

# Spares You Might Carry

By Steve Jekogian

This list is broken down into a few lists for just everyday things you should have to things needed for longer trips.

Everyday items needed.

Jack that works

Knock off hammer

Membership list in your region—so you can call someone for a ride home or help, ask your regional President

Tools:

- Screwdrivers, Phillips and straight
- open end wrenches 7/16, 1/2, 9/16, 3/8
- socket set
- 'Fix a flat' in a can
- AAA card or AAA phone number—take the phone number if you break down call, join, then call the local number for a tow
- vise grip pliers (great to pinch off rubber hoses – brake lines, heater water hose, fuel lines, servo hose, and to hold things together)
- Electrical tape, holds wires together, repair radiator and heater hoses
- Electrical wire, 2 feet, for repairs as well as to hold up exhaust pipes and to hold things on
- Sand paper fine for points and spark plug cleaning
- Duct Tape – why not

Spare Parts:

- 1 spark plug
- 2 rotors, a lot are poorly made
- points/condenser
- lower radiator hose, upper is a universal fit hose at a gas station
- Fan belt
- brake fluid

Longer trips

All of the above

Moss Motors phone number

Fuel pump

Nuts and bolts

Tire Tube

# HEALEY TRAVELING KIT

Roger Moment  
Longmont, Colorado

I'm the superstitious type and always have a selection of spares, supplies and tools along whenever I go on a long trip. My superstition works like this: If I don't bring the stuff, I'll need it in some godforsaken place. If I do have these items along, I won't need them. In effect, it's cheap insurance.

With that in mind, here is a list of things that I suggest you have along when driving your Healey any distance:

## Tools:

1. Shop manual.
2. 1/4-inch drive socket set including ratchet, 3-inch extension, 1/4-inch, 5/16-inch, 7/16-inch, and 1/2-inch sockets. A complete set will have these plus a few more and is recommended.
3. 3/8-inch drive socket set, with 7/16" through 3/4" sockets. You also should have a 13/16-inch socket as well as a 13/16-inch spark plug socket. I also suggest having 3-inch and 6-inch extensions for it. I have replaced all my 12-point sockets with 6-point because they are much less likely to damage nut or bolt corners. If you have a 100, carry some BSE/Whitworth sockets as well.
4. #1 and #2 Phillips screwdrivers. If your car was built after about 1962 or 1963, you will likely have Pozidriv screws as well as, or instead of, Phillips (BJ8s are Pozidriv). MBs could have a mix of both. Look at your screws to tell which type you have. Pozidriv have little radial "tic" marks at 45 degrees between the cross point tips.
5. Long, flat blade screwdrivers, small and medium.
6. Diagonal cutter.
7. Long-nosed pliers.
8. Adjustable ("crescent") wrench. I carry two: a 3-inch and either an 8-inch or 10-inch. The larger one should be able to span a 1 1/4-inch nut.
9. A feeler gauge with 0.012", 0.025", and 0.085" feeler blades.
10. Channel-lock pliers.
11. Vise grips.
12. A set of combination wrenches with sizes of 1/4-inch, 5/16-inch, 3/8-inch, 7/16-inch, 1/2-inch, 9/16-inch, 5/8-inch, 11/16-inch, 3/4-inch and 7/8-inch for sure. The box end should preferably be 6-point rather than 12-point. If you have a 100, Whitworth/BSE sizes should be carried as well.
13. A volt-ohm meter. Be sure to have a couple of alligator clip leads about 2-3 feet long each. Remember that any circuit you test for resistance (ohms) MUST be dead (not live from the battery) or you risk burning out the meter. Turning off with the battery switch is a good solution (assuming your switch is connected properly and works).
14. Jumper cables.
15. Tow strap.
16. A 6-8-inch length of 1/4-inch steel or brass rod.
17. A low-compressing scissors jack. You must make certain that the jack will fit under the frame when the tire is flat!
18. Also, for cars that have their original coils, and for all 100s, you need those little split brass washer-disks for attaching high-tension leads to the coil and 100 distributor caps. You also need spare Bakelite screw-in nuts.

## Supplies:

1. JB Weld.
2. Duct tape.
3. A roll of electrical tape.
4. WD-40.
5. Bar's Leaks (or other cooling system sealer).
6. Ten feet of #18 insulated braided wire and a few feet of #18 or #20 steel wire.
7. A small collection of crimp terminals.

## Spare parts:

1. Fuel pump. (See comment at the end.)
2. Points, condenser, distributor rotor, and distributor cap.
3. Hardware assortment, including various 10-32 screws; 1/4", 5/16", and 3/8" hex bolts, washers and nuts in various lengths.
4. Fiber banjo washers; suggest four.
5. Fan belt (be sure you have the correct one for your car).
6. Radiator hose clamps, wire type; suggest one or two.
7. Heater hose clamp, wire type; suggest one.
8. If possible, an entire spare generator could come in very handy. This would be for long cross-country travel.
9. One spare RH and one LH knock-off.
10. A spare 165-15 inner tube.
11. Coil. Again, this is more appropriate for longer, for cross-country trips.
12. Fuses. 35-amp fuses are more important; the 50-amp fuse only works the horn circuit, so without spares of this one you just will have a silent trip. But carry a good four to six 35-amp fuses.
13. One set of spark plugs, pre-gapped. These don't have to be new; just serviceable.
14. Tail/stop light bulbs.
15. Dash lamp bulbs.
16. At least one spare wiper blade. If you lose a blade off the arm having a replacement will not only help seeing in rain, but protect the windshield from scratching because you won't have an "un-bladed" arm.
17. A spare gas cap.
18. A wooden stick about 30-36" long. I use this to test fuel level in the tank, if I don't think the gage is working.
19. For cars with FID carbs, a spare set of jet/diaphragms. You could carry a couple of carb rebuild kits that should include these, plus other spares.
20. Spare stop light switch. Be sure you have one with the proper terminals: screw or spade.

# ADVICE TO NEW OWNERS

**Graham Vink**  
Vienna, Virginia

There's plenty of advice floating around the Internet about how to evaluate a car that you're thinking of buying. Much of it is even correct. So this article covers what to do next – from the perspective of safety and reliability – after you've written the check and your new Healey is now sitting in your old driveway (or vice versa).

The following suggestions are aimed at people who are new to Healeys or perhaps to the entire world of British cars, but these tips are based on the assumption that you do at least some of your own work (if not, this is going to be a pretty expensive hobby!) and are at least somewhat familiar with automobile mechanical and electrical systems.

First, before you even start up your Healey, check the oil, water and brake/clutch fluid. Make sure they are present in adequate quantities. In addition to checking levels, it's also a bad sign if the oil is thin, like water, or the water is thick, like oil, but we'll deal with those issues later.

Second, once you've started the engine (this assumes it starts, which, as you'll discover, is not a sure thing for any British car), get out, open the hood and watch the carburetors for a couple of minutes while the engine is running. If the car has been sitting for any length of time, it's not unusual for the carburetors float to stick open, resulting in a stream of gasoline running out of both carburetors and dripping on the soon-to-be-hot exhaust manifold. If this happens, either shut down the engine and clean the carbs, or invite the neighbors over for the bonfire that is about to start.

Then if all systems seem go, take a VERY slow drive around the block and apply the brakes a few times, preferably *before* you reach the intersection being crossed by a troop of Girl Scouts. Hopefully, (a) they will work (the brakes, not the Girl Scouts) and (b) the pedal won't feel soft or spongy. Make the same check of the clutch. The reason for these precautions, even if you've already test-driven the car, is that if the vehicle has been unused for a long period, or if the fluid is bad, the seals in the hydraulic system will sometimes work for a day or two, and then fail. No seals equal no brakes.

When the brakes are functional, then take a spin around the

of these gauges doesn't work, it should be the **FIRST** thing you get fixed). After all systems are at operating temperature, check under the bonnet for any leaks (gasoline, water or oil, although the oil reference is redundant).

So far, so good. The car starts, runs, stops, and retains most of its vital bodily fluids. Now you're ready for the next step: spending REAL money!

Here, in no particular order, are some things that a newbie Healey owner should think about doing or buying. These suggestions stem from my decade-long ownership of a 3000 Mark II, series BJ7, plus my former ownership of two Triumph TR6's (not at the same time, thank God).

- Get a battery charger (used/cheap is OK; 6 amps is enough) and a set of battery cables (heavy duty, not cheap and light). For Healeys that have the battery in the trunk, or even under the back seats, that's a LONG run for the cable between the battery and the starter. If the engine cranks slowly, often it's the combination of an undercharged battery and corrosion on the terminals at either end of the cable, so do something about both problems.
- Get to know "Harbor Freight Tools" ([www.harborfreight.com](http://www.harborfreight.com)). This is a great source for cheap tools, and they're even cheaper when they're on sale, which you'll learn about from the 15 catalogs that arrive every month after your first order. Purists always say, "Don't buy cheap tools," and in theory they're right, but I'd rather have the right cheap tool for the job than no tool at all. Also, Harbor Freight has a lifetime guarantee on most of their hand tools (you just call 'em up, spend some quality time on hold, describe what broke, and they'll send out a replacement).
- Change the oil, even if it looks clean, since you don't know when it was last changed. I like to use a can of engine flush (from the auto parts store) in the oil before changing it, to remove any sludge. (Be sure to follow directions). Some people disagree, under the theory that the solvent can break loose deposits that will cause

Basically, my philosophy with a new used vehicle is to replace all parts related to routine maintenance at more or less the same time, even if it may not be needed. That way, you've established a known "good" baseline for as many components as possible, instead of wondering when to replace them, or trying to diagnose which old part is causing a problem. This also reduces the odds of a total breakdown (burst hose, dead coil, broken fan belt, etc.). And finally, it gives you a traveling supply of spares, and while most gas-station mechanics can fix these cars, most won't have the parts to do it, unless you provide them.)

- Consider draining and refilling the transmission/overdrive and differential, since you have no idea what kind of oil has been put in them, or when. (When I bought my Healey, the seller told me that the overdrive hadn't worked for years. I noticed the oil was low, topped it up, and it's worked perfectly ever since.)

- Examine the radiator fan closely, especially if it's an after-market unit, and look closely for any cracks or signs of metal fatigue. These can be harmful to your radiator hoses and sheet metal (see accompanying story) or fatal if you're unfortunate enough to be standing over the engine compartment when a blade cuts loose.
- Closely examine the condition of the capillary tube from the engine to the oil pressure gauge; if the tube breaks, it will happily pump all the oil out of your engine (fortunately, it takes a while).

Last but not least, remember that you don't have to do this all in the same day. Spread it out over a couple of weekends. In fact, some of the more seasoned, experienced Healey owners, like me, have been working through lists like this since the previous century and still haven't quite made it all the way to the end. ☹

## Make Your Healey Reliable – REALLY!

by Tom Mason, Minnesota AHC

Your Austin-Healey can be more reliable than your new car!

If you think about taking a long drive somewhere, knowing there will be few repair shops along the way, it is possible that your Austin-Healey is more reliable than your new car. If your Healey breaks down, it usually can be fixed by the roadside with simple parts that you can carry with you. If you lose a computer or relay on your modern car, however, you will need a shop and tools to fix it. It is pretty hard to repair a modern car on the roadside. I can repair most Healey breakdowns where they occur.

It is also possible to speculate ahead about most Healey problems and can anticipate the weak points of the car. The following list is taken from the repair manual and presented in that order with comments.

**Engine** — The engine is strong with few weaknesses and they just use more oil as they get older. A new Healey used about 1

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quart in 400 miles. The drain plug needs a washer and should be cleaned and coated with RTV when replacing it. (Same for OD and gearbox). The rocker shaft wears in the cylinder head and will cause smoking in the exhaust as it wears. Valve guides should be replaced when doing the rocker shaft.

**Ignition** — The basic ignition is weak with points lasting only about 6k miles or less. New rotors are poorly made. I had a CD system that was point triggered but the company is out of business. I would go Boyer Brandsden or use a Lumention ignition system, personally.

**Cooling systems** — The cooling system is marginal for many climates. Replace the thermostat, use a six-bladed fan and have the radiator cleaned. Additionally, check the temperature gauge with a real thermometer to verify it is working. If everything is just right, the car should not exceed 190°, ever.

**Fuel System** — Buy yourself one of the new SU solid state pumps for about \$150. This simple move will double the reliability of your car. This is the easiest thing that you can do. In fact, there is not any reason to avoid doing this simple thing. The original system burned up the points and new parts were often very weak resulting in early failure. Almost any club drive will have one pump quit on a car. Most after-market pumps are even worse.

**Clutch** — The pressure plate goes first, but replace all three parts. Replace hydraulics as a set, i.e. slave and master with a new hose.

**Gearbox** — Change the oil with the engine or every other time. If used gently the gearbox and OD should go over 200k miles. Abuse it and buy synchros and pay a lot to have them replaced.

**Prop shaft** — Grease it and should be good for 200k miles.

**Rear Axle** — Keep it full and tighten the shock bolts occasionally.

**Steering** — Check the tie rod ends and lube all parts. If the box gets loose or leaks oil, it should be rebuilt. Healey Surgeons can rebuild it for you.

**Front Suspension** — If properly lubed, it can go 200k miles. Tighten the front shock bolts every 6k miles or regret it. The wheel will fall down if you neglect to do this and it is very dangerous to your health.

**Brakes** — Bleed new fluid through the system every other year. Change pads sooner rather than later.

**Electrical** — Despite what you might think, it is a pretty good system. Rebuild the generator and starter every 100k miles. If the car is not driven in winter, the electrics hold up pretty well.

**Wheels and tires** — Chrome wires with stainless spokes are great. Keep your car washed and waxed. Use classic leather wax or similar on your interior.

Drive and enjoy your well-maintained Healey! See you on the road. 

## Wear is the Problem!

by Rich Chrysler

AHC of Southern Ontario

### Introduction

*This begins a series of technical articles which explains how different components wear and what can be done to reduce the problems of wear. Covered will be running gear, engine, and gearbox, overdrive and clutch.*

*The articles were prepared for a Tech Session for the Austin-Healey Club of Southern Ontario.*

There are two major factors which lead to the ultimate demise of our cars—wear and corrosion. These two things work away at our new cars and slowly but surely lead to component failure. "Wear" is best described as deterioration or removal of material due to friction and heat. In many cases the wear factor can be greatly reduced by proper and adequate lubrication. This lubrication forms a film or "cushion" between the two wearing surfaces to slow down or stop the friction and heat factor.

Noted are examples of how inadequate lubrication, or in the cases of clutch and brake linings, how sacrificial wearing materials will cause deterioration to a point where replacement is necessary.

To begin we will discuss what causes wear. As described above, it is the deterioration or removal of material from two adjoining moving surfaces. Under a microscope, even a smooth polished surface will appear as a series of hills or valleys whose peaks will be the first to be ground away. A film of lubrication will keep these two surfaces separated and keep wear to a minimum. (See illustration below.)

If the lubrication is removed or contaminated, the two surfaces quickly make contact with each other, destroy the "peaks", and build up tremendous heat in the process. In extreme cases the expansion by heat of the two materials can cause total seizure and component failure. Usually, however, we are simply dealing with the lack of lubrication causing varying degrees of wear which in turn causes widening of

tolerances beyond specification and therefore excessive clearance or slop in the components.

### Components Which Wear— Running Gear

#### Tires

The easiest to observe without dismantling anything on the car is friction between the soft tire and harder road surface. Tires wear away at the tread pattern and are a sacrificial wearing item which must be replaced periodically.

Uneven wear of tires can be an indicator of incorrect pressures or of other problems in the geometry of the car such as worn or incorrectly adjusted steering and alignment components. Tire/wheel balance should also be checked.

#### Wire Spoke Wheels

Aside from collision damage, the most common problem can be incorrectly tightened wheels on the spline hubs causing looseness and friction of the splines. Inadequate greasing of the splines or foreign materials such as dust or dirt getting into the splines will quickly wear them away. To a lesser degree this also happens in the spoke nipple and rim cambered surfaces, causing rapid wear and looseness or failure of the spoke or nipple itself. Prevention is clean, well greased splines and knockoff caps, tightened securely—but not overtightened.

#### Splined Hubs

Splined hubs go hand in hand with the above but careful attention must be paid to the tightness and security of the hub to its studs or bearings to eliminate loose play and wobble of the hub itself. Both splined hub and wheel splines should have a smooth flat on the crest of each spline and be clean and well greased. High melting point wheel bearing grease works well here. Also, be sure to smear grease on the cone seating surface. This lubrication must be repeated each time the wheel is removed and replaced.

#### Wheel Bearings

Wheel bearings must live in lubricant. The rear bearings are fed a supply from inside the rear axle, kept there by outboard oil seals allowing oil to lube the bearing but not the brake linings. They are a thrust type and should be carefully inspected any time a rear seal needs replacing by washing thoroughly in cleaning solvent (varsol), dried, and inspected by spinning slowly. Observe any indication of roughness both in action and observation. When replacing, pre-oil the bearing liberally to ensure it has lubrication right away at the first turning of the wheel.

Front wheel bearings can be inspected the same way. BN1 series cars have inner and outer ball thrust bearings, packed in their own wheel bearing grease and carefully installed to spec. From BN2 on to the end of production, Timken thrust roller bearings are used. Pre-lubed as per above but carefully set up with shims as per the manual's instructions.

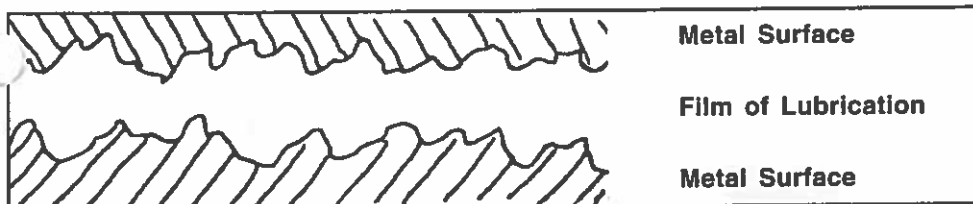
When inspecting any bearing, roller or ball type, watch for nicks, scratches or discoloration of any kind as well as any roughness to its action. This cannot be checked without first thoroughly washing all grease out and drying with air and/or a non-fluffy rag. Always pre-grease before installing.

#### Steering Rod Joints

The most common cause for wear is a torn rubber boot surrounding the joint which has allowed dirt and moisture to enter. All joints prior to the BJ8 have grease fittings and recommended frequency of greasing is every 1000 miles!

Check for wear by attempting to pry up each side and watch for excessive play. This joint is a ball inside a socket, sealed in permanently by peening a cap over the assembly except on the earliest BN1 which had an adjustable screwed cap to take up excessive up and down end play. Ensure that the grease fitting is working properly or replace it. It's important that the little ball in the end of the grease nipple doesn't stick open to let in contamination, or stick closed to prevent grease from entering. Also ensure that the above mentioned rubber boot is not torn or split and is securely seated into its groove with the spring keeper in place. Lastly, make sure the castellated nut is tight on the tapered shaft and a good cotter pin is properly installed.

*To be continued.*



## Wear Is the Problem!

by Rich Chrysler

AHC of Southern Ontario

### Steering Box and Idler Box

These are normally filled with 80/90 weight hypoid gear oil. The oil seal is found near the bottom of the output shaft and is the most common cause of wear—allowing oil to seep out past the worn seal. This leaves the box empty in time and allows metal to metal wear of the steel output shaft and the bronze bushing. This is easily detected by turning the steering wheel back and forth and listening for a characteristic clunk in each direction.

This malady is often incorrectly hidden by someone tightening down the adjustable end float of the output shaft and increasing the depth by which the tapered peg enters the worm of the steering column. This can lead to premature wear of these two components. The bushing and seal are easily replaced once the box is out of the car and the steering arm has been removed.

Correct adjustment of the steering box is very important and can be easily accomplished as per the service manual. Please note that any time the horn/trafficator tube is extracted from the column for any reason, oil will be lost from the steering box, requiring topping up when the job is completed.

### Shock Absorbers

The Armstrong lever shocks are normally sealed for life. However, wear can occur in two places. The gradual loosening of the mounting bolts causes friction and wear in the mounting holes of the casting (aluminum) and the gradual failure of the shaft seal in the body of the shock.

Failure of this seal will allow the hydraulic fluid to escape, characterized by a dark damp appearance around the immediate area. In time the fluid level will drop to a point where air will enter the hydraulic bores and total damping will be lost.

Care consists of periodic checking that all mounting bolts are tight and that there is no visual evidence of a leaking seal. Should a shock absorber need replacing, replacement used, rebuilt components are available.

A final note of observation—check to see that the rubber bump stop beneath the front

shock arm is intact. If it deteriorates, the shock arm can come into contact with the frame shock tower mounting plate. In extreme cases it may cause a tearing away of this plate.

### King Pin and Swivel Axle

The vertical steel king pin runs up through a lower and upper bronze bushing pressed into the swivel axle. These bushings are lubricated by grease. Failure to grease every 1,000 miles can lead to metal-to-metal contact and premature wear of the parts.

The screwed fulcrum pin at the base of the king pin also is fitted with grease nipples. Failure to grease these screwed pins via the steel bushings will allow wear to the threads and excessive play at the bottom of the king pin. Regular chassis lubrication every 1,000 miles with the weight of the car off the wheels will prevent this wearing of components.

To check for king pin and fulcrum pin wear, jack the front wheel off the ground and with the wheel still tight to its hub, try to rock the wheel by grasping it at the 12:00 and 6:00 position. A slight clunking—usually more evident at the bottom—will be evident if these parts are worn.

Note: you will experience the same sort of play if the wheel bearings are loose, so don't let these faults mislead you in your diagnosis.

King pin kits are available, but the new bushings must be pressed into their correct positions and then carefully reamed for final precise fit. Use a two-stage reamer kit with pilot shaft to ensure perfect alignment of the two bushings—not a job to be carried out by the home enthusiast.

### Front Springs and Bump Rubbers

The front coil springs are quite trouble free. The only wear they may experience will be slight compression under load over the years. It is not recommended to install spacers between the coils to increase ride height, as this can cause serious distortion of the spring in extreme cases.

In very rare cases, a spring may break. Usually this occurs in the first or last coil, and the broken spring must be replaced. Always replace springs in pairs only, or handling may be seriously affected.

Bump rubbers found bolted to the lower spring pans may part company with their mounting plates. These must be replaced if this occurs.

### Rear Springs and Bump Rubbers

It is not uncommon to find leaves broken right through and not be terribly obvious in their condition. Ride height may suffer but this can also take place as springs "settle" in.

Rear springs can be removed and re-arched, or replacement leaves can be installed. However, this often can result in too harsh a ride or a ride height which is not accurate to what it should be. Replacement springs are readily available and should always be replaced in pairs.

Rear spring shackles should be kept greased by way of the grease nipple extending to the rear of the car beneath the foot floor on all models but the Phase II BJ8. Spring eye bushing should be checked for evidence of deterioration.

The u-bolts and plates along with the rear axle bump stop rubbers should be examined periodically for tightness and condition, and should be replaced if necessary.

### Pistons and Bores

The pistons with their rings run up and down the precisely machined cylinder bores. In actual fact, the piston itself should not touch the bores but run suspended on the rings, and all this on a fine film of oil, controlled by the oil control ring so the oil will not reach the top of the piston and burn up on ignition.

As mileage and wear accumulate, a number of things happen. The rings, with start out life quite sharp and exact in their dimensions, will gradually wear away. The grooves in the piston in which the rings sit also will wear somewhat and will build up a carbon deposit—a residue from combustion. At the same time the cylinder bore will wear away, leaving a larger diameter than when it was new.

As the whole process continues, the lower part of the piston, referred to as the skirt, may start to "slap" at the cylinder bore as it continues its up and down travel. At the same time, the rings lose much of their sealing ability and will do less and less to seal the gases into the combustion chamber and the oil in the lower crankcase. This will result in loss of power and burning of oil.

Prevention, i.e., regular oil changes from new, will lessen or delay the effects, but nothing will stop the advance of this wear—so long as the engine is being used. The cure is usually new rings and reconditioned bores, or, if beyond specification, a rebore to oversize accompanying piston/ring assemblies.

## Check Your Healey's Fuel Lines

by Sandi Baker

AHC, Pacific Centre

(Reprinted from Austin-Healey Magazine, September-October, 1996)

I changed out all the rubber fuel lines in "Tealey" before the trip to the 1996 West Coast Meet. The new reformulated gas that we're now required to buy (at a higher cost) in California (and soon to be in all the other states) contains an additive called MTBE that eats rubber fuel lines and maybe even rubber parts in your carburetors and fuel pumps. MTBE stands for Methyl Tertiary Butyl Ether. It's the ether that eats the old rubber.

While I was changing out "Tealey's" fuel lines, I found a leak where the steel line under the car met with the rubber line going up to the carbs. Good thing I checked.

There are several new types of fuel lines available. I used a Dorman #J30R7 type of rubber line. There is also a Spectre, metal braided over the Dorman, as well as Russell, all metal aviation type lines. The regular Dorman costs about \$1.29 per linear foot for  $\frac{5}{16}$ " or  $\frac{1}{4}$ ", the Spectre costs about \$2.99 and the Russell about \$4.99. For most applications, the regular Dorman is fine, but if you have a line going under the car, it might be good to use the metal braided type so it will resist impacts from rocks, etc. It is also a good idea to add a fuel filter that you can see through in front of the fuel pump and another right in front of the carbs.

I then moved "Lapis" into the garage and noticed many gas droplets on the driveway. It was really pouring out. The gas was coming from the bottom bowls of the carbs where there's a plug sealed by an O-ring. Both O-rings were eaten through and dripping profusely. I fixed them with new O-rings, but it's definitely a wake-up call. Bottom line is that all the old rubber parts that fuel passes through can be dissolved by this new gas and cause engine fires or worse. It's a relatively simple and cheap problem to fix, so go check your Healeys and do this NOW, BEFORE you have a problem.



# Wear Is the Problem— Engine

by Rich Chrysler

Southern Ontario AHC

*This is a continuation of a series of technical articles which explain how different components wear and what can be done to reduce the problems of wear. The articles were prepared for a tech session for the AHC of Southern Ontario.*

## Carburetor Shafts and Linkages

The carburetor body and the throttle shaft will wear in normal use to a point where air will be drawn into the carburetor around the worn shafts. This is usually observed in the fact that the engine will not settle down to a proper slow idle. If the throttle idle screws are closed right down, the engine still will run due to this alternate air supply coming in around these worn shafts and bodies. This can be repaired by having the throttle shafts, butterfly discs, and shaft bushings renewed.

The mechanical ball/socket linkages can also wear, causing a whole series of slight bits of play at each joint, resulting in a large amount of excess play at the throttle pedal. Some of this can be adjusted out, but the proper remedy is new ball/socket assemblies. It is very important that all these linkages are adjusted carefully as per the workshop manual's instructions. The overdrive throttle switch should also be adjusted carefully.

Maintenance of carburetor shafts and linkages is limited to correct adjustment to eliminate excess preload of the system, and periodical light oiling of all wearing surfaces.

## Oil and Fuel Flex Hoses

These hoses are usually of a neoprene inner hose housed inside a woven metal sheath with male or female pressure fittings at each end. Over very long periods of time they will deteriorate from within until suddenly one day, without warning, you will experience a leak—a serious one. It's strongly suggested that if a hose is suspect—replace it now. Enough said!

## Gaskets and Seals – General

A gasket is a material which is placed between two mating surfaces to take up any irregularities found in these surfaces and effect a gas or liquid tight joint. It may be made of paper, cork, cardboard, copper, aluminum, or a compound such as gasket goo or silicone. All of these compounds are usually used once only and must be renewed if disturbed. Seals usually are made of a type of rubber or soft pliable material which can effect a good seal. Generally seals can be found keeping a liquid in—or out—of a moving, usually spinning, component.

All gaskets and seals are usually cheap in cost and should be renewed any time the component is disturbed. A seal lip will wear out in time, causing a leak. A gasket usually will not wear out but may corrode or otherwise harden and deteriorate—again resulting in a leak. This deterioration is found usually by observation. Periodical checking of the entire car from front to back is good recommended practice. A gradual loss of a coolant or lubricant can cause premature wear and failure of any component.

## Flywheel Ring Gear and Starter

The ring gear mounted to the perimeter of the engine flywheel meshes with the pinion mounted to the starter motor when the starter is energized. The starter pinion turns the ring gear, turning the engine's crankshaft. When the engine starts, and begins to turn faster than the starter motor, the pinion is thrown back out of mesh with the ring gear. Often, through a dirty pinion and return spring, the pinion will remain engaged, or just touching the spinning ring gear. This will chew off an edge of the ring gear teeth. In extreme cases, enough of the ring gear teeth is gouged away to leave the starter pinion unable to mesh with the ring gear and a loose, slipping chatter may be heard when mesh is being attempted.

Prevention is limited to never engaging the starter while the engine is running, and never applying oil or any wet lubricant to the starter pinion assembly. A clean starter pinion, shaft, and spring assembly lubricated only with dry graphite—so as not to attract dirt—will usually result in many years of trouble free service.


A starter, being an electric motor, has carbon brushes which are spring-loaded in contact with an armature. The brushes wear down the carbon over the years and require periodic replacement. The worn-down carbon dust can often clog into the groves between each armature segment. Its good practice when replacing worn brushes to carefully clean out this carbon build-up between the segments. This carbon is electrically conductive and can cause high resistance and poor performance of the starter.

## Gearbox, Overdrive and Clutch

### Gearbox

The gearbox is really a rather straight forward unit, and if properly lubricated and operated with a bit of mechanical understanding and respect, will last the operator virtually the lifetime of the car. As we have observed so far in our series, it's not a perfect world, and these gearboxes usually have suffered through ham fisted drivers and less than ideal maintenance practices.


The most common problem which arises is the gradual weakening of the synchronizing rings, causing a secondary problem, the clashing of gears as they try to mesh while still spinning. Synchromesh rings, fitted to second, third, and fourth gears have fine thread-like teeth machined into their inside diameters which grip the steel synchro hub to stop its spinning. This enables the gear to be smoothly engaged without clashing of the teeth. As these synchro rings wear, their gripping ability de-

creases, and continued spinning of the gears causes the inevitable clashing of the gear teeth. This is very harmful as the spinning gears act as very efficient "milling cutters," which soon destroy the edges of the gears. Synchro rings can be replaced fairly easily with  ones. The gears themselves, however, are quite difficult to obtain, and expensive to purchase once found.

The most common areas of gear wear and damage are the spur gears (straight cut) of first gear, reverse gear, and the idler or spur gear on the laygear cluster. Apart from those areas, the needle roller bearings, layshaft, all seals, and all bearings should be replaced whenever the gearbox is overhauled. Shifter forks must also be examined carefully for wear.

### Overdrive


The overdrive unit is a very trouble-free assembly, in so far as wear is concerned. Most problems encountered with overdrives are usually related to electricals, which energize the solenoid to close a hydraulic circuit, which allows engagement of the overdrive cone clutches.

The only wearing areas in an overdrive unit are primarily the gradual hardening and deformity of the accumulator piston "O" ring. This is the major cause of a slow-to-activate overdrive unit—or one which may cut out once it gets fully heated up under use. Sound familiar? This is literally a \$0.12 common "O" ring, but it requires some major disassembly of the unit to gain access to it. Of course, whenever an overdrive unit is overhauled, it's again a decision to replace the rear bearing and oil  and, of course, all gaskets.

Lastly, there are two small "O" ring seals on the cross shaft from the solenoid through the case to the adjuster arm. These, if worn, will allow oil to escape and drip down from there.

### Clutch and Linkage

The clutch plate is an item which will, by design, wear its linings over time and high mileage. A good, average clutch plate life may be some 60 to 80 thousand miles, less if the driver is one who drives hard and/or slips a clutch more than is necessary. If a worn-down clutch plate is left in use too long, it will wear down to a point where its bonding rivets will come into contact with the smooth flywheel surface, and cause scoring of this surface. A clutch plate may become contaminated with oil; either from a worn rear main seal, or by a worn front seal in the gearbox. This oil in contact with the clutch lining will cause a dark oily glazing and slippage of the clutch. The carbon release bearing presses on the clutch cover plate to release the clutch from the flywheel. This will in time become worn to a point where disengagement of the clutch will be impossible. This release bearing is usually replaced whenever the clutch is serviced, as it requires removal of the gearbox from the engine to gain access to it.

The clutch activating linkage is very  to wear. It consists of pushrod, clevis pin, and release bearing arm. Each of these is a steel to steel wearing point, usually catching road dirt,

(Continued on page 29)

# Mechanicals

## Summer Touring Safety Checklist

By Gary Lownsdale, AHCA President

*Courtesy of Smoke Signals, newsletter of The Smoky Mountains Austin-Healey Club*

Now we are looking forward to attending events across state lines and driving the cars for several hundred miles on a trip, maybe trying to earn one of the new AHCA Driving Awards. We want to make sure that our Healeys make it to the event and back in a safe and secure manner. These items should be checked before undertaking a lengthy journey:

**1. Fuel Lines** – How old are those stainless steel braided fuel hoses on your car? Have you wondered about the condition of the rubber under that beautiful shiny steel? If that hose is over a couple of years old, then under the cover is an ordinary rubber fuel hose that may not even be resistant to modern fuel additives, such as MBTE or octane boosters. The rubber may be dried out and cracked and just waiting for that isolated spot of highway to let go and spew the gasoline onto your exhaust manifold. Check and replace them now!

**2. Oil Pressure Gauge Supply Line** – On the left side of the Big Healey engine and the right side of the Sprite engine, there is another stainless steel braided hose that supplies hot oil under high pressure to your mechanical oil pressure gauge. Have you ever replaced that hose? Do you know what condition the rubber is under the stainless sheath? This is a common area of failure on long distance driving, and it is a real

mess to clean up at the side of the road. When it lets go, hot oil is spewed onto the engine, exhaust manifold, and out the back of the hood onto the windshield. Windshield wipers do not work well in removing hot oil. Replace it now! It is a \$10 hose. We always carry a spare with us anyway.

**3. Fuel Pump Supply and Inlet Hoses** – When was the last time you crawled under your car and really checked the condition of those hoses and lines going into and out of the electric fuel pump? If you did not buy that Healey when it was new, the chances are good that a prior owner has replaced at least part of those lines with rubber hoses. Check to make sure that they are sound and have an up to date SAE code for fuel additive resistance. Leaking fuel from under your car onto your exhaust pipe could ruin your day – big time!

**4. Battery Connections and Ground Cables** – For Big Healeys, make sure that you have checked the condition of your ground cable to the cutoff switch and the cutoff switch to the body ground in the trunk. One of the most overlooked electrical shorting areas is in the long battery cable that runs forward over the right wheelhouse. After many years of vibration, this cable's insulation can wear through and result in a direct short from the battery to the chassis. The battery continually drains down for no apparent reason. Have you also ever wondered where that white and black wire is going from the cutoff switch? It goes to the

coil, and when it shorts or comes loose, the coil shorts out and the engine dies. Most restorers now cut this wire loose from the harness, since it was originally installed to protect race car engines from running on the generator after the battery failed or after an accident.

**5. Hydraulic Brake Hoses** – We have performed the side of the road field vise grip fix on friends' broken brake rubber hoses a number of times to get their cars to a safe repair area. Those hoses are not meant to last forever, and were originally designed for DOT 2 or 3 brake fluid. The hoses fall from the inside out and stress crack near the end fittings. Replace them before you leave. Don't forget the rear hydraulic hose at the rear axle. This is one that is often overlooked.

**6. Fuel Tank Integrity** – On Big Healeys, remove your trunk mat and check for wetness on the top of the tank and around the fuel sender unit. Try to detect a scent of old gas. Look under the car for wet areas, especially where the tank contacts the body seals. Pinhole leaks can release a great deal of fuel onto your hot pipes and near your battery before you know it. On Sprites, look under the car for wet spots anywhere on the tank. It would not be a bad idea to undo the six nuts holding the fuel tank in place, lower it and check the top surface and around the fuel sending unit for leaks.

Okay, now we have checked those hard to get to and often overlooked areas of the Healey. Let's go on that first long distance drive of the summer and know that it will be a good one. Enjoy that Healey to the fullest! 'Til next time!

## Cool Tool

By Karl M. Thomas, Northeast Region

Somewhat more than a year ago the restoration of my 1962 BT7 was completed at last. The product of this effort was successful because the AHCA and Healey Marque were such excellent resources for finding parts, services and technical information. Like so many others in the club, I wanted to do the majority of the work myself for the satisfaction provided and the inherent training. Good advice and references were invaluable. As a small return, maybe this description of a rivet heading tool will

help someone.

As the restoration reached the final stages, an assembly plan became essential. All the finishing of the body parts was complete. Each part had been individually painted since I wanted complete coverage of all surfaces. In particular, good paint coverage where the aluminum shrouds touched the steel frame would help prevent the usual electrolytic corrosion at the interface. After completing the build-up of the chassis, the time came to install the front and

rear shrouds. One task involving the rear shroud (body panel) appeared to be a real challenge for me. This task was heading the rivets that fastened the shroud to the frame channel or rail at the trunk lip.

Most restored Healeys I had seen used pop rivets, but the original rivets were headed solid aluminum rivets. Solid seemed right and the appropriate rivets were ordered and delivered. The rivets came with a yellow sheet advising care in heading the rivets with a hammer. Heading these rivets with a hammer was well beyond my ability. Visions of dents in the soft aluminum along with chipped and flaking paint invaded my

ing the seat belt mounting is solid and rust free. Make sure that the belt webbing and buckles are secure and working properly. Many older seat belts will not hold tightly after many years of use. These should be replaced, along with any worn or frayed webbing.

### Instrumentation

The instruments and gauges on the dash inform the driver of the vehicle's operating functions and condition. Make sure that the gauges are reading correctly and functioning. The battery must be held down securely and the battery mounting clean and secure. The non-grounded side of the battery must be insulated from the chassis with tape or an insulated cover. The condition of the electrical harness and wiring must be pristine. It's time to check all of the electrical connectors and look for frayed insulation. Many performance-running faults on a track or in an autocross can be traced to intermittent electrical shorts in the wiring.

### General Safety

Get the best helmet you can afford, preferably a Snell 95 approved version. This is your number one protection against serious head injury in any type of collision or rollover. Know your car, tires, and your capabilities before entering an event. Talk to an experienced driver and ask lots of questions about what to expect. Do not let your ego get in the way of safety. The better drivers maintain a great deal of respect for the destructive potential of an automobile, and they take precautions to avoid "getting in over their heads" in a driving situation. The adrenaline rush that accompanies engaging in a speed event is fun and useful, but it can also cloud good judgment until you learn to use it wisely.

Okay, now we have checked those really hard to get to and often overlooked areas of the Healey. Let's enter that performance event with the confidence that it will be a safe and enjoyable one. Enjoy the sound and feel of a Healey pushed to the fullest! 'Til next time!

## Performance Driving Safety Checklist, Part 2

By Gary Lownsdale,  
Smoky Mountain AHC

Last month's issue included Part I of this article, which covered tires, wheels, hubs, bearings, spindles, steering components, shock absorbers and suspension. Here's the conclusion of a thorough list of items to check on your Healey before you participate in a performance-driving event.

### Frame and Chassis

Inspect the frame, underbody and chassis of the car with a critical eye toward rust, cracks, improper repairs, missing frame supports (like outriggers) and field-rigged fixes. The chassis takes an enormous torsional twist during hard cornering. To get an idea of this loading, try to run at full speed and turn your ankle to make a 90° change of direction. Now imagine, over one ton of mass turning at 1g of lateral acceleration. If the chassis or frame is rusted or

cracked, the fault will continue to propagate toward a catastrophic failure. When was the last time that you saw a rusted race car?

### Engine and Transmission Mounts

Do you realize that your engine and transmission are held in place to the frame at three points in rubber mountings? The rubber develops cracks from hardening and absorbing shear, compression and tensile loads over the years. These mounts should be inspected and replaced on a regular basis. If a considerable amount of additional horsepower has been added, then consider installing solid mounts (for racing purposes only) or at least an engine movement limit strap. The transmission mount, which is the rear engine mount, is often overlooked since it is under the car, but it is just as critical.

### Driveshaft

Make sure that the driveshaft has good lubricated U-joints installed and that the

joining bolts are at least a grade 5, with grade 8 preferred. Fabrication of a simple driveshaft yoke from a metal strap will also prevent a driveshaft from hitting the pavement or breaking through the underbody structure if a U-joint should fall. A local machine shop can also balance the driveshaft and perform a crack inspection for you.

### Seat Belts and Seat Mountings

After spending so much time on making sure that the chassis is strong, let's not overlook the importance of keeping the driver in position. Make sure that the seat is mounted securely to the floor or frame. Have you replaced all of the seat-mounting studs that were snapped off when you first replaced your carpeting? Are the seat back hinge points and connections solid and tight? Is the seat frame integrity compromised by a rusty seat frame?

Are the seat belts mounted into a solid and secure portion of the frame or chassis? Make sure that the sheet metal surround-

## The Devil Is In The Detailing



By: Glenn Abello

**H**ealey owners should take pride in the valuable and rare examples of automotive history residing in their garages. It has always been my belief to care for these geriatric English cars as you would any cherished, aging family member.

This session of **UPGRADE ALLEY** discusses the steps that you may consider in detailing your Healey. Sure there are a million ways to clean your Healey, but here are mine.

### SUPPLIES REQUIRED

It's a good idea to have the proper detailing materials available before you start this project. The following is a list of some of the items that are in my Detail Shed<sup>1</sup>.

- Two utility buckets dedicated for washing the car
- Good quality detergent formulated specifically for cars
- A micro-fiber wash mitt
- California Water Blade
- Rain-X
- Carnauba Wax (cleaner-free)
- Wire-Wheel Brush
- Tire Foam
- Chrome Polish
- Micro-Fiber Polishing Cloths and Cotton Diapers

### DETAIL PROCEDURE

I have broken the detailing of your car down into easy-to-follow steps for your convenience.

#### 1) PRE-DETAILING:

Using the car, or just storing it in a garage, will produce a film of road dirt (including tar), dust, pollen and/or other contaminants on the vehicle's surface. These potentially abrasive materials must be removed prior to applying any wax to the car.

**WASHING:** It is suggested to wash the car on a dry, calm day, out of direct sunlight. Wet the car with a gentle spray from your garden hose to remove loose surface contaminants.

Next, wash the Healey. Fill one bucket with warm water and a good quality car detergent (don't use dish detergent; it is too harsh), and the other with rinse water. Use a clean microfiber wash mitt, rinsing it frequently in the clear water to remove dirt that the mitt is picking up off the car, before dipping it in the wash water.

Use the wheel brush for your wire wheels. Rinse with

# The Devil Is In The Detailing

another gentle spray with the hose. Spray the entire car with distilled water<sup>2</sup>. Wipe down the car with your California Water Blade.

## 2) INTERIOR DETAILING:

Healey interiors, in their original configuration, were subject to a gradual deterioration from inside and out. General surface wear is unavoidable, but the nature of the car's construction often allowed water seepage through the floor pans into the original jute padding under the Wilton Wool carpeting. This may result in deterioration of the sheet metal flooring. If practical, you should lift the carpeting (it is held to the floor pans with snaps) to allow the jute padding to dry out completely. Short of a restoration, this action should slow further damage to the car.

Once the carpet is dry, vacuum the interior, scrub the floor mats and reinstall. Wipe the vinyl seats, dash top and dash board with a damp cloth and treat with a vinyl conditioner such as Maguiar's Ultimate Protectant (available in most auto shops). Clean the instrument glass faces and interior mirrors with a non-ammonia based window cleaner and a soft cloth.

## 3) EXTERIOR DETAILING:

The wrap-up for your detailing is in the exterior polishing and treatment. The available products for this process are many, but I will give you some that I have found useful, safe and yielding of spectacular results.

**Chrome:** My favorite is Simichrome, a cream paste available in 50 gram (1.76 ounce) tubes from a variety of sources<sup>3</sup>. Another choice is Blue Magic Metal Polish Cream. Apply the chrome polish according to the package instructions and buff with a microfiber cloth or soft, lint-free cloth such as a cotton baby diaper (these are available through commercial laundry services).

**Tires:** Spray the tire sidewalls with a tire treatment, such as those manufactured by ArmorAll, Black Magic, or Maguiar's. Be careful to avoid getting the spray on the tread surface or wire wheels. Allow to dry thoroughly before driving the car.



**Convertible Top:** All tops should be washed thoroughly during the Pre-Detailing phase of the procedure with a purpose-made brush, such as the Green Long Handled Tire and Wheel Brush and a cleaner, such as 303 Convertible Top Cleaner. The latter product will not only clean the top, but also inhibit the future growth of mildew.


OE Vinyl Tops should then be treated with a UV protectant and dirt repellent, such as Ragg Topp Vinyl Protectant. The upper-end fabric tops, such as the Robbins Sun-Fast products, recommend the use of the Ragg Topp Fabric Protectant. This product restores the water-repelling and anti-contamination properties to the top (hood) that were manufactured with the original fabric.

**Windscreen:** After the windscreen is dry, apply a coat of RAIN-X to it. Follow the instructions on the label. RAIN-X is available in auto stores, general retailers (Walmart, Target, etc.) and other outlets. This polymer-based spray lowers the surface tension of rain water striking the windscreen, thus causing it to roll off without streaking. It also inhibits dirt, soap and insects from sticking, so one application will keep your windscreen clean and clear until it wears off.


**Rear Window:** The clear plastic rear windows on our Healeys are notorious for yellowing and scratching. Diamondite Plasti-Care will inhibit this deterioration and help to keep the rear window clean and clear. If your rear window is already scratched or yellowed, try an application of Wolfgang Plastik Lens Glaze to restore its clarity.

**Painted Surfaces:** This is always subject to personal choice as to the "best polish ever made", however, I prefer



 straight, cleaner-free carnauba paste wax. This wax is easy to apply and remove and leaves the paint with a very hard, durable and deep finish. There are hundreds of products containing carnauba<sup>4</sup> wax and range wildly in price. Note that there is no product that contains 100% carnauba<sup>5</sup> wax and the available products are of several purity levels, hence the variation in price. My recommendation is the P21S Concours Carnauba Wax product from Brookside Import Specialties. A 6.2-ounce jar retails for about \$33, but will last for several seasons. There are many other manufacturers that produce quality carnauba waxes, including Mother's, Maguiar's and Zymol, so the choice is yours.

To apply, just wipe on a small section of the car and wipe/buff with a microfiber cloth. Carnauba waxes generally do not leave a white "powder" on the rubber seals located at the windscreen frame, contain no solvents, leave a hard, durable finish and will bring out the depth of your painted surfaces.

This should get you well on your way to a nicely detailed vehicle. While the end result also is determined by the car with which you started (i.e., you can't make a silk purse from a sow's ear), you will still enjoy that first drive in your freshly scrubbed Healey. 

**Footnotes:**

1) The name brands of products listed are those which are used by the author. You may want to use a brand with which you have used in the past.

2) Distilled water, which contains no dissolved salts or minerals, is available in any food market. Spray bottles may be purchased from general supply centers, such as Walmart.

3) The easiest way to locate products is to enter the product's name into a search engine, such as Google, on your computer.

4) Carnauba waxes are derived from the leaves of the Brazilian Copernicia prunifera palm.

5) Pure carnauba wax is too brittle to be used alone and, therefore, "carnauba" products contain other waxes, despite marketing claims of "100% Carnauba Wax" in some advertising.