

## RANDOM RODDIN' MEMBER PHOTOS

Here is a space for photos that you send in. No requirements, just something that is car related and may be of interest to the members. Great place to show your projects, your garage, something funny and car related. It's your page. Here are a few from this month. Let's see what you got...



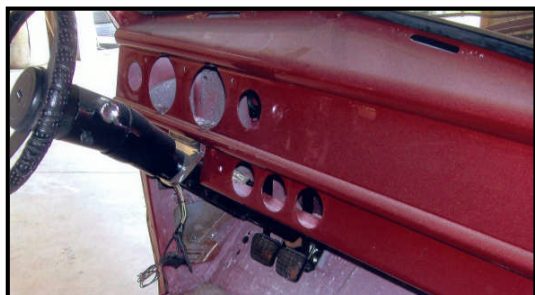
*How about this old 331 DeSoto Hemi that Danny has lying around his shop? 1958 was the time of the Fire Dome...*



*Danny's cat is supervising the rebuild of Jim Zorn's Holley... You can tell she's the boss!*



*Greg's garage...Nothing's apart now, but just wait. There is always something about to happen. Spring is coming... How 'bout the 468" Big Block just sitting there... What should we put that in?*



*Norm is now working on the interior. This shows his new dash and gauge layout.*

## IN DEPTH MEMBER PROJECT NORM'S '38 COUPE PROJECT UPDATE

Norm continues on the restoration and updating of his project '38. The paint work is complete and the motor is in. The attention recently has been on the interior. He had taken time to fully insulate the interior, laid out modern gauges and worked on custom tin work for the fuel cell, battery and tool boxes. We are all looking forward to seeing the completed car this summer!



*This is Brandon, Norm's grandson. He is 10 years old and Norm says that some day this car will be his! Wow, that is cool!*



*A quiet and cool interior is a must. Here is the dynamat that Norm is installing throughout the interior.*

*Custom aluminum fuel cell, battery box and a tool box are shown looking in from the rear of the car.*



## CARB TUNING by Bob Stock

Sitting on top of our self-operational air pumps (more commonly referred to as engines) for many of us is the lowly carburetor. This little marvel is often overlooked or dismissed as inconsequential to gain understanding of although the basic operating principles are fairly straight forward and can even be comprehended by the Geico cavemen. We'll start with the air intake - I don't know of a single book that explains this all - I have several carb books along with several aerodynamics and engineering manuals...wouldn't really recommend a certain one...but follow along with my meanderings, maybe this will be worth reading.

What we are after is an efficient burn and air flow, and as with most things - crap in = crap out. The place to begin is with whatever is on top of the carb - keep in mind also that I am going to ignore everything except the intake for now; however, if you don't look at your engine as a system, you will never achieve optimum performance.

First, we must understand a basic part of all of this - the air is not being sucked in the engine. WHAT? – Nope, the air has weight like anything else. When the piston evacuates the area in the cylinder, it creates a space, which is lower than atmospheric pressure, which must be filled. The air then "falls" into the engine. While this is quite oversimplified, it needs to be understood, because it means that any impediment in the intake tract can have an effect on efficiency. If you have a rough entrance, the air molecules begin playing pinball on the way through turbulence.

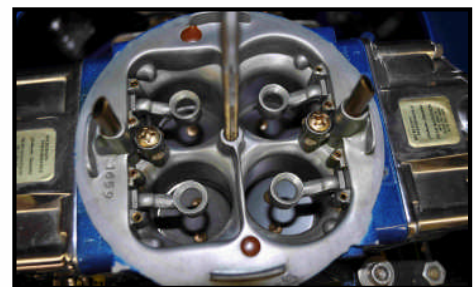
This is not the only negative effect – friction is involved which tends to slow the entry process and create heat. Now this is rather minute, but if we are after the optimum, it bears mentioning. It's all about air moving as efficiently as possible throughout the engine with minimum unnecessary constrictions. Most stock air cleaners have little snorkels - this is mainly to act as a silencer and in the form that most are in, is a definite performance detriment - in a following article I will focus on density, as well as the fact that we obviously cannot get the volume of air we need.

The basic formula for the required air cleaner size is  $(CID \times MAX \text{ RPM}) / 20,860$ . Using a 440 with a maximum rpm of 6200 we get:  $(440 \times 6200) / 20,860$  or 130 sq inches. To figure out how tall we need to be use the formula  $SQ \text{ inches} / (\text{diameter} \times 3.1416)$  or (using an example of a 15" diameter air cleaner on the same engine)  $130 / (15 \times 3.1416) = 2.77$  inches. This is the least allowable for the engine. On a paper element a good figure to use is the smallest allowable  $\times 1.24$ . High flow types like a K&N multiply by 1.11. This gives us a figure of 3.07 inches for this engine using a high flow type. If you insist on ignoring this and use a little 6" X 2" custom chrome one, it is akin to trying to breathe through a straw. Some other things to keep in mind - the lid needs to be a MINIMUM of 3/8" above the bowl vents and choke tower if you have one. It should be at least the same height above the main opening as your largest venturi size. If you are using an intake tube or hood scoop the cross sectional area of the opening(s) should be 1.35 times the cross sectional area of your carb opening.



A few other things to consider are base shape, hood scoop or any other cold air system involved. The base shape on many aftermarket units is flat - this is NOT good. One of the best shapes is the stock Chevy units with the big curve in the base - it happens to be very close to the optimum radius for the average 4 barrel. In general, you want a radius at least 1/2 the diameter of your carb entry on the base. Without getting into a bunch of complicated mathematics, all of this has to do with the mass / speed of the air incoming. Air does not like to turn sharp corners or cross rough edges (including those "casting" lines on the secondary venturis and other internal carb air passage surfaces) – anytime you do, turbulence and pressure changes occur. A sharp edge is also a bad thing on an intake - it cause's shear and promotes turbulence. Using a flat base causes the air to rush across the top of the carb which produces a vacuum effect on top of the venturis. This causes problems getting a sufficient volume of air in the carb and upsets the metering circuits. Main metering is controlled by pressure drop (I'll get into this later) and anything that modifies the "seen" signal will mess with how your carb functions. This is why it's not good to have open top carbs or open velocity stacks hanging out in the wind on your race car.

Ever wonder about the strange scoop shapes on the pro mod cars? One reason is to ingest the proper amount of air, while maintaining the smallest possible frontal area, while minimizing turbulence. Putting a hood scoop opening that is too large on a car only increases drag, and the ones that are too short will cause the same problems as an air cleaner lid that is too close to the carb. While, as in most things, this is all a series of tradeoffs, whatever intake system you use to direct air into the carb needs to revolve around the coolest, densest air possible, with the least amount of turbulence necessary. If you are using an intake tube(s), they should be as smooth as possible, with the minimum number of bends possible.



*Example of a highly modified Holley carb with choke housing removed, smoothed radiuses and replaceable air bleeds.*

There you have it in a nutshell, next month we'll delve into carburetor mechanics.