

EVALUATION OF AN AMC GREMLIN
INCORPORATING PETERMAN MODIFICATION

November 1973

Test and Evaluation Branch
Emission Control Technology Division
Environmental Protection Agency

Background

Walter Peterman of Caracas, Venezuela, contacted the Office of Air and Water Programs and requested an evaluation of his control system. Data was presented from Olson Laboratories compiled using the 1972 FTP on a 1973 AMC Gremlin (258 CID, standard transmission). The data illustrated good control of unburned hydrocarbons, carbon monoxide and nitrogen oxide. Based on these results a confirmatory test program was undertaken by the Test and Evaluation Branch.

Device Description

Test work was conducted on a 1973 AMC Gremlin with a 258 CID engine and standard transmission. The control system included a carburetor air bleed and modification of the distributor vacuum advance. The air bleed arrangement is schematically illustrated in figure 1. In effect, the bleed system allows for better distribution of the fuel as it passes the throttle plate. The distributor modification included reversing the vacuum advance so that a vacuum retard was affected. Comparison of the stock vacuum advance characteristic with Peterman's vacuum retard is schematically illustrated in figure 2.

The Peterman modification did not use exhaust gas recirculation.

Test Program

Two tests were run on the Gremlin as modified by Mr. Peterman. Two baseline tests were also run on this vehicle. It was later noted by Mr. Peterman that his vacuum retard system was not disconnected during the baseline testing. EPA personnel did not make any note of this situation at the time of testing. All testing was conducted in accordance with the 1975 Federal Emission Test Procedure as described in the November 15, 1972, Federal Register. All tests were performed at a simulated inertia weight of 3,000 pounds.

Results

Test results are reported in the attached table. The 1975 interim emission levels were achieved with this vehicle modification.

There were two potential driveability problems noted with the modification. The vehicle demonstrated surge during the

LA4 dynamometer testing. This condition was not noted on the road. Knock was observed on medium to hard accelerations with this vehicle when driven on the road. Knock was not observed during the LA4 dynamometer testing. It should be noted that 100 RON lead-free fuel was used during all testing. Neither of these problems were apparent in the baseline configuration.

Conclusions

1. Although 1976 interim standards were not achieved, emission levels well below 1975 interim standards were achieved with the Peterman modified 1973 AMC Gremlin.
2. Both knock and surge were observed during testing of the Peterman modified 1973 AMC Gremlin.

1975 FTP Results
with Peterman Modification

	HC	CO	Device Testing NOx	CO ₂	Fuel
	gm/mi	gm/mi	gm/mi	gm/mi	Consumption mpg
	0.97	7.23	1.14	531.59	16.3
	0.94	5.92	0.89	500.95	17.3
Avg.	0.96	6.58	1.02	516.27	16.8

Baseline Testing*

	1.62	26.95	1.47	459.49	17.7
	1.72	34.02	1.87	475.20	16.7
Avg.	1.67	30.49	1.67	467.35	17.2

'75
Interim
Std.

1.5 15.0 3.1

'76
Interim
Std.

0.41 3.40 2.0

NOTE: All tests conducted at 3,000 lb. inertia and 10.3 hp
at 50 mph.

*Distributor modification was present during the baseline
testing.

CROSS SECTION
STD. CARBURETOR



CROSS SECTION OF
CARBURETOR WITH
PETERMAN'S AIR
BLEED

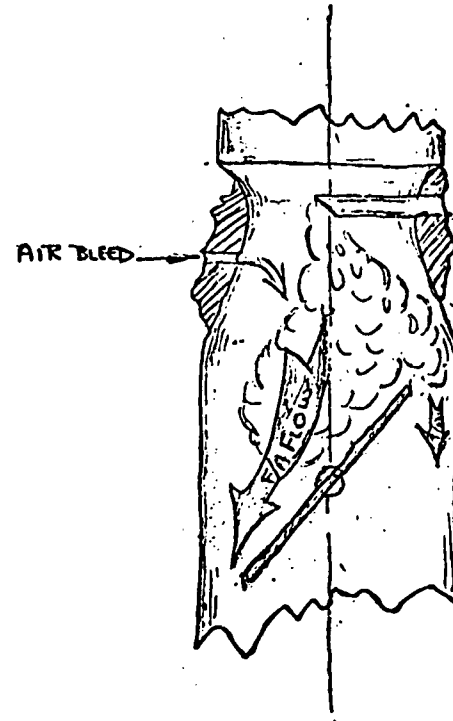
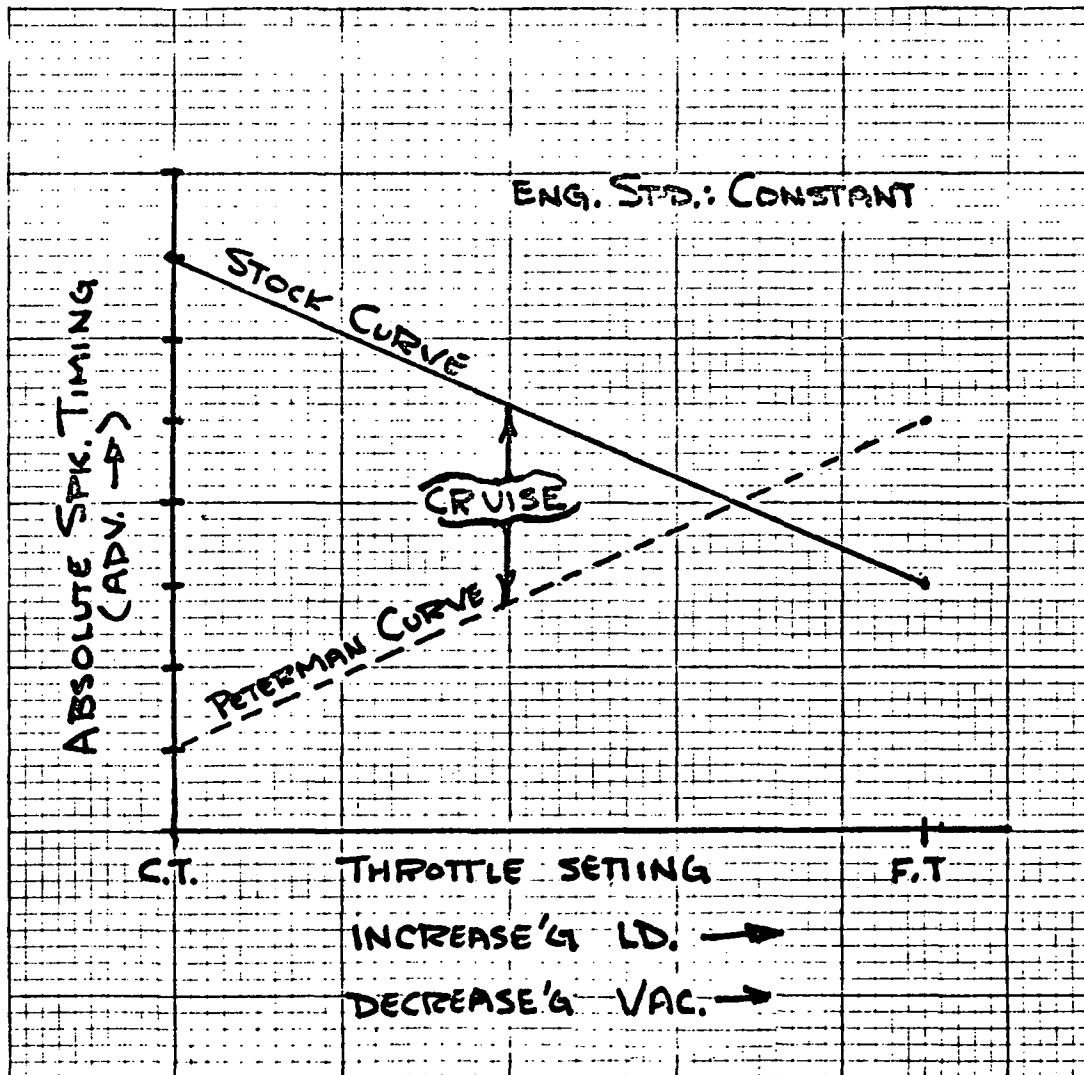


FIGURE 1

COMPARISON -- PETERMAN VS. STOCK SPARK CHARACTERISTIC



NOTE: COMPARISON @ CONSTANT ENG. SPD. ---
THUS, CENTRIFUGAL ADV. IS CONSTANT

FIGURE 2