

GMC Western States

Tech Center Number 45 – November 1, 2005

A Note from Bert Curtis



Pictured: Fay and Bert Curtis

Hi, from your new Tech VP, Bert Curtis. I'd like to tell you a little bit about myself and your chapter's continuing Tech Center goals for 2006.

My wife, Fay, and I have owned our GMC since Nov. 1998. It was not only our first GMC, but our first RV. We have learned a lot about both in the last 7 years. In fact, we worked for almost two years on our Glenbrook after we drove it home, before we drove it again. At the 2000 Western States Casa de Fruta rally (which we attended without our coach) one of the main questions we asked was "Do you really drive your coach the speed limit?". Fortunately the answer was always yes with sometimes an "and faster" added in. So, we knew there was hope out there, especially with my prior mechanical background.

Speaking of that, my first car was a Fiat 600, bought with the engine in the back seat, disassembled. Since then, I've had fun keeping a Bugeye Sprite running, along with various Lotuses, Corvairs, and other assorted cars. I worked as a foreign car mechanic in several shops, went into architectural design and then we started our own business making replacement frames, suspensions, and bodies for Lotus street and race

cars. Some of these have raced in Europe, Australia, and the Far East. My knowledge of the GMCs is not 100%, but as we have worked on every chassis system but the final drive, during our coach ownership and have had our share of "odd" problems, I do have a knowledge base and am always willing to learn and expand it. So this year, I hope to address potential trouble areas and take some of the perplexity and mystery out of owning, maintaining, and enjoying a GMC.

I hope that everyone had a great summer with their GMCs and that those of you who attended the Estes Park rally had a great time, learned something new at the seminars, and had a safe uneventful journey home. As Fay and I were unable to attend, Donna Prishmont has once again taken great notes and her summaries of the seminars are included in this issue of the Tech Center news.

I am looking forward to continuing the great tech center traditions of my predecessors and in that spirit, start this issue with items I feel are very important to a lot of us, maintenance and preventative maintenance. Most of us bought our coaches second, third, or fourth hand and all of us want to get where we are going and back, without mechanical problems. Hence, we need to either know precisely how our coach has been maintained or start with a new baseline and then follow a set maintenance schedule. It is always easier to take care of a problem, or potential problem, at home than out in the wilderness. And, as most of our memories are not as good as they once were, keeping a journal of when (date and mileage) and what was done is very important!

For illustration purposes, I'm going to use our coach, a 1976 Glenbrook, as an example. We bought it knowing only that the engine and radiator had been replaced a year earlier and that the tires looked new. Not much to go on. On our way home, we learned that she badly needed shocks, as we went swaying and porpoising down the road when driving over 50 mph. That is when we decided to pretend that nothing had been maintained and to

start a baseline for a maintenance schedule. Following GM's guidelines as spelled out in the maintenance manual and reprinted below, we changed fluids, brake shoes and pads, lubed the chassis, and checked or changed all of the other items mentioned on the list. Now we just need to record and remember to follow the schedule. By doing this, we drastically reduce the possibility of roadside failure.

ENGINE, CHASSIS, AND BODY MAINTENANCE SCHEDULE:

Lube and General Maintenance:

When	Services
Every 3 months or 3,000 miles	Chassis lube, change engine oil
Every 6 months or 6,000 miles	Check fluid levels and a/c condition, clean air compressor filters
Every 6,000 miles	Rotate tires (check wheel nut torque after first 500 miles)
Every 12 months or 12,000 miles	Change transmission & final drive fluid, check cooling system
Every 24,000 miles	Clean and repack rear wheel bearings, check CV boots and seals

Safety Maintenance:

When	Services
Every 6 months or 6,000 miles	Check tires, wheels, exhaust system, drive belts, suspension, steering, brake & power steering
Every 12 months or 12,000 miles	Check drum brakes, parking brake, throttle linkage, bumpers, underbody

Emission Control Maintenance:

See your manual, as different years have different requirements

Preventive Maintenance - part 1 Starter and Alternator:

For the most part your coach's starter and alternator are totally forgotten, until something goes wrong (usually at the most inopportune time). If you are lucky, you will never need to replace one and with just a little preventive maintenance, you will get the maximum life out of yours.

The job of an alternator is to keep the batteries charged and to provide an adequate and steady supply of electricity to the vehicle's components while the engine is running. It not only charges the starting battery, but also the house batteries on most of our coaches. A by-product of producing this electricity is heat, which is why the alternator has plenty of cooling fins around its entire body and has its own cooling fan. To help keep it from overheating, make sure it is free of dirt, grease, or other debris on its exterior, every time you service your coach. Anything that traps heat inside it will also kill it in short order.

Also, check the condition of the electrical connections on the alternator and at the batteries. Loose or corroded connections will rob a percentage of the alternator's output, causing it to work harder. Be sure to check the belt too. If it is worn, loose, or damaged, the alternator will not perform well either. If a belt is loose, tighten it. If marginal, replace it. And while mentioning belts, be sure to replace it with the proper size to prevent slippage and squealing. The only way to stop a belt from squealing is to replace it.

While checking the belt condition and tension, be sure to also check the condition of the mounting hardware. If it is loose or the alternator is barely hanging on, the alternator will be subject to jarring and vibration, which may cause internal damage or possibly the total failure of the alternator. And the alternator relies on its mounting as a grounding source. Hence, a loose alternator will not be able to

deliver its full output due to a voltage drop at the poor ground. It will be forced into an early death due to working extra hard in what might be a losing battle to keep up!

Your starter, on the other hand, has just one job to perform: to start the engine. Otherwise it is just along for the ride. All it wants in return is a big jolt of electricity once in a while and a clean, dry place to live the rest of the time. So again, make sure all terminal connections are kept clean and tight. Check that the mounting bolts are clean and tight as well, as it also depends on these as a grounding source. Be sure to check the engine and battery grounds. Anything that causes a voltage drop on either the positive or negative side of the starter circuit will keep the starter from delivering its full cranking power.

Again, be sure to keep the outside of the starter clean. It is tucked along the right side of the engine block and is prone to being the recipient of fluid leaks from the engine. Locate and fix any leaks and then thoroughly clean the starter and surrounding areas. An oil, coolant, or any other gunk soaked starter is prone to dying at a very inconvenient time! Remember, it is easier to maintain or replace items that are kept clean. These two items, your starter and alternator, will reward the time you take to keep them clean and well connected with a very long life of service.

**Summaries of Tech Sessions at Estes Park,
CO
by Donna Prishmont
(with editing by Frank Condos
and Mike Cherry)**



**Problems Seen In the Shop by Jim Kanomata
9/22/05, 9:15 a.m.**

When you park your coach take a look underneath to see what may be leaking. Identify it before it gets worse.

After running your engine for a while, open your hatch, check condition of belts, tension, water leaks, constant velocity connections, oil leaks, etc.

Make sure you have a truck muffler and not a car muffler.

Jim sees many intake manifolds cracked under the carburetor.

Use a GMC AC/Delco Fan Clutch. Check to see fan clutch is not oily or dirty, indicating leakage.

Put in the Gene Fisher alternator diode adapter that prevents the wire from burning under the dash. Contact Jim on this, mail@appliedairfilters.com, or see Gene Fisher.

Use a deep cycle battery for the house battery.

Rear brake hose – It's not the miles but the length of time and aging of the rubber. It needs to be replaced. Replace front and back brake hoses. Call Alex Sirum to get these.

Replace the proportioning valve. It often gets "frozen" over time. The brass unit is the new one.

Fuel Filter – Put it down by the electric fuel pump in the back by the tank switching valve. Check with Jim for the number. Replace this in a timely manner.

Put a durable screen from the bumper frame to the lower radiator frame to prevent holes in the radiator.

A dual greaser for the rear bogies can be purchased from Jim. This insures greasing of both sides of the bogies.

Check the air conditioner hose as the pulley and belt can cut it if it hangs down and hits the A/C belt or pulley. This often happens with age.

Put in a steel fuel line going to the carburetor from the pump. Do not use hoses or fuel filter in this section!

Use 5/8" wrench to remove nut to fuel filter in carburetor, if you still have a filter there. Remove filter if you have one elsewhere in the fuel line. Replacing this filter often results in a fuel leak at the carburetor.

Weld the nut onto the plate that the final drive is attached to. This facilitates putting the bolt back in.

On the oil filter adapter that mounts to the engine, the rubber lines that go to the radiator should be changed at least every 10 years. If you break an oil line you can remove this adapter and put the filter right on and go down the road a little for service. There is a rubber seal between the adapter and the engine. You can replace this seal with the seal from an oil filter as it is the same.

Air bags usually leak through the "O" ring at the inlet to the airbag.

Brighter headlights are available like Halogen. (Or don't drive at night like Jim does.)

When replacing the final drive cover put in a new gasket. Don't use sealer as there is a vent or at least don't put sealer in the vent area. Don't remove the staples that hold the gasket pieces together.

Change engine coolant every 2-3 years.

Check the steering column above the steering box. The bolt that holds it is sometimes loose.

Check that you have an aluminum cone on the airbags; not plastic. Use anti-seize compound on the airbag mounting bolts.

Use synthetic grease and oil in final drive, transmission, engine, etc. It lasts longer and takes higher temperatures.

Fuel pump can dump gasoline into your engine if it is failing. Change the pump at least every 5 years.

Check the transmission vent on top of the transmission. In the event of an overflow, fluid can hit the exhaust manifold and start a fire. Put on a new fitting (ell) in the top of the transmission and run a hose off to the side to prevent this.

Replace your body pads if they are missing or flattened. These pads cushion the body from the frame.

On the distributor cap, make sure mechanical advance is working. Pins worn? Springs ok?

Radiator caps – 9 or 10 pound cap only, or the radiator may bust a seam along the tank.

Power For The Masses by Chuck Garton 9/22/05, 10:30 a.m.

Water System: Hooking up the water system, with a pressure regulator. Chuck uses 2 - 4 ft extensions with a "Y" as well as quick disconnects. You can let the water pressure off outside the coach when you are disconnecting. Try Kwik Link brand quick disconnect. He uses a brass check valve to replace the plastic OEM. He raised his water heater to put in a new valve to drain the water heater. On his kitchen drain pipe he uses clamps instead of gluing it so you can take it apart later.

He also put in a drain valve to drain the shower under the coach when dry camping. He put in a drain for the sink also. Chuck uses tubing that you heat up, then shape for the connection that forms as it cools.

Batteries: Chuck has installed hydrocaps on his golf cart batteries. The cost is about \$80 for six. Now he only has to add water about every 6 months.

Inverters: Tru Charge 40+ and ProSine 1000 inverters to run his refrigerator and various

accessories such as electric blanket, stereo receiver and amplifier, and TV while dry camping.

Three - 12 volt computer muffin fans replace the fan above the stove. They are very quiet. He uses an electric oil pump to pump up the oil pressure before he starts his engine.

Editor's note: Chuck's electronic interests are far, far beyond the average GMC owner. His changes and additions are something that must be seen to be believed, and even then you probably wouldn't believe it! Most of us just hope the engine starts, the lights come on, the H2O pump runs, maybe a little noise from the stereo.

Myth Busters – Stump the Experts – Frank Condos
What is True, a Myth, or an Opinion?
9/22/05, 1:00 p.m.

Frank used the format to stimulate discussions centered about some of the more controversial subjects. We have included some of the highlights.

The stock brake system was always marginal.

Fact: The brakes met the DOT certification requirement to stop from 60 mph within 200 ft for a vehicle over 10,800 lb

Opinion: They can be improved.

80mm front calipers

1-1/16 or 1-1/8 in wheel cylinders in the

intermediate rear wheel

carbon metallic pads and shoes

rear disc conversions

sensitized booster (not more braking just an easier pedal push)

Brakes – An electric vacuum pump is needed for safe operation

Fact: If the booster is not leaking, there will be at least two boosted applications with a dead engine.

Opinion: They do provide extra margin if the engine stalls. (The audience was split on this issue)

Four Wheel disc brakes on the rear are best.

Opinion: There is a problem with clearance on rough roads. They work great for stopping. Better

heat shed; better in water. They will lock up on a hard stop. Too much rear braking is not good. If you go larger on the rotor in the front then you have to balance it out in the rear.

Rear brake self adjusters will keep your shoe brakes adjusted.

Fact: Not unless you make hard back-up stops and then go forward for repeated adjustments. Most of us don't.

If your engine runs hot, use a 180 deg. Thermostat.

Fact: If it runs hot you have other problems. The system was designed to run more efficiently with a 195 deg thermostat. Some of the causes for over heating include dirty or clogged radiator, collapsed hoses especially the lower, incorrect timing, slipping belts failed fan clutch. Motorhome Enhancements (828-465-0678) displayed their new all aluminum radiator with better heat rejection and built in high performance oil and transmission coolers.

Shroud your radiator in the front and the back all the way around. Get an accurate temperature gauge to accurately measure your engine temp.

Distributor vacuum advance will work better off of manifold vacuum than carburetor ported vacuum.

Mark Mac Neil from DynoTune Shop in Santee, CA. commented that under part throttle low load the ported vacuum gives the correct vacuum advance under half throttle and higher loads they are the same. Mark recommends the MSD timing control to maximize ignition timing under the wide range of today's poor fuels

Current fuels can overheat even in the fuel tank and cause drivability problems.

Opinion: According to Mark Mac Neil, temperature measurements and tests with insulated tank bottoms indicate this may be true. Jim Anstett reported that he installed fiber ceramic paper (McMaster's Car catalog), 1/4 inch thick, on the bottom of the tank with contact cement Since then there have been no problems in 20,000 miles and 2 1/2 years.

Chuck Garton has a fuel temperature sensor in his gas tank and he has read it at 148 degrees at Baker, CA in August. Some reported that a refinery

near Denver reported that fuel can start boiling at 85 degrees F.

All steel radial tires are the only safe tire to run.

The session concluded with the question that sparked more opinions than there were navels in the room. The reader should refer to Chuck Botts writings from a previous Tech Center (Tech Center 40, June, 2003 which came out with Newsletter 52. See on website, www.gmcws.org).

**The Ultimate Coach – Marc & Lillian Trubert
9/23/05, 9:00 a.m.**

Marc and Lillian started out with “Baby”, their 23 ft GMC. The first thing they did was write a mission statement for their new coach, a 26 ft GMC Royale. The Truberts found their new Royale, “Roadrunner,” in Reno, NV. It has a new Mondello engine in it. Their mission statement is, “The final result will be a solid, all systems go, balanced and lighter vehicle with chosen latest innovations. The look will be a sleek, basic GMC with eye catching exterior. Built in storage will keep interior clean and uncluttered. Materials chosen will be a monochromatic, contemporary vehicle style with no wood or homelike decorating.

Lillian says that it is most important to have a project statement that you can get back to and not get sidetracked. Get estimates so you know what the costs will be. Watch the weight of your coach and have a storage plan. Lillian had a good handout, Renovating, a GMC Check List. It is very detailed and I’m sure she wouldn’t mind e-mailing it to you if you are thinking of renovating a GMC.

Finding someone who could help them renovate led them to Jim Bounds in Florida. They wrote everything down for better communication with Jim. You can check out everything that is being done to “Lillian’s” coach on Jim’s website, <http://www.gmccoop.com/> to see their unique exterior paint.

According to Lillian, you need approximately \$100,000 to renovate a coach. This includes picking up a coach for about \$20,000 or less,

\$10,000 to \$20,000 for a new engine, maybe even a Vortec, 8.1L. Expect \$15,000 to \$30,000 for the interior. Count on \$75 an hour for labor. As an example, it took 30 hours to put in a new MacNeil dash with GPS, satellite radio, etc. They’ve put in a flat array Tracvision satellite dish. Northwest RV supply is a good place to purchase appliances, etc.

Lillian feels that owners aren’t the best source of objective opinions. On decorating, Lillian suggests going monochromatic. It’s easier to decorate. Choose the bed you like, whether it be inner spring, air, or foam. Lillian also suggests C. R. Lawrence custom made windows for the GMC.

Lillian strongly reiterated throughout her talk that everyone has their own ideas of what is important to them and they should go with that without being concerned with other’s opinions, likes and dislikes.

**Essential GMC Knowledge – Duane Simmons
9/23/05, 10:30 a.m.**

Duane Simmons provided the rally attendees with an update of his excellent seminars on What Every GMC Owner Should Know and GMC Onan Power Drawer Electrical Trouble Shooting Demo. Duane’s seminars are especially valuable to new owners and also provide new insights and reminders to us old timers. Copies of these seminar handouts are available from the club secretary, Frank Condos.

**Front Bearings, Hubs/Knuckles by Dave Lenzi
9/24/05, 9:00 a.m.**

Dave discussed what he’s discovered recently about bearing failure. Reasons why assemblies are put together incorrectly: seals, knuckles often are not to print. He used a drawing made by GM in 1972 for illustration. The manual shows you doing the removal and replacement on the vehicle. Dave does this process on the bench as he believes it is easier and he is able to do a much better job.

He discussed axial clearance and what happens to it when you press the bearings onto the hub. (max.

.002) Many knuckle bores are out of round so you don't get a good fit. Dave believes the knuckle bore must be ground to get a good fit. Clearance and out of round both affect the final bearing clearance.

The torque on the nut on the end of the axle shaft is 140 ft lb to hold it square. On the outer seal, Dave finds the 3 bolt retainer is often distorted due to previous uneven tightening of the 3 bolts. He recommends rebending the ears on the plate to get them to where they should be – necessary for proper seal location. It is much easier to get the retainer plate evenly tightened on the bench than on the vehicle. The inner seal is the worst seal he's ever seen. This is where the problems are. The fit is important. Measure if you have the tools to see that it's preloaded against the shoulder. You want .020 deflection on the seal. Dave will be making a tool for putting the inner seal into the proper location. Again, it is easier and better to check final seal location on the bench than on the vehicle.

Lack of lubricant is the last cause of failure in bearings and failure of a seal. Dave's an absolute believer in grease fittings. He greases his bearings every fall with the grease fittings he installed in the knuckle. He also grinds grooves in the spacer between the two bearings to allow the grease to flow evenly to both bearings of the set. More bearings are ruined by assembly and disassembly than by lack of lubrication. To grease he loosens the axle nut about 1/8", pushes the axle shaft back toward the final drive to allow the grease to flow past the seal, then pumps in grease until clean grease flows past the inner seal. The excess grease is then cleaned off the outer CV joint shaft. He says it takes about a half hour to do one side.

Other good hints for maintaining the bearings: raise the front end up before a long trip and give the wheel a shake top to bottom to see if it's still tight; look at the inner seal and see if it is wet (it should be dry); wash new bearings with mineral spirits to get rid of the rust inhibitor; if you use parts cleaner, rinse with fresh mineral spirits. Dave uses Timken bearings.

Better Breathing by Emery Stora

9/24/05, 10:45 a.m.

Part One of Emery's seminar covered the installation of Thorley headers, and fabrication of a 3 inch exhaust system and a rear muffler.

Design Goals: Do it yourself fabrication; a rear muffler to reduce heat and noise; use readily available parts; maintain the stock 3 inch rear sewer dump capability; keep costs down.

Emery gave detailed installation instructions and suggestions for the new headers, muffler and tailpipe. Below is a list of parts Emery used. Welding is required for the Y connection between the 2-1/2 in. pipe and 3 inch joints to assure no leaks. Mandrel bent ells are used for full flow bends. The Flowmaster muffler is installed within the rear frame member and requires a few hammer blows to fit. The 5/8" copper line was used to relocate the propane line – necessary.

Parts needed:

Thorley Headers 355Y set

1 – 10' length 3" OD aluminized steel pipe

2 -2' lengths 3" OD aluminized steel pipe

2 -40" lengths 2 1/2" OD aluminized steel pipe

3-90 deg. 3"OD x 3"ID elbows – mandrel bent, 6' radius, 12" legs

J. C. Whitney 81ZX22974W

5 – 3" Stainless steel band clamps – J. C. Whitney 89ZX0157B

2 – 2 1/2" Stainless steel band clamps – J. C. Whitney 89ZX0156U

1-- 3" U-Bolt muffler clamp for hanger

1 – Tube Permatex Ultra Copper Silicone sealant

1 -- Flowmaster Series 70 muffler, Offset/Offset, 53074

1 – Flowmaster muffler heat shield 51022

1 – four foot 5/8" OD soft copper tubing

1 – 90 degree 5/8" flare elbow

1 – 5/8" flare close coupler

This list of parts as well as pictures of the process can be found at:

<http://www.gmcmhphotos.com/gallery/showalbum.php?aid=123&&uuid=emerystora>

Part Two covered his approach to a cold air intake. A cold air intake was a favorite option during the muscle car age and is present on most all current cars using fuel injection.

Installation: He also suggests picking up an air intake assembly from a throttle body injected 1993-98 Jeep Grand Cherokee with hose clamps. A further search of the Men's Mall (junkyard) will yield an air filter box such as that from 80's Caddy Seville. An alternative could be one of the conical K & N air filter systems.

For connecting tubing use abs sewer pipe fittings, if necessary, but not metal dryer hose. The hose from a 1989 Cutlass will work. Locate the air intake ahead of the radiator and cover with a screen. This will deliver cooler denser air to the engine.

Editor's Note: Those of you with a '76 or later coach in California that requires the bi-annual smog inspection, this setup will not pass the under hood inspection since a thermostatically controlled hot air intake is required.

Note: Technical seminars and other technical articles printed in this newsletter are provided for information only. What you do to your coach and how you do it is your responsibility.

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