



the **ALUMINUM WORKHORSE**



THE OFFICIAL PUBLICATION OF THE LAND ROVER OWNERS ASSOCIATION

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LAND RANGER

BITS AND PIECES

Reminder that as your membership renewal time arrives you will receive a postal card advising you. A prompt reply will ensure continuous delivery of your newsletters.

Please note that if your membership number fell between #508 and 515, your membership number has been shifted ahead due an oversight while transcribing to the computer.

The Association received a product brochure regarding a new bull bar being marketed in the UK called a "Carriload". This is a wrap around black vinyl coated, steel bull bar capable of being lowered from front end protection mode to a 200 kilo carrying rack with supplied strap. The "Carriload" can be fitted to the SII, IIA, III, 90, 110 and Range Rover. Advertised delivery price in the UK is about \$495.00. Further info can be obtained from Trevor Marks, Markseller(UK) Ltd., Alvediston Nr Salisbury, Wiltshire SP5 5LY, Tel: 0722 780533.

For general information the Rover Group, which Land Rover is part of, was recently purchased by British Aerospace (BAe). This turned control from government to the private sector. From the press information it seems that the buy out will benefit both BAe and Land Rover since BAe supplies mobile missile systems based on military 90 and 110 models already. All we can hope is that the immense strides Land Rover has made within the last eight years will continue. And who knows, maybe, just maybe some of our favorite metal beasts may start arriving here in the USA.

Thanks to RC Gordon Perrott and friend Trina for the new style in our applications. A bit more flash to our already flashy group.

As we had stated earlier RC Ron Mowry is attempting to compile a cross reference list of parts available at your local auto store. It goes without saying how valuable this list will be for all of us. So if you have acquired a number or source please send it on to Ron. Find his address on page 1.

You members residing in sunny Southern California: please note that Geoffrey Jackson has taken over the responsibilities of RC down there. His address and phone number can be found on page 1.

The newsletter needs help. We have pretty much exhausted our supply of members letters, tech tips and stories. If you have something to share, please do so. I really do not wish to start on the old reprint articles again, because we need more information on keeping our little beasties off the road, so to speak. My only alternative is to go to fewer newsletters per year in order to keep the information relative.

Land Rover Spares

Here is a list of parts and service establishments to aid you when you are searching for parts or service. This list is published on a non-partisan basis for your benefit. Please help us keep this list updated by letting us know of new businesses or ones that have gone out of business.

ATLANTIC BRITISH PARTS
PO BOX 109, ROVERRIDGE DR.
MECHANICSVILLE, NY 12118
518-664-6169 *P *UP *R

ATLANTIC BRITISH PARTS
PO BOX 1068, WATERLOO
QUEBEC, CANADA, JOE-2ND
514-539-2669 *P *UP *R

ATLANTIC BRITISH PARTS
PO BOX 620
LEWISTON, CA 96052
916-778-3922 *P *UP *R

BRITISH AMERICAN CAR SERVICE
426 26TH STREET
OAKLAND, CA 94612
415-452-4322 *SV

BRITISH PACIFIC
101 WEST GREEN STREET
PASADENA, CA 91101
213-681-9783 *P UP*SV*S*F*R

BROWNS LANE, INC.
7808 FAIR OAKS BOULEVARD
CARMICHAEL, CA 95608
916-944-0244 P *SV

CAMPART DIST., INC.
221-41 AVENUE N.E.
CALGARY, ALBERTA, CANADA T2E2N4
403-276-2211 P UP SV

D.A.P. ENTERPRISES
7 KENDRICK RD.
WAREHAM, MA. 02571
617-291-1211 *P *UP R SV S

DIXIELAND ROVERS
RTE 3, BOX 358
TIFTON, GA 31794
912-386-8498 SV, F

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GREEN HILL ROAD
BARRINGTON, NH 03825
603-332-8504 SV

MORGANS SPORTS CAR WEST
1570 S. 300 W.
SALT LAKE CITY, UT. 84115
801-487-5979 *SV

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STANHOPE, NJ 07874
201-398-5715 *P SV S

PAUL SAFARI COMPONENTS
PO BOX 39, QUEENSTON STREET
ONTARIO, CANADA L0S-1L0
416-262-4446 P UP F SV

ROVERS NORTH
BOX 71
WESTFORD, VT. 05494
802-879-0032 *P *UP F SV

ROVERS WEST
731 S VINE AVENUE
TUCSON, AZ. 85719
602-792-0295 *P *UP R SV S

SCOTLAND YARD
3101 E. 52ND AVENUE
DENVER, CO. 80210
303-297-9237 *SV P UP R

SCOTTY'S LAND ROVER SERVICE
45 RIDGE PARK DRIVE
CONCORD, CA. 94518
415-686-2255 *P *UP

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4734 PEARL ST
BOULDER, CO. 30301
303-449-7195

THE IMPORT GARAGE
1815 S.E. 50TH
PORTLAND, OR 97215
503-235-5951 *SV

UNION JACK ROVER SPECIALISTS
PO BOX 30318
TUCSON, AZ. 87551
602-721-0361 *SV

WEST COAST BRITISH
6398 DOUGHERTY ROAD #34
DUBLIN, CA 94568
415-824-6091 P UP SV

THE BRIT NW LR Co.
1043 KAISER RD. SW
OLYMPIA, WA 98502
206-866-2254

ROCKY MOUNTAIN ROVERS
732 51 AVENUE S.W.
CALGARY, ALBERTA T2V DA7
403-253-7977

LAND ROVER ENTERPRISES
2104 JEROME AVE.
YAKIMA, WA 98908
509-453-8580

VERMONT ROVERS
CAMBRIDGE, VT. 05444
802-644-2128

KEY
P = NEW PARTS
UP = USED PARTS
SV = SERVICE & REPAIR
S = LR SALES
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locking hubs, dual tank
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LAND ROVER 88", 4 cyl
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smetics, driven daily - \$-

MARKET PLACE

'66 LAND ROVER 88", Trop. r
w headers & exhaust sys.
terior redone, recent re
00 or trade for 109"PU.

LAND ROVER 109", 4 cyl
w paste green paint, in
mechanical condition - \$320

'62 109 p/u new tires, exhaust system, needs paint \$3,800
Contact: Steve Hill 916-393-3767 CA

'74 88 4 cyl, driven daily \$3,000; '67 109 6 cyl safari gd
cond. \$4,000; '65 109 4 cyl p/u \$2,500 Contact: Ron Mowry
207-658-9064 ME

'74 88 4 cyl, extras \$3,500 Contact: Jeff Stitt 702-
463-2011 NV

3 109s RHD \$5,000-\$6,000 Contact: Geoffrey Jackson 714-
385-7779 CA

'69 109 4 cyl, no rust \$7,400 Contact: Bruce Fletcher 312-
383-4071 IL

'72 88 6 cyl Chevy BD Contact: Dave Wilding 916-457-2047 CA

'56 107 4 cyl s/w fwh, rebilt eng exc cond Contact: Peter
Van Wart 415-332-2384 CA

'60 88 4 cyl RHD, rebilt eng \$3,00 Contact: Eric Gleason
503-658-2636 OR

'71 88 4 cyl, rebilt eng/brakes paint \$2,900 Contact: Vic
Winchcombe 205-649-0445 AL

'63 88 4 cyl, eng gd, \$700/BD Contact: Eric Radecki 916-
481-3753 CA

'66 109 4 cyl, NATO p/u well equipt. Contact: Tim Johnson
207-825-8094 ME

-PARTS-

SIIA trans \$300, Rear axle/diff \$200, pr of hardened axles
\$200 Contact: Tom Sawyer 213-438-6201 CA

Parting out 12 frameless LR all types, all Series except
SI Contact: Ron Mowry 207-658-9064 ME

-WANTED-

2 plastic Diesel grille badges, diesel exhaust manifold
Contact: Craig McClure 404-284-0265 GA

1 plastic Diesel grille badge Contact: Ron Mowry 207-658-
9064 ME

-CALENDAR-

-Northwest-

JULY 2nd-4th Oregon Coast, Contact: Doug Shipman 503-252-
5566

SEPT 2nd-4th Portland All-Brit Show, Contact: Steve
Zedekar 206-263-4397

-California-

SEPT 11th Palo Alto Brit Show, Contact: Steve Hill 916-
393-3767

-Nevada-

JUNE 28th-JULY 2nd High Desert Tour, Contact: Scotty
Howat 415-686-2255

JULY 2nd-4th Black Rock Desert, Contact: Marvin Mattson
702-972-3673

-Northeast-

JUNE 22-JULY 2nd Prince Edward Island, Canada. From Maine
to Nova Scotia by ferry. Costs: \$60 per car, \$32.50 per
person, \$16.12 per ages 5-12. Ferry to PEI will run \$10
one way. Contact: John Cranfield 902-765-4532.

JULY- Magical Mystery Tour, 88's only, severe off road
conditions. Contact: Ron Mowry 207-658-9064

AUGUST 20th-21st Rovers North Rally Contact: Ron Mowry
207-658-9064

OCT 2nd - All Brit Show Westminster, Vt.

SUMMER 1992 Proposed trek from Halifax, Nova Scotia to
Anchorage, Alaska. Trek will be approximately one month
in duration. Assistance is needed in all aspects of the
trek. If you can join us or assist in any way please
contact Ron Mowry, PO Box 1023, W. Lebanon, ME 04027
or phone 207-658-9064. An invitation is extended to all
Land Rover owners.

-Southern-

JULY 2nd 1st Annual picnic and BBQ at Dixieland Rovers
Contact: Steve Johnson 912-386-8498

LAND ROVER OWNERS ASSOCIATION
P.O. BOX 162201
Sacramento, CA 95816

Letters



Pedro Gonzalez has invited any member of the Association to the opening of his illustrations as part of the "Wild California" exhibit at the Academy of Science in Golden Gate Park, Saturday, September 24th.

A number of us are planning to attend, so if you are in the area let me know. Hopefully, we can plan a dinner in San Francisco later in the day. Steve Hill, 916-393-3767.

John Palmer has written in with a discovery made while rebuilding a transmission from a '66 NATD 109. Apparently there are two oil seals on the primary pinion on the clutch withdrawal mechanism housing. To his knowledge, these are unavailable. Fortunately, a civilian pinion and housing can be substituted. However, because there are numerous civilian types, information from reliable sources, such as Chip Marvin from Matchbox Rebuilders is necessary.

Bob Bagnall is writing a book on Land Rovering! Send all your personal wild and unbelievable Land Rover stories, with a photo if possible to: Bob Bagnall, PSC Box 80563, Davis Mtn. AFB, Az. 85707-5300. All contributors will be acknowledged in the book.

Paul Poole is interested in hearing from anyone who has done any type of engine conversions. Please write to: 114 Bayleaf Ln., Madison, MS. 39110

Cliff Johnson, who travels to Britain frequently throughout the year, has discovered a company in London which shows promise in regards to parts and importation of older Land Rovers. All parts are genuine and/or approved by Land Rover. For further information contact: Guy Scottorn at Transautex U.K. Ltd. 50 Pall Mall, London SW1Y 5JQ Tel:01 839 4644.

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"BOSTON TO BOSTON - 1987"

by
Glen Foster

Part 1

Murphy's Law has a way of thwarting any good and valiant attempt to succeed. In 1986 anybody attending the Black Rock Desert trip knew I didn't. But not due to the lack of effort. But last year was different - with my good friend, Jim Shurtleff (another LRDA member and Land Rover mechanic par excellence) we threw a few things into the back of my V8 109 and left. No hotel reservations, miles per day plan - we just grabbed some cash and on June 26, westbound I-80 lay before us.

The Black Rock Desert pioneers endured hardships we can only imagine. But I felt some of their spirit as we Roved along through the Pennsylvania hills. The 109 seemingly unruffled by our speed on the open road managed 150 miles per fuel tank.

Our first big dinner break was Wendy's Hamburger haven - it took about a half hour to find due to some bogus signs and being in no mood to ask for directions. But it was worth it, Jim received a prize for his patience. A bright red twist tie for bun bags in his hamburger. We scratched that eatery off our Michelin list.

It was dark now and the Ohio skies opened up with a torrential downpour. And as we all know every leak found on a Land Rover worked perfectly. Jim and I discussed stopping for the night so the first rest area became home that evening. However, after long hours at the wheel of a Landy, the drone of the V8 still in my head and every expansion joint of the interstate in my back, I settled down for 'Road Warrior' type dreams as the big rigs came and went.

Waking up in Ohio that morning was a great step in the trip. We immediately noticed the smell of the earth in the air. Back home we always caught the sea breeze or ocean smell, but never the earth. It was a clear day as we motored through the rest of Ohio, Indiana, Illinois and into the heartland - Iowa. The farmland was as we imagined it, like a cartoon with the same scene going around and around. Starting out fresh from Pleasant Valley, Iowa we crossed Nebraska into the scrubby hills of Wyoming by nightfall. The Land Rover was treating us well, using a quart of oil every 900 miles, considering our average speed of 70 mph was returning 18 mpg.



Next morning, armed with maps we Rovered into "The City". After countless up one hill, down the other, dodging cable cars and electric busses we found ourselves at the Pacific Ocean. Stopping at the Golden Gate Bridge for a photo session, we said good-bye to San Francisco then started northward again, passing thru Mill Valley for the last time, catching the sunset at Bodega Bay. We marvelled at the deer herds coming down to the roads to graze with the cattle. The pink splashed sky gave way to reds, then finally a deep blue/black with uncountable stars overhead. We made camp along a slow moving muddy river.

Breakfast time next morning found us at the Pat Paulson Vineyards in the Napa wine country. At the time little did we know what lay ahead. Upon our entry into the "Avenue of the Giants" within the redwood forests of California, we had to take time to absorb the concept of time, how insignificant the Land Rover and ourselves were in comparison.

Arriving in Eureka was quite a treat after seeing miles of nothing. Burger King took care of our needs while Mobil super handled the 109. We were now ready to make the all night run to Reno. Across the top half of California we continually were amazed at the perfusion of wildlife everywhere. Deer knowing of our calling kept clear of the road. However, we did note the extensively dented front end of a Toyota with "deer crossing" written across the damaged area. We met the sunrise coming into Reno stopping for breakfast and supplies for the Black Rock.

As it heated up outside we pushed on harder now with the anticipation of meeting fellow members of the Association waiting ahead in Gerlach.

Don't miss the conclusion to this saga in the next newsletter.

That Monday morning in Rawlins, Wyoming was cold, but the sightings of deer and pronghorn amid the open spaces sent a warm feeling through us both. As the road stretched out ahead shimmering in the heat like a long black snake, we felt pleased with ourselves having passed the half way point.

Eventually Utah arrived along with a steep climb in the temperature. After a pit stop in Salt Lake we pressed on arriving at the Lake with it lapping up to the edges of the interstate. We had heard about the problem, but seeing for yourself really hit home. Fences peeked out just above the waterline and tops of beach bath houses stuck out of the water.

As we continued thru the heat, the skies darkened behind us while ahead sunshine beckoned. Off to one side rain swept down out in streams bent by the wind. It enveloped us and soon we found how ineffective the little wipers were in a raging western storm, but we pushed on.

About five miles from nowhere we caught sight of something out of place out on the Flats. Jim's binoculars revealed a small aircraft on it's back. Hiking out, we were relieved to find a bright green ultra-light, ripped and flapping in the wind- empty.

The steel grey sky swirled with storm clouds, the wind picking up as we pulled up to a track marker on the Bonnieville Salt Track. Gathering handfuls of warm salt, we couldn't help but wonder what it was like to drive on the surface as fast as we could. I looked at Jim and he looked back- that's all we needed. In the next second we were rolling down the flats following orange safety cones at 75 mph. But I soon realized that I had strayed quite a distance from the marker and was in trouble -with the clouds and salt reflecting the dim light, I found myself in a whiteout situation. No up or down or right or left - just white. I finally got turned around just as the heavens broke open. Keeping the Land Rover in a straight line became a chore as the rain turned the salt into slick, ice- like conditions. When I spied the tourist marker we headed for the Tarmac.

Heading into Nevada was hard getting used to with its searing heat of the day and bone chilling cold of the night. At 7:30 am we pulled into Waterhole, Nevada to pick up supplies. We marvelled at the activity at this time of the morning -in the small grocery store men watched TV, having a beer.

Through Reno, Nevada stopping in Truckee, California for lunch among the pine trees, the green vegetation contrasted strongly from the scrub and sand just an hour or so behind us.

Rolling down the mountains toward Sacramento, we passed all the truck run-away ramps. I thanked myself for doing the brake job before leaving. As we gassed up we noticed there was indeed something different about California- these weird gas nozzles with the plastic on the spout. It took some contorsions, but finally the tanks were filled and off we went.

Bumper to bumper in Sacramento commute traffic sipping on ice cold drinks, we felt the push to go onward to San Francisco. We skirted around "The City" as it's known, continuing north into Muir Woods, a misty-cool area among the redwood trees. After a quick dinner we found a motel in warmer Mill Valley - a shower, clean sheets saw us through the night.



"THE FIRST FORTY"



In April of this year Land Rover, Ltd., Solihull England celebrated the anniversary of it's introduction to the world of the "Land Rover", a friend to the farmer.

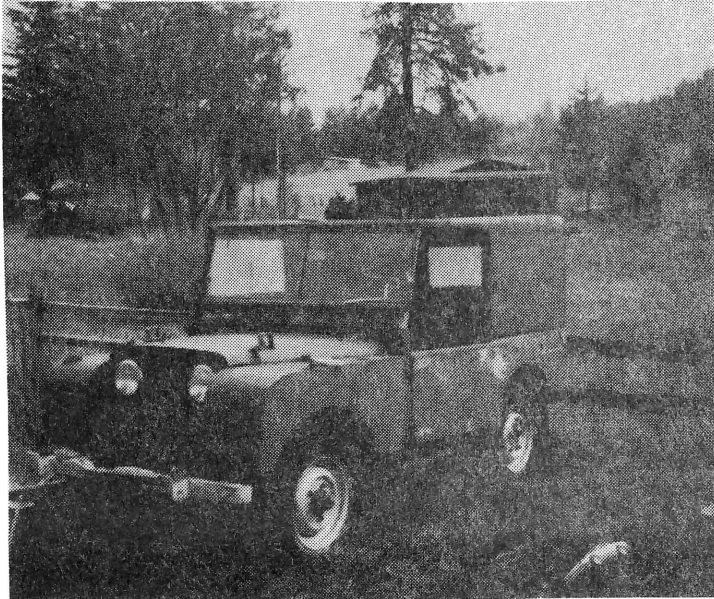
Many years have gone by the way side- years of evolution, experiments to make the world's most versatile vehicle even more so.

In celebration of this milestone two young men from Bedfordshire have arrived in the United States on a year long friendship tour. With the backing of numerous commerial companies, the Association of Rover Clubs and at personal expense, Jonathan Rogers and David Jenden will be seeing the sights behind the wheel of a new 1988 110 County. Specially painted and decaled for the occasion.

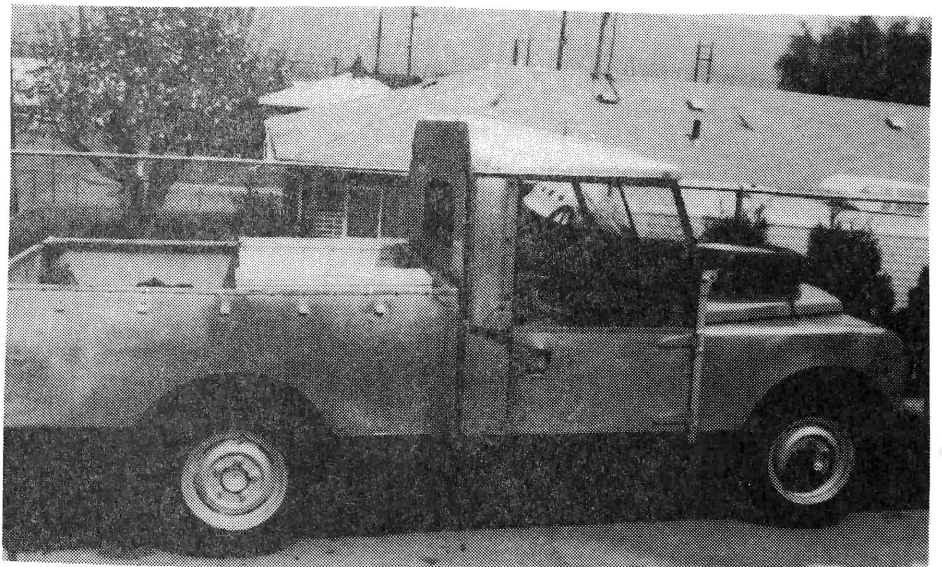
On behalf of the Association, my family and I hosted them for a few days thru April and May. It goes without saying that the exchange of memorabilia, Association news and general Land Rover information was, as David would say "superb".



As your Association Officer I have extended Jonathan and David any support or resource at our disposal in order for them to finish their journey. They also carry with them a letter of introduction from me, a copy of our membership list and Regional Coordinators. My hope is that the entire membership will have the pleasure of meeting them personally. If you see them on the road, extend a hearty welcome into your area and help them out if necessary. However, if you don't ever have the opportunity, look for more about their travels in future newsletters.



A example of Earl Mohr's stable of vintage Land Rovers.





THE BRITISH NORTHWEST LAND ROVER COMPANY

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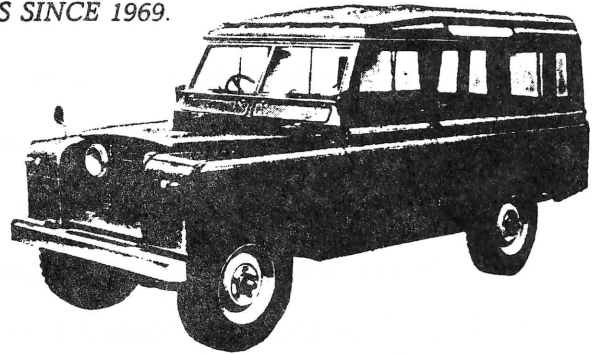
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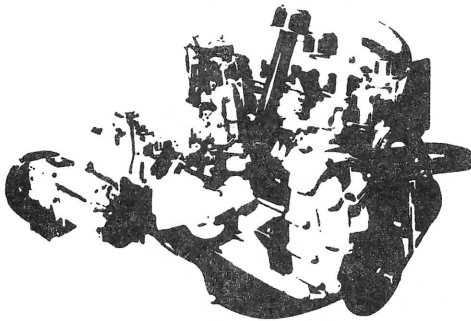
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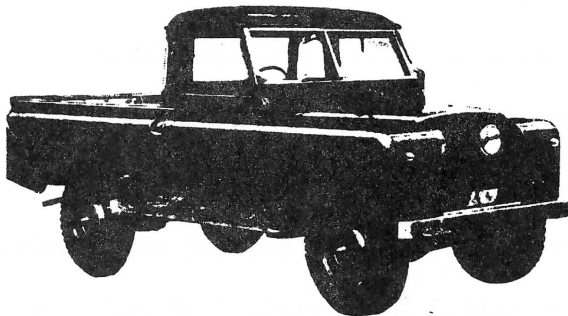
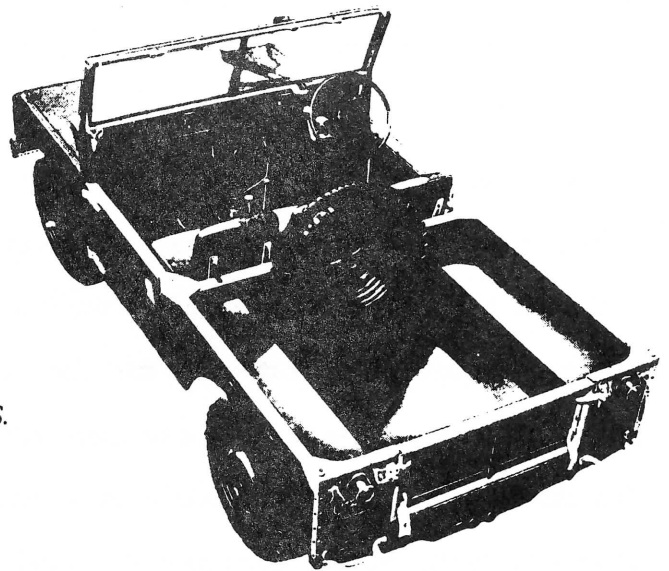
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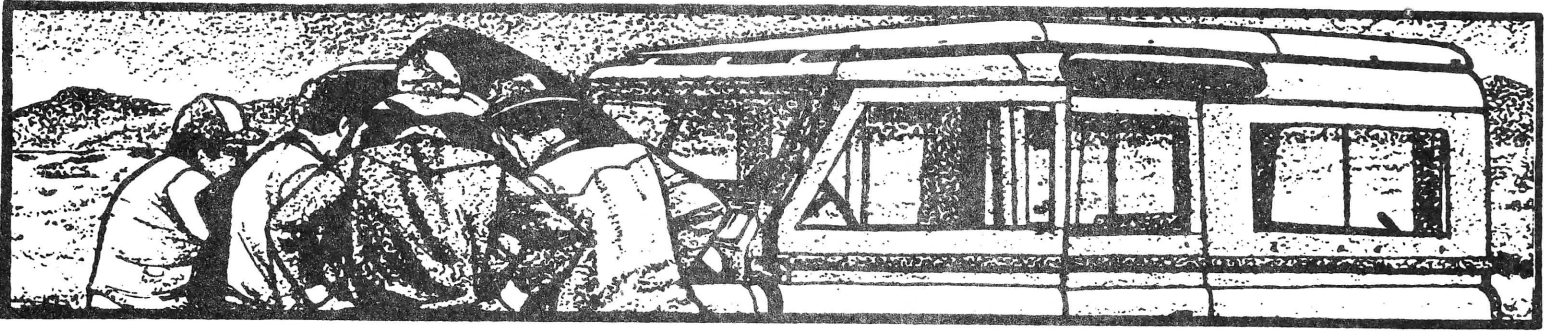


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TECH TIPS·by the numbers

Tips on Diesel Exhaust Smoke

My experience with diesels started with a Ford Escort, then a Land Rover (3 years now), then a Peugeot, and finally an Isuzu. I've read every book I can get on the subject and do as much of my own work as possible. I'm not a mechanic by profession, and I welcome any comments or disagreements from anyone out there with more experience or training. Diesel owners have to stick together since there is a lot of ignorance out there, and people can screw up your vehicle more easily than fix it. My first tip is one I got from Chip Marvin, #109, who advised me to take my distributor pump into a certified CAV service shop to get the timing checked. He was right - another diesel injection shop, which said they knew all about CAV pumps, had set the timing off by five degrees. That caused me some serious smoking problems. The key here is that if you can't do the work yourself, and can't blame yourself for messing it up, then be sure the people doing the work are qualified to do it right.

The kind of exhaust smoke you get from your vehicle will tell you a lot about it's condition. All diesels have some visible smoke under certain conditions, but if it becomes very noticeable or strong smelling then there is something wrong with either the performance or design of the system, or the way you are using the vehicle. Many people may find this hard to believe, but diesel engines are inherently cleaner than gasoline engines when it comes to CO, NOx, and hydrocarbon gases, but they can produce significant amounts of carbon particles, such as we've all seen.

There are basically three kinds of diesel exhaust smoke: black, blue, and white. Some black, or rather visible grey to black smoke, is considered normal on all diesels when accelerating hard or under load conditions, such as climbing a steep hill or towing a heavy load. With most diesels if you floor the pedal at low rpms or take the engine toward its upper rpm limit you will get significant amounts of black smoke. This smoke simply means that the engine is at its power limit for that speed and that the amount of fuel injected into the cylinder is greater than the engine's ability to burn it cleanly. Different vehicles will smoke in varying quantities, and my Land Rover at 3500 rpms has about normal smoke for most diesels. However, air restrictions will dramatically increase the black smoke, since there is not enough oxygen to burn the fuel thoroughly. This can come from a clogged air cleaner or a flattened or crushed air intake hose.

You may also find that your diesel will smoke more on one tank of fuel than another, or when getting fuel from different stations. There is considerable variation in diesel fuel, and generally, the higher the BTU content of the fuel, the blacker it will smoke. I have found in all of my diesels, that winterized fuel (blended #1 and #2 diesel), will smoke less than straight #2. I'm told that #2 fuel oil will smoke even more. As the BTU's go up, so will your mileage, so you will always get better mileage on #2 than mixed #1 and #2. Also, as the BTU's rise, so will the cylinder temperatures, so you will want to keep an eye on your smoke. The most dramatic change in fuel seems to come when you travel, since the stations are more likely to get their fuels from different refineries. For my Escort, my best mileage has been in Colorado (55-60 mpg), while my worst has been South Dakota (30-35 mpg). Also, Wisconsin's diesel fuel seems to be a little better than Minnesota's. Though the difference in mileage will not be as great with a larger diesel engine such as in the Land Rover, the difference will still be there.

Black smoke will usually get worse when the injectors begin varnishing from the diesel fuel. Putting a can of diesel injector cleaner in a full tank of fuel will usually solve it, but if it is persistent then you can do it for as many tankfuls as you need. This has occurred to a small extent with my Land Rover, but it doesn't get enough miles put on it for it to be a significant problem. In severe cases of dirty injectors, or varnish in other parts of the fuel system, I was told you could put one quart of automatic transmission fluid in a full tank, and the detergents in the ATF will quickly clean up the problem. The owner of a diesel injection shop told me this, so it should be reliable. I tried it once in my Land Rover, and except for a slight bluish cast to my exhaust, it worked fine. It greatly reduced the black smoke I was getting at the time.

Black smoke can occur if the timing is set too early, so that the fuel is injected too soon. This can also lead to detonation if the fuel burns too quickly in the cycle. This has only happened to me on my Escort when the timing belt slipped and it was so bad the car had to be towed.

Blue smoke is the same as with a gas engine; it means that engine oil is getting into the cylinders. The only other things that can give you blue smoke are a slight bluish cast from ATF or engine oil added to the fuel, or from unburnt diesel fuel in a cold or badly timed engine, when the fuel is injected too late. Most people say that the diesel fuel looks white, but to me there is a slight bluish cast to it. To tell if your compression is a problem then either take it to a shop that KNOWS diesels (two shops have given me erroneous readings) or do it yourself. My factory manuals do not give any values for the compression of the 2.25 liter diesel, and no one I talked to seemed to know either, so I wrote to Tim Clark at Land Rover Ltd., and he replied with "The compression for your Land Rover is quoted in our Service Manual at 31 to 33 KGF/CM squared." This comes out to, in my reckoning, 440.9 to 469.4 psi (which is high for an automotive diesel). To get a reading from your engine you will have to first buy a diesel compression gauge, and make an adaptor from an old glow plug for your engine. I have been told by two diesel mechanics that there are several factors that you have to be aware of that will alter your readings. The engine should be warm so that the metal parts have expanded and the oil is warm. The starter and battery should be in good shape to crank it properly; the fuel should be cut off completely, and the glow plugs should

be removed to reduce drag on the other three cylinders. Then crank the engine for ten rotations and the highest compression from the ten will be recorded on the gauge. If you do not eliminate all of these factors then your compression readings will vary greatly. Before I did it the right way, my compressions varied from 360 to 440 psi.

White smoke can come about from several sources, and almost every diesel owner will get white smoke at certain times. The most common is when first starting the engine. This smoke will sometimes just be water vapor in the exhaust system, as with a gas engine, but also often contains some unburnt fuel, since the cylinders are still too cold to thoroughly burn the fuel. Some automotive diesels will smoke white whenever they idle because the cylinders will cool sufficiently to reduce efficiency. Jim McIntyre, #384, told me that he thinks that the hot plugs in the head do not retain their heat well enough at idle. I believe he is right. One book I read says that this occurs primarily with diesels using a swirl, or turbulence, chamber design rather than an open combustion chamber or precombustion chamber design. The Land Rover uses the swirl chamber design, as do most automotive diesels, and so is more likely to cool too far, compared to the other designs. Most diesel Land Rover owners I have talked to have this problem, but some don't, so there may be other factors involved, such as timing problems. Some supporting evidence that it might cool too far comes from my pyrometer (exhaust gas temperature) readings. Supposedly, diesel fuel needs a temperature of 600 F to ignite properly, and the compression alone is supposed to provide that, but my pyrometer will drop down as far as 350 F if the engine is allowed to idle for very long. The drop is slow and hovers around 500 - 600 F, but then goes lower. A pyrometer can be ordered from any parts store, or you can look for a shop that caters to truckers, since they will have them in stock. Mine cost about \$75 or \$80, and is very useful for monitoring high and low temperatures. Diesels should never go above 1200 F, and when my timing was off the temperatures soared to 1650 F. Severe engine damage can result, I'm told, from too high a temperature, but I lucked out with only burnt exhaust valve guide seals. If the timing is either advanced or retarded then your temperatures will go up, and many diesels can exceed the proper limit even when timed properly.

The Mazda diesel used in the Ford Escort has a solution to this problem. They call it afterglow, and whenever the temperature drops to a certain level, including initial startup, the glow plugs will continue operating, but at a reduced voltage to reduce wear. It certainly seems to work on the Mazda, and I have just installed an afterglow system on my Land Rover. Unfortunately, I haven't driven it since it was installed due to other work I have been doing. When I have thoroughly tested the system I will report on it.

Temperature is not the only source of white smoke. If the volume of smoke is significant, then there is probably a timing problem. This can occur either when timing the distributor pump to the flywheel, or at the timing chain, or if the special locating screw for the drive gear for the distributor pump slips. Another source is the internal timing of the distributor pump. This happened to me and when it was corrected the white smoke was totally eliminated except for a little at idle or startup, and the exhaust temperatures dropped 250 F at the high end.

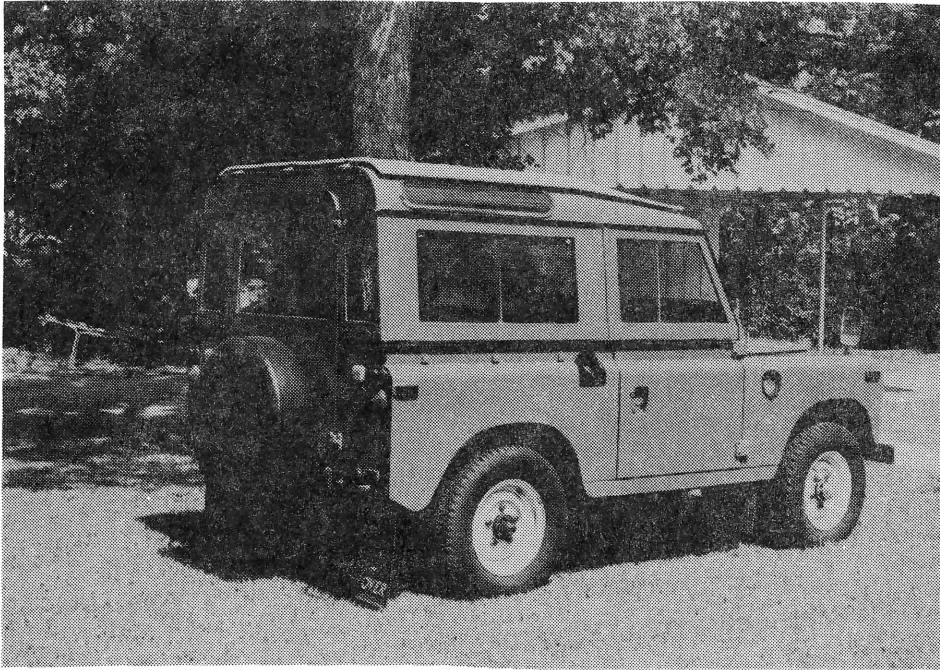
The injectors can sometimes cause some white smoke, but only

if they are malfunctioning. If one happens to stick open then the timing for the following cylinder can be affected because of altered pressures in the pump. This can also lead to air being forced back through the injector into either the pump or the spill pipe. From the spill pipe it is possible for air to bleed back to the second fuel filter, and from there back into the pump. If air gets into the fuel lines it will screw up the timing of the pump because air compresses very differently from diesel fuel, and the various injectors will inject either early or late, depending on the fuel pressures. Air leaks can also occur at any fuel line fitting, inside the lift pump, at the fuel filters, or even in the distributor pump. I have found it useful to use clear plastic hose for the low pressure lines, since you can see where the air is coming from. This is not really a permanent solution since the plastic hose is not intended for fuel lines and will yellow and harden with age. I found three years to be about the maximum life for the plastic. I find this a reasonable time span, considering that I have had fuel/air leaks at the lift pump, spill pipe, one fuel filter, and the distributor pump. Maybe I have had more trouble than most people, but the plastic does help. You should also be aware that the plastic, when new, is quite soft and can tear if you tighten your clamps too much. You should also replace all washers in the high pressure lines when you remove them, since the washers all compress and can get tiny grooves in them that can leak if you re-use them.

Another cause of white smoke can be inadequate fuel supply from the lift pump, either from clogged fuel filters or a faulty lift pump. Either cause is relatively easy to fix, and a fuel pressure gauge will clue you in if there is a problem.

One uncommon, but severe smoking problem occurs when the injection system is damaged from wax (gelled fuel), water, or algae being forced through the system. There will probably be a significant rise in both white and black smoke, since the system has been severely damaged. This means repairs to both the injectors and the distributor pump, and in the case of algae, thorough cleaning of the fuel tanks, all lines, lift pump, and filters. Algae will start growing in diesel fuel if it left to sit in warm weather for six months or more. This is not common except on diesel ships, unless you have a diesel that you are not using and so just let it sit. If you intend to do this, then save yourself a lot of trouble and money by draining the entire fuel system and filling it with a professional preservative designed for storing diesel injection parts. The safest thing is to just keep using the vehicle periodically.

Smoking in general, whatever the color, is more common as the system ages. This is from wear in the components leading to increased inefficiency. The point at which you repair the components is up to the owner, but will eventually be necessary. Most components, whether injectors or pumps seem to be affected by both heavy use over many miles, or just age. My Land Rover has many fewer miles than my Escort, but has given me much more trouble. I attribute this to both age and some ignorance on the part of one or more owner in the past. Diesel injection systems are designed to last a very long time, and with proper care, will do just that.



This fine example of a Series III is owned by member John Mateer.

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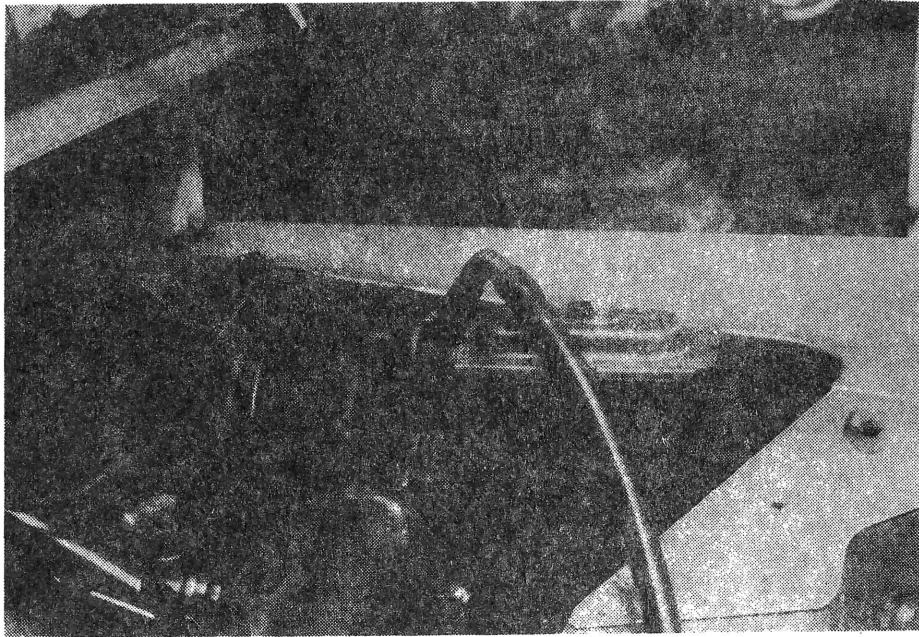
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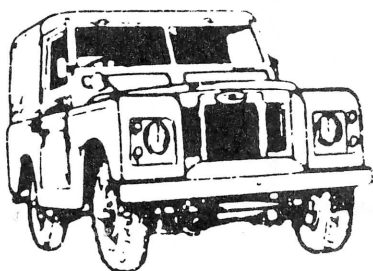
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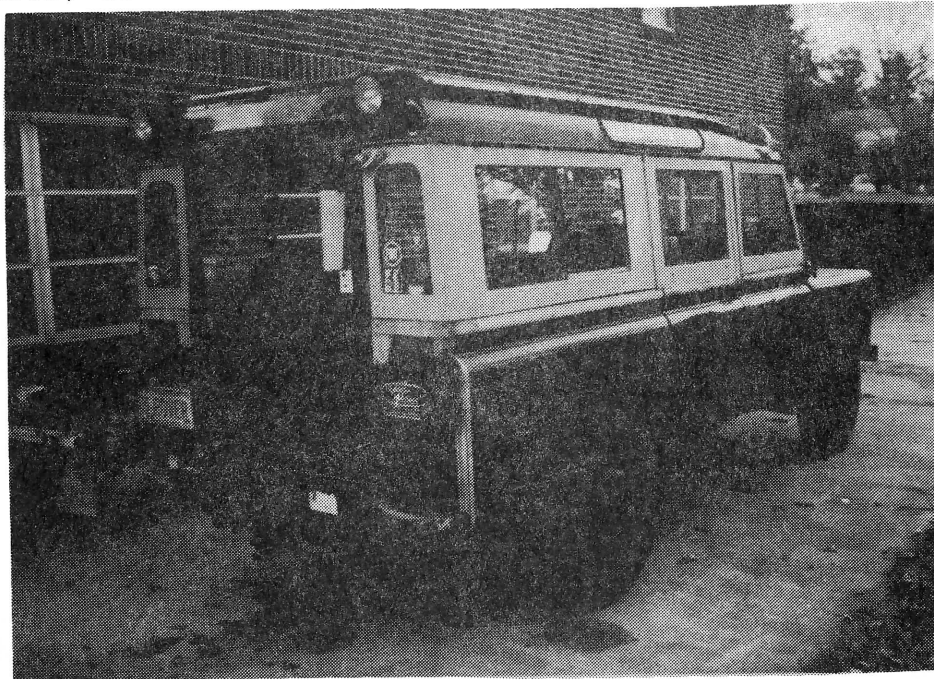


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This 3/4 rear shot is of RC Jack Walters '66 109 diesel.

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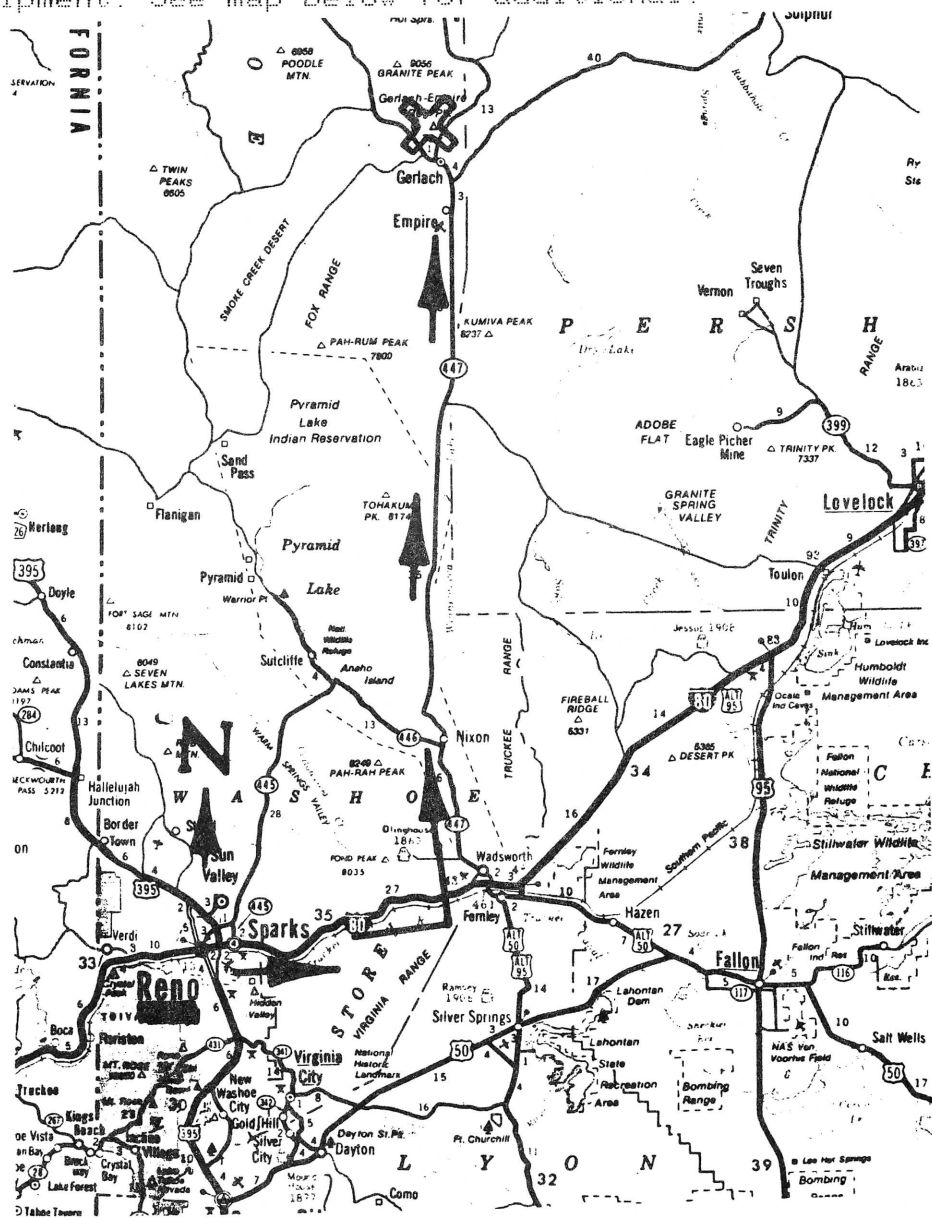
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