UPDATE AUDIE TECHNOLOGY

November 1997

Trade Show

We will be at the Performance Racing Industry (PRI) Trade show east, December 4-6 in Columbus, Ohio. This is the largest show in the world for hardcore racing. **We will NOT be at the PRI west show this year.**
For more information and re-register contact PRI: Phone (714) 499-5413 Fax (714) 499-0410. Pre-registering is strongly recommended. It will speed your check-in at the show. You MUST have some form of ID (business card, etc.) which identifies you as being in the racing business to be admitted to the show. Check with PRI for standards and details.

Swirl Success

We have been hearing good things from head porters using our swirl meter. One porter recently reported horsepower gains on several different engines using the swirl meter together with pitot tube (air velocity probe) and regular CFM reading to better understand what is happening with his heads. The swirl meter is an RPM based design. This frees it from the zero drift and poor low swirl sensitivity of torque based swirl meters. The use of a lightweight polycarbonate honeycomb disk for the trigger wheel also improves low swirl sensitivity. A paddle pickup as an alternative pickup device is under development and should be available soon. The Audie Technology swirl meter comes on a custom shipping/storage box, although most owners never need to store it because it is always on their bench. Contact Audie Technology, Inc. or your local Audie Technology Dealer for pricing and more information.

Air Does Funny Things

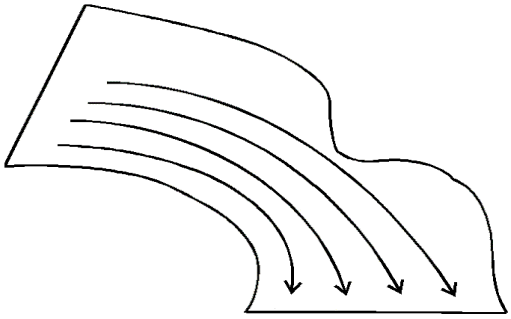
Everyone who works with heads is at a disadvantage -- they can not see air. It is interesting to note that early work in fluid dynamics was done using water, dye and transparent pipe. Of course we can try using smoke, but it does not work too well at higher air speeds, and port walls are not exactly transparent. To further complicate things air does not always react in expected ways. The thinner the air the more it defies our expectations. This is why it is much easier to design an intake port then an exhaust port. sometimes air will even do the exact opposite of what we expect. There are situations where you can increase depression or valve lift and the flow will decrease! What causes the air to react, not just somewhat differently, but totally opposite its usual manner? If we knew why, we might be able to design ports that avoid this problem.

The volume of air flowing through a port is a product of the air velocity and the cross-sectional area through which the air if flowing. During a flow test when depression increases the air responds to the increased pressure differential by flowing faster. This increase in velocity through the same cross-sectional area results in greater flow volume.

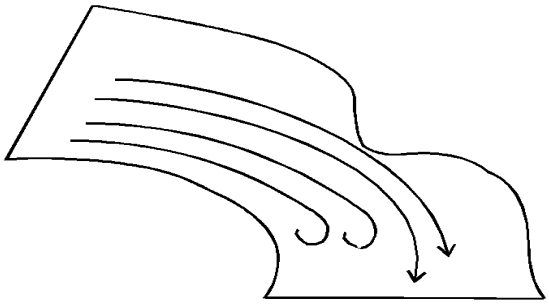
In some cases, however, increased depression results in decreased air flow. Since the flow is less either the air velocity or the cross-sectional area, or both must be less. The intuitive reaction is to assume that since the port walls are solid metal, the cross-sectional area can not be changing, and therefore the air velocity must be changing. But, the truth is that the effective cross-sectional area is changing. The problem is caused by ports that force the air to change direction. The air can smoothly make the turn at low velocities, but not at higher velocities. This effect is similar to a car that can take a turn at low speeds, but wipes out on the same turn at high speeds. The air trying to make the turn at higher velocities "wipes out" and forms vortices. Theses vortices block par of the port, reducing the effective cross-sectional area. (This is somewhat of a simplification. A full analysis must also consider boundary layer and other effect.)

Now that we know the problem, what can be done to fix it? Several approaches come to mind:

1. Straighten the port so the air does not have to turn so hard.
2. Increase the cross-sectional area in the turn so that the air can slow down and still pass the same volume. (but be careful or the air will slow too much. This will drop the fuel and remove the inertia needed to get good cylinder filling.)
3. Change the flowing characteristics of the air so that it makes the turn more easily. (One way to do this might be to increase the air pressure by means of a supercharger or turbocharger.)



Low velocity air flows smoothly around the bend.



Vortecies develop as high velocity air is unable to smoothly flow around the short side of the bend.

E-Mail

E-mail is an excellent way to contact us. Audie Technology, Inc.