



# VEE LINE

NUMBER 81

JUNE, 1971

## DIRECTOR'S CORNER

I'd planned on devoting this issue to the Po' Boy Head Flow Testing Procedure, but under the present conditions, who needs it? Above and beyond that, this organization was formed primarily to provide liaison between Vee owners and SCCA, in regard to rule changes. Certainly such liaison is needed now! If it's effective, we'll get back to head modification later, when it's legal.

In the meantime, please do write to the Competition Board, whatever your views, so that they'll have it *before* this next meeting

## MEMBER'S SOAPBOX

"Dear Don—Do you feel that there would be any beneficial effects from extending a ram tube upward from the carburetor, above the driver's head, and curving it forward to get a positive ram effect from the vehicle's forward motion?

How about some advice on cheap construction of Z-bars and adjustable camber compensators?

Chuck Cunningham, Coats, N.C."

*This has been tried (of course) and found wanting. From the force of the wind in your face at so many miles an hour, you'd swear you are missing out on several pounds of free supercharging. However, I tried (with a homemade manometer and a '50 Chev at 60 mph) to measure the effect and could only find a pressure differential of about 2" of water. That's roughly equivalent to around 0.16" of mercury, which is less than the variation in atmospheric pressure during a normal day, or to put it another way, is equal to a change of a few hundred feet in altitude. Considering that your speed may vary from 30 to 100 mph on most any course, your carburetion would vary as with a change in altitude so that any benefit at one speed would be at least partially offset at any other.*

Technically a "Camber Compensator" is a device marketed by EMPI for use on VW's ("our" model, with the swing axle). It's simply a transverse leaf spring, pivoted under the transmission and tied to the outer ends of the axle tubes with web straps. It acts only as an overload spring. It was adapted for use on Vees (principally by Autodynamics) and reached the stage where it had two or more leaves and was actually THE rear spring. Often the coil springs were merely a few turns of heavy wire. Then the rule was changed to specify that the coil springs had to be able to support the car independent of any "camber controlling device" and at about the same time the "Z-bar" came into use and the "camber compensator" has all but disappeared.

The "Z-bar" went through a couple of transitions, too. Like the leaf spring, at first it was torqued to the point where it was carrying most of the weight of the car. Then

*there was a period when it was torqued in the opposite direction—two guys climbed on the back of the car to preload the springs while the torsion bar (Z-bar) links were connected. Now, I believe, most drivers adjust the loading to about neutral at normal riding height.*

*Specific dimensions for a Z-bar would be determined by those of the car on which it is to be used, and general construction features can be determined just by examining a couple of them in the pits. However a couple of not-so-obvious points come to mind.*

*Like material, for instance. I have seen a couple of them made from stainless steel shafting, which seems to be OK, although it's not often used for springs (which Z-bars are, actually). Stainless should be bent cold—if you try to heat it and bend it, it will probably break off at the hottest spot before it bends very far. "Maxell" steel is probably the most reliable steel for the purpose, for an amateur to use. It's not exactly a spring steel, but it isn't touchy about heat treatment—just let it cool in the air after heating and it will recover most of its original qualities. It comes only in "hot-rolled" condition, which isn't as pretty as "cold-roll-*

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## ANOTHER CURE

Ever change a leaking rear axle seal—and have the new one leak, too? Frustrating, isn't it? Next time you change one, don't throw the old one away, or a least don't discard the little spring which goes around the sealing lip. Keep it for the next time you have a leak. Then just take the seal housing off, slip the spring in place right over the existing one (that's right—two springs) and replace the housing. (Better use new O-rings, though.) The extra tension will do the trick and won't hurt a thing. Works on flywheel and transmission seals, too, and on front wheel seals, if you're using a light oil in the hubs instead of grease.

It doesn't seem sporting, somehow, to install the extra spring on a new seal, without even giving it a chance to show what it can do, but it would be good insurance.

## IT WAS BOUND TO HAPPEN

Looking back over the past seven and a half years of Formula Vee, and our efforts to attain improvements in the rules, it appears that generally we have gotten what we have asked for—eventually. However, it also appears that in addition to our requests (some of them repeated several times) it has often taken an additional nudge, in the form of a decision of the Court of Appeals, to start the wheels turning at Wesport. Too often, it has been brought to SCCA's attention, through our ballots, that some gray area in the rules is being exploited and that clarification is needed, but the condition is allowed to continue for a year or two. By the time action is finally taken so many cars and owners are affected that some compromise, satisfying no one, is announced, rather than a better definition of the original rule. The hassle over the body rule a couple of years ago is probably the best example, up to now.

Now we have another such situation. Specific dimensions for bore, stroke, combustion chamber volume, and headspace were first incorporated in the rules for 1966. In our Fall ballot of 1967 we requested (by a vote of 224 to 77) that "blueprinting" be made specifically legal. No response. We requested it again in 1968, 1969, and last year. No response. In the meantime, it had become generally accepted as legal, due to lack of any indication to the contrary. The Vee manufacturers, and other professional engine builders, have been advertising flow-tested heads for a couple of years, and directions for fly-cutting were first printed in the June, 1967, issue of the VeeLine. During that period other such "modifications" have become accepted practice, under the assumption that if the rules spell out a dimension, permission to attain that dimension is automatically implied. Valve seats, as well as the balance of the port, are now being enlarged. Cylinders are being shortened, in order to attain the .039" minimum headspace. Cranks are being reground, in order to get that .005" tolerance in the figure for the stroke. To the best of my knowledge none of these have ever been the subject of a protest, so there has never been enough pressure on the Competition Board to compel them to take any action. Our ballots just weren't enough!

As has been mentioned here several times, Frank Schultheis, Chief Scrutineer for the San Francisco Region, and one of the scrutineers at the ARRC last year, is one gung-ho official! He has taken it upon himself to learn all about Formula Vee (especially)

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## IT WAS BOUND TO HAPPEN

(Continued from page 1)

and has made it probably the most legal class in the Northern Pacific Division. And he has really opened a can of worms!

He declared Neal Williams' engine illegal because the washers inserted under the rocker arm shaft supports, to compensate for the metal removed in the fly-cutting process, were "not specifically authorized" in the rules. (And they certainly aren't, of course.) Neal appealed, on the ground that *not* using them would result in the rocker arm shafts being moved closer to the camshaft, and that *that* would be an illegal modification. (And it certainly could be so considered, of course.)

The Court of Appeals apparently missed the point, somewhat, concentrating their attention on the fact that the heads had been fly-cut, rather than on the change (or rather lack of change) in the rocker shaft location relative to the rest of the engine. While their final statement is somewhat vague in defining just which area is referred to, it appears that it at least *includes* the fly-cutting of the heads— "...The Court also considered the statement in 5.1 Formula Vee GCR "no component of the engine—may be altered, modified or changed—" to be unequivocal in its meaning." Actually, this is the only conclusion they could possibly reach. The question wasn't whether or not either practice should be *condoned*, but whether or not it is *legal*—in accordance with the GCR. That's the only decision the Court is empowered to make. It certainly seems reasonable to assume that if a meas-

## MEMBER'S SOAPBOX

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*ed* shafting. "4140" is probably the most common "alloy steel" suitable for a Z-bar. It comes in "cold-rolled" condition and won't scale badly with heating so you can easily restore the finish at the bends with fine emery cloth, if you're fussy. Again, unless you have access to an oil quenching bath, air cooling will "heat-treat" it sufficiently. DON'T quench it in water unless you want to make a cold-chisel or something out of it.

You can buy fancy ball-bearing mounts but there's so little movement that it's not worth it. A couple of 1" x 1" x 1½" blocks of aluminum or brass, or even steel "key stock", will make fine bearings. If you slip them on the shaft (with a couple of set-screwed shaft collars) before making the second bend you won't even have to split them.

Mount the lower ends of the connecting links as low as possible on the rear axle, one ahead and one behind, of course, and ideally the same distance from the center of the axle. The Z-bar bearings should be directly above the axle, naturally. The arms of most Z-bars are normally horizontal, but a more favorable operating angle would be obtained if they angled downward, so that they would meet the links at approximately a 90 degree angle.

urement is specified, the rule also *implies* permission to attain that measurement. However, the *basic* rule says that only those modifications which are "specifically authorized" are legal. The Court does not have the authority to change a rule, or to authorize any deviation from it.

When you start digging, it's amazing how many other "unauthorized modifications" have become generally accepted as "legal", just through common usage. Perhaps this is good! Since no one has felt strongly enough about any of them to enter a protest, I would take that to indicate to SCCA that these practices are approved by a great majority of Vee owners, and should therefore be specifically included in the rules in order to forestall another situation such as we have now.

Just for a start, a strict interpretation of the rule (and that is the only kind of interpretation which should be made!) would prohibit a lot of things we've all been taking for granted. For instance:

1. Trimming an older fan shroud so it will fit over one of the crankcase-half bolts on later cases, or even drilling holes for sheet metal screws for attaching wiring or tubing clips.

2. Trimming the overhang on the cylinder shrouding covers, either to permit fitting inside the frame, or just for neater appearance.

3. Use of Helicoils for restoring stripped threads, or retapping to a larger size.

4. Lineboring crankcases to take the later type replaceable cam bearing shells.

5. Use of any except stock VW bearings in conjunction with line-bored crankcases or reground cranks.

6. Removal of the aluminum casting from the center of the intake manifold.

7. Use of non-VW spacers on the front suspension in conjunction with the sway bar.

8. Use of anything but an *altered* VW steering column.

9. Rotation of the rear axle tubes to any position other than stock.

10. Removal of the rear shock mounts.

11. "Porting" or "flow-testing" heads, other than opening up to the specified dimension those areas which are originally smaller.

12. Cutting off the support for the rubber bumper between the front torsion arms.

13. Plugging of the choke shaft holes in the carburetor.

14. Use of a Solex brass float in the carburetor.

15. Shortening cylinders in order to attain the legal .039" headspace.

16. Drilling and tapping the transmission for a vent tube fitting, or drilling and tapping the crankcase for the authorized threaded plugs and heat indicator.

17. Use of older (up through 1965) brake drums.

18. Use of shims under the rocker arm pedestals on fly-cut heads, and, of course,

19. Fly-cutting of the heads.

20. Fill in this one yourself, and add as

many others as come to mind. Use another sheet of paper if necessary!

If Frank is tapped again to act as Scrutineer at the ARRC (and he certainly should be!) he has warned competitors in this area, at least, that the rules *will* be strictly enforced, as far as he is concerned. This means, of course, that he can only find cars legal or illegal—from there, it's up to the Stewards of the Meet (SOM) to decide penalties. Unless there is some change in the rules in the meantime, it would seem more than likely that the "\$100 fine for a rule infraction" will be repeated again this year.

Is there any possibility of a change between now and Thanksgiving? Well, let's say there's no real reason why there couldn't be. The Competition Board meets quarterly, the next meeting to be on July 20. While it is custom, it is not law that they can only make changes in the rules effective for the next calendar year. They *could*, then, resolve this problem in time to prevent a repeat performance of last year's fiasco. What would it take to persuade them to take such action? Letters! From you, and you, and you! There isn't time for a ballot between now and the meeting, so draw up your own, using the list above as a guideline, and adding anything you see fit. Do it whether you're in favor, or against, whether or not you expect to be in the front row at the ARRC. If any changes are made, it will affect everyone. It will if *no* changes are made, too! Send your letters to:

David C. Tallaksen, Chairman, Competition Board, SCCA, 196 14th St. N.W., Atlanta, Ga. 30318. (He's expecting them!)

Since the members of the Competition Board (and all the other officials of SCCA) get this thing every month, I'm going to write my own letter right here—not as representing *your* thinking, but as my own personal opinion. If any of it makes you mad enough to write *your* opinion, in order to cancel mine, great! If you agree with anything here, say that, too, but write your own letter! Don't depend upon this one to carry any more weight than yours will.

Dear Competition Board:

Due to a recent affirmation by a Court of Appeals that Sec. 5.1 of the Formula Vee rules takes precedence over any implications which may be read into any of the other

## UNCLASSIFIED ADS

**WANTED:** Formula Vee—finished or unfinished. Rod Ferguson, 7085 Santa Irene Circle, Apt. 103, Buena Park, Cal. 90620 (714) 821-0697.

**FOR SALE:** '67 Beach Mk 5-B. Just rebuilt from bare bones to flawless racing orange. '71 roll-bar, adjustable Armstrongs. Track-ready for any height driver, \$1000. Trailer, \$200. Glen Marcus, 412 11th Ave. S., Naples, Fla. 33940. (813) 649-9555.

**WANTED:** More Vees for sale in this section! If you don't want to sell yours, tell someone who does!

rules, it appears that we Vee people are in a peck or trouble. Suddenly it has become obvious that many of the practices which we have gradually drifted into are actually illegal! Since so many of us are guilty or so many of these intractions, it would certainly be more humane to bring the rules into conformation with these practices than to compel all the illegal cars to conform to the present rules. For instance:

1. I can see no harm in permitting holes in the fan housing for sheet metal screws, or even for roll-bar braces, or in permitting trimming to fit later crankcases. However, I *don't* think altering the shape of the housing (in order to cut down on frontal area) should be allowed.

2. I can see no performance advantage in trimming the cylinder shrouds in any manner desired, nor in substituting or altering the baffles below the cylinders, so I'm not permitting such alterations. (The fact that we will have to get new shrouds, and lower the engine  $\frac{1}{4}$ " in order to get them under the frame rails if this isn't legalized has nothing to do with it!) I've even come to the point where I wouldn't worry about missing fan blades, *if removing them was specifically legal*. After all, it takes so much air to cool the engine, and so much horsepower to move it, whether this is limited by removing fan blades, or by running the fan slower by means of a slack belt. However, I *do* feel that there should be some restriction against cooling the engine motorcycle-fashion, as some owners are reported planning to do.

3. It's pretty obvious that Helicoils and spark-plug inserts (or even rethreading holes oversize) aren't specifically authorized now.

4. Lineboring for cam bearing inserts is no different than for main bearings, but is not specifically authorized at this time.

5. I'm sure the intent wasn't to require genuine VW products if undersized or oversized bearings are used, but that's what the rule says.

6. I'd recommend not only *permitting* removal of the aluminum casting on the manifold, but *requiring* it. By making a plaster-of-Paris mold of that casting, melting it off, enlarging that section of the manifold, and then recasting the aluminum around it again—and don't think I haven't been tempted!

7. It's pretty farfetched to suggest that anyone would call those front suspension spacers illegal, but they certainly aren't of VW manufacture, and they're *not* specifically authorized.

8. If there are any "altered VW" steering columns used on Vees, they've been altered beyond any recognition.

9. It might be argued that rotation of the axle tubes is implied to be legal under "alteration of the shock absorber mounts", but it isn't *specific*.

10. The same for complete removal of the shock mounts. This was "Specifically Authorized" on a "Driver's Meeting" page

in Sports Car" a year or so ago, but it has never been included in the GCR.

11. Porting and flow-testing! Although it goes by the name of "polishing" in the GCR, this rule is pretty specific already—"provided it does not enlarge the port beyond so-many millimeters inside diameter". "Polishing" (in a Court of Appeals decision, *W. J. Denison vs. SOM*, Oct 6, 1966) was stated to include the removal of metal by any means, regardless of the surface finish attained. It was also limited specifically to "reaching the allowable inside diameters". The initial disqualification was based on the removal of the bosses around the valve guides (which had been replaced intact after the "polishing") but the Court ruled that lacking specific restriction, any portion of the port could be brought to the specified diameters. This would presumably apply to that portion of the port surrounded by the valve seat as well as to the rest of it, but this has never been *specifically* spelled out. There is, in the present rule, no possible interpretation permitting any modification of any portion of a port which is already larger than the specified limits. Intake ports, where they branch, are already much larger than the 29mm limit, in stock condition. Any amateur, with an electric drill and rotary file, can open up the smaller portion of the ports to the specified limits with a few hours work and no expense, but I understand the current price of professionally flow-benched heads is in the neighborhood of \$250 a pair. Is there any way of differentiating between a flow-tested head and one done by eyeball and finger-tip methods? Is there any way of restricting the one and permitting the other? Should flow-tested heads be accepted as necessary for Formula Vee racing? Or should we scrap the whole concept and require the ports to be strictly stock? Frankly, I can't come to any conclusion which would require any change in that rule. Stock heads vary more, probably, than the difference between amateur and professionally prepared ones, and the average Vee owner has less chance of obtaining a good (or excellent) stock one than he does of preparing one. Probably the provision for porting results in more equality between cars than would a restriction to strictly stock. However, I feel that the definition of "polishing" should be more specific, especially in regard to the areas in which it is permitted.

12. Why not permit removal of the rebound stop on the front suspension? It serves no purpose, adds nothing to performance, and is an ugly wart on an otherwise functional component.

13. Plugging the choke shaft holes no doubt affects the air flow into the venturi, and thus performance, but it costs nothing, can be done by anyone, and should be included in the permission to remove the shaft.

14. Solex makes a brass float for the 28 PCI carburetor. Its only advantage is that it won't turn over when the bowl is empty and the carb is tipped, like when it's laid on a bench during a rebuild. It raises the fuel level in the bowl, which must be corrected

to normal by use of washers under the float valve, or bending the float lever. Not many are in use. Are they as legal as the inverted plastic floats?

15. Shortening of cylinders to attain the legal headspace should be permitted. Considering the .0005" tolerance for the bores, the variation in length is amazing! I have found as much as .010" difference between cylinders on one engine. This can not only result in excessive headspace in one cylinder, but also in warping of the head when it is bolted down snugly on two cylinders varying in height. A competitor is expected to use sufficient shims at the base of the cylinder to insure at least the minimum headspace if his cylinders are too short, so why should he not be able to reduce them in length, if necessary, in order to attain the same dimension?

16. Permission to drill and tap for vent fittings, heat indicators, and threaded oil passage plugs is certainly *implied* in the respective rules, but can "implication" be recognized in some areas and not in others?

17. I believe the present dimension for "track" is based on the 5-ribbed brake drum. All other things remaining equal, this drum results in approximately  $\frac{3}{8}$ " wider track than does the original equipment. The "plus or minus  $\frac{1}{8}$ " tolerance" makes one or the other illegal, then.

18. Use of shims under the rocker arm supports! Which is what started this in the first place. Ed Zink says they are not necessary, and that's true. There are several ways of accomplishing the same thing. With certain combinations of VW valve train parts, flycutting the heads brings the rocker arm shaft enough closer to the camshaft so that there is not enough adjustment to permit the rocker arm to clear the end of the valve stem. The end of the rocker arm in which the screw is located can be ground back to provide sufficient clearance, but this is certainly not an "authorized modification"! The rocker shaft studs could be unscrewed a couple of turns, to raise the seating surface, except that Frank Schultheis' checking procedure includes a go-no-go guage which would detect it. The end of the valve stem could be ground off somewhat, although this measurement, too, is subject to checking. The only legal way I know of is to use the older push-rods, which are 2mm (.040") shorter than the later ones. (The late ones have a knurled area at one end for identification.) Neal Williams, whose protest and appeal set off these fireworks, claims that this will result in  $3\frac{1}{2}\%$  more valve lift, which is why he decided it would be safer to try to maintain the normal position of the rocker arm shaft (in terms of distance from the camshaft) by the use of shims, which *don't* give any performance advantage. This is certainly cheaper and easier than finding a set of obsolete push-rods, and does not give any performance advantage. (We used shims on Petunia's "A" heads, on the '62 engine, but found we didn't need them for the "C" heads we just finished modifying, in conjunction with the '62 push-rods.) This

proposition depends, of course, on the next one:

19. Fly-cutting the heads, which brings us back to where we started. Probably the best reason for legalizing this practice is the fact that it has gone unchecked for so long that "everyone" now has done it. Almost as compelling is the fact that prohibiting it—requiring stock heads—would make this a manufacturers class. Not one Vee owner in a hundred could find a source of heads, test them for volume and flow characteristics, and pick the best one out of even a dozen of them, if he could find that many. On the other hand, Ed Zink, for example, has stated that he follows this practice with manifolds, returning at least half of those he buys after testing them. Out of the other half, you can bet that there is some thoughtful selection in allocating them to the various owners who purchase his engines. And probably, even after years of this practice, he still finds an occasional one which is better than any of the previous ones. The situation would be the same if stock heads were required. As far as I have heard, no one has ever found one with 43cc combustion chambers, yet there must be at least one, somewhere, since VW says that is the minimum they allow in their production heads. If stock heads were required, then, who would have those with the smallest legal combustion chambers? Fly-cutting is not inexpensive—even as a do-it-yourself project. If a tool such as the one described in an earlier VeeLine has to be purchased, that and a burette would run to perhaps as much as \$50. However, this cost could perhaps be shared by several owners, or the tool sold or rented, or additional heads could be done to reduce the cost-per-head. At any rate, I believe the "equalizing factor" justifies the cost.

A third good reason for legalizing fly-cutting is that it has been approved by a large majority on our past four annual ballots:

	For	Against
1967	224	77
1968	351	63
1969	228	45
1970	240	60

Actually, the question on the '70 ballot assumed legality of the fly-cutting process itself, and asked, "Should machining of the head to attain minimum combustion chamber volume leave the recess in the head in stock configuration?" I think this deserves some consideration along with the basic question. The valves are both pretty well shrouded around at least a third of their diameter by the sides of the combustion chamber, and it is tempting to remove metal from that area in order to improve the gas flow characteristics. In fact, I have been told that the heads of one engine builder in the East can actually be recognized by his treatment of that area. I would think that some measurement should be included (perhaps center-line of valve to end of combustion chamber) to limit this practice. I don't think it's wise or practical to prohibit it, since the sandcasting process by which the heads are made leads to some definite and relatively large variations in that area, even between adjacent chambers in the same head.

So much for the specific questions above. Now I'd like to throw in another one which doesn't quite fit in the above category, but which deserves attention. Is there any good reason why the manifold and carburetor should not be mounted *behind* the engine? There is one good reason why it should not only be permitted, but perhaps even required—fire protection! If, after a flip, the car comes to rest inverted, there's enough gasoline in the bowl to start a moderate sized bonfire right at the base of the driver's neck. Likewise, a sticking float, or a fuel line gone adrift, could be the cause of serious burns. I understand that as the result of such an accident, this matter is presently of some

concern in the Southern California area, already. Like some of the other suggested "modifications", this would give no performance advantage, and would cost nothing to accomplish.

I realize that this is a good hatful of trouble to throw at you in the middle of the season, but I sincerely hope that you can find time to rectify this situation—if not before the ARRC, at least for the '72 season.

Sincerely, Don Cheesman

OK, that's *my* "letter". Now how about sitting down and writing *yours*? Right now! Time is of the essence, tempus fugits, and he who hesitates is lost! Theoretically, rule changes are made effective as of Jan. 1 of the following year in order to allow time for compliance (even though they usually aren't available until February) but in this case (these cases) we already have compliance—what is needed is rules in compliance with the compliances, which shouldn't require much advance notice. If enough of you are interested enough to make your interest known, it's just possible that the Competition Board *might* depart from tradition and make these changes effective immediately. The head you save might be your own! So DO it! NOW!

**SUPER VEE**

The "TBA" professional Super Vee race for Aug. 29, shown in the schedule in the last issue, will be at Road America, in Wisconsin. VWoA has announced that purses for several of the eight races in the series have reached the \$10,000 mark, plus additional contingency awards.

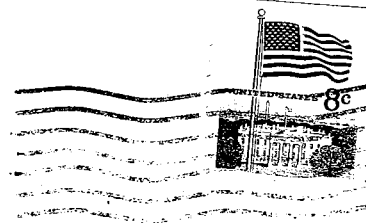
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