Crankshop 1500 three cylinder engine

On the wall in our control room, I have a cork bulletin board covered with old Polaroid photos of dyno tuners from the 1980's. In the upper left hand corner is a photo of Crankshop owner Larry Audette, about 23 years younger with lots of brown hair. He's standing, grinning, next to one of his early creations—a three cylinder "Mach 1 ½" that made 187 HP, incredible power 23 years ago! Larry used to buy Mach 1 engines, saw crankcases in half and create these big engines by welding crankcases and heads to make triples out of twins to sell to open mod racers. As I recall, Larry was eventually the first to make 200 HP here, and we celebrated that incredible dyno run with an $8.00 bottle of Dom Batavia champagne-like fizzy wine.

The eighties and early nineties were great years at DynoTech (then called C&H Dyno Service after my main business C&H Welding Supply which capitalized the dyno project). Many of the successful "eastern" aftermarket sled engine modifiers/ pipe builders used my then-revolutionary sled engine dyno to hone their engine and pipe building skills. Tim Bender, Crankshop Larry, Cycledyne Joe, Dan&Dale, DynoPort Rich, John Hooper, HTG Rob, and Greg Jaws all succeeded in making bigger power—in part by testing here—sticking pistons, grinding ports, cutting and welding pipes, boring cylinders bigger and sticking even more pistons! I used to buy industrial strength muriatic acid by the gallon. None of us really knew what BSFC or A/F ratio meant back then, but we all knew HORSEPOWER. More is better. One by one, out of necessity they all acquired their own in-house dyno testing equipment, but the good memories live on. Today, many full and part time engine builders still come to test and tune powerful engines. Due in part to this website these often young people come here with great knowledge of things like BSFC and BMEP, which makes their learning curves way less steep than the many dyno pioneers who came here before them.

I was pleased when Larry Audette called to see about dyno testing one of his big 1500 engines to compare early and late pipe design. Apparently, the dyno absorber that Larry designed and machined out of billet for his own testing was either out of commission or out of holding power for this high HP assessment.

In the early years, Crankshop big mod engines were sometimes-porous weldments with crankshafts made by pressing extra crank throws and con rods onto two cylinder OEM cranks. Today these three (and sometimes four) cylinder monstrous engines are made with custom cast crankcases (aluminum or magnesium), huge cast cylinders and heads, and crankshafts made stoutly out of billet steel to minimize the issue of torsional vibrations that often plague OEM crankshafts with extra cylinders pressed on. Engine purchasers have their choice of either case reed or twin rotary valve induction. Polaris triple ignitions are usually provided.

This particular 1500 is Larry's own case reed inducted lakerace engine, brought here by his pal Todd Demaires. I believe this sled still holds the "all-motor lakeracer" ET and MPH records at the AmSnow/ DTR Adirondack Shootout in 660ft. The engine is mounted solidly to an aluminum plate without rubber motor mounts to dampen floatbowl-foaming vibration. But even though solid or semi-solid mounts often create awful fuel-flow issues, this 1500 triple billet 76mm stroke crankshaft is balanced to perfection, and smooth as a sewing machine on the dyno at high revs. As we can see in examining the test data, fuel flow of the 110 octane gas is smooth and steady through the Crankshop 52 mm carbs. I have had the opportunity to dyno tune consumers' similar CS1500 engines, and this one is typical and not a one-off specially built engine for DynoTech. What you see here is what you should expect (and maybe more). These tests are done in "lake race" conditions, with cool engine temperatures.

The purpose of the test session was to compare early and current pipe configurations, and to demonstrate the power of this engine. Early (discontinued 6-7 years ago) pipes were called "10" stampings, and the modern versions referred to as "22s". Though this engine had no airbox to facilitate measuring CFM, we can see that the fuel flow with the 22 pipes was higher, implying that the 22 pipes flow more air. Higher HP with higher airflow is always better! So if you have one of these engines with early pipes, an upgrade would surely be a worthwhile consideration.

CS1500 triple with seven year old "10" pipe stampings

EngSpd RPM	STPTrq Clb-ft	STPPwr CHp	BSFC B lb/hph	Fuel B lb/hr	WtrOut degF	AirTmp degF	STPCor Factor	TsTim2 Second
6800	161.3	208.8	0.655	131.1	62	63	1.037	0
6900	165.1	216.9	0.635	132.2	63	63	1.037	0.3
7000	166.7	222.1	0.581	123.9	65	63	1.037	0.6
7100	169.6	229.3	0.605	133.1	65	63	1.037	0.8
7200	174.6	239.3	0.585	134.4	66	63	1.037	1.0
7300	177.7	247.0	0.595	141.0	67	63	1.037	1.6
7400	178.7	251.7	0.589	142.3	67	62	1.036	1.7
7500	184.7	263.7	0.582	147.7	68	61	1.035	2.3
7600	192.3	278.2	0.564	150.8	69	61	1.035	2.7
7700	192.5	282.2	0.553	150.0	69	61	1.035	2.8
7800	198.5	294.8	0.538	152.5	69	61	1.035	3.2
7900	203.3	305.8	0.512	150.6	69	61	1.035	3.7
8000	202.7	308.7	0.510	151.4	69	61	1.035	3.7
8100	207.0	319.3	0.507	155.4	69	62	1.036	4.4
8200	205.2	320.3	0.509	156.8	69	61	1.035	5.1
8300	202.9	320.7	0.506	155.9	69	61	1.035	5.2
8400	200.9	321.4	0.495	153.3	69	59	1.033	5.7
8500	198.2	320.7	0.500	154.5	69	59	1.033	6.0

CS1500 triple with newer "22" pipe stampings

EngSpd RPM	STPTrq Clb-ft	STPPwr CHp	BSFC B lb/hph	Fuel B lb/hr	WtrOut degF	AirTmp degF	STPCor Factor	TsTim2 Second
6700	173.8	221.7	0.631	134.7	56	60	1.034	0
6800	175.1	226.7	0.618	134.9	56	60	1.034	0.1
6900	178.4	234.3	0.628	141.6	57	60	1.034	0.7
7000	189.8	252.9	0.608	148.0	58	60	1.034	1.2
7100	190.9	258.1	0.587	145.9	58	60	1.034	1.3
7200	198.9	272.7	0.569	149.1	58	61	1.035	1.9
7300	199.1	276.8	0.568	151.1	59	61	1.035	1.9

7400	208.6	294.0	0.564	160.0	60	59	1.033	2.5
7500	210.5	300.6	0.546	158.2	60	59	1.033	2.7
7600	216.3	313.0	0.507	153.0	60	59	1.033	3.1
7700	220.4	323.2	0.496	154.6	61	59	1.033	3.6
7800	222.3	330.2	0.464	147.6	62	59	1.033	4.0
7900	221.7	333.5	0.471	151.3	63	59	1.033	4.1
8000	222.7	339.2	0.464	151.9	66	57	1.031	4.7
8100	221.2	341.1	0.478	157.6	67	57	1.031	4.9
8200	218.8	341.7	0.485	159.7	70	58	1.032	5.3
8300	215.2	340.0	0.497	162.8	71	59	1.033	5.5
8400	209.3	334.8	0.515	166.1	72	60	1.034	6.1