



VEE LINE

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1969 FVI RULES REFERENDUM DUE

DIRECTOR'S CORNER

You old-timers who have waded through this before might as well skip it and go on to something else. This is for the newcomers to Formula Vee who think they may have bought the wrong car, or who are disillusioned with the class because they're convinced that you have to have a "Brand X" car or engine to make any kind of a showing. It is *also* for those who may have bought a "Brand X," and are beginning to question the integrity and genius of the builder because they are not automatically winning every race they enter.

There is nothing new in this situation. It started when Ray Caldwell brought out the Autodynamics as the first competitor to the Formcar, and SCCA revised the original Vee rules somewhat before adopting them to allow this type of competition. Since that time, there have been a half dozen "new" cars and engines which have threatened to revolutionize the class, and make everything else obsolete. But somehow it never happens.

Should those of us who can't afford the latest fad in cars or engines give up racing and make dune buggies out of our Vees? Heck, no! But probably we *should* take a good long look at the things we could still do to our own equipment. Do we know, for sure, what tire pressure is best for a given track, or what air correction jet is absolutely the best, or that our distributor is at the absolutely perfect setting?

And how about our driving? Have you noticed, taking a look at a number of races, that there is *still* no one particular make which can be said to be dominating? Certainly there are makes, from time to time, which make a big splash; but you will note that the drivers of those cars were doing pretty well in their previous cars, too. Are we *sure* we could beat them if we could just trade cars?

While we're looking for reasons for looking at the rear of another car, let's look at *all* of them.

ANOTHER CHAPTER IN THE CONTINUING STORY OF WHAT HAPPENED?

As we were saying, so your car "oversteered" three complete turns before you came to a stop. How can you change your suspension, or your tire pressure, or tire size, or something to correct it? We agreed (didn't we?) that "oversteer" is when the rear end slides more than the front end, and "understeer" is when the front wheels do most of the sliding — that we're not concerned with "slip angles" and other theories concerning tires in firm contact with the pavement. We *are* going into some theory, though; so if it doesn't exactly fit the facts, remember that theoretically the bumblebee can't fly, but the fact that he does doesn't automatically invalidate aeronautical theory.

Let's start out with a pet theory of mine: "You can't spin a Vee on a dry track, in either third or fourth gear, if you keep the throttle to the floor." I know that will get a rise out of a lot of you, but please finish this before you start shooting. A corollary to that theory would have to be, then, "You can't cure understeer or oversteer by mechanical means." Hit another nerve? OK, let's modify that a bit by saying you can *affect* either condition to some extent by making mechanical adjustments, changing tire types, sizes and pressures, etc., even though you can't *cure* them that way. I rather hesitate to get into those mechanical angles because they are so controversial, but we may hit a few high spots later. Right now, since they are not the cause of the problem, really, let's take a look at what is.

Just for a start, which kind of "steer" would you expect a dragster, just coming off the line, to have (assuming that he almost, but not quite, could get the front wheels off the ground)? If he turned the front wheels to full lock, he'd get a little effect from them, of course, but he'd have the largest case of understeer you could imagine, wouldn't he?

OK, this is what you do in your Vee, or in your sedan, or in any other vehicle, every time you step on the throttle. You can see it on your Vee in the lower gears — just watch your front suspension. The opposite effect is obtained, of course, when you brake, or even when you let up on the throttle — the front of the car noses down. This is commonly known as "weight transfer."

Actually, there is no such thing as *weight* transfer. There is no relative movement of any of the components, so there is no actual transfer of weight. So for the purpose

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WHAT'S FOR NEXT YEAR?

By the time you get this it will be June, and the meeting of the SCCA Car Classification Committee at which our rules proposals for 1969 should be presented will probably be in October, so let's be thinking about what we want for the future. As always, any proposals will be put on the ballot, unless, of course, it is purely frivolous. (It's tough enough counting the legitimate proposals!) I hope we can get by with less than the 41 proposals on last year's ballot — that was over 12,000 of those little marks to count! And we have, right now, an increase of over 200 members since last September!

Some proposals already received include: wider wheels (again), swing-type oil pick-up in the crankcase, use of 5" x 14" transporter wheels, restricting tires to non-racing types; and if I've missed anything, please send it in again — I must have lost it.

NASSAU AGAIN?

At last reports, another "Vee" event at Freeport (Bahamas) this winter is definitely out. However, "Red" Crise is predicting that Nassau will succeed in coaxing him back to resume his "Speed Weeks" there. Could be, but don't start converting your "Vee" to a "Five" till you get something definite.

THINK ABOUT IT!

Why should the winner and the second place car in a three-car race receive the same points as they would if they had defeated a full field of thirty or more cars — and the third place car receive none at all? Why shouldn't they all receive points, but on a basis which takes into account the difficulty of their placing? Why not base it on the present first-six-cars-get-points system, but start at the bottom of the list? For instance, in a three-car race give 3, 2 and 1 point, respectively; five cars, 6, 4, 3, 2, and 1, and for six or more the present 9, 6, 4, 3, 2, and 1.

This would discourage National points contenders, especially, from traveling long distances to race where they might expect but little competition; and it would encourage every entrant to try to persuade others to enter and build up the field, instead of hoping that no one else will show up.

Nine points for the winner of a two-car race seems a bit ridiculous!

BOX SCORE

Membership as of April 30
Membership a year ago

734
428

ANOTHER CHAPTER

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of this argument, at least, let's call this condition "pressure transfer," referring strictly to the downward pressure exerted by the tire against the pavement. Under acceleration, then, we have a "pressure transfer" to the rear wheels, and under deceleration or braking, a "pressure transfer" to the front wheels. OK?

Now let's get back to the weight. The center of gravity of any object is, of course, the single point, somewhere near its center, where the object would be balanced in any position. In a Vee it would be a point about 18" above the ground, on the center line of the car, just about at the driver's seat. The weight won't be equal on the front and back wheels, naturally, because, like a lever, less weight on the longer arm will counteract more weight on the shorter. We will have, then, about 400 lb. on the front wheels and 600 on the rear, with the driver aboard.

Now suppose we were unable to attach a rope to the car at that center of gravity and pull the car sideways with it. Which end would slide first - the heavy end, or the light end? Nope, neither end. Theoretically both ends would slide equally, because the friction between the tire and the pavement is proportional to the "pressure" on it, which, in this case is equal to the weight. The front wheels although they have less pressure - and thus less friction - are farther from the center of gravity than the rear wheels, and would make up in leverage for the additional pressure on the rear wheels. Taking a rail dragster for example; again, the center of gravity would be so far behind the front bicycle wheels that even though they would have but a fraction of the resistance, multiplied by the length of the frame it would equal that of the rear wheels.

So what does that have to do with spinning out? Well, the basic cause of spinning out is centrifugal force, of course, which tends to keep the car going in a straight line in a corner, even though you are opposing that force by turning the wheels. If centrifugal force can overcome the friction of the tires against the pavement, you slide, and if the rear end slides more than the front end, you spin. Which brings us back to that center of gravity again. Just as the rope which was sliding the car sideways a few minutes ago was attached at just one spot, so does centrifugal force pull the car sideways, from just that identical spot. This is why the term "weight transfer" is misleading. There is *no* weight transfer, which means that the center of gravity - and the center of centrifugal pull - remains at the same spot, no matter what you do, or what position the car is in.

Now we're about to arrive at a conclusion. Let's combine the centrifugal force and the friction of the tires, and consider them in conjunction with each other in a corner. If the car is coasting - neither accelerating nor decelerating - so that the downward pressure is normal on all tires, when the centrifugal force exceeds the friction of the tires, it will do so on all of them at once, just as the rope pulled all at the same time. Incidentally, some drivers claim that the best way out of a tight spot is to declutch and coast, which might have some merit, at that. However, let's look at the effect of power, on and off, in this same corner.

Let's assume that the car is just below the breakaway speed but the driver panics and applies the brakes. As we saw before, the front end gets more downward pressure ("pressure transfer") and the rear end gets an equal amount less (the total remains the same - equal to the weight of the car) which changes the friction of the tires accordingly. However the center of gravity remains in the same spot (*no* "weight transfer") and centrifugal force still pulls from that spot as it did before. With the change in tire friction toward the front of the car, what happens? The rear end slides first, of course, and the front end sticks even tighter. Spin-out! Unless the driver realizes his error in time and takes steps to correct it.

If he caused the spin by braking in the corner, he wouldn't have time to correct it, probably; so let's assume that instead of braking; he merely let off on the throttle. Although not as severe, it will have the same effect as braking - it will cause a "pressure transfer" to the front wheels, and reduce it on the rear ones, enough to start them sliding. This time, however, he gets right back on the throttle - hard. The nose raises up, there is a "pressure transfer" back to the rear wheels (still *no* "weight transfer" - change in center of gravity) so the grip of the rear wheels on the pavement increases and the front ones break loose. He counteracts this by turning the steering wheel in the direction of the turn, so that even though the front wheels are sliding, they are still turning and pulling the car toward the inside of the curve. In this serial, at least, that's "understeer."

If you'll analyze most cases of spin-out - yours, and anyone else's - you'll find that almost without exception they are caused by braking, or even letting up on the throttle, when the car is almost at the break-away point already. It may be due to going too fast, or to the necessity for avoiding another car, but the result is the same. (If you've done it, and got away with it, you could have been going faster - you weren't near the critical speed.) The exception is the case, like our theoretical driver above, who deliberately started a spin, but corrected it before it got out of hand.

The problem with staying on the throttle in a turn, especially if you're going too fast already, is that no matter how far you turn the front wheels, it's possible that the front end will "plow" right off the outside edge of the pavement. If this seems inevitable, letting up on the throttle momentarily will "kick the back end out;" and if you get back on it in time, both the front and rear wheels will be trying to pull the car back

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THAT MAN AGAIN!

Just when I thought I had this thing pretty well under control, along comes another letter from Terry Farrell, who more than once has provided some good thought provoking items for discussion:

"Dear Don - I just got VL #43 and feel that I must speak out. Again!

(A) My 1965 official VW book of tolerances and wear limits states that 43.0cc is the minimum combustion chamber volume, as you also said several times in back issues of VeeLines."

By darn, you're right, Terry! I have two 1966 VW booklets, "Without Question," and one of them shows that figure, too. The 44-46 figure is from the latest supplement to the VW Shop Manual, which not only gives that figure, but illustrates how to measure it with the disc and burette. The figure is given as being the same for both the 1200 and 1300 heads. Apparently heads were made, for a while at least, at the lower figure, so "in my opinion" it would have to be acceptable as a "blue-printing" figure, at least. Thanks for making us legal (?).

"(B) Doesn't your method result in having the cylinder seat in the head more than the 0.539-0.543" specified in the same VW specs? You should have to plane the head as much as you cut out with your cutter."

Right again - except that the last operation described cuts an additional ring around the cylinder recess, which is, at that point, at the specified depth. The whole surface of the head could be planed off to that same level, if desired, but there's really no point in doing it. The extra groove gives the necessary clearance for the cylinder barrel, and can be done at home, without extra cost. It's readily detectable, of course, but so is a head with the entire face machined off, instead of just the area around the recesses and bolt holes, as furnished by VW.

"(C) I hope you are speaking 'tongue in cheek' about not-reshaping the combustion chamber. Everyone adjusts the big one, and hogs out the resulting small one."

You said it - I didn't!

"(D) I agree that something must be done to correct this tire problem. The people in this area with the new Goodyears are only getting 2 to 3 races per set. No one has been able to get the new Firestones that I know of."

I thought, when I heard this at Freeport, that it was typical racing exaggeration, even though the Goodyear distributor said it. However, there have been so many similar comments that it must be fact. The same distributor also said that those who couldn't afford the best tires shouldn't be racing anyhow. Those who were racing there didn't seem to be too concerned about the cost, it is true, but if all those who can't afford \$500 worth of tires a year should quit Formula Vee, there would be enough room at the next Bahamas race for the rest of them. So what should be done about it?

"(E) At the last Riverside race the stewards impounded the whole race to look at fans. Everyone with blades removed was warned to have them fixed by the next race."

Well, hallelujah for your Stewards! At last someone has had guts enough to make a decision on the subject! Only on a local level, to be sure, but maybe it will be contagious.

"(F) What is the 'ZEE BAR' and how does it work (why)? Is it the same as an anti-sway bar? Is it better than a cable?"

You hit a nerve, there, Terry! My pet peeve! It will get a paragraph or two next time if there's room enough.

"(G) I am told by Zink customers that he uses a cam out of late '65 engines that he says is better than the 'B' cam."

That's what VW says, too. This is still a subject for discussion, but for all practical purposes, the "late '65" cam is the same as the "early '63". It's the "D" cam, according to the book and the box it comes in, but consists of the cam with the "C" cast on it, attached to a gear. The "D" applies to the entire assembly. The "B" cam had the letter "B" cast into it, and the letter was also part of the part number for the assembly. There was also, for a very short time, an early "A" cam, which had no letter at all on the casting. That's clear, isn't it?

"(H) Since you have given the proverbial inch, can we assume you will eventually give the proverbial mile and give blessing on 'blueprinting' the rest of the engine - crank, cam, etc?"

See the next question.

"(I) Have you ever seen official VW weights for crank, cam, rods, rocker arms, push rods, etc? In the book I have the minimum weight for pistons in 275 grams."

No - and that's why I mistrust "blueprinting." VW has a pretty good set of dimensions for the crank and the piston weight, but nothing else in that line that I know of. How, then, are people "blueprinting" cams, for instance? I've seen claims that it involves shifting the gear on the shaft to the "proper" location, but what's the proper location?

"(J) Wasn't there a protest several years ago that outlawed turning the carb around? Why can't I turn the manifold around?"

Why would you want to? I don't recall the circumstances, but there was a "Driver's Letter" in 1964, I believe (before they started printing them in "Sports Car") to the effect that manifolds couldn't be located behind the engine. I don't believe it mentioned turning the carb around on the manifold. It was never incorporated in the rules, and since it would not affect engine performance, I can't see anything against it, myself. But don't quote me - that's just my opinion.

"I hope you don't mind my asking these trivial questions, but I find a good argument good for the soul, not to mention lap times."

Terry Farrell, Lynwood, Cal.

Heck, no! The more controversy, the better! That's what this here thing is all about!

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onto the inside of the track. Also, some speed will be lost in the process, due to sliding of all four wheels.

There are a couple of other thoughts which might not be out of place here. It's pretty well publicized that if you're sure you're not going to make a turn you should "drive off" rather than slide off. That probably doesn't need much amplification, except, "Don't wait too long to make up your mind." The other one, however, doesn't seem to be too well known, even among the better drivers.

You've still got a chance to save a spin as long as you're less than crossways of the track and have enough track left to do it on. Beyond that point, you've had it, and had better start planning what to do next. Some drivers use that as the point for throwing both hands above their heads to show that they are out of control, but that should be fairly obvious to the immediate neighbors by that time, so let's see what you can do with the control you have left.

More often than not, when a car spins it makes from about three-quarters of a turn to two or three quick spins, but finally slows down enough for the tires to grip the pavement. It then darts off the track in whichever direction it happens to be pointing at the time, rolling either backward or forward. This reaction is very unpredictable, and annoys the following drivers no end, especially if they find themselves on a collision course with it. However, with a little forethought and planning, a spin can be executed with skill and precision that will bring cheers from the crowd.

First and second, simultaneously, get on the clutch and brake - hard! (The brake, anyhow.) It will give you a braced position in the cockpit in case the rest of it doesn't go according to plan; but even more important, if it is done at about the critical crossways position, the car will continue its spin in a predictable direction. While the wheels are locked up, they don't care which way they are pointed - they will slide in a straight line, more or less in the original direction of travel, which means you will have quite a distance to go before hitting the dirt. It also enables following drivers to plan their evasive action better. If you manage to get onto the clutch, too, before you get reversed or get the brakes on, killing the engine, you'll be saved the time needed to restart it. This, in itself, will mark you as a skilled spin-out artist.

Finally, if your spin lasts long enough for you to regain your composure (some of them seem to last several minutes) and you've planned ahead what you're going to do if the situation ever arises, you can very possibly let up on your brakes just when the car is pointed in the right direction, allowing the wheels to roll and grip the pavement, and continue without even stopping. This is a guaranteed crowd-pleaser! If you can't stop the spin in this manner while you're pointed forward, do it when you get slowed down more and are going backward. In this position you have a good chance to see the oncoming cars; and if none seems to be headed your way, you can put the wheel hard over, making a U-turn, come to a stop, and start out on your journey again. If you've managed these maneuvers without getting hit, or without hitting the dirt, chances are you won't even be black-flagged into the pits for a mechanical check.

You think I'm kidding about *planning* a spin? I'm not! You drive the various corners in your imagination between races, don't you? So do a few spins, too - until your hands and feet will cope with them automatically. Or else keep this copy of the VeeLine in the cockpit of your car for quick reference.

This is oversimplified, of course, and we'll go into it a little deeper in the next chapter, if any. However, this will do for a starter, and if you missed the moral, it's "Don't brake, or even get off the throttle in a turn, except on purpose. Do it before you get there." By the way, note again that the "Cheesman Theory" applies *only* in third or fourth gear, on a dry track, and in a Vee. Corvettes in the rain are something else, but that comes later.

IN THE PACIFIC NORTHWEST

The Portland "Rose Cup" races will be held in conjunction with the "Rose Festival" again this year, on June 8 and 9. It's a "Conference" event, but is traditionally approved and attended by SCCA, too. Let's have all the Northwest Vees out to this one, from both organizations. For entries, write to Miss Kathy Warner, Cascade Sports Car Club, 24 NE Russett St., Portland, Ore. 97217.

ANY QUESTIONS?

After getting the article on "cc-ing" back from the printers, I could still understand most of it, but I could believe that anyone who hadn't witnessed the operation might have a question or two. If you do, fire them in - I'd hate to have it go to waste for lack of understanding.

MEMBERS' SOAPBOX

"Dear Don - The tire problem is going to be a sticky one, I think. I know I can't afford that sort of thing... The thing that 'makes' Formula Vee is the 'buddy system' that exists among all the participants. It's great!"

Paul White, Newport, Ore.

"Dear Don - I'd like to heartily endorse Bill Maisey's comments regarding the ridiculous cost of running the short-lived Good-year Vee tires, and would most fervently support any form of restrictions."

John Dixcee, West Linn, Ore.

"Dear Don - . . . The fast Vees are breaking lap records out here, apparently due, at least in part, to the new '2-weekend' Goodyears. . . ."

Tom Withrow, Washington, D.C.

HOW NOT TO WELD A GAS TANK

There are two kinds of welders - those who won't weld a gas tank, and those who will. Among those who will, there are several different theories as to how to do it safely. Some fill the tanks with water, some won't touch a tank which hasn't been steam cleaned. Some insist on a shot of CO-2, and some stuff the tank with dry ice (same thing). One method often used (usually successful) is to stick a hose from the exhaust pipe of a car in the tank to fill it with carbon monoxide. This isn't recommended - carbon monoxide under the right conditions is still combustible; it will still combine with oxygen to form carbon dioxide. At least one welder has been successful in welding tanks with the gas still in them, which isn't really too wild when you consider that the gas vapor has to be mixed with a large proportion of air before it will explode.

My method is to drain the tank as dry as possible, and then stick an air hose in it for half an hour or so, making sure that the resulting fumes are ventilated away so as not to be ignitable. At the end of that time, if no odor of gas is detectable I go ahead with the welding, still leaving the air blowing into the tank to dilute any possible remaining gas to below the igniting level.

If a compressed air hose is not available, a vacuum cleaner hose will do just as well, provided the motor of the cleaner is kept upwind, so the fumes can't be ignited by sparks from the brushes. I learned the hard way, though, after repairing a leaking seam in Petunia's new aluminum tank - be sure to thoroughly blow all the lint and dirt out of the hose before inserting it into the tank. I didn't. I'm still removing the main jet and the screen from the fuel pump after every practice session and race, and cleaning the lint from them. We goofed two races because the car wouldn't run long enough to finish before plugging up, but it's nearly all cleared out now.

The VEE LINE of
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Don Cheesman, Director
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THE ANSWER?

Ex-President Whit Tharin's answer to Chris Paulhus's comments on rear track measurement may not exactly answer the question, but it should put an end to any argument. He just about proves that there's really no answer possible:

"Dear Don - About the time the old-style brake drums became scarce, I had to take a new ribbed drum and install it for a race. I was questioned by someone who threatened to protest me. In the rules, only the track dimension could be applied to disqualify the ribbed drum, so I, too, measured the track with the wheels at zero camber, and found it to be well under the limit. Further investigation revealed that a standard VW will meet the measurement only on the ground, where it makes its actual 'track,' and then only if the standard camber is set up in the rear wheels. Maybe that's why they call it 'track.' It would appear that the mistake Vee owners are making is to assume that it is measured at zero camber. Perhaps we need a rules clarification. I'm in favor of whatever will let the new drums run legally.

"In the last VeeLine you hinted you would like to see another vote on the claiming price for engines. My position hasn't changed, although my engines have, and I would only advocate increasing the price to \$500. I have a little better idea now what a top notch engine costs! As a matter of fact, I would like to see the claiming price idea extended to whole cars, as-is, where-is, for \$2500, or at the most, \$3,000. Such claiming prices should quiet the critics of Formula Vee costs,

curb the creativeness of costly builders, and keep the class in the amateur bracket. Try that on the membership!"

Whit Tharin, Allendale, S.C.

Whit was the sponsor of the original "claiming price" proposal a couple of years ago. As to the brake drums, the ribbed drums are listed as standard VW 1200 replacement parts in the parts books, so I can see no ground for questioning their legality. As for the track measurement, either SCCA should measure a number of representative Vees (at zero camber) and come up with the correct figure, or else we must assume that any assembly of legal VW 1200 rear axle parts automatically meets the track requirement, which is also specified as "standard VW."

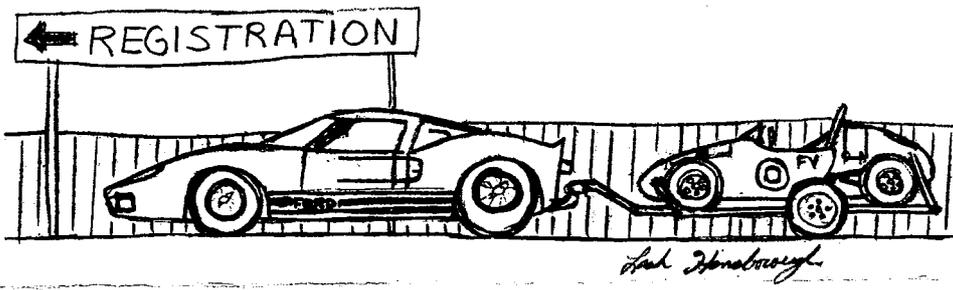
UNCLASSIFIED ADS

FOR SALE: Formcar, legally modified engine just overhauled, ready to race. New Firestones: \$900. Tom Withrow, 3109 Garfield St. NW, Washington, D.C. (202) 338-7892.

FOR SALE: Autodynamics, 8 Goodyears, good trailer, lots of spares. John Ristic, 495 W. Pine St., Platteville, Wisc. 53818 (608) 348-3431.

FOR SALE: Autodynamics, spares, extra wheels, good tilt-bed trailer. \$1650. Trades considered (especially VW). Gene Novy, 39 Linda Drive, Buffalo, N.Y. 14225 (716) 634-1495.

FOR SALE: Formcar, lovingly cared for, driven only by lady journalist on weekends. Now have Crusader, too - only need one. Harriet Gittings, 37158 Blacow Rd., Fremont, Cal. (415) 793-2514.



Formula Vee International

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