

SEPTEMBER 1979

\$1.00

Popular Mechanics

HOME VIDEO
Complete guide to
new disc players &
cassette recorders



PROPANE FOR YOUR CAR:
PM converts a V8—and
answers all your questions

6 COMPLETE PLANS:

- 2 bath built-ins for storage & privacy
- 2 beds for adults
- 2 beds for kids



REAR DRIVESHAFT

FULL-TIME 4WD
TRANSFER CASE

FRONT DRIVESHAFT

**FREE ENERGY-
PROGRAM OFFER**

**PM COMPARES
PROGRAMMABLE
CALCULATORS**

40-PAGE HOME ENERGY SAVER

- PM installs a solar water heater
- 18 new wood cutters and log splitters... and more!

**AMC EAGLE
FIRST 4-WHEEL-
DRIVE SEDAN!**

**PLUS: Subaru
owners thrilled
with 4wd wagons**



DETROIT LISTENING POST

Engagement announced: Washington and Detroit

No one's yet calling it a marriage, and it was made in the Middle East (not in heaven), but after years of adversity, our government and domestic automakers are saying they'll team up in the fight against dependence on foreign oil for transportation needs.

Following their presidential "summit conference" last spring, Detroit's top auto executives and Department of Transportation head Brock Adams are working on plans for cooperation in research toward the safer, cleaner, ultraefficient automobile of the future. Only about 5 percent of the automakers' budgets have been spent on pure research in recent years due to the tremendous expenditures required just to meet each year's safety, emissions, damage-resistance and fuel-economy standards. Now the government has agreed to plow hundreds of millions of dollars into research by the auto companies, universities and other organizations. The plan also calls for arm-twisting the oil companies into contributing some of their technical expertise toward creation of future vehicles that will use far less of their product.

GM's future family cars

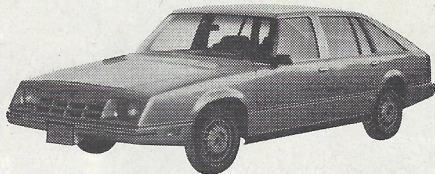
We got a sneak look at a GM experimental car and a glimpse of what's coming down the road a few years hence for the family-car market. Labeled "Integrated Vehicle" and "2x3" (two passengers up front and three in back), the car is more a test bed for concepts and components than a specific model prototype, but it's most closely related to the full-size luxury sedans (Cadillac, Buick and Olds) that GM is considering building for the '84 model year.

It is powered by a small, transverse-mounted V8 driving the front wheels and features highly aerodynamic styling, a roomy interior and a rear-hatch fifth door. It is as tall as the Pontiac Bonneville we saw it parked next to, and nearly as long, but it should be capable of far better fuel economy due to lightweight design and materials throughout.

Interesting features include MacPherson-strut front suspension, rack-and-pinion steering, beam-type rear axle with trailing arms and self-leveling rear suspension,

fuel tank mounted under the rear seat (ahead of the axle), and fiberglass body panels bolted directly to a lightweight steel frame without rubber bushings.

GM's midsize cars are scheduled for their second major redesign in '83 with A-cars (Malibu, LeMans, Cutlass, Century) getting front-drive and A-specials remaining conventional-drive. The next year will see the second full-size model redo, at which time the top-line C-cars (Cadillac, Buick Electra, Olds 98),



GM '84 luxury cars (Cadillac, Olds, Buick) will have parts, materials, concepts from this "Integrated Vehicle" test car.

but not the B-cars (LeSabre, 88, Pontiac, Chevrolet), may go front-drive. The Integrated Vehicle could evolve into the 1984 C-car, but that decision is still being pondered.

More on gasohol

The 10-percent ethyl alcohol, 90-percent gasoline blend known as "gasohol" has been getting a lot of attention as one method of extending the nation's motor-fuel supplies. A small industry has sprung up to produce the fluid (using alcohol from waste grain products), an increasing number of retail outlets in the Midwest and elsewhere have begun selling it, Washington has encouraged its use, and Detroit automakers have extended their new-car warranties to cover it.

Since grain alcohol has less energy content than gasoline and tends to "lean out" the air/fuel mixture, performance of most cars suffers slightly with gasohol. Still, almost any car should be able to run on gasohol with no modifications and no damage to either engine or fuel system. Cold starting and running may be affected slightly, especially with late-model cars that are already tuned to superlean mixtures, but gasohol's slightly higher octane rating should reduce knocking and pinging in many cars. If it's available in your area, try it and see.

Propane power

Propane, a liquid petroleum gas (LPG), is a byproduct of oil drilling and is an alternate fuel for internal combustion engines that's been used for years. Recently, car owners have been clamoring for conversion information, and the subject is covered in this month's *Saturday Mechanic* on page 48A.

Other alternate fuels

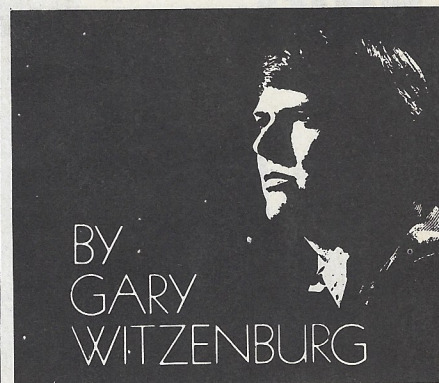
While autos and trucks are getting more fuel-efficient, and increasing usage of gasohol and propane could stretch fuel supplies to some degree, there is growing emphasis on development of entirely new fuels and production processes. Among the leading candidates are pure alcohol (either ethyl or methyl), synthetic fuels from coal and oil shale and hydrogen. Each has its problems, all are still costly, and none is very likely to supplant gasoline to any large degree for years to come. But these and other alternatives could eventually combine to ease the mounting pressure on crude-oil supplies—and the new fuels will get more cost-competitive as the price of gasoline continues to soar.

"Conservation, by itself, will not solve a scarcity," says GM president E.M. Estes. "It will only prolong it. At some point we, as a nation, obviously will be better off to put our billions into additional energy production rather than into further conservation. When a resource begins to get scarce and expensive, the thing to do is find a different resource to do the job."

Alternate engines

While some people feel there is nothing wrong with our highly developed internal-combustion engine—only

(Please turn to page 171)



(Continued from page 43)

the fuel we are using to power it—others are looking at alternative engines as the best way to solve our fuel problem.

Diesels offer an alternative that's already in production, but a diesel engine only shifts your dependence from one crude-oil product to another. Major fuel-saving revisions to the internal-combustion engine, such as Ford's stratified-charge "Proco" engine, also will help when they reach production in a few years. But what about the future of electric- and turbine-powered vehicles?

The major problem with electrics can still be summed up with one word: battery. Batteries as we know them today are bulky, heavy and expensive. Moreover they have extremely short life spans when continually charged and discharged, and they are very inefficient energy-storage devices when compared to a tank of gasoline.

Some manufacturers currently are producing electric vehicles for short-range recreational and commercial delivery use. Several of these companies are working on this development independently, and others are doing it as part of government-funded, experimental programs, but all designs are of limited usefulness until a battery breakthrough can be achieved.

Electric Auto Corp. in Troy, Mich., plans to have a GM wagon-based electric luxury car in production in 16 to 18 months. It carries a small gas-powered generator on board to run accessories and pump some energy back into the batteries while driving.

The best of the practical experimental designs so far is a joint Chrysler/General Electric effort unveiled last June that boasts a range of 145 miles at a steady 55 mph or 75 miles in stop-and-go conditions.

Turbine cars, meanwhile, have been awaiting a breakthrough in ceramic-material technology so that certain parts can take the extremely high temperatures that are required for a turbine engine to be considered fuel-efficient.

Recent reports are that such a breakthrough may be close at hand, and we may yet see practical turbine cars on the road in the late 1980s. The big advantage of a turbine engine that makes it worth pursuing, of course, is the fact that it can run on almost anything from heating oil to corn whiskey and produce only a small amount of pollution in the process.

PM

SEPTEMBER 1979 171

There's a new-fashioned hardware store in town.

Sentry Hardware. With a brand-new sign, and some old-fashioned ideas. Because Sentry is more than a store able to provide you with exactly the right tools and supplies you need, at a price that's fair and reasonable. Sentry is people. Friendly, helpful, knowledgeable people.

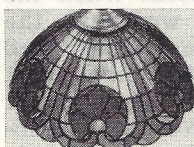
So when you're ready to do-it-yourself, start off at the hardware store where people are ready to help.



SENTRY Hardware When you're ready to do-it-yourself.

Check the Yellow Pages under Hardware for the Sentry Store nearest you.

Interested in becoming a Sentry Hardware dealer? Contact us at Sentry Hardware Corporation, Cleveland, Ohio 44113



STAINED GLASS

Send 50¢ for fascinating catalog of kits, tools, ideas, books and supplies.

BIG STARTER KIT
Only \$16.95 ppd.

WHITEMORE,
BOX 2065EM, HANOVER, MASS. 02339

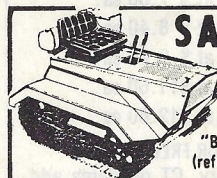
SPARE TIME INCOME? SELL KNAPP SHOES!

Sell famous Knapp Cushion Comfort Shoes full time or part time to supplement your income. Enjoy the financial success and security you've always dreamed about. Millions of repeat customers. Earn higher commissions plus bonuses. No investment. Free selling and training kit to get you started. America's No. 1 company in the direct selling shoe industry. Write: Knapp Shoes, Dept. L 612 Knapp Centre, Brockton, Mass. 02401.



KNAPP

The more for the money shoe.



SAVE MONEY

Assemble our unique Mini-Dozer Tractor Kit. Buy factory-direct. Catalog of Kit construction and uses — \$5.00 "Build-it-yourself" Plans — \$7.00 (refunded on any purchase!)

STRUCK KIT, Dept. PM99, Cedarburg, WI 53012



BRITISH SPORTS CAR PARTS

Steel/fiberglass body panels, upholstery, carpets, tops, wire wheels, grilles, bumpers, wiring harnesses, headers & exhaust systems, mech. parts, rubber trimmings. Catalog \$3.

**AUSTIN-HEALEY
MG**

TRIUMPH

JAGUAR Dept. PJ
512 BOSTON POST RD
DARIEN, CT 06820
(203) 655-8731/2

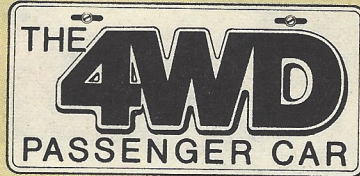


Driving American Motors'

by Gary Witzenburg
DETROIT AUTO EDITOR

The Eagle, the world's only *full-time* four-wheel-drive car, has landed. With this earth rover, you get in, start the engine, put the automatic transmission in gear and drive away. There are no hubs to lock or unlock, no confusing array of levers to shift this way and that. On or off the road, you just drive it and forget it; the only time you'll even realize the 4wd is there is when it gets you out of a jam no two-wheel-drive system could.

Subaru's wagon is the only other 4wd automobile on the market (see page 96). Its 4wd system is simple, too, but it must be engaged with a floor-mounted lever, is recommended for use at 50 mph and below, and has no limited-slip differential between the front and rear axles. By con-



trast, the AMC Eagle's heart is a unique, viscous-drive center differential that lets the front and rear systems run independently in normal conditions, but transfers torque to the higher-traction end when any wheel begins to slip.

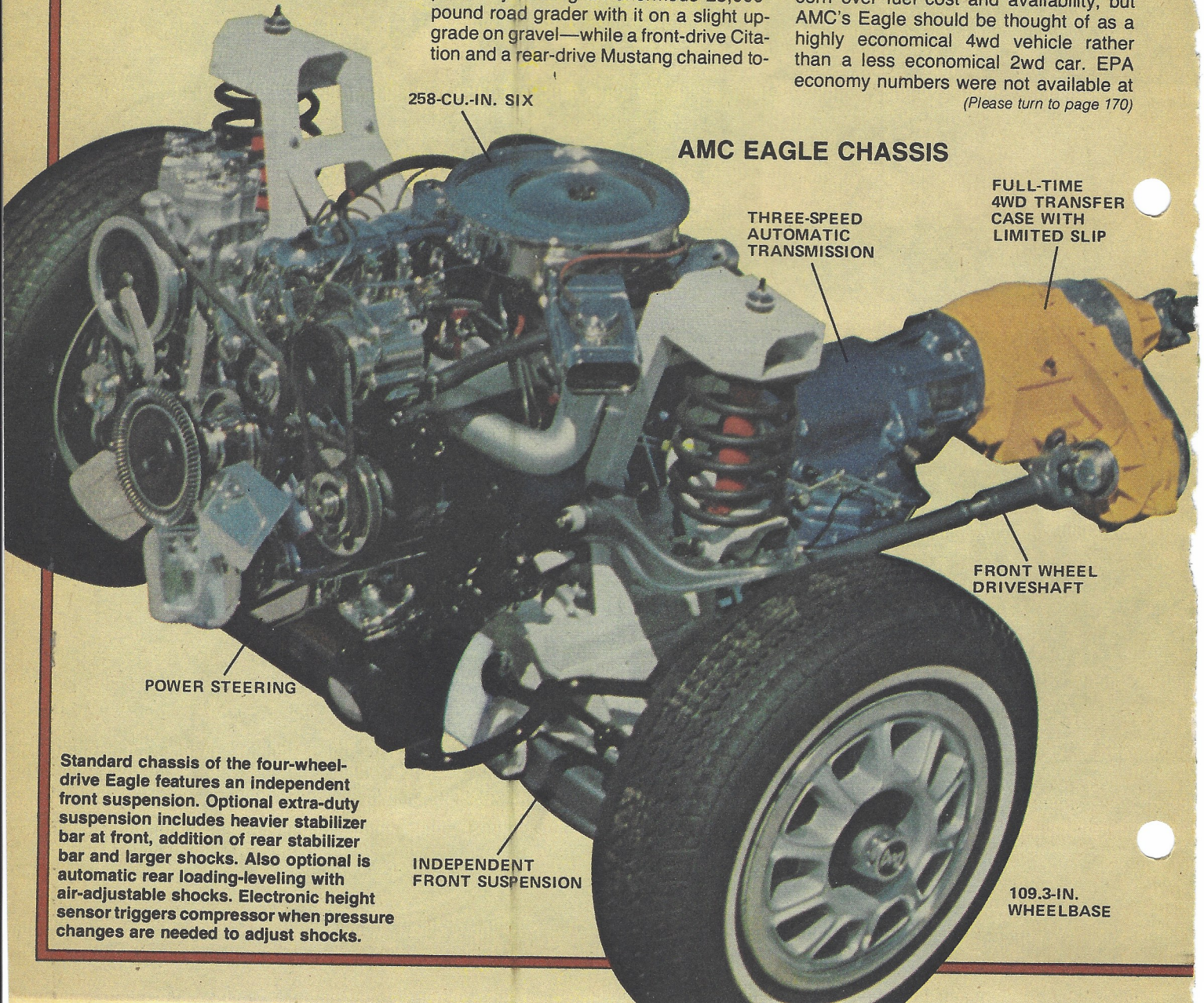
And it works amazingly well, as we discovered in a day of test driving at AMC's Burlington, Wis., proving ground. We didn't have any ice or snow to play on, but we did try it in slippery mud, sand, wet grass and on very steep hills. AMC engineers demonstrated the Eagle's pulling power by hauling an enormous 25,000-pound road grader with it on a slight upgrade on gravel—while a front-drive Citation and a rear-drive Mustang chained to-

gether just sat there and dug holes trying to move it. We even stopped our Eagle to pose for photographs on the steepest hill around, shut off the engine, then casually restarted and drove on up and over.

The Eagle is not intended to be crashed and thrashed around off-road like its cousin, the Jeep, but it *is* designed to give its owner the freedom to go almost anywhere, any time, without worrying about weather or road conditions. AMC figures there's a large market for that kind of mobility in an attractive, quiet, roomy and comfortable passenger car. Many people want to be able to get through "no-matter-what" but don't want the extra size, weight, ride harshness and fuel consumption of a truck-type 4wd or the out-back primitiveness of a Jeep.

Some may question the wisdom of introducing a 4wd car in a time of great concern over fuel cost and availability, but AMC's Eagle should be thought of as a highly economical 4wd vehicle rather than a less economical 2wd car. EPA economy numbers were not available at

(Please turn to page 170)



258-CU.-IN. SIX

AMC EAGLE CHASSIS

THREE-SPEED
AUTOMATIC
TRANSMISSION

FULL-TIME
4WD TRANSFER
CASE WITH
LIMITED SLIP

FRONT WHEEL
DRIVESHAFT

POWER STEERING

INDEPENDENT
FRONT SUSPENSION

109.3-IN.
WHEELBASE

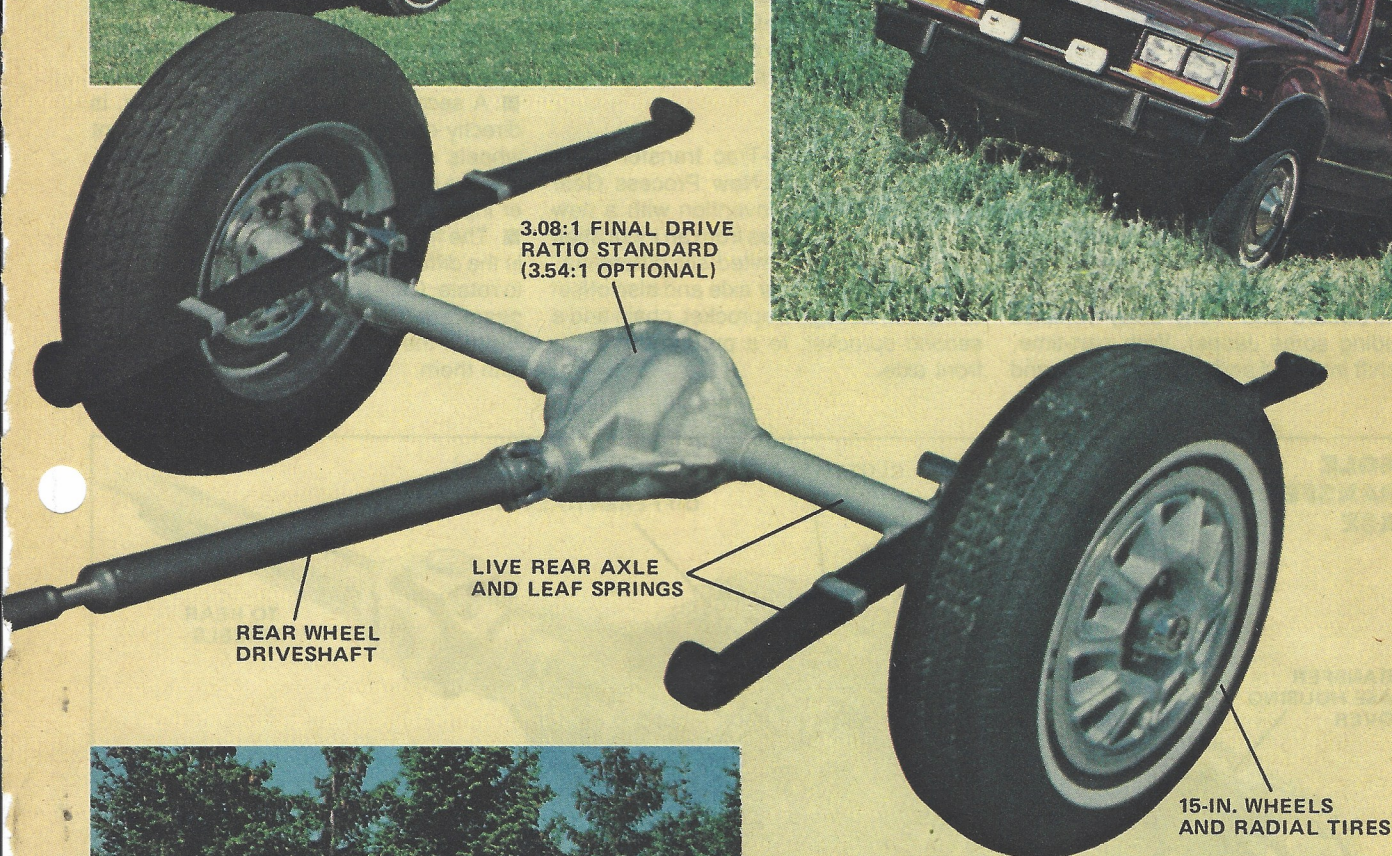
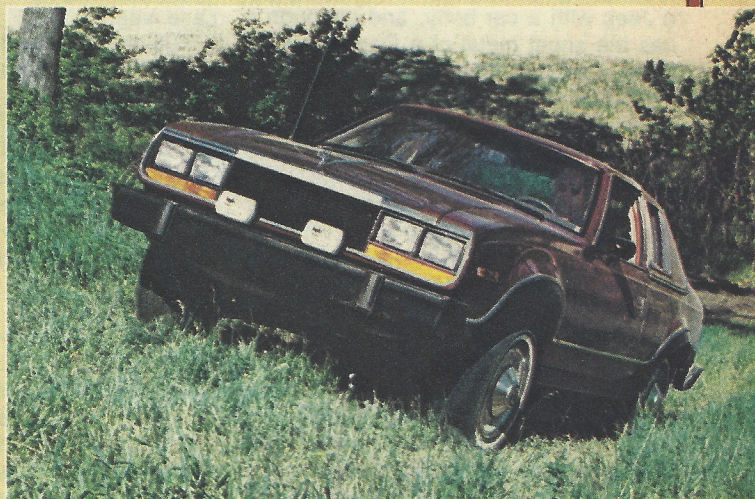
Standard chassis of the four-wheel-drive Eagle features an independent front suspension. Optional extra-duty suspension includes heavier stabilizer bar at front, addition of rear stabilizer bar and larger shocks. Also optional is automatic rear loading-leveling with air-adjustable shocks. Electronic height sensor triggers compressor when pressure changes are needed to adjust shocks.

four-wheel-drive Eagle



Four-door sedan is one of three body styles offered in the Eagle line. Car will be available with many luxury options, like vinyl roof (shown at left), power equipment and cruise control.

PM's test in hilly terrain revealed impressive performance. The 4wd Eagle concept balances comfort of a well-appointed passenger car with ruggedness of a four-wheel-drive chassis.



Two-door sedan, like the four-door and station wagon models, is 186.2 inches overall on a 109.3-inch wheelbase. Its height is 55.8 inches compared to 55.3 for the four-door and 55.0 for the wagon.

Station wagon model, like all Eagles, has seven-inch ground clearance. Curb weight is 3407 pounds compared to 3306 for two-door, 3361 for four-door. Width of all models is 71.94 inches.



DRIVING AMC'S 4WD EAGLE

(Continued from page 92)

press time, but AMC says the Eagle should get only about two mpg less than a comparably equipped 2wd compact, putting it in the 18- to 20-mpg range.

While the three Eagle body styles (two-door and four-door sedan and five-door wagon) obviously are derived from the corresponding Concord models (which in turn are updates of the old Hornet line), they are much more than just 4wd Concorde. Appearance differences include unique grille, taillamps and other styling cues, three-inch higher ground clearance

and 15-inch wheels and tires under the soft rubber fender flares and sill guard. But the major differences are underneath. The transmission delivers power directly to the transfer case, which then distributes it via the viscous-drive differential to both front and rear drive axles as needed. Power flow is direct to the rear wheels, while a silent-type chain connects the differential's front output shaft to the front-wheel driveshaft.

Front suspension is independent with upper and lower control arms, tube shocks and coil springs mounted above the upper arms. The front differential is mounted to the engine's left side with an

axle tube extending to the right, and short, equal-length, articulated half-shafts connecting to the wheel hubs. Constant-velocity (CV) joints are at both ends of each half-shaft to allow for seven inches of front-wheel travel. A conventional Hotchkiss live rear axle on leaf springs and tube shocks brings up the rear, with a full 9.4 inches of travel. Springs at both ends are slightly stiffer than those of a 2wd car to give the firmer ride and handling appropriate to a vehicle with off-road capabilities. Still, over-the-road ride is surprisingly comfortable. A 0.94-inch front stabilizer bar is standard, while the optional extra-duty suspension substitutes a 1.06-inch front bar and adds a 0.625-inch rear bar, stiffer shocks and slightly firmer rear springs.

The only Eagle power train for now is AMC's 2-bbl., 258-cu.-in., in-line Six with the Chrysler-built Torque Command three-speed automatic transmission used in past V8-equipped AMC cars. Four-cylinder, manual transmission versions should be available before long. The engine puts out 114 hp at 3200 rpm, giving leisurely performance in the 3400-pound Eagle, but its 210-ft.-lbs. of torque at 1800 rpm is more than adequate to haul it through or up almost anything you might encounter off-road short of a quicksand bog or a building. A final-drive ratio of 3.08:1 is standard, but a 3.54:1 ratio comes on high-altitude models and with the optional towing packages, except in California.

Standard tires are P195/75R15 fiberglass-belted radials on six-inch-wide rims, while steel-belted all-weather Goodyear Tiempos are an optional choice. The spare in both cases is a high-pressure, spacesaver type on a special wheel which is stored beneath the cargo floor.

The reinforced, integral body/chassis measures 186.2 inches long and 71.9 inches wide on a 109.3-inch wheelbase, with height ranging from 55.0 to 55.8 inches, depending on the body style. Power steering and brakes are standard, as is a protective plate under the transfer case.

Although Eagle will be marketed as a 4wd car, it is classified as a light-duty truck for emissions regulations because of its ground clearance and short overhangs. Unfortunately, it still requires exhaust gas recirculation (EGR), air injection and a catalytic converter to meet emissions regulations, and therefore needs unleaded gas. Prices had not been announced as this was written, but they should be less than a well-equipped, truck-type 4wd and well under the rumored \$10,000, according to AMC.

The Eagle may also become a bird of prey, likely to eat up some sales of Jeeps as well as other 4wd competitors. But AMC feels it will attract plenty of new customers who otherwise wouldn't have bought the 4wd at all.

PM

Repainting your home? Nothing covers better or lasts longer than Olympic Overcoat.[®]



Olympic Overcoat was made for previously-painted surfaces. It covers old paint with amazing ease—Overcoat seems to flow like cream. Yet it wears like iron! That beautiful 100% acrylic latex finish lasts for years. Olympic guarantees it or your money back. Just follow easy label directions.

See all 25 colors at your Olympic Dealer. He's in the Yellow Pages. Or write Olympic: Dept. C, P.O. Box 1497, Bellevue, WA 98009. **Flows like cream, wears like iron.**

