STAHL HEADERS/CAMS
1513/1515 Mt. Rose Ave.
York, PA 17403

STAHL HEADERS/CAMS NEWSLETTER
ISSUE #3

DYNO HEADERS

Stahl makes special dyno headers that often last three to five years. To be classified as a "Dyno" header it must have 3/V' thick flanges, adjustable primaries and some designs receive selected pipes to be aircraft struted and/or double wall tubing at the flange. We offer headers that fit most engine dyno frame designs in a "Sprint" car design with a standard offset and have 24" minimum length primaries. We expect most dyno headers to have a three year life span if the dyno exhaust system is properly supported and there is sufficient air flow over the headers. We can also build race car design headers with the special "Dyno" features. Dyno headers are offered only in completely assembled form. All dyno headers come with 2") and 6" long adjustable primary pieces and your choice of removable collector from 2-l/4" thru 4" in l/4" increments. Primary tube sizes range from l-l/4" thru 2-l/8 " depending upon the application.

DYNO TRIVIA

For our own research and development work, Stahl Headers has developed a unique dyno facility including the design and manufacture of a custom "STAHL" water brake absorption unit. We have done considerable research to develop this facility as well as creating computer programs to help us analyze the data. We are willing to share the results of our efforts with you. Please contact us for a free dyno information package. Why do we offer free information to help you improve your dyno testing? We want all dyno facilities to reproduce a realistic environment to the engine and to produce valid repeatable test data. We are convinced that better test data will prove Stahl products outperform the competition resulting in sales to those few who demand the very best and are capable of telling the difference. We invite interested people to visit on a weekend with prior arrangements. If you are going to build or rebuild your facility we urge you to come and see us.

STAHL CAMS:

STAHL HEADERS: (717) 846-1632

STAHL HEADERS/CAMS NEWSLETTER QUESTIONNAIRE

Your Name: _____

Company _____

Address: _____

_____

Phone: _____

Flow Bench: _____
Brand Model

Dyno: _____
Brand Model

Computer:

Specialty:
Drag Race: _____
Oval Track: _____
Road Race: _____
Other: _____

Cams Used Most:
Flat Tappet : _____
Roller : _____

Please complete & return to:
STAHL HEADERS/CAMS
1515 Mt. Rose Ave.
York, PA *17403*
(717) 846-1632 *or 846-3123*

ATTENTION!
DO YOU WANT TO CONTINUE TO RECEIVE THIS NEWSLETTER?
If your mailing label has XXXXXx's on it, we have no response from you on Issues #I or #2.
To remain ***on our mailing list,***
please complete the above questionnaire and return to us as soon as possible.

DIRT ENGINE BUILDERS

Build dirt late model engines? Have a dyno? Can't test zoomies--CALL US! We have some suggestions as to how you can do it by making large cones and using 8" 90deg elbows. Do you know that several manufacturers sell headers for late models that have 14" to 16" variations and average some 24" for all 8 pipes? Did you know these headers are down as much as 45-50 HP at 6000 compared to a properly designed set of headers?

WHO REBUILDS MAGNETOS?

We want to offer a list of people who re build magnetos. Please write or call us with the names of people or companies who you've had both good or poor results.

DYNO OIL TEMP

Dick Moroso reports oil temperature stability achieved by putting the oil cooler in a separate tank and running the engine outlet water through the tank so it serves to both heat and cool. He used to get a 10 to 12 deg. oil temperature rise over a 30-35 second 100 RPM accelerations test on V-6 Buicks and now is getting a 1 to 2 degree temperature change. He also reports l/2 % torque-hp repeatability on his Superflow in the same test mode. The test cell features an 8" diameter non sealed exhaust system connected to the engine exhaust system. A separate air supply blower and duct is used for the engine supply air sourced from inside the building and outside air to ventilate the cell.

BELIEVE IT OR NOT

Some camshafts make the engine sensitive to new headers. New headers can be worth 1% with some cams and no dif ference on others. A final choice between two cams should be run with both new and used headers with carbon build-up. If your dyno will accept race car design headers, then discuss it with one of your customers. Some customers may care enough about winning to provide you with both a new and used set to find out if the cam is sensitive to header condition.

DRAG RACE CAMS

We may entertain doing some exclusive Drag Race Cams. Interested people should call Jere 4-7 p.m.

VALVE LASH

Based on the cams we have run through cam check we urge you not to loosen valve lash from the manufacturer's specs unless you are prepared to significantly increase loading. Due to the variations in designs our suggestions are generalized and will vary from cam to cam. However, the principals are the same. When the lash is loosened the contact point relativity between the valve and the cam lobe is changed. When the valve spring is loaded and there is no lash in the system, the valve is being controlled by the cam lobe. Once the lash point has been reached the valve is free to bounce unless the spring has control. One of the major factors involved in breaking valve train parts is how fast the valve closes. The faster it closes the more prone it is to bouncing. The more it bounces the more severe the loads on the valve train. The closing speed is changing much faster at .045 cam lift than at the lift point where the lash is supposed to be set. Thus, the looser the lash, the faster the valve is closing and the sooner it is depending solely upon the spring for control. For example, .002 more lash may be similar to reducing the RPM at which valve control is lost by 300 in some roller cams. Increasing the lash .004 may lose 600 to 800 RPM of control. It is acceptable to loosen lash on the dyno to determine if the existing cam is too large so long as the RPM's are carefully controlled. Keep in mind, some roller cams now being sold will start to bounce steel intake valves as early as 7200 7300. Flat tappets will usually tolerate looser lash due to the hydroplaning action between the lifter and cam caused by the bath of oil.

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STEP HEADER POWER INCREASES

Valid dyno tests of step headers vs proper single size headers have yet to show us more than 1.25 % power increase. Is this a cost effective horsepower gain? Certainly a necessity for a drag race engine but of questionable value on a l/2 mile engine in our opinion.

DYNO WATER

There will be a predictable temperature increase of the water passing through a dyno. The physics books state that 100 HP = 4241.8 BTU's per minute. Thus, if you are absorbing 585 HP and running 60 gallons per minute through the brake you will have a 50 degree F temperature rise in the water. "So what," you say. Well, if the water temperature is 85 degrees going in, it will be 135 degrees coming out and that's OK. But, if it is over 140 coming out, you are getting "brake cavitation" and that is promoting readout repeatability problems. We have a chart available (just ask for it). We prefer closed loop systems and treating the water. We mixed 15 gals of NAPA water pump lube and anti rust inhibitor in 1000 gallons of water that had been run through a Culligan filter assembly. There appear to be many pros & cons to the water system. Please send us your advice and opinion.

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DYNO EXHAUST SYSTEM

The engine-dyno frame should permit the actual vehicle exhaust system to be run for rela tive testing. We have seen collectors work on one design header and not on another design. There are two exhaust systems to deal with on a engine dyno. The engine exhaust system is that part that fits the race vehicle. The dyno exhaust system is that part that continues the engine exhaust system to outside the cell/building and in many cases has to provide some noise reduction. It should not be sealed to the engine system. The basic sizes for the dyno system: 4" system is acceptable for 100 HP, 6" for 100 - 200 HP, 8" from 250 - 400 HP, 10" from 400 - 625 HP. That means a V-8 with 400 HP needs two 6" diameter pipes. A 700 HP sprint engine needs two 8" pipe systems. If you elect to run any other type of system, or seal the pipes, the dyno system becomes part of the tuning effect of the engine exhaust system and invalidates most manifold, header, camshaft, and cylinder head performance testing.

THE MAN WHO THINKS HE CAN

If you think you are beaten, you are;
If you think you dare not, you don't;
If you like to win but think you can't,
it's almost a cinch you won't;
If you think you'll lose, you're lost;
For out in the world we find success
begins with a fellow's will;
It's all in the state of mind...
If you think you are outclassed,
you are;
You've got to think high to rise,
you've got to be sure of yourself
before you can ever win a prize.. .
Life's battles don't always go to the
stronger or faster man;
but sooner or later the man who wins
is the man who thinks he can.. .

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ATTENTION CAM DOCTOR OWNERS

Cam Doctor is sold by Quadrant Scientific. If you have purchased a Cam Doctor, please call or write us. If you're thinking about buying one, call someone else.

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STREET ENGINES

After burning 330 gallons of fuel running a 350 Chev and a 400 small block Chev street engines at 2550 & 3050 RPM primarily at part throttle in HP ranges from 35 HP to 125 HP, we found several startling things:

(1) A balance tube **HURT** fuel distribution on every manifold/header combination we tried. It never helped part or full throttle power.

(2) Tri-Y (l-1/2 to l-3/4 to 2-l/4) headers did nothing at part throttle compared to l-1/2 and l-5/8 x 36 4 tube. All testing was done through mufflers with full length vehicle exhaust & tail pipes.

(3) Put an oil shield on a late 86 or 87 Edelbrock Performer manifold and part throttle fuel distribution improves 50 % -- that's right -- 50 % , from an average of 200 degree cylinder to cylinder exhaust temperature variation to 100 degree variation.

To **know** when to do is **WISDOM.**
To **know** how to do is **SKILL.**
To do it as it should be done is **SERVICE.**

QUESTION OF THE YEAR
IS HP A TRUE UNIT OF MEASURE FOR RACE ENGINES?

We have come to realize that the present method of measuring racing engines via HP or Torque is not totally relative. There is need for a new unit of measure perhaps RPM, torque, and CFM. I suspect that we need to include BSFC or better yet CO or C02, or oxygen content. For years I thought BSFC was the most important number derived from a dyno test. Having been shown some 4 years ago that measuring CO, C02, and hydrocarbons was of more value than BSFC, we spent some time last year comparing 3 of the exhaust gas analyzers that are of the type normally used by retail automotive repair stations. This is not new thinking, but somewhat different than the way most race engine people look at race engines. It's a wide open topic. We are looking for thoughts, experiences and suggestions. HELP! ! !

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CAMSHAFT DYNO TESTING

Run 1000 RPM below whatever the engine sees. Example: if it gets down to 4600 in the turns, then start testing at 3500 - 3750; if it won't pull load that low then change the combination until it will. Run 500 RPM higher than reports of max race track RPM. i.e.: If the engine sees 8400 (some Nascar Modifieds), then you better run 8900 to make sure the valve train/camshaft will be stable.

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SPRINTS

Call Randy McKinley (717-843-0871) and he'll tell you about going 17 races with a Stahl Cam in a 406 sprint engine where both the valves and seats looked so good he only did a light re lapping and ran it 15 more races.

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We have had good response to Issues #l and #2 and hope this issue is as well received. Don't forget, if your mailing label has XxXx's on it, please return the response section to remain on our mailing list!