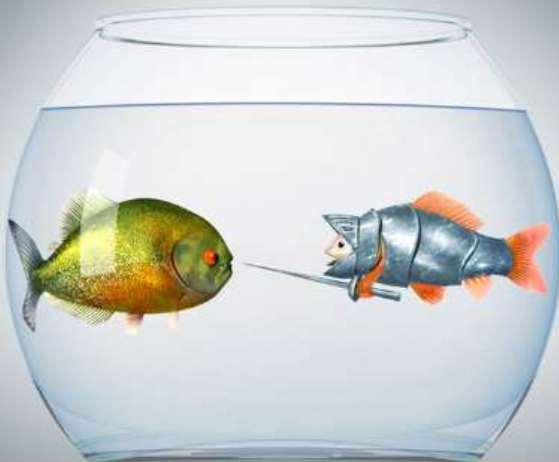


# WHEN YOU DON'T SEE **EYE TO EYE** WITH YOUR MECHANIC

A QUICK GUIDE FOR IMPROVING  
COMMUNICATION, AND KNOWING  
WHAT YOU ARE GETTING  
FROM YOUR AUTOMOTIVE MECHANIC



By **MARVIN R. RAY**

# **When You Do Not See Eye to Eye With Your Mechanic**

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Mycertmech.com Publishing

When You Do Not See Eye to Eye with Your Mechanic. A look at auto repair facilities and the industry across the country.

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FIRST EDITION 1996

SECOND EDITION 2013

*Designed by Marvin R. Ray*

**Have you ever asked yourself any of these questions?**

How come I feel like my mechanic just mugged me?

Did I just get grossly overcharged on my car repair?

Why can't they get my car fixed right the first time?

Is my mechanic qualified at what he does?

How can I save money on my auto repairs?

How come I would rather go to the dentist than a mechanic?

***If you have ever asked yourself any of these questions, this book is for you!***

*This book is dedicated to  
all former customers  
who gave me experience?*

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Most of all, I credit the many wonderful and not so wonderful customers I have had over the years. It is because of them I have the knowledge, background, and information for putting this book together.

May all who read this book be enlightened by the technology they drive and their automotive repair shops future.

# Chapter One

## **Will car repairs of the future? financially cripple you.**

For a long time, the do-it-yourself auto repair has been gone. As a result of this, costs associated with fixing cars have increased. Hybrid cars are not only more expensive when you buy them, they are currently more expensive to fix than cars that run with a conventional engine. Working on a Hybrid is a specialty; it is not something you want to trust with your next-door neighbor who works on his old 1975 Chevy Pickup. This high technology, along with more and more gadgets on your car, is going to cost you when something does not work correctly and trust me that will happen it is just a matter of time. A CVT transmission for a 2001 to 2003 Toyota Prius can cost around \$8,695 a far cry from my 1997 Ford F350 transmission that costs \$2,500.

As we progress further into automotive technology, some fear we will find ourselves deeper in debt when these cars break down. Hybrid cars represent a large portion of our future in the country.

Turbochargers and superchargers help force air through the engine, allowing it to use more fuel, generate a bigger explosion in the cylinder and increase power. These devices typically operate at high rotational speeds, which make them vulnerable to damage and susceptible to heat.



When they go bad, it can cost about \$1,600 to replace them, with related repairs spiking the price by \$700 to \$3,000.

When a catalytic converter fails, it is pricey. Repairs can cost up to \$2,692. It is the parts that are expensive, not the labor.

A hybrid battery is often bundled with an integrated motor-assist battery, which charges it. Change one and you have to change both — to the tune of about \$2,700.

A clogged injection pump, the device that delivers fuel into the engine's cylinders, is a relatively common problem for drivers. A Honda fuel pump might run a couple of hundred dollars and be straightforward to change. But in trucks and SUVs, the repair can cost upward of \$2,900.

Engine replacement can cost upward of \$8,000, leading many car owners to scrap the vehicle altogether.

*“Saving for tomorrow”*

# Chapter Two

## Where are the spark plugs?

The purpose of this book is to help educate you about the future of the automotive repair shop, and where it is going. In addition, I will help you better understand your automotive mechanic. As you cruise into this book, you will see why the “Grease monkey” or “Mechanic” of yesterday is now known as an “Automotive Technician.”

In today’s society of auto repair the question, “what does he mean by that?” has been asked repeatedly by virtually everyone who owns some mode of transportation, be it worth fifty dollars or two hundred and twenty thousand dollars.

If you have been in a driver's seat since 1975 you would remember the brand-new clutch smoking, tires screeching, ground thumping, blur that cost you four or five thousand dollars. Your boyfriend or husband was proud to do the work by themselves on this sleek machine; it was easy back then. You could see the spark plugs. And they were pretty simple to change.

Back then automotive parts seemed fairly inexpensive. Besides, it was enjoyable for some to spend the weekend bonding with their ride.

Let us look around 1985. What about those changes? Isn’t this about the time we heard more talk about a car’s computer? Did not some of us say, “That’s impossible!” And

what about the cost for one of these environmentally safe gutless wonders? They sure saved us time at the gas pump though, and hey we were helping the gas shortage, right? What a price to pay. I remember it took twice as long to reach 55 mph! Did you ever find yourself leaving the house ten minutes early to make up for the lost performance of your new car? After all, you could jam the throttle through the floor and hardly even move. And what about the cost? The last time you spent that much money, it had a foundation under it. Sure, you could still kind of see those spark plugs, even though they were a little harder to get to, but hey, you were able to stick the money saved on next month's car payment.

What about 1996, the year of the stylized, sleeker, aerodynamically designed automobile, with hundreds of different shapes, sizes and an array of colors that would make even Picasso jealous. What power, what class, what gas mileage! All this, and still environmentally safe. The cost? Well, it is only a monthly payment.

About this time, you are thinking, "This is awesome. I've got it all." Then comes that dreaded day when you open the hood, scratch your head, saying something like "I know those spark plugs are somewhere, right? And where is the oil filler cap?" No problem, I will just follow the spark plug wires. Now where do you suppose they hid them? Where is the distributor? And what is DIS? And can you explain what you mean when you say my O<sub>2</sub> sensor told the ECM to dump less fuel through the EFI?

Now, in 2013 we have shapes and sizes that most of us never knew existed. From the Smart Car to the Hummer, these cars come equipped with so many technological gadgets that I could write another book describing each of

them individually. Following is a small sample of what can be found standard in most of today's cars.

- Air Bags
- Driver Assistance
- Electric Cars
- Hybrid Technology
- Natural Gas
- Navigation systems
- OnStar
- Rearview cameras
- Self-Parking
- Tire Pressure Monitoring Systems
- Tons of cup holders
- Traction control
- Video System

*Automotive technicians start what they finish!"*

# Chapter Three

## What do you mean, “there’s a charge?”

Is there really anything in life that has not cost? If there is, how do I get it?

I think back to a time when I had a customer come into my shop (without an appointment) and said "My oil light is on. Can you check it?" Well, this seemed simple enough, so I said "Sure." Since the day was heavily scheduled, and all the shop bays were full, this was going to be a parking lot job. But then why not, it was a beautiful day. Grabbing a handful of tools that I knew I would need, I set out to check what this customer might have considered his pride and joy: a 2002 Saab?! I was on a mission to please another potentially good customer. First, I proceeded to check the wiring to the oil pressure sending switch, which is under the intake manifold. Everything looked in place. Next, by making sure that the connection was okay, I checked the wiring to the sending switch with a Digital Volt Ohm Meter (Technician grade, cost \$600). When the wire checked out okay, I went on to check the sending unit and oil pressure. I arrived at the conclusion that the oil pressure was probably adequate. After all, this fine bucket of bolts did arrive without Billy Bob’s Tow Service, and there was not that horrible noise that sounds like rocks left in your kids pants when going through the dryer. But to make sure, out came the oil sending switch, which required a ratchet

(technician grade ratchet, cost \$129) and a three-inch extension, to enable me to reach the blasted thing (technician grade extension, cost \$26) along with an oil sending switch socket (technician grade socket, cost \$58). With the sending switch out, it was time to verify that oil pressure was between operating specifications. To make sure that this customer would not be the next set of flashing amber lights on the side of the road, I took the oil pressure gauge tester (technician grade, cost \$382). and proceeded to thread it into the block to check the oil pressure. I started the engine and observed the oil pressure. After seeing where it was, I referred to the manufacture specification on my web-based information system (cost \$195 per month) to verify that the oil pressure was within operating specifications. The diagnosis at this point was that the oil pressure sending switch was bad. So, I wrote up a bid for a new switch and labor and presented it to my new customer. I felt he had one option, replace the switch. But this customer knew he had another option, forego the new switch, and put the old switch back in, saying, "Don't worry about it." I warned him that if any time in the near future he lost oil pressure, he would not have any indication of this, because his oil light would remain on all the time. He agreed that it would be okay. From there, I buttoned up the job and finished writing up the ticket. Total owed for the test: \$45 dollars. Then it happened, like an F-16 being shot off an aircraft carrier. His attitude changed. He went ballistic! **“What do you mean there’s a charge? It only took you 30 minutes!”**

From here, I proceeded to explain the cost of the tools used to make my diagnosis (total cost \$1,390) not to mention, he had taken me away from my already good customer base, along with my time involved, my education, shop insurance, overhead etc. He did not buy any of this. I

am telling you; this guy was one tough customer. He just knew that there should not be a charge. After wasting another 30 minutes of my time he finally paid, with the remark "I will never come back!" Was I upset that he felt he had been overcharged? You bet. Was I happy he was gone? For sure! Was there a time in the whole presentation when I lost my cool? Absolutely! Our heated conversation ended with my counseling him that next time, he should go to school, get an automotive degree, open his own shop, buy his own tools, and fix the \*#! ^ problem himself.

As he drove down the lane, I proceeded to put my day back together and not let his actions influence the next good paying customer who came through my door.

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*"Life is short so paddle hard"*

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# Chapter Four

## What is it gonna cost?

Have you ever wondered why your automotive technician cannot seem to give you a straight answer from a fairly simple question like, "Hey, Vern how much to fix this bucket of bolts?" Or, how about "What do you mean it is going to cost me?" These questions come up all the time. This is the first misunderstanding between the technician and the customer. Just like any other industry, whether it is a plumber, electrician, doctor, dentist even your washer repair man, you cannot receive an accurate estimate on what it is going to cost if you do not evaluate and narrow down the problem. If there were a crystal ball that told auto technicians, the car's problem I would own it and would be living on the top floor of the Wynn's in Las Vegas because you would be paying me for this information. Have you ever pulled a weed and thought you got that entire dirty bugger, only to find it back a few days later? Sometimes things are not what they seem to be.

I remember a close friend speaking with a persistent auto body shop customer on the phone one day, before cell phones and Skype. This customer felt that my friend should be able to give an estimate to the very penny of what it was going to cost to fix their car. After a lengthy conversation, to my amazement, my friend finally said, "Listen, why don't you put the phone up to the car so I can see it, and then I'll give you an estimate." This may seem ridiculous, but you cannot do what you cannot see, even with a cell phone or



Skype. The same goes for diagnosing a problem on your car. The approach should not be "how much will it cost to fix my car?" It should be, "how much will it cost to diagnose my car's problem properly?"

## HOW IMPORTANT IS DIAGNOSING?

Diagnosis accounts for close to 80% of the job, leaving 20% for the actual repair. Diagnostics is the final frontier of the automotive industry; cars of today have computerized electrical components. To fix these components, you have to diagnosis the problem first.

Back in the 1960's and 1970's your technician could easily tell what the cost was going to be to repair your car. Since then, things have changed. In the "Good-ole-days" we were listening to cassette tapes and CD's. We had no idea that we could talk on a cellular phone, and see the person we were talking to, and the changes Google would make to our lives. Since we have arrived at the full-blown computer age, it is virtually impossible to give an exact estimate on repairing a car without diagnosing the car first.

## HOW DOES THE COMPUTER AFFECT MY CAR?

Let us use the brake system for an example. The first brake ever designed was the hand brake. Think back to the covered wagon days, where you grabbed the lever with all you might, using both feet to brace yourself as you slowly came to a stop. Sometime after that came the manual hydraulic brake system. This system enabled us to stop much more quickly after having reached much higher speeds of travel. There was less physical force required by the driver. However, we still had to jam pretty hard on that brake pedal. Years later

we saw power brakes, boy were they easy, just tap that baby and you could go into a four-wheel skid in a matter of seconds. How about today's ABS brakes, better known as Antilock Brakes. Who would have imagined a brake system where you just push the pedal to the floor and if one wheel starts to skid, the computer kicks in and pumps the brakes for you, at a much quicker and safer *interval*?

Now, let us evaluate what the repair on each system would involve. The old hand brake system required a brake shoe, some sort of pivot pin, and a handle. Could I give you a close estimate about what it would take to repair it? You bet, after all, I can see everything we mentioned.

How about the manual and power brake system? Yes, I could be fairly accurate as to what is causing the problem. After all, we still have the brake shoes, but instead of a lever we have brake fluid pushing a piston that pushes on the brakes, against a drum or disc. If your brakes squeal, you probably have brake dust build up or you are close to hearing a very obnoxious growling sound, when this happens it is probable the cost of repair just escalated. If the brakes drag, you might have developed a leak, which in turn soaked your brake shoes leading you back to replacing them, after fixing the leak of course. And sometimes, the mechanical part or “master cylinder” as we call it, would need replacing. Fairly simple, so far?

Now let us take that system, add an Anti-brake System (ABS) light, a Traction Control Switch (TCS), 4 Wheel Speed Sensors (WSS), Electric Brake Control Module (EBCM), Instrument Panel Cluster (IPC), Brake Control Module (BCM), Brake Pedal Position Sensor (BPS), Brake Pressure Modulator Valve (BPMV) and an Engine Control Module (ECM) waiting for a signal it will receive telling it what to do. And OOPS! I forgot the multitude of

wires. For example, did you know a 2008 Chevy Malibu ABS brake system contains the following wires:  
Orange – Black – Brown – Tan – White – Red with Black tracer – Pink – Light Blue – Yellow – Dark Green – Brown with a White tracer.

I hope you understand that when you ask how much is it going to cost to fix? You really should start by asking “What is it going to cost to diagnose my car properly?” If your technician continues to give you FREE (the most popular word in the English language) diagnostic charity, the chances are his bottom line of his business is running in the red unless he chooses to sell you other items you really do not need. It is stated that billions (with a b) of dollars are spent every year on unneeded repair. If the technician is honest and has the proper equipment and tools and he gives a FREE evaluation every time a consumer enters his shop after paying tens of thousands of dollars to be open, you will be looking soon for another repair facility as he will not stay in business exceptionally long. You may not care about this right at this moment, but with fewer repair shops to serve you, the cost of repair will drastically escalate. Everything your technicians uses cost him money i.e., tools and equipment increase every year to the tune of 5%-15%. A good technician has to charge for his diagnosis, or he cannot afford the proper diagnostic equipment required to fix your car properly and efficiently.

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*“In a perfect world doctors would complain about what automotive technicians make”*

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# Chapter Five

## How does my technician arrive at my costs?

There are three types of repair charges:

1. Overcharged, (generally infuriates you if you know about it)
2. Undercharged (auto repair shop goes out of business, no one benefits)
3. Charged what it is worth. (Everyone benefits)

Where I come from (western states), the average shop charges are \$65 - \$95 for a FLAT RATE hour. A flat rate hour is an estimated time frame for every repair that occurs on your car. It is put together to protect you the consumer, and for the technician to estimate how long it may take to repair your car. All shops should have this in the form of a web information service. The web system gives more up-to date coverage and takes less time for a technician to look up information than years past, by using a manual or changing CD's. Ask your technician to explain this on your next car repair, so you can better understand what it looks like, and how it works. For good basic coverage, a technician is looking at \$195 per month, but as you have heard before "Wait there's more" this is not enough for a higher end technician; he will spend another estimated \$125-\$250 a month for additional coverage where technicians share their knowledge with each other on the hard to fix problems (Total

cost per month \$320- \$445). Ask your technician to explain this on your next car repair, so you can understand better what it looks like, and how it works.

A web-based system shows that a 2009 Maxima with a 3.5L engine requires 3.3 hours to replace the spark plugs. At an average of \$80 per flat rate hour that totals \$264. You may think a spark plug is a spark plug, but that is not the case anymore. The spark plugs for this car cost over \$20, multiply that by six, and you have a total of \$120 for the spark plugs. These plugs are Iridium Long Life spark plugs, required by the manufacturer to do the job properly. Total for labor and plugs is \$384 for what used to cost you \$39.95 years ago on a much less expensive car. The best ad I saw years ago was “We fix \$39.95 Tune-ups.” Keep in mind this technician should also do a diagnosis which costs you an additional \$69.95 to \$89.95 if done properly. If he tunes up your car and puts the plugs into an engine with a dead cylinder or other major issues, like a bad injector or coil pack, he just wasted your hard earned \$384 dollars. Along with not checking other items like your air filter, PCV valve, belts, coil packs and scan data (not just pulling a code).

## THE FUTURE AUTO REPAIR SHOP

The automotive industry has changed and continues to change rapidly as technology advances every day. If your technician continues at the rate he is going, he will be out of business soon. If you do not believe this, look around where you live and notice how many new homes have gone up, how many fast-food places, cell phone stores, convenience stores, bagel shops, supermarkets, banks and so on. Now compare that to how many new auto repair shops you have seen go up. This should scare you! In ALL supply and demand

situations, the costs accelerate. The major reason costs will continue to rise in the auto repair industry is that training, tools, and equipment increase yearly, along with more specialty tools needed than ever before to repair cars in this 21<sup>st</sup> century. Every year between 300-400 new models appear, currently there are 3,497 to over 4,000 out there right now that your technician has to know how to work on if he wants to stay in business today. As an automotive technician, it is hard to stay abreast of everything. This is where the right information system with training and equipment come in.

Many shops are missing the boat if they say “I won’t do air conditioning or I won’t do computer diagnosis” the fact remains that they will not be able to hold on much longer if they do not. If they cannot fix today’s cars, how will they fix tomorrows? It has been stated the future auto technician will become more of an automotive engineer. Let me give you a scenario. I take my car to a local guy for a service. He completes it and I am satisfied, the next time I need some computer work or air conditioning work he states he does not do it, but in a friendly gesture says, “Joe down the street can take care of that for you.” So, I go to Joe, and he does a wonderful job and in talking to him, I find out he performs the same service my last guy did. Who do you suppose I will visit next time? Is it important for me to get it all done at one place? What will happen to the other guy? What will happen to Joe’s pricing when the other guy goes out of business?

## WERE WILL TOMORROW’S TECHNICIAN COME FROM?

On August 29, 2012, Chris Woodyard of USA Today stated:

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LOS ANGELES – Jonathan Hernandez figures if he is going to drive, he had better know how to fix cars. And he is well on his way to earning his degree in auto repair from Los Angeles Trade Technical College. But the 23-year-old does not intend to put his community college credential to use as a career. He plans instead to become a tattoo artist. "I can do a tattoo in three hours and make \$300," explains Hernandez, who says he is not tattooed himself. Such are the challenges for auto dealers and repair shops looking to recruit the repair technicians of tomorrow. A generation who grew up playing Xbox games instead of rebuilding carburetors does not seem to have the same fascination with auto repair as earlier generations who grew up as shade-tree mechanics.

There is already competition among auto dealers in many parts of the nation to hire or retain good technicians. The bigger worry is whether there will be enough younger workers in a few years as a wave of midcareer mechanics hits retirement age.

"We're finding that we're going to run short of technicians in the very near future," says Rich Orbain, manager for General Motors' Service Technical College. "It's already getting very difficult to get young people interested in this as a career."

Auto-repair educators say they are fighting misconceptions about the profession. They point out that fixing cars has gone high-tech. A laptop computer is becoming as important a repair tool as a set of socket wrenches. And, in a world of job uncertainty, auto repair remains a career largely impervious to being outsourced abroad.

The nation's demand for auto mechanics is expected to have grown about 17% from 2010 to 2020, adding 124,800 jobs for a total of 848,200, the Bureau of Labor Statistics reports. Auto technicians overall earned an average of \$35,790, but 10% earned more than \$59,590, in 2010, the

most recent year for which the BLS has data. While high school graduates can land basic maintenance jobs such as changing engine oil, the real need will be for more highly trained technicians. It is those at the top of the profession that the industry is most concerned about losing, the master mechanic who do not just read troubleshooting data off a computer screen, but rather put their education and experience to use to interpret clues and pinpoint a problem.

Faced with the complexities of today's cars, master mechanics are being asked to deal with issues that would have required an engineering degree in the past. That problem is being compounded by the multiple new powertrain technologies hitting the market, including hybrids, electrics, and advanced clean-diesel engines.

"You have paralegals and paramedics. You're getting to the point in (auto repair) that you are going to have para-engineers," says Frank Diertl, general manager of engineering services for Mercedes-Benz in the U.S.

While in the past, fixing cars was more about mechanical aptitude, electronics and computer-controlled systems rule today. A typical car may have 20 or more microprocessors working together, each running software with thousands of lines of code to control vital systems, whether it is anti-lock brakes or the infotainment system.

Many auto technicians are embracing how the job is evolving toward high-tech. A survey of 5,000 auto technicians conducted by consultant Carlisle & Co. on behalf of six automakers found that the second-biggest reason the technicians chose the profession was that they like working with technology — named by four out of 10. The only bigger reason, at six out of 10, remains having grown up working on cars. (Participants could give multiple answers). But the same survey also pointed up the challenge:



Top mechanics are getting older. Mechanics at the dealerships of General Motors, Ford Motor and Chrysler Group had an average age in the low 40s. "They are going to have to replace them more quickly," says Carlisle partner Harry Hollenberg. The looming shortage is lost neither on automakers nor on educators — both are working to drum up enthusiasm for careers in auto repair. But it is not easy.

Kids who could not wait to get their driver's licenses now often are blasé. They would rather talk to their friends through Facebook or other social media than drive over to meet them. In 1980, 87% of 19-year-olds had gotten driver's licenses, according to a study released in July by the University of Michigan Transportation Research Institute. By 2010, that figure had dropped to 70%.

"Automobiles were our social network," says Tony Molla, vice president the National Institute for Automotive Service Excellence, an outfit commonly called ASE, which certifies auto technicians. "Today's kids are using more electronics to do the same thing." Of course, the more deep-seated problem that many of them also are not versed in math and science hurts recruitment since those skills can be vital now in fixing cars.

High schools cutting programs does not help, as well, that more high school districts have whacked budgets for auto repair programs, a key source of recruits. Supporting the programs has become more expensive because of the test equipment now involved. "They are making hard decisions about what they can do," says Molla. Molla says some schools have had to limit enrollment in auto repair and specialized courses. "In some areas, there are more kids applying than they have seats for them," he says.

AAA says it reaches out to 900 vocational schools across the country to encourage stronger programs and more

students. "Students are still interested, but you have to go out and actively pursue them at the high schools," says Mike Garblik, professor of automotive technology at Sinclair Community College in Dayton, Ohio. "They are being pulled in so many different directions. There are so many opportunities."

Jobs are practically guaranteed, Garblik reaches out to a wider student population, trying to make sure that students interested in information technology careers are aware of how much the auto industry now depends on computers. He has another lure: a nearly 100% job placement rate.

Out at Los Angeles Trade Technical College, known to everyone as just "Trade Tech," Automotive Department Chairman Rudy Serrato also reports finding jobs for most of his graduates. And despite the misconceptions about the "grease monkey" image, "You can make good money," he says.

Serrato is a 1972 graduate of the program he now runs — and he has not lost any enthusiasm for the subject. Launching into teaching a summer class on heating and air conditioning in cars, he notes the thrill of troubleshooting. "It's the challenge of fixing something someone else can't fix," he says. And that is where the skill comes in. Sure, a car's computer may spit out a "trouble code" to report what system is malfunctioning. But that is not enough. "It's a matter of how to diagnose that trouble code," says Jose Ramirez, an instructor. "You have to play around with it." He adds that he tells the students "Anyone can replace a part. I teach them how to troubleshoot. That is where the money is," he says.

Student Hernandez says he is impressed at how the job employs physics and other skills. "You really have to use your brain," he says.

Other students, such as Jazmin Bravo, 19, of Bell, Calif., seem up to the challenge. Even though she does not yet drive, Bravo says she entered the program because "I love classic cars," especially 1960s models. Some students end up talking about a car as if it were a robot from another planet that they can understand. "It can talk to you and tell you what ails it," says Felipe Morataya, 32, of Los Angeles. "You can reason with it to tell you the problem."

The most common question I get asked by repair shops is "Can you find me a good technician?" On several occasions I have been offered \$300 to \$500.

I witnessed a technician get fired one day, and thought, no problem, his replacement will probably be in place by next week. But after eight weeks of the business running ads, and spending thousands of dollars, with no luck, they rehired the technician that was fired. Are auto repair shops hard up for technicians? I would say so. How many times do you hear of people getting rehired after they get fired? As I meet with shops owners, I am finding out that this is their # 1 concern.

We must all share some responsibility in helping the future technician or it is going to be crippling to our wallet, but as stated for years in our industry "you can pay me now, or you pay me later" at a much higher cost I might add.

*A sign I saw in a small-town repair shop: "To my past due accounts when you die, please let me be one of your pallbearers. I have carried you this far, and I might as superbly finish the job!"*

# Chapter Six

## How do I choose a good? auto repair shop?

One of the first means of finding a good auto repair shop is to evaluate the place of business. What type of cars do they specialize in? How new are the cars they work on? You can learn a lot from what a shop does just by driving by. For instance, are there a lot of cars in the lot that look like they have not moved since Woodstock? What is the latest year of car in the parking lot? If you see a bunch of old vans with peace signs on them, and you drive a 2003 car, this shop might not be for you. What you should be looking for are cars that are newer and not 1980 through 1990 models. These shops are not bad; they just might not be qualified to repair newer cars. If you drive a 2003 car, you should be looking for a shop that has many newer cars waiting in its parking lot for repair. You will always find a mix of years, just make sure that there is an indication that this shop does work on newer cars.

Once you have scoped out the outside, go in for a closer look. Go in to make your appointment and check things out. Something to start looking for, ASE certification sign on the building. This can usually be seen on the shop sign or in the window. Most shops that are ASE certified are proud of it and display it. ASE stands for Automotive Service Excellence. Until around the early 1970's, a customer had no way to distinguish between a competent

and incompetent technician. ASE's mission statement is to help improve the quality of auto repair and service through testing and certification of the auto repair technician. So, as you walk into the office, look, and see if there are certificates of achievements on the walls, most technicians that are keeping up to date with training are proud of their accomplishments and want you to know that they are involved with staying educated on your newer car.

Another item to check is the cleanliness and order of the shop. Cleanliness is the best policy, but to be honest, if the shop is really busy and trying to keep up with the demands of customers, the first thing neglected is going to be the floor. There should not be six inches of grease caked on the floor, but chances are you might notice a days' worth of grime. After you have made this evaluation, talk to the person at the front desk. Now would be a good time to start asking a number of questions. What types of cars do they work on etc.? Make sure they work on your year and make of car, maybe the newer cars out front are just parked there because of the business next door. Check what their schedule is like, no sense wasting a lot of time if they cannot look at your car for three weeks and you would like it sooner, (although this is a good indication that this shop has a good following and does good work). Other good questions to ask are, how long have they been in business? Who will be working on my car? How long have they been a technician? Are they ASE certified in what they will be doing? We are not trying to rule out the technician that is starting. All we want to do is make sure that there is a multitude of experience in the shop. As you talk with the person behind the counter, continue to ask questions like "What is the warranty length on repairs, and exactly what does it cover and not cover?" And "Will I get the warranty in writing?"

Ask what steps his business is taking to be around for the next decade. Do they subscribe to some of the monthly auto trade publications? If he does, chances are that he reads them to stay up on what is happening in the automotive industry. What type of equipment does he use and is it updated? You might not know what to look for, but if this technician just recently purchased a piece of equipment, which could range from \$2,000 to \$40,000, he will be prouder than a new dad on the day his first child was born. He will more than likely show it to you and possibly bore you with what it can do. Ask your technician what his specialty is. This gives you an idea where he is heading. If he likes to do tires, chances are he is good at front end alignment, ball joints, shocks etc. If he likes to do computer work, he will probably have a real knack for those tough drivability problems you may have down the road.

Check to see what type of record he keeps on you and your car repair. If by chance your dog eats your receipt, will you be the only one holding your warranty? You might also want to ask where he buys his parts. Like everything in life, you get what you pay for. If you are looking for a cheap job, chances are you will get a cheap part. You are always better off putting top quality parts on your car. The part will last longer saving you grief and money down the road. Poor quality parts can cause other related problems, such as drivability, handling etc.

If you have found a technician who is excited about the future in the automotive industry, you will know by all the things that have been covered. There are two types of individuals in this industry. Those that want to get out, and those that want to stay in. I guarantee that those that want to stay in are spending more money for training and equipment

to better themselves and profit from this industry in the future.

When you have found a technician that takes care of you, let him know by simple letters, cards, even a tip. You would be surprised how far these will get you on your next repair. Too few customers express appreciation to their technician for a job well done. If you have a problem, let him know and work with him on getting it taken care of. Just like athletics, baskets are missed, and fumbles are made. Mistakes happen, sometimes at no fault of the technician. There are times that a new part can go bad causing both of you grief. Haven't you bought something new, and it did not work right the first time? Keep an open line with your technician, and chances are he will do whatever it takes to solve the problem. Anytime work is done on your car, spend a minute asking the technician to show you what he did. This will help educate you on what is taking place with your car.

The key to remaining happy about your car's repair is to find that one special shop who can handle your personal needs and who will take care of you, whatever the problem.

*“Everything should be made  
as simple as possible, but no simpler”*

# Chapter Seven

## What are the real costs for? my technician?

The following is a list of approximate costs for top quality hand tools and equipment for 1996. Keep in mind the range of cost can at times seem large, but there are so many different types of testers and tools that depending on what they do, the cost will fluctuate. Most top technicians have or are in the process of acquiring these tools and equipment to better their job performance.

The following list is an estimate as there are so many choices and manufacturers. These are not your run of the mill, buy it at Harbor Freight tools. These are professional grade tools.

\$10,000 is a moderate cost for a toolbox to store the technician's lifetime investment of hand tools. (He could spend \$15,000 or more for tool storage).

\$35,000 is a good assortment of hand tools with some specialty tools to complete most jobs in a quick and professional way.

\$3,500 to \$6,000 for each above ground Hoist. (Most shops have two or three).



\$5,000 to \$10,000 for Air-Conditioning recyclers, now a federal law in order to do any form of automotive AC service.

\$3,000 to \$4,500 for an Antifreeze recycler. Some places this is becoming more of an EPA issue also.

\$2,340 per year for just one base web-based information system covering repair of your car along with labor rates, technical service bulletins etc.

\$300 to \$1,000 for a good 2-to-2 112-ton Floor Jack. (Most shops have at least two).

\$1,200 to \$2,000 for a Transmission Jack.

\$60 to \$90 for one pair of Jack Stands. (Most shops have two to three sets).

\$300 to \$500 for a Battery Charger.

\$1,700 to \$4,700 for a Brake Flush Machine.

\$3,000 to \$5,000 for a Transmission Flush Machine.

\$1,300 for a Smoke Machine (checks for leaks)

\$500 to \$2,500 for an Alternator, Regulator, Starter, Battery tester.

\$800 to \$2,000 for a Press, used in pressing bearings etc.

\$4,500 to \$12,000 for a Scan Tool/ Basic Lab Scope used in checking your check engine light and electrical integrity. Updates can cost as much more than \$3,000 per year.

\$2,900 to \$10,000 for a Lab Scope that helps in reading voltage patterns, primary circuits, and secondary circuits along with amp ramping.

\$300 to \$800 for a Digital-Volt-Ohm Meter.

\$3,000 to \$7,000 for a Wheel Balancer (if the shop does tires).

\$900 to \$12,000 for a tire machine.

\$1,200 to \$4,000 for an Air Compressor.

\$200 to \$1,400 for a Solvent Tank.

\$1,000 to \$3,000 for a Wire Feed Welder.

\$1,000 to \$3,000 for an Oil Filter Crusher. Because of EPA regulations.

\$2,000 per computer to access web-based information store and run shop management systems.

\$35,000 for an alignment machine and then another \$4,000 to \$10,000 to put your car on

As you can see, even if your technician has a lesser amount/value of tools and equipment he will have over \$45,000 invested to repair your car (ten years ago your

technician had an estimated \$24,000 invested). The shop owner will have this amount of \$24,000 minimum, combined with shop equipment equaling a minimum of \$40,000, totaling a considerably basic \$65,000. This does not include rent, insurance, utilities, waste disposal, specialty tools for his profession, shop supplies or training to remain on the leading edge.

Some might say "But when it's paid off, he makes a killing!" On the contrary, after about five years, you find the equipment needs to be updated or replaced due to everyday use. And if that is not enough, how about all the new equipment that keeps coming out to link into all the new technology? Did I mention occasionally a tool or two seems to disappear in a customer's car or who knows where, and when this happens it has to be replaced. From my knowledge, I really do not know of too many other professions that have this kind of cost. Training is also necessary to try to stay up with all that is changing in the automotive field. Automotive technicians receive such small compensation for what they do, thus why some are saying "I've had enough, it's time to move on to something else." The thing about most technicians is that they absolutely love what they do. It is something that gets in their blood, and just keeps on going. Much satisfaction results when a car leaves their shop purring like a newborn kitten.

Next time you see your technician, ask him the value of his tools and equipment. More than likely, his investment will surprise you. If you really want a good response, ask his wife, who did not get a new dress because a tool needed to remain competitive.

*"Things are more like today  
than they ever were before"*

# Chapter Eight

## How can I save money on car repairs without losing quality?

We have gone over what it takes to make a good technician. Now let us see how we can save your hard-earned dollars.

Once you have found a good auto repair facility with the proper equipment and training for your car repairs, chances are you have saved money already. By having the proper equipment, an automotive repair shop will cut down repair time on those tricky problems. But in life, things change. Ownership of repair shops change, technicians change and sometimes attitudes change.

In order for you to be your own "watch dog" on your vehicle repairs, there are a few steps you can take. If you feel strongly that the automotive part which was causing you grief did not actually get replaced, ask to see the old part. I mentioned this to a close friend and his question was, "How do I know that this automotive part does not belong to another vehicle?" Great question! Ask your technician to show you where the new part is installed. At times you may not be able to see the area in question. For example, your clutch is totally contained by a transmission bell housing. So now what do you do? If you feel strongly that you have been violated, obtain the old part from your technician. Find a parts store and have them tell you if the removed part is the correct part for your make and model of vehicle. The parts clerk can usually pull new parts from the shelf and compare.

This will answer any questions you have in your mind regarding the honesty of your technician. I wish I could say this scam never happens, but, as in any profession, one can always find dishonesty.

If the technician will not give you the part because he has a core charge, pay his core charge. A core charge is a minimal charge the parts house pays your technician so they can recover the old part. From there the manufacturer of the part rebuilds it.

There are three different types of parts available to your technician: remanufactured, aftermarket new, and original equipment, (which is a dealership part). The cost can vary greatly between these different parts.

Another watch dog trick is the Internet. With your home computer, you can verify the repairs done on your vehicle. There are informational systems available to you on your home computer through the Internet. These systems contain service information, flat rate times and part prices. It will cost you to browse through and see what was involved in the repair of your vehicle, but if you feel strongly that you have been "taken," it might be worth checking out.

One of the most important ways to save money on your vehicle repair is to make sure your technician is well trained. Most people do not like to have their car repaired twice for the same problem. Without the right equipment and training, it could take your technician longer to repair your car, and this could increase the cost of your repair. For example, I know of a shop that said they could repair a check engine light problem. They did in fact have a computer diagnostic tool to diagnose the problem. The shop's computer diagnostic tool showed that a certain part was bad, so the shop replaced the part and reset the computer. After rechecking the car's computer, the technician found the same

problem existed. Now what? Does he have the training and knowledge to continue? In this case, NO!

So, he might charge you for the diagnosis and send you down the road. Guess what the next shop must do? You got it, diagnose the problem, and charge you again. You might say, “The last shop already charged me for the diagnosis.” Your new technician cannot accept another technician’s diagnosis. It would be like somebody starting a recipe to bake a cake and then leaving you to finish it without knowing exactly what had been added. Would you know what ingredients are in it already, or what needs to be added? If your new technician accepts the other technician’s diagnosis, he could be chasing what is called a ghost in the industry. A ghost is a problem you try to chase down, sometimes for days, only to find you were on the wrong track. This is quite common. Any time you take a car in for repair, the technician will have to start from ground zero, this way he will know where he has been and where he is going. This is why it is extremely important you know exactly what your repair shop is qualified at doing. After checking to see if the shop has ASE certified technicians, dig a little deeper and check what areas they are certified in. There are specific areas of certification, i.e., Electrical Systems, Engine Performance, Engine Repair, Manual drivetrain and Axle, Automatic transmission and Transaxle, Heating and Air Conditioning, Brakes, Suspension and Steering.

The following is an example of an ASE Engine Performance test question:

While diagnosing poor drivability on an engine with electronic spark control:

Technician A says there is no need to check base timing.

Technician B says base timing should be checked and the emission (VECI) decal gives the proper procedure.

Who is right?

- (A) An only                      (C) Both A and B  
(B) B only                      (D) Neither A nor B

As you can see these questions are very technical to test your technician's ability.

Today there are almost 330,000 (Seventeen years ago there were 380,000) ASE Repair Technicians/Parts Specialists working in auto dealerships, independent garages, service stations, franchises, and schools. ASE is the only nationally recognized organization that certifies automotive repair technicians.

ASE certification is not an assurance or guarantee of work performed or that the technician is ethical, just as a medical board certification does not guarantee that a doctor has good bedside manners.

After your technician has done the diagnosis on your vehicle and starts the repair, he may run into additional problems as he gets deeper into the job. Let your technician know that you want to be notified immediately if there are going to be additional charges, have him explain these additional charges and what they will be. Also, request from him any additional parts that will be involved. I have yet to meet anyone who does not get confused when they are quoted one price and find it considerably higher when they pick up the vehicle. Communication is your best money saver.

*"By the time we make ends meet,  
they move the ends"*

# Chapter Nine

## Is car maintenance a SCAM?

NOT if you educate yourself!

Many an article is written that doing maintenance on your car is a scam. Is it? Let us take a look. Since the advent of the automobile, the world has chosen to use fossil fuels (fuels formed by natural processes such as anaerobic decomposition of buried dead organisms.) to run its cars. I do not know about you, but if it was once alive and is now dead, I am fairly sure there is going to be some sort of issue with it.

Fact – burning fossil fuels creates carbon buildup in your engine. All the detergent fuel you put in your car does help in the cleaning process, but it does not get rid of ALL of it.

Modern cars come with a manufacturer maintenance regimen. You can look it up in your owner's manual (if you still have it clunking around in the glove box.) You will hear writers all over the web stating their opinion towards this. First off, let us look at their expertise. Do they have the training to work on cars? Some of them cannot even spell Camaro right (Camero), let alone give you proper advice on maintaining your vehicle.



## What constitutes a Severe Maintenance Service?

- Most of your trips are less than four miles
- Most of your trips are less than 10 miles, and outside temperatures are below freezing
- You drive in extremely hot weather (St. George in the summer)
- Your engine is at low speed most of the time (not on the highway)
- You do a lot of stop and go driving
- You operate your vehicle in dusty or muddy conditions
- You tow a trailer, regularly carry heavy loads, or use a car-top carrier

Condensation from an engine cooling off is another factor of car maintenance. If you drive on the freeway just a few minutes at freeway speeds, this allows the moisture in the oil to evaporate. Noticeably short trips, or trips of less than ten miles when it is very cold, do not allow the engine to heat up enough to get rid of the water. And water in the oil leads to damaging sludge. Also, towing, and heavy loads raise operating temperatures and quicken fluid breakdown. Dusty and muddy driving means that more dirt will get past the air filter to contaminate the fuel system and engine oil.

The bottom line is that YOU need to decide for yourself if the regular or severe service schedule is right for you, based on your driving.

Are there fraudulent services in the auto repair industry? Absolutely! Is it your responsibility to understand what needs to be done to your vehicle, and when? Absolutely? I

know some people are lazy and chose to depend on others to invest their money, raise their children-- yet expect it all to work out to their favor in the end. Let us be real; if you genuinely care about these items along with overpaying for car repair, you will research and ensure you are doing what is proper for you and your family rather than depend on someone making their living off your money.

A mechanic that tells you your car needs an Internal Top Engine / Fuel Injection Clean may not be lying to you. Ask him to show you how he knows that. Some areas he should point out will be the throttle plate where you can see all that black sludgy crap from Victor the Dinosaur that has built up on your intake throttle plate, or the Idle Air Control Counts on your mechanics scanner (not a cheap diagnostic scanner that does not give you live data). Trust me, if the throttle plates look like Victor has been there recently, so does the intake manifold, Idle Air Control Valve, back of the valves, top of the piston, and Oxygen sensor.

I know someone reading this right now will totally disagree with me, so for those bozos do this test yourself. An engine is a vacuum pump. It pulls in air and fuel then ignites that mixture to create power. At sea level the vacuum of a good running engine at idle will be steady between 17" and 21" HG. I personally have discredited many who say this service is not needed by doing a vacuum reading before and after a cleaning. I have seen an increase of .5" HG to 5.0" HG on vehicles from nothing but this service, with the customer returning after driving it stating, "It feels better than when it was new". Carbon DOES build up in your engine and does affect gas mileage; it lowers compression which causes a drop in power and responsiveness, it creates pre-ignition which can damage an engine, and creates an

uneven burning in the compression chamber causing the fuel not to burn properly creating more... you guessed it carbon.

When and how you do your car, maintenance is up to you, but remember you can pay your mechanic now or you can pay him later (at a higher cost). The choice is yours.

*“When I die, I want to die peacefully in my sleep, like my grandfather. Not screaming and yelling like the passengers in his car.”*

# Chapter Ten

## New meaning for “Eat your vegetables?”

Vegetables and bio-fibers like kenaf, hemp, grass, corn straw, flax, jute, henequen, pineapple leaf and sisal can do a car good, too?

We know that vegetables help build strong bodies, but a car body. Yup, just when you thought you knew it all the car industry has found out that vegetable fiber helps reduce weight and strengthen components as compared to man-made glass fibers and petrochemicals derived from oil.

Surprisingly, bio-composites have been around since the 1920s, when Henry Ford built prototype car components including dashboards, door panels and passenger compartment parts from hemp-derived plastics. Hemp-derived car parts send me back years ago to the movie *Up in Smoke with Cheech and Chong*.

Nissan’s all-electric Leaf is designed to take hundreds of thousands of tons of plastic bottles away from landfills. In fact, 60 percent of the plastic on the Leaf’s interior is recycled material, at the end of the Leaf’s lifespan, 99 percent of the 3375-pound vehicle weight is recyclable

and can be transformed back into water bottles or other Leafs.

Motive Industries INC out of Canada has produced the Kestrel electric car, which does not use gas and has many parts and pieces made from advanced plant-based plastics. It also weighs in at a little less than 2,000 pounds. Nathan Armstrong, President of Motive, feels that they are onto something. “We know we are presenting unique solutions that will help solve many of the challenges facing the automotive industry, not only environmental but also logistical (as in supporting Canadian industry).”

On a technological side, using composite material (hemp) versus metal has many benefits including lighter weight, increased impact absorption and rust resistance. “While a steel stamped vehicle will absorb impact by crumpling under pressure, a composite vehicle will absorb the energy, then return to its original shape,” comments Armstrong.

Scientists say that bio-composites are, pound for pound, stronger, lighter, and cheaper to produce than steel.

Small changes can make a huge difference. Ford is using 20% wheat straw bio-filler in the third-row storage bins of its Flex wagon. Consider a plastic storage bin. By using wheat straw-reinforced plastic rather than 100-percent traditional petroleum products, it is estimated that petroleum use will be reduced, along with CO2 emissions.

This is just Ford's first application of this material. Ford is already considering using the environmentally friendly technology in the construction of center-console bins and trays, interior air registers, door trim panel components and armrest liners.

Ford's sustainable materials portfolio also includes soy-based polyurethane seat cushions, seatbacks, and

headliners; post-industrial recycled yarns for seat fabrics; and post-consumer recycled resins for underbody systems, such as the new engine cam cover on the 2010 Ford Escape's 3.0-liter V6.

The most amazing example to date is a bio-composite race car developed by the University of Warwick in England. The ecoF3 is made from vegetables and runs on chocolate derived biofuels. That gives a whole new meaning to not eating your vegetables, along with the new business I want to start – a chocolate bar at every racetrack. After smelling the biofuel, race fans will sublimely want chocolate.

So, when you buy your next car and the steering wheel is made out of carrots and you have broken down in the desert, can you eat your steering wheel to survive?

*“Knowledge is knowing a tomato is a fruit; Wisdom is not putting it in a fruit salad.”*

# Chapter Eleven

## What is NGV & CNG?

Currently, natural gas is abundant and cheap. However, because of the technological and legal hurdles involved in converting a car to run on natural gas, it can cost thousands of dollars. Is it worth it? Let run the numbers and see.

Let us start off by discussing that the only way to convert a vehicle to natural gas is by hiring a certified compressed-natural-gas (CNG) installer to do the job.

Your biggest expense is going to be the compressed natural gas fuel tank. Then, you have a fuel regulator that takes the 3600-psi fuel tank pressure and drops it to 125 psi. You can then hook it to a home compressor that will cost thousands and take hours to fill, or you can go to a station that charges anywhere from .85 cents to \$1.65 for the equivalent of a gallon of gas.

With total installation costs running from \$5,000 to \$10,000, at \$3.25 per gallon of regular gas, that would buy you 1,538 to 3,076 gallons of gasoline. Research has shown that as gas prices creep up to the \$5.00 range, more people gravitate to converting their car. A \$5,000 to \$10,000 investment could then buy you only 1,000 to 2,000 gallons of fuel.

If you drive the average 15,000 miles per year, and your car gets an average of 22 miles per gallon, you will buy 681 gallons of fuel in a given year.

So, is natural gas the way to go? It depends on you having the upfront investment of \$5,000 to \$10,000 first. If you do, then it might. Keep in mind you will be losing trunk space for the natural gas tanks too.

Let us dig a little deeper to better understand what NGV & CNG are. A natural gas vehicle or NGV is an alternative fuel vehicle that uses compressed natural gas (CNG.) There is also liquefied natural gas (LNG.) Natural gas vehicles should not be confused with those powered by propane (LPG), which has a fundamentally different composition and has increased in price to match gasoline.

Your existing gasoline-powered vehicle can be converted to run on CNG, LNG or the gasoline you currently use. Diesel engines for heavy trucks and busses can also be converted to run on these systems. An increasing number of vehicles worldwide are being manufactured to run on CNG. Until recently, the Honda Civic GX was the only NGV commercially available in the US market. Since that time, Ford, GM, and Ram have added bi-fuel offerings to their vehicle lineup. Ford's approach is to offer a bi-fuel prep kit as a factory option, and then have the customer choose an authorized partner to install the natural gas equipment. Choosing GM's bi-fuel option sends the HD pickups with the 6.0L gasoline engine to IMPCO in Indiana to up fit the vehicle to run on CNG. Ram currently is the only pickup truck manufacturer with a truly factory-installed bi-fuel system available in the U.S. market.

The good news is that NGV filling stations are popping up all over the place because they can be located anywhere that natural gas lines exist. Compressors (CNG) or



liquefaction plants (LNG) are usually built on a large scale, but small home refueling stations are possible with CNG.

CNG can also be mixed with biogas, which is produced from landfills or wastewater. These biogases also do not contribute to the concentration of carbon in our atmosphere. With that all being said, you can breathe deep and not worry as much about the poisonous particulates you are breathing as compared to years ago, or can you?

*“I thought I wanted a career; turns out I just wanted paychecks.”*

# Chapter Twelve

## What is the cost to operate a car in? America these days?

As we all know, the cost of buying and owning a vehicle can vary widely, i.e., a Bentley vs. a Kia. Did you know that where you live can have a factor in that as well?

Research shows that Georgia is the most expensive state in the Union to operate a car. But my favorite is Oregon, where it is the most affordable.

The gap is huge, almost double, to keep the ole bucket of bolts running in the peachy keen state of Georgia calculating in insurance, repairs, taxes, and fees. Glad I am not moving to Georgia anytime soon.

The top five most expensive states are:

- Georgia – over \$4,000 per year
- California (no surprise) - \$3,966 per year
- Wyoming (surprised me) - \$3,938 per year
- Rhode Island - \$3,913 per year
- Nevada - \$3,886 per year

But do not think you will get away without paying higher costs. The cost of car ownership is rising continually, as high

as 12% per year for maintenance and repair of your fine automobile.

Currently the national average to operate a car per year in this fine nation is \$3,201.

The least expensive states:

- Indiana - \$2,698 per year
- Montana - \$2,660 – sure miss that state
- South Dakota - \$2,343 a year
- Alaska - \$2,227 – love that state
- Oregon - \$2,204 per year – love that state

So, the next time you are looking for a job or a place to move to, you may want to consider that the prettiest states (in my own opinion of course) will take better care of you when it comes to taking care of your car. Of course, these costs do not include your monthly payment.

*“Some people are like Slinkies ... not really good for anything, but you can't help smiling when you see one tumble down the stairs.”*

# Chapter Thirteen

## 134-point inspection? Really!

No piece of car buying advice is more often ignored than having a mechanic do a Pre-Purchase Inspection on a used car. Way too often, people lay out thousands of dollars on a car because of emotion instead of taking a drive down to a mechanic who could save them thousands of dollars.

So maybe you do not want to spend the extra money for an inspection? Fine, do not complain about the repair costs because you chose not to have it inspected!

I have yet to have someone tell me I cannot take their car in for an inspection before I buy it. If they did, then red flags and whistles would go off all over the place.

Are those pre-qualified used cars for sale any better, usually not. More than ever, this is when you should get a second independent opinion. These car dealers sell cars. Their job is to make the most profit they can on a car. Do not think for a minute they are going to put in any more than they have to into your newfound car. Case in point, I had a customer come last week that bought a used car from one of these places 6 months ago. He was in because of a noise in the rear end. He stated, “I bought it six months ago and am sure everything is in good standing, but while it is here going and give it a once over.” Does this look like it was pre-inspected and replaced?

Always, always, always get a second opinion to make sure nothing is wrong with the car. I knew a guy that bought a motor home four states away. He did not get a Pre-Purchase Inspection and it ended up costing him thousands of dollars before he even got home.

A general inspection can run you \$49-\$99, so why wouldn't you do that? I cannot tell you how many used car inspections I have done and found out there was not a jack with the spare, or the spare was flat. I know what you are thinking... I will not need it; I have towing insurance. Yup until it happens one night late in a rainstorm in the middle of nowhere and you do not have cell coverage. And how about hidden problems with the body, frame, or engine? Or hidden engine codes that could reveal major engine problems? Maybe the previous Bubba that worked on it left bolts loose and parts out. Think I am kidding? Think again! I have seen it all. There are times the car needs a new engine or transmission before they can sell the car. Do you think they take it to the best guy in town? Hell No! They find the shadiest shade tree mechanic that will get the job done so they can sell it "As Is!" What about flood damage? Has the car been in a flood? Well, you will never know if you do not get it inspected.

The best money you can ever spend is to get your used car pre-inspected before you buy it. If you are buying from a dealer, ask for a warranty or find out if they will stand behind you if you have a problem. There are some that do an excellent job with this. They are the guys that look at having you as a long-term customer. They are far and few between but do exist.

So next time before you buy a used car, save your mechanic grief from having to listen to you complain about

your car repair and yourself headaches and financial strain;  
get your next used car pre-Inspected.

*“Did you know that dolphins are so smart that within a few weeks of  
captivity, they can train people to stand on the very edge of the pool and throw them  
fish?”*

# Chapter Fourteen

## Lost in thought?

Lost in thought while driving can change the rest of your life. Check out the Top 10 List of The Deadliest Driving Distractions

More than 65,000 people have been killed in car crashes over the past two years, one in 10 were in crashes where at least one of the drivers was distracted. That is according to police report data analyzed by Erie Insurance in the Fatality Analysis Reporting System (FARS), a nationwide census of fatal motor vehicle traffic crashes maintained by the National Highway Traffic Safety Administration.

“Lost in thought or as some call is distracted driving, as is any activity that takes your eyes off the road, your hands off the wheel, or your mind off your primary task of driving safely,” says Doug Smith, senior vice president of personal lines at Erie Insurance. “We looked at what law enforcement officers across the country reported when they filled out reports on fatal crashes and the results were disturbing. We hope the data will encourage people to avoid these high-risk behaviors that needlessly increase their risk of being involved in a fatal crash.”

The analysis, which looked at data from 2010 and 2011, showed police listed the majority of drivers who were

distracted as “generally distracted” or “lost in thought.” Police also listed several more specific types of distractions. Below are the top 10 distractions involved in fatal car crashes:

#### Distracted Drivers

- 1 Generally distracted or “lost in thought” (daydreaming) 62%
- 2 Cell phone use (talking, listening, dialing, texting) 12%
- 3 Outside person, object, or event, such as rubbernecking 7%
- 4 Other occupants (talking with or looking at other people in car) 5%
- 5 Using or reaching for device brought into vehicle, such as navigational device, headphones 2%
- 6 Eating or drinking 2%
- 7 Adjusting audio or climate controls 2%
- 8 Using other device/controls integral to vehicle, such as adjusting rear view mirrors, seats, or using OEM navigation system 1%
- 9 Moving object in vehicle, such as pet or insect 1%
- 10 Smoking related (includes smoking, lighting up, putting ashes in ashtray) 1%

I did not see any mention of the woman or guy (both on separate occasions) that I saw eating a bowl of cereal on the way to work. Really? There are a lot of things I do, that I should not when driving, but eating a bowl of cereal?

Smith added that because FARS data on distraction is based largely on police officers’ judgment at the time of the crash, and because some people may be reluctant to



admit they were distracted when being interviewed by police after a fatal car crash, the numbers are difficult to verify and may, in fact, under-represent the seriousness and prevalence of driving distractions.

The data is meaningful, however, because unlike surveys in which consumers self-report the types of distracted behaviors they engage in, the FARS data is based on actual police reports on fatal crashes.

If you “feel” the need to eat cereal or do your hair, makeup, eyeliner on the way to work, do us all a favor; get up earlier and do it before you leave the house, because you are endangering not only yourself, but everyone else on the road. We have enough things out there that take our eyes off the road we do not need any extras.

*“My computer once beat me at chess, but it was no match for me at kick boxing.”*

# Chapter Fifteen

## Moonshine?

For the past 8 years, I have developed a way to run my Chevy and Ford trucks on used motor oil and transmission fluid. I figured out how to do this after fighting others in town for used vegetable oil from our local restaurants. The supply was not keeping up with demand, so I moved on.

I may be ready to move on once again. Must be something about a challenge that drives me. I have enjoyed the series Moonshiners, and countless times told my sweetheart that I want to build a still. NOT for drinking purposes, just to do it. You have to admit it looks cool! Right? Years ago, I had a distiller for our drinking water and played with many types of solar systems, wind power etc. so why not moonshine? But a different type. The one for fuel.

So, my first question was can I make my own moonshine legally? Short answer is YES, at least for fuel. You can acquire a permit from the Federal Bureau of Alcohol Tobacco and Firearms for FREE, yup that is right FREE. Ya, it blew me away, too. Most states accept the Federal permit as an OK to manufacture moonshine. Each locality is different. I strongly advise you if you try this to dig deep and find out all the particulars for your area first.

Can cars really run-on moonshine? They sure can, but only if it is the strong stuff "hiccup". It needs to be a

minimum of around 150 proofs, which sounds like some fairly good stuff wink, wink. For best results it needs to be 190 proofs.

This is not new. Alcohol has been used to fuel cars since Henry Ford's Model T. The Model T was equipped to run on ethanol as well as gasoline. More recently, you have seen the federal government mandate that ethanol make up 10 percent of today's gasoline.

Any car can run on this kick butt hooch if set up properly. Cars before 2000 are not really equipped to handle alcohol long-term, and can lead to leaks, rust, and corrosion. But they can be retrofitted if so desired. Alcohol has become a regular additive to gasoline today so modern fuel systems were developed to withstand a much higher tolerance for the, if you will "white lightning".

So, if you are passing by the house and it smells like Diane is in the kitchen making corn bread stop in for a drink, oops I mean some corn bread and we will sit around the still and chat about the good ole Prohibition Days.

*"I'm not sure but I think my clear conscience is the sign of my bad memory."*

# Chapter Sixteen

## The un-diagnosable car problem!

One of the worst things about having car problems is when you have a problem that no one can fix. So, let us hear about your unsolvable car problems.

Having been in the auto repair industry my entire life, I have to admit that there have been times I have lost sleep and pulled out my hair trying to figure out an issue on a car. I have been so taken by the problem that it dominated my life and every thought. There comes a time it is a personal thing, and I am not going to let the issue win. If I had gotten paid for the time, I had spent on these problems I could have had a new truck every year. When I started Automotive Diagnostic Inc. years ago, we were the dumping ground for cars no one else could fix. This taught us the importance of right diagnostic equipment and training.

The first thing is to duplicate the problem. Often times I have had to send a customer away (which I hate) telling them to stop by when it happens, and I will drop everything to check it out. My phrase has always been “If you can make it do it for me, I will tell you what it is.” In 33 years, I can only remember 6 that I never was able to fix (one we found out years later was because it got hit by lightning which no one knew about at the time we were diagnosing it), but neither could any other shop or dealership. The only

problem with that is that I have always taken pride in solving the issue. Besides, when you do it makes you a better technician.

In today's cars, there are up to 100 million lines of computer code, more than in some jet fighters. Today's modern car has 30 or more computers that communicate together to provide your amenities and performance; some luxury cars have as many as 100 of these "black" boxes. So, when you have car problems, think about how infuriating it is when your laptop or desktop does not do what you want and multiply that by 30 - 100 times. These computers control hundreds of functions in a split second, from brakes to entertainment to performance. Your car includes miles of wires that are hard to get to. Cars are so refined that every available space is used for something and trust me, whatever you are trying to get to will have something in its way. There are times I have had to pull an entire dash just to get to a wire harness.

It is extremely important that, if your car has an intermittent problem, you seek out a professional repair shop that is equipped to check and repair these kinds of problems. A lot of mechanics think they can find and fix these issues but lack the proper tools and equipment to do so, costing you more money.

*"The sole purpose of my middle name is so I could tell when I was really in trouble with my mom."*

# Chapter Seventeen

## Expensive DIY fix!

As I sat working on some paperwork, I drove the car from well you know the place, it is a little warmer than southern Utah, but not by much lately. At this point, I had no way of knowing this was going to be the nightmare of the day. The car was towed in, so it was obvious that there was a major problem.

As I was pushing the car in to the bay, the customer asked, “Can you have it done by 5:00?” A lot was going through my mind at the time, so I unthinkingly answered “Sure.” That was my first mistake.

Years of experience has taught me that I should never promise a vehicle at a specific time, due to the many systems a mechanic needs to check. Countless hours can be spent on one single electrical problem.

The nightmare began 60 minutes later, when the customer called to ask whether or not the car was finished. This calling continued the rest of the day every sixty minutes. “A watched pot never boils,” certainly applied here. Not to mention the time it took every 60 minutes to answer the same phone call.

Understanding that my customer needed his vehicle, I calmly explained that the troubleshooting takes time, with the car in the service bay I checked out the basics – fuel,

spark, and compression. The spark was missing in this vehicle. The spark causes a small explosion in the combustion chamber creating power to make you engine run. On older cars this would not be so complicated. On this modern car, it was more complex.

The computer runs the spark/ignition system. With the ignition system being run by the computer a whole new diagnostic procedure takes place. Ignition is simple by itself, but throw in a computer, crank sensor, control module, coil packs, knock sensor, spark plugs, and miles of wiring and the mechanic has his work cut out for him.

At this point, I turned to my trusty web driven information systems, which consist of tens of millions of pages of information. Yes, that's right, tens of millions of pages. A lawyer may have a lot of books and information to go through, but I venture to estimate we go through a lot more. I have been told these systems can update over 300,000 pages quarterly. Good information means a quicker and better fix for our customers, but it costs us. The systems I use contain OEM information intermingling with hundreds of thousands of mechanics across the world and can cost close to \$500 per month.

As I started to look up TSB's (Technical Service Bulletins) on the car I found nothing from the OEM that related to the problem at hand. This is in important aspect many mechanics forget or do not do. GM stated that 30% of problems can be found by looking at TSB's.

Next, I pulled up the wiring schematics of the ignition system. These diagrams look like an old Atlas Road map. You might find it interesting to look at one of these the next time you have your car repaired. As I pulled the wiring diagrams and ground areas along with splices, junctions, and related components the phone rang again. The customer

wanted to know what was taking so long. I again explained that this process takes time. Of course, now he also wanted to know what it was going to cost him. As with any “timed” troubleshooting service the cost can be unknown until the mechanic gets into the problem. I personally always sell blocks of time to give the customer a cost estimate. If I find the problem quicker than the block of time given to the customer, I give them a break on the price.

With information in hand and my lab scope I started to repair the car. To make a long story short after two hours of testing, probing, and referencing the electrical schematic I found the problem.

One especially important piece of information my customer forgot to tell me was that the “No start” problem happened after he had been under the dash installing his own stereo.

Information is what fixes cars today, more than ever. Do not be afraid to share what you know about the things that have been done to your car by you or someone else. It will save you money, and the mechanic time.

After a number of hours involved in the repair of this car the easy part of the nightmare was over. I now had to explain to the customer that he was the reason the car would not start, and I would have to charge him for all the work I had done.

Repairing today’s vehicles is more complex than ever. Even the simplest things can create major problems. It is good to remember this when performing a DIY function.

*“When in doubt, mumble.”*



# Chapter Eighteen

## Should you stay or should you go?

The question gets asked occasionally “If a tanker truck is filling the gas station’s tanks at the time, I pull up to fill my gas tank should I stay or should I go?”

A gas tanker can hold up to 9,500 gallons of fuel so when it drops fuel into the underground tank at a gas station if by chance there is any silt, dirt, or sludge in the tank it is going to be disturbed. But with that in mind, gas stations have filters on the intake pipe and filters at the dispersing pump that trap this dirt, silt, and sludge. Every automobile since its conception has had a screen on the pickup in the tank and a fuel filter in line that also traps these unwanted particles.

A lot has changed in the past years; technology, the design of better filters and the introduction of ethanol to our gas supply are just a few to mention. Ethanol is like a cleaning solvent; it goes in and cleans contaminants from both the storage tanks, gas tankers and your gas tank. I know this for a fact as recently I was working on a friend’s 2000 Bentley Arnage, this car is 13 years old and has only 40,000 miles on it, so we know it has been sitting a lot over the years building all sorts of crud in the tank, lines, filter, and injectors. He had some drivability issues which I addressed

along with a Top Engine Clean / Fuel Injection Service to get everything back to normal. Carbon is a byproduct from running fossil fuels that builds up in your engine, (not as bad as it once did) so to get things back to normal, this service goes through and cleans the throttle plate, idle air control valve, intake manifold, backs of the valves, tops of the pistons, O2 sensor and the front of the catalytic converter. So, I went ahead with the cleaning and for the first time in over 20 years of performing this service the car ran worse, and I mean really bad! Now keep in mind this is a \$225,000 vehicle, so nothing on it is going to be cheap. As I fretted over my dilemma, I drew my associates together that are the top of their game in drivability and diagnostics. The conclusion I made was that the cleaner I had put in the tank had done its job. It had removed all the contaminants from the tank, lines and filter and pushed them up the line into the injectors creating major havoc for me. Once I realized what the issue was it was easy to correct the problem. The Bentley performed as it should, and I have to add that in my 33 years in the industry I have never ever driven a nicer car.

So, should you go, or should you stay when a tanker truck is filling up at your favorite watering hole for your car? I go! Everything shows that you should be okay, but because of my history of seeing problems back in the 70's and 80's I just feel better about not staying. Sometimes it is hard to teach an old dog new tricks; ask my wife.

*“Some people hear voices. Some see invisible people. Others have no imagination whatsoever.”*

# Chapter Nineteen

## Oil change translator

Changing your engine oil is a simple task; there are many lube places, repair shops, big box stores that will do it for you, yet many (including myself) let the interval go longer than it should. Some people think it never needs to be done. Years ago, I was training in a repair shop that had an engine torn down. It was obvious at first glance what the problem was, as inches of sludge that looked like cold roofing tar had built up on the interior of the engine causing it to fail prematurely to the tune of \$4,500, a lot more expensive than changing the oil at recommended intervals. Years ago, there was an ad that stated, “you can pay me now, or you can pay me later.” This statement still runs true today.

Routine maintenance will keep your car’s engine lubricated properly. Inside your engine are high-speed moving parts causing your oil to get dirty over time. This dirt builds up and creates friction which can damage moving parts if the dirty oil stays in the system to long.

So which type of oil is right for your car? You will hear all types of recommendations, to keep it safe always follow your car manufacturer recommendations; sometimes you can also find the type of oil required printed on the oil cap under the hood of your car.

Depending on your vehicle's make and model, you may see one of the following printed on that cap, 5W-20, 5W-30, 10W-40, 15W-40. These numbers refer to the "weight" or thickness of the oil. Motor oil gets thicker when it is cold and thinner when it heats up, thus 5W-30 oil performs better when it is cold.

There are many different types of oil out there today: All-synthetic oils that perform better than your ordinary petroleum-based oil, but their drawback is that they are more expensive. Usually, you will see these recommended for luxury and high valued cars and pickups.

There is nothing wrong with running synthetic oil in your car, except for the cost. There are some cases where a vehicle may have a specific need for either a blended synthetic or standard, petroleum-based oil. Always, always follow your owner's manual.

Synthetic blends are a combination of petroleum-based oil and the synthetic oil. These blends perform well in SUVs and other large vehicles. This oil is less expensive than full synthetics.

High-mileage oil is made especially for cars with 75,000 miles or more on the odometer. Using high-mileage oil in these older vehicles will help you get more life out of your engine.

Premium conventional oil is standard for brand-new cars and should be changed every 4,000 miles, every four months or when your oil-change indicator light comes on — whichever happens first.

When you get your oil changed, you need to be aware of a few scams that can take place.

1. The up sell – telling you that you need a transmission flush, power steering flush, brake flush, coolant flush,

differential flush etc... where this may be accurate you need to take control of the situation by having the mechanic explain why. This is one area I will have to spend more time on as it does get quite detailed in making sure you are not being taken for a ride. In the meantime, contact us if you feel something is not right, we will be happy to help you out.

2. Frequent returns – Mechanic tells you that you need to come in every 3,000 miles for an oil change. Read your owner’s manual as this is not the case like it was years ago.

3. The "no change oil change" – Some mechanics, believe it or not will bring in the vehicle, make it look like they are changing the oil and then kick it out without any oil being changed.

4. The "no filter oil change" - Mechanic says they will change the filter but then only change the oil, leaving the old filter on the vehicle. Drivers going in for an oil change can mark their oil filter with a big red X using a marker, and then look directly after the oil change to make sure the filter has been changed or ask the mechanic to see the new filter on the car.

5. The voided coupon - Shops will offer a cheap oil deal then hit you with hundreds of dollars of work to make up for the low-ball oil change. Do not be fooled by this; if it sounds too good to be true, it is!

6. Always ask the service writer or mechanic to show you what they did and explain to you the process they use when changing your oil.

*“Children seldom misquote you. In fact, they usually repeat word for word what you shouldn’t have said.”*

# Chapter Twenty

## Technology lures women

Do women care about technology in their cars? Yes, say manufacturers, and they are banking on new technology and safety features along with a healthy dose of style to appeal to women car buyers.

What is crazy to me, is because this is such a male dominated world and most men are clueless to what we, the woman, want... they still think we want the extras in order to buy a car!!

Back in the day if a car had a mirror visor, that was the first thing a salesman would show me when I went to buy a car. REALLY?! Really.

The Ford marketing survey found that women buy 45 to 50 percent of all new cars and influence up to 80 percent of all automotive purchases. GO FEMALE POWER!! However, the men still do not get it. UGH!!! Yes, we love the backup cameras, airbags, tale lift technology...but so do the men.

Women want the SAME THING as men, a trustworthy, drivable car that does not need a thousand dollars to fix – I want my mechanic to be able to open the hood and be able to fix the darn thing...without having to go to Stanford to know where the fuse box is!!!

This is the problem with all the “new” cars out there. The more dazzle, the more problems they give us. PERIOD.

If the video goes out in the back...that means an electrical issue, which means it is not just the video that has to be fixed. So those 6/9 months of peaceful bliss with the kids in the back watching Disney – now turns into an \$800.00 car repair bill.

So, as I write this – is there anything we can do about this?! No, and H#LL NO!! We cannot seem to make any man understand us, the woman. Through the ages, men have been the ones to take care of the female...Killed the dragon kind of thing. But now – we kill our own dragons, and a lot of women bring home the dragon to cook and take care of the men. I guess until we get a female who owns a car manufacturing company – the female race will just have to keep on enduring and adapting as we continue to do now. As the men say: “It is what it is!”

Diane Ray

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*“Keep your dreams alive: Hit the snooze button.”*

# Chapter Twenty-One

## What women want women should get!

What women want; women should get!

It is common to hear or read about the growing influence of women in today's society. Today's U.S. female consumer is not just the caregiver for her family, she is the chief executive officer of the American household. Companies that respond properly to today's female consumer are making smart business decisions.

In a study conducted by Fleishman-Hillard and Hearst Magazines, today's woman feels it her responsibility to help friends and family make smart purchase decisions. "During the past few years, we have watched the evolution of women and their sphere of influence," stated Nancy Bauer, senior vice president and senior partner, Fleishman-Hillard. "Simply put, when it comes to the dynamics of today's marketplace, women have changed the marketing communications game. The 2012 female consumer is a valuable broadcaster and amplifier of ideas in the marketplace."

A friend of mine recently asked me to do a checkup on his van. When I asked him why, his answer was that his wife had decided they were going to buy a new vehicle and



wanted to know the status of their current one; she had already picked the make, model, and color.

Nine out of ten women believe repair shops treat them differently because they are women, and the difference is seldom positive. Women want to be informed customers and understand the repair in layman's terms and receive quality repairs and customer service. They respond much better to a clean waiting room, timely delivery, and repair orders that are easy to understand.

Women are more attracted to social networking than men. While men are more likely to visit entertainment, betting, games, and music websites women are spending more time on Facebook and Twitter. It is not always about what auto repair is being done to her car that is important, it is more about who she tells before and after the repair that should have auto repair shops concerned.

The old adage of one satisfied customer will tell three friends while an angry customer will tell 10 has made monumental changes. With the advent of social networking one satisfied customer might tell 10 to 300 friends whereas an angry customer will tell 12,716,322 -- as per United Breaks Guitars on YouTube.com.

Countless studies show that politeness and recognition are extremely important in a woman's buying decision. Over 60 percent of woman say they have left a store, stopped buying products or hung up a telephone on someone at least once in the past year due to poor customer service.

According to About Women and Marketing magazine, service with a smile and a "can do" attitude make women customer's feel welcome. Women like to know that someone is available to answer questions with "yes," "no"

or “I’ll find out” responses instead of “I don’t know” or “I don’t think so” responses.

Ultimately, all customers want value, whether they are using the services of an automotive repair facility or shopping for everyday products. Value is difficult to assess; however, fair prices, respectful service, convenience, quality repairs and a pleasant atmosphere are good starters for creating value in any customer's mind.

*“If you can stay calm while all around you is chaos, then you probably haven’t completely understood the situation.”*

# Chapter Twenty-Two

## Good bad and the ugly

A new report shows that Fort Collins, Colo. has the safest drivers, while the least-safe are in the nation's capital. Really? Did they spend any time in Utah? LOL!

Allstate Insurance did an Allstate America's Best Drivers Report and found that Fort Collins Colorado (about 65 miles north of Denver) earned the safest title among the 194 cities ranked. The went on to say that their study found drivers in Fort Collins average 13.9 years between collisions, which is 28.2% less likely than the national average. Boise, Idaho; Sioux Falls, N.D.; Brownsville, Texas; and Madison, Wis., round out the top five best-driver cities, with accident frequency ranging from 12.5 years to 13.9 years.

"We know that about the national average for the time a driver has [an accident] is about every 10 years," Allstate spokeswoman Kate Hollcraft stated. "We're looking at drivers in all of those cities as compared to the national average."

Fort Collins was No. 3 in Allstate's 2012 report, but it held the top spot in 2010 and 2011 — and placed second from 2006 to 2009. By contrast, Washington, D.C., had the worst drivers in the 2013 report, with a predicted average of just 4.8 years per driver between accidents. That is 109.3%

higher than the national average. A slew of East Coast cities — among them Baltimore, Philadelphia, New York City, Providence, R.I., and Newark, N.J. — ranked in the bottom 25.

The nation's capital has harbored the worst drivers from 2008 to 2012, according to Allstate. In fact, in the study's nine years, Washington ranked last all but twice. "They've got a lot of people and a lot of cars in a small space," Hollcraft said. "There are always a lot of factors that go into [the rankings], so we can't say that it's one or two. But there's absolutely something to be said for cities that are more compact or more densely populated."

Still, sprawling Southern California had a few cities among Allstate's bottom 25, including Los Angeles and two suburbs (Fullerton and Glendale). Perhaps traffic promotes bad driving. Traffic information provider INRIX named Los Angeles the country's most-traffic congested city in 2013. And six of INRIX's most congested 10 cities ranked in the bottom 35 of Allstate's study.

"Damage [is] not necessarily to property but to the car," Hollcraft said. The insurer weeded out theft or incidental damage, like a tree branch falling on a parked vehicle, "so we're really looking at someone's driving habits."

*"The probability of someone watching you is proportional to the stupidity of your action."*

# Chapter Twenty-Three

## Tips in a minute

Car trouble is not something any of us want to deal with. We want to hop in the car, turn the key, and have it run like a Swiss Watch, every time. Unfortunately, sooner or later there will come a time that some sort of symptom will creep into your life at the worst possible time. Is it a major problem or minor issue? Here is a glossary of terms that should help you get a handle on what your vehicle is saying to you and assist you when discussing with an auto mechanic (automotive technician).

### *Brakes*

- If your vehicle seems to take longer to stop and you feel like you need to start hitting the brakes 1.5 miles before the stop sign you have what we call *Brake Fade*.
- If you feel like you have to push the brakes through the floorboard and think you might

have to use the Fred Flintstone method of stopping, you have what we call a *Low Brake Pedal*.

- If when you engage your brakes your car, seat and fillings in your teeth start to fluctuate and pulsate you have what we call *Brake Pedal Pulsation*.
- If when you push on your brakes your car starts having a mind of its own by wanting to turn left or right and then those darn things engage suddenly throwing everything in the back seat up on the front dashboard you have what we call *Brake Grab*.

### ***Engine***

If you are pouring the coals to the engine to get to work faster than normal because you overslept and all of a sudden you feel like you have reached the end of the rope your car came with by losing power and the engine hiccups at irregular intervals you have what we call *Engine Cut Out*.

If you are driving the kids to school and it sounds like crinkling soda cans under the hood or popcorn popping, especially when going up a hill you have what we call *Detonation*.

If you turn the engine off and remove the key and the darn thing keeps chugging, spiting, and sputtering like an old John Deer tractor you have what we call *Dieseling*.

If you push on the gas pedal and nothing happens, especially when taking off from a stop sign or light, kind of like when your wife asks if you took the trash out that she told you to do 3 times then you have what we call *Hesitation*.

If you have a bucking sensation that pulsates and jerks and throbs and changes with engine speed, usually felt above 29.7 miles per hour and when you are at idle, you hear a spitting sound from the exhaust then you have what we call a *Miss*, not to be confused with the Mrs.'s.

If your engine runs rough, shakes, rattles and rolls unevenly at an idle you have what we call a *Rough Idle*.

If your engine has no getup and go like some of those early Monday mornings after a great weekend, and it will not accelerate as fast as usual and it feels like you before coffee, Red Bull, Coke or Pepsi then you have what we call a *Sluggishness*.

If your car has little or no speed increase when you push the accelerator, yet when you continue to push it down gradually, eventually you get an increase in speed, kinda like asking your kids to pick up their room and by the thirteenth time they do it, then you have what we call a *Spongy Response*.

If your engine dies out or stops running right after you accidentally honk at the biker gang in front of you and does the same thing at idle or while driving, you have what we call a *Stall*.

If your car speeds up then slow down, then speeds up then slows down, similar to the way you feel when the caffeine wears off until the next batch kicks in then you have what we call a *Surge*.

### ***Steering & Handling***

If your suspension seems to bottom out like when you were a teenager and you jumped that canal with your folks Pontiac and you hear a heavy thud you have what we call *Bottoming*.

If you have to turn the steering wheel way to far before the front wheels engage you have what we call *Excessive Play*.

If your vehicle is hard to steer when first started or while trying to parallel park in downtown New



York with honking horns, yelling and the occasional feathered finger you have what we call *Hard Steering*.

If you release the steering wheel while holding on to your Egg McMuffin to answer your cell phone and your car changes lanes you have what we call a *Pull*.

If you are holding on tight to the steering wheel because you like the rapid side-to-side motion produced from your front wheels felt in your steering wheel you have what we call *Shimmy*.

If your car takes a long time to feel right again after hitting those grocery store speed bumps at 34.3 miles per hour or it feels like an old pioneer wagon with a spongy or mushy ride you have what we call *Pitching/Sway*.

If your car shakes and at times is harmonized to your favorite song on the radio you have what we call a *Vibration*.

If your car is like your teenager and has a mind of its own by meandering and requires frequent adjustments to maintain its direction while you are busy texting, then you have what we call a *Wander*.

### *Odors & Stains*

If you smell a sweet odor with your husband's shoes off in the car and you start to see steam from under your hood you have what we call a *Coolant/Antifreeze Leak*.

If you see small, heavy, thick, gooey black stains on your brand-new driveway then you have what we call an *Axle Leak*.

If you see thick smoke with a heavy tar pit odor coming out from under your hood and you can account for your kid who is easily entertained with matches, you have what we call *Burning Oil*.

If you see what you think at first is one of the colors of the rainbow, yellow, green, pink or orange stains under your car and they are like a baby oil consistency, you have what we call *Coolant Streaks*.

If you have brownish stains under your car and your kids and grandkids are all grown up, you have what we call *Oil/Power-steering Leaks*.

If your car smells like the burnt toast you patiently waited for but never popped up with an acrid smell, you have what we call an *Electrical Short*.

If the car in front of you filled with 6 kids 2 grandparents and 2 parents produces a rotten egg not coming from the family and smells like the sulfur pits in Yellowstone National Park, you are smelling *Bad Emissions*.

If you just rode your brakes all the way down Wolf Creek Pass and you smell a burning rubber type odor, you have what we call *Overheated Brakes*.

If you smell a hot, heavy metallic odor and you are not at a heavy metal concert and it is accompanied by that sweet smelling coolant/antifreeze odor, you have what we call *Overheating*.

If you are seeing reddish- or reddish-brown stains on the driveway every time you leave your mother-in-laws house and you can account for her cat, you have what we call a *Transmission Oil Leak*.

*“Every man is a damn fool for at least five minutes every day; wisdom consists in not exceeding the limit.  
Elbert Hubbard*

# Chapter Twenty-Four

## What does he mean by that?

Here is a list of most common phrases you may see or hear your technician use.

2WS -	Two Wheel Steer
4WAL -	Four Wheel Antilock
4WAS -	Four Wheel Air Suspension
4WD -	Four Wheel Drive
4WS -	Four Wheel Steer
A -	Amperes
A-6 -	Axial 6-cylinder A/C compressor
AAT -	Ambient Air Temperature
ABC -	Active Body Control
ABS -	Antilock Brake System
AC -	Alternating Current
A/C -	Air Conditioning
ACC -	Adaptive Cruise Control
ACE -	Active Cornering Enhancement
ACM -	Airbag Control Module
ACT -	Air Charge Temperature
ADAS -	Advanced Driver Assistance System
ALM -	Adaptive Learn Matrix
AOS -	Automatic Occupant Sensing
ASD -	Automatic Shutdown
BCM -	Body Control Module
BPCM -	Battery Pack Control Module
BPMV -	Brake Pressure Modulator Valve

BPP -	Brake Pedal Position
BPW -	Base Pulse Width
BTDC -	Before Top Dead Center
CAN -	Controlled Area Network
CANP -	Canister Purge (solenoid)
CARB -	California Air Resources Board
CASE -	Cranking Angle Sensing Error
CCC -	Computer Command Control
CCCD -	Catalytic Converter Cool-Down
CCP -	Controlled Canister Purge
CCRM -	Constant Control Relay Module
CFI -	Continuous Fuel Injection
CFI -	Cross Fire Injection
CID -	Cylinder Identification
CKP -	Crankshaft Position
CLS -	Coolant Level Switch
CMFI -	Central Multi-port Fuel Injection
CMP -	Camshaft Position
CNG -	Compressed Natural Gas
CO -	Carbon Monoxide
CO2 -	Carbon Dioxide
COP -	Coil on Plug
CP -	Canister Purge
CPC -	Camshaft Position Control
CPI -	Central Port Fuel Injection
CPP -	Clutch Pedal Position
CSFI -	Central Sequential Fuel Injection
CVRSS -	Continuously Variable Road Sensing
CVS -	Canister Vent Solenoid
CVT -	Continuously Variable Transmission
DAB -	Driver Airbag (module)
DC -	Direct Current
DC -	Duty Cycle

DCM -	Door Control Module
DDM -	Driver's Door Module
DFI -	Direct Fuel Injection
DGI -	Direct Gasoline Injection
DI -	Distributor Ignition
DIY -	Do It Yourself
DLC -	Data Link Connector
DMM -	Digital Multimeter
DOHC -	Double Overhead Cam
DOL -	Data Output Line
DPFE -	Differential Pressure Feedback EGR
DSCC -	Distance Sensing Cruise Control
DSDA -	Dual Stage Driver Airbag
DTC -	Diagnostic Trouble Code
DVOM -	Digital Volt-Ohmmeter
E85 -	Ethanol 85 percent
EAS -	Electrically Assisted Steering
EBCM -	Electronic Brake Control Module
EBM -	Electronic Brake Module
EBP -	Exhaust Back Pressure
ECC -	Electronic Climate Control
ECM -	Engine Control Module
ECS -	Electronic Crash Sensor
EEC -	Electronic Engine Control
EFE -	Early Fuel Evaporation
EFI -	Electronic Fuel Injection
EGR -	Exhaust Gas Recirculation
EGRC -	Exhaust Gas Recirculation Control
EGRVR -	EGR Valve Vacuum Control
EHB -	Electro-Hydraulic Brake
EHCU -	Electronic Hydraulic Control Unit
EHPA -	Electro-Hydraulic Power Assist
EHPS -	Electro-Hydraulic Power Steering

ELC -	Electronic Level Control
EMB -	Electromagnetic Brakes
EPR -	Exhaust Pressure Regulator
EPS -	Electric Power Steering
ESC -	Electrical Systems Controller
ESC -	Electronic Spark Control
ESC -	Electronic Suspension Control
FC -	Friction Curve
FCM -	Front Control module
FCP -	Fuel Cell Partnership
FCU -	Front Control Unit
FCV -	Fuel Cell Vehicle
FDC -	Fuel Data Center
FF -	Flexible Fuel
FFS -	Flexible Fuel Sensor
FI -	Fuel Injection
FICM -	Fuel Injector Control Module
FLI -	Fuel Level Indicator Input percent
FLI V -	Fuel Level Indicator Input VOLTS
FPCM -	Fuel injection Pump Control Module
FPDM -	Fuel Pump Driver Module
FSS -	Forward Sensing System
FSVF -	Fuel Solenoid Valve Fault
FT -	Fuel Trim
FTP -	Federal Test Procedure
FTP -	Fuel Tank Pressure
FTPT -	Fuel Tank Pressure Transducer
FUELPW1 -	Injector Pulse Width Bank 1
FUELPW2 -	Injector Pulse Width Bank 2
GA -	Gravitational Acceleration
GDI -	Gasoline Direct Injection
GPCM -	Glow Plug Control Module
GTL -	Gas to Liquid

GVW -	Gross Vehicle Weight
GVWR -	Gross Vehicle Weight Rating
H -	Hydrogen
H2DI -	Hydrogen Direct Injection
HAST -	High Accelerated Stress Test
HBA -	Hydraulic Brake Assist
HC -	Hydrocarbons
HCM -	Heating Control Module
HCM -	Hybrid Control Module
HCU -	Hydraulic Control Unit
HEGOG -	HEGO Ground (circuit)
HEPS -	Hydraulic Electric Power Steering
HEV -	Hybrid Electric Vehicle
HIS -	Horizontal Impact Sensor
HO2S -	Heated Oxygen Sensor
HPDI -	High Pressure Direct Injection
HSA -	Head Side Airbag
HSC -	High Swirl Combustion
HSDI -	High-Speed Direct Injection
HSE -	High-Speed Enrichment
HSEA -	High Solar Energy Absorbing (glass)
HTRX1 -	02S Upstream Heater Control
IA -	Intake Air
IABM -	Integrated Airbag Module
IAC -	Idle Air Control
IAFM -	Integrated Air Fuel Module
IAFS -	Integrated Air Fuel System
IAT -	Intake Air Temperature
IC -	Ignition Control
IC -	Integrated Circuit
ICA -	Injector Cam Actuation
ICCS -	Integrated Chassis Control System
ICE -	Internal Combustion Engine



ICM -	Ignition Control Module
ICP -	Injection Control Pressure
ICS -	Integrated Chassis System
IDI -	Integrated Direct Ignition
IDM -	Ignition Diagnostic Module
IDM -	Injector Driver Module
IDS -	Integrated Diagnostic Software
IFES -	Integrated Front End System
IFI -	Indirect Diesel Injection
IFS -	Inertia Fuel Shutoff
IFSM -	Integrated Fuel System Module
IGN -	Ignition
ILC -	Idle Load Compensator
IMS -	Instant Mobility System
IMSC -	Intake Manifold Swirl Control
IMSC F -	Intake Manifold Swirl Control Fault
IMT -	Intake Manifold Tuning
INJ -	Injection
IPM -	Instrument Panel Module
IPM -	Integrated Power Module
IPR -	Injector Pressure Regulator
IRDS -	Independent Rear Drive Suspension
ISC -	Idle Speed Control
ISG -	Integrated Starter-Generator
ISI -	Ion Sensing Ignition
ITS -	Idle Tracking Switch
IVS -	Idle Validation Switch
IVSC -	Integrated Vehicle Speed Control
IWC -	Inertia Weight Class
KAM -	Keep Alive Memory
KAPWR -	Keep Alive power
KS -	Knock Sensor
LCM -	Lighting Control Module

LDP -	Leak Detection Pump
LDR -	Low Data Rate
LEV -	Low Emissions Vehicle
LIE -	Laterally Inclined Engine
LNG -	Liquid Natural Gas
LPG -	Liquefied Petroleum Gas
LPS -	Low Pressure Sensor
LT -	Long Term (Fuel Trim)
LTPI -	Low Tire Pressure Indicator
LTPWS -	Low Tire Pressure Warning System
LUS -	Lock-Up Solenoid (see TCC)
LV8 -	Load Variable 8 Cylinder
MAF -	Mass Air Flow
MAP -	Manifold Absolute Pressure
MAT -	Manifold Air Temperature
MC -	Mixture Control
MCU -	Microprocessor Control Unit
MDP -	Manifold Differential Pressure
MEM -	Memory
MEMCAL -	Memory Calibration
MFI -	Multiport Fuel Injection
MID -	Monitor Identification
MIL -	Malfunction Indicator Lamp
MIN -	Mobile Identification Number
MMC -	Manifold Mounted Converter
MPa -	Mega Pascal
MPFI -	Multiport Fuel Injection
MSO -	Mixed Signal Oscilloscope
MTV -	Manifold Tuning Valve
NG -	Natural Gas
NGSC -	Next Generation Speed Control
NGV -	Natural Gas Vehicle
NI -	Neutral Idle

NiMH -	Nickel Metal Hydride
NLGI -	National Lubricating Grease Institute
N-m -	Newton Meters
NO <sub>x</sub> -	Nitrogen Oxides
NV -	Night Vision
NVLD -	Natural Vacuum Leak Detection
O <sub>2</sub> -	Oxygen
O <sub>2</sub> S -	Oxygen Sensor
OBD -	On Board Diagnostics
OBD II -	On Board Diagnostics, Generation 2
OC -	Oxidation Catalyst Only
OCC -	Output Circuit Check
OCR -	Oil Control Ring
ODM -	Output Drive Module
ORC -	Occupant Restraint Controller
OSS -	Output Shaft Speed
OTC -	Overhead Trip Computer
PAB -	Passenger Air Bag
PAIR -	Pulsed Secondary Air Injection
PASE -	Passive Start and Entry system
PATS -	Passive Anti-Theft System
PCI -	Programmable Controller Interface
PCM -	Power Control Module
PCV -	Positive Crankcase Ventilation
PFE -	Pressure Feedback EGR
PFI -	Port Fuel Injection
PFS -	Purge Flow Sensor
PHEV -	Plug-in Hybrid Electric Vehicle
PMV -	Pressure Modulator Valve
POT -	Potentiometer
PPS -	Passenger Presence Sensor
PROM -	Programmable Read Only Memory
PS -	Power Steering

PSA -	Pressure Switch Assembly
PSCM -	Passenger Seat Control Module
PSCM -	Power Steering Control Module
PSD -	Power Sliding Door
PSP -	Power Steering Pressure
PTC -	Pending Trouble Code
PTC -	Positive Temperature Coefficient
QDM -	Quad Driver Module
RABS -	Rear Antilock Brake System
REEGR -	Rotary Electric EGR
RPA -	Rear Parking Assist
RPM -	Remote Power Module
RPM -	Revolutions Per Minute
RPO -	Regular Production Option
RSC -	Roll Stability Control
RSS -	Reverse Sensing System
RSS -	Road Sensing Suspension
RWAL -	Rear Wheel Anti-lock
RWD -	Rear Wheel Drive
RWS -	Rear—Wheel Steer
S4WD -	Selectable Four-Wheel Drive
SAE -	Society of Automotive Engineers
SC -	Supercharger
SCI -	Serial Communications Interface
SCM -	Seat Control Module
SCS -	Side Crash Sensor
SCTM -	Seatbelt Timer Control Module
SCV -	Speed Controlled Volume
SDL -	Serial Data Link
SDM -	Sensing and Diagnostic Module
SI -	System International
SIAB -	Side Impact Air Bag
SIG RTN -	Signal Return

SIR -	Supplemental Inflatable Restraint
SIS -	Side Impact Sensor
SKIM -	Sentry Key Immobilizer Module
SPI -	Serial Peripheral Interface
SPL -	Smoke Puff Limiter
SPOUT -	Spark Output
SRW -	Single Rear Wheel
SSM -	Suspension Steering Module
SSS -	Speed Sensitive Steering
SSV -	Shift Solenoid Valve
ST -	Scan Tool
ST -	Short Term (Fuel Trim)
SWC -	Steering Wheel Controls
SWPS -	Steering Wheel Position Sensor
TAC -	Throttle Actuator Control
TACH -	Tachometer
TACM -	Throttle Actuator Control Module
TAP -	Transmission Adaptive Pressure
TAS -	Trap Alert System
TB -	Throttle Body
TBI -	Throttle Body Fuel Injection
TC -	Transmission Control
TC -	Turbocharger
TCC -	Torque Converter Clutch
TCS -	Traction Control System
TCS -	Transmission Control Switch
TDC -	Top Dead Center
TED -	Thermo Electric Device
TFP -	Transmission Fluid Pressure
TIM -	Tire Inflation Module
TOC -	Transmission Oil Cooler
TOT -	Transmission Oil Temperature
TP -	Throttle Position

TPA -	Terminal Positive Assurance
TPI -	Tuned Port Injection
TPM -	Tire Pressure Monitor
TPS -	Throttle Position Sensor
TR -	Transmission Range
TSB -	Technical Service Bulletin
TSI -	Two Speed Idle
TSS -	Transmission Speed Sensor
TSS -	Turbine Shaft Speed
TT -	Telltale Lamp
TVR -	Turbine Vane Regulator
TVS -	Thermal Vacuum Switch
TVV -	Thermal Vacuum Valve
TWC -	Three Way Catalyst
TXV -	Thermal Expansion Valve
ULEV -	Ultra Low Emissions Vehicle
ULSD -	Ultra Low Sulphur Diesel
UTD -	Universal Theft Deterrent
V -	Volts
V2G -	Vehicle to Grid
VACS -	Vehicle Access Control System
VAF -	Vane Air Flow
VAF -	Volume Air Flow
VAPS -	Variable Assist Power Steering
VATS -	Vehicle Antitheft System
VB -	Valve body
VCC -	Viscous Converter Clutch
VCI -	Vehicle Communication Interface
VCRM -	Variable Control Relay Module
VCT -	Variable Camshaft Timing
VDCS -	Vehicle Dynamics Control System
VDM -	Vehicle Dynamics Module
VDOT -	Variable Displacement Orifice Tube

VDP -	Vehicle Dynamics Processor
VDR -	Vehicle Data Recorder
VDR -	Vehicle Dealer Recorder
VDS -	Valve Deactivation System
VDV -	Vacuum Delay Valve
VEDR -	Vehicle Event Data Recorder
VES -	Variable Effort Steering
VGT -	Variable Geometry Turbocharger
VIC -	Virtual Image Cluster module
VIN -	Vehicle Identification Number
VIP -	Vehicle Intrusion Protection
VIU -	Vehicle Interface Unit
VLCM -	Variable Load Control Module
VLR -	Voltage Loop Reserve
VMM -	Vehicle Measurement Module
VNT -	Variable Nozzle Turbine
VR -	Vacuum Regulator
VREF -	Voltage Reference
VRLA -	Valve Regulated Lead Acid
VRV -	Vacuum Reducer Valve
VS -	Variable Speed
VSC -	Vehicle Stability Control
VSS -	Vehicle Speed Sensor
VSV -	Vacuum Solenoid Valve
VTA -	Vehicle Theft Alarm
VTSS -	Vehicle Theft Security System
WAC -	Wide Open Throttle A/C Cutoff
WGC -	Wastegate Control
WIF -	Water in Fuel (sensor)
WSS -	Wheel Speed Sensor
X-valve -	Expansion Valve
xVDS -	Extended Vehicle Diagnostic System
ZEV -	Zero Emission Vehicle

# About the author

As a young boy, Marvin spent countless hours taking things apart to see what made them tick. It was always a challenge to fix something broken and a great reward when the object in question returned to its original working status.

About the time Marvin reached high school he found the first love of his life, a 1963 Chevy Impala. At the age of 15 and with \$50 gifted from his parents, he set out to build his new dream. After spending countless hours and \$3500, his dream was accomplished by the time he received his driver's license. Marvin was proud of his shiny charcoal paint, tuck and roll interior, vinyl top, mag wheels, and a back end jacked up so high you could drive a foreign car under it! Whenever the high school administration wanted to find Marvin all they had to do was go to the auto shop.

After high school, Marvin spent the next two years at Utah Trade Technical College. During this time, he had found a new love, one that was faster, stronger, and meaner: a 1966 GTO. A real tire smoker! The Dean of the automotive department reprimanded Marvin by saying "That car is a lethal weapon!" Marvin was proud. He had obtained his goal!

Two years later with degree in hand, off he went to Utah State University to continue his study of Automotive Technology, or was it girls, (at 19 years of age who could keep those two straight?) During the course of school and girls, the Automotive Technology program was canceled.

Marvin decided it was time to look for employment. He acquired a part-time job as a mechanic at a local garage, Tune Tech. After the first week of working 70 hours Marvin was afraid to ask what full time employment would be like.



The next three years were spent working countless long hours and dreaming of opening his own business.

While working those long hour days a new love came into his life, one bad 1970 4x4 short bed pickup truck that would do almost everything Marvin promised.

About this time Marvin was offered more money from a local VW dealership, Valley Volkswagen. With the focus of wanting to own his own shop one day, he accepted the job.

Within one year, Marvin saved enough money to obtain his lifelong dream, his very own auto repair shop. With the tools all purchased and a loan co-signed by a close friend, Buzz Jones, Marvin's new business was off and running. A second shop was later opened, complete with a full staff of auto mechanics, and a King Kong size headache from owing his body and soul to the local bank.

After 12 years of working 16-to-18-hour days, Marvin sold his shops and moved on to teach part time at Bridgerland Applied Technology Center. Six months later Marvin was Department Head of the automotive program, in a full-time capacity. After three years of teaching high school/post high school students and night classes to auto shop technicians, Marvin bought a tool franchise and became involved with selling tools to repair shops in Salt Lake City. A year later he was in Montana working as a Technical Representative for Snap-on Tools, covering most of Montana and Wyoming. Following his three years stay in Montana, he moved to St George, Utah to open his first Diagnostic Repair Center. A year later he was approached by a Utah State representative to train auto repair shops in the state of Utah diagnostics and business management for 13 years. With the downturn of the economy, Marvin jumped ship to be a regional trainer for Big O Tires, less than

a year later becoming their National Training Manager. Twenty years of travel had taken its toll on Marvin so after 4 years with Big O Tires and then Grease Monkey International he is now back at home running My Certified Mechanic a company that makes sure you do not get ripped off with your automotive repairs.



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Have you or someone you know ever felt like they got ripped off or were overcharged on a car repair?

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I work with anyone who owns a car purchased after 1996, who are challenged with not knowing if their repairs are truly required, not knowing what it should cost and overall feels they have lost control when taking their car in for repair.

I have created a proven system where we validate the repair leaving you in control not the mechanic, so you will know exactly what is needed and what it should really cost.

I have 33 years' experience in the auto repair arena, owned repair shops and have worked extensively with some of the largest companies like Snap-on Tools, Napa Auto Parts and Big O Tires training thousands of owners and their employees in 16 states.

The reason I started this business is because all my life people have come to me asking about their car and the repair costs.

My mission is for people to have confidence in their auto repair.

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