We all know that modern cars have many more safety features than cars did 50 years ago. In the May 2014 issue of *Car and Driver* magazine, there was an article by Jeff Sabatini titled "How're Ya Dying?" *(sic)* A major focus of this article was to compare the fatality rate per 100 million miles of travel for various forms of transportation for the years 2000 through 2011. As expected, commercial air travel was the winner, at 0.9, excluding travel on commuter air carriers, at 4.2. Interestingly, the total for all motor vehicles was 1.4, and the total for passenger cars only was 1.1. For you motorcyclists, please ride carefully—the rate for motorcycles was 31.5. My forty-plus years of crash reconstruction has shown me that many motorcycle fatalities were not the fault of the motorcyclist, and that, for many crashes involving motor vehicles of all types, the driver who was not at fault had no reasonable means of avoiding the crash. Total vehicle fatalities of 32,367 in 2011 don't seem that much better than the annual fatalities of 36,399 for 1960, until one considers that total miles driven in 1960 amounted to approximately 719 billion. In 2011, the total of miles driven was approximately 2.9 trillion. Considering the vastly greater number of driven miles, the fatality rate per 100 million vehicle miles was roughly five times greater in 1960 than in 2011. Better drivers? I think not. I believe that the reduction in fatality rates is primarily attributable to the numerous additional safety features in modern cars, although there obviously are other factors involved, including better maintenance and design of roads, more elimination of near-road obstacles, better signage, and more efficient planning of traffic patterns.

In a sidebar of that article which had the heading "Buckle Up Your Little Ones," the author wrote that motor-vehicle deaths among children twelve and younger decreased by 43 percent from 2002 to 2011. He also stated that one-third of child fatalities in 2011 were to occupants who were not properly restrained. Properly used child car seats save lives. The safest place for a small child is in an appropriate, properly installed car seat placed in the center of the back seat. The middle position in the back seat is statistically the safest position for any occupant who is properly using the safety belt incorporated into the vehicle. I will never forget a crash I reconstructed in which a baby had been placed on a **booster seat** (emphasis deliberate) in the left rear seating position when the driver of that vehicle blew a stop sign, causing a collision between the left side of his car and the front of a car which had the right of way. The baby was the only fatality, and I am certain that the baby would have survived uninjured if properly placed in a car safety seat appropriate for the age and secured by the seat belt in the center of the rear seat of the struck car. But life is full of many unfortunate events; I'm sure most (perhaps all) of you have memories of similar tragedies.

Laser scanning of objects (crash sites, vehicles, and other items) is becoming more available. I do not have my own laser scanner, but I have the means to have laser scans of crash sites and/or vehicles conducted at competitive prices. Laser scans allow a three-dimensional image to be electronically created inside a computer, and the three-dimensional images can be moved as a body to show positions at a site or alignment with other vehicles or other objects. Please contact me if you are interested in having laser scans of crash sites and/or vehicles in cases where you want to retain me to conduct a reconstruction. I also still use a rolling measuring wheel, steel and fiberglass tapes, a Smart Level, and other equipment to make measurements at crash sites and of collision-damaged vehicles. I have contemplated buying my own total station system, but a friendly competitor has recently bought one, and he has offered to work with me on total station work if and when it is needed or appropriate. There are some situations where total station equipment is the best method of getting a significant number of valid data points at a crash site, but the old tried-and-true methods work most of the time. In situations where I have made measurements with my hand tools and someone else has made measurements with total station equipment, I can take my drawing and place it on his, and they will line up exactly. But there may be some situations where the perceived superiority of modern technology warrants measurements with total station equipment, and I will be able to provide that whenever a client desires or requires it. Call and ask if you have questions—I have access to technology and equipment that I don't own but which can be incorporated into an investigation at a reasonable price.

Those of you who read my last newsletter may remember that I mentioned absorbed glass mat (AGM) batteries. Would you believe they are now available in a size for your car? (Apologies to Agent Smart.) Would you believe they're only twice the price of a lead-acid battery with the same performance characteristics? I certainly hope that volume production will bring the price down; I couldn't justify the higher price unless I had a start-stop vehicle or a hybrid vehicle, which I don't.

I recently upgraded my desktop machine by replacing the boot disc with a solid state drive (SSD). This image is of the SSD that I installed. It is a 500 GB SSD; installation and cloning were relatively painless. I am enclosing this photo and text primarily because I hate to send a newsletter with no images. If you are looking for a faster computer, an SSD boot drive is probably your best answer.

The rolling resistance of cars and light trucks is much lower now than the numerical value of that property 50 or more years ago, when much of the groundwork for scientific crash reconstruction was being established. Sources from that era indicate rolling resistance in terms of the acceleration of gravity, 32.2 feet per second squared, in the range of 0.10 to 0.20 for vehicles coasting in gear with idling engines. Back then, many engines had higher compression ratios with no emission controls, many more vehicles had manual transmissions, the automatic transmissions of the era were more closely coupled with their engines, most cars were much less aerodynamic that today's vehicles, most cars were 1,000 to 2,000 pounds heavier, and virtually every car in America rolled on bias-ply tires. A significant factor in improving fuel mileage in modern automobiles is to reduce their air resistance and their rolling resistance, especially when the throttle is at idle. Wind-tunnel-aided design of bodies and radial-ply tires are two significant factors in that reduction. Modern automatic transmissions are not as tightly coupled to their engines as their archaic predecessors, and emission controls do not, in general, allow as much engine braking as was available in the distant past. Cars roll on their tires easier and farther now, and they get better fuel economy with generally more horsepower from smaller engines than the cars of bygone eras. So what? I'm glad you asked! Some computer programs based on algorithms developed in the early stages of crash reconstruction used those drag factors for calculating post-impact speed loss,

which is a component of the impact speed. For vehicles which rotated significantly after impact, as many do, the use of those values for inline rolling resistance in gear makes no discernible difference in calculations regarding post-impact speed loss. However, for those vehicles which travel along a post-impact path parallel to a longitudinal axis, the use of those currently high values for post-impact travel can lead to impact-speed calculations which are high, sometimes by a substantial amount. So, what values should we use for inline rolling resistance? I'm glad you asked! Several fellow professionals and I are planning to conduct documented experiments on a variety of late model cars and light trucks during the 2014 Southeastern Crash Conference to be held in Charleston, South Carolina, the last week in July to determine their total rolling resistance in line, in gear, engine idling. If circumstances and equipment come together to allow us to conduct those experiments, I'll share the resultant data with you in a future newsletter. Why do we go to such extremes? Because we want to provide the most accurate, objective evaluations of crash data we can. Aren't you glad you asked? ☺

For those who may be in the market for a new vehicle, Yahoo Auto ranked the 13 safest in three categories: in luxury cars, the Infiniti Q50, The Volvo S80 and S60, the Mercedes Benz E-Class sedan, the 2015 Hyundai Genesis, the Cadillac XTS, and the BMW 5 Series; in the SUV/Crossover category, the Volvo XC60, the Subaru Forester, and the Mercedes Benz M-Class; in less expensive sedans, the Subaru Legacy/Outback, the Buick Regal, and the Chevrolet Impala. J.D. Power identified the top-ranked cars in the 2014 Initial Quality Study; it did not include any Volvo, Mercedes, BMW, or Subaru models. The Buick Encore, Chevrolet Malibu, Chevrolet Silverado, Chevrolet Suburban, Chrysler Town and Country, and Dodge Challenger were among the top ratings. Others included two Ford models, the Edge and the F150, one Lincoln model, the MKX, and two more GM models, the Terrain and the Yukon, for a total of 11 of the 26 listed being from American manufacturers. The only German vehicles in the group were three Porsches: the 911, the Boxster, and the Panamera. The Ridgeline was the only Honda in the category. Hyundai models included the Accent, the Elantra, and the Genesis. The QX50 and QX80 from Infiniti were listed. The Kia Cadenza and Sportage were included. The Lexus ES made the list, as did the Nissan Juke. Mazda 5 and MX-5 Miata completed the list. As an aside, Lamborghini, long known for producing cars with Italian styling and stunning straight-line acceleration, now has a model which can compete in road-holding with Ferraris, for those with a quarter of a million dollars to spend on a car. And Alfa Romeo, now owned by Fiat, is returning to the American market with a mid-engine sports car which is expected to sell for under $60,000. I guess we'll all have to rush out and buy one while they're cheap! ☺

Thank you for reading my latest newsletter. I anticipate that I will have some information from the 2014 Southeastern Crash Conference, where I am an invited speaker once again, to include in my next newsletter. Please drive safely, and please call me when you have a motor-vehicle related issue which needs investigation and/or reconstruction.

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