

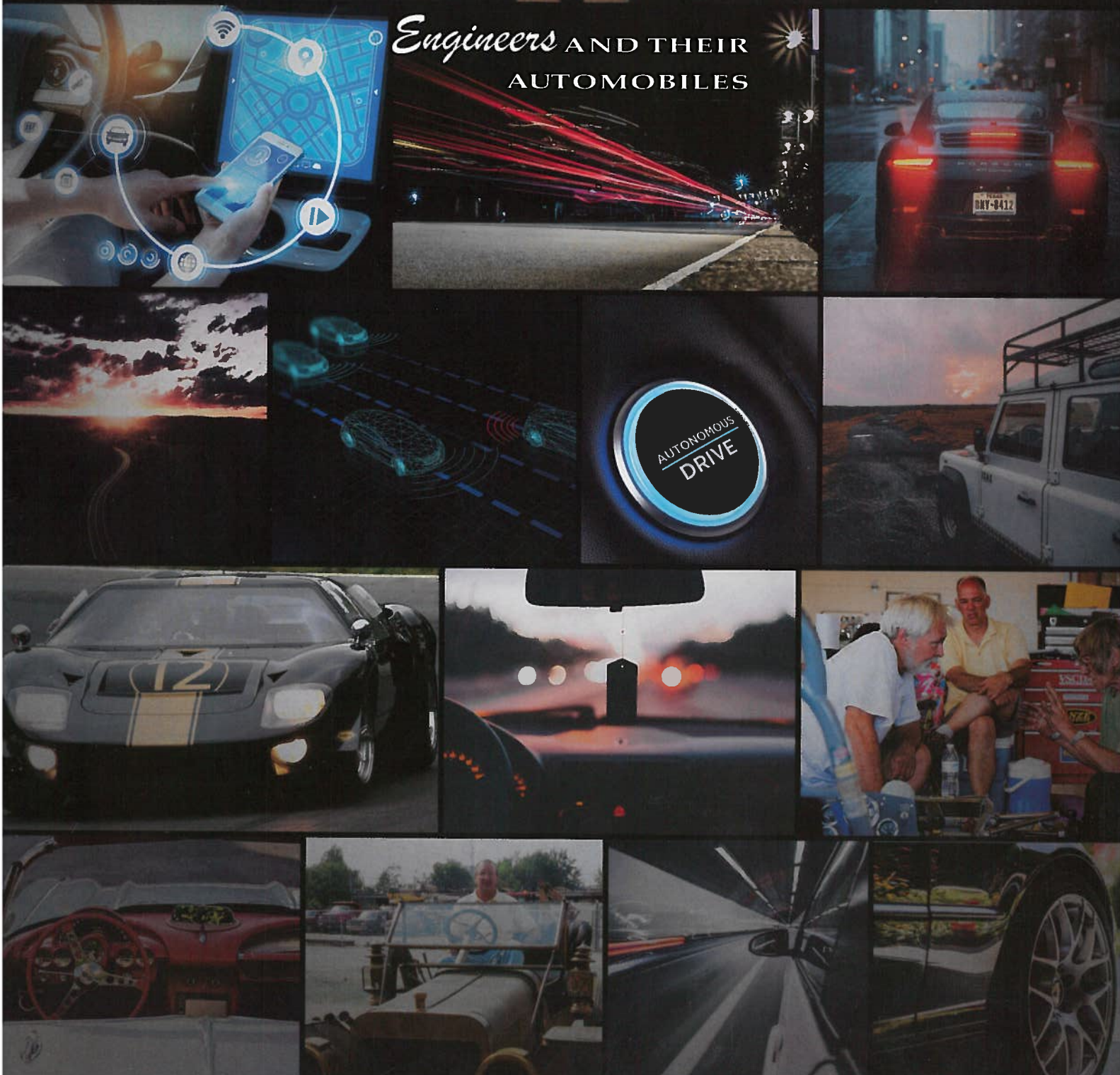
*Pittsburgh*

WINTER 2017

# ENGINEER

*Quarterly Publication of the Engineers' Society of Western Pennsylvania*

*Engineers* AND THEIR  
AUTOMOBILES





# Guest Editor Column

By: Mike Zappa

I'm an old school engineer. There are a lot of us out there who could be thinking about retirement, but are concerned about "what will I do after I retire?" I am 68 years old with no set date for retirement.

What I have been able to do is adapt my knowledge and skills, not only in business, but also to my personal "at home" life. In business, I am a partner in a commercial real estate firm that manages office buildings, medical offices, sports complexes, and retail strip malls. You might ask, "how does engineering apply to that field?" Well, it does in a big way. The biggest issue experienced in managing a building, and its tenants, is HVAC. Here comes the engineering application to problem solving. Tenants report that it's too hot, it's too cold, it's drafty, etc. I'm sure that if you are in an office building, this problem has happened to you or your company. HVAC installation, particularly in older buildings, may not meet the demands of current technology. With rapid advancements in technology, more stringent ventilation requirements and the average life expectancy of most HVAC equipment spanning 15- 30 years, it is not uncommon for HVAC loads to far exceed what older buildings were designed for at that time. Time to put on your engineering hat and apply your knowledge to solve these sometimes complex issues. This is what my partner and I do in the real estate business -- we are engineers in real estate!

With respect to my hobby, I build and race vintage cars. Vintage is the keyword here, since my younger counterparts considered me vintage! Being a mechanical engineer with hands on mechanical skills, blending the two seemed to be a good fit.

"How?" you might ask. Well, my affinity for English cars, particularly Lotus (by the way, Lotus means "Lots Of Trouble Usually Serious"), led me to undertake the repairs that I could not afford at the time to send to a shop. Put your engineering cap on once again and jump in to solve the problem.

I have been performing restorations and racing cars for over 45 years. What I learned in school, business, and life experience I have applied to my hobby. Back in 1969, Pitt had a '69 Trans Am Camaro raced by Bob Fryer and Company. I wanted so much to be part of that team, but upperclassman prevailed. This is when my interest in racing began. Suspension set up is most important. Spring rates, geometry motion for each wheel, and strength of materials, all sound like engineering to me.





## Pittsburgh Vintage Grand Prix Celebrates 36 Years

Pulling off the track and returning to the infield after a class win in a weekend of Sports Car Club of America (SCCA) road races, I set about returning the race car to its road car status -- replacing the race wheels and tires with street ones, peeling off the race numbers and headlight tape, and so on. That's when I discovered that I'd finished the race with only two of the five lugs that secured the left front wheel. This was at Summit Point Raceway, a twisty 2-mile, 10-turn road course near Cumberland, Maryland. It features several high-speed right-hand turns, one at the bottom of a hill, putting massive stress on the driver's side front wheel and tire on my front-wheel drive car, and snapping off three lug bolts. Another lap 'til the checkered flag, and I might have been headed for the weeds, or worse.

In SCCA's Showroom Stock classes, in which I raced, no modifications were permitted, other than for safety -- roll bar, multi-point safety belts, a window net, and fire extinguisher. It wasn't built as a race car, but it was a relatively new car -- only 2 years old and well maintained. It was a well-made car, and a race winner, but it hadn't been designed or strengthened to withstand the rigors of racing.

Now, imagine taking a car that's not 2, but 62 years old, and putting it on a race track. Not only is it an old car -- it's old technology, old metallurgy, old systems and designs. But that old machinery has a fascination for a new breed of competitor, the vintage race driver. While it's true that an impressive number of drivers in Schenley Park each July for the Pittsburgh Vintage Grand Prix (PVGP) might be called "vintage" themselves, the term refers to the sport of racing older cars. Indeed, the youngest of the cars racing at Schenley Park -- the most recent -- are some 45 years old.

The PVGP started with one day of racing in Schenley Park, Labor Day weekend of 1983. The event has just celebrated its 35th year, and now encompasses about 10 days of vintage car-related activities including a road rally, several car shows, a black-tie gala, an elegant jet center event, two full weekends of racing at two separate venues, and a whole lot more. Since 1983, the Vintage Grand Prix has staged vintage automobile events to raise funds for two Pittsburgh-area charities focused on autism and individuals with intellectual

disabilities. To date, the PVGP has contributed more than \$5-million to the Autism Society of Pittsburgh and the Allegheny Valley School. A thousand volunteers, hundreds of race cars, and thousands of show cars have combined for one of the Pittsburgh area's largest spectator events every year.

Vintage racing is a sport that's really taken off in the last several decades. It's an extension of the car restoring and collecting hobbies, but one that respects the automobile as a machine -- a tool -- and not just a work of art. It honors the engineering and innovation of earlier times, as well as the heritage of automobile racing. Cars have been raced, after all, pretty much since the first time there were two of them on the same road at the same time.

Unlike the class I participated in, where the cars are raced as delivered, our vintage race cars have been carefully prepared for the track. Rules mandate that the cars should be prepared as they were, or might have been, raced in period, but that still permits considerable modification. But, old cars are full of old parts -- old welds, old steel and aluminum, old joints and fasteners -- and when they're raced, they're being used in a way that places extraordinary stresses on all their components; stresses that would take a toll on a brand-new car. So, the organizers of these events are serious about making sure the cars are up to the challenges. On the Schenley Park circuit, those include nearly constant turns, bumps and potholes, off-camber curves resulting from the high-crowned public road, and always the threat of accidental contact with a curb, storm drain, hay bale, or even tree trunk or light pole -- hazards not encountered on a purpose-built race track. The Schenley Park course is notorious for the repeated heavy use of brakes. Longtime MG-TD racer (and multiple PVGP race winner) Manley Ford says drivers brake "a heck of a lot harder here than at almost any other track we race on." Add the possibility of rain, and, of course, the fact that the drivers are going as fast as they dare all the time, and you have a daunting proposition. It's a task that requires a serious approach to safety in all aspects.

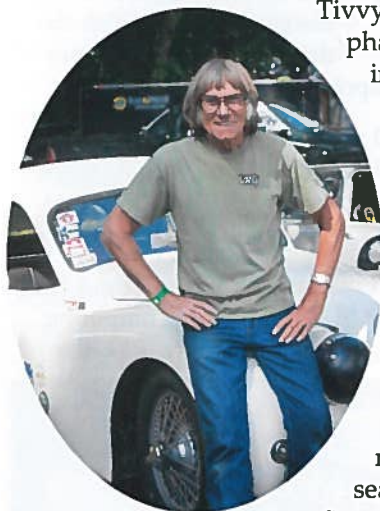
Developed over the years by the serious road racing community of the SCCA, which began sanctioning road racing in the late 1940s, scrutineering, or tech





inspection, provides an opportunity for another pair of eyes, in addition to the driver's/builder's/mechanic's, to inspect each race car. At other events, some of the tech inspection is aimed at assuring that cars meet requirements of their individual race classes. But, in vintage racing, as in SCCA, the main focus is on the safety of the cars – safety equipment, safe racecar construction, and in safe condition.

Tivvy Shenton has served as Chief of Tech for the Pittsburgh Vintage Grand Prix for about 25 years. He's a former vintage racer, and many-time winner here in his Jaguar XK-140. His resume includes apprenticeship at Rolls Royce in his native England, and work for several of Ford's European factory racing programs before moving to the U.S. Now living in Virginia, he runs Tivvy's Autocraft, in Danville, which builds and restores vintage cars.



PVGP Tech Chief Tivvy Shenton and his Jaguar XK-140, dominant for many years in the Over-2 liter Production class at Schenley Park

Tivvy states that the emphasis of his team of inspectors is "strictly on safety." They check for potential issues with, for instance, suspension bushings and steering linkage. They look for cracks in brake rotors and on chassis components, especially on single-seat ("formula") cars and sports racers. They'll check seat mounting, seat belts, fire extinguishers (all cars must carry at least a 2.5 lb. bottle), and the design and installation of roll bars. They're interested in the fuel system, look-

ing for leaks, the location and mounting of fuel tanks, and the installation of fuel cells and bladders.

Tivvy says tech inspection isn't restricted to the cars themselves. Inspectors also want to make sure the drivers are using approved fireproof suits and gloves, and that their helmets are current and approved. Helmets, in particular, have a limited lifespan, and carry labels indicating build-year and Snell Foundation ratings.

John Bechtol, owner and driver of several vintage race cars, who's the PVGP's Competition Director, points out that improvements in suspension stiffness, power, cornering speeds, and increases in weight or changes in weight distribution all have effects on vehicle dynamics, and can bring out weaknesses in components not necessarily expected. Improved suspension allows

higher cornering speeds, resulting in increased stresses on suspension parts, wheels, wheel bearings, and half shafts.

John says Tivvy, in fact, spotted a crack in the frame of John's Formula Super Vee before one race. It wouldn't pass tech, so John returned it to his race prep garage, where it was repaired in time to return to the park and make the race. John points out that when formula cars like his suffer a problem, it can be a nightmare for the driver. Open wheel cars have very little bodywork to shield the driver and components, so when they go off the road, or come into contact with another racecar, damage is likely, and injury a possibility. So, John says, most drivers are happy to have another pair of eyes go over their cars before they take to the track.

MG-TD racer and mechanic Manley Ford says that the tech crew is checking items a driver or mechanic might



Tech inspectors make their rounds through the paddock at PittRace. Jeff Graham, of Kittyhawk, NC, patiently awaits a visit to his 1958 Austin Healey Sprite

not even think of, especially if he's been scrambling to get the car ready. For instance, there's an expiration date on racecar seat belts. Manley mentions that sunlight can damage the belts, particularly in cars where the cockpit is open to the elements. They check throttle linkage, to make sure that the throttle return spring is firmly attached; and that a quick-release steering wheel actually locks back onto the column when it's supposed to. Constant removal and replacement can wear locking and latching mechanisms.

Racecars must pass tech before each race weekend. In Pittsburgh, where the PVGP runs two race weekends back to back each July (at PittRace first, then Schenley Park), cars racing both weekends must pass tech at each. Some drivers, like PVGP winner Mark Maehling, bring two cars, to race in two different classes. For two weekends, that means four visits to the scrutineers. Mark says when you're preparing two cars to race, it's twice as easy to overlook a potential problem.





Issues concerning particular cars are noted in the cars' own logbooks, which must be presented to scrutineers during tech inspections prior to each race event. The vintage racing magazine Victory Lane also makes an effort to publicize common failures and weaknesses in particular models, alerting inspectors to known tech and safety issues and problems. And, as Executive Director Dan Delbianco points out, the racers themselves help their fellow racers and competitors in a show of support and cooperation not often seen in the pits and paddocks at other race events, lending tools, parts, and expertise.

There are a number of organizations that sanction vintage car racing – Vintage Sports Car Club of America (VSCCA), Vintage Racer Group (VRG), Historic Sports-car Racing (HSR), Sportscar Vintage Racing Association (SVRA), Vintage Sports Car Drivers Association (VSCDA) are a few – and most, like the Pittsburgh Vin-



Top 3 in the Pre-War/MG-TD race. From left, Manley Ford, Middleville, MI; George Shafer, Somerset, PA; and Kurt Byrnes, Upper St. Clair, PA

tage Grand Prix, are members of the Vintage Motorsports Council. In fact, the PVGP's John Bechtol is its vice president. Many of these organizations have their own sets of rules, and the Council has been organized to help coordination and cooperation among them, particularly in the area of driver instruction and licensing.

A portion of the VMC mission statement reads: "All racing is dangerous and only the proper attitude of the driver and the careful preparation of the cars will diminish the danger and will enhance

our appreciation of this sport."

While the modern world races ahead, it seems, toward autonomous cars, a small society of individuals races, with a look over their shoulders, and with a love and respect for the technology and machinery of times past.

Come and join us at the Pittsburgh Vintage Grand Prix this July. It's our 36<sup>th</sup> year of showing and competing with old cars, and raising funds for charity. PVGP.org

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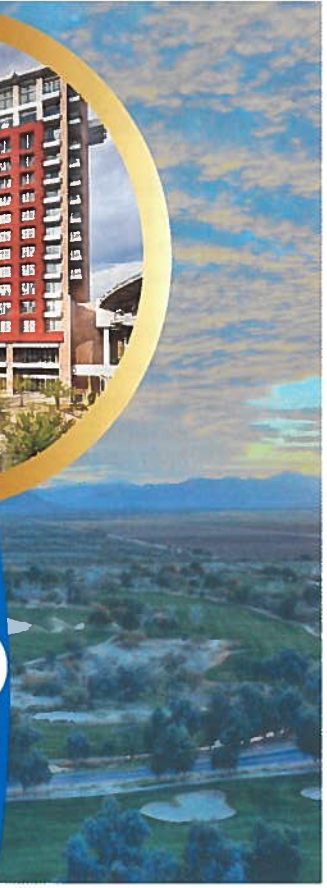
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# Ten Minutes

## with Mike Zappa

*ESWP Publications Committee Member Paul Parise sat down with Guest Editor Mike Zappa to discuss his lifelong interest in vintage cars, racing, and automotive engineering - then and now. Here are the highlights of that conversation...*

*Paul Parise: What's your all-time favorite car?*

**Mike Zappa:** As far as a race car or a street car?

*PP: Could be any.*

**MZ:** As far as a race car goes, a Chevron B16. Probably my all-time favorite car. It was a prototype car built back in the 60's that came with an YBM four-cylinder. It was extremely fast, it handled extremely well, great car. It ran Le Mans in '69, probably my all-time favorite race car. All-time favorite street car, most likely a Jaguar E-Type.

*PP: I agree, that's a great car. So just to infer a little bit about your background, originally you were enamored with race cars in school at Pitt and later it led to show cars and the like, so if you could, about the show car period, how did you get into that and what did you like about it?*

**Zappa:** Being a car fanatic I always liked going to car shows to see what they had to offer and I wanted to be a participant. With the show cars, the frustrating part of was, (particularly when you got into concourse), the points they would take off if you had a blade of grass on your tire or if you had a speck of dust on your hood. That became extremely frustrating for me and I wanted to utilize the car more than just driving it to a show, putting it on the lawn, sit there and watch it and bring it home and put it in the garage. I wanted to active-

ly participate in really using the car for what it was designed for. That's what led me to probably the racing side of it all.

*Parise: How long did it take you to come to that realization? A couple years?*

**Zappa:** Well, I guess everybody has the excuse. When you have children, it sort of changes your lifestyle a little bit; it definitely changed mine. I could have a car for an entrant to a car show with the kids and it wouldn't cost me any money to participate. I probably did that for about four years. Once the kids were old enough and in school, I started making a little bit more money, I then swung straight into racing the cars.

*Parise: So into the racing portion of your automotive career, what was the first race car you had and how did you get involved in racing where you could actually enter a race and what was that process?*

**Zappa:** Well of course being from Pittsburgh, the Pittsburgh Vintage Grand Prix was a big attraction. It all started with the car shows at Pittsburgh Vintage Grand Prix. I was watching these race cars go around Schenley Park and I said "I'd love to do that!" So the idea was to find a car that would suit me best. Initially I was attracted to formula cars at that time so I bought myself what is known as a Lotus



1965 FORD GT 40 MKI

18. It's a Lotus 18 Formula Jr. because the Lotus 18 V8 ran Formula 1. This had a little four-cylinder motor in it that was great for Schenley Park. So I bought the car, probably paid more than I should have, but I had an absolute blast driving it, there's no doubt about that.





*Parise: And from there you went onto bigger-bore engines or what was the next step on the run on the ladder?*

Zappa: I think what we transitioned to was I got away from open-wheeled cars and stepped into prototype cars immediately. That's when I started to drive and own the Chevron B16, then a Lola T212, these were all race-production cars that really were fast, lightweight, and they were considered sport racers. I found myself wanting this need for speed which led me to the Ford GT or otherwise known in America as the GT40. You know we had a 289 Mark I which I just sold that car a year ago. That car at Elkhart Lake would do 212 miles an hour on the back straight, wheel to wheel with another car. So that need for speed was definitely being fulfilled. Now that I'm older, I'm probably stepping down to a production car like an MGB which I race at Schenley.

*Parise: I think the one thing people don't realize, unless you are a car guy, is the Ford GT 40 really was commissioned as a Ferrari beater, from what I understand Henry Ford II was actually going to buy Ferrari at one point and eventually pulled out of that deal. I think he commissioned that car specifically to beat Enzo Ferrari in Le Mans, which he successfully did, right?*

Zappa: That's correct. Henry Ford II did try to buy Ferrari, Enzo turned him down. That's what ticked-off Henry to build the Ford GT. The Ford GT, which Eric Broadley was the basic designer who was also the designer for the Chevron B16, there are some similarities in the cars that they were coupe cars with the engine in the rear, etc. only the Ford had a much bigger engine. The Ford GT was almost a Lola design originally, it was a Ford Lola and then a Ford GT and they raced with several different types of engines back then also. Then it evolved; of course in '66 and '67 when they swept Le Mans 1,2,3 won first with the 289 first and then with the 427 cars.

*Parise: I think one of the interesting things now is, that if you look at how race cars were designed and built in that era, which would be in the 60's and you fast-forward to today, it's an entirely different ball game. Where at least, to some degree back then, you could be almost a nobody building a race car in the back of your garage where nowadays it's a much more involved effort, both from a monetary standpoint and what have you. I guess maybe that's the allure with vintage racing, is that kind of what draws you? Its carburetors and things we know might not be around or what is it?*

Zappa: You've got to remember back then in the 60's

and even in the early 70's we didn't have computers to analyze every motion of the car, what was being stressed, what wasn't being stressed. Engineers now apply computers to the car design and the whole world changed immediately, you have active suspensions that are computer controlled, whereas in the vintage cars, you crank a nut here or there to change the suspension setting or to change the shock setting, now it's all done electronically. You know, the steering assist or drive-by-wire, I mean back in the '60's we were essentially hooked-up to the tires and the steering wheel, now its

drive-by-wire, there's no hook-up from the wheels, to the steering rack to the steering wheel in the car. People don't realize it, but that's a fact, that's where we are today. We're so advanced technically today, these are some of the things that make the cars much more expensive and much faster too, but not as much fun as far as I am concerned. Back then it was driver skill, today it's how good the car is designed and how good the car behaves on the race track. You can almost throw somebody with some limited experience in a car like that and they'll go fast.

*Parise: To that end, one of the things I saw recently, there's a documentary on Amazon right now and the preface of that is essentially*

*Nissan commissioned a driver for Le Mans who trained on video games. There was a competition, they came up through the ranks on these video games and eventually it got to a point where they put them in a real car and then put them through Le Mans. So it's kind of interesting to have that point be made.*

*Parise: Back to vintage cars and some of the good things that are enjoyable about driving them and whatnot, what about the safety aspect. How does that play into what you do as a vintage racer and how do you address that concern?*

Zappa: You know these cars are not cars designed with air bags. What they do have on the fuel side is they have a fuel cell, which is modern. Back in the day, they just had the gas tank, a steel tank, now they're foam-lined, they're sometimes double-lined so that the fuel upon impact is contained within the actual environment it's been put in. That's just one thing, we are strapped-in pretty seriously with probably either a 5 or a 6-point harness, you have roll cages that are mandatory that if the car flips. I'll be honest, I've had a couple of serious shunts in the vintage car and with that because of the cages and the fuel cell being what it is, etc., the car was totally destroyed but I came out



1962 MGB Race Car



with some minor bruises. So there is safety but it's not like modern day cars today, it's a different type and I mean you get into a race car today, back then they didn't wear seat belts. Well now even vintage cars are required to have seat belts.

*Parise: What about things like tires? Are you running modern compounds or something different?*

**Zappa:** Tire manufacturers are producing tires that are engineered for the vintage car, probably with a little bit more modern compound in it but they are tires that meet what we call the vintage spec. They're doing a great job. Pirelli, Hoosier, they're all doing a great job of producing a tire that is suitable for the vintage car.

*Parise: So with that, where would you like to see the automotive industry go as a whole? Clearly there's a movement towards emissions and things of that nature and even electric cars, that maybe to some folks take the fun out of it. What's your vision to keep that fun aspect of cars and keep the industry alive?*

**Zappa:** In my vision, I am a driver. I hate to see driverless cars and trucks on the road. That's, to me, why

even have a car? Just jump on a train or an airplane because you don't need it at that point. I mean, the electric cars they're great. Tesla builds an incredibly fast car that I see keeps running pace with the Hellcat built by Dodge. I mean they're running neck-and-neck in a quarter mile. But to take the driving experience away from the driver? What purpose is that? Now you're just a passenger in the back seat.

*Parise: I think with that, one thing we need to keep in mind in the automotive industry is while there is a push for greener technologies and other things that might make it more convenient, there's still a handful of folks that enjoy cars and enjoy working on them and all of the excitement that comes with them, so hopefully we'll be able to see some technology and still keep that aspect in the future. I appreciate you being with us and thank you very much.*

**Zappa:** Thank you.

You can learn about Mike Zappa and Zappa Racing by visiting his website, found here: <https://www.zapparacing.com/about-us>



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