My 1789 Chevy Rod Engine – A 12-Month Search for Power and Highway Comfort

Last year, after more than 25 years owning a mostly stock SV Alpine, I headed down a road that may help others looking for more power and better highway cruising from the standard Alpine engine. While this article will mostly focus on the 'more power' side of equation, it began with the desire to cruise more comfortably at highway speeds.

Step one: Reducing rev's on the highway

After years of coveting an OD transmission, spring of 2003 was my year and I purchased a rebuilt tranny from Alpine West Midlands in the UK. (Just as an aside, the OD was an anniversary present from my wife. Anybody jealous? You can't have her.) Rather than just pull the old transmission, I decided it would be a good time to pull the engine too, replace the motor mounts and try to stop some of the oil leaks I'd put up with for so long. So, I posted a simple question on the SAOC Discussion Board: "What else should I do while my engine is out?"

I got some great feedback, but that posting also led me to a yearlong email and telephone conversation with Jim Ellis ("Jim E", as he's known on the board). Before Jim headed down the V6 Dark Side, he'd taken the basic 1725 engine about as far as possible in his search for more power and torque and he became an advisor and mentor to me. Although I'd never before been inside my engine (or any engine, for that matter) with Jim's encouragement and advice, I had my stock camshaft reground by Delta Camshafts to their KB profile. It was not difficult to remove and re-install it, even for a novice, and there was a very noticeable difference in torque when I was done. I highly recommend the KB grind to anyone looking to make their 1725 a little more powerful, without sacrificing drivability in traffic. (They have more aggressive profiles, but this is the recommended one for all-round drivability.) I also recommend the OD addition. It was well worth the expense (around $800, plus shipping) and effort, as the ability of the car to cruise at highway speeds was dramatically improved.

Of course, the path to more power has no real end, and I didn't stop there. I swapped my Strombergs for a Weber 32/36 and replaced the points with a Pertronix ignitor. If you haven't seen Jim's article on ways to add more power to a 1725, I highly recommend you email him and ask for it.

Unfortunately, while I was very happy with the power and improved cruising ability, the reality was that I'd beefed up a very tired engine. The pistons and rings hadn't been touched in close to 30 years and I had significant blow by (exhaust gas blowing out the valve cover) and very dirty exhaust. So, it was time for an engine rebuild. And more power.

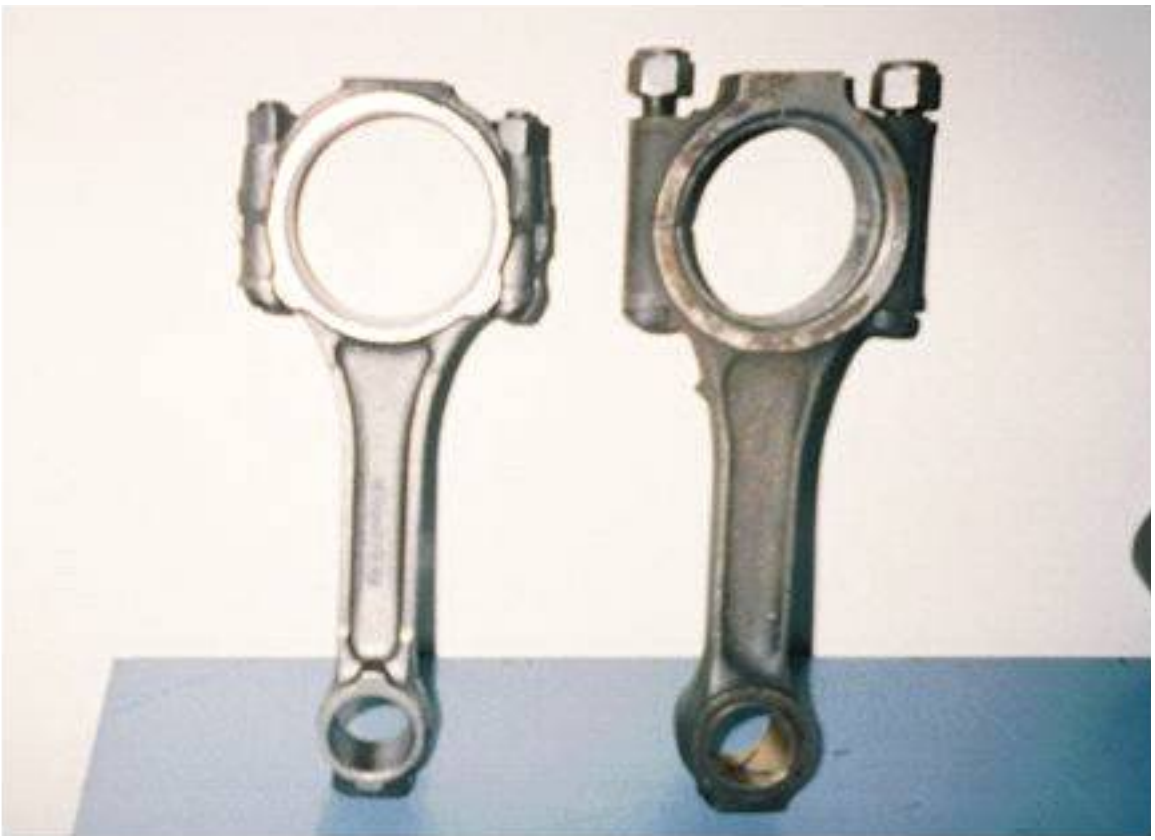
But, on the way, I returned briefly to the highway cruising issue. I also needed new tires. Know how you can walk into Home Depot to buy a bolt and walk out $100 poorer? Well, I didn't want to put new tires on my 38-year-old wires and decided to convert to Minilites (the 14 inch VB Minator version, in the end). That required new hubs, of

course, which I didn't want to put on a rear end that hadn't been touched 40 years. But, as long as I was having the rear end rebuilt, I decided it would be a good time to switch to a 3.89 rear end. Enter Jan Servaites. Jan rebuilt a rear end for me with a new 3.89 gear, and I gave him my old one in return. Again, the improvement on the highway was significant. I gave up some of my newfound power off the line, but if you want to enjoy you car above 50 mph, you can't beat the OD/3.89 combination.

Designing and building the new engine

But, back to the engine. While my car was basically stock, it did not have the original engine, so it was too late to worry about matching numbers. Still, I could have just rebuilt that one, but I wanted to be able to continue driving the car while I worked on the engine. Also, I'd never built an engine before and wanted the option of putting the old one back in if the rebuilt one didn't work. So, I decided to build a new one.

I bought some of Jim's surplus 1725 parts, and began to plan for my new engine. I tried to find +90 pistons, but they don't seem to exist anymore. I considered having a set made, but stumbled on a new set of +60's on eBay that everyone else seems to have missed and bought them for $45. I could have stopped there and headed off to the machine shop, but Jim had another recommendation: Chevy connecting rods. Jan wrote about this in a recent issue of the Marque (Issue 7). The rods used in the old (mid 60's) Chevy II/Nova 4-cylinder engine (I believe these were also used on some of the later 6 cylinder engines) are almost the exact same length of the Alpine rods, but stronger and lighter and with a little bit of modification to the rods and crankshaft, they'll work in our engines. I knew enough by now to trust Jim's recommendations, so I bought a set of reconditioned rods at my local Advance Auto Parts for about $25 each.



Chevy Rod (left) vs. Alpine Rod

Jim recommended lightening the flywheel to prevent damage to the transmission input shaft due to the increased torque of the new engine and I bought a lightened flywheel from Jan.

I collected the various bits I would need and armed with my workshop manual, some web surfing and more consultation from Jim, I put together a set of instructions for my machine shop on how to prepare everything for a 1789 Chevy Rod Alpine Engine. Here are the details:

Engine Block

- Clean and magnaflux.
- Resurface deck.
- Increase bore to +.060 – should be 3.2702/3.2706, but verify against pistons. Clearance should be .0015".

Crankshaft

- Clean, magnaflux and resurface main journals (mine were .010 under when I started, they took them to .020).
- Grind rod journals to 2.000 inches to match the Chevy rods.

Connecting Rods

- Drill top oil hole to match Alpine rods (Chevy rods don't have one, I gave them an Alpine rod for reference).
- Side dress big ends' length and width to fit the Alpine crank and in the 3.27 bore. The recommended side clearance for Chevy rods is 0007-.0027, rather than 0.009-0.013 for Alpine rods. (Note: The machine shop recommended that I widen the crankshaft to accommodate the Chevy rods, rather than dress the rod width, which I did.)
- Hone small end to fit Sunbeam wrist pin. The wrist pin hole needs to be honed approximately .030 inches to float the Sunbeam wrist pins in the Chevy rods. The clearance should be .0005. (Note: we looked to see if it would be possible to put Alpine bushings in, but this would have left the small ends dangerously thin. We may have been able to find other bushings that would work, but elected to simply run them free-floating.)
- Another note: When it comes time to install everything, the torque setting for the Chevy rod bolts is 35 lbs, rather than the 24 lbs for the Alpine bolts.

Pistons

- Cut .060 inch from the top of the pistons (the difference in height between the Chevy rods and the stock Alpine rods) plus however much was removed from the deck. (Note: my machine shop did this last and test fit the pistons into the block to get an exact measurement, which was a good idea. In my case, the total was .064.)

Balance

- Balance the rotating assembly.

Piston after being shortened. Note smaller dish.

Rebuild costs

I visited three machine shops before selecting the finalist. The 'winner' was also the most expensive, but they had the best equipment and gave me the greatest level of comfort, which was worth a premium. They were especially high on the crankshaft work (their specialty) relative to Standard Crankshaft in Charlotte, NC (www.standardcrankshaft.com). Jim has used Standard before and was very happy with their work, which would have been around $200 less than I paid, even with shipping costs. But, as a novice at this, I wanted to have almost everything done at one place. And, they let me stop by all I wanted and watch, and even let me work in their shop to remove casting flash after the engine had been baked and bead blasted, so I am comfortable with my decision.

Approximate costs:

Machine Shop.....$1400
Pistons.....45
Rings.....45
Chevy rods.....100
Reground camshaft (Delta KB).....50
Lightened flywheel.....80
Bearings.....60
Total.....$1780

The head is not included in the total above. I had purchased a rebuilt Vizard head with a three-angle grind from Jim last spring, originally intending to put it on my old engine. I held off, once I realized that the old engine needed too much work, and saved it for this engine.

Engine Compression and thoughts for next time

Early in the project, I toyed with increasing the stroke and displacement by having the crank offset-ground. Taking the main journals from the standard 2.375 inches to 2 inches would have allowed me to increase the stroke, increasing displacement from the 1789 provided by the +60 pistons to somewhere between 1850 and 1900. Unfortunately, I played with this in an Excel spreadsheet I created to calculate compression ratio (I'm happy to email this to anyone who wants it) and found the combination would gave me too much compression (above 10.5:1). Without the offset, I was just under 9.5:1. I could have increased the size of the combustion chamber in the Vizard head to bring the ratio back down, but decided not to go that far since I had the head all ready to go by that time. Also, this would have required further milling of the pistons, and I was concerned about weakening them by taking too much off. However, if I had it to do all over, I would consider having custom pistons made, which <u>in theory</u> could be combined with a larger Vizard head and/or a lower/profile to allow the offset grind with acceptable compression.

Driving it

Due to the lightened flywheel, my first impressions were not as dramatic as I expected and I am still babying the engine (less than 200 miles on it, as I write this). Also, I am still fiddling with the Weber carb in order to get the jetting just right, but I am very happy with the outcome. The car has plenty of power at all speeds and the engine is far smoother than before. (Just a note here: my old engine is the only Alpine I've ever driven, and I have no idea what was inside of it, as I've never opened up the engine.) It idles smoothly at around 1000 RPMs and has ample torque all the way up to around 70 mph (that's the fastest I've gone to date). It pulls especially well around 3000 RPMs, up to around 4500. It cruises comfortably on the highway at around 65, at is only doing 4000 RPMs at 70. It feels like it could go much faster. Jim tells me it probably redlined at about 7500 RPMs. I'll have to just trust him on that one.

The other thing I've noticed (and remember, I've also changed to a 3.89 rear end) is that I use the overdrive much less than before. With my old engine, I used the OD anytime I was cruising above 45 MPH (in 3rd gear). Dropping the revs made the car much more comfortable to drive. Now, I really don't use it until I get up to highway speeds, and could honestly cruise at 65 without it.

In short, I've having a ball! I have a stereo in the car, but honestly haven't turned it on once since I put the new engine in. Originally, that was because I wanted to be able to listen to the engine in case anything went wrong. Now, it's because I am having too

much fun driving to be distracted by anything else. I'll turn it on eventually, but not for a while.

Am I done? I doubt it. Headers, fully electronic ignition, electric fuel pump; they are all possibilities at this point. And, I keep eyeing twin DCOE carbs and thinking about how much more power they'd add. Then I remember: this is exactly how Jim Ellis started his path towards the Dark Side. Stay tuned…