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

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STAHL HEADERS/CAMS NEWSLETTER
ISSUE #12

STAHL DYNO PROGRAM

We are pleased with the compliments and reception to our Dyno Program. However, I feel there is a segment of people that I failed to reach due to my lack of proper explanation of the tutorial demo disk and documentation. The purpose of following the documentation is to show the *capability* of the program. We know of no other method to accomplish this objective. However, *it is not necessary to learn to use all the capability of the program to use it.* Some of you have been intimidated by the thought of having to learn all the commands. It is possible to use the program with one of the supplied configurations and never learn anything more than how to convert or receive files, press the graph key and step through the first four or five screens.

We are very willing to rework any part of the program that is not intuitive or logical. It is possible to get a version of the program to read data from any source.

WARNING . . . ADVERTISEMENT... New Header Models.

Stahl has found a 56 Chev with 29,470 original miles. It is getting a .030 over 56 225HP engine that is being done to meet most of NHRA Super Stock rules. No it won't be a race car, but it will run 8500-9000 with ease and make at least 350-360 HP and be streetable.

So guess what one of Stahl's new model headers is? You've got it... a 55-57 in the car header (or as we say a chassis header). I don't want to run fenderwells on a street car. The header turned out extremely nice. No more than 2" variation in all 8 pipes. Will be available from l-1/2 thru 2" in both a version to clear the stock rear engine mounts and a higher version to give adequate ground clearance if a trans cross member has replaced the rear motor mounts.

We also have completed a beautiful Busch Grand National 18 degree V6 Chev available in l-7/8,2,2-1/8 and 2,2-1/8,2-l/4 for restrictor plate engines. I will guarantee this header to outperform any other Busch header with comparable tube sizes/lengths.

The 82-92 Camaro small block is the most difficult car we have encountered and made headers for. There is one design for the SCCA American Sedan type car, another header for NHRA Super Stock engine location and finally one to fit stock engine location but it will not clear the original stock mounts. These headers are available from l-5/8 thru 2". For those people with the 475 HP+ street cars we've got a very nice header... but you'll have to do some fabrication work to get a dual 3" dia. street system on it and to have adequate header ground clearance. We also have available both 3 and 3-1/2 oval-shaped tubing which helps tremendously to pick up ground clearance after the headers.

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-I 632 or 846-3123

ATTENTION!
DO YOU WANT TO CONTINUE TO RECEIVE THIS NEWSLETTER?
Check you mailing label!

????? Return above questionnaire to remain on our mailing list for future issues.
XXXXX This will be your last issue unless you return your questionnaire. Those that do not respond are either not reading our newsletter or don't care and, in any event, we don't need to waste. Previous issues are available upon **written** *request only.*

EXCLUSIVE CAM DESIGNS

If you are an engine builder and have wanted a specific roller cam that is not available or want cams that your competitors cannot buy, we are now in a position to accomplish such an arrangement for reasonable costs. Price for the design can run from $200 to $500 depending upon complexity and $250 to $300 for the master. To become part of the equation you will need to own Cam Pro from Audie Technology.

THERMOCOUPLES

With the cooperation of a ProStock engine builder/crew chief, we were able to prove in 1992 that thermocouples placed in headers are not a valid source of EGT info. They must be positioned in spacer blocks between the cylinder head and headers.

Advice is like castor oil, easy enough to give but dreadfully uneasy to take.

Josh Billings

DYNO INFORMATION

For those of you involved with building a dyno and have not read a paper I wrote 5 years ago called "Measurement" I strongly urge requesting a copy of it along with things called Dyno Info, Dyno Parts and a Dyno Cell Sketch. Also available is a set of 10 drawings detailing the cell, ventilation system, engine air supply and exhaust system.

ANTI DETONATION DETECTOR

Jerry Dorman Racing Engines offers a detonation-sensing device and meter that we urge all engine builders to purchase. We have first-hand experience with the device and find it really works well on the engines we have tried it on. Available from Jerry 805-238-6461 or Diamond Racing Engines.

Doing business without advertising is like winking at a girl in the dark. You know what you are doing, but nobody else does.

ENGINE DYNO FACILITY

To better understand the issues involved, let's break this subject into four categories: Facility, Equipment, Data Acquisition and Data Analysis. Each category is dependent upon the other 3 to be able to accomplish the mission of doing a valid relative dyno test. Each category may be changed without requiring major changes to the other categories. It is possible to do competitive work with off the shelf items that are now available for most racing arenas. However for those people building engines where they must to go after every 5 HP in order to win (such as ProStock), a different level of equipment is required. The repeatability must get down to .25%. The ability to recognize small (as in 5%) power changes is necessary. (5% of 1175 HP is 5.88 HP.) The increasing trend of non-ported iron cylinder heads and flat-tappet cams is also requiring more precision in order to build a power advantage. The effort required to build a 5 to 8% power advantage in these type engines will be as demanding as the effort to exceed Warren Johnson's speed in ProStock from an attention to detail standpoint. It will come in very small increments. If you can't measure small changes, you'll never know if you are **going forwards, backwards or standing still.**

If you want me to help you do a better job of engine dynamometry, I have to see very thorough pictures (no video tapes) and some tests on a disk. Because I have spent so many years looking at dyno data, I can tell a lot about a facility by looking at the data.

Unfortunately we are constantly being informed about engine builders with Depacs who make no notes in their test files. I've gotten a report of one well known name who ran over 2800 tests in 1992 without one word of notes. Thus the tests are now worthless. My experiences indicate to me that the history of what we did is basis for learning and understanding to go forward. To accomplish this I am constantly going back to review results. This is the reason our dyno program has all the report flexibility features. It also explains why we advise that regimen and discipline is necessary when making dyno test notes. If you don't want to learn, then don't make notes. We'll go into more detail in this area another time.

I used to have an outstanding memory. I could remember details that astounded some of those who worked closely with me. Well gang, I've got news for you. In 1990 I figured out where grey hair comes from. It's gray matter leaking out. In 1991 I figured out bald guys really do have an advantage. They have less leakage. In 1992 I figured out that too many people refuse to accept help for a variety of reasons. Many don't understand the need for doing things any differently. I talked with several people who told me they did not see any need to hook up a computer to their dyno. Some of us feel so insecure when talking with someone who knows more than we do that we can't concentrate enough to learn. Some have such a large ego that they have the "Not Invented Here" syndrome. Those with that affliction think if they didn't invent it or do it, then it is either no good or not worth the bother. Ego is great. Hell it has driven me for at least 40 years. It takes an effort to be open-minded and not let ego **interfere.** I have a big problem. I just cannot accept the spoken word as fact. I have to see proof. It's not that I think people are lying to me, because they don't lie most of the time. It's just that their perception of the way things are is not usually substantiated by the facts. Kind of like the crew chief who says the car handles great, but we lack power. The driver says we need a better car set-up and more power. The engine builder claims the chassis doesn't handle or the driver doesn't stand on the go pedal enough (unless the driver is paying the bills or is a friend.) Who do you believe? **Do you want to win or just participate?**

A dyno brake is primarily a device to load an engine. Running an engine on a dyno will only tell us a few basic things. Is it leaking oil or is it going to break the first few minutes of operation? Since most dyno facilities do not pressurize the cooling system we don't even know if the engine is going to leak water after installation in the vehicle. The building of a reliable engine has nothing to do with dyno testing. To evaluate engine power the dyno has to become a measurement device. If we do reasonable work in a useable facility the dyno will tell us whether we made the correct decisions while building the engine from a power standpoint. The same as a micrometer is necessary to properly measure piston-to-wall clearance or bearing clearances.

Facility: Includes primarily the dyno cell but it also has to include fuel storage. The facility includes the ventilation, engine air supply and water system. For most of us it is the most difficult area to change. Through the years I have found we could do some incredibly quick and dirty things to accomplish adequate ventilation, engine air supply, measurement of air temperatures/humidity and exhaust system pieces.

However anytime we did chose the quick and dirty route the facility was very difficult to work in and we had to be very careful if we were to collect useable data by our pre-1989 data standards. Considerations include fans, blowers, and ducting for both cell air ventilation and engine air supply, water supply, drains, and fire-extinguisher systems. **Remember, no compressed-air lines or fuel storage in a dyno cell. The** big can of worms is to achieve noise containment to permit running an open exhaust system. In 1992 two of our customers reported the positive results of unsealing their exhaust system. In this category one needs to know what pieces to buy and how to do it right the first time or be open-minded enough to admit changes are necessary.

Equipment Selection: Brake/absorption unit, engine stand, oil heating/cooling, engine cooling system, possible outlet brake water heat recovery systems for northern facilities, pumps, fuel supply system, and for most of us an ignition power supply. **No serious engine builder uses a battery for the power source for a battery operated ignition system.** The difficulty here is trying to figure out what equipment to buy. We give away a parts list with sources for the asking and request a handling fee so we can break even.

Data Acquisition: We now need to separate data acquisition from data analysis. There are numerous systems that would work on an inertia wheel dyno such as a Superflow 730. But a manually controlled water brake is a different game to get usable data. To date the DePac system is the only one I have seen that produces useable data on a manually controlled dyno. Hopefully there will be other companies that will be able to produce a comparable system to allow purchasers optional sources. So far I have not seen any data from any other system that compares in any way. How about it DAS system people?? Send me some data files to show me. There's a lot of marketplace room for something to compete with the Depac. In this category we not only have to figure out what to buy because there are so few choices, but many times how to install it and then we still have to develop valid test procedures. Several customers have educated me as to how to use a SF901 to get repeatable data. We do share this information with Stahl Dyno Program customers.

Data Analysis: This also used to be the exclusive property of Depac. However, now that we have exceeded the capability of the Depac program with our Stahl Dyno Program I believe we have set the new standard. The program is now available for Superflow owners and Depac owners. We are in a position to do special versions to read data from any DAS (Data Acquisition System) with data in rpm increments. My experience with the over 3000 tests on my computer has proven to me that it takes longer to analyze the data from, for example, 5 different exhaust-system combinations than it takes to perform the tests. Before graphical software I was not able to consistently do proper analysis due to all the complexity of trying to relate so much numerical data. We are very pleased with the early response to the tutorial demo for the Stahl Dyno Program that we started shipping in February. Several people have commented that it looks complicated in the beginning but as they spent more time with it they discovered it to be quite intuitive and logical to use. The tutorial demo program is available for $25.00 and there are three versions of the working version that sell for $495 or $695 depending upon the application. We will do special versions to read rpm-based data that comes from other sources. Since the Depac data acquisition system came on the market and raised the standards I have found I have had to relearn and rethink many many subjects. As far as I'm concerned all testing I participated in or was made aware of prior to 1989 was done incorrectly or had a combination of poor data repeatability and poor analysis tools. This resulted in not having the proper information to make good conclusions. The workload/time requirement placed on me during the development of our dyno program software over the past 23 months has certainly been educational. I found it necessary to change my thinking on numerous items. Consequently at this time I do not believe it is possible to do any valid testing using steady-state testing for anything other than stationary engines. In other words for those few people still stuck in the rut of steady-state testing I can only ask, "Is that how the engine is used in the race car?"

As of today my vision says the most versatile brake is the SF901 (new or used). I believe it is possible to get data for most applications with the built-in DAS. Manually controlled dynos currently must use a DePac. Really serious people need to build inertia wheel systems and go to time-based DAS. We can help with design of inertia wheels and we have software.

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