



VEE LINE

NUMBER 67

APRIL 1970

VW AWARD PROGRAM

Finally got a list of last year's VW award winners. It's too long to include here (118 names) and there are no regional affiliations shown so it won't be possible to notify your region's newsletter editor—this time. Next year perhaps.

Tom Davey (Tenafly, N.J.) and Butch Harris (Houston, Tex.) tied for top money—\$430. There were two others in the \$400 bracket—Harry Ingle and Harvey Templeton. Five more drivers received \$300 or more, 13 got between \$200 and \$300, and 22 made \$100 to \$200. The balance went to 74 drivers, in amounts of \$20 to \$90.

None of the above figures is really impressive compared to those advertised by some marques, but add it up and comes to a total of \$13,000 which isn't exactly jingling money.

This program, for participants in all National races, is administered by Volkswagen of America, but the money is donated by the VW distributors; so next time you meet yours, let him know you appreciate it. Or better yet, tell your local dealer. He'll probably be glad to pass it on, and it might give him some ideas, too.

The VW support program for 1970 SCCA national racing will be the same as for 1969, and will apply to both Formula Vee and Super Vee: \$50 for 1st, \$40 for 2nd, \$30 for 3rd, \$20 for 4th through 10th. To be eligible for prize money, a National Competition License Holder must register by sending his name and address to Formula Vee, Volkswagen of America, Englewood Cliffs, N.J. 07632. Do it now! More details in the next VeeLine.

SO IT'S NOT A VEE!

This is about my '64 Karmann Ghia, but since it does have a few things in common with Petunia, you might be interested anyhow.

It had a ring, valve, and bearing job about 25000 miles back, but it seemed that there was always something more important to do (like work on Petunia or write a VeeLine) so the valves didn't get adjusted, and there has been evidence of a badly burned one for the past 5000 miles or so. This gave me a good excuse to order one of those Isky cam-and-hydraulic-lifter sets, and while it was down it seemed a good idea to replace the jugs and pistons (with slightly oversize ones).

Item: Did you know that the '61 and most of the '62 VWs had a "¾-race" cam? Just for fun I degreed the '62 "B" cam (installed at the last teardown) and the new "¾-race" Isky, using a degree wheel, dial indicator, and graph paper. They were practically identical! The actual curves differed very slightly; but the start and finish of both were identical, the overlap was the same, and the peak lift was about 0.010" less for the Isky cam than for the "B" VW. Used with the hydraulic lifters (no clearance) against the stock VW clearance of 0.008", even this difference is cancelled out.

Item: VW has made several changes toward preventing oil leakage around the six large crankcase studs. The current method (for older engines) is to use a new set of nuts for each rebuild, with integral sealing material imbedded in the face of each nut. This works fine, from a sealing standpoint, but at teardown it has its drawbacks. The sealing compound is forced into the space between the stud and the hole in the crankcase half, and it stays there when you remove the nut. Aside from the expense involved in replacing perfectly good nuts each time (about \$2 worth), the seal in effect becomes another nut, except

OOPS! SORRY!

So far, no one else has called me on it, but Bob Hicks, Quality Control Supervisor for Riviera Motors (VW's NW Distributor) points out the fact that 3.375" converts to 85.5mm, which is really the standard bore for the 1600cc VW engine, rather than the 83.5mm mentioned here a couple of months ago. That was *not* a typographical error—it was mathematical.

But speaking of errors—in case you haven't noticed, you now have two No. 64 VeeLines in your collection (January and February). Last month's was No. 65. In order to avoid confusion in the future, especially when late-comers are ordering back issues, we'll call this one No. 67, and if there is any occasion to refer to last month's, it will be called No. 66. OK?

Also, not that it matters, but just to keep the record straight, my name is spelled "Cheesman"—not "Chessman," as is shown in the booklet, and in the letter in No. 65 (64A?).

buried below the surface of the crankcase. This makes crankcase splitting somewhat of a chore. An icepick works pretty well—you can take the plastic "nut" out in pieces, or, if you're lucky, you may be able to screw it out with the point of the pick.

New cases have a definite improvement over this method. There is a recess machined around each stud, at the center line of the crank case, for the insertion of an "O" ring. When the bolts are tightened, the ring is compressed between the two case halves, preventing oil from getting into the stud hole at all. (These rings are included in gasket kits now.) So all you have to do is get a new crankcase and take advantage of this scientific breakthrough? Nope, if you have access to a small lathe and a drill press you can make another "Formula Vee Tool, No. FV2468."

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STEPPED IN MY OWN GUM!

This thing was cut short, right in the middle, by a 10:30 PM phone call from Dale Sawyer, of Auburn, Wash. Seems that at pre-race tech inspection Thursday night about three-fourths of the Vees had been rejected. Illegal roll bars! Formcars, especially! Ho, ho, ho, Donald—so now how do you feel about tech inspectors?

Naturally, first to the GCR. Yes, it does say that the roll bar has to be one continuous piece. OK, so our roll bar is one continuous piece—the lower curved section to which it is welded is a "main chassis member." Fine! Except that in that case the legs of the hoop are only 14½" apart (15" required), and the braces are about in the middle instead of in the "upper third" of the rollbar. No point in using that argument. So how about this one—"Roll Bars of alternate materials or design may be accepted. . . upon presentation of data verifying strength equivalence to the required minimum standards." It's obvious that a Formcar rollbar—1½" tubing, strongly braced—exceeds the minimum standards of the one-inch sixteen-gauge tubing called for in the rules. And the tech inspector is a friendly type who has known Petunia for years—in fact he sold her to us as a kit.

So Friday morning a call to the tech inspector, who is as friendly as ever and just as firm—"OK, show me some data, like the rule says, and I'll pass it." Well, we don't have any data, actually, but how about a demonstration—like if I build a perfectly legal one-inch rollbar over the top of the present one, and then roll the car over and show that it won't stand the strain, but the original bar would? "Yes, I'd accept that. I just have to have some proof that I didn't pass a sub-standard bar. SCCA's insurance company has been raising a lot of fuss about inadequate roll bars, and we've been told that there will be NO illegal roll bars on the tracks this year, so just give me something that I can protect myself with and I'll buy it."

So a search for one-inch sixteen-gauge tubing, which isn't exactly as common as one-inch steel pipe. Finally, at 4:00, Friday afternoon, a phone call to Seattle. Yes, they can get it on the Greyhound—should have it by morning.

Saturday morning, no tubing, so another round of phone calls for any size of tubing. Finally, in the farthest corner of a five-acre junk yard, six feet of 1½ x 1/8! We're in business, but it's obvious that our best bet now is to replace the original one, rather than to try to prove something. (I still want to do it some time, though!)

Apparently this isn't just a local program or one restricted to the Pacific Coast, so for the benefit of the many of you who may be in the same boat, we'll have a brief seminar on roll bar building.

First, get your tubing. (While you have

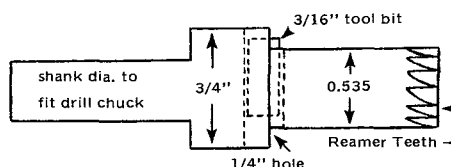
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SO IT'S NOT A VEE!

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that it has no flats to grab it by, and its dimensions are shown below.

The cutter is a short piece of 3/16" lathe tool bit. It is a drive fit in the 1/4" hole, and won't need a setscrew. Drill the hole first, and then machine the shoulder to get the proper depth of cut, as shown. (Due to the "square peg in the round hole" the actual cut won't be quite that deep, but it isn't really critical.) Set the tool bit to cut just a liiiiiittle bit smaller than the 3/4" shoulder, so that the shoulder will act as an automatic depth gauge. The new VW cases have half of the recess cut into each half of the case, but it's much simpler to cut all of it into one side than it would be to remove the studs and recess around them, too. In this particular case the holes were coated with old sealing compound, burned oil and other crud, so the reamer teeth were cut into the end of the pilot section with a file. You can try it without them first.



Item: After 82000 miles, this particular crankcase showed cam bearing wear in excess of the VW "wear limit" by a couple of mils, as measured with plastigage. Probably a machine shop could bore the case for the new replaceable bearing shells—for a price—but the local VW dealer said, "Gunnysack it!" After six years experience with Formula Vee? Hah! Fat chance!

Having nothing to lose, I bought a 16" "mill bastard" file. That's right—sixteen inch. You won't find that size at your local drug store, but they are available—and required for this job. The single stud in the crankcase half which carries the oil pickup was removed, and the flat face of the case was filed down to decrease the clearance. OK, I know this won't work, but it did. Filing was done mainly on the lower part, to avoid decreasing the main bearing bores too much, but there is some reduction there, too, of course. After a few strokes across the case one way, a few were taken at right angles, in order to prevent any low spots. Whenever possible, the file was guided so as to cross the mainbearing and cam bearing areas, and more pressure was exerted on the bottom edge of the case than on the top. In fact, the top edge was filed barely enough to brighten the metal. I overdid it slightly, getting a "Russian fit" on the cam. Before the flywheel was installed there was enough drag on the camshaft to cause the crank to move endways (due to the angle of the timing gear teeth) when the direction of rotation was reversed. However, with the "moly" oil furnished with the Isky cam, and half a can of STP for good measure, the engine was broken in by tested Formula Vee methods (ten minutes in the garage, a couple of miles through town to the highway, 50 mph for a couple of miles, and now let's see what it will do) with no problems. Oil pressure is 40, cold; about 37 at 65, and 25 idling, hot, leading to some suspicion that oil leakage around the cam may be a factor leading to low oil pressure in Vee engines, after all.

Try this at your own risk, and remember

that the head-space in the top of the cylinder would be reduced by the amount you take off the crankcase, on that side.

If you're wondering about the main bearings, so did I. For one thing, I reused the same mains, which appeared to be as good as new, and they're evidently heavy enough to resist the additional crushing. At any rate, there was no sign of drag on the crankshaft.

Item: One exhaust valve seat had a couple of notches which matched those in the burned valve, too deep, at first glance, to grind out. However, having gone to some trouble to "Formula Vee" the heads, I tried it, anyhow. Sure enough, by the time a seat was reestablished it was too big to fit the new valve. However, a 1500 valve did the job perfectly. Probably should have replaced the other three, too, just to make everything come out even, but grinding that much out of just one seat was an evening's job. Being an exhaust valve, it doesn't seem to make any difference—an intake would probably be more noticeable.

Note: This is *not* a suggestion for salvaging Formula Vee heads. It's just for Beetles and Ghias.

MEMBERS' SOAPBOX

Dear Don—Have you heard of the "127-inch box" flap? Apparently only a few will fit in that box (ours is 3" too long). Can we get shrunk? We have to re-do nose, and so does everyone else. Ruin my paint! . . .

Harriet Gittings, Fremont, Cal.

(A postcard from our 1970 Executive Secretary. What would you do, if you'd received it? So did I—I called her that evening.)

It seems they have a "box" in that area, 127 inches long, in which a legal Vee will fit. No fit, no pass tech! Obviously her car, and many others no pass.

This interpretation of the rule is being disputed quite convincingly by Larry Wilson of Scaramento. In a letter to Jim Patterson (SCCA's Director of Club Racing) accompanied by a copy of the original "Formula Vee Automobile Racing Association" rules, he points out that the "overall length" originally applied to the body shell only. A diagram, included as part of the rules, illustrated precisely where the measurements were to be taken (125 inches, plus-or-minus 2 inches). When SCCA adopted Formula Vee for 1964, it made a few changes in the rules, but the "overall length" (max. 127", min. 123") was included verbatim.

In the original rules the exhaust pipes could not "extend more than four inches behind the body," which obviously would extend the "overall overall length" to a maximum of 131". The exhaust rule has since then been changed to "1 inch to 3 inches behind the rearmost part of the body," but there has been no indication at any time that the interpretation of "overall length" has been changed to include the exhaust pipes.

I brought this up to SCCA several years ago, and the reply seemed perfectly logical at the time—"Overall length means just that—overall length." However, it is just as obvious, taking the evolution of the rules into account, that, in the case of Formula Vee, at least, "overall length" meant "overall length of the body." Pipes were extra. And with no change in the wording of this section of the rule throughout the years, it seems only logical to conclude that the original meaning still stands.

If you run into difficulties with your car perhaps you can show this to your officials and at least get a stay of execution until some definite word is received from Westport. Jim's decision, as has been mentioned here before, isn't legally binding; but it carries a lot of weight, and somehow or other it usually seems to be upheld by the Competition Board.

(If you have a Formcar, relax! Petunia, at least, is legal either way.)

Dear Don—1200cc pushrods have evolved through three changes, from No. 113 109 301 A to 113-109-301 D. The "D" series is thicker and heavier. They are also about 1/8" longer. If you try to use them in place of the "A" series you will have to use shims under the rocker arm assemblies, or pull the plug in one end and trim them to length. If your engine uses the "A" series, I'd suggest buying a spare set now, if they're still available in your area.

On my last trip to my local VW dealer I found that Robert Bosch is marketing a line of "Formula Vee" accessories. Now, folks, you can run down to your dealer and buy such great things as: "Formula Vee Twin Fender Mounted Air Horns" or "Formula Vee Wood-rim Steering Wheels." Have fun!

Jim Everson, St. Paul, Minn.

I'm not familiar with the "C" and "D" push rods (my source of VW information has dried up somewhat lately), but the "B" replaced the "A" way back in December, 1963, with the introduction of the "C" head. It, too, is 2mm longer than the "A." The longer push rod is to be used with a higher rocker arm shaft support (1mm) in order to reduce side thrust on the valve stems. New shaft supports are probably cheaper than a set of push rods you may never need. As you mentioned, you could also use a 1mm (0.040") washer under the old supports. If you fly-cut your heads in order to get the minimum legal combustion chamber capacity, you will have thrown the VW valve geometry out of kilter, anyhow; so don't worry about getting everything just exactly on the money—just throw in another washer. Driving your car about a thousand miles a year, the difference in valve train wear and noise should be the least of your worries.

Yes, I've seen those "Formula Vee" goodies. That "Formula Vee Wood-rim Steering Wheel" doesn't add much to top speed, but it could very well affect "pick-up."

Dear Don—I'm afraid the reprint from "Auto Sport" (As Others See Us) is incorrect. Positions for the heat races at Daytona were determined by pulling names out of a hat. The fact that Zinks were in the pole position for the three races has something to do with the mathematics of the total number of Zinks entered versus the overall total, 43 out of 103.

The pushing referred to is used not only by the Zink drivers, but by several other teams, as well. Anybody who wants to go fast and be competitive is using the drafting and/or pushing technique. The pusher and the pusher work as a team, therefore the danger or safety factor is the same as when drafting.

The VEE LINE of
FORMULA VEE INTERNATIONAL
Don Cheesman, Director
1347 Fairmont Ave.
East Wenatchee, Wash. 98801

MEMBERS' SOAPBOX

(Continued)

When one is drafting and the man in front points behind with his thumb, he wants to be pushed! The defense rests.

Burt Richmond, Chicago, Ill.

I don't quite grasp that "new math," but that wasn't my original statement, anyhow—it was "Auto Sport's."

I did make some rather adverse comments on this practice, and shall continue to do so. First, from a safety standpoint, the driver behind can't see past the car ahead. Any sudden swerve by the leading driver will probably end up with the two cars jackknifing, the pusher going over a rear wheel of the leading one.

Aside from that, Vee racing can hardly be considered a competitive "sport" if "teams" are allowed to compete against individuals.

I certainly hope that the appropriate officials are not only taking note of this situation, but will also take some action, before it's forced on them by a clearly preavoidable accident.

By the way, I am informed by one of his handcuffed volunteers that Burt is the originator of those membership applications marked "Join!"

Dear Don—... Also, while I'm writing, I'd like to put in my two cents worth about something else. In my opinion the Formula Vee, and most other rear engine, open wheel single seaters, look and could function much better without the restriction of rear body panels—that is, from the firewall back.

Tom Hanes, Erie, Pa.

Formula "A," possibly, but a Volkswagen engine waving in the breeze...!

Dear Don—You may be interested in the answer I received from Jim Patterson regarding the "cam-bearing" cases in Formula Vee...

Bob Luchette, Youngstown, Ohio

Bob enclosed a copy of a letter to Jim in which he asked if the presently furnished crankcases for 1200 VW (with replaceable cam bearing liners) are legal. Jim's reply was, "Technically this is not legal, but many are using rebuilt cases with cam bushings."

I'd have to argue with that one. In the first place, contrary to the publicity which led to the establishment of Super Vee, the 1200 VW is not obsolete. True, it hasn't been sold in the U.S. since 1965, but the last I heard, it is still "current Volkswagen production" everywhere else in the world. As such, it is subject to the long-established Volkswagen policy of continued improvement. A corollary of this policy seems to be that such improvements shall, without actually changing previous models, be interchangeable as far as is possible, with previous components. Thus we have had at least two cylinder heads since 1965 which have superseded the previous models, but which are interchangeable with them, in every way. There is no significant difference between any of the heads which have been used, other than improved valve train geometry, better cooling, stronger studs, etc.—items which would not affect performance. In fact, it is permissible to use an early head on one side of the engine, and a late one on the other. However, these late heads (now the only replacements available) would also

have to be considered technically illegal, apparently.

There is some merit to this interpretation nevertheless. Volkswagen could make some change in the 1200 engine which would affect performance. In time this would become the "current replacement" part, available to everyone; but for a while such parts would be at a premium if they were to be considered automatically legal as soon as they were introduced. Perhaps, as with the rear brake drums, such changes should be specifically incorporated into the rules by part number. One way or another, regardless, some provision will have to be made for using "current production components" as they supersede the earlier ones. (See the letter on push rods.) Like Mark Twain's, the VW 1200's obituary seems to have been somewhat premature.

Incidentally, if you read that opinion two or three times you could come to the conclusion that there is some hint that re-built cases might be just a little bit less illegal than new ones. However, "If the rules don't say you can..."

STEPPED IN MY OWN GUM!

(Continued from Page 1)

plenty of time!) If you're in a large city you shouldn't have much trouble, but it isn't a commonly stocked item in drug stores. Junk yards are a good possibility, but be sure what you're getting. Rust won't hurt anything, unless it's deeply pitted, as you will ruin the shiny finish of new tubing when you heat it, anyhow. For some reason, even though it is made of the same grade of steel, water pipe is not legal roll bar material. If it has threads, or has a brand name (like "Bethlehem Steel") rolled into the metal, it's pipe. If the outside diameter isn't exactly on the money (1", 1-1/8", 1-1/4") it is probably pipe. (It could be tubing if it's 1-5/16, but it's not likely.) Tubing is measured on the outside, pipe on the inside, by the way—1-5/16" OD is probably 1" pipe.

The specs in Appendix Z are somewhat hard for a layman to understand. "Seamless" covers a lot of territory. Generally speaking, it is formed from a solid bar in a unique rolling process through which the center of the bar is forced to separate enough for the entrance of a tapered mandrel. Rollers on the outside squeeze the bar between them and the mandrel, stretching it to the desired diameter and wall thickness. Sold as "Shelby tubing," it is used chiefly for material for sleeves, bushings, collars, rings, etc., where both inside and outside diameters are to be machined. The varying wall thickness and ovality are of no consequence. Refined by further rolling and drawing processes (DOM) at increased cost, it is used for high pressure liquids and gases, and for hydraulic cylinders. Unless you can get it at a bargain, it has no advantage for use in roll bars.

"ERW" (Electric Resistance Welded) is more often referred to as "CREW" (Cold Rolled Electric Welded) or "HREW" (Hot Rolled Electric Welded). Either type is made of a strip of steel rolled into tubular shape, with the seam welded electrically. Wall thickness, then, is uniform throughout. "Cold Rolled" has a smooth polished finish, "Hot Rolled" has a rougher oxidized finish. The latter is also called "Structural Tubing."

If you have a good torch, full gas and oxygen cylinders, and plenty of time, you can bend the bar yourself, but if you have a few

spare bucks and can find a shop with a tubing bender, it's probably worth the price to have it done. Check with the source of your tubing, or with a local hot-rod shop, for a real, genuine tubing bender. If he can bend exhaust tubing properly (and has shoes and dies to fit your smaller tubing) he's your man. If he's a bit vague about tubing, but assures you he can bend pipe and conduit, skip it! His equipment will make scrap iron out of your nice new tubing.

OK, so now to work. If you're going to duplicate the old bar (probably the simplest way to go), cut it out of the car in one piece. If you can use the old braces, leave them in place to help in locating the new bar. If you're going to design from scratch, most of this will apply, anyhow.

Using the old bar as a pattern, draw a picture of it on a piece of heavy plywood. On a couple of additional pieces, draw the inside radius of the curves you want to bend and saw them out. Wrap a strip of steel (freight strapping is great) around them where the tubing will contact them and nail (and glue) them in place on your picture. You'll only need one side of the picture, for bending, because you can flop the bar over and bend both sides on the same form. You'll need the whole pattern, though, to check the finished product against, to insure that both sides are the same. If you're making just a simple "U" bend, you'll still need a second block to hold the tube at one end while you pull on the other.



You're going to heat the tube to a nice red color, but it will still take some effort to bend it, so figure some way to keep your pattern in place. If you have a wooden floor to which it can be nailed, fine! If not, call in your heaviest friends to stand on it, or park the family sedan on it. When you start bending, you'll be too busy to tend to such details.

Now to the fun part. Braze a small cover plate over one end of the tube, fill it with coarse sand (the dryer the better) and then braze a cover plate over the other end. Tap the pipe while filling it, until it quits settling; and when brazing the covers on, leave a couple of gaps for the escape of steam. Otherwise the red hot tube could blow up and get sand all over your clean floor.

Be sure you have plenty of oxygen and

(Continued on Page 4)

SUPER VEE

Ed Zink's Super Vee will have a somewhat different front suspension system (naturally!). Instead of the conventional A-frames he's using a fabricated upper arm, pivoted at the frame, and extending on inboard where the coil spring and shock are located.

The world's first Super Vee won't be seen on U.S. tracks. It's in Europe. Beach's first car was bought by Formula Vee Europe, and is now on a press tour there.

Any of you Super Vee fans who are disappointed at the restricted wheel widths, and who have been with us for a couple of years, may recall that we ran Goodyear 9.40-15 Indy Specials on Petunia's 4" rims for two seasons with no problems at all. Wear was evenly distributed over the entire width, and there was no sign of rim-cut or sidewall deterioration. Due to the apparently better adhesive qualities of the new Vee tires, suspicion that the increased wind resistance wasn't doing us any good, a rapidly vanishing tread pattern, and the fact that one of them got ripped in a shunt at the start of the third season, we finally switched to more conventional tires. But if we were running a Super Vee

Speaking of tires, how about those on the "Dixon" Super Vee in the last issue? And on several other "artist's conceptions," for that matter?

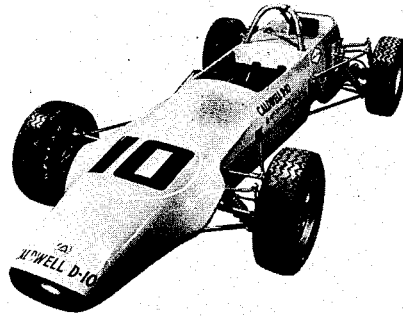
You have to read this with the understanding that only a Court of Appeals can issue a binding interpretation of a questionable SCCA rule; but on the other hand Jim Patterson is the Director of Club Racing, and while his interpretations and pronouncements aren't the final word, they are the finest you can get without going the protest route. SO—here is his interpretation of the suspension rule for Super Vee—

"If I were building a Super Vee, I would consider that Sec. 8.3 of the GCR permitted the use of any standard VW parts, since other sections (8.6, for example) clearly indicate "VW 1600."

"Super Vee Cars should carry Class designation (FSV)."

So, get a 1600 engine, and a safety fuel

cell (see Appendix X, Sec. V in the GCR for approved makes), stuff them in your Formcar, and at the rate the professional models are popping off the assembly lines you might end up as Divisional Super Vee Champion.



Here is the Caldwell Super Vee, completed the early part of April and displayed at the New York Auto Show.

HEY, KIDS!

It looks as though, even before they get a chance to vote, teen-agers will be able to race in the U.S. While IMSA doesn't yet conduct any drivers' schools, they are accrediting such schools as meet their standards, and plan to license qualified "graduates" in the 18-21 year bracket to participate in IMSA events.

UNCLASSIFIED ADS

FOR SALE: '69 Zink—run only 10 times. Rebuilt before last race. British Racing Green but will repaint to suit. \$2600. Also, Autodynamics, old but solid, strong engine. \$1500. Burt Richmond, 75 E. Wacker Drive, Chicago, Ill. 60601, (312) 644-5080.

NEW TRACK FOR THE ARRC

As was predicted here some months ago, the American Road Race of Champions will be held at the Dallas International Motor Speedway this year—Nov. 25 to 29. It's probably safe to predict, too, that it will be held there in 1971, '72, '73. . . .

No confirmation, yet, of the prediction that Westport would be moved to Dallas, too.

STEPPED IN MY OWN GUM!

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acetylene, and a large "rosebud" tip on your torch, because this is going to take a lot of heat. Not only the tube, but the sand, too, has to be hot enough to stay red until the bend is completed.

Free bending like this is tricky, at best. After a section is bent perfectly, it has a tendency to "hump up" even more as the bending progresses on around the form. It is helpful if you can clamp the stationary end of the tube to the plywood and pull on the other end as you bend in order to keep it snugly against the form. However, if you find that the bend is still not even, you can go back after it is completed, heat the uneven section again, bend it freehand, checking against the "picture" until you get it even. Make the other bends (if any) the same way, and you're in business.

For Formcars the original design was pretty stout laterally (it had no fore and aft bracing at all) so to simplify refitting the firewall, cut out the center section of the old bar and weld it in place on the new one. This is easier if done before the bar is installed. Set the bar and the center section in place and hold them with a few sheet metal screws through the firewall while they are being tack-welded. Then remove and complete the weld. There will be some shrinkage, due to the welding, which will pull the legs toward each other, so after it has cooled, take a large welding tip in the torch and heat a corresponding area on the opposite side of the tube to a dull red, as rapidly as possible. This should pull the tubing back to about the original shape.

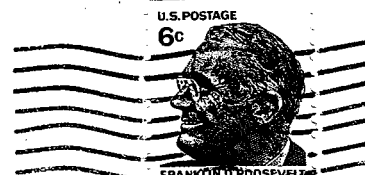
Using the firewall, again, as a jig, set the completed bar in place and weld it carefully. A shot of spray paint, a 3/16" inspection hole (normally kept covered with a piece of black electrician's tape to keep out the rain) and you're ready for the tech inspector.

Again, this whole thing is for your benefit, whether you like it or not, so take advantage of it. If your original bar was of .1" material, don't duplicate it! Use something heavier. It has been proven—several times—that one-inch bars don't do the job, regardless of the minimum specs in the GCR. If your bracing was marginal, improve it. There's no point in going through all this just to please a tech inspector.



**Formula Vee
International**

1347 FAIRMONT AVE.
EAST WENATCHEE
WASH. 98801



Van D. Durrett, Jr.
1508 S. Jennings
Bartlesville, Okla. 74003

A

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