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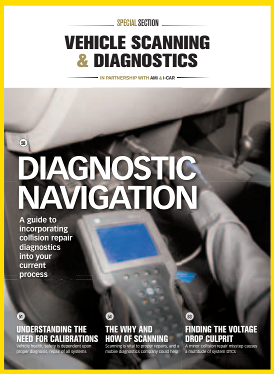

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NACE AUTOMECHANIKA 2017

Coming to Chicago, July 26-29.
Register now @ NACEAUTOMECHANIKA.COM/REGISTER

NACE AUTOMECHANIKA // TRAINING

PHOTO AND FILE DOCUMENTATION

This training course, presented by Mike Cassata, who is recently retired from Amica Insurance and now with Hammer Insights, will present the most professional and accurate ways for collision repair facility staff, staff appraisers and independent appraisers to photograph damage and document findings and observations.

ABRN.COM/PHOTO

UTILIZING ENTERPRISE ARMS REPORTING TO IMPROVE SHOP PERFORMANCE

Attendees of the course will understand how to unleash the power of ARMS Reporting to improve their operational performance. Mike Anderson, the former owner of Wagonwork Collision Centers and now the owner of CollisionAdvice, will present the session.

ABRN.COM/ARMSDATA

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WWW.ABRN.COM
24950 Country Club Blvd., Suite 200 // North Olmsted, OH 44070
Phone: (440) 243-8100 // Fax: (440) 891-2675

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CO-LOCATED EVENTS

BUSINESS OUTLOOK CONFERENCE OFFERS INDUSTRY INSIGHT

Organizers of NACE Automechanika, the largest U.S. trade show dedicated to high-end technical and management-related training for automotive service and collision repair shops, will host the first annual Business Outlook Conference, offering shop owners and managers, parts distributors and suppliers insight into new technology, economic trends and the changing automotive landscape.

Featuring high-level thought leaders from widely recognized companies, the Business Outlook Conference will be a two-day event taking place July 26-27 each morning prior to the opening of NACE Automechanika at McCormick Place West in Chicago.

Dan Ricci, global automotive leader with IBM Cognitive Solutions, will headline the event with a discussion on big data and analytics impacting the automotive sector. Additionally, Dan Hearsch, director with financial firm AlixPartners, will speak to economic trends impacting the automotive aftermarket. The two-day conference will also feature:

• A panel discussion focused on telematics and in-vehicle connectivity moderated by Greg Potter, executive manager and COO with the Equipment and Tool Institute;

• A peak at key legislative issues, "How

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BREAKING NEWS

ON THE SHOW FLOOR

SHOW FEATURES, NETWORKING ABOUND IN CHICAGO

Elevating your expectations for a trade show, NACE Automechanika 2017 is bringing new and innovative features to the show floor in Chicago.

Along with a multitude of co-located events, numerous trade show floor features serve as added incentive to attend this training and exhibition event, set for July 26-29 at McCormick Place West in downtown Chicago.

Hit the show floor this summer and check out these great features:

AUTOMECHANIKA TRAIN STATION: Exhibitors from around the world will share how to become more efficient using their products and services. Training every hour.

CAREER CONNECTION: Looking to make a change or tackle a new challenge? Want to connect with the hottest jobs in your field? The Career

>> FEATURES CONTINUES ON PAGE 8

TRENDING

REGISTER NOW TO ATTEND THE MSO SYMPOSIUM

On July 26, the MSO Symposium will give an industry update, discuss OE certification, insurer relations legislation, regulation and more. Register today!

ABRN.COM/MSO2017

ESTIMATORS: EARN PROFESSIONAL DESIGNATIONS

The Automotive Management Institute launched a new designation for estimators that will be available during NACE Automechanika 2017 in Chicago.

ABRN.COM/DESIGNATIONS

TRENDS, TECHNOLOGY, PROCESS TO BE FOCUS OF TRAINING AT NAMC

With four full days of training and education, NACE Automechanika 2017, July 26-29, is a "must attend" for industry students, technicians, shop owners and educators

ABRN.COM/EDUCATE

TRAINING OPPORTUNITIES

I-CAR PRESENTING SEVEN TRAINING COURSES AT NACE AUTOMECHANIKA 2017 IN CHICAGO

I-CAR® will be presenting seven training courses at NACE Automechanika 2017, July 26-29 in Chicago.

Below are summaries of the courses to be presented. All courses apply toward achieving I-CAR Gold status.

Vehicle Trends and Diagnostic Overview 2017: This course is the latest live course delivery of I-CAR's popular NEW series, which annually takes a look at vehicle technology and trends. This year's course not only covers features and collision repair procedures for several 2017 models, both foreign and domestic, but also includes information on automotive collision diagnostics and scan tools. The session includes information on the increasing importance of performing diagnostic scans, and the differences between certain electrical troubleshooting tools. The various options a shop has when it comes to ensuring diagnostics are completed are discussed.

Refining the Team and the Business: Building on the fundamentals learned in Developing the Team and the Business, this live course elevates production management skills by understanding how to add the right staff to the team, as well as how to effectively use and enhance the team already in place. Topics include identifying staffing needs, scheduling employee vacation time, managing employee training — including understanding the resources available through I-CAR — and how to monitor workplace safety using federal, state and local guidelines.

Blueprinting Process and Damage Recovery: Minimizing supplements while increasing productivity — this is what the blueprinting process is designed to do. Uncovering hidden damage before the vehicle enters the production cycle can lead to a more accurate damage report, resulting in reduced repair times and improved efficiency. This course defines the blueprinting process, goes beyond the disassembly of damaged parts and writing estimates, and demonstrates through quick checks and other damage discovery processes how blueprinting can streamline efficiencies through a standardized approach to all vehicles.

The Art and Science of Estimating: This course introduces the learner to key aspects of the estimator role. The student will learn about the practical applications of the estimator's workflow as well the soft skills required for effective communication with co-workers, customers and insurance company representatives. An effective estimator possesses good communication and people skills, which are more subjective in nature. In the field, estimators devote a majority of their time not in obtaining the estimate, but in artfully negotiating complex personal interactions. An estimator must be emotionally intelligent and deft in communicating with coworkers, the insurance company and the customer.

Understanding the Cycle Time Process: In today's business environment, efficiency is essential to bottom line performance and improving cycle time is one of the most powerful ways to increase efficiency. An understanding of how cycle time impacts both the customer experience and the overall success of the business isn't just a management issue. It's a concern for the entire organization. Everyone must work together to continuously improve. Learn how to improve cycle time, perform more effective upfront damage analysis and more efficiently order and receive parts for a direct and positive impact on your facility.

Automotive Foams: Upon completion of this course, the technician will understand the uses and application procedures for automotive foam. The course will also provide an understanding of structural foam considerations and curing methods, and the ability to identify procedures related to the installation of expandable foam. The technician will understand how to choose correct replacement materials and know how to work safely around automotive foams.

Hazardous Materials, Personal and Refinish Safety: Understanding the many components of working safely in a repair facility can greatly impact business performance. Identifying specific procedures that can prevent injuries, understanding the correct methods for storage and disposal of hazardous materials and wastes, as well as recognizing the proper personal protective equipment can each play a role in creating a safe and efficient workplace.

Register for any and all classes at ***ABRN.com/ICARclasses***. Technical and management courses for both the collision and mechanical segments will be held July 26-29 at McCormick Place West in downtown Chicago.

Most courses will be held in rooms on the level below the trade show floor. For a complete schedule of available classes, visit NACEAutomechanika2017.sched.com.

There is a cost to attend collision training courses presented during NACE Automechanika. Costs for the I-CAR courses vary between $100-$150.


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>> BOC CONTINUED FROM PAGE 5

is Capitol Hill impacting your business?" from Bob Redding, Washington D.C. representative with the Automotive Service Association (ASA);

- A regulatory session, "Staying Compliant: Helping Shops and Distributors Avoid Costly Violations," presented by Charles Ayers, president of the Coordinating Committee for Automotive Repair.

"The Business Outlook Conference was developed to help attendees better understand the future of automotive. We hear a lot about connected vehicles, new fleet technology and crash avoidance systems," said Michael Willins, UBM Automotive Group content director and conference coordinator. "The technological revolution we are witnessing will change how parts are delivered, what parts are needed for vehicle repairs, the repair services that shops offer and the overall repair process. Rather than being fearful of what's coming, we think this creates a lot of opportunities for forward thinkers, and that's the goal of the Business Outlook Conference — to get them thinking about what's possible."

The conference will also showcase a special presentation from Mike Jones, president of Discover Leadership, who will help attendees "Win the Moment" personally and professionally. Jones will show attendees the value of being outcome focused in life and business.

The Business Outlook Conference will be a must-attend event for all shop leaders, distributors and suppliers. Register today at ***ABRN.com/BOCregister***. The conference is one of many events taking place at NACE Automechanika designed to benefit shops interested in working more closely with automotive parts distributors and suppliers. The event provides matchmaking and concierge-serviced meeting times and spaces during the show in an effort to help attendees build business relationships. The service opens in May, and anyone registering for NACE Automechanika can indicate their interest in participating.

NACE Automechanika features more than 140 training courses covering a variety of mechanical management and technical topics at no cost. Free training continues on the show floor inside the OE Coliseum Training Theatre, through demonstrations on the I-CAR stage and at the Automechanika TRAIN Station. Not to be missed, more than 40 collision-focused courses are also available throughout the week.

There are several other co-located events taking place during NACE Automechanika including the annual MSO Symposium and the Advanced Technology & Diagnostic Repair Forum, as well as the Collision Industry Conference.

>> FEATURES CONTINUED FROM PAGE 5

Connection is the place for you. Speak with career counselors, learn about résumé building, pick up your training certificates and network with the industry — trainers, associations, organizations and others.

COMMITMENT TO TRAINING LOUNGE: Didn't get enough time in class? Need to ask more questions? Just looking to talk shop with the experts? Stop by and connect with the industry's leading trainers in a relaxed environment.

INNOVATION ZONE: Catch a glimpse of the industry's most innovative automotive products and services. Whether it's a new tool or a piece of equipment, a product advancement, new packaging or technology, this is where to find what's cutting edge in the automotive aftermarket.

MEDIA MOMENTS: Stop by the stage and hear the latest news on a variety of revolutionary products, support the Recycled Rides program as they donate vehicles to families in need, or take a stand to applaud CREF as they donate a check in support of the Chicago-area automotive students.

OE COLISEUM: Your one-stop shop for all OEMs: Toyota, Nissan, Fiat/Chrysler, GM and more. Come see what's new, get trained on each of their products, expand your knowledge and become more competitive.

SCAN-A-PALOOZA: Listen to industry guru Mike Anderson as he gives real insight into the world of diagnostics. Then get up close with a variety of companies as they demonstrate their products on a range of vehicles — all happening right on the show floor!

SPRAY ZONE: Don't just look. Stop by this area and test out new paint, paint guns, accessories and more.

THE COLLECTION – DEALER DRIVEWAY – THE PARKING LOT: Don't miss the hottest cars with the coolest vibes in these special vehicle areas! From the newest to the antiques, we will cover it all!

THE HOT SPOT WELDING CENTER: Get a bird's-eye view of welding techniques all day, every day.

THE SHOP OF THE FUTURE: Powered by AutoVitals, experience each of the many sections of a full-service shop. See how you can make large and small changes to bring your shop into the future.

TOOL ALLEY: Take a walk on the wild side and check out the latest, greatest tools and equipment hitting the market.

TRUCK COMPETENCE: Interested in the big trucks? Check out the heavy duty industry's newest vehicles, aftermarket parts and advancements.

VIRTUAL STAGE: Step into the driver's seat and get hands-on training without getting dirty, or even touching a vehicle.

Come check out these features — and more! — at NACE Automechanika. Register today at NACEAutomechanika.com/register!

SIMPLE INVENTORY AND ORDERING

Three ingredients can help shops create a streamlined and effective process

JIM COMPTON // Contributng Editor

There are several advanced methods to consider for inventory and ordering, such as software systems like CollisionLink and NuVentory. However, for this article, we will talk about some simple, basic ways to start managing inventory and ordering. Many find it easier to start off with basic methods, get everyone onboard and then migrate to more dynamic systems.

For most shops, enlisting the support of their jobber can greatly help and simplify this task. We will use three basic ingredients to create a simple inventory and ordering system: standard operating procedures (SOPs), historic purchases (from the jobber reports) and input from staff.

First, we need to have some basic SOPs in place. These establish a basic framework for how we are going to do things and what we are going to need to get those tasks done. For example, if we have determined that all repair work will be finished with 180 grit by our body techs, we don't need to maintain body tech inventory in anything finer and only a few grits coarser. Similar SOPs can help reduce the part number count in the paint, detail and other departments of the shop.

Every jobber should be able to provide a report of purchases. Using a full 12 months will provide a very complete list covering just about everything used on a regular basis. Remove anything not used on a regular basis, which therefore does not need to be part of regular stock.

With our SOPs in hand, we can consider only those products that fit within our SOPs as the regular or "Authorized Stock List." This can help thin our regular stocked part numbers, making inventory simpler and setting a basis for ordering.

The purchase list from the jobber can be narrowed to fit SOPs with input from staff on what products, sizes, grits and methods works best. This can then be

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pared down to our authorized stock list. I suggest determining 12 months worth of supplies divided by 26 to give us a two-week supply.

A two-week supply can, in most cases, provide enough inventory to last at least one week, with minimal overstock and less rush or fill-in orders. Filling back up to this level with each order will keep inventory fairly stable and aid in accounting for inventory. For example, a shop using 100 gallons/units of clear per year will need 4 (100 ÷ 26 and rounded up) gallons/units on hand, along with the required activators. While the mix of activators may change through the year based on temperature and humidity, the quantity doesn't need to change very much. For this example, the 4 units of clear will also require 4 units of activator. Sometimes that will be one fast, two medium and one slow, and other times that mix may change.

Why not have one week of supply, some may ask. Even though most shops can get multiple weekly deliveries, two weeks seems to work better and reduce added deliveries, time spent ordering, receiving and other administrative tasks associated with inventory. Down the road, reducing from the proposed two-week stock to a one-week level may be feasible. It is at this point that consideration may be given to a more advanced system.

PHOTO: SHERWIN-WILLIAMS AUTOMOTIVE FINISHES

Using this pared-down list and calculated quantities, we can now not only create an order form, but also a recommended stock level that ties into our SOPs.

Several shops have taken the approach that only those items on the order form (authorized stock list) can be ordered and delivered by the jobber; any other items require a signature or approval from management.

These order forms can also serve as an inventory form, providing a tool for the jobber to aid in the physical inventory (counting) process. Many jobber systems will allow for an order or quote to be created, providing an extended inventory valuation. These order forms can also be part of the process when reviewing and updating SOPs.

Another advantage of the now-stable set inventory level is an easier accounting for costs. In a production environment, cost of goods sold (CGS) is generally accounted for by taking beginning inventory plus purchases minus ending inventory. (Please keep in mind that this example for calculating CGS is over simplified — there is more involved.) CGS should be compared to sales every month to determine margins or profits. With a fairly stable and consistent level of inventory, we can calculate our margins each month without an inventory count and adjustment. Annual or bi-annual physical inventory counting and reconciliation is still recommended.

Adjusting inventory

As new techniques, procedures and regulations come into play, an adjusted authorized stock list may be needed. Many shops and jobbers have further edited these lists into specific department order forms, including body shop, paint shop, detail and general shop. Leaving room on these forms for quick additions will help with small changes in SOPs or needs. A regular review of SOPs and authorized parts will help keep this system working.

The other systems, two of which are mentioned above, can be a more precise and dynamic method of keeping inventory and ordering. Here we discussed one of the simplest methods; walk before you run. This can still be a big improvement for those who don't have a system in place and are just starting to embark on improved ordering and inventory control.

One thing everyone agrees on is that better management of inventory and ordering can help with improved P&M margins, reduced time and inventory on the shelf. Whether you choose the simple methods or some of the more dynamic tools available, better management of inventory leads to better P&M margins.

JIM COMPTON is the owner of J. Hunter & Associates, a consulting business that specializes in lean material management. *jhcompton@att.net*

HOW TO GET MORE OUT OF TRAINING

Teach employees that training is valuable and necessary to continued success

JIM COMPTON // Contributing Editor

If you were told that you could get more from training and get it for free, would you want to do it? Of course, why not? For most of us, training, learning and continued education has a significant cost. We invest not only money, but also time, energy and hopefully effort. Why not get a little more for free?

Quick disclaimer: I am a lifelong student and still attend classes, training and other learning opportunities in both my business and personal life. I am also an I-CAR instructor, so I have seen some of the best students from the industry come through my classes and some of the others as well.

In general, I have two types of students coming to I-CAR classes: The "I get to be here" folks and the "I have to be here" folks. There is a significant difference.

First, the "I get to be here" folks. They show up on time, usually a few minutes early, perhaps a little tired after a full day of work. They know why they are there, what class they are attending and what is expected of them. They almost always leave with the provided materials, ask questions and participate in the class.

Then we have the "I have to be here" folks. They may also be tired and either arrive within minutes of the time set to start the class or are late. Their first questions are often: "How long is this class?" "What is this class about?" and "Why do I have to take this class?" They are more likely to leave the provided class materials behind and will often participate only if coaxed.

So let's get to the getting more for free part. Imagine reminding your technicians about a class (required or not) that they have been chosen to attend. Do not say, "Here is a class that I have scheduled for you and you have to attend it." Rather, imagine telling that employee, "Let me

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know what you think of this class. I am interested in your feedback."

Imagine asking the employee(s) to come back after the class and offer a couple of minutes debriefing on the class with their workmates or team, perhaps in a weekly production or safety meeting.

This doesn't need to be hard or added work. For most classes there are handouts or worksheets that attendees can refer to later. Doesn't this make a clear statement that you not only value learning and training, but also value that employee and value their opinion? Could this perhaps let the employee know in advance that there is more to training than just attending classes?

It does make a difference when a supervisor says, "You have to go to this class," versus, "Here is a class that should help all of us. I am interested in your feedback." It does make a difference when an employee is asked to share what they have learned. They listen just a little bit more; they participate just a little bit more. And I believe they retain just a little bit more.

Employees who feel valued tend to perform better, have better attitudes and accept responsibility. According to a study done by the American Psychological Association, "Half of all employees who say that they do not feel valued at work report that they intend to look for a new job in the next year." The study went on to say: "Employees who feel valued are more likely to report better physical and mental health, as well as higher levels of engagement, satisfaction and motivation, compared to those who do not feel valued by their employers."

Was this just a rant from an instructor? Or a couple simple ideas to enhance the learning experience?

JIM COMPTON is the owner of J. Hunter & Associates, a consulting business that specializes in lean material management. *jhcompton@att.net*

TECHNICAL

EXTREME PREPPING

PREPARE FOR CUSTOM WORK WITH CUTTING-EDGE DIRECTIONS

CUSTOM PAINT WORK appears to be growing in popularity for repair shops. Prepare for the day when a happy repair customer asks if your shop creates specialty finishes.

TIM SRAMCIK // Contributing Editor

With the constant entry of new technology and need for attention to the smallest details in a variety of repairs, the last thing most shops need is one more departure from the ordinary. Or do they? If a shop has the staffing, space, equipment and desire, one such avenue you could consider is custom painting. There are four good reasons why:

1. Spark excitement. Over time, even the most dedicated employees get bored. Custom work lets you recharge their interests with creative challenges.

2. Build your bank. Custom work can give a nice boost to shop profits — if properly scheduled among other customer repairs — and catch the attention of a new line of customers.

3. Join a movement. Plenty of anecdotal evidence points to an influx of custom requests to traditional shops. Jason Haskin, a technical rep for Valspar's House of Kolor, reports he now answers as many inquiries from shops as DIYers. Every national paint manufacturer offers a custom paint line. At last year's SEMA Exhibition, AkzoNobel announced plans to partner with custom shop owner and TV celebrity Dave Kindig to create a new custom paint line.

4. Just because. Your shop probably already has in place much of the skillset and tools to perform custom work. Giving custom paint a try is a terrific way to market your talents with show cars and other creations that your competitors are churning out. While no shop should be simply tossing away valuable time and resources, custom painting is an affordable side offering with some very big potential benefits, as long as the collision production lost is outweighed by the value of custom work.

Before getting started, you'll need to brush up on your custom paint skills, including prep work. Every great paint job begins with proper prep. In the case of custom painting, prep work needs raised to a whole new level. Use these suggestions provided by the professionals who manufacture the custom products.

Philosophical foundations

"The goal of collision repair is to get the

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vehicle back to pre-accident condition and back on the road, while the goal of custom work is often aesthetic," says Axalta Business Account Manager Gene Fenske. "Custom painters will usually use higher end materials designed for appearance and spend many more hours laboring over fine details."

That, in a nutshell, is the difference between collision and custom work. In both cases, you want to produce excellent work. But with a custom job, shops need to raise their game a notch or two (or three) to create an eye-popping product that's going to awe a demanding customer paying a premium out-of-pocket price for a premium service. Creating such a product starts with premium prep work that builds a foundation for excellence by sticking to strict guidelines.

"If I was going to spend thousands of dollars on a custom vehicle, I would not take any shortcuts, especially on the surface preparation step," says Sherwin-Williams Automotive Finishes Project Manager Nick Dowling.

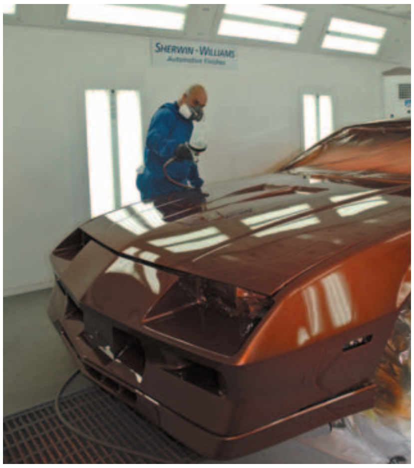
Providing top-of-the-line preparation goes well beyond aesthetics. It's necessary when performing custom work.

"Custom painting also comes with more risk because of the amount of material used and increased film weights," says AkzoNobel Technical Manager Matt Miles. "Because of this, it is extremely important that the preparation and system selection is chosen correctly and compatible with the application."

Miles adds, "When choosing the system it is important to understand the materials used need to provide the most rigid film structures as possible with compatible Thermal Glass Temperatures (TG) for overall hardness."

Keep in mind that custom paint mistakes can be particularly costly. Missteps can result in time-intensive re-dos that can significantly cut profits (or eliminate them all together).

"Check and recheck! Clean, clean, clean! Attention to detail and being thorough can save you many extra hours of work to correct mistakes," says Fenske.



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Superlative sanding and shaping

The bulk of that attention is spent on sanding and shaping. Gaps are to be tighter and more consistent. Body lines must be made crisper and cleaner, and panels transformed to be smoother and straighter than what the factory typically delivers.

Ringbrothers, a collision repair shop in Spring Green, Wis., that does business with BASF, has decades of experience producing such work. Founders Jim and Mike Ring have picked up a host of industry awards for their efforts, including "Best Chevrolet of Show" at the 2014 SEMA Show and back-to-back Goodguys Street Machine of the Year awards, along with numerous magazine covers and OEM builds.

They suggest the following ultimate shaping and sanding procedures.

Step 1. Metal prep. In a climate-controlled space, use a DA sander to strip the entire vehicle down to bare metal. For good adhesion, wipe down the car with metal cleaner before grinding with 80 and 36 grit, depending on metal thickness.

Put away the DA sander and all power tools until just before the car is ready to buff. All sanding from this point forward is done by hand.

Step 2. Skim the vehicle. Create mirror flat panels by first fully assembling the car with seals and gaskets installed. Build a stable base for the primer and clear coat by skimming every square inch of the entire car with body filler.

To ensure the gaps along doors, hood and trunk lid do not shift during the sanding process, apply 1-1.5 in. spots of filler across the gaps around each side of the doors, hood and deck — one to two spots per side depending on length of panel. These filler spots will remain until primer has been sanded to 600 grit.

Step 3. Tape edge lines. To keep crisp, straight edges, grooves and/or creases, apply masking tape along the top of the edge. Sand up to the tape edge. Remove that tape and apply new tape to the bottom of the edge. Sand down to the tape edge. Repeat for each level of sandpaper grit described in following steps.

PHOTO: SHERWIN-WILLIAMS AUTOMOTIVE FINISHES

PLAN ON SPENDING significantly more time sanding and shaping custom jobs vs. repair work.

Step 4. Guide coat. To reduce shrinkage, use dry guide coat between each level of sanding in all sanding steps. Guide coat will stay in any scratches or pin holes and reveal what has not been sanded or sanded well enough.

Step 5. Sand filler. Using a sanding block, sand filler with 36 grit, 80 grit, 180 grit and 320 grit before priming. Again, be sure to apply dry guide coat between each sanding layer.

Step 6. Spray polyester. Spray the vehicle with four coats of spray polyester instead of primer. Block sand with 80 grit, 180 grit and 320 grit, applying guide coat between each sanding layer. If no spots have been sanded through to the filler, then finish sanding car with 400 grit and finally 600 grit.

If there is a breakthrough to the filler, stop at grit 320 and re-prime with Primer Surfacer. Continue block sanding with 320 grit, 400 grit and finally 600 grit.

Step 7. Disassemble vehicle. Once 600 grit sanding is complete, cut filler gap spots and then disassemble car. Clean up all edges, jams, etc. Prime edges where necessary.

Plastic problems

Custom prep involves many materials other than metals. With owners of a wider range of vehicles and model years requesting unique paint work, plastics have been pushed into the forefront. Plastics provide a different kind of challenge since you don't necessarily need to strip away the existing finish. Instead, you'll want to first check if it's in good enough shape to use as a foundation for new paint.

PPG supplied the following directions for determining if the finish needs removed and the steps for prepping in either case.

Note: Always inspect plastic parts for imperfections and damage. Make any necessary repairs or replace before putting down the new finish.

Step 1. Wash the part with hot water and soap. Rinse and dry completely.

Step 2. Clean the entire part with an appropriate cleaner and clean towels to remove contaminants. Dry thoroughly.

Step 3. Test the existing finish by rubbing it with a strong thinner or urethane-grade solvent on a clean towel. If the coating wipes off or softens significantly, remove it by sanding and jump to Step 6. If the coating integrity is maintained, it can be used as a foundation.

Step 4. Begin prepping by block sanding with 220-320 grit to remove minor defects. The objective is to remove any defects and level the surface — not to strip the surface to bare plastic.

PHOTOS: SHERWIN-WILLIAMS AUTOMOTIVE FINISHES

THE BASIS of great custom prep work — clean, clean and clean some more.

Step 5. On edges, body lines and difficult-to-sand recessed areas, use a gray scuff pad or pad coarse enough to remove any gloss.

Step 6. Re-clean the entire part thoroughly with an appropriate cleaner and clean towels. Dry completely.

Step 7. Tack off the dry part.

Step 8. Apply plastic adhesion promoter to bare plastic or any cut-through areas.

Step 9. Apply one coat of flexible sealer to the entire used plastic part.

Note: You'll need to take similar steps when prepping fiberglass or carbon fiber. Check for surface porosity and use a pit filler as needed prior to priming, according to Miles.

Epoxy elements

For almost any kind of restoration project, epoxy primer sets the foundation for corrosion protection. As such, it sets the foundation of the entire job and must be applied correctly. Use the following tips from PPG to guide epoxy work.

- Epoxy primer will not stop or neutralize any rust that has already started or is already present. Note that bare steel starts to rust in as little as 30 minutes at 50 percent humidity. Aluminum starts to oxidize in 8 hours after sanding.
- Epoxy primer needs to be applied within 30 minutes of paint removal, especially in humid conditions. (If this isn't possible, consider working on individual parts or smaller areas of the project to meet this timeframe.)
- Untreated steel and aluminum should be coated with a minimum of 3.0 mils wet (1.5 mils dry) of primer for corrosion resistance.
- To avoid contamination, do not touch metal with bare hands before applying primer.
- Epoxy primers should only be sprayed over metal or aluminum that has been treated with metal treatments and within 8 hours after those treatments have dried.
- Sand blasted or sanded metal should be epoxy primed within 30 minutes at 50 percent humidity to prevent corrosion from starting.
- Check the application recommendations for any metal treatments. Example recommendations often require the epoxy to be coated with a minimum of 1.0 mils wet (0.75 mils dry).
- Note that metal treatments cannot be used in some areas due to VOC or heavy metal restrictions. Refer to local regulations.
- One coat of epoxy primer must dry 1 hour before body filler application. Two coats of epoxy primer must dry overnight before filler application.

Fantastic finish

As with any other paint department work, you don't want to be left short of supplies. Since custom jobs often use up more materials, be sure to keep extra on hand. Also stock up on any necessary specialty items for final prep steps and other procedures such as detailing. Dowling recommends:

- Fineline/Pinstripe tapes
- Liquid spray masking
- Glamour Clearcoats
- Dry Effects
- Specialty Pigments/Effects
- Dyes

Dowling and the other professionals *ABRN* spoke with also stressed the need for shops to continually reassess both their methods and knowledge of this field due to the regular updates to custom technology. Dowling directs customers to stay in contact with paint manufacturer reps and resources who can provide the latest advice and directions, along with critical information on the newest products.

Haskin notes the same. He says he spends a good part of his time getting veteran painters back up to speed. Haskin declares, "There's a lot of old dogs out there needing some new tricks."

Some new tricks could be your key to a hot business line.

TIM SRAMCIK has written for *ABRN* and sister publications *Motor Age* and *Aftermarket Business World* for more than a decade.
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THE IMPORTANCE OF POST-REPAIR INSPECTIONS

THE REPAIR of this 2008 Infiniti doesn't look bad from this angle!

PHOTO: JIM COMPTON

Confirming repair quality and accuracy ensures safety for drivers and helps bolster the reputation of the collision repair industry

JIM COMPTON // Contributing Editor

Our industry at times suffers from a poor consumer image. We don't like to admit it, but the reality is we have some shops doing a less-than-quality repair. Maybe what we need is a dose of Penicillin!

Yes, that shot may sting, but most people agree a healthy, respectable image is a good thing. One thing that can continue positive momentum is post-repair inspections. These can be done in-house for quality control, throughout the repair process, or after the vehicle is back in the owner's hand, often by a third party.

We industry insiders don't always see the accident and the aftermath the same way as consumers do. For many, this is an emotional upheaval, and for all, it's an unwanted disruption in their lives. I truly admire those shops that go out of their way to help their clients through the repair process and back to their normal life with compassion and understanding. Some clients are not so lucky. They have a less-than-palatable experience with the collision repair process.

I often find myself talking to Bill "Billy" Walkowiak of Collision Safety Consultants in North Carolina. We share some similar views of our beloved auto body repair industry. We both have experienced some of the best shops and technicians doing quality work, working within OEM guidelines and producing a quality repair. We have also seen repairs done improperly, where the vehicle owner did not get a quality repair and, unfortunately, some even had an unsafe vehicle returned to them with missed welds, incomplete repairs and parts that should have been replaced but were not.

No one is perfect and even the best shops and the best technicians using the best procedures can still have a less-than-perfect repair — occasionally.

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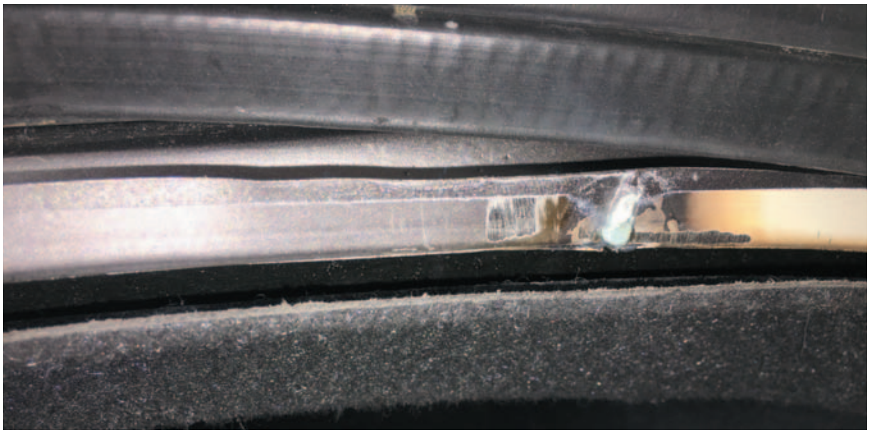
Good repair practices include some quality control procedures as a vehicle is handed off from one technician or department to another. While this is great and can help reduce errors or missed procedures, it is not the same as an objective review by a third party.

Most OEM-specific acceptable vehicle repair procedures are easy to access, many for free or for a small nominal cost. I-CAR, Ford, General Motors, Toyota and Honda, among many others, all have plenty of free web-accessible information. So there is no reason for not following proper repair procedures.

So let's take a look two post-repair inspections — one is a win, and the other is one that our industry should not be proud of.

On a 2008 Infiniti, I asked Billy to tell me what he found with his post-repair inspection. "The shop 'clipped' in a used quarter section; they cut it at the striker and the middle of the package tray. It had bare welds and the welds had little or no penetration. They left the inner wheel house damage and never addressed the kinked rear frame well. The re-repair estimate was about $8,000. You could not properly fix this vehicle without addressing the structural damage and providing corrosion protection. The shop put this customer in a completely improper, unsafe, potentially deadly situation. They did not even try to cover it up," Billy said.



AN EXPOSED WELD with no corrosion protection was hidden by the weather strip.

When he inquired with the shop that did the repairs, he was told: "I just fix 'em like I always have; it's not that bad."

My conversation with Billy continued: "They don't know what they don't know. I think it's possible if this lady had been in a subsequent rear-end collision, she could have been seriously injured or even killed. The vehicle was designed to absorb energy. This vehicle would not react the way Infiniti designed it. "

Thankfully, not all post-repair inspections find problems — here is an example:

Ronnie Pack of Pack Brothers Collision Center in Belmont, NC, and Billy discussed one post-repair inspection they had encountered. "Great repair. We inspected a 2016 GMC that only had 1,786 miles on it when it was hit, causing more than $32,000 in damage. Ronnie Pack and I could not find one flaw!" Billy said. "I've been at this 7 years, and I'm amazed. He even painted the bolt heads."

"In my 45 years, this is one of, if not the best, vehicle repairs I've ever inspected," Pack said. The truck was fixed by David Payne at a family-run shop in Akerman, Miss., called Terry's Auto and Glass. Nice job, David!"

Scanning

It seems that no collision article in 2017 would be complete without some discussion on scanning; and there is even a section in this issue devoted just to the topic (see page 50). One point that I don't think is given enough attention is that some of the data provided in a scan can save both the shop and insurance company potential issues and costs with the repair. The freeze frame data stored by many OEM systems can show if there was an issue or problem with a system before the collision.

Presenting the average vehicle owner with pre- and post-repair scans can be a great sales tool for both the shop and the insurance company, showing both go to great lengths to provide an added value for the customer.

My friend Mike Anderson is famous for saying "You don't know what you don't know." This is very true with a well-done post-repair inspection. When the vehicle is painted and reassembled, even the sharp eye of an industry veteran can't spot all the work underneath. So let's understand that post-repair inspections are a good thing for all parties.

What is our industry to do? We can't self-police every repair; we can't make sure every shop and technician follows procedures and performs quality, safe repairs. Until there are some major changes in our industry, perhaps we should consider post-repair inspections as that needed shot of Penicillin!

JIM COMPTON is the owner of J. Hunter & Associates, a consulting business that specializes in lean material management.
jhcompton@att.net

GET THE MOST OUT OF OEM TRAINING

OEM training is costly in many ways. These tips help ensure your investment is well spent.

JOHN YOSWICK // Contributing Editor

Shop owners often have a bit of a love-hate relationship with automaker collision repair training. They love having access to the latest repair techniques and information, the improvements in repair quality and productivity it enables in technicians, and the label of being an "OEM-certified shop" that the training helps them earn.

They sometimes hate, however, the costs that come with training, which can include not just "tuition," but often travel, re-testing fees for techs who miss the mark, and perhaps most critically, lost production while techs are away at training.

"It's the number of people we have gone in a given month, training somewhere, [that's expensive]" said Barry Dorn of Dorn's Body & Paint in Mechanicsville, Va., a shop that has earned certifications from Porsche, Audi, Tesla and Jaguar-Land Rover. "And it's not just that technician; it's what he generates for every other department. Your painters aren't producing paint labor because they're not getting those cars that [the body technicians away at training] would be producing. That is [revenue] that you cannot get back."

So if your business is going to invest in OEM training, whether as part of earning OEM certification or just to ensure you're repairing vehicles correctly, how can you get the most out of that investment? Shops owners and automaker trainers weigh in.

Choosing whom to send

One of the most common questions shop owners have about OEM training is how to best decide which technicians would be their best choice to send, particularly since some of the programs have first-time failure rates of 60 percent or higher.

James Carvino of RoJo Collision in Brooklyn, N.Y., a shop certified by about 10 automakers, said he doesn't think there's much rhyme or reason as to who will succeed. "I've sent younger guys who seem to take hold of it better, but they're just not as experienced, so they have more problems," Carvino said. "We all have our top techs, the guys who we think are going to go down there and do it, only to find out they wanted to walk out of class because they didn't want to hear that the way they were doing things was wrong. I also had another guy who I thought was a lost cause who came back from Mercedes-Benz school with a new life as far as how he wanted to repair cars."

OEM trainers themselves are sometimes surprised by the students shops send. "The main thing that I notice is technicians who come to training who don't have basic computer skills," Mike Kukavica of Porsche said. "They really need to be able to get to the workshop manuals. It's not a paper book anymore.

PHOTO: THINKSTOCK / IVELINRADKOV

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They have to be able to use a computer."

Shawn Hart, a trainer with Audi of America, said some students show up with little understanding of even why they are there. "They'll say, 'My manager just said here's your ticket, you're going to training,'" Hart said.

He said shops should make sure technicians are really interested in the particular training being offered; he recalled one student who was told by his employer he was going to training to become the shop's aluminum technician even though that wasn't the type of work the technician wanted to do.

"If they're passionate about something, they'll learn it," agreed Rick Miller of Jaguar Land Rover.

"Send someone who will take it seriously," Kelly Logan, technical manager for Tesla Motors, said. "I've seen some techs who spend more time on their phone during their welding test and ended up failing."

"They should have a thirst for knowledge and be there to learn," agreed Jason Bartanen, director of industry technical relations for I-CAR, which conducts the Jaguar-specific training for the automaker in the United States. "Those are the ones who succeed. It all starts with attitude."

Getting them prepped

There are ways to help technicians prepare for OEM training and testing.

Going through it yourself can help you help them know what to expect. Dorn said initially "it was tough getting anybody" to go to some of the more intensive OEM training and testing, but after he himself failed his first Tesla welding test and his technicians saw him becoming more of a hands-on student with them, something changed.

"I think that's what you have to do, re-learn your craft, and get more hands on," Dorn said. Another thing he's done to help prepare his techs for the OEM welding tests is to install a complete welding station that closely matches that of the OEM training facility.

"So when we walk in [to the OEM facility], it's familiar space," Dorn said. "Positioning — how you lean up against something, how you rest your hand — all of this is part of the process and determines whether you are going to pass or fail. You need to have every advantage you can in order to pass."

Dorn also brings trainer Toby Chess into his facility to work with his newer technicians. "We now have six apprentices with journeymen technicians that Toby goes through the welding process with," Dorn said." He goes through the bonding and riveting process, too, just to get them acclimated right from the beginning. He's pretty in-depth and stringent. He'll spend three hours with one apprentice, and then put him back in the line. They're all scared to death of him at first but love him at the end of the process. And as soon as he's gone, they all ask when he'll be back."

Tom Elder of Kompact Cars, Inc., Clarksburg, N.J., whose shop was among the first in the country to receive Mercedes-Benz certification, said he's brought in a trainer from the welding equipment manufacturer to help prepare technicians for OEM testing. Having seen how expensive the re-testing process is (and how tough it can be on a technician to fail), Elder offered welding training in his shop to outside technicians who called him in order to help them prepare.

A number of the automakers also are working on training materials to help students prepare for the classes and testing — and have access to some "refresher" materials once they are back in the shop.

Bartanen said Jaguar-Land Rover is developing some online information to make technicians aware of the types of material they will be welding, what the weld specifications are, what machine settings they will need, etc.

Audi is developing videos on topics like how to analyze a carbon fiber component, which a technician could watch before or after the training, as needed.

Carvino said he has made sure he gets through any automaker training and testing himself in addition to sending technicians. "I don't let any guy go and get something that I'm not going to have myself so there's not complications down the road if that guy leaves," Carvino said.

NOT OEM CERTIFIED? GET THE TRAINING ANYWAY

Can a shop get OEM training without becoming part of the automaker's shop certification program? That varies by automaker.

"Anybody who comes in touch with our vehicle should have the information available to them," said Joe DiDinato, collision training administrator for Toyota. "Our training is available to independent shops as well as insurance carriers."

Audi of America, however, only offers its training to independent shops with dealer sponsorship to become part of the Audi shop certification program. Audi trainer Shawn Hart said cars are becoming too complex for shops not to start to specialize.

"If a shop wants to learn this, they need to look into getting on the [certified shops] program," he said. "You're not going to be able to fix these cars without being on the program."

Either way, long-time trainer Mark Olson of Vehicle Collision Experts said he thinks shops should seek out any OEM training available, even if not becoming certified. He pointed to Honda's requirement to use a particular type of welding wire on some of its vehicles.

"One of the biggest problems is that technicians don't even know to ask for that," Olson said. "Access to this information is super easy. It's an online I-CAR class. If you're fixing Hondas, you should be taking their classes whether you're certified or not."

Making the investment

The number of automaker training facilities around the United States continues to grow. Although it can be expensive to send a technician halfway across the country for a week or two of training, the automakers say that has advantages over in-house training. The training facilities generally have more than one of the specific welders or other equipment students need to use during the training, whereas a shop likely will have only one, for example.

Logan said getting students out of the shop environment also helps improve their focus on the training.

"Sometimes in a shop atmosphere, there's a lot of distractions; the tech gets pulled away, say, because you need to get a car out," Logan said.

Eric Mendoza, collision repair and refinish training assistant manager for Toyota, said his company is well aware of the investment a shop is making in sending a technician away for training.

"We're working really hard to make sure that when you're sending your people, it's for information that is best learned in our shop, using hands-on learning," he said. "We want the value of sending your guys to far outweigh the cost."

For his part, shop owner Dorn said he can certainly understand how a shop owner may be hesitant to make a major investment in a technician's training given the concern that the technician may then leave for another shop.

"That runs through my mind as well," he said. "But the worst thing you can do is not train them. At some point, they have to step up. And once they do, once they meet that challenge, it makes them so much better at what they do overall."

JOHN YOSWICK is a freelance writer based in Portland, Ore., who has been writing about the automotive industry since 1988.
jyoswick@spiritone.com

Get to the 'why' when facing production problems

Is it your system – or your team's failure to follow it?

If you have production bottlenecks, it's time to start asking why. Repeatedly.

Here's what I mean. When something doesn't go right with a job in one of our shops, it's almost always because someone deviated from our system. They skipped a step, for example, usually not because they're being lazy or trying to cut corners, but just because they think it may save them some time.

Finding out if that's actually what happened just takes asking "why" multiple times. For example:

• Why was this car delayed? Because we were missing a part.

• Why were we missing a part? Because the wrong one was delivered.

• Why didn't we catch that earlier in the process? Because we didn't mirror-match the new part against the old ones.

• Why didn't we mirror-match the parts? Because parts were coming in so fast, and we didn't think we had the time to do it.

Bingo. It took four "whys" (sometimes it can take five), but we found the cause of the problem. I believe whole-heartedly in the mirror-matching process, and my staff has come to believe in it as well. But occasionally, when things get really crazy, it may not happen on every part on every job. That rarely saves us all that much time — and in the example above, it clearly cost us.

The process of multiple "whys" helped us confirm that it wasn't our system that was broken (though if it were, the "whys" can help you pinpoint that as well). The problem was clearly that someone deviated from our system. But no matter which it is, you want that cause to come to the surface so you can get back to basics, making sure everyone is doing what you know works.

The good news is that problems like these can become a great opportunity to remind your team about the benefits of consistently following the system — and the potential downside that thinking "there's not time to do that" can have.

WHEN SOMETHING DOESN'T GO RIGHT WITH A JOB, IT IS ALMOST ALWAYS BECAUSE SOMEONE DEVIATED FROM OUR SYSTEM.

It's also an example of how following the system is particularly critical early in the process. Finding that wrong part on the day the vehicle is supposed to be delivered can mean a delay. But that very same incorrect part problem, if caught early in the process, wouldn't have delayed a thing. We still would have had the car in process for days, typically, so we could have recovered from the error without missing a beat in production.

I also remind my staff that the only thing that takes more time than following our systems is dealing with the aftermath of not following the system. Are you really coming out ahead skipping a step to save some time if that means a vehicle has to be repainted or re-washed or partially re-disassembled and then reassembled a second time? If you don't have time to do something right, how are you going to have time to re-do it, maybe multiple times, to correct an issue?

The reality is you are going to spend that time somewhere along the line. It's almost always best to spend it upfront rather than scrambling at the end.

Getting to the bottom of what's causing production delays is, I believe, what sets great shops apart from the rest. I often say fixing cars is just a byproduct of what we do. We could be making sandwiches or building furniture or shining shoes. No matter what the business, what will truly set you apart from your competition is having a team of problem solvers. No one can just accept the problems they see within the business. Everyone needs to drill down and figure out how to fix it.

So the next time there's a stumble in production at your shop, start asking why. Figure out if it's your system, or someone's failure to follow that system.

RYAN CROPPER owns Able Body Shops, with two locations in Anchorage, Alaska, as well as Total Truck Accessory Center.
rcropper@ablebodyshop.com

Work to improve yourself from the inside out

BUILD A POSITIVE RELATIONSHIP WITH YOURSELF TO SEE PERSONAL DEVELOPMENT

MIKE JONES // Contributing Editor

I believe that our eyes have been taught to see what is pleasing and what is not. We look at people and make an assessment of their worth and value immediately based on the picture, the one percent visible to the human eye.

As a result, last year people spent over $12 billion undergoing surgical procedures to alter their one percent to create a more attractive picture, literally photoshopping their appearance to look more attractive to the human eye.

I have observed people meeting someone for the first time and telling them how beautiful they were just based on the picture, the one percent they can see.

What you see with the human eye may be deceiving. The outside does not always look as good as the inside. It is more valuable to get to know people from the inside out. If you come to know the inner beauty of the person, the outward picture has little value.

I have met people over the years that because of their outward appearance, I would never have spent any time getting to know them.

After my 30 years in the people business, I can tell you that my wise grandmother was absolutely spot on when she said, "Do not judge a book by its cover."'

A lot of people hire folks based on the one percent and quickly learn that was not a good hire.

Here are my five tips to improve your attractiveness from the inside out:

1. Build a positive relationship with yourself. If you lose something or forget something, do not call yourself "stupid" or an "idiot." Be your own best friend.

2. Build more trust in the relationship you have with yourself. We are halfway into the New Year and some of you made some promises on Jan. 1 that you have broken. If you practice breaking promises to yourself, you will develop a habit of breaking promises to yourself. Begin again right now and keep those promises small and on a short time cycle.

3. Challenge yourself to do something new today. Get out of your comfort zone. Read a book, eat a new food and talk to different people. Go explore and learn something new today.

4. Do something physical every day. It doesn't matter how long or what it is; however, it should be focused on getting heathier. There are people walking around that appear to be physically fit based on how skinny they are, but the inside may not mirror the outside.

5. Invest in your own personal development. Buy a book, take a class, and get some professional coaching. To be clear, the only way to get a return on the investment is by applying what you learned. I have had people recommend books and classes to me they read or attended and shared how awesome they were and how much they benefitted from the book or the class. I took them at their word and read the book or attended the classes and came back and asked them, did you really read that book? Did you really attend that class? Because I gained things from the book or the class that was transformative for me, but I did not see an improvement in their inner attractiveness. Investing in you is the best investment you will ever make.

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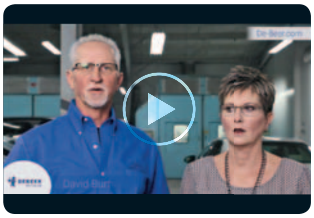

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JULY 26-29
NACE Automechanika 2017
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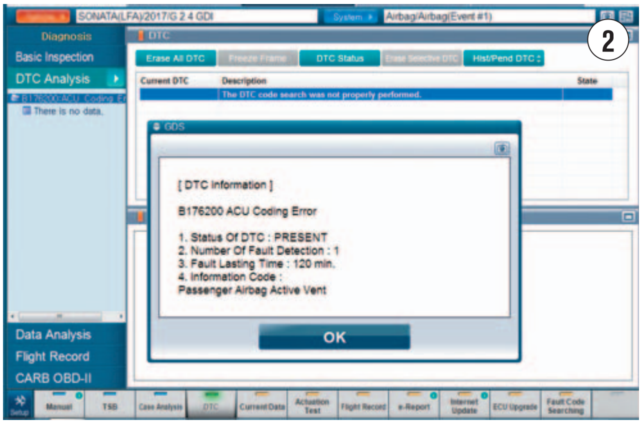
AIRBAG VENTI

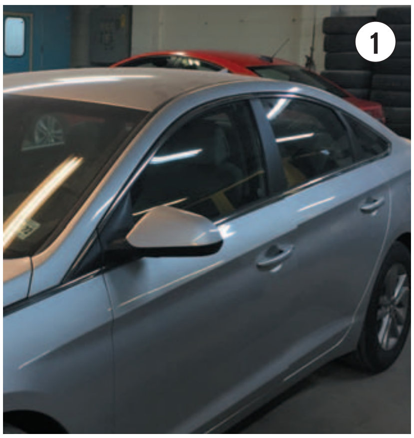
USING DIAGNOSTIC PATIENCE TO UNCOVER THE TRUE CAUSE BEHIND AN AIRBAG ERROR CODE

JOHN ANELLO // Contributing Editor

I was called to a shop to program a newly installed airbag module on a 2017 Hyundai Sonata with less than 700 miles on the odometer (Figure1). This vehicle was involved in a front-end collision with deployment of the front driver airbag and the driver seatbelt. The airbag module had to be replaced because on this particular vehicle, once crash data is stored in the control unit, it cannot be cleared. There was no deployment of passenger-side components because no one was in the passenger seat during the accident. This is determined by the passenger occupant seat weight-sensing device that will prevent deployment if no one is sitting in the seat.



When I arrived at the shop, I plugged my Hyundai GDS scan tool into the car and selected the airbag reprogramming procedure. When I went to perform the task, the tool came back with an error code B176200, which sets when the airbag module will not accept the coding procedure. The coding of the airbag can be performed manually by inserting a specific alpha numeric number that reflects the components that are installed in the airbag system. If the coding information is incorrect, then the airbag module will refuse the coding. This code can be retrieved by installing the old module and reading the coding written to the old module, or you can retrieve the coding from Hyundai's website for a small fee. My Hyundai factory scan tool is online with the server so it will automatically insert the coding for me. So I was surprised that the module would not follow through with the coding process.



The airbag module on this particular vehicle does not have the capability to diagnose the airbag system for a fault until it is properly programmed, unlike other manufacturers that will create a laundry list of codes until the control module is properly configured. The scan tool does have a hidden feature that will point you in the right direction if there are no error codes present that are keeping you from coding the airbag control module. You simply highlight the coding error fault by clicking on it, then you click on "DTC Status" above the error code. A window will pop up showing you what current errors are creating the coding fault (Figure 2). The error fault displayed dealt with an issue of the passenger airbag active vent. I have never come across this device or even known it existed. I fully understand deployable airbags, seatbelts, buckles and battery-positive pyro-tech devices, but I never knew about a vent being deployed. So this one I had to crash course. It just amazes me how much there is out there to learn on a daily basis. I just recently learned about the Starbucks Venti, and now I have to be schooled on the Hyundai Venti.

After doing some research, I found that certain manufacturers were now adding an active vent into front airbags that control the venting of the airbags after they deploy. By looking at the passenger dual-stage airbag, you can see the third plug for the active vent device (Figure 3). My big question here was how the active vent could have been deployed if the passenger airbag was never deployed and there was no one sitting in the passenger seat. There was a chance that the active vent circuit had high resistance in the connections because anything over 0.5 ohms in an air bag system can set off an airbag light.

I decided to install the old airbag control module and properly secure it so it would be grounded. It is very important to not just hang a module with the connector engaged because

PHOTOS: JOHN ANELLO

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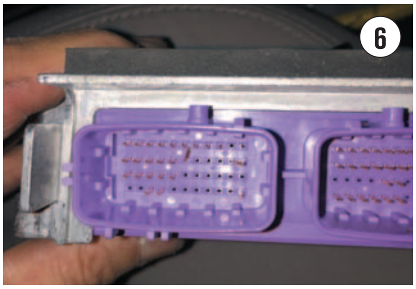
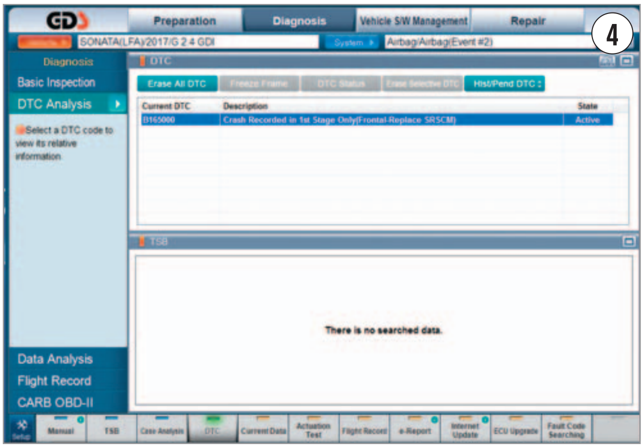
the mount in most vehicles serves as a ground feed for the module, and the module may not communicate with the scan tool. It is also a safety precaution to avoid accidental deployment of onboard airbag components. By installing the old module I would be able to diagnose the system because it was already configured for the vehicle. When I scanned the old module, I was surprised to only see the code B165000 for crash data stored in the system. There was no active vent error fault stored (Figure 4).

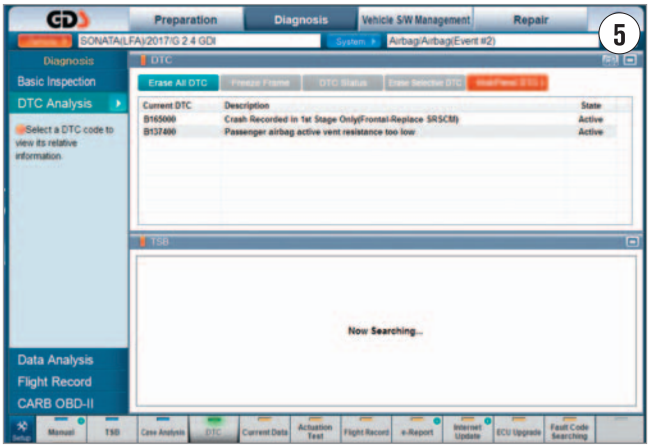
I now needed to test the active vent system wiring. This can be easily done by simply lifting the connector shorting bar tab on the top of the connector. This plastic tab is always destroyed in the field by inexperienced guys who don't know about its operation. Prior to pulling a plug off a deployable component, if this tab is not lifted first, the connector will be damaged and there will be no way to move the shorting bars away from the component pins. This always results in a short-circuit code during reassembly. So by leaving the tab in the up position, it would allow the shorting bars within the active vent assembly to make contact with its pins and create a short-circuit code (Figure 5). This, in turn, is an easy way to prove out the wiring from the airbag control module to the active vent device. If I pushed the shorting bar back in, then the active vent code disappeared. At this point there was nothing wrong with the circuit. There had to be something wrong with the new control module.

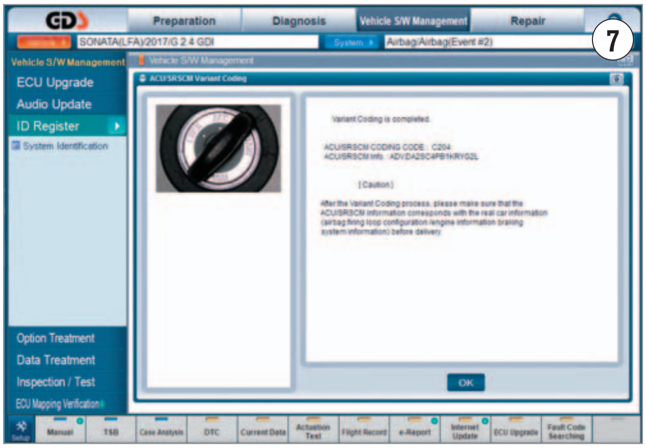
I picked up the new module to check for proper pin connections, and I was shocked at what I saw. The guy who secured the connector to the air bag module could not get a straight, clear engagement of the connector. He secured it on a slight angle and bent a few pins on the new control module (Figure 6). Lucky for this guy, I was able to use a fine pair of needle-nose pliers to straighten out the damaged pins. I bolted the module back in place, secured the connector and attempted once again to program the module, and the scan tool was able to insert the coding with no problems (Figure 7).

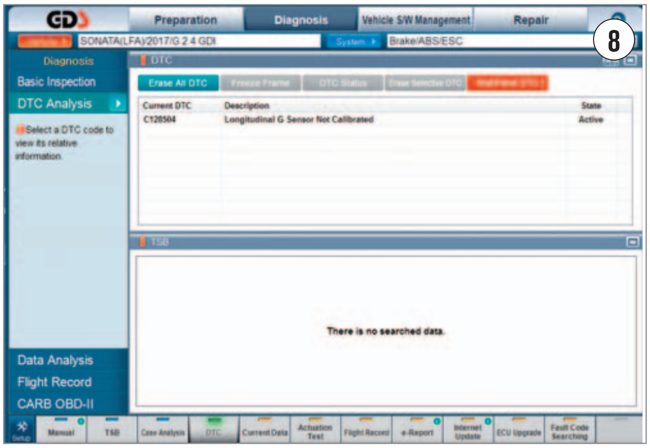
Okay, so now we're done, right? Not so fast because we now have an ABS light on the dash with a code C128504. This code relates to the Longitudinal "G" sensor not being calibrated (Figure 8). What the manufacturers did without you realizing it is they incorporated a Yaw sensor internal to the airbag module to measure longitudinal and lateral movement for vehicle turns and





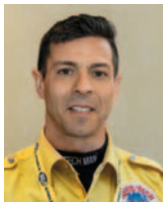






vehicle stop and go. This sensor is not accessible through the airbag system to calibrate. It is bussed to the ABS control module and all data acquisition and calibration procedures are done through the ABS menus.

There are criteria measures to be met prior to calibrating a Yaw sensor. You must make sure you are on level ground and that the vehicle is at proper curb height with the tires properly inflated. Once this is achieved, then you are ready to calibrate the sensor and now you're finally done with the task of securing a new airbag control module into the airbag system. My only hope is that this story will enhance what you know about the airbag systems of today.



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

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Understanding the need for scans, calibrations

Vehicle health, safety is dependent upon proper diagnosis, repair of all systems

DARRELL AMBERSON //
Contributing Editor

Scans, calibrations and new vehicle technologies have been THE hot topics for the last two years in the industry, although in many ways they still feel like relatively new issues — primarily because we are still far from having industry-accepted, standard policies, procedures and compensation methodology.

I know from my own experiences and anecdotal information that far too many shops are not yet performing pre- and post-repair scans. Information providers have yet to establish definitions and pricing guidelines for scans and calibrations. Pricing is based on who is performing the procedure and who is paying for it. Most insurance companies lack clear and concise policies on when to scan and calibrate, as well as on payment. Some instruct staff to address scan and calibration authorization and pricing on a case-by-case basis, which adds to inconsistency and confusion. Some insurers concoct their own policy and pricing methodology, sometimes at local levels that can differ by region. Some insurers are critical of shops that perform scans and calibrations according to manufacturer directives, accusing them of being "uncompetitive" because they charge for them, and then rewarding shops that don't perform the procedures because they are "competitive."

While many OE manufacturers have established definitive policies and procedures, there are still some manufacturers who have not provided clear and concise direction. Policies and procedures and required equipment vary from one manufacturer to another. And to complicate matters, many people — often insurers — question the motives of the manufacturers, implying they are self serving in protecting their own interests and passing liability issues on to repairers and indirectly to insurers in the form of potentially unnecessary procedures. We are in a state of confusion. How disappointing that our industry doesn't evolve better in the face of change, especially as we are dealing with critical safety issues, including accident avoidance and airbag deployment systems.

PHOTOS: DARRELL AMBERSON

Yet, we know we are making progress because there are so many discussions taking place, there are new training opportunities and equipment manufacturers are starting to develop collision-specific tools.

Education

Of course the key to making progress is education. There are some excellent classes on the topic:

• I-CAR, class # VT210E01, "Introduction to Diagnostics and Scan Tools" is a great place to start; it's an hour-long online course. They also have other classes on new technologies and calibrations.

• Automotive Management Institute (AMi) offers "Management's Guide to Scanning and New Technology." This online class is closer to 90 minutes; some insurers are using this to educate their claims people.

"Shop owners, managers, estimators and insurers who are not making a concerted effort to understand the topics of scanning and calibrations are doing a disservice to their customers, their businesses and to themselves," said AMi president Jeff Peevy. "The AMi online course was designed for those not necessarily doing the scans, but those needing to understand and manage the process. Regardless of your approach to becoming informed on the subject, it is important that you not be passive about it."

I know from personal experience that the more information I seek the more I find. In addition to the obvious factory bulletins and repair information, there are many articles — such as those included in this special section — releases from I-CAR and many presentations and training opportunities at industry events such as NACE Automechanika, SEMA and the Collision Industry Conference.

Getting started on scans

After becoming educated on the topic, most collision repairers conclude that scanning is a necessity. A significant concern is the potential exposure in a worst-case scenario of a safety system failure resulting in injury or loss of life that could have been avoided through appropriate diagnostic and calibration procedures.

Most OE manufacturers have formal positions on the topic and many insist on pre- and post-repair scans on all of their brand vehicles after any collision. Today's collision repair businesses have many choices regarding how to approach performing scans. The most simplistic approach is to simply sublet the work to a dealer or an independent contractor. The alternative is to start performing some or all scans in-house. A good starting point is with an analysis of the shop's current mix of work by age and model; shop procedures and how to integrate scanning; staff competence and staffing needs; tool and equipment needs and options; budget; and shop IT infrastructure including WIFI or cable internet access and capacity, as well as adequate security features to prevent viruses and hacking.

Assuming you decide to start doing some or all scans in-house, your scan tool choices include OEM and aftermarket tools. Both have advantages and disadvantages.

The big picture

It's most important to consider the basic function and design of these new technologies. It was mandated that all 1996 and newer vehicles have an On Board Diagnostic system II (OBDII). Included in that requirement is the use of a specific 16-pin connector that is universal to all models and is to be located within two feet of the steering wheel (see photo on page 51). The system monitors an incredible number of functions and when something goes awry, it creates and stores a Diagnostic Trouble Code (DTC), often referred to as a fault code. The purpose of the DTC is to aid technicians in locating the source of problems, presumably leading to a corrective repair. Depending upon model and options, systems can be capable of producing hundreds or even thousands of different DTCs. Very few of them will light a dash warning indicator.

"Clearing codes" is a phrase that has become common in the collision repair industry. Unfortunately, too many people have the impression that it is our job to make the codes go away, and then everything is fine. Instead, we need to understand that the code is an indication of something wrong and therefore it is our job to identify the source and address it accordingly. The process of the scan identifies the codes. Determining what the codes mean may require additional research of factory data and repair information from sources such as OE websites or ALLDATA. It can be time consuming. If the source of the DTC is unrelated to the accident, the consumer — and perhaps insurer — should be informed. If they elect to not correct the issue, it is best that the code be left in the system for diagnostic purposes at some potential later date. (It is prudent to have the consumer sign a release before starting the repair that allows the repairer to obtain their vehicle's data and share it with the insurer.) If the code is related to the accident, steps should be taken to correct the issue and clear the code before handing the vehicle back to the customer. If the code is not cleared, you leave the vehicle with a potentially permanent record of the accident and/or repair, which may have negative implications for the customer in the future, such as from diminished value at trade-in time.

Think of the scan as the only way that you can look into the system. Visual inspections are very limited in the problems you may detect. If you have a good understanding of all the systems, a road test may identify if most systems are functioning. However, so many systems are so complex that it is difficult to know how all systems on all vehicles behave. And even if you identify a malfunctioning system, you will in all probability need a scan to pinpoint the issue. A scan is by far the best tool to identify potential issues and the best tool to assure the health of the systems.

Calibrations

While scanning is the most thorough way of checking the health of these new systems, there is more that one needs to understand and consider. Calibrations are a key issue. A scan may identify that a camera or sensor is working and that there are good electrical connections in its system, but it may not tell the technician that the camera or sensor is in proper calibration. If a windshield mirror-mounted camera was pointed in a direction out of its prescribed range of vision, it potentially may not see what it was intended to. If an adaptive cruise control was engaged, it may cause the vehicle to drive up on a small vehicle it didn't see, such as a motorcycle, because

OE SCAN TOOLS VS. AFTERMARKET SCAN TOOLS

OE scan tools:

- Coverage limited to specific manufactured vehicles
- More than one may be required for each manufacturer
- Contains the latest and most complete functionality
- Validated by the OE manufacturer
- Updates released frequently
- May provide capabilities that aftermarket tools don't, such as build data, freeze frames or frequency counters

Aftermarket scan tools:

- Wide range in capabilities and cost from the best units to most modest ones
- Some provide coverage for most vehicle brands and models
- Some provide procedures and functions for diagnostics and calibrations equal to OE tools on many vehicles.
- Cost effective
- Updates may not be as frequent
- Information may not be as current

it was only seeing a larger vehicle, such as a truck, in front of the motorcycle.

It is a necessity for repairers to know when it is appropriate to perform a calibration. Factory bulletins and other factory repair information are great resources, especially when dealing with common calibrations such as seat weight sensors.

There is a relatively new source that may be the easiest and best tool to identify calibration needs. On the I-CAR Repairability Technical Support Portal there is a link to OEM Calibrations Requirements Search. You simply put in the vehicle information, and it will tell you what calibrations may be required and give information on what tools, such as scanners or object detection targets, may be required.

Programming

Some repairs include the necessity to reprogram Electronic Control Units (ECUs). Scanners that use an SAE J2534 standard may be required. Most aftermarket scanners don't include it. Some ECUs have anti-theft systems imbedded and require licensed security identification (LSID), which is available to the aftermarket through the National Automotive Service Task Force (NASTF).

The future

I just read of a new pedestrian detection system that Ford will offer on 2018 Mustangs and F-150s. It relies on information from a radar system in the bumper and a camera on the windshield, along with a database of pedestrian shapes. When detecting a pedestrian, the system warns the driver then automatically applies the brakes to avoid hitting the pedestrian. It works even in dim light and will not take such action on other shapes, such as deer. In the event of a collision repair, it may raise repair costs and require calibration. It's just one example of the anticipated onslaught of new technologies we will be dealing with. There is every reason to believe that as a percentage of repair costs, addressing new technologies will comprise an increasingly larger portion. If you as a repairer haven't reacted to these new technologies, you have a lot of catching up to do. All of us will have to devote more and more resources to equipment, staffing and training.

DARRELL AMBERSON is the president of operations for LaMettry's Collision, which has eight locations in the Minneapolis and St. Paull area. He is a board member for the Automotive Service Association, and he has more than 40 years of collision industry experience.
damberson@lamettrys.com

The why, how of scanning

Scanning is vital to proper repairs, and a mobile diagnostics company can help

ERIC ZIEGLER// Contributing Editor

Vehicles are becoming more complex with many consumer-driven feature improvements to vehicle navigation, infotainment and safety systems. The price tag on these modern high-tech marvels that many of your customers own is probably equal to or more than the house you grew up in! The modern automobile is usually one of the greatest investments, second usually only to the purchase of a home, that people nowadays make in their lives. Since vehicles are costing more, the cost of repairing them is also increasing. A lot of this is due to the advent of all the expensive safety systems like multiple airbags, passive restraints like seat belt pretensioners, collapse steering columns, adaptive cruise control, lane departure/collision avoidance and blind-spot detection systems.

The job of the auto body estimator can be a difficult one. Software estimating programs have been around for years to aid in this task of getting the estimate correct with the least amount of supplementation and to reduce cycle time. Matrixes of parts to be replaced after a certain type of deployment collision have traditionally been used to limit the insurance company's liability post-collision repair. But with the advent of more and more expensive mission-critical safety systems, the accuracy and cost effectiveness of these estimating methods is becoming more and more limited. The insurance companies have come to this realization and pilot programs for pre- and post-repair scans are in place in many markets and soon to become the status quo or industry standard. I own and operate a mobile diagnostics and programming company providing dealer-level diagnostics such as pre- and post-scanning, programming and wiring repair to my collision and service repair facility clients.

Pre- and post-repair scans are becoming a bigger and bigger part of what we do in collision centers. While there are tooling and online options for pre- and post-scanning, establishing a working relationship with a local mobile diagnostics professional is your best bet if one is available in your area. No online service can realistically compare to having a "boots on the ground" professional when it comes to data interpretation and insuring a successful programming outcome. Module programming can be tricky at times. Proper tooling and technique are critical to the successful outcome. If the battery voltage drop is too low or if the key is cycled at the wrong time, the programming results can be catastrophic.

So, what is driving the trend shifting to pre- and post-scans? First, think of how the post-deployment airbag parts matrix model worked in the past. Parts were replaced based on a certain type of collision deployment. The matrix suggested replacement of all possible parts that "could" have failed in that deployment collision. Oftentimes, this resulted in the replacing of parts that may not have actually failed, and unnecessary losses for insurance companies. Insurers are always looking to reduce loss and liability and improve their bottom line. Second, and perhaps more importantly, consider that the modern late-model vehicle can have an upwards of 50 modules that communicate on multiple computer networks. There are literally hundreds of Diagnostic Trouble Codes (DTCs) that can set — many of

```
DG149746 - Taurus                                   Complete View
System :
Software version : IDS-103.01
Select Option
Hold (saves recordings).
Complete (deletes recordings).
Delete (deletes session).
 Vehicle:  Taurus
 Engine Type:  TiVCT
 Capacity:  3.5L
 Transmission:  Automatic
 Fuel Type:  Gasoline
 Emission level:  Federal Emission
 Odometer:  50102.9
 (VIN):  #########DG149746


Strategy : DG1A-
Filename : DG1A-14C204-ATD
Module Part Number :
(ABS) Part Number = DG13-2C219-AE
Standard Equipment Modules - Pass - (ABS)
(ACM) Part Number = DG1T-19C107-DG
(ACM)_FILENAME = DG1T-14D099-DF
(ACM)_HARDWARE_NUM = DG1T-14F188-DC
(ACM)_CALIBRATION_FILENAME = DG1T-14D100-DE
Optional equipment Modules - Pass - (ACM)
(APIM) Part Number = DG1T-14D212-AD
(APIM)_FILENAME = DG1T-14D205-AB
Optional equipment Modules - Pass - (APIM)
(BCM) Part Number = DG1T-14B476-AA
(BCM)_FILENAME = DG1T-14C184-AA
(BCM) Software Part 1 (F16C) = DG1T-14F390-BC
(BCM) Software Part 2 (F10A) = DG1T-14C636-AE
(BCM) Software Part 3 (F16D) = BC3T-14F389-AA
(BCM) Software Part 4 (F16E) = DG1T-14C408-AC
(BCM) Software Part 5 (F16B) = BT4T-14F391-AC
(BCM)_HARDWARE_NUM = BC3T-14F141-BC
(BCM)_CONFIGURATION_FILENAME = DG1T-14C636-AE
Standard Equipment Modules - Pass - (BCM)
Optional equipment Modules - Fail - (C-CM)
Optional equipment Modules - Fail - (DCSM)
Optional equipment Modules - Fail - (DDM)
Optional equipment Modules - Fail - (DSM)
Optional equipment Modules - Fail - (DSP)
(FCDIM) Part Number = DG1T-18B955-CC
(FCDIM)_FILENAME = DG1T-14D358-CD
(FCDIM)_HARDWARE_NUM = DG1T-14F180-CA
(FCDIM)_CALIBRATION_FILENAME = DG1T-14D359-CD
Optional equipment Modules - Pass - (FCDIM)
Optional equipment Modules - Pass - (FCIM)
```

PHOTOS: ERIC ZIEGLER

GERBER PONTIAC TAURUS LOG

which may not turn on a Malfunction Indicator Light (MIL). Third, most of the modules have some sort of programming, setup, configuration or calibration requiring OE tooling and subscriptions either after collision repairs or module replacement. Because of the locations of some of these modules, it makes them susceptible to collision damage. Some safety equipment — like collision avoidance, adaptive cruise control, blind-spot monitoring and lane departure modules — are extremely expensive, so you must take time to assess possible damage prior to repair, rather than once the vehicle is in production or after it has been repaired.

Vehicle Information: 2012 RT 3.6L 2C4RC1BG2CR207336
Odometer: 55341.2 miles

wiTECH

Publication Date: Wed Jan 18 2017
Page: 1

ECU Summary Information

ECU	Name	Original VIN	Current VIN	Part Number	Flash Part Number	H/W Version	S/W Version	Spare Part Number	ISO Code	S/W Number	H/W Number	Variant	Version	Bus Type	Country Code
ABS	Anti Lock Brakes	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	05154911AE	05154911AE	0A.0E.00	#0: 11.34.30	Not Available		Not Available	Not Available	10	01	CAN C	N/A
CCN	Instrument Cluster/Cabin Compartment Node	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	68055682AG	68055736AG	FF.FF	00.02.04	Not Available		Not Available	Not Available	06	11	CAN IHS	USA
DMFL	Door Module Front Left	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	05026861AE	05026861AE	08.10	11.13.00	Not Available		Not Available	Not Available	08	07	CAN IHS	USA
DMFR	Door Module Front Right	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	05026860AE	05026860AE	08.10	11.13.00	Not Available		Not Available	Not Available	08	07	CAN IHS	USA
DMRL	Door Module Rear Left	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	68079910AB	68079910AB	07.08	02.03.00	Not Available		Not Available	Not Available	02	00	CAN IHS	USA
DMRR	Door Module Rear Right	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	68079910AB	68079910AB	07.08	02.03.00	Not Available		Not Available	Not Available	02	00	CAN IHS	USA
HFM	Hands Free Module(cell phone)	00000000000 000000	2C4RC1BG2 CR207336	68104904AB	68104904AB	14.00	63.01.23	Not Available		Not Available	Not Available	02	03	CAN IHS	USA
HVAC	Heat, Ventilation and A/C	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	55111236AF	55111236AF	0B.18.01	#0: 11.16.03, #1: 11.16.03	Not Available		Not Available	Not Available	10	03	CAN IHS	N/A
ORC	Occupant Restraint	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	68062118AF	68062118AF	10.12	10.40.00	Not Available		Not Available	Not Available	03	07	CAN C	USA
PCM	Powertrain Control Module	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	68185470AD	68185470AD	11.2F	11.10.00	Not Available		Not Available	Not Available	23	A6	CAN C	USA
PLGM	Power Liftgate	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	68079913AB	68079913AB	08.12	03.03.00	Not Available		Not Available	Not Available	05	00	CAN IHS	USA
PSDML	Power Sliding Doors (Left)	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	68079909AB	68079909AB	07.08	01.31.00	Not Available		Not Available	Not Available	02	00	CAN IHS	USA
PSDMR	Power Sliding Doors (Right)	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	68079909AB	68079909AB	07.08	01.31.00	Not Available		Not Available	Not Available	02	00	CAN IHS	USA
RADIO	Radio	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	05091201AC	05091201AC	02.07	33.00.41	Not Available		Not Available	Not Available	03	01	CAN IHS	USA
SAS	Steering Angle Sensor	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	56046497AD	56046497AD	03.00	03.05.01	Not Available		Not Available	Not Available	01	02	CAN C	USA
TIPMCGW	Central Gateway	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	68105507AC	68105519AC	01.10	09.02.00	Not Available		Not Available	Not Available	08	54	DIAG CAN C	USA
TPM	Tire Pressure Monitor	2C4RC1BG2 CR207336	2C4RC1BG2 CR207336	56029401AG	56029401AG	07.24.03	#0: 09.14.00	Not Available		Not Available	Not Available	01	04	CAN C	N/A

2C4RC1BG2CR207336 VEHICLE SCAN REPORT

This is extremely important, especially if the repair of said systems could have totaled the vehicle. Moreover, these are usually big dollar supplements that have to be turned in. Replacement of these types of systems require programming and oftentimes special calibrations requiring OE tooling. Having a system-wide pre-scan of the vehicle before the estimating and repair process begins is a procedure that captures and documents any codes that are present or pending, and in some later-model vehicles, the time stamps associated with them. This can be extremely beneficial for both the insurance company and the collision shop. This is a great aid in determining any unreported prior damage and can help combat the "ever since you worked on my car, XYZ doesn't work" complaint. Collision centers and insurance companies usually have no leg to stand on due to not having any record of previous unreported failures. If an owner complains loud enough, the insurance will pay out to avoid the negative publicity. This may result in the collision shop having to foot the bill to avoid a poor BBB, Yelp or online review. Pre- and post-scans will be a great step in the right direction to combat this. Here are just a few scenarios that come to mind where pre- and post-scans could be beneficial.

Scenario 1

Let's say the customer had bought a late-model vehicle with radar adaptive cruise control and hit something that damaged the ACC module, but didn't cause any other obvious damage. They got a $2,000 estimate and elected not to repair. Six months later, the vehicle was rear ended, causing $10,000 in damage. The vehicle was towed in on a flatbed with flat tires and a low battery from the flashers being left on. The body shop lacks the tooling to scan advanced safety features like ACC and obviously, they can't drive it. So, post-frame pulling, sheet metal repair, blocking and painting, the vehicle is returned to the owner who soon after returns to the shop. "Since you worked on my vehicle, my ACC doesn't work," the customer explains. The ACC module is on the complete opposite end of the vehicle in relation to where the damage occurred. The part is extremely expensive. The owner insists that the ACC worked fine prior to loss, and neither the body shop nor insurance company has any documentation that the ACC was inoperative prior to the accident. Eventually, the insurance company pays for a completely unrelated repair. The pre- and post-scan documentation would have given both the shop and the insurance carrier a legal leg to stand on.

Scenario 2

The vehicle is a 2014 Ford Explorer Limited that has deployed the front airbags, pretensioners and has fairly extensive frame and sheet metal damage and is close to, but not at, total value. The insurance carrier approves it to be repaired. The collision shop orders parts based on a matrix for a driver and passenger airbag deployment. The matrix calls for driver and passenger front airbags, clockspring, crash sensors, both pretensioners and seat belt anchors and a Restraints Control Module (RCM). It also states: "all deployable devices should be inspected post-collision." Both front airbags are obviously deployed, the front seat belts are pulled on and they are as tight as a string bass. It all seems pretty obvious to the estimator.

Structural repairs include pulling the frame, and the sheet metal is hung. The vehicle is blocked and paint blended with no issues. Cycle time has been ticking away, and post-production, the SRS MIL is on — the shop realizes that the RCM didn't get programmed. The PMI of the RCM is performed. The SRS MIL remains on, and codes are read from the RCM. A code for the collapsible column deployment loop is the only code present. A closer inspection reveals the collapsible steering column has deployed and needs replaced. This is an expensive part that is not always stocked at the local dealer.

A pre-repair scan report from a mobile tech would have alerted the shop to closely inspect the column for deployment. Part of the OE's inspection process is to check for codes and deployment loop statuses with a factory scan tool. One could argue that a shop with a scan tool could perform some of these functions. It could, if properly trained and tooled at a substantial cost of time and money.

Scenario 3

A late-model Mazda has been in a deployment collision. The RCM has been changed out. A mobile tech is called in to shut off the SRS MIL. The shop attempted to do the RCM setup with their recently acquired aftermarket scan tool. After they attempt the procedure, the light is still on. They reluctantly call in a mobile tech who is not initially told about their attempt to setup and program the new RCM, just that the RCM was replaced. The mobile tech realizes something is afoul when the usual U2100 module configuration code that is almost always present in Ford, Lincoln, Mercury and Mazda SRS modules that have been replaced and need a PMI performed is not present. Moreover, there are codes for the driver's third deployment loops. The mobile tech consults a wiring diagram, which shows no such deployment loop for this year, make and model of vehicle. A physical inspection confirms this as well. After some quizzing of one of the techs, the shop comes clean about their attempt to try out their new tool that was "supposed to" do this function. A PMI of the RCM is performed using hexadecimal data obtained from the OE, since the original RCM is no longer present. The SRS codes are cleared and the SRS MIL is no longer on.

While the shop had good intentions, it fell short of the task and set erroneous RCM codes that resulted in wasted cycle time that could have been better spent working on vehicles in production that were in the body tech's field of expertise. It also illustrates the need to have the proper OE tooling, subscriptions and "time in type" to expedite this repair in a timely manner and keep the collision shop's production running smooth.

Scenario 4

A late-model Toyota with Millimeter Wave Collision Avoidance/Adaptive CC rear ends another vehicle, causing significant damage to the front of the vehicle. The body shop is in a medium-sized Midwestern town that doesn't have a local Toyota dealer. The shop has elected to use an online service that, after purchasing their hardware, will "remote in" and do the pre- and post-scans and any programming needed. The shop is told to have a solid internet connection, dedicated bay and a tech on standby for a two-hour window. The pre-scan catches the damage to the Millimeter Wave unit, and it is replaced. The post-scan comes back with codes that the Millimeter Wave module calibration was not performed. This is a procedure that requires special targets, OE tools and the familiarity with the system and its operation. Oftentimes after performing a very specific calibration/setup, the vehicle is required to be driven in a certain manner. The online remote service providers cannot do this.

Pre- and post-repair scans are here to stay, and they are a great benefit to the collision shop, insurer and vehicle owner. They help take the surprise out of estimating and repairing the complex modern vehicle. There are a few options to doing these scans — a shop can purchase the OE equipment and subscriptions and do them in-house, or outsource them to either an online vendor or to a mobile diagnostics service. Regardless of your choice, pre- and post-scans will soon be part of your day-to-day operations, if they are not already.

ERIC ZIEGLER is an ASE Certified Master Tech who specializes in module programming, drivability, electrical and network systems diagnostics. He owns and operates EZ Diagnostic Solutions Inc. and is a trainer for Automotive Seminars and The Driveability Guys.
eric@diagnosticsolutions.com

Diagnostic navigation

A guide to incorporating collision repair diagnostics into your current processes

JASON BARTANEN // Contributing Editor

PHOTOS: I-CAR

SCANNING is the only way to determine if there are any DTCs present.

If you haven't incorporated collision repair diagnostics into your repair process already, it's time. Advanced Driver Assist Systems (ADAS) are here to stay and will only continue to increase. By the year 2022, collision braking will be standard equipment on all vehicles sold by several OEMs in the North American market. If you're planning on continuing to repair late-model collision-damaged vehicles, you're going to have to be prepared to deal with some level of diagnostics; and those that are best prepared will likely have the most success.

After making the decision to get more active in diagnostics, questions quickly arise: Which tool(s) should I invest in?; Where am I going to do my diagnostics work?; Who is going to do my diagnostics work?; How do I incorporate these processes into my current repair process? The goal of this article is to help guide you through some of those questions.

Which tools should I invest in?

This is one of the most common questions I get about diagnostics, and it's one that isn't easily answered. If you've decided to bring your diagnostics work in-house, you'll have to answer this question early on. I suggest pulling your last couple years of repair orders and looking at the types of vehicles you're working on. If you're working on a few makes more often than not, you may want to consider an OEM scan tool for those models. The ones that you work on less frequently can be covered with an aftermarket tool, or by subletting to a local dealership. When choosing an aftermarket scan tool, it's important for you to know the capabilities of that tool. Work with the tool provider to confirm that it cannot only read and clear codes, but that it also has the required initialization/calibration capabilities for the makes and models you work on most frequently.

Another option, with excellent coverage, is a remote diagnostics tool. Collision Diagnostic Services and AirPro Diagnostics are two companies that offer this type of tool. Remote scanning offers you access to an OEM scan tool without the investment of having to buy several OEM scan tools or having the expertise for several to operate the different scan tools.

When is scanning required?

This question is one of the most hotly debated topics in the collision repair industry today. Several vehicle makers have recently published position statements on when they require pre- and post-repair scanning. Others have questioned the necessity of doing it on "all" vehicles, including those with no Malfunction Indicator Lamps (MIL) illuminated. The fact is, not all Diagnostic Trouble Codes (DTC) will illuminate a MIL. Simply relying on the presence of an MIL to determine if you're going to scan the vehicle is not a sound process.

Personally, if it's my shop, I'd be scanning every vehicle — and not just because of the OEM position statements. Instead, I'd be scanning the vehicle to determine which, if any, DTCs are related to the collision and which, if any, are likely NOT related to the collision. Scanning the vehicle, researching the DTCs and making the determination of related/unrelated codes is the best way to ensure that all parties involved have a clear understanding of what is required for complete, safe and quality repairs. If the vehicle is hit in the front and has an adaptive cruise control-related DTC, chances are that it's collision related. However, if that same vehicle has a code for a rear-wheel speed sensor that has had 150 key cycles since setting, you can

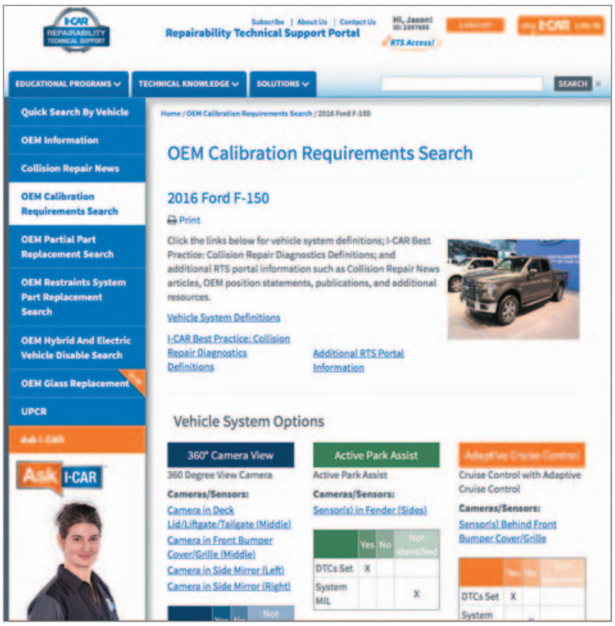
rest assured that the code isn't accident-related. Scanning the vehicle during the damage analysis process is the best way to ensure that you're writing the most complete assessment possible. Similar to 3D measuring, if you don't scan the vehicle, it's not possible to identify all of the "hidden" damage.

Scanning isn't only done during the damage analysis process. As part of a sound quality control process, post-repair scanning should also be done to ensure the vehicle is delivered to the customer free from any collision-related (or collision-repair-related) DTCs.

Post-repair calibration/aiming

While the debate on pre- and post-scanning has taken center stage, there is another important step that has gone largely ignored. Post-repair calibration, or aiming, is essential for many of today's Advanced Driver Assist Systems (ADAS) to function properly. Many of these systems are guided by cameras and/or sensors. When replaced, or sometimes simply moved, calibration/aiming is required. Without calibration/aiming, the system may not function properly, potentially causing a collision.

SPECIAL TARGETS may be required for forward-facing cameras and sensors.



THIS SEARCH TOOL, available from I-CAR, can save valuable time when writing a complete damage assessment.

Vehicle makers have specific criteria for when calibration/aiming is required and, often, a detailed process for the calibration/aiming procedure. Recently, I-CAR announced the launch of an OEM Calibration Requirements Search feature on the I-CAR Repairability Technical Support website. Visit ABRN.com/ICAR-calibrate. I-CAR staff invested thousands of hours of research identifying:

- which options were available on 2016 vehicles
- when calibration/aiming is required
- if the system will illuminate an MIL and/or set a DTC
- if a scan tool is required for calibration/aiming
- if any other special tools are required for the calibration/aiming procedure

Location, location, location

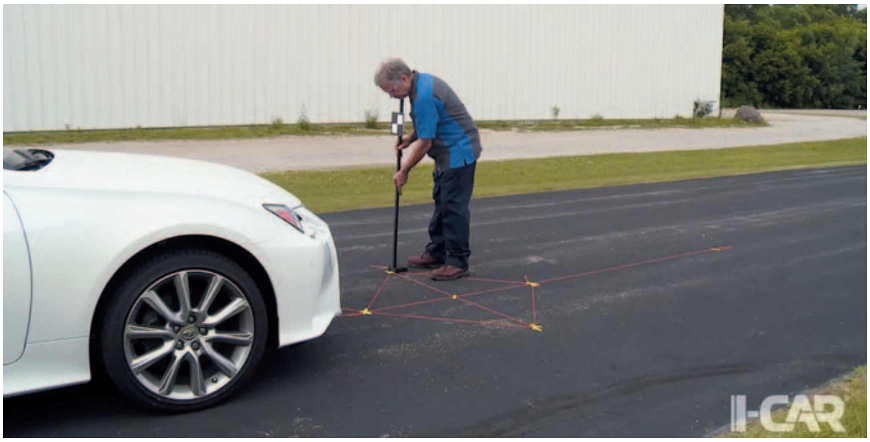
Many calibration/aiming procedures require targets to be placed at specific distances and may have requirements for how flat the area is and/or space requirements in the front, rear and sides of the vehicles. There may even be lighting specifications for some of the calibration procedures. Having the space to do many of the calibration/aiming procedures will be important.

When incorporating collision repair diagnostics into your repair process, pay close attention to these requirements and identify a location in your facility for this type of work to take place. Similar to a clean room for aluminum, you might want to consider a diagnostics room for scanning, calibration/aiming, more in-depth diagnostics and repair.

Staffing up

While the proper tools, targets and location are all required to be successful in collision repair diagnostics, capable staff is a necessity. Without a solid staffing plan, success will be impossible. But how do you decide who should be your collision repair diagnostic technician? For many seasoned collision repair technicians, the world of diagnostics is foreign. Many of us chose this side of the automotive world because we enjoy the artistic feel of taking a collision-damaged vehicle and restoring it to look as good, or better, than it was before the collision. We also like to work on visual, tactile things; diagnostics is much less visual and doesn't offer any tactile feedback, like removing a dent, straightening a body or refinishing.

One suggestion for staffing would be to seek a seasoned service technician. They may not only offer some expertise in diagnostics, you may also benefit from



VEHICLE MAKERS often have specific procedures for determining where to place aiming targets.

I-CAR NOW OFFERS an introductory course on diagnostics and scan tools.

their experience to offer new services to your customer.

I believe we'll start to see many career and technical schools and colleges offering collision repair diagnostics as part of their curriculum. Get involved with your local school's advisory committee and encourage them to offer their students training in this area. Graduates with strong collision repair diagnostics are going to be in demand very soon.

If you opt to work with one or more of your staff members to get them up to speed on collision repair diagnostics, there is training available from many of the scan tool makers. This training will help ensure that they know the capabilities and limitations of the tools you've invested in. I-CAR also features three courses currently (see sidebar, page 62) and is working on additional courses for collision repair diagnostics.

The process

In October, I-CAR hosted a Repairability Summit on the topic of collision repair diagnostics. We gathered subject matter experts from vehicle makers, collision repairers, insurers and tool and equipment suppliers. Our goal was to publish an industry-developed and vetted process for collision repair diagnostics. The group convened again in November to review the process, and in January, I-CAR published the following Best Practice for ADAS collision repair diagnostics.

Disclaimer: Before any repair decisions are made, access to OEM repair information is required. Diagnostic Trouble Codes (DTCs) do not identify which part needs to be replaced, rather DTCs are a piece of the diagnostic process that will lead a trained and qualified technician to the correct test to accurately diagnose the damage. Ensure that you have proper battery support when scanning. Although this process was developed to cover Advanced Driver Assist Systems (ADAS), the process can be applied to other electronic systems, such as restraints, adaptive lighting and other systems that may require calibration and/or aiming.

Pre-scan process

1. Conduct customer consultation.
   a. Gain customer authorization to scan vehicle and to share data with appropriate parties involved (Sublet Technician/Insurer/Repair Facility Personnel)
2. Check for Malfunction Indicator Lamps (MILs) and/or information display messages.
   a. The 12-volt electrical system must be enabled to identify any MILs.
   b. Not all systems will illuminate MILs, even if there is damage to that system.
3. Document any MILs and/or information display messages.
4. Identify Advanced Driver Assist Systems (ADAS) (Collision Braking, Lane Keep Assist, Adaptive Cruise Control, etc).
5. Document ADAS.
6. Document potential damage to ADAS, ADAS mounting location(s), damage that may affect ADAS, or parts that will need to be R&I near ADAS.
7. Identify calibration/initialization/aiming requirements for ADAS parts, including required calibration/initialization following R&I.
   a. RTS — OEM Calibration Requirements Search
   b. OEM information
8. Identify enable and disable switches
   a. Enablement/disablement may be

required for some calibration procedures.

b. If it is turned off, system may not be able to be calibrated.

c. Systems that can be enabled/disabled should be documented, so that a system is not turned on when customer wants it off.

9. Perform pre-scan.

a. A pre-scan is not possible if the 12-volt electrical system and vehicle communication networks are disabled or cannot be maintained throughout the scan. If a pre-scan is not possible because of vehicle damage, it should be done as soon as repair progress allows it to be done safely.

10. Document DTCs and other data.

a. Does not include black box info, speed of accident/accident recreation

b. Include pending, current and past DTCs

11. Access OEM information to identify system(s) affected by DTCs.

a. Access to OEM information is required

b. Check OEM information for bulletins/recalls/campaigns for DTCs

12. Determine likely related and unrelated DTCs.

a. Leverage the "Collision Advantage"

b. Key cycles/time stamps/freeze-frame data

I-CAR DIAGNOSTICS TRAINING

Currently, I-CAR offers a suite of courses on electronics and has recently released three courses tailored for collision repair diagnostics:

- Calibration of Front-Facing Cameras and Front Radars (VT200E01) is a one-hour online training course that provides information on front-facing cameras and radars, and covers some of the aiming procedures required, following repairs.
- Introduction to Diagnostics and Scan Tools (VT210E01) is a one-hour online training course that provides an overview of the diagnostic process and shares the features of various types of scan tools.
- Safety Shield Technologies (NI001E01) is a one-hour online course that was developed in conjunction with Nissan. The course covers Nissan/INFINITI's Safety Shield system and repair considerations.

Post-repair calibration(s) and post-scan processes

1. Perform all required calibration/initialization/aiming steps, following OEM published procedures.

a. Some systems will require the vehicle to be driven to perform calibration/initialization/aiming within the required driving parameters.

b. Some systems will not detect issues within the system until the vehicle is driven within the required driving parameters.

c. Some systems will require special tools and/or aiming equipment for calibration/initialization/aiming.

d. Some systems will require both.

2. Perform post-scan.

3. If related DTCs return, begin OEM published diagnostic process to determine error.

Conclusion

With the increase in ADAS systems on today's vehicles, collision repair diagnostics is going to continue to play a growing role in complete, safe, quality repairs. To remain competitive in this industry, you'll need to invest in the necessary equipment, training and space to repair vehicles with these technologies. Now is the time to start incorporating collision repair diagnostics into your work flow.

JASON BARTANEN is the Technical Director for I-CAR, the Inter-Industry Conference on Auto Collision Repair, a not-for-profit training organization focused on education, knowledge and solutions for the collision repair industry.
jason.bartanen@i-car.com

Finding the voltage drop culprit

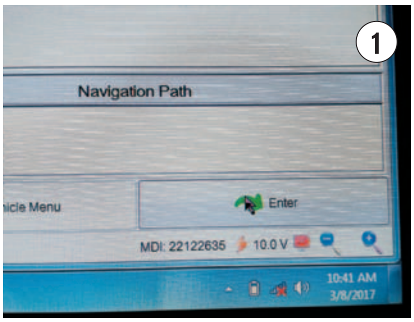
A minor collision repair misstep causes a multitude of system DTCs

JAIME LAZARUS // Contributing Editor

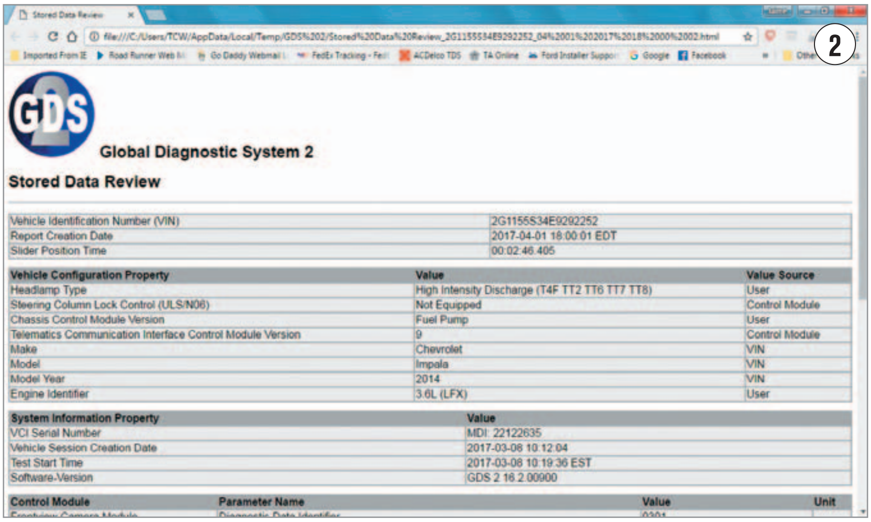
I always expect the unexpected, the unusual or the bizarre solution will be what it takes to fix the car when the owner of Ken Davis Auto Repair calls me in to look at a customer's vehicle in his shop. I was pleasantly disappointed this time!

I have a great deal of respect for Ken, and all others in automotive repair, who attend training on a regular basis. At an early point in my career, I recognized that in order to make my life easier during my work day and prove my claim of wanting to work smarter and not harder, I had to accept the fact that my job isn't just 9 to 5. It's one that requires frequent afterhours (and before-hours, weekends, etc.) investments in training.

I mean after all, when you think about it, where is the MOST expensive training facility? It's that service bay where a car sits, and you don't yet know how it's supposed to operate (and therefore, don't yet know how to fix)! I'd much rather the cars come in, get fixed, leave and it's on to the next one than to be stuck learning a new system, holding my bay hostage and impacting an entire shop's scheduled work load.



GDS2 LOW VOLTAGE



Vehicle Identification Number (VIN)	2G1155S34E9292252
Report Creation Date	2017-04-01 18:00:01 EDT
Slider Position Time	00:02:46.405

Vehicle Configuration Property	Value	Value Source
Headlamp Type	High Intensity Discharge (T4F TT2 TT6 TT7 TT8)	User
Steering Column Lock Control (ULS/N06)	Not Equipped	Control Module
Chassis Control Module Version	Fuel Pump	User
Telematics Communication Interface Control Module Version	9	Control Module
Make	Chevrolet	VIN
Model	Impala	VIN
Model Year	2014	VIN
Engine Identifier	3.6L (LFX)	User

System Information Property	Value
VCI Serial Number	MDI: 22122635
Vehicle Session Creation Date	2017-03-08 10:12:04
Test Start Time	2017-03-08 10:19:36 EST
Software-Version	GDS 2 16.2.00900

Control Module	Parameter Name	Value	Unit

PHOTOS: JAIME LAZARUS

GDS2 REPORT SCREEN

Ken is an owner/tech and is very much like me in his desire for peak efficiency. So when he calls on my diagnostic services, I kind of expect there's something REALLY weird going on. In the case of this 2014 Chevrolet Impala LTZ, this was so true!

During his initial phone call, he mentioned a few of the strange things the car started doing a couple of months ago that have happened on a more and more frequent basis. Ken told me, "The vehicle had been trouble-free in the 20,000 miles since the current owners had purchased this used car. Recently, an intermittent no-crank, no-start condition has worsened and now numerous systems are not performing as designed."

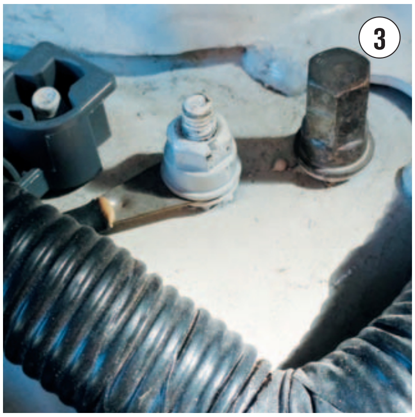
More specifically, the problems identified by the vehicle owner are that the starter would not make any sound when the push-button to start the engine was depressed; while driving, the instrument cluster would suddenly and without any common reason, just go dark and all gauges would seem to lose power; the headlights illuminated normally but at times would go out and then come back on. There were more symptoms, but it isn't necessary to list them here. This description of symptoms sounds fairly complicated, doesn't it? What are your initial thoughts?

Then he went on to say the owners had first taken the car to the Chevrolet dealership where it was noted that there had been some body repairs made to the front of the vehicle, which the owners were unaware of at the time they purchased it. In part, due to the repairs, which included aftermarket parts, the dealership politely refused to accept the vehicle into their service bays and suggested Ken's shop might be better suited to "handle it."

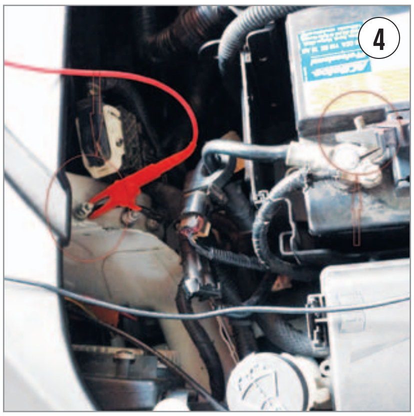
I'd made some suggestions that he and his tech could check — things that are typical causes of the intermittent phenomena. The next day, in his second call to me, he elaborated on the test results for the suggestions I had made. I'd asked them if a complete electrical system test had been performed. I had also asked them to perform a vehicle-wide Diagnostic Trouble Code (DTC) check and to record the findings. In addition, I was curious if any aftermarket electrical devices were installed on or in the vehicle.

Their aftermarket scanner was able to access a majority of the modules on the network in this well-equipped Impala. Almost every module had stored codes, some relating to "Low Voltage" and most had DTCs that I like to call "Tattle-Tale" codes. Those are codes about module "State Of Health" messages.

Each module is supposed to identify itself on the network at some point. All modules are told to "keep a look out" for the other modules' report that they are on the network and that they are working properly. When a module does not receive an expected notification that another module was supposed to send, then this module stores a DTC that implies the other module is not healthy. It doesn't matter why that message didn't arrive — when a module expects the announcement on the network that the other module is "healthy" and it is not received, the code is stored.



GROUND ON A PAINTED SURFACE



VOLTAGE DROP CONNECTION POINTS

When Ken received the test results from his tech Jerry and saw how many DTCs were stored in every module, he asked Jerry to hold off on doing any more testing and made an executive decision. Jerry was well-versed in network diagnostics, but felt a bit intimidated by the number of codes set and also had some big jobs in the shop that needed to get done that week. So Ken asked me to take the job. It didn't hurt Jerry's feelings in the least when I showed up to relieve him!

General Motors' Global Diagnostic System version Two (GDS2) is the diagnostic software used on this car by the dealership technicians and is also available to the aftermarket repair shops. It is the diagnostic tool I chose to use in this case. I have numerous aftermarket scanners and PC-based diagnostic tools I could have selected from, but had I done so, I may not have gotten all the information the car had to offer.

I started my diagnosis by reviewing with Ken and Jerry what I thought I'd heard them say. We all have been guilty of multitasking while conversing and not hearing everything correctly. I was driving at the time Ken made his first call to me, so distraction from my call could have occurred. Our chat confirmed we were all on the same page, so I proceeded to perform my diagnosis.

I began working on the car with a verification of the electrical system integrity. This is where every (electrical fault-related) diagnostic sequence should begin. Since the battery is the starting and ending point of every circuit in the car, shouldn't we make sure there is nothing wrong with it? I tested the vehicle's battery with a conductance tester and a carbon pile load tester, and then I tested

SOME OF THE NINE GROUNDS

BATTERY GROUND CABLE VOLTAGE DROP

the alternator and the starter. All passed — Jerry's test results had been the same.

Then I performed a vehicle-wide DTC and ID Information scan, which indicated numerous instances of "Low Voltage" problems (Fig. 1) and network-wide communication faults (Fig. 2). During this time I was closely monitoring the Data Link Communication (DLC) voltage displayed on the GDS2 screen. I saw it drop a few times to below 10 volts as modules were queried for their information one at a time.

It was during a visual inspection that ground wire terminals were found to be attached to painted surfaces rear of the left headlight and on the left strut tower (Fig. 3). Here is where I say something's wrong. Remember what I said about the car's battery being the beginning and the ending point for all circuits? I haven't had the privilege (in very many years) of inspecting brand-new Impalas as they were prepared for delivery, but it seems as if attaching ground wires to painted surfaces could potentially cause problems right from the start. So, I don't know if that's how they come from the factory — but I do know that once I cleaned the paint off one of the studs, I recorded a reduced amount of voltage drop — by a large amount! Looking closer I found evidence indicating this vehicle had been repaired after a frontal collision.

The voltage drop tests performed while cranking the engine showed no less than 216 mVDC (0.216 VDC) differences on any of the first four ground terminal eyelets tested (Fig. 4). Could this amount of ground circuit "loss" cause all the modules to act as if they've lost their voltage supply (lost their minds)? Maybe.

You might ask, "what is this voltage drop test and why is it important?" Well, imagine a wire that has voltage running through it. The amount of voltage measured at one end should be very close to the amount measured at the other. This would be true under most circumstances. Now, if there were to be something wrong with that wire, something that caused some sort of resistance, then the amount of voltage read at either end of that wire would be different from the other. That difference is what is called the "voltage drop."

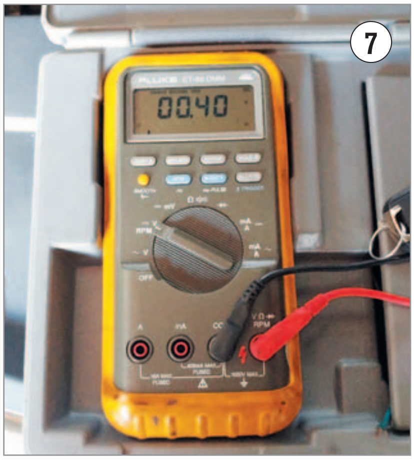
Resistance in a circuit can be in the form of corrosion (such as when the insulation on a wire is violated and the wire eventually turns green), looseness (such as when wire terminals aren't tight or two aren't mating correctly) and many other ways including the introduction of something between connections (like paint, which doesn't conduct electricity very well). Yes, paint can interfere with the return of electrons to the battery, the amount which can be measured using the various techniques of performing voltage drop testing.

The Mitchell1 wiring diagram indicated there were (only) nine ground points under the hood of this car. Some were grouped closely together and others were at each of the four corners in the engine compartment (Fig. 5). I decided to measure the ground circuits beginning with the battery ground cable. Measuring from the battery post to the eyelet at the other end of the battery ground cable my DVOM (Digital Volt/Ohm Meter) displayed the drop as 0.212 Volts DC (Fig. 6). I use this measurement as a standard to go by because every test afterwards will include this drop. It's important to note that a voltage drop test should only be performed while loading the circuit. I did this by engaging the starter at the same time as recording it using the "Min/Max" function of my DVOM.

Once I have established the standard, then I can subtract that amount from future tests if I need to. I now know that amount of difference in voltage to the battery post is caused by how much resistance the battery ground cable has. If I test another ground circuit without attaching to the battery negative post, I can add the drop in the battery ground cable to get the TOTAL voltage drop in that circuit.

Say I test a ground in the trunk by attaching my DVOM leads to a ground eyelet (for whatever system) and to a ground stud in the trunk. I will read the drop found in that area alone. But, to know the total voltage drop that that system is subject to, I have to add the drop of the battery's negative cable as well since that cable attaches the battery negative post to the rest of the car.

Once I had tested a few of the easy-to-get-to ground eyelets, I then moved my lead to the bell housing, near where another ground cable attaches. The readings changed every time I tried to record the maximum voltage drop! When the starter did engage, I read as low as 00.40 (400 mVDC, Fig. 7) but sometimes, when the starter wouldn't respond to the push-button command I was giving it, I read over 10 VDC! Ten volts drop on the ground circuit is close enough for me to consider it an open circuit! It was a simple process of elimination at this point to locate the culprit. I worked my way back



LARGEST VOLTAGE DROP RECORDED

ARCING EVIDENCE

towards the battery.

Under the battery tray on this car are located numerous studs that are welded to the inner fender well. To each of these studs is attached a ground wire terminal (eyelet). I was able to reach each one and gave them a little "tug" to see if they were tight or not. Sure enough, the eyelet of the cable that attaches to the transmission bell housing was loose and easily moved with the slightest pressure. I removed the nut and while closely inspecting the terminal, found evidence of arcing (Figs. 8, 9). A lot of current was finding it difficult to complete its path to the battery through this loose connection!

The repair authorized by the vehicle owner was to combine the transmission bell housing ground cable on the same stud as the battery ground cable. I'd cleaned up the corrosion from the eyelets, removed the paint from the stud and

LOOSE NUT — ARCING

nut, then I coated all components with a liberal amount of dielectric silicone grease prior to reassembly. I cleaned and protected all other eyelets and studs under that hood just to make sure there would be no potential for failure in the future. I cleared all DTCs from every module, tested and re-tested many times for the customer complaint to reoccur, without incident.

It should be mentioned that all other aspects of the collision repair appeared to be done professionally. The owner had received the car unaware that any body damage had ever been repaired and had driven it for years before any repair-related incident ever showed up. I'm hoping the loose cable attachment was simply an oversight on the technician's part, one any of us could have made, but also hope collision repair specialists reading this would be extra careful with grounds in their future repairs.

Please don't attach them to painted surfaces and expect them to be perfectly fine. No matter what you do, please perform voltage drop tests on them before returning the car to its rightful owner. This is a simple test and provides proof the connection made is what it should be (or not).

JAIME LAZARUS has regularly presented technical seminars since 1985. He recently taught instructors at the North American Council of Automotive Teachers conference and the NASCAR Technical Institute.
jlazarus1@cfl.rr.com

AUTOLOGIC HAS ALL THE AUTOMOTIVE ANSWERS

Since 2000, Autologic Diagnostics has provided advanced aftermarket automotive diagnostic solutions worldwide.

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AssistConnect is a centralized web-based system providing repair technicians direct access to the latest approved, licensed, original equipment manufacturer data immediately via Autologic's secure cloud server. AssistConnect is the only service that provides instantaneous access to vehicle manufacturers' licensed data without requiring multiple downloads. Since AssistConnect is cloud-based, Autologic automatically manages updates so customers are always assured they have the latest data.

AssistFix provides repair shops using any brand of scan tool direct support from Autologic's expert Fault2Fix team of nearly 100 master technicians. Each Fault2Fix team member is dealer-trained and brings — on average — 15-20 years of on-the-job, original equipment manufacturer (OEM), technical and specialty automotive experience in European automotive brands to their roles. And, Autologic's "Try Before You Buy" program provides users the option to experience the AssistFix service on a trial basis for a brief period.

The **AssistPlus** device combines a deep diagnostic feature set with a range of applications, including a web browser, high resolution stills and video camera. It joins proven multi-brand European vehicle diagnostics capabilities with third-party information sources.

Additionally, **AssistMobile**, Autologic's complimentary mobile app, is available to use in combination with each of these novel approaches.

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Go beyond just repairing vehicles to achieve success

Provide vision, transparency, trust and gratitude to your team

For many years, we managed our business with a few leaders carrying the burden of making sure the company achieved its goals. If things were going well, we communicated it to the team. If we were under-achieving, management would push the team to get more cars out or capture more jobs. It was one of two meetings: either rallying the troops or a celebration of meeting goals. Any team member could tell you our goals, but they could not tell you how to arrive at them. Most thought the sales goal was an arbitrary number to shoot towards.

We came together as an organization to determine our core company values. We realized there was a disconnect between what the "leaders" saw as a vision and what those who were our partners in the work saw. We had not communicated, trained and connected them to this vision. What was missing? Vision, transparency, trust and clear, measurable and manageable goals so each person could understood their impact and how it related to a positive, successful outcome.

TO SUCCEED, WE MUST BE TRANSPARENT ABOUT THE CURRENT STATE OF THE COMPANY, WHERE WE WANT TO GO AND HOW WE CAN GET THERE.

We realized sitting around a conference table with only the owners and a few from management was not the path to create change. If we wanted growth, change and improvements, we must begin by including our team in these discussions. We must be transparent about the current state of the company, where we want to go and how we can get there.

First, we started with vision, making sure it is clear, easy to remember, compelling and consistently communicated. The vision should be where each leader, manager and team member can see the big-picture goal of providing an exceptional experience for customers, a positive environment for our team members to grow and be fulfilled in what they are doing and bottom line, do everything with excellence, striving to be the best.

Transparency was the next piece. For us, that meant holding weekly management meetings to include leadership from all departments. There is a set agenda that always starts out with goals in a clear, concise manner and an explanation of how that number was set. It was important for us to be transparent, which in turn led to greater trust. With transparency, everyone was confident that there was no manipulation.

This change led to engaged team members who now had a greater sense of purpose and direction. We talk all the time about providing an exceptional customer experience; yet we must also provide an exceptional learning environment for our team.

A Gallup research study indicates, "A highly engaged workforce means the difference between a company that outperforms its competitors and one that fails to grow." Engaging your team does not happen overnight. It includes a combination of things, including communication, transparency and a relationship built on trust.

Relationships do not develop without being intentional. It is important that every manager and leader of your organization understand the importance of relationship building. The larger the organization, the harder it is for upper management to have relationships with all the team members. Each manager and leader must develop this within their team. Creating relationships and developing teamwork must be a priority.

One of our core company values is gratitude. Showing appreciation is an important part of our culture. As humans, we all have the need to be appreciated. Be intentional, find opportunities to say thank you, and publicly recognize your team members for small and big wins. As Jon Gordon writes in his book, *Soup: A Recipe to Nourish Your Team and Culture*, "Businesses that delivered legendary service also had the strongest, most supportive cultures in which employees were valued, listened to, cared for, served, appreciated and loved; in turn these employees valued, cared for, served, appreciated and loved their customers."

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*

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