on a quarterly or biannual basis. This doesn't have to be a major expense, but should be enough to let your employees know that you are appreciative of them choosing to act safely.

People often want to be part of something that is bigger than themselves. With that in mind, formation of a safety committee could be a great way to harness positive energy for building your company's safety culture. The committee ought to have representatives from all areas of your business and should meet on a regular basis to discuss safety issues. Concerns that the committee brings forward should be dealt with proactively, again demonstrating your sincerity concerning the importance of safety in your business practice. For smaller companies, your safety committee could be less formal. For instance, it might be a simple meeting of you and all your employees to discuss the issues. The main point is that the meetings happen regularly and that the concerns are dealt with in a timely manner.

Finally, there is no substitute for "walking the walk." Don't put your employees in a position where they are tempted to take risky shortcuts to gain your approval. It should be the other way around...give them incentive to take the high road and minimize their risk as they perform their day-to-day tasks. Consistency on this front will lead to greater buy-in from your workers and a safety culture that will help build your business! 📌



**TONY MARTIN** is the author of "Tuning In to Safety," a book written to help workers get their priorities straight in regards

to safety. Tony works in the mining industry in Fairbanks, Alaska. He is a qualified Heavy Duty Equipment Mechanic and former post-secondary level educator.

[tony@tuningintosafety.com](mailto:tony@tuningintosafety.com)

# Creating a culture of innovation in your business

Mapping out the steps to successfully building additional revenue sources

I was recently speaking with DeLee Powell, the second-generation owner of Baker's Collision Repair in Mansfield, Ohio, and I knew I needed to start my next column with one of the things she said. DeLee has experience shepherding her business through some challenging times. Her first year of owning the business began just months prior to 9/11, for example, and Ohio was among the hardest-hit states in the Great Recession of 2007-2009. So now with the economic challenges the country faces, DeLee has a core belief that I think shop owners need to hear.

"You can't use anything as an excuse," DeLee told me. "You've got to figure out how to move through it, how to continue to be successful. So many people in the collision industry will say, 'Well, the industry as a whole is down x percent,' as an excuse why their business is down x percent. That's never acceptable to me. Our thought process here is: What are we going to do differently so our business isn't off X percent?"

I first started working with DeLee in the early 2000s, and I've watched her take a business that was started by her father in 1953 and that was nurtured by her brother in the 1980s and 1990s, and grow it over the past 20 years into one of the industry's best-of-the-best. In that time she has helped the business nearly triple its sales to close to \$6 million. Baker's 37 employees working in an 18,000 square foot facility – in a town of just 55,000 people, an hour's drive from either Columbus or Cleveland.

I called her because over the years she has demonstrated what I see as a primary key to success in this industry right now: the ability to develop new revenue sources. We'll look at those avenues in upcoming columns, but there's a necessary prerequisite that DeLee has also excelled in: building a great culture. Innovation requires a culture that attracts and nurtures people who are geared up and motivated for that type of thinking. So I asked DeLee to start with what she feels she's done to build a successful culture at her business.

Her answer falls into two broad categories. First, she her-



**INNOVATION  
REQUIRES A  
CULTURE THAT  
ATTRACTS AND  
NURTURES  
PEOPLE WHO ARE  
GEARED UP AND  
MOTIVATED FOR  
THAT TYPE OF  
THINKING.**

self has some traits and characteristics – either innately or that she's developed over time – that help her be a role model and leader of a team driven to succeed.

"One of the lessons my brothers and I and even my kids learned from my Dad was his work ethic," DeLee said. "He always just thought, 'I'll do whatever I need to do to get it done.' So I sometimes think I'm naïve, in a good way. I don't ever think I won't be able to do or accomplish something as long as I work at it."

She said she also tends to be a long-term thinker.

"When we had our company's 50th anniversary, in 2003, I remember thinking: Okay, what do we need to do to be here another 50 years," DeLee told me. "So instead of looking at just a 5-year plan, I've always looked long-term as well. What do we need to do long-term to really make the company strong?"

The last inner skill that she believes has helped her build a great culture at her business is goal-setting.

"I think it's really important to write goals down," DeLee said. "I remember back in 2001 writing down a set of about 200 goals for the business. I

found that list about 10 years later and realized I'd met every one of those goals for the business but one. The last one was having the best KPIs in the country among Sherwin-Williams' customers. So I've been working on that last one. It's a hard number to hit, but striving for that goal has really helped our business."

She said she doesn't think the word "culture" appeared on that list of goals, but the concept was there. One of her goals was to become the type of company where people wanted to work, to be the employer-of-choice. That type of culture that nurtures innovation and revenue growth. How that has become a reality at Baker's Collision Repair will be the subject of my next column. ■

**STEVE FELTOVICH** of SJF Business Consulting, LLC, works with dealers, MSOs and independent collision repair businesses to make improvements and achieve performance goals.  
[sjfeltovich@gmail.com](mailto:sjfeltovich@gmail.com)





# GARAGE TIME IS THERAPY FOR SHOP OWNER WHO OVERCOMES PHYSICAL OBSTACLES

## Muscular dystrophy doesn't keep Scott Bisi from pursuing his SEMA Show dream

JAY SICHT // Contributing Editor

**L**ike the owners of many car and truck fabrication and customization shops, Scott Bisi's dream is to take one of his builds to the SEMA Show. And with a little help, he hopes to make that dream come true this year. But unlike many other shop owners, Bisi, owner of Cougar House Garage, in Shelton, Wash., has to overcome daily physical challenges to accomplish tasks many of us take for granted. Bisi, 32, has

muscular dystrophy, a genetic disorder that doctors predicted would require him to use a wheelchair in his early 20s — if he were to live that long. He and his mother, Jami, have been proving them wrong ever since.

“When you work out, your muscles break down and then they rebuild,” he said. “Well, I am missing just the chromosome that rebuilds them, so I always have to be very careful not to overexert myself or cramp up my muscles. I can't lift over 20 pounds, so the guys come in

to move all the steel and move heavy things around, like swapping a motor, moving an axle, and things like that.”

While Bisi has some part-time help for the heavy lifting, he spends four to six hours a day in the shop, scooting around on a rolling shop stool, or when walking, taking extra care to not trip and fall over even a garden hose or pebble. If he should break a bone, he would likely have to start using a wheelchair.

Later in the day, when he starts having difficulty standing or has fatigue

# D DIAGNOSTIC T O O L S



**LAUNCH**  
TECH USA  
CREATE • CHANGE

From **DIYers**  
To **Master Technicians**



Gear Scan Plus

**• ANYONE**



Millennium Master

**• ANY BUDGET**



CRP Elite

**• ANY PURPOSE**

## • MILLENNIUM SERIES •



**LAUNCH**



[www.launchtechusa.com](http://www.launchtechusa.com)



1-877-528-6249



@LaunchTechUSA



@LaunchTechUSA



from working in the shop, he spends the balance of his day in the office, running the business, updating social media and designing Cougar House Fab four-link lift kits for Chevy, Dodge, Ford and Toyota trucks, the brand that is the shop's specialty.

He uses one of three CAD/CAM programs to put his unique flair into designing axle trusses, radius arms, cross-members, brackets, shock towers and more, and then sends that program to cut 1/4-inch-plate steel on his 4-foot-by-4-foot Baileigh Industrial CNC plasma table. He said his designs are inspired by science fiction movies such as *Star Wars* and *Tron*.

"You can make a lot of these parts very basic and just put them together. But doing the cutouts and spending the time on those details is what really makes them high-quality, unique parts. Plus, at Cougar House, we strive to have the best welds possible. We do not cut any corners with welds, and we really spend a lot of time with test welds before we get to the customer parts and laying the welds down on them."

### SEMA Show-bound with latest project

The SEMA Show-bound project is a 2014 Toyota 4Runner, named "Project Carnage." Bisi said he wanted to be the first shop to solid-axle-swap (SAS) a fifth-generation 4Runner, and he sourced Ford Super Duty axles for the task.

"We set it up with a center cradle and radius arms in a four-link design, just like you do on a full-size truck, and then we got in contact with TIS Wheels. They're our vendor and sponsor for billet wheels, and we'll be going to the SEMA Show with Baileigh Industrial as another sponsor."

Bisi said he'd received word from sponsors that his ride will be rolling on TIS' new 28x16-inch wheels, wrapped in 42-inch Nitto Trail Grappler tires, with more sponsorships to come, either dis-





counted or furnished in exchange for promotional consideration.

He's been documenting the build on his YouTube channel, which has more than 400 episodes and close to 4,000 subscribers. The 4Runner SAS build video series shows the various steps needed to design and build the swap. Thus far, traffic has grown organically, with no expert assistance to increase his search engine optimization to help draw in viewers.

"We've been telling viewers we're going to SEMA and how we're going to vlog it the whole way there. It's our first time going. You know, we're just a little custom four-wheel-drive shop in Washington state, so we're hoping to go to the SEMA Show and really put ourselves on the map, because nobody has done a fifth-generation 4Runner this way."

Bisi started the shop in 2012, after graduating in 2009 with an associate degree in Advanced Automotive Technology from New Market Vocational Skills Center in Tumwater, Wash., where he learned more about suspension, powertrain and bodywork. Before that, though, he had been working on cars and trucks since middle school. The shop's name came about as a nod to the shop's specialty of building rock-crawling Toyotas to use in the mountains, where cougars could also be found.

Cougar House Garage is also capable of undertaking all kinds of custom frame and suspension fabrication and modification. One of Bisi's earlier projects was a 2010 Ford Super Duty, which he converted to two-wheel drive and modified to "lay frame" on airbags (air springs) with his welded-in frame step notch, fabricated front control arms, his own custom four-link kit in the back, 24" semi-truck Alcoa wheels, and a swapped-in 24-valve Cummins engine.

"I learned everything about air ride and IFS for those builds on that truck. That way, I'm able to work on other customer vehicles and give them my touch for those, too."

## Overcoming obstacles with garage therapy

Each morning for Bisi brings with it a routine of getting to feel well enough to start working.

"I wake up at 10 in the morning," he said. "I get through my muscle cramps, and then around noon, I can eat something and then go out to my garage and work till about 8 at night. I work a schedule like that because that's when my body allows me and when I'm most mentally strong."

Bisi grew up on a farm riding dirt bikes, building fences and other physical activities, so staying active was a priority for him.

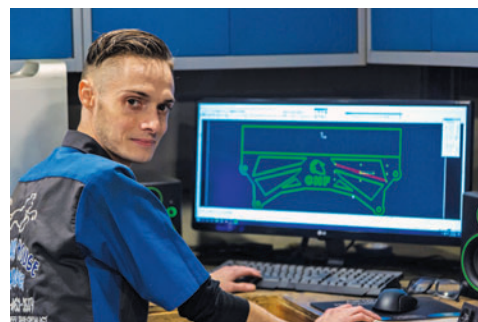
"A lot of these parents, when their child is diagnosed with muscular dystrophy, they tell them to get into video games and hobbies like that. But their muscles actually atrophy, and it hurts them. Living an active lifestyle but being very careful not to overexert myself has actually maintained my muscles very well. So that's one of the reasons I'm still able to be so active and do as much as I can."

Jami Bisi, who helps her son with book-keeping, first saw signs in him of muscular dystrophy at age six. He was not properly diagnosed until he was 14. At the time, he could still run and jump on a trampoline. But his condition started to deteriorate, and before he was 18, he could no longer walk correctly. Doctors prescribed narcotics and muscle relaxers.

"All of the kids Scotty went to camp with have passed away," she says. "All that I research, as soon as they get on narcotics and muscle relaxers and become bedridden, they go pretty fast."

Doctors wanted Jami to be prepared for the worst, predicting her son would die in his early 20s.

"They started putting me in counseling to prepare for it. But I walked out of counseling and said, 'No, this isn't...I'm not...I can't believe this. I can't process this this way.' So I started looking into alternative medicine."



She began with massage, including sessions with a sports physical therapist, who is also a licensed chiropractor.

"He massages Scotty and keeps his hips open and his toes up with massage so he doesn't trip as much. And I use [medical and now legal in Washington state] cannabis for him for sleep, instead of muscle relaxers, because it doesn't have any bad side effects. It's gone out of his system in the morning when he wakes up, and he doesn't wake up locked up. If I don't give him the cannabis, he wakes up at, like, 4 o'clock in the morning locked up so hard, with just tears running down his face, he's in so much pain."

The Bisis credit the regimen with preventing Scott from degenerating the past 14 years, along with adhering to the advice of one doctor, who told him to treat himself like a tennis athlete: stretch, don't overdo the exercise, and eat a healthy diet.

"I refuse to medicate him with narcotics and muscle relaxers," Jami Bisi said. "We push through the pain, and we massage through the pain, and he gets out in that garage and forgets about it. His work out there is what's keeping him alive. If he were depressed and bedridden, I would lose him. I want to keep him inspired and working and dreaming; that's the medicine that works the best." ❧



**JAY SIGHT** has worked in a number of roles in the automotive aftermarket for more than 25 years. Based in Columbia, Mo., he has covered all industry

segments of the business as a writer and editor for 15 of those years.

[jaysicht@gmail.com](mailto:jaysicht@gmail.com)

# Who knows what is to come next?

In unpredictable times, only the nimble and flexible will survive

**L**ife these days feels a little bit to me like a game of Jumanji. If you've seen the movie, you might know what I mean: One minute you're sitting down at home to play a board game. You roll the dice and, all of sudden, giant mosquitoes are buzzing around the room as you run to avoid getting stung. They eventually fly out the window, and you roll the dice again, and a band of wild monkey is running around the house throwing dishes and anything else not nailed down. That crisis gets averted, you roll the dice, and suddenly there are elephants running up the street out front, making total losses out of parked cars. A few more rolls of the die, and you're suddenly in the midst of jungle vines and rhinos and cheetahs and pythons – and the whole world doesn't look anything like the one in which you started to play the game.

Does that seem a little like what this year has felt like to you?

Perhaps like some of you, I wrote a 2020 business plan for my company last December. In the middle of February, I re-wrote it. At the end of March, I re-wrote it yet again. And as the spring progressed, it seemed a bit fruitless to do more revisions until at least something ahead seemed at least somewhat predictable.

Everyone is looking for and talking about when things will get "back to normal." I keep hearing from a lot of shops, "We just need to ride this out for a few more weeks and we'll be good." What I think we all need to consider is that it won't ever get "back to normal." At least not exactly to the way it was. Consider some of the things that changed "forever" after 9-11 (think about air travel, for example) or after the Great Recession (think about home financing practices). Events like these change what "normal" looks like.

Take telecommuting. Are we quickly going to return to scores of white collar workers driving downtown to high-rise office buildings full of people? Maybe some, of course. But many workers and companies are finding that's no longer necessary – and maybe not even desirable.



**YOU HAVE TO STAY ON YOUR GAME IF YOU'RE GOING TO SURVIVE. I CAN'T TELL YOU WHAT THAT LOOKS LIKE FOR YOUR BUSINESS.**

On the other hand, people might not like the idea of getting on a bus, subway, train or airplane so may drive instead. I live in Portland and have an office in Seattle and used to fly to Seattle all the time. I'm driving to Seattle now.

So who knows what to expect?

That's why I'm saying instead of trying to guess what lies ahead, spend that energy making sure you nimble and flexible, able to adapt quickly. A tug boat pulling a barge can't turn left quickly. It's going to take two miles to get that barge turned. That's fine in the middle of the ocean, but it's not going to happen in a narrow river.

Let's say two months after all the stay-at-home orders are lifted (whenever that happens) and your business is at, say, 80 percent of where it was in terms of revenue. Can your business withstand an ongoing 20 percent hit if that is as close to "normal" as you'll get for the foreseeable future?

Can you make that left-hand turn if that's what's needed – and then turn right quickly if that suddenly becomes the route you clearly need to go? Do you have a culture that supports that adaptability?

If you have ever been in a physical fight, you may have experienced that sense of being in control as it's going well for you. But then there's suddenly that moment when you're not. That left hook comes in, and, bam, you are now off-balance. You realize you are no longer in control and may even be in real danger.

You can't let that happen at your business. You have to be on your toes. You have to stay on your game if you're going to survive. I can't tell you what that looks like for your business. It might mean running lean, diversifying your businesses, finding new revenue sources.

But there's one thing I can tell you with certainty about the future: If you can't spin on a dime, you're probably not going to make it. 📞

**MARK OLSON** is the founder of Vehicle Collision Experts, LLC (VECO Experts), a consulting firm that takes a holistic approach to working with shops on repair quality and business performance. [mark@vecoexperts.com](mailto:mark@vecoexperts.com)



# PREMIUM BODY SHOP

## Supplies

HERE TO HELP BODY SHOPS  
SAVE MONEY & KEEP THEM GOING!

### Premium LINERS & LIDS *Only* \$59.98



- 1 HARD OUTER CUP & COLLAR (650ML)
- 50 LINERS 25 LIDS (125 MICRON)
- 25 LIDS (190 MICRON) 50 CAPS

- YOU'LL FIND THAT TECHNICIANS OPERATE WITH GREATER EFFICIENCY AND SPEND LESS TIME ON CLEANING TASKS

- AN ALL-IN-ONE DISPOSABLE SOLUTION FOR MEASURING, MIXING, FILTERING, AND SPRAYING OF PAINT MATERIALS

- SAVES ON PAINT CONSUMPTION AND REDUCES SOLVENT USAGE BY UP TO 70%.



### PANELSHOP 1200

ZERO DUST - BODY SHOP SAFE - 3 IN 1

- REDUCE CYCLE TIME
- REMOVES SWIRLS
- FLAWLESS RESULTS
- COMPOUND, POLISH AND GLAZE! JUST USE DIFFERENT PADS
- ELIMINATES COMPOUNDING MARKS, ULTRA FINE SCRATCHES, AND OXIDIZED PAINT!

*Only* \$19.98 32OZ.



6" DA HOOK & LOOP  
SANDING DISCS  
QTY: 50 DISC

*Only*  
\$24.98

NOW AVAILABLE ON  
**amazon**  
*Prime*

SEARCH "INSTA FINISH LINERS" ON AMAZON FOR A QUICK PURCHASE

**HELP OTHERS BECOME A RESELLER!**

### PAINT GUN ADAPTERS



*Only*  
\$24.98  
FOR A 2 PACK

WANT MORE? FIND THE WHOLE LINEUP ON INSTAFINISH.COM

DISTRIBUTORS WANTED - 310.515.9530



# THE IMPORTANCE OF TRACKING KPIS

Learn how to use the information to keep your business moving forward

**ALAN LUKENS //** Contributing Editor

**W**hen it comes to business improvement, it all starts with measurements. There is an old saying, “You cannot improve what you do not measure,” which stands true today. To effectively understand a metric, a standard must be defined by using benchmarks called KPIS, or Key Performance Indicators. Once this has been measured over a specified duration (nothing less than 90 days is best), the KPI can be compared against previous periods and other regional or national benchmarks to understand

where there may be opportunities for improvement.

Let’s begin with a root cause analysis to determine what variables influence the performance of a specified KPI, which could be individual variables or a combination of other KPIS. We will then analyze each one to look for any parts of the process that can and should be improved to begin driving enhancements in the target area. The key is to never stop tracking or striving for even the most minute of improvements — the best improvements are small and incremental. Keep with it, stay focused and do not try to tackle too

many areas at once. Pick three to five KPIS that are the most impactful to your business and leverage the industry experts in your area. A great place to start is with your paint manufacturer’s business development manager and taking advantage of performance group meetings if they are available to you.

When it comes to business performance, there are certainly an overwhelming number of data points that could provide potential for improvement. Don’t let yourself be overcome with what is known as “paralysis by analysis” by taking on too much. You should focus on a few

KPIs that drive the largest impacts to your business (and as you begin to achieve and revise your goals, additional KPIs can be tracked for continual improvement).

KPIs are often categorized into three key areas: business management, productivity and industry performance. In terms of business management, the ultimate KPI for any business is net profit. This can be tracked as total dollars, or, more frequently, as a percent to total sales.

One business management KPI that supports total sales and allows you to break down performance based on varying job sizes is severity, or the average repair dollars per repair order (RO). As the industry continues the shift into stringent OEM repair procedures, this metric is less about balancing this number to keep other industry partners satisfied and more about understanding capacity and performance for your business. Likewise, cycle time KPIs provide insight into the duration of time it takes for various stages of the repair process. These KPIs are often tracked individually so that improvement measures can be applied to that specific part of the process: arrival to start, start to complete, complete to delivered and total key-to-key time.

For productivity, a great KPI to track is touch time. This KPI determines the average duration of time each vehicle is worked on per day. Of course, the higher this number is, the more labor hours you will be producing in the shortest amount of time. Another KPI that is impactful to productivity is hours per booth per day. In the past, often the predominant booth utilization KPI was booth cycle time. However, booth cycle time just denotes the amount of time it takes to run one booth cycle regardless of how much labor was generated. By tracking hours per booth per day, actual production is being measured and capacity utilization can be determined.

When it comes to tracking KPIs, accuracy and standard methodology is critical to drive consistent and sustainable

results. When looking at a KPI, it is important to track the data in the same format each and every time to ensure when comparing against previous periods or other industry benchmarks so that you are comparing apples to apples. For instance, if you are looking to improve paint cost and profitability, tracking this at a net level (after discounts) will allow you to compare against yourself (or other locations if you have multiple), but will not provide an accurate representation of how you perform compared to other shops in the industry.

To fully understand your performance, this should be tracked at what we call refinish or list pricing. This levels the playing field for the KPI and ensures all data points are measured in the same manner and removes the impact any negotiated deal you may have with vendors from the calculation. Doing this will provide a true benchmark comparison so you can be consistent, accurate and diligent in your efforts for any KPI you have decided to track. The results you get back and sustainability of any improvement will rely on this.

A prime example of how a KPI can influence multiple facets of a business would be hours per booth per day. For instance, if we hypothesize that a paint booth can typically produce ~300 paint hours per week with the right processes in place and your shop has seen bottlenecks in the paint department, this KPI will compare your performance against this benchmark. Let's say your shop is averaging 175 hours per week and has one paint booth. Your body department can produce 275 hours to the paint department per week. At first glance, one would consider purchasing an additional paint booth to increase the amount of capacity in the paint department to meet the current demand. Without comparing your KPI to a benchmark, you could needlessly be making a substantial investment into a piece of equipment that may not be necessary to meet current demand. When paint booths can range from several thousand to over a hundred thousand dol-

lars, this will significantly impact the profitability and available production space within your business.

An alternative to this investment and risking the creation of excess capacity would be to look at the processes and other KPIs in the shop to gain a better understanding of what could be improved to maximize the capacity of the existing spray booth. There could be an array of root causes: improper QC between body and paint, insufficient preparation resources, lack of productivity boosting products implemented, insufficient training, improper product selection and so on. The validation of current processes should be a prerequisite to any expansion measures.

There is no time like the present to begin analyzing where your business can make improvements. It starts with understanding your situation and knowing how to use information identified in the KPIs to decide how to move forward. Building a strong relationship with your business development manager will help you identify opportunities for change and growth, as well as networking with other trusted industry professionals who can offer you valuable insight. Regardless of who you decide to connect with, beginning to think differently and realizing how quickly the landscape is shifting for the automotive collision industry will help you adapt to new ideas and resolve challenges more confidently as they come up. Start tracking your business' most important KPIs today and be ready to face the future of automotive collision repair. 📊



**ALAN LUKENS** has dedicated more than 25 years to the collision industry through learning, adapting and developing innovative solutions

to everyday problems. For the past 10 years, he has held various roles within the automotive refinish division at BASF across sales and marketing. Today Alan manages regional customer segmentation in North America and the global business solutions portfolio for BASF.

# ANATOMY OF A PARTS CODE TABLE

Use this tool to help with the accuracy of your damage appraisals

**JOHN SHOEMAKER //** Contributing Editor

**W**hen written correctly, parts code table entries are valuable when documenting damage appraisals by helping to fill in the gaps left by estimating systems. This allows a repair planner to add steps or processes to completely illustrate what the vehicle repair needs. One of the concerns I have when reviewing parts code table entries, however, is that they are too vague and often create more questions while providing less answers. A parts code table entry should define as much as possible of the who, what, why, where and how in the same manner as an estimating database repair line. The best samples I have seen are in the Society of Collision Repair Specialists (SCRS) Guide to Complete Repair Planning.

Parts code table entries should be as descriptive as possible using the least amount of words. A common error I see is a part code table entry like “Restore Corrosion Protection,” which does not state clearly enough which process the repair planner expects to be performed. How many types of corrosion protection can you think of? The best parts code table



entry also has a line note accompanying them to provide additional explanation. When described in an entry such as “Restore cavity wax,” with a line note describ-

ing “Restore factory applied cavity wax using (product), which requires (percentage) of 12oz can to complete repair,” it removes any doubt on the repair plan-



ner's expectations. Aligning the parts code entry on the damage appraisal under the panel that requires the cavity wax further illustrates where the product needs to be applied. Developed together, the part code table entry and the line note should thoroughly describe the process. To tie the two together, you should use the same identifier as RCW for Restore Cavity Wax for the part code entry and the line note.

Another common error I see in parts code table entries is in the area of structure alignment. I see manually created parts code table entries such as "Pull Rear Body" with a labor value identified. If you think for just a minute, I believe you will come up with a variety of different panels in the rear body area. In that same minute you will wonder which panel requires a pull and why, as most often this entry is found near the bottom of a damage appraisal and not really in line with an obvious repair operation. Estimating system databases have several operation choices available where you can select rear body panel and use the operation "Align" to identify the exact panel that requires the "pull." You should accompany the database entry with a line note showing, "Rear body panel has 5mm of crush as identified in structure measurements" to explain what needs aligning and by what degree. When identifying the panel in this way, you can select adjacent panels that might also need alignment, which further illustrates the repair requirements. The estimating database will also tell you the metal types involved to help you determine if the panel can be aligned, which is something a manual parts code entry will not.

The key is to only create manual part code table entries when absolutely necessary and not replicate something that can be found in the estimating database. Using the database whenever possible will help you keep the repair process aligned within each specific category, as well as alert you to related operations. When creating a parts code table entry, it should mirror the typeface of the esti-

## READ THE ARTICLE? GET AMI CREDIT!

This article is worth .25 credit hours toward Automotive Management Institute (AMi) designation programs. To receive credit, log in or set up a free "myAMI" account at [ami.knowledgeanywhere.com](http://ami.knowledgeanywhere.com). Then search for "Anatomy of a parts code table."

imating database to present a consistent image. I see many entries that are in all CAPITAL letters, which makes them stick out rather than blend in with the other appraisal lines. While you can and should align manual part code entries within the category that the step is required, most often I find them at the bottom portion of the appraisal. Multiple entries at the end of an appraisal will appear random and create questions to their validity or need.

Creating a parts code table can be time consuming. However, the consistency it will provide is unmeasurable towards building an informative damage appraisal. As mentioned above, clarifying the who, what, why, where and how will pay you great dividends in helping all involved understand the expectation of the repair. When your damage appraisals completely illustrate the vehicle repair requirements, you build confidence in your business and reduce secondary communications from those involved in the repair process. This confidence will foster sustainable business relationships and provide growth through customer satisfaction. 📄



**JOHN SHOEMAKER** is a business development manager for BASF North America Automotive Refinish Division and the former owner of JSE Consulting.

[john.a.shoemaker@basf.com](mailto:john.a.shoemaker@basf.com)



**AUTEL MAXISYS**

**PRE-SCAN & POST-SCAN**

# DIAGNOSTIC REPORTS

NOW AVAILABLE ON ALL MAXISYS 908 TABLETS  
MS908, MS908P, MSELITE, MS908S, MS908SP

**PRE-SCAN**



SCAN & PRINT

**POST-SCAN**



REPAIR & PRINT

**Fast & Easy Reports**

- Step 1: AutoSCAN the Vehicle
- Step 2: Print Pre-SCAN Report
- Step 3: Repair Vehicle
- Step 4: AutoSCAN Repaired Vehicle
- Step 5: Print Post-SCAN Report

**ADAS MODULE IDENTIFICATION**  
ICOM PINPOINTS MODULES REQUIRING ADAS CALIBRATION




TEL: (855) 288-3587 • [USSUPPORT@AUTEL.COM](mailto:USSUPPORT@AUTEL.COM)  
[AUTEL.COM](http://AUTEL.COM) • [MAXITPMS.COM](http://MAXITPMS.COM) • [MAXISYSADAS.COM](http://MAXISYSADAS.COM)  
 ©2020 AUTEL U.S. INC., ALL RIGHTS RESERVED



## A look at the industry's actions to change business practices that meet new expectations

**JOHN SHOEMAKER //** Contributing Editor

**O**ur industry has gone through some interesting changes over the last couple of months, adapting very quickly and remaining resilient as we've all tried to keep our businesses open and employees on the payroll in a strange new world. For some, the struggles were too much and businesses were shuttered. For others, the challenges were difficult to overcome,

and yet others further buckled down and developed or refined current processes and standard operating procedures to work within government restrictions. As we developed new practices, and we educated ourselves on different ways to conduct business, created new and innovative solutions and all while teaching our customers new expectations. In doing so, we created a new normal.

The biggest shift towards a new normal in collision repair businesses that I have seen is the widespread adoption of photo estimating. This is a practice that has long been disputed by some, and yet incorporated by others as continuing restrictions have made it a necessity. Looking for ways to restrict physical contact between our staff and customers, photo estimating has replaced the common question we ask





# IT'S GOOD TO BE **GENUINE**



**GENUINE • QUALITY • RELIABILITY • FIT • VALUE**

Toyota Genuine Radiators and Condensers provide uncompromising quality. They're meticulously designed for the perfect fit, engineered and tested by Toyota, and backed by our Toyota Genuine Warranty. And now, they're available for almost all Toyotas on the road, giving you the perfect blend of benefits to help increase your shop efficiency and profitability.

EXCLUSIVELY FROM YOUR TOYOTA DEALER



**Wholesale Parts**

» **[toyotapartsandservice.com](http://toyotapartsandservice.com)**

For complete details about Toyota's warranties, please refer to the applicable Warranty & Maintenance Guide or see your Toyota Dealer.



of clients: "Can you bring your vehicle in for an estimate?" In the past, I know shops have often been asked by a customer on the phone how much a repair would cost, and of course, the first response would be that the shop needs to take a look at the vehicle first. The shop might have even had a customer offer to send pictures outlining the damage to help determine the cost of a repair, to which they were informed that process would never work, as there could be hidden damage and repair costs.

So, what changed? My guess is necessity. Fortunately, there have been significant improvements made in photo estimating in the recent years that make the process a little more user-friendly for all the parties who are involved. Websites have been upgraded to support the process, and customers are embracing them because they don't have to make multiple visits to the repair shop in order to prepare for a vehicle repair. As we begin to reopen our collision centers as the government reduces restrictions, will photo estimating replace drive-in estimates at your shop? If not, how will you challenge your competitors that do?

Many of the shops I have talked to recently are now offering pick-up and delivery service for customers in order to create a "touchless" repair process. Some have always provided this service in their shop, but for the majority, this is a new endeavor. As we move into the new normal, will your shop still offer a pick-up and delivery service? If so, how will you manage this process? I know many hope they will be much busier once people start moving around again, so how will you sustain this service while balancing increased business? If you do not intend to continue with this service indefinitely, how will you address the request with the customer who now

knows you can do it? It is going to be hard to explain to your customers that the practice was only temporary after you have shown the ability to make it a reality. For shops to maintain their market share, they will need to adjust to the continuing shift in attitudes, behaviors and expectations of their consumers.

One thing I've noticed throughout all of this is an overall improvement in customer service. It seems shops are talking to customers more, especially regarding what to expect and their options for repair. Front office staff are focusing on scheduling repairs rather than the need to get an estimate. Something I have been discussing in my training for years, and now through necessity, is becoming more frequent in practice. Another shift is in how paperwork is being handled. Some are using a DocuSign arrangement while others are emailing forms and asking customers to leave them in their vehicle. Many have added touch-free payment options by taking credit cards over the phone or through a link on their websites. With everything combined, we have lessened the inconveniences a collision customer generally endures while they work through the hurdles of getting their vehicle repaired. I think this is a new normal we can live with!


As many have operated in a different world over the last couple of months, they have taken a hard look at themselves and their businesses. I have only mentioned a few of the many practices shops have changed to comply with government restrictions. My goal throughout this article was to suggest how these changes are affecting our customer base. We have all seen how companies like Amazon, Zappos and others have changed consumer purchasing habits. Our new workarounds follow in the same vein and could create a difference in how

## READ THE ARTICLE? GET AMI CREDIT!

This article is worth .25 credit hours toward Automotive Management Institute (AMI) designation programs. To receive credit, log in or set up a free "myAMI" account at [ami.knowledgeanywhere.com](http://ami.knowledgeanywhere.com). Then search for "How we created a new normal."

we operate once restrictions are eased.

There are some who say we should probably not go back to the way we previously handled our business. To some degree, I must agree with them. The changes we have made in our processes has changed the way customers interact with us today and align us more with Amazon than our collision center prior to this pandemic. As I have asked throughout this article, can you sustain the changes you made in your processes for the long term? If the answer is no, then it is time to look at your processes to see what you need to change so you can sustain them.

As we ramp back up towards the new normal, there is not going to be a convenient time to stop doing something that made a customer experience better. We have created a new normal and need to refine our processes to ensure customer expectations are met before the ramp up begins. I feel confident customers will continue to expect the Amazon experience more so than the service we provided in January, and we must be prepared. 



**JOHN SHOEMAKER** is a business development manager for BASF North America Automotive Refinish Division and the former

owner of JSE Consulting.

[john.a.shoemaker@basf.com](mailto:john.a.shoemaker@basf.com)

# ADAS — A MOBILE TECH'S EXPERIENCE

ADAS IS TIED TO NEARLY EVERY OTHER ELECTRONIC SYSTEM ON A VEHICLE TODAY, SO UNDERSTANDING PROPER DIAGNOSIS AND CALIBRATION IS VITAL

MIKE REYNOLDS // Contributing Editor

**A**s a mobile technician serving both the collision and repair industry, I was reluctant to get into ADAS calibrations. But even if I had wanted to avoid them, it wouldn't have been an option, as they are tied into nearly every other electronic system on the vehicle. It is easier to think of a system that is tied to the ADAS system than one that isn't. Consider a front radar operating adaptive cruise as it approaches a slower vehicle ahead. It may be receiving information like wheel speed and yaw rate (turning motion) from ABS and airbag modules, just to name a few. At the same time, it may be outputting signals to the ABS module to apply brakes, the airbag module to lock the seatbelts, TCM to unlock the torque converter or downshift, the radio to operate an audible warning, the cluster to operate a visual warning, the PCM to control throttle angle, the BCM to operate brake lights and maybe even the suspension controller to adjust dampening. If you think that's impressive, check out the Audi pre sense side system, which uses a radar to detect a side impact and raise the vehicle over three inches in half of a second to help absorb the collision. Needless to say, there isn't much on the vehicle that isn't tied into an ADAS system.

With that in mind, it makes a little more sense how just about any fault can disable these systems. It's crazy to think that an aftermarket radio can cause an ADAS system not to function correctly, but I've seen it with my own two eyes.

Aftermarket radios are the least of our worries going forward. Because these systems are intertwined into so much of the vehicle, we are seeing more and more repairs that used to be simple and quick, which now require a calibration. If you're reading this, chances are this isn't new information. But are you able to identify what ADAS components need calibrated after a collision and why? It's not as easy as you may think and has been causing a disruption in the collision repair process for quite some time. Let's see if we can break these systems down and make the components and calibrations a little easier to understand.

As an instructor who also gets to sublet for collision repairers, I would like to think I understand the challenges that ADAS has presented the industry. One of the first things I teach students is to completely disregard the system and focus on the component. Terms like autonomous emergency braking, lane assist, lane keep and birds-eye-view are irrelevant to us because we are not repairing these systems. We are repair-



**FORWARD FACING RADAR UNITS** come in many shapes and sizes and are sometimes mounted behind emblems or covers.

ing the components that are a part of these systems. Component identification is the first and most crucial step in understanding ADAS, so to start we are going to address the four most common ADAS-related components on vehicles that need calibrated after a repair.

First and most common to collision repair are radar units. We used to be able to group radar into two categories, forward facing and blind spot, but as technology advances we are seeing radar units placed all around vehicles. A short list of names for radar sensors includes: Distance Sensor, Forward Facing Radar, Millimeter Wave Radar, ICC Intelligent Cruise Control sensor, ACC Adaptive Cruise Control module, BSI Blind Spot Indicator module, BSM

Blind Spot Monitor module, SODM Side Object Detection Module and BSW Blind Spot Warning module. Obviously, nomenclature isn't going to get us very far in identifying these components, as there are far too many titles for these components. It is much easier to identify them by their shape and location on a vehicle. Most radar units are black rectangular modules that often measure between 3-5" depending on application. They are usually mounted on the exterior of the vehicle, sometimes exposed, but often under a cover or panel. Some radar units can also be mounted under the windshield (common in Volvo, and newer RAM trucks) or in taillight housings (common in Ford trucks). It is important to note that there are a few forward-facing radar units that have a domed shape face (common in Dodge, Chrysler, Jeep and a few Nissan, Hondas and Mercedes). While these radars may perform different functions like adaptive cruise or blind spot monitoring, the principals of how they operate, as well as the purpose and need for calibration is essentially the same. We'll dive a little deeper into that shortly.

Next, we will talk about sonar sensors — AKA parking sensors. There are very few vehicles (mostly newer Toyotas) that require calibration of these systems; however, it is important to mention them because we must be able to distinguish them from other components. Parking sensors use sonar (sound waves) to measure the distance from objects in very close range (typically a few feet). These sensors have been around quite a while. They are round, small and mounted in front and rear bumpers. They can be used for parking assistance as well as autonomous parking. Because they measure distance, they can be easily confused with the term distance sensor, which is most commonly used to describe a forward facing radar that is used for adaptive cruise or autonomous braking functions.

Forward-facing cameras are almost always mounted behind the center of the top of the windshield, or sometimes to the roof right behind the windshield. They can sometimes be identified behind a triangular cutout in the windshield although other components like light and rain sensors can sometimes be located in the same area. Some vehicles (like Subaru) run two stereo cameras. These cameras are most often used for lane keeping systems, but can also be used or aid in adaptive cruise control as well as emergency braking systems. These cameras use imaging technology to allow the vehicle to identify things like signs, lane lines and objects in the roadway.

Driver vision cameras are different from the forward-facing or image-processing cameras in that they are used to display images for the driver to use when maneuvering their vehicle. These small cameras can be mounted in the rear tailgates, trunks, mirrors and grilles. This technology was around for quite a while as a backup camera, but it has evolved into some pretty impressive bird's-eye and 360 view systems.

Now that we know a little bit about how to identify these components, we can focus on what's important — do they need calibrated and why?

But before we dive into it from a collision repair perspective, let's look at it from the perspective of the repair shops who have even less exposure to the technology. If a repair shop is replacing a transmission in a 2016 Ford Transit that is equipped with Lane Departure Warning, the camera in the windshield must be calibrated after the service. A repair technician may laugh when you tell them this, but direct them to the R&R procedure of the transmission and they will see that the front subframe with the steering rack must come off in order to remove the transmission. Because of this an alignment must be performed and after that alignment, the



**THE OLDEST OF ADAS TECH** is still around and not likely going anywhere.

windshield camera must be calibrated.

If you think it might be easy for a repair technician to miss that calibration, you better believe it will be much easier to miss it when trying to come up with a collision repair plan. This is mainly because it is nearly impossible to predict what components will become uncalibrated in a collision, as no two collisions are the same. Could a rear hit cause a front radar to be out of alignment? Absolutely. The only way to know if a component is calibrated correctly is to calibrate it.

Some manufacturers are better about creating collision guidelines regarding post collision calibrations. Honda, for example, states in a position statement (Aiming Driving Support Systems April 2020) that all forward facing cameras and radars must be calibrated after ANY SRS deployment. But many manufacturer's repair info is not as specific or can be hard to find.

In almost all cases, if an ADAS component is removed and reinstalled, or replaced there is some sort of calibration, alignment, or coding that needs to be done. In most instances it is easy to find a chain of repair procedures that leads to the need to perform a calibration i.e. Headlight repair required bumper removal and the forward-facing radar is mounted in the bumper and must be calibrated after R&R. Often a wheel alignment is followed up with ADAS calibrations as well.



# TARGET

YOUR NEW  
REVENUE STREAM

MA600

AUTEL MAXISYS

ADAS  
CALIBRATION

AFFORDABLE & PORTABLE



FOLDABLE CALIBRATION FRAME

## DON'T JUST REPLACE WINDSHIELDS RECALIBRATE YOUR FUTURE

ONE LEVEL CALIBRATION PROCEDURES FOR MORE THAN CAMERA BASED SYSTEMS

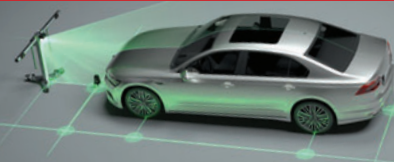


FIVE LINE LASER  
1 PERSON PROCEDURE  
QUICK & SIMPLE SETUP



YouTube  
TRAINING  
VIDEOS

@AutelTools



<https://www.youtube.com/auteltools>



Phone: (855) 288-3587 • [USSUPPORT@AUTEL.COM](mailto:USSUPPORT@AUTEL.COM)  
[AUTEL.COM](http://AUTEL.COM) • [MAXITPMS.COM](http://MAXITPMS.COM) • [MAXISYSADAS.COM](http://MAXISYSADAS.COM)  
 ©2020 Autel U.S. Inc., All Rights Reserved



**AUTEL**®

“So, if the calibration isn’t listed in service info, we don’t need to do it, right?” Not necessarily. Because the service information cannot be written to cover every collision, we need to ask a few questions before choosing not to calibrate an ADAS equipped vehicle after a collision repair.

Is it possible that the ADAS component has shifted from the collision?

Is it possible that a repair such as a heavy structural repair may have changed the mounting angle or location of the ADAS component in relation to the wheels or direction of travel?

Is it possible that the vehicle will not track the same as it did after the collision repair?

If the answer to any of those questions is yes, then you should consider having the calibration checked. So let’s talk about the why.

Let’s say we need to remove the front bumper in order to repair a damaged fender on a 2017 Toyota Avalon, chances are it is equipped with a millimeter wave radar sensor that will need calibrated after the repair.

“But Mike, are these calibrations really that important? What actually happens when the millimeter wave radar is removed and reinstalled with the bumper on that Toyota Avalon and a calibration isn’t performed?” Well, let’s first talk about what the millimeter wave radar is and how it works. Radars are primarily used in adaptive cruise, autonomous braking/collision warning and blind spot monitoring systems. The radar units emit a beam of radio waves. The width of that beam (think field of view) is dependent on application i.e. a blind spot radar will emit a wide beam that allows it to detect vehicles throughout the entire blind spot, where as a forward facing radar may emit a tighter beam intended to only identify vehicles ahead. Once emitted, radio waves reflect off of objects, and some of those reflected radio waves return to the radar unit

where they are used to measure the distance and velocity of whatever object they reflected off of. In order for the radar to determine this information, it needs to compare measurements taken over time and compare them to a reference angle. For now, think of the reference angle as the center axis of the radar beam. If an object detected by the radar unit is located 31° to the left of that reference angle, and one second later it is 59°, it can now use that information, along with distance and velocity measurements to determine the trajectory of the object the radar has detected. If you feel like nerding out, read up on the doppler effect and azimuth angles for an even better understanding of how this tech works.

Once the radar in our Avalon has identified an object, it’s location, trajectory and velocity can be calculated using the reference angle, but it will need to know the trajectory of the vehicle that the radar is mounted on (our Avalon) in order to operate any ADAS function. For this operation, it will look at inputs from steering angle, wheel speeds, and yaw rate to name a few.

These inputs allow the system to predict the trajectory, velocity, and direction of travel of the vehicle. Compare that data to the data of the object that the radar unit identifies and voila! We have everything we need to operate our adaptive cruise control. Well, almost — there’s more to it than that. For example, in order for a radar to know where a detected object is located in relation to the Avalon, it must know where the radar unit itself is located on the vehicle. When we perform the millimeter wave radar calibration on our Avalon, we are feeding the radar that information! The radar has no way of knowing it has been removed and reinstalled and is not likely that when we removed and reinstalled the bumper, that the radar ended up in the exact position it was before the R&R.

And if we don’t calibrate that radar?

Even if our Avalon came into the shop with a properly operating adaptive cruise system (which is unlikely after a collision), the radar would have been previously calibrated and learned it’s mounted position in relation to the vehicle. In a perfect world when traveling on a straight and level road, all four wheel speeds are the same, the steering angle sensor would read 0°, and the vehicle will travel straight forward along the vehicle centerline. In that same perfect world, the radar would be mounted perfectly on that centerline so that the center of the radar beam (beam axis) matched the vehicle centerline. But we don’t live in a perfect world and chances are that radar wasn’t mounted perfectly center when it came in. Odds are even better that it isn’t going to be mounted in the same position when it is reinstalled. This is why they must be calibrated. The radar has no way of knowing that it’s beam axis angle (consider this the angle the radar is looking) has shifted when it was removed and reinstalled. If it isn’t calibrated afterwards, chances are the reference angle it is using to calculate the position of objects it detects is not correct.

But does it really make a difference? Consider that an average long range radar can read over 800 feet. If that radar was removed from the vehicle and reinstalled 2° off horizontally, its beam axis will land 13.96 feet in the wrong direction at a distance of 400 feet. The average width of an interstate lane is 12 feet meaning that at HALF of it’s useable range the radar will be “looking” in the wrong lane if the radar is only 2° off and a calibration is not performed! There are two things I am certain of: First, I am not capable of removing and installing a radar unit and having it end up within 2° of where it was before I touched it, and second, I do not want to be in a Toyota Avalon with the adaptive cruise set at 65mph while the radar is looking at vehicles in the wrong lane!

And keep in mind that this example would apply to a vehicle with no visual damage to the front of the vehicle near the radar. This makes it easy to understand why calibrations are imperative on vehicles that have damage near radar units.

Although camera imaging technology and driver cameras do not operate the same way as radar, the necessity for calibrating them after any service that could shift one of these components is the same.

Going back to our Transit with the transmission R&R, you may have been thinking that there is no way we could have shifted the IPMA camera on the windshield during the R&R of our transmission, and you would be correct. So why was the calibration necessary?

I had mentioned that the radar in our Avalon was presumably calibrated and learned. When we calibrate these systems, at least during a static calibration, we are often calibrating the component in relation to the centerline. But what if our vehicle has a directional pull?

The camera in our Transit is looking at the lane lines and determining the position of the vehicle in relation to the center of the lane in order to operate the LDW (Lane Departure Warning) system. In addition, it is constantly trying to predict where the vehicle is going in relation to the lane markers so that it can give an audible or haptic warning to the driver if it determines the vehicle is about to exit the lane. As I'm sure you could imagine, steering angle input is crucial to the operation of this system. Even a slight adjustment during a wheel alignment can change the tracking of our Transit which would have been learned prior to performing the alignment. The camera has no way of knowing that the vehicle was aligned. Because it may not track the way it previously did before the alignment, and that can directly affect the operation of the LDW system, the service procedure requires the camera alignment to be performed after adjusting the front toe.

Our Transit and Avalon are really just the tip of the iceberg. These systems, components, and calibrations can vary drastically from model to model, let alone make to make. We generally use the term "calibration" to define a wide variety of ADAS-related procedures, and we often try and categorize calibrations as dynamic or static with dynamic being a calibration performed while driving and a static calibration being performed in the shop using special tools. While this can be helpful, I believe it can also be misleading at times. Not all ADAS-related functions require a scan tool function to perform a calibration. Just because your scan tool does not have the option for a calibration or says that there is not one, does not mean there isn't. And just because your scan tool shows a calibration function, even if it is a dynamic calibration, does not mean that leveling tools or special procedures are not required before performing the calibration.

I often see vehicles not being calibrated because the procedure wasn't in the scan tool when in reality, these components do not need a scan tool for the calibration. Instead, they have procedures requiring special tools used to measure the position and mounting angle of a component on the vehicle.

The other big misconception we need to change is the idea that if there are no codes, nothing is wrong. It is a common misconception in the glass industry that if they don't unplug the camera no codes will set, and it will not need calibrated. That is not the case at all. These components have no way of determining that they have been removed and reinstalled and most of them will not set a code even if they are unplugged and plugged back in. This is because if they did set codes, a calibration would need to be performed every time the battery went dead.

Often these systems will take many miles of driving to set codes indicating the calibration is off. I have driven plenty of vehicles with no codes that would have

allowed adaptive cruise to rear end the vehicle in front if I didn't intervene as well as vehicles with no codes that activate the brakes when approaching oncoming traffic in the opposing lane on a two lane road. Often these systems will eventually code but it may take multiple instances of unsafe operation before the system is disabled and codes are set. No codes does not mean no calibration!

What we see most often is a vehicle being sent out after a repair without having a calibration performed, and the customer either returns it to the original collision repair facility or worse yet a competitor's repair facility, because the system does not operate properly or has set codes and disabled the system. This is usually due to the components being out of alignment and can often be remedied with a calibration but in some instances, a panel or mounting bracket is misaligned or damaged and needs replaced. Catching these issues beforehand helps improve cycle time.

As this technology advances the ability for these systems to determine that they have come out of calibration is getting better. Unfortunately, we still see a few shops trying to sneak these vehicles out without having a calibration performed, but because the likelihood of them returning is fairly high, compiled with the risk and frustration involved in dealing with an ADAS-related issue after the vehicle is repaired, even the most aloof of repairers are finally getting on board. Hopefully the information in this article will help you and your team be even better prepared to identify and plan around ADAS-related repairs and keep efficiency high. 📧



**MIKE REYNOLDS** is the owner of Mobile Automotive Service Solutions in Charleston, SC, and a former automotive instructor at Trident Technical College. He

is certified as an ASE Master Technician (A1-A9, X1) along with L1 and L3.

[mike@masscharleston.com](mailto:mike@masscharleston.com)



# SHUTTER MOMENT

## DAMAGE TO RADIATOR SHUTTERS FORCED A DIAGNOSTIC CHALLENGE

**JOHN ANELLO //** Contributing Editor

I was called to the shop to address a CEL lamp on a 2017 Dodge Ram Pickup that was recently involved in an accident (**Figure 1**). The body shop was all done with the vehicle, but wanted to perform a post-repair scan and address the issue of the check engine light. If there were any further issues with the vehicle, then a supplement would be needed to do further repairs in order to

complete the insurance claim for guarantee of customer satisfaction. The last thing you need is to let a vehicle go with underlining or unforeseen issues only to have the customer come back with complaints associated with the accident. You want to prevent comebacks and bad reviews that could end up on social media putting your reputation at risk.

When I arrived at the shop, I performed a full vehicle post scan and the only codes that were in memory were

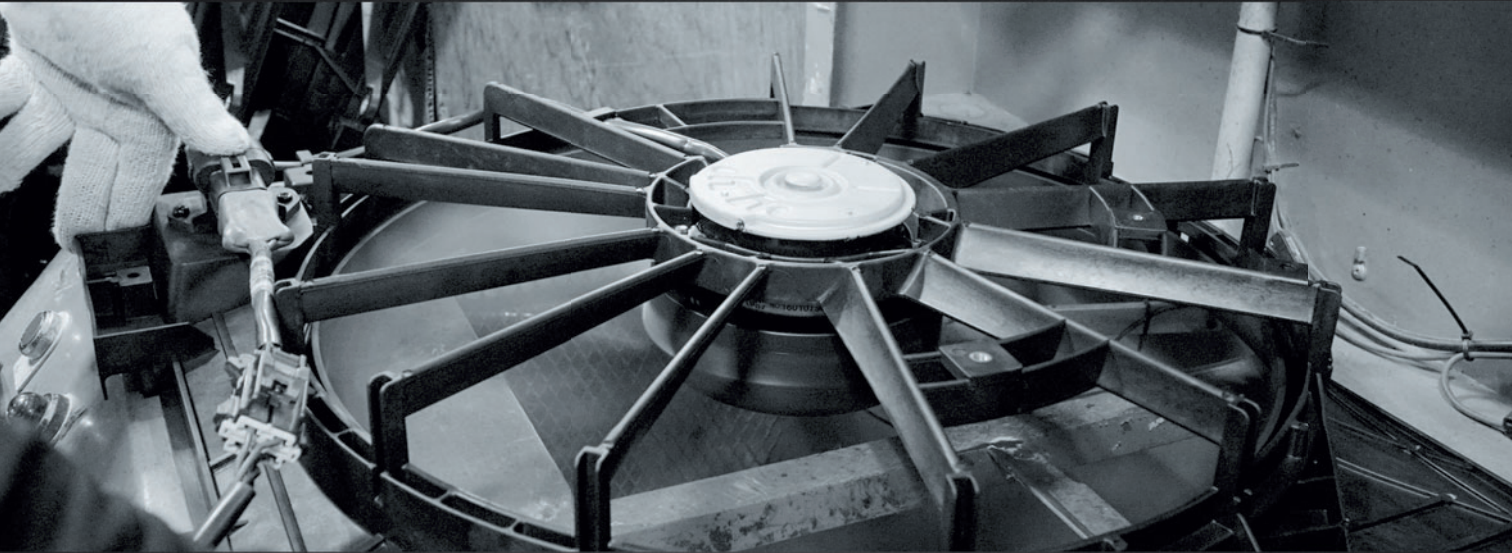
stored in the Powertrain Control Module (**Figure 2**). The first code P1D73 dealt with a performance issue with the radiator shutters that were in front of the radiator that controlled air flow going through the radiator. These shutters are normally closed during low ambient or engine temperatures. This helps to prevent a drag coefficient across the front of the vehicle when the vehicle is in motion down the road. If additional cooling is required due to increasing engine tempera-





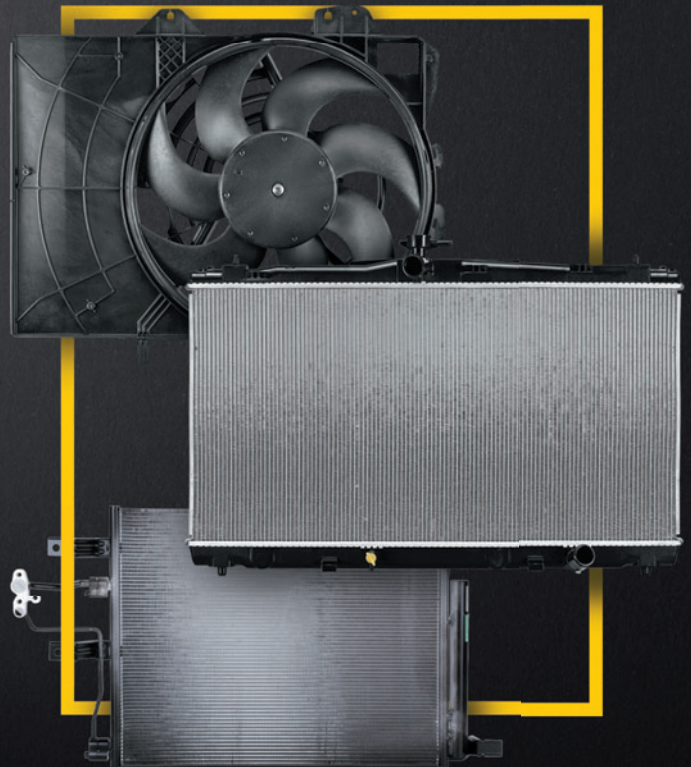


# Expect More. Expect TYC.



## Need Cooling Products? Think TYC.

- Vehicle and individually in line tested to ensure fit, form, and function.
- Designs reflecting the latest technology, including control modules and brushless motors.
- Comprehensive in-house design, tooling, testing, and production, including subcomponents for consistent, reliable built-quality.
- OE-comparable motor performance and connectors - No 'Piggy' tails here.



**TYC is a Proud Supporter of Novitas Foundation**

Your gift can save lives, bring hope and build a future for a world in need go to [NovitasFoundation.com](http://NovitasFoundation.com).



SCAN QR CODE  
TO LEARN MORE

*\*(Select Applications)*

For more information about TYC™ replacement automotive parts, consult your local TYC™ parts distributor or look up parts online at [www.TYCUSA.com](http://www.TYCUSA.com).



tures, the Powertrain Control Module will command the grill shutter vanes to open. In colder climates, the active grille shutters may be used to improve engine coolant warm-up times rather than resulting to the old-school tactic of putting a piece of cardboard in front of the radiator.

The active grille shutters are controlled by an actuator and each time the vehicle is started, the PCM will initialize the shutters to fully open and then cycle back to the closed position. This helps the PCM to learn the hard stops for the shutter assembly, but in it is a great diagnostic visual inspection to perform on most cars because you can at least confirm that if the vanes move then it's guaranteed that the actuator and wiring are OK and there is no mechanical binding. If there are any issues, then the performance code will set after a vehicle starts up. If the vehicle is in a cold climate below 40 degrees Fahrenheit, the PCM

MaxiSys		VEHICLE DIAGNOSTIC REPORT		AUTEL 2
ESM -- Electronic shifter		0		Pass
EDM -- External disc module		0		Pass
<b>1. PCM -- Powertrain control module — ( 02 )</b>				
1.1. P1D73	AGS performance			
	Stored			
1.2. U11E9	Lost communication with AGS			
	Stored			

may assume that the shutters are frozen from ice so it might not set a code; therefore, a mechanical issue would not be detected until a warmer period start up. In this particular case, I did go outside and check the operation of the shutters. They did fully open and then close on start up, so I knew it was safe to say that the new shutter assembly installed was operating correctly.

The second code stored in the PCM was code U11E9 that dealt with a com-

munication issue. This shutter actor has a built-in smart module that gives it the ability to communicate with the PCM through a LIN network line. There are only three wires feeding the shutter actuator (**Figure 3**). One being a power supply, another being a ground feed and the last circuit being a LIN feedback to the PCM. The LIN circuit is used as a feedback circuit to give the PCM information on the position of the shutter, and it will accept commands from the PCM





to the position it should be in. If this “U” Code was a hard failure, then you could almost guarantee that the actuator either had a loss of power/ground feed or an open/shorted LIN circuit.

The shop did replace the entire shutter and actuator assembly (**Figure 4**) because it was damaged from the front-end collision. It was quite easy to just clear the codes and call it a day because everything was in working order. The LIN circuit was operational because the PCM had the ability to command the shutters to cycle on vehicle start up and the power/ground feeds were OK because the actuator was operating. The one thing that a lot of shops would never know is that there is a specific procedure you must perform on this vehicle that other manufacturers do not require. Every time those shutters are operated, the PCM will start its counter and keep in memory how many times the shutter has been cycled from closed to open. This can be seen in scanner data (**Figure 5**). Notice that the vehicle from day one had about 13,806 commanded shutter cycles. That is some miles on that component and I’m guessing that the manufacturer is allowing the PCM to keep track of the aging factor of the actuator from a maintenance point of view.

If you put a new actuator and shutter assembly in, then this counter must be set back to zero because it is no longer the original part from three-plus years ago. There is a functional procedure in the scan tool to reset the counter back to zero when a new one is installed. It’s basically a feature like resetting the oil life index after an oil change. This setting will stay in memory because it is in a volatile memory section of the PCM where even a low battery condition will not jar it out of the history log. It’s part of a post-repair procedure that should be done during a front-end repair on this vehicle when the shutter assembly is replaced. I can almost guarantee you that there are plenty of these vehicles running around without this procedure ever being done and you

150	Reverse Gear Lockout Filtered Switch State	Off				
151	Skip Shift Filtered Switch State	Off				
152	Fuel Tank Pressure	-410.0	-32768	32767	Pa	
153	Active Grille Shutter (AGS) Fan Speed	-1	-32768	32767	rpm	
154	Active Grille Shutter (AGS) High Fan Speed	-1	-32768	32767	rpm	
155	Active Grille Shutter (AGS) Low Fan Speed	-1	-32768	32767	rpm	
156	Active Grille Shutter (AGS) Medium Fan Speed	-1	-32768	32767	rpm	
157	Active Grille Shutter (AGS) Desired Position	AGS Open				
158	Total Active Grille Shutter (AGS) Actuations	13806.5	0	10737418 23.5	counts	
159	Variable Speed Fuel Pump Volts	2.8693	0	320.31	V	
160	Variable Speed Fuel Pump Actual Rail Pressure	410.0	0	1023.98	kPa	

151	Skip Shift Filtered Switch State	Off				
152	Fuel Tank Pressure	-429.0	-32768	32767	Pa	
153	Active Grille Shutter (AGS) Fan Speed	-1	-32768	32767	rpm	
154	Active Grille Shutter (AGS) High Fan Speed	-1	-32768	32767	rpm	
155	Active Grille Shutter (AGS) Low Fan Speed	-1	-32768	32767	rpm	
156	Active Grille Shutter (AGS) Medium Fan Speed	-1	-32768	32767	rpm	
157	Active Grille Shutter (AGS) Desired Position	AGS Open				
158	Total Active Grille Shutter (AGS) Actuations	0.0	0	10737418 23.5	counts	
159	Variable Speed Fuel Pump Volts	2.8986	0	320.31	V	
160	Variable Speed Fuel Pump Actual Rail Pressure	416.0	0	1023.98	kPa	
161	Variable Speed Fuel Pump Duty Cycle	85.8497	0	100	%DC	
162	Variable Speed Fuel Pump Desired Rail Pressure	430.0	0	1023.98	kPa	
163	Maximum Boost PRatio	NOT-DEFINED			PRatio	

can’t blame it on the repair technician. The manufacturer should put a warning sticker on the new shutter assembly to notify the repair tech that this procedure should be done, but they don’t; I’m guessing stickers these days are expensive.

You can see the end results of the shutter reset at 0.0 Actuations (**Figure 6**). It was well worth it for the shop to call me in to perform the post scan on the vehicle. When I perform vehicle scans it is not just about resetting a vehicle, but it’s also gathering all the information you find and making sure anything that is associated with the codes has been corrected. There are also many post-repair procedures that must be followed with each manufacturer and in this case, it involved resetting the counts on the grille activations. There may also be requirements to calibrate SRS Passenger Occupant Seats for child weight or even calibrating the ABS Yaw and steering angle sensors. If these post-repair procedures are not done, then the onboard systems may not

function properly as designed.

My only hope is that this article has opened your mind to realize as these vehicles get more complex, it is vitally important to keep up with technology. There are always new designed systems being added on these vehicles at a never-ending pace and if you are unfamiliar with the strategy of these systems, you may be doing an injustice to your repair techniques if you don’t keep in the loop. I can only say that if you are reading this article along with many other trade articles in our industry then you are the true trailblazer that is keeping your head above the vehicle technology wave and you will endure as the successor. 🏆



**JOHN ANELLO** owns Auto Tech on Wheels in northern New Jersey, which is a mobile diagnostic service for 1,700 shops, providing technical assistance and

remote programming. He is also a nationally known trainer.

[atowscopeit@aol.com](mailto:atowscopeit@aol.com)

# A DIVE INTO SQUEEZE-TYPE RESISTANCE SPOT WELDING

## UNDERSTANDING THE BASICS AND BEYOND

DAVID BRINKLEY // Contributing Editor

**W**hat did the good spot weld say to the bad spot weld? A: You just couldn't "resist," could you? If you don't know much about spot welds, I'll let you off the hook. That joke isn't particularly funny. Good welding jokes are hard to come by. Squeeze-type resistance spot welding is the subject we will cover. No more jokes will be attempted. I promise!

Although not new to our industry, it is a process that virtually every shop should be capable of performing currently. I will recap the process if you are familiar with it, and get you up to speed if you are new to it. If you are not currently capable of performing this process and need to justify the purchase of a machine, you will hopefully benefit from this information. I'll give a high-level overview of what squeeze-type resistance spot welding, or STRSW for short, is and why it should be regularly used in today's collision repair shop. I will go over the different types of machines and some of the more common procedures associated with this equipment. In the end, you should be confident about what technicians are doing and why. If you haven't purchased this type of equipment yet, you will have some idea of what you should be looking for when purchasing an STRSW machine.

The STRSW process in its simplest form of explanation is that where a weld,

or joining of the materials, is made by a resistance weld. To explain it just a bit deeper, it is a weld that typically bonds two or more panels/parts together by creating an electrical resistance between two electrodes. The electrodes don't touch; they attempt to pass current through the location, thereby heating the metals to a point of welding them together. Another aspect is the "squeeze-type" part of the process. It's here where a typical resistance spot welder and STRSW separate. In the STRSW process, the panels are squeezed together with a minimum, or specific amount, of pressure while the weld is created. The squeezing of the panels together is typically done first before preheating of the metal and the actual welding process. It may follow this simplified overview: squeeze, preheat, weld, cool down and release. Tips of resistance spot welders are made of copper, which is a better conductor of electricity than steel. That design is what creates resistance as the current attempts to pass through both tips. It is why the machines of today are far better than those of days past or those used in industrial applications. Some resistance spot welders use a manual squeeze action, but it may be limited by the operator's strength. Current equipment applies a much stronger force — more on that later.

If you are fortunate to have a squeeze-type resistance spot welder in your shop, consider this to be a refresher — or maybe you know about the machine, but not really what it is or what it does. It may be



AN EXAMPLE OF SHUNTING PLIERS

that it's not being utilized correctly or often enough for various reasons. This can also help you to better explain to your customer how this part of the repair process works. They may be reassured knowing that you are using a similar method as the manufacturers used when they built the car, truck or SUV. The use of STRSW is what I would consider a "win-win-win." The repairs are done correctly, they resemble the factory appearance, and it is much more efficient than the MIG/MAG welding. In appearance, it will mimic other similar areas of the vehicle. The ability to have a visually better repair should not exceed the importance of performing the necessary type of repair. Resistance spot



# GET ORGANIZED NOW

BE READY WHEN THINGS GET BACK TO NORMAL



PART # I-MCWM

## INNOVATIVE PAINT PREP CART WITH MASKER™

- > Stores material & supplies in full view from any angle
- > Rolls into the work area for greater efficiency
- > Keeps supplies handy and techs on the job
- > Facilitates easy-to-use bar code inventory system
- > Enables repair & process controls for consistent quality
- > Additional models available for bodymen & detailers
- > Lifetime warranty



PART # SSPC-B

## INNOVATIVE PARTS CART B™

- > Load parts directly from the delivery truck
- > Vertical storage saves valuable floor space
- > Open design for easy loading & unloading
- > High-Carbon, durable steel construction
- > Shelves adjust & nest in seconds
- > Durable powder coat finish
- > Industry's only parts cart with a Lifetime Warranty
- > Additional models & accessories available to meet your needs

VISIT [INNOVATIVETOOLS.COM](http://INNOVATIVETOOLS.COM)  
TO VIEW VIDEO DEMONSTRATIONS AND  
TO FIND A DISTRIBUTOR NEAR YOU





welding, in even its most basic form, reduces the amount of heat put into the panels at the time of the weld. That fact also can play a role in the possibility of limiting the amount of corrosion forming at a later time as well. The less heat, which reduces the “heat affect zone” (HAZ), used during a resistance welding process, the less chance there will be unnecessary damage to coatings on the steel. There is an even more important reason we will discuss next.

Squeeze-type resistance spot welding may be a critical factor in the proper way to join advanced steels. It is this notion as to why you should understand the OEMs’ requirements of STRSW in certain scenarios, whether it be general collision repair guidelines or specific body repair procedures. The use of steels other than mild cold rolled steel is rampant in today’s vehicle construction, as you should be well aware. Many of these advanced steels do not respond well to methods of days past. Even though joining of advanced steel may appear satisfactory after MIG/MAG welding, the amount of heat introduced into the area could have caused that steel to become brittle and not perform well in a subsequent collision. As mentioned above, if corrosion sets in due to the elevated damage of the coatings, that can also affect crash worthiness at a later time.

As for the shops that do have the necessary equipment, but aren’t utilizing it to its full potential, there can be several reasons as to why. The two most common factors that have brought the shop to that state are either the machine is out of date or more likely there is a lack of knowledge/training in play. It may be that the initial investment did not have satisfactory training or the current employees were not part of it, or have not been educated by the ones who may have proper knowledge regarding the equipment. It may be that your machine you have currently is satisfactory, but recurrent or even initial training should be considered to gain its full potential.

The machines are available through many different welding equipment manufacturers. The most important consideration when choosing the right machine for your shop is what, if any, recommendations or requirements are made by the vehicle manufacturer. Some manufacturers have approved specific equipment, while others don’t. Vehicle makers that don’t specify a particular brand or model of machines may still have minimum requirements that a machine must be capable of. Shops that are engaged in an OEM certification program, or are looking into a possible future relationship, may want to consult that program’s requirements. If you find yourself in a market where one particular vehicle make is popular, I would suggest you purchase a machine that coincides with that manufacturer’s guidelines. If you are considering an upgrade by purchasing a new machine, the same considerations should be in play. Nugget size can be called out by some OEMs, as well as clamp force or other specifications required. It may be the vehicle maker has amperage or other minimum guidelines only. That may lessen the need



AN STRSW MACHINE WITH A SINGLE-SIDED OPTION.



A TYPICAL STRSW MACHINE.

to purchase a particular brand or model of equipment but will require the buyer to make sure those specifications can be met with that particular welder when choosing.

As promised, we will cover the “squeeze” aspect of the process. The ratings for the machines as it relates to the squeeze pressure can be represented in Dakanewtons, or daN for short. That value can be converted into a more understandable measure of pound-force. Some automakers specify a particular or minimum amount of force to be applied when squeezing the panels together before performing the weld. The newton is the Standard International (SI) unit of force. I won't go into it any further because it gets a bit scientific. As stated, it is the squeeze force applied, but it's important to recognize the machine capabilities as it relates to repair information.

The different types of power supply are typically either 3-phase electrical supply requirements, or the machine may be battery operated. Some machines may operate on 230V, but those with 3-phase requirements are the most common. The battery-operated machines may be used where there is no 3-phase power supply to the shop or other limiting circumstances. There are several factors when selecting a machine if you are not using the OEM recommendations. Most are based on current and applied force. Welding time is also a component to consider in the ability of a machine. The specifications that a vehicle manufacturer may require could have all or more parameters listed to perform the correct weld. The body repair manual of the specific make, model and year should be referenced before any work begins. Machines may have the ability to sense the type of metal and create welds based on what the machine determines to be the appropriate settings. It may be that the machine can sense more than the type of metal alone. It may be able to detect the type, thickness and if there is anything in between the metals such as adhesives. If not the automated type, the user may have to manually input parameters such as the type of metal, thickness and whether or not weld bonding is being performed.

Some equipment makers have programs installed into the machine that are based on a particular vehicle make and/or model settings. Feedback from the equipment may include a pass/fail on each weld, and they could have the ability to document the process for record-keeping by the shop. Software updates are typically done as called out by the welding equipment manufacturer. Some machines will have the ability to connect directly with their respective manufacturer for updates and may even provide training videos for the user within the machine.

We will now cover some of the typical repair procedures that may be required when it comes to STRSW. Shunting of the panels is a common requirement. Shunting is typically done with specific pliers similar to locking pliers but allows the multiple work pieces to be “connected” before the first weld is per-



AN STRSW MACHINE WITH ARMS OF VARIOUS LENGTHS.

## I-CAR NAMES JEFF PEEVY TO NEW VICE PRESIDENT ROLE

I-CAR®, the Inter-Industry Conference on Auto Collision Repair, announced the addition of renowned collision repair industry veteran Jeff Peevy, AMAM, to its executive leadership team as Vice President – Technical Products, Programs & Services.

In this new role, which becomes effective at the end of July, Peevy will spearhead the strategic development and growth of all I-CAR curriculum and technical relations efforts while leveraging

his more than 20+ years of executive management experience in the industry. Most recently, Peevy served as President of the Automotive Management Institute (AMI) since 2015, and as the 2019-2020 Chairman of the Collision Industry Conference (CIC).

He also shares a long and successful history with I-CAR, where he served as senior director of field operations and led I-CAR's collision repair segment team before his AMI post. Continue reading at [ABRN.com/jPeevy](https://www.abrn.com/jPeevy).



formed. Pliers that are made specifically for shunting will most likely have copper “feet” with a cable connecting those feet so the current has an easy path to follow at that specific location. Shunting may be done with typical locking pliers, but for the best possible results, specific shunting pliers should be used. For further information refer to I-CAR Collision Repair News article, “Shunting the current when spot welding,” posted in June 2016.

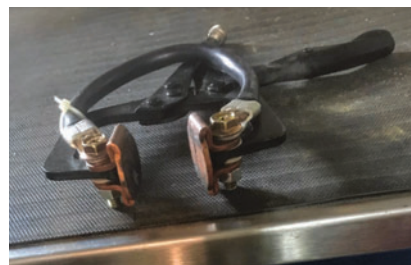
Test welds may also be listed as part of the repair procedure and are very important, just as in MIG/MAG welding. The welds may look OK and the machine may verify a good weld, but ultimately a destructive procedure on the test weld is the only true way to know if the performance is going to be there based on your settings and other preparations. Another note about clamping is that all clamps or other means of fitting a panel together, besides the shunting clamp used for the initial weld, should be insulated. There are various common methods to do this, such as using tape or other non-conductive materials used on the areas where the clamp comes in contact with the metal.

Air pressure is typically used for the clamping force during the welding process. The amount of air pressure set during the weld will affect the clamp pressure and therefore can affect the weld quality. Vehicle manufacturers will sometimes specify minimums in those parameters that will be used with settings and machine capabilities. It is also worth noting here that it is a common practice to remove all coatings where the electrode tips come in contact with the steel. Typically OEM-applied coatings, such as e-coat, are left intact on the inside where the panels meet. It may be that the vehicle manufacturer specifies a weld-through coating to be applied between the panels or the process may include weld bonding. Weld bonding is a process where an adhesive, typically two-part, is used between the panels to aid in the joining process. If weld bonding is re-

quired, the technician should follow the vehicle manufacturer guidelines on the proper way to prep the panels before applying the adhesive. If no manufacturer guidelines exist, it is common practice to follow the product manufacturers’ guidelines.

STRSW machines may have several functions that can be performed by one machine outside of their primary function. Examples may be a dent removal capability with a weld-on puller, such as a slide hammer or manual pulling attachment. Other functions may include the ability to weld studs, nuts, washers or pins on a panel used for attaching such things as a heat shield, closeout panels and such. Metal shrinking abilities may be built into the machine for straightening/shrinking processes as well. Some machines may have the ability to perform a “stitch” or “seam” type of weld with the single-sided function. Machines may also have the ability to perform single-sided spot welds. These welds will require a ground attachment to the material being welded and will not have the ability to squeeze the panels together. It is reliant upon the operator to make that happen. It is why these types of welds are less efficient when compared to STRSW, but it may be necessary as limits can exist where the arms of the squeeze-type mode will fit. Vehicle manufacturers will, at times, specify what type of welds are to be made if there are limits to where the arms can reach.

As with any other tool or piece of equipment, training is paramount. Welding equipment manufacturers may have training available at purchase or provide it in another form. It will be important to determine how that will take place before purchase. There is nothing worse than investing in a process or equipment and not utilizing it to its full potential. Liability concerns should be at play here, as well. Maintenance should also be planned before purchase. There are some wear/consumable items on most machines.



**SHUNTING PLIERS AND COPPER PADS.**

The electrode tips are very important in many ways when it comes to making a proper weld. Alignment, condition and size can all have effects in this area. Training is important; equipment makers and OEM-facilitated programs that provide training may have Alliance courses that could qualify for I-CAR credits. General types of education that are not machine specific are available as well. For further online and in-shop training refer to I-CAR:

- Online- Introduction to Squeeze-Type Resistance Spot Welding
- Hands-On-Squeeze-Type Resistance Spot Welding Hands-On Skills Development

The most important guideline is to follow the vehicle makers’ repair manual or criteria for the machines and processes before beginning the repairs. As stated earlier, choosing a machine for initial purchase or when updating current equipment, the vehicles you are repairing should weigh into the decision-making process. Training and support are important as well. We all know the only thing constant in our field is change. There have been changes in this arena, too. Mostly for the better! 📧



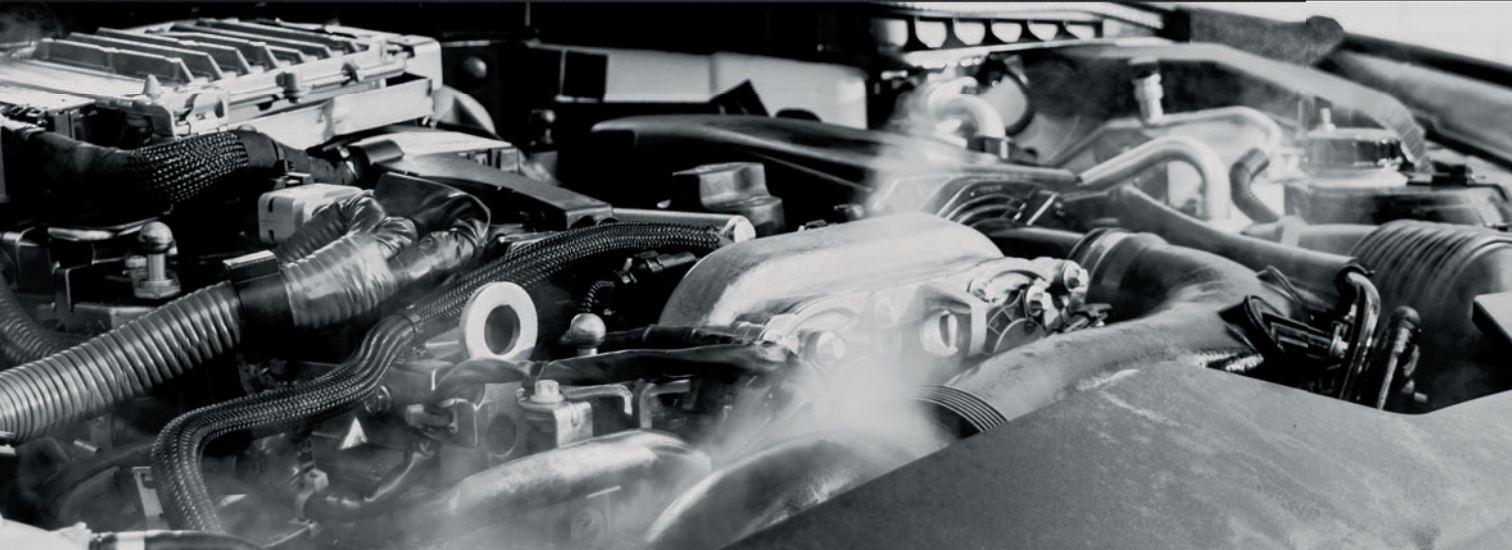
**DAVE BRINKLEY** works for I-CAR as an In-Shop Knowledge Assessor and Instructor. He has worked in the collision repair industry for more than 35

years, working as a technician, manager and insurance appraiser. He’s the founder of CR Tools LLC, a development and consulting company for collision repair tools. [brinkley3@outlook.com](mailto:brinkley3@outlook.com)



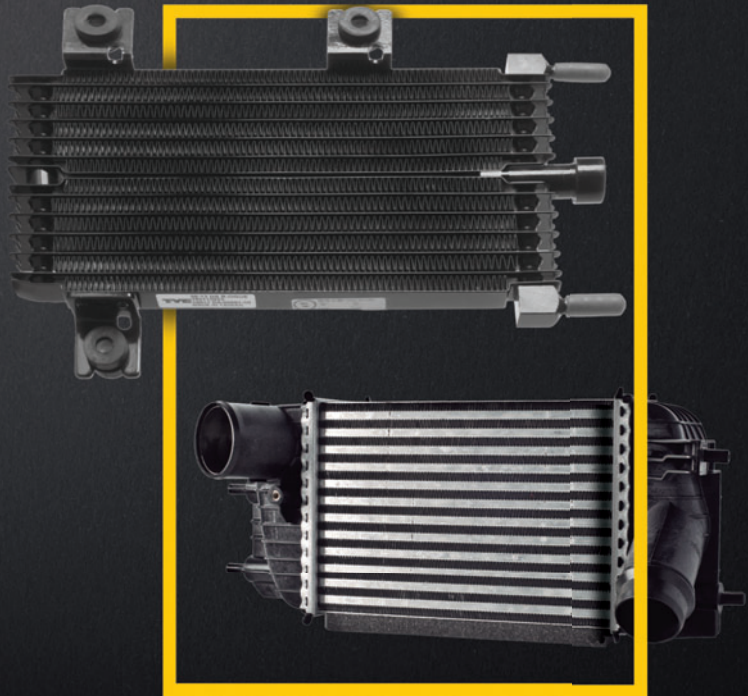


# Expect More. Expect TYC.



## All your Cooling Needs, **All at TYC.**

- TYC's Coolers are Non-Universal. Designed and manufactured to be application-specific.
- Individually in line tested to ensure fit, form and function.
- Designed, produced, and tested in simulated extreme environments (hot, cold, salt, heavy rain) for ultimate reliability.
- Consistently having the most late-model applications for your repair needs.



**TYC is a Proud Supporter of Novitas Foundation**

Your gift can save lives, bring hope and build a future for a world in need go to [NovitasFoundation.com](http://NovitasFoundation.com).



\*(Select Applications)

For more information about TYC™ replacement automotive parts, consult your local TYC™ parts distributor or look up parts online at [www.TYCUSA.com](http://www.TYCUSA.com).





**WHEN WELDING PLASTIC**, the goal is welding the rod and the repair area at the same time without “puddling” as one typical does during metal welding.

# THE POWER OF PLASTIC

## THE LATEST STEPS FOR PLASTIC REPAIRS

**TIM SRAMCIK //** Contributing Editor

**W**hat is the state of “artisansh” in today’s collision repair industry? Just one generation ago, repairers were raising this same question because many felt they were quite literally saying goodbye to an era of repairs. One successful, long-time shop owner described the change to *ABRN* as such, “We’re no longer craftsmen. We don’t reshape metal. We are simply parts replacers.”

To a great degree, that was the course the industry had taken. Swapping out damaged parts with replacements (often from lower-cost, aftermarket sources) was cheaper and more efficient than restoring the fit and beauty of a piece by re-

forming the steel. Ironically, at the same time, a new kind of artistry was making its way into repairs with the increase in the use of plastic parts. Reforming/restoring plastic often proved cheaper than replacing an entire part and involved the kind of craftsmanship being lost on the metal side of repairs.

Today, plastic repair still entails a necessary degree of artistry. Mastering this work is essential to properly bringing a part back to life. Help ensure your shop is up to its next plastic repair with these steps and recommendations provided by Polyvance.

### **Cleaning, aligning damage, handling deformation and aligning tears**

Plastic damage comes in many types and

often in combinations. Follow these basic repair rules.

In order to maximize the strength of any repair, thoroughly clean contaminants from the surface in the damaged area with these steps:

**Step 1.** Clean both sides of the repair with soap and water. Dry with a clean cloth or compressed air.

**Step 2.** Spray a dedicated, specialized plastic cleaner onto the surface and wipe off while wet with a clean, lint-free cloth. Wipe in one direction to avoid spreading contaminants back over the clean area.

#### *Distortions*

If the plastic is distorted, heat with a heat gun and reshape the distorted area. Always heat the plastic all the way through by holding the heat gun on the area until the opposite side of the

plastic is uncomfortable to the touch. Once heated, force the plastic back into position with bumper rollers or other appropriate tools, then cool the area with a damp cloth. Stretched areas can be shrunk with the bumper cold. Keep working until the plastic is smooth, then sand overall with 80 grit to help identify remaining low spots. Push out remaining low spots and repeat the process.

Note that thermoset polyurethanes (PUR, RIM) feature a “memory” that often can cause them to return to their original position if held under a heat lamp or in a heated spray booth.

#### Tears

If the part is cut or torn to the edge, align the cosmetic surface using aluminum body tape and begin the repair process on the back. By aligning the outer surface, you minimize the amount of filler required to restore the proper profile to the part.

### Basics of the nitrogen welding process

Welding with nitrogen involves the coordination of both hands, with one controlling the torch and the other feeding the rod. Do NOT “puddle” the rod as you would in metal welding. Instead, melt the bottom surface of the rod and the top of the bumper at the same time and fuse them together with the downward pressure on the rod. This process creates a stronger repair because it leaves the basic structure of the rod intact.

Remember the five important factors for plastic welding: T.F.A.P.S. — Temperature, Flow, Angle, Pressure and Speed.

- Temperature — set the temperature on the nitrogen welder’s dial to the



**THE FIVE IMPORTANT FACTORS** for plastic welding are T.F.A.P.S. (Temperature, Flow, Angle, Pressure and Speed). Make sure your equipment settings and processes follow all five.

proper setting based on the type(s) of plastic. For example, the PP/TPO setting will generate an air flow of about 700 – 800 degrees Fahrenheit.

- Flow — set between 2.5 – 4 gallons per minute depending on the plastic thickness; less for thinner plastics, more for thicker.

- Angle — maintaining 45 degrees between the torch and the bumper is optimum. Aim the stream of hot air a little in front of the rod; for a thick rod like the 06 profile, focus a little more heat on the rod.

- Pressure — put as much downward pressure on the rod as possible to help the rod fuse with the bumper. Keep a steady downward pressure on the rod and keep the rod moving slowly. Don’t overheat the rod and let it fold over backwards.

- Speed — weld 4 to 6 inches per minute. This can be difficult with a thin rod like the 03 profile, since the rate is so slow. With thicker rods, like the 06 profile, you may need to go even slower. The important thing is to move steadily while keeping proper downward pressure on the rod while also making sure the bumper and the bottom surface of the rod are both melted before they come together.

### Repairing a cracked bumper with a nitrogen plastic welder

The repair steps listed here are specifically for a PP/TPO bumper torn to the edge, though the technique can be adapted to other specialty repairs on tabs and mounting holes.

1. Clean the bumper before you grind it. Start by washing the entire bumper (not simply the repair area) with soap and water.

2. Use a red scuff pad to spread the soap and scuff the plastic. This will put small sanding scratches into the bumper to help further improve adhesion.

3. Rinse the soap off and allow the bumper to dry. Once dry, clean the bumper with a specialty plastic cleaner to remove all solvent-soluble contaminants such as silicone, wax and mold release agents. Apply the cleaner in a heavy, wet coat; let it sit on the surface for a few seconds and then wipe dry with a clean paper towel before it evaporates. Caution: Do not simply soak a rag in cleaner and wipe it around since this only moves the contamination around on the surface without removing it.

4. Align the outer (cosmetic) surface. Often, plastic has been stretched or dis-



torted in the damaged area.

5. Before welding, align the crack as closely as possible. If the plastic is dented or stretched, heat with a heat gun and push the plastic back into position.

6. Once the plastic pieces are lined up, use aluminum body tape on the outer (cosmetic) surface to minimize the need for filler.

7. Prepare the back of the crack first. Prep the back with 50 to 80 grit sandpaper to roughen the surface and remove any paint overspray.

8. Grind the surface flat if it doesn't need to be smooth on the back. Grind a v-groove if the surface needs to be flat when finished. Always grind at a slow speed since going too fast creates friction heat that will melt and smear the plastic. The goal is creating a good, rough sand scratch in the plastic without melting it.

9. Weld the back of the crack. For maximum strength, use the R02-05 wide ribbon. This wide ribbon spreads the load over a large area for maximum strength. Start the welding by preheating the end of the welding rod and the bumper at the end of the crack. The plastic will start to turn glossy.

10. At this point, push the end of the ribbon rod down into the plastic and bend it toward the welder. Make your pass by melting the bottom surface of the rod and the top surface of the bumper simultaneously, forcing the melted plastics together with steady downward pressure on the welding rod. Again, the proper welding pace is 4 – 6 inches per minute. Always melt both the rod and the bumper at the same time.

11. Weld a tee. After completing the weld down the crack, reinforce the repair by making another cross-stitch weld at the end of the crack along the edge using the R02-04 ribbon for the edge reinforcement. (Because the original extruded



**POLYVANCE'S HEAD TRAINER JOHN WILBURN TRAINS JEFF BOWN** the head trainer for Chicago-based MSO Crash Champions. Be sure to take advantage of available plastic repair training and build your experience

structure of the ribbon is not disrupted in the welding process, trying to tear the bumper is like trying to tear the rod in two. As long as the rod is welded solidly to the bumper, this will provide plenty of extra strength.)

12. Prep the front side for welding. After the back weld is cool, peel the aluminum tape off the front side. Using a 6121-T or 6125 cutter bit in a rotary tool, grind out a v-groove down the crack in the plastic about 1/16 to 3/32 inches deep.

The width of the v-groove should match the kind of rod you want to use on the front side. Most of the time the R02-01 1/8 in. diameter round rod is the best choice because it is easier to finish being a narrow rod. In this case, grind the v-groove about 1/8 in. wide. For stressed areas or anywhere you want added strength, you may choose to use a ribbon on the frontside. In that case, grind the v-groove a little wider than the width of the ribbon.

13. Sand off the paint immediately adjacent to the v-groove with 80 grit in a DA sander.

14. Weld the front side of the crack. Using your selected welding rod or ribbon, perform the weld in the prepared v-groove the same way you did on the back side.

15. Finish the weld. Once the weld is completely cool, sand with 50-80 grit paper in a grinder or DA. Be careful not to sand too fast since this will just melt and smear the plastic. It's best to use a sharp, new piece of paper and slow down the sander a bit to keep the plastic from melting.

Sometimes the repair may be finished out and feathered with the welding rod, but most often you're going to need some filler to fill in the low spots.

As always, be sure to follow all OEM and repair instructions. Because plastic repair requires experience, practice your skills and help train others. 📧



**TIM SRANCIK** has written for *ABRN* and sister publications *Motor Age* and *Aftermarket Business World* for more than a decade. [tsrancik@yahoo.com](mailto:tsrancik@yahoo.com)

# DID YOU KNOW?

**ASE CERTIFIED**  
TECHNICIANS

- ➔ **GET PAID MORE**
- ➔ **GET HIRED FIRST**
- ➔ **ADVANCE FASTER**



## **MOTOR AGE TRAINING**

**OFFERS THE MOST COMPLETE AND EXTENSIVE  
ASE TRAINING SERIES AVAILABLE ANYWHERE!**

**GET THE MATERIALS YOU NEED TO PASS ALL OF  
YOUR ASE CERTIFICATION TESTS - **GUARANTEED!****

**Motor Age**  
**TRAINING**  
Self-Study Guides for ASE Certification

**...YOU PASS OR DON'T PAY!**

**MONEY-BACK  
GUARANTEE.**



**www.PASSTHEASE.com**





# PUSHING THE PERFECT REPAIR

PART 2 IN A TWO-PART SERIES OF WHAT YOU NEED TO KNOW ABOUT DIRECT-TO-METAL SEAM SEALING

DOUGLAS CRAIG // Contributing Editor

*The series covers when technicians may still want to prime when using DTM products to prevent corrosion and when they can forge ahead and apply directly to the metal. Repairers will understand what DTM products are and how to use them properly to perform the “perfect repair.” Part two explains procedures and differences.*

**S**eam sealers are used for duplicating factory appearance during automobile repair and industrial heavy-duty truck, bus and trailer repair. Currently, there are two seam sealer processes in use in the industry. Repair shops can use Direct-to-Metal (DTM) seam sealers or a two-component primer followed by a seam sealer. DTM seam sealers, as the name implies, are applied directly to the metal surface without the use of a primer beforehand. There are

some questions within the industry as to which method to use. Many repair shops follow the two-component primer method as it does provide a better repair. Since a primer is not necessary for DTM sealers, they are often used when highest corrosion protection is not needed. Although each automobile manufacturer offers its own recommendations, in the end it is up to the individual shop as to which process to use.

## One-component vs. two-component seam sealers

As the names imply, a one-component sealer uses only one material. A one-component system uses a caulking gun to apply the product onto the car where it begins to cure. Most one-component sealers cure via a reaction with water in the air. A two-component seam sealer involves the mixing of two different materials to create

the sealer. The two-component system utilizes a cartridge system that contains two parts — A and B. As it’s being extruded, it will go through the mixer to combine the parts. When it reaches the car, it is mixed and is now having a chemical reaction that will activate curing.

## Curing

The one-component sealer material begins to cure based on shop temperature and humidity level. With one-component products, their cure time can be affected by the weather. During the summer, humidity levels tend to be high, which provides the moisture needed to cure. In the fall, the temperatures start to change and get cooler and humidity levels lower, which leads to slower curing. Different geographic areas will have different cure times as well, such as the Southwest,



which tends to be dryer. The seasonal differences in humidity changes curing speed and often causes an influx of phone calls to the material's manufacturer about the product not curing. It's curing, just significantly slower. Every product has a different cure time for a certain temperature, so it's important to be familiar with the product being used and how much time it needs.

To move a repair through the shop faster when temperatures are a concern, the two-component products are superior. They will go through a chemical cure due to mixing A and B together. As long as it's not too cold, these sealers cure rather quickly and do not rely on outside humidity for the chemical reaction to occur. The one-component products are generally firm in 25-30 minutes and cure in roughly 24 hours, depending how thick it is. So, it could be a longer time with certain weather conditions.

A two-component sealer can cure faster since it doesn't rely on the absorption of moisture. How fast the sealer cures will depend upon the formula. Generally, they are firm in 3 to 20 minutes — much faster than one-component sealers.

After a half hour most every seam sealer is firm enough that you can't make a mark on it. While it may not fully cure for 24 to 48 hours, you can touch it without damaging it and with most, the paint can be applied to it.

To keep the repairs moving in the shop, paint can be applied and dry while the seam sealer is hardening. With some seam sealers, paint can be applied immediately; with others you may need to wait 10 to 30 minutes — but this isn't a long time. After the parts are seam sealed, they will typically be moved to the paint area, which takes time.

It's important to know your seam sealer and its bond and cure times. Complaints arise when the masking pulls paint off the seam sealer. That's because the whole system has not cured, and the bond has not fully developed. This occurs most com-

monly with one-component materials.

Two-component seam sealers, because they're chemically curing, are generally fully cured in 24 hours, but are firm to the touch and paintable in minutes depending upon the formula used and the shop temperature. Even though they may not be fully cured, the early bond strength of the paint system is generally superior to one-component materials.

Don't forget that the seam sealing products you're using and your paint system need to be tested on a scrap panel so you know clearly how your systems work together. It's important to test the paint on the seam sealer to ensure you will get the results you want.

### Process

- Sand any paint edges before the seam sealer goes down so you're not working around fresh sealer when prepping for paint.
- Clean! Make sure there is no dust, dirt or rust on the shiny metal.
- Apply masking tape, if desired, to define the size of finished bead.

### Procedure for one-component seam sealer

- Place into caulking gun and prepare per manufacturer's directions.
- Apply sealer.
- Sealer can be spread with a spreader.
- Sealer can be brushed for a brushed appearance.

### Steps for two-component seam sealer

- Prepare the seam sealer cartridge ahead of use.
- The first step in preparation is leveling by placing the cartridge in the applicator gun and extruding until you see the material. This is an important step. There could be a couple millimeters more of material on one side, so leveling ensures both A and B side come out on ratio.
- When ready to apply the seam sealer, extrude a mixer's length sealer as

waste, ensuring that A and B are mixing properly. If striations or streaks are visible, the mix is not even. Extrude more material until it is evenly mixed.

- Leveling and purging errors are where almost all product failures begin.
- Apply sealer.
- Seam sealer can be spread with a spreader.
- Seam sealer can be brushed for a brushed appearance.

### Types of seam sealers

- Non-Sag: Thick and holds texture such as brush marks.
- Controlled Flow: Thinner in viscosity. They are still thick, but will smooth out when tape is removed.
- Self-Leveling: Very thin and will flow out to an edge. One use is where the side of car meets roof.

Prepare the seam sealer cartridge ahead of use.

### Avoid usage errors

When choosing a seam sealer to use, consider how much time you need and if your surrounding temperature will affect your cure time. Most importantly, always remember to level and purge before using any two-component system. Omitting the leveling and purging steps result in most of the application problems.

Additionally, every product has technical data sheets and a training program to show the proper use. Use these resources to train all technicians in the best procedures. It seems simple, but don't forget seam sealer manufacturers always have a customer service phone number, website and email for questions. The manufacturer is the most underused resource for a technician. 📞



**DOUGLAS CRAIG** is  
Technical Application  
Engineer and Collision  
Industry Liaison, Structural  
Tech Service, LORD  
Corporation.  
[douglas\\_craig@lord.com](mailto:douglas_craig@lord.com)

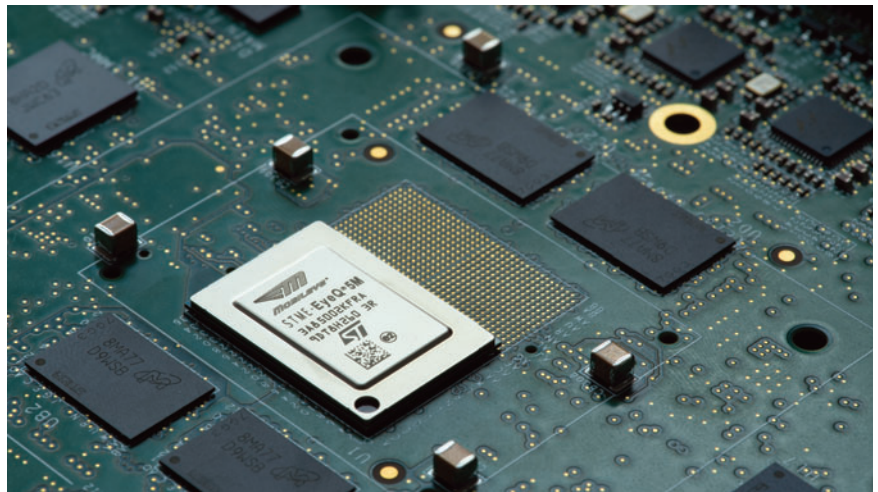
# PREVENTING COLLISIONS — SAVING LIVES

DELVING INTO THE WORLD OF ADAS IS NOT A QUESTION OF “IF,” BUT RATHER, “HOW LONG WILL YOU WAIT?”

**TRACY MARTIN //**  
CONTRIBUTING EDITOR

**E**lectronics makes up a significant portion of any automobile made in the last 35 years. Today, advanced driver-assist systems (ADAS) are one of the fastest-growing segments in automotive electronics and is the precursor technology to fully autonomous driving vehicles. One example of advanced ADAS electronics is Mobileye’s EyeQ technology, which is used by 27 OEMs on 40 million automobiles worldwide. Mobileye is an Intel Company that manufactures the EyeQ vision-processor System-on-Chip. EyeQ vision processors constantly monitor the driving scene in front of a vehicle and alert the driver of an impending accident with another car, pedestrian, bicyclist, or motorcycle. The EyeQ system is also capable of detecting speed limit signs and, controlling the vehicle’s high and low headlight beams during night driving. Future-generation Mobileye devices will include camera-only automatic electronic braking, as well as various features enabled by self-driving technologies. Mobileye also makes retrofit systems for heavy-duty truck fleets.

It is estimated that around 80 percent of vehicles today have at least one driver assistance system. In this article, we will take a look at two ADAS systems: driver alert and collision avoidance.



**MOBILEYE’S ADVANCED ADAS ELECTRONICS VISION-PROCESSOR** System-on-Chip incorporates their EyeQ technology that is used by 27 OEMs and found on 40 million vehicles worldwide.

The increased usage of ADAS will have a significant impact on the auto repair industry as well. Even a simple job like replacing a windshield or bumper is complicated by the presence of ADAS sensors that need to be re-calibrated. Companies like Autel, that manufacture the MaxiSys ADAS Calibration Tool, and Bosch, who sell their DAS 1000 Calibration Set offer potential revenues for repair shops who will have to educate consumers regarding increased costs for windshield replacement and/or accident repair.

## Sleepy driver alert systems — a voice of reason

Wake up!, Anti-sleep pilot, Driver Condition Monitor, Fatigue Detection or Tired-



**THE MOBILEYE 8 CONNECT SYSTEM** provides drivers with audio and visual warnings of potential hazards on the road. These systems can be retrofitted to any vehicle and are often installed on truck fleets.

ness Detection Warning are some of the names of systems that warn a driver that they are not paying attention to the road



**AFTER AN ACCIDENT**, or component replacement, the Bosch DAS 1000 calibration set offers a means for professional adjustment of sensors and cameras used in ADAS systems.

ahead — time to get some coffee or pull over and take a nap. Sleepiness reduces reaction time, vigilance, concentration, and alertness that all effect attention-based driving activities. Besides, the quality of decision-making is affected by slower information processing.

There are four types of systems used in driver fatigue detection systems. Steering pattern monitoring uses input from a steering wheel sensor or input from an electric power steering system. These systems focus on monitoring steering wheel movements and deviations from the lane position to detect sudden or excessive corrections in the direction the vehicle is traveling. These inputs can trigger a driver alert if they become too frequent.

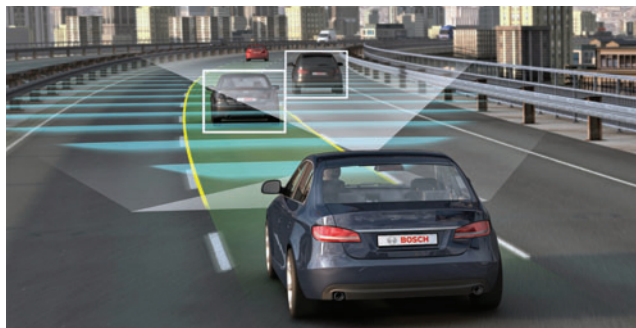
Another system uses a lane monitoring camera and works only when a driver is steering the vehicle, vs. an automatic lane-keeping system. On-board artificial Intelligence (AI) uses smart learning about driver behavior and can react to keep the driver alert. For example, if a vehicle receives frequent lane departure warnings, the system can alert the driver that it's time to pull over to take a break.

Driver eye/face monitoring is another technology used to detect driver fatigue. These systems use a camera to observe the driver's face, and in real-time determine the driver's physical and mental condition based on its driver-face image database. The driver's state of alertness can be estimated from eye closure frequency, blinking, gaze direction, yawn-

ing, and head rotation. These systems will sound an alarm when the driver reaches a hypo vigilance state that indicates fatigue and/or distraction. Hypo vigilance is defined as an enhanced state of sensory sensitivity and anxiety that often leads quickly to exhaustion.

A fourth technology to determine driver alertness is a physiological measurement that requires body sensors to measure parameters like brain activity, heart rate, skin conductance, and muscle activity. The reliability and accuracy of driver drowsiness detection by using physiological, or body measurement signals is higher when compared to face-monitoring cameras. However, the intrusive nature of measuring physiological signals remains an issue. Just imagine, a driver would shave their head and place a dozen electrodes on their scalp to monitor brain activity (or lack thereof) and place other sensors on their chest to measure heart rate — who would want to look like a science experiment while driving down the highway? Instead, researchers are exploring the use of sensors/electrodes placed on steering wheels and/or within the driver's seat as a more practical way to take these measurements.

While these four types of technologies can be used as a stand-alone system, it's more likely that they will be used in combination. For example, too many large steering inputs combined with too many eye blinks and excessive drifting



**FORWARD-FACING RADAR, LIDAR** and stereo-view cameras connected to a fast computer processor can detect other vehicles' speed and distance and provide alerts to drivers to avoid accidents.



PHOTOS: BOSCH

#### **A BOSCH RADAR UNIT CAN DETECT**

an on-coming vehicle that runs a stop sign or red light and provide input to warn the driver and/or apply emergency braking.

into adjacent lanes of traffic would trigger a "stay-awake" alert.

#### **Forward collision warning**

The basic concept that two vehicles should never try to occupy the same space at the same time is what forward collision warning (FCW) systems are all about. OEMs are consistent in that they all choose a different name for their collision avoidance systems like Ford Forward Alert, BMW Pedestrian Warning with City Brake Activation, Mitsubishi Forward Collision Mitigation and Chrysler Full Speed Forward Collision Warning Plus, to name a few.

Forward Collision Warning systems have been around for a few years, mostly on high-end luxury cars. It has only been in the last few years that these systems can detect pedestrians, automatically apply the brakes and use electronic steering to swerve around vehicles or other objects. Today FCW systems are offered on more mainstream, lower-cost



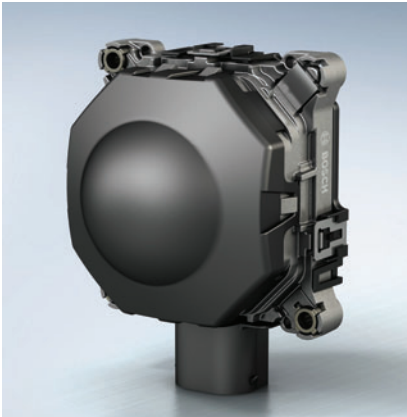


PHOTO: BOSCH

**THE BOSCH LRR4, FOURTH GENERATION, LONG-RANGE RADAR SENSOR** can detect other vehicles at a distance of 820 feet (250 meters). It can be used as part of FCW systems, adaptive cruise control, and other ADAS systems.

vehicles. It's only a matter of time before some form of FCW will be required on all new cars.

The most basic of FCW systems monitor a vehicle's speed, the speed of vehicles ahead, and the distance between them. The system's computer does the "math" and if parameters reach a level where it is determined that a collision is about to happen, the system sounds a warning to the driver and/or on some vehicles applies the brakes in certain circumstances.

Depending on the manufacturer, several technologies are used for FCW systems including radar, lidar and cameras. Soon, when vehicles are wirelessly connected to the driving environment, GPS sensors will detect fixed dangers like stop signs, railroad crossings, lane merging, and others. Radar is also known as "echo ranging," where a high-frequency light, audio frequency, or radiofrequency pulse is sent out by the vehicle's radar collision avoidance sensor. If the pulse strikes an object it reflects part of the pulse energy to return to the radar emitter where it is detected. The difference in time between when the detection pulse was sent out and the arrival of the reflected wave is then used to calculate the speed, and/or range, or distance to the object.



PHOTO: VOLVO

**WHEN THE VOLVO PEDESTRIAN AVOIDANCE SYSTEM** on this Volvo V40 detects that a pedestrian has been hit, it raises the hood slightly and deploys an airbag that covers the windshield.

Light imaging, detection, and ranging (Lidar) works on the same principle as radar but uses light energy to illuminate an object. The difference in the return time and the wavelength is used by the system to create a 3-dimensional representation of the target or object. Lidar, also known as 3D laser scanning, was originally used to make high-resolution maps and has been adapted for use in ADAS systems. Lidar can sense objects as far away as 600 feet (200 meters) and because of its high energy avoids most radio frequency interference. However, the downside is that it can take inaccurate readings from objects that have poor or no reflectivity — like clothing worn by pedestrians.

Using an onboard camera (or stereo-view cameras) is another method to detect surrounding vehicles or pedestrians. The camera produces a digital image that a computer extracts dimensional data from and converts to numerical, or symbolic information. This process is known as computer vision and is the analysis and understanding of information from a single image or a sequence of images. The computer compares digital images to a database and determines



PHOTO: AUTEL

**WITH MORE VEHICLES EQUIPPED WITH ADAS SYSTEMS** on the road drivers' overall situation awareness of other vehicles offer a safer driving environment.

what an object is and what to do about its presence, i.e. sound an alert and/or apply the brakes.

### Other life-saving countermeasures

On some vehicles, similar technology offers collision avoidance for pedestrians. As early as 2004, Honda's Intelligent Night Vision is a system that detects pedestrians in front of a vehicle and alerts the driver. In the event of a collision with a pedestrian, the Volvo V40 uses seven sensors embedded in the front of the car that transmit signals to a control unit. The control unit evaluates the signals, and if it registers what it interprets as the vehicle running into a human leg, the pedestrian airbag is deployed. The hood hinges are each equipped with pyrotechnical release mechanisms which, when the system is activated, pull out a pin and release the rear of the hood panel. At the same time, an airbag is activated in front of the wind-

shield. During the inflation sequence, the airbag raises the hood 4 inches (10 cm) and it remains in the raised position. The gap between the raised hood and the engine creates a space for the hood to deform and provide a dampening effect when it is struck by a pedestrian.

The use of ADAS that helps drivers with steering, braking, monitoring, and warning tasks is expected to increase over the next 10 years. Because ADAS technology can be critical in providing drivers forward collision, lane departure, and pedestrian alerts, and on some systems automatically activate the vehicle's braking system, it is paramount that it functions properly. Many factors can cause an ADAS system to be knocked out of calibration including collisions (even a minor fender-bender), windshield replacement, wheel alignment, and suspension repairs. Other factors affecting calibration include sensor mounting bracket removal or replacement; changes in tire size; front airbag(s) deployed or ADAS-related DTCs set. ADAS systems have to be properly calibrated to gauge speed and distance that are critical to their performance.

For example, a vehicle is involved in a minor accident that affects the front grill knocking the forward-facing radar unit out of calibration (not pointing to where it's supposed to) could result in a misapplication of automatic braking. If the radar sensor is pointed up (even by a few degrees) the forward-collision warning system could interpret a bridge as a stopped vehicle and as the driver approaches the bridge, the ADAS system applies the brakes. Automakers recommend recalibration of ADAS sensors after collision repairs that also include a diagnostic scan before and after any work performed on these systems.

Autel is an international company that manufactures professional, OEM-level, ADAS calibration equipment for the automotive aftermarket. Their ADAS Complete Frame Targets Calibration



**A TECHNICIAN USES WHEEL CLAMPS** and lasers to set up the Autel Calibration Frame level and parallel to the vehicle. The frame holds OE targets used to calibrate radar and camera sensors.

Package for All Sensors, combined with their MaxiSys ADAS calibration tablet, provides independent shops the ability to work effectively on ADAS systems. The calibration packages include a frame that holds target pattern boards, sliding target crossbar, wheel clamps, and wheel lasers, and vehicle-specific target boards.

With the vehicle level, wheel clamps with lasers are attached. This allows the technician to adjust the calibration frame parallel to the vehicle. The Autel MaxiSys tablet with ADAS calibration module offers technicians video and graphical step-by-step guidance for setting up and calibration procedures. The MaxiSys tablet instructs the technician as to which targets to use and the OEM procedure required for camera, radar, or night vision calibration. With insurance companies paying between \$200 to \$300 for each ADAS calibration, and \$100 to \$150 for pre and post diagnostics, independent shops can justify the cost of this equipment.

The technological advancements that make up the systems representing ADAS,



**THE AUTEL MAXISYS TABLET** is used to set up the Frame Target Calibration tool for ADAS calibration procedures. The tablet guides the technician through the process using video, graphics, and complete instructions.

are here to stay and, are bringing society ever-closer to the full-autonomous vehicle. Encounters with these systems can no longer be avoided as they have virtually infiltrated every system on today's modern vehicles. The time is never better than right now, to get the necessary training, information and tooling to see the prosperity of your business, well into the future. ☺



**TRACY MARTIN** has covered the powersports industries since 1998. He is also the author of six Motorbooks Workshop Series books published

by the Quarto Publishing Group and is a regular contributor for *Motor Age*.

[tracy.martin@yahoo.com](mailto:tracy.martin@yahoo.com)



# COLLISION PRODUCT GUIDE

## AIR PREPARATION SYSTEM

The Motor Guard M-60R Air Preparation System combines Motor Guard's exclusive sub-micronic compressed air filter with a precision, true-diaphragm regulator and gauge for a powerful point-of-use air preparation unit. The key to the M-60 air filter's performance is Motor Guard's proprietary hydrophilic media. Compressed air passing through the tightly wound element is stripped of water, oil and other contaminants.



[WWW.MOTORGUARD.COM](http://WWW.MOTORGUARD.COM)

## BST860

The LAUNCH Plug-and-Play Battery Tester BST860 is designed for many battery-powered vehicles ranging from 12V to 24V like cars, boats and motorcycles. It can perform six types of battery system tests, which include ripple detection, battery test, electric current test, starter test, charging system test and voltage test to find out the battery health status. BST860 will display the analysis result in a few seconds, which also can be printed out with the built-in printer. If you see any abnormal test results, expect shortened service life span or battery drain.



[WWW.LAUNCHTECHUSA.COM](http://WWW.LAUNCHTECHUSA.COM)

## MOUNTING PLATE PACKAGE

The Autel MA600 Mounting Plate Package (MA600RAP) consists of a Mounting Bracket, Mounting Plate, Mounting Adapter and Laser Adapter Plate. Once installed, the Mounting Plate enables the MA600 to use the Radar Calibration Box, the Calibration Plate, the Adaptive Cruise Control (ACC) Reflector and the Night Vision Calibration Box to perform radar and night vision calibrations on vehicles equipped with ACC, Blind Spot Monitoring (BSM), Front Collision Warning (FCC) and NV systems.



[WWW.AUTEL.COM](http://WWW.AUTEL.COM)

## POWERED AIR PURIFYING RESPIRATOR

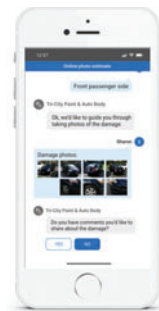
Lincoln Electric® introduces the VIKING™ 3350 XG PAPR helmet, complete with exterior grind control, often preferred by welders. When choosing a Powered Air Purifying Respirator for a fabrication environment, its respiratory performance, versatility and optic quality are three important variables to consider — all of which the VIKING™ 3350 XG PAPR helmet provides. Additionally, the helmet features a number of benefits that improve the welding experience.



[WWW.LINCOLNELECTRIC.COM](http://WWW.LINCOLNELECTRIC.COM)

## CCC ENGAGE WITH PHOTO ESTIMATE

Consumers can now request repair estimates from their smartphones by uploading photos of vehicle damage. Repair appointments can be scheduled by you directly in CCC ONE upon receipt of the estimate. No in-shop visit required. CCC Engage — a smart, safe new way to solicit estimates, schedule appointments and to safely take care of your customers and staff. Try it today at the below website. Or you can always call the CCC Team at 877.208.6155.



[WWW.CCCIS.COM/CCCENGAGE](http://WWW.CCCIS.COM/CCCENGAGE)

## SEAM SEALER BUNDLES AND KITS

Whether sealing out moisture, dirt, fumes or using for sound deadening applications, Kent Automotive's new seam sealer bundles and kits provide everything needed to finish the job. They are a high-strength solution for door seams, underbody, wheel arches and more. Features include fast cure time reduces the time to complete jobs, strong and durable to ensure longer repair life, paintable in less than 30 minutes to increase productivity and more.



[WWW.KENT-AUTOMOTIVE.COM](http://WWW.KENT-AUTOMOTIVE.COM)

## LIMITED TIME PROMOTIONAL PRICING

For a limited time, Blowtherm USA's affordable WORLD "S" spray booth is promotionally priced at \$42,900! Blowtherm's energy-efficient spray booths, with standard LED lighting, translates to increased profits — bottom line. Our engineers are unsurpassed, providing quality, performance and longevity in every build. Due diligence. Learn the difference. Why settle for anything less? Blowtherm...the name you trust, the quality you deserve. \*Price excludes freight, installation. Financing available. Options extra. Call today: 1-855-463-9872 or visit the below website.



[WWW.BLOWTHERM-USA.COM](http://WWW.BLOWTHERM-USA.COM)

## PLASMA CUTTING MACHINES

Firepower® has launched a new series of manual plasma machines — the FP-25i, FP-35i, and FP-45i — featuring an advanced LCD interface that simplifies set-up and operation. Operators make all adjustments with just one knob, viewing process information on the generous, full-color 2.8-in. screen. All units weigh 30 lbs. and come with a 60-amp torch and 15-ft. cable.



[WWW.ESAB.COM](http://WWW.ESAB.COM)

## AD INDEX

ADVERTISER	PAGE #
AUTEL US INC.....	21, 27
AUTOMOTIVE MGMT INSTITUTE.....	51
BLOWTHERM USA.....	5
CCC INFORMATION SERVICES.....	9
INDUCTION INNOVATION INC.....	7
INNOVATIVE TOOLS & TECH.....	35
INSTA FINISH.....	17
LAUNCH TECH (USA) INC.....	13
MOTOR GUARD CORP.....	51
OPUS IVS.....	CV4
PPG INDUSTRIES.....	CV2
PRO SPOT INTL INC.....	CV3

ADVERTISER	PAGE #
TOYOTA MOTOR SALES USA.....	23
TYC GENERA.....	31, 39

## PRODUCTS

AUTEL US INC.....	50
BLOWTHERM USA.....	50
CCC INFORMATION SERVICES.....	50
ESAB.....	50
KENT AUTOMOTIVE.....	50
LAUNCH TECH (USA) INC.....	50
LINCOLN ELECTRIC.....	50
MOTOR GUARD CORP.....	50



## Body Shop Requirements

FROM PULLING TO PAINTING

# High Tech Air Preparation System



MHT-7000 Air Prep System

Six Stages for Air Prep in a Single System

Motor Guard has introduced the most advanced air preparation system for spray booths and critical refinishing operations. The Motor Guard High Tech Air Preparation System (MHT-7000) offers six stages of air prep in a single unit and provides for the quickest, cleanest cartridge change in the industry.

- The MHT-7000 High Tech Air Filtration System
- The MHT-7100 Compressed Air Filter
- The MHT-7200 Compressed Air Desiccant Dryer
- The MHT-7300 Compressed Air Precision Regulator
- Made in the U.S.A.



800.227.2822
motorguard.com



## AUTOMOTIVE MANAGEMENT INSTITUTE

## Management & Administrative

- Training
- Education
- Career Paths
- Certificates
- Professional Designations
- Learning Support

Convenient, effective, online courses and advanced instructor-led classes.

The knowledge you need for the business you want.

amionline.org





# Learn how to face your challenges head-on

Look for unusual opportunities when facing times of crisis

**W**e have all been facing unusual challenges this year. It is easy to become overwhelmed, panicked and allow emotions to take charge instead of well thought-out logic or reason. There is a saying, “What you look for, you will find.” It does not mean that we do not have to address the problems that arise. We must face our challenges head on, boldly and swiftly.

There are at least two phases in a crisis, and I am sure there will be more as we continue down this road. The first is the Emergency phase — the initial shock, shutdown of the American economy and questioning how will we survive and what we need to do to protect ourselves and our team. The second is the Adaptive phase — how do we thrive in this new reality?

A week into the pandemic, I attended a virtual leadership conference. One of the speakers closed his session by referencing an article entitled “Scary times’ success manual” with 10 strategies that can be used to survive and thrive. You can read it at [ABRN.com/scarytimes](http://ABRN.com/scarytimes). It was an excellent resource for me as I joined my leadership team in navigating through this time.

## Practical opportunities

As we transitioned from the emergency phase to the adaptive phase, we began looking at ways to cut expenses. We found that we had been complacent in executing expense cutting because we had been in the success zone. Crisis creates clarity. It becomes clear what is fluff and what is necessary. For us, that meant we continued with individual advertising efforts that had the best return on investment; however, others that were not producing got let go. We were committed to keeping our team employed, so they were not our focus when looking to reduce costs. As we began looking for these unusual opportunities, we continued to find them. It started with finding unnecessary expenses to cut. One of the next opportunities was to accelerate our electronic communication efforts and find creative ways to serve our customers.



**FOCUS ON TODAY. ALTHOUGH OUR GOALS CHANGED, WE STILL SET GOALS. IN TIMES OF CRISIS, THIS FOCUS IS ESSENTIAL.**

## People opportunities

We believe we provide an exceptional repair experience for our customers, but we found ways to serve them better. It was now more important than ever to understand our customers’ changing needs and create solutions for their problems. The key in this is to adapt quickly. It is necessary to have strong leadership in a crisis, and it is critical to empower your team to make decisions that align with your values. Engage your entire team in looking for opportunities to add value.

## Focused opportunities

Focus on today. Although our goals changed significantly during this time, we still set goals. In times of crisis, this focus is essential. We focused first on our team. It was vital that they felt secure in their health and financial stability. We over-communicated, with empathy and frequency. Transparency and vulnerability were necessary as we navigated each day. This focused activity and communication led us to continue to find opportunities, deepen and strengthen team member relationships and foster a healthy culture amid a crisis.

Finding opportunities during an economic downturn is possible. The key is urgency, avoiding complacency and managing the chaos. I want to leave you with a few questions to consider. In what areas do you see complacency in your business, department or location? What are a few stretch goals you can set to overcome the complacency? How can you engage your team to develop solutions on an ongoing basis? Top-down leadership will only take you so far. Are there areas that need more focused communication and transparency to build a healthier and more competitive team? What makes today successful for you, your department, your team, your location or your business? Answer that question, then work backward to make it happen. 📧

**SHERYL DRIGGERS** is the owner of Universal Collision Center in Tallahassee, Fla. Through her career, she has gained specialized experience in marketing, management, public speaking, teaching and fiscal oversight. [sheryld@universalcollision.com](mailto:sheryld@universalcollision.com)



i-Grit



SANDamigo

# The Collision Repair Industry's New Abrasive Choice

- Cleaner
- Faster Cuts
- Longer Life

Pro Spot now offers Abrasives! With two options to choose from: the i-Grit Ceramic Abrasives and the SANDamigo Abrasives. Choose from a wide range of sanding discs and sheets that will meet any shops needs. Complete your shop or paint booth with Pro Spot Abrasives and Dust-Free Sanding Systems.

**PRO SPOT**

[prospot.com](http://prospot.com)  
877-PRO-SPOT



Get Free  
Abrasives!  
Request A  
Demo Today.

Follow us on





## The Only Collision Repair Solution with OEM Scanning at your Fingertips!

- ✓ Licensed OEM Pre/Post-Scans
- ✓ Live Repair Guidance from OEM-Trained Technicians
- ✓ Full Scan Tool Capabilities
- ✓ Programming & Coding
- ✓ ADAS Detection & Calibration



**OPUS | IVS**

Powered by  
**DREW TECHNOLOGIES**

**Call to schedule your demo today!**

OpusIVS.com  
sales@OpusIVS.com  
(844) 235-4251 (opt. 3)