

Miscellaneous Hints, Thoughts, and Ideas

by
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Besides being a hole down which one throws money (with the possible hope that a white rabbit will appear and amaze your friends), an older car is also something of a challenge to the intellect since you get such interesting problems to solve, often with so little information. This article explores some, probably obvious, things I have stumbled across or had to solve in the last few years. I'll discuss specific vehicles here to avoid any possible confusion, but anything I discuss will probably generalize to other vehicles with similar problems.

One of the more frustrating things that can happen to you is when you take on what appears to be the most straightforward and simple job, and then find that everything you touch turns to dross and lies in a smoldering pile at your feet. For example, I bought this 1976 Cadillac Seville from a co-worker for what was probably a good price. This was to be my wife's regular around town car, a present to replace the 51 Dodge she was then driving. Well, this Cadillac was not quite a show car, but it did have a straight body, a running engine, and a nice leather interior. One of the features was that the motor had been changed and replaced with one from a 77 Oldsmobile. Thus, not only did I get a car without what I understand is a rather problematic fuel injection system, but I also got a car, registered in California, with a non-California engine. This latter fact I didn't know. So, after actually paying for the car, one of the first steps was to inspect it and find out why the oil pan was sitting on top of the steering linkage (broken motor mount bolt - apparently the replacement engine was removed from a wreck and the mechanic never thought to check that it was installed right) and to get the car running correctly.

The next step was to transfer title, which in California also includes an inspection to ensure that the pollution equipment is installed correctly and operational. Well, remember this car has a different engine. So, no normal inspection station would touch it ("Hey buddy, that's the wrong engine, we don't know what to do with it, you have a big problem..." you know the story). So, being vaguely resourceful, I called the appropriate state agency and asked what to do and found out that there are special state inspection stations for such situations, and that the stations charge no inspection fee (compared to a typical \$20 to \$30 fee for regular privately owned inspection stations). Wonderful, thinks I, so I drive right on down there. You can guess what they found --- the mechanic who had changed the engine had also either thrown away or bypassed all the pollution equipment, including using the wrong air cleaner (fuel injected cars did not require an air cleaner with the thermostatic control, carburized cars like the Olds did). Well, no problem, thinks I, just go get them parts, put them on, and all's swell. So, here's what happens: the air cleaner is easy, just get one from a junk yard. The plumbing is pretty tricky, but the (really very helpful) guy at the state inspection station gave me a photocopy of a manual page showing how to hook it all up, so it should be easy, except there is this thing called an "SAVM" shown and no one sells it and the dealers don't even show it in the parts book.

Now, it turns out that if you need an unavailable pollution control part you can get a waiver, but you have to prove that it is unavailable. There are some places that specialize in these parts (at suitable prices, of course) and one of them had this thing for \$35. About this time, I have to visit the east coast, so while there I go to a wrecking yard and pay \$15 for an SAVM (it stands for spark advance vacuum modulator - on California cars there was a manifold mounted assembly that would control the spark advance as a function of coolant temperature. This thing was used on other cars, presumably because it was cheaper). Wow, thinks I, I saved big bucks by flying across the country

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and buying this thing. So I get home and hook it up and the car doesn't run right at all. Now, the fellow from whom I bought it felt that running correctly meant that it would start and stop on command. I personally like things like a smooth idle, and decent mileage and with this nifty new used part that certainly wasn't happening. Looking inside the mystery part revealed that it had a couple of rubber diaphragms and some flapper valves, and all had turned to mush, which meant that two different kinds of vacuum and the vacuum advance connection all leaked together. This clearly was not what GM had in mind for the part. Solution - a bit of creative tinkering to make the thing stay in one position or the other (but not both simultaneously), so that it did not short out the different vacuum circuits. Now the car runs right, so a quick trip to an Olds dealer to buy the timing marker (a plastic goodie that is attached to the timing chain cover with a bolt - apparently this is some kind of improvement over the old welded on pointer, that is until it falls off and gets lost), set the timing correctly, and revisit the inspection station. The car passed all tests and was never more than a tenth of the maximum permitted emission levels, and performance was greatly improved over when I got it. Morals? - 1. no need to defeat pollution equipment, it just makes it worse, 2. don't buy used SAVM valves, and 3. the official inspection station can be your friend if you let them.

But wait, it gets worse. Since I now knew that the mechanic who had been maintaining this car was a total fool, everything was suspect, and I started checking routine things. He had bypassed the electric fuel pump, and connected the mechanical pump to the fuel return line, and then pinched off the return line by jamming a bolt into it (fixed that no problem), he had just "repacked" the wheel bearings, except that he forgot to put grease on them (changed all wheel bearings), and so on. After quite a few of these sometimes petty, sometimes significant mess ups, I got to the brakes. Now some car manuals say to change brake fluid every 2 years because the fluid is hygroscopic (absorbs water) and it becomes corrosive as it absorbs more water (see articles in SK reviewing the benefits of DoT 5 brake fluid), and every car I have bought which has sat for years has had all the wheel cylinders frozen in place. So, I decide to change the brake fluid. What could be simpler??? right??? Wrong.

First, the bleed fittings had been tightened with the good ol' crescent wrench and vice grip one too many times and one of them would not come out at all - it twisted off inside the caliper. This of course was a problem. Fortunately, an acetylene torch and an easy-out got the broken fitting out. If you have to do this, the torch is used to heat the caliper (or whatever) and make it expand. The easy out will then back the fitting out easily most of the time. Make sure you use the kind of easy-out that is basically a tapered rod with a square cross section rather than the kind with the reverse threads. The kind with the reverse threads tends to expand the fitting in the hole and you will never ever get it out (well, maybe with a lot of drilling and tapping and cursing), while the square kind does not expand the fitting - just don't pound it in too hard. Now, what to do for the missing fitting? HINT - all GM stuff is the same unless proven different - so I used a bleed fitting from an old cylinder from a 65 Chevy truck that was lying around. Of course, I could have gone to the parts store and bought a new one, but that would be cheating.

Now, just refill and bleed, right??? Wrong again. No matter how much I bled from that thing, the brakes would not get firm. After bleeding about 600 gallons of fluid through the car, I figured that I probably didn't understand something. After much searching, I ran across the advice (in the installation instructions for a replacement master cylinder I bought in desperation) that if the master cylinder is mounted at an angle in the car, the car must be jacked up to level the cylinder before bleeding. Well, I didn't know that (did you?), so I tried it. To level the cylinder, I had to jack the rear end of the car about 4 feet off the ground. When I bled it again, a large air bubble came out. Apparently on this car the brake line to the rear wheels goes all the way to the top of the well over the

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differential, and air gets trapped in that high spot unless you jack up the car or use a pressure bleeder (I now own a pressure bleeder, got it at a swap meet for \$5, and filled it with \$30 of brake fluid - it's far easier than jacking up the car, and quicker too). This didn't quite fix the problem cause the rear brakes were not adjusting correctly, because the star wheels on the self adjusters had become rounded. HINT - if you are working on self adjusting brakes, be sure the adjuster can rotate the star wheel without slipping. If it slips, the wheel won't turn, and the brakes won't adjust at all. These wheels are available from many auto parts stores - if you find one bad, change both and be sure not to reverse the left and right sides. After changing them, operate the adjuster lever by hand and make sure that when it rotates the wheel the shoes expand.

For stupidest mistake of the century, consider the following nomination - warning, don't try this yourself, or your wallet will hate you. The car, an 85 Porsche 944, but any car with belt driven overhead cams will do. The problem - a leaky water pump "What??? what does that have to do with the cam belt?? "you ask. Well on this car, the water pump is driven by the back side of the cam belt, so to change the water pump you remove the electric fans, a bunch of hoses, a bunch of belts, the timing belt cover, two timing belts (one for the balance shafts, one for the cam shafts), and then the rear timing cover. But, the rear timing cover won't clear the pulley on the front of the crank shaft, so that has to come off, and of course it is held on by one giant nut tightened by a large gorilla. (Test - do you see the mistake yet???) Well, it took a rather large piece of pipe and a breaker bar to loosen the nut and then the pulley came off. With part of an old shock absorber and some steel pins I made a special spanner wrench for holding the balance shafts so I could get the notched pulleys off them, and then I could get at the water pump. Of course, being an aluminum engine, half the bolts were frozen and twisted off in place (drill drill tap tap curse curse drill drill ...)but eventually the whole thing was done and reassembled (did you figure out the mistake yet???) and I started it to test it. Well, it ran on 3 cylinders rather than 4 like it is supposed to (got it yet??). A quick compression test showed 0 compression in one cylinder, plenty in the rest, and pulling the cam off the top of the engine confirmed that I had bent a valve. Add another \$200 for an un-needed valve job, re-assemble, and all was well. What was the mistake??? Of course - I pulled the timing belt off before loosening the pulley bolt. When I loosened the pulley bolt the engine turned a bit, and one of the pistons pressed on one of the valves and bent it about ten degrees. Never do this, you feel soooooo stupid afterwards - always make sure the valve train is properly connected to the crank shaft before doing anything that could rotate the engine. And, by the way, if anyone else works on a 944, I found out that the price of rebuilt water pumps for that car varies from \$850 to \$250, with the cheapest being the oldest Porsche dealer in the state, and the most expensive being a discount parts supplier, so shop around for parts carefully for that car.

Another problem which is likely to plague some SK readers is shift linkage problems, particularly on column shift vehicles. The following relates to a 65 Chevy pickup which is used daily as a working truck by a friend (and which I have kept running for the last 20 years or so). As these vehicles age, the shift linkage gets increasingly sloppy, until it starts to jam leaving you stuck in some gear (usually third) in the middle of traffic. The quick solution is to open the hood and to push and pull on the rods which connect the column to the transmission to get the thing back into neutral. The more this happens the more maddening it gets, and eventually the vehicle is almost undriveable.

Now, on this vintage Chevy truck, and probably on passenger cars as well, the column shift moves a selector with a notch and two side extensions. The notch grabs either a reverse/first selector lever, or a second/third selector lever by engaging a pall that extends from each lever. Once engaged and moved from the neutral position, the pall on the other (not selected) lever presses against the

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side extensions on the selector to prevent it from disengaging from the pall on the selected lever. See figure.¹

Several things wear out on this mechanism, and they all have to be dealt with. First, the palls wear down by rubbing against the selector lever. The solution here is to weld up the palls so that they extend at least 3/4 to 5/16 inch from the levers, and to grind them back to shape. The second thing that happens is that the bearings at each end of the selector assembly wear down and have to be re-adjusted - there are two bolts 180 degrees apart at the lower end of the selector assembly which can be loosened to allow the lower bearing to be rotated. This causes the bolts to move in angled slots which will (for a while) take up the free play in the selector mechanism. If this doesn't work because all the adjustment is already used up, the other alternative is to add a shim (I used a nail) above the upper bearing to move it down. With the adjustment all the way loosened, the upper bearing can be moved downward and retained with a nail inserted through an oil hole. Or you can add a washer between the upper selector bearing and the upper lever - if you use a washer, be sure to use a copper or nylon washer and not steel - the former makes a good bearing, while the steel will cut into the levers.

The final thing that happens is that the bushings at the lower (transmission) end and at the upper end of the linkage wear out and the linkage develops so much slop that no one can shift it. After much messing around, I found that the Hearst linkage repair kit (which was hanging on the wall of my local all night auto parts store) had exactly the right white nylon bushings for the lower end. I used two bushings (face to face) on each rod, at the lower end to get a snug fit. At the top end, the lower lever requires a bushing of 1/2 inch ID. Since I couldn't find one of those, I made my own by cutting a short piece of copper water pipe and sliding it over the rod end, along with two brass washers on either side of the lever. The upper rod attaches to the bushing differently, but the rod MUST be adjusted so that it is parallel to the transmission lever (do this by rotating the rod in the rod end and then retightening it).

After all the bushings are replaced, be sure to realign the palls so that when the transmission is in neutral they line up with each other, and your car (or truck) will shift like new again. And, at least one annoying rattle will disappear since the linkage is not shaking around any more.

¹Bill, if you have a better exploded view of this than my hand drawn sketch, please use it to replace or augment this sketch