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Effectiveness of Idle Adjustment on Passenger Cars at Commercial Repair Facilities

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Abstract

This paper describes the results of a project on passenger cars to evaluate the effectiveness of idle adjustment at commercial repair facilities. This effort involved a total of 222 passenger cars tested by Automotive Testing Laboratories (ATL) & Automotive Environmental Systems, Inc. (AESI) during 1979 and 1980. These vehicles were a subset of 1225 vehicles tested in St. Louis, Washington D.C., Phoenix and Los Angeles as part of the FY 77 and FY 79 Passenger Car Emission Factor Programs. Only vehicles which arrived for testing without limiter caps were eligible to participate in the survey. After the complete laboratory test, a contractor employee took each vehicle to a service station, independent garage or dealer and asked simply that the idle mixture and speed be adjusted to manufacturer's specifications. Upon return to the laboratory, the work performed by the facility was evaluated using a tachometer and garage-type emission analyzer. The sequence was completed when the contractor's mechanic performed the idle adjustments to the best of his ability. The data obtained illustrates the inability or unwillingness of the majority of commercial repair facilities to properly set idle mixtures. The results of this project point to the need for mechanic training in reducing vehicle emissions through correct maintenance procedures.

Background

According to the Clean Air Act and its Amendments, the Environmental Protection Agency (EPA) is required to encourage and implement programs which will assure that properly maintained vehicles will meet their emission standards throughout their useful life. Inspection/Maintenance programs are the primary force behind this effort to control emissions from in-use vehicles with the work to be performed by the commercial repair industry. It is well known that a substantial number of in-use vehicles will not meet their emission standards when tested in an as-received condition (Reference 1 and 2). One of the major reasons is that the idle mixture and speed has been maladjusted. In order for these vehicles to meet their emission standards, these adjustments must be made correctly. The typical places for these adjustments to be made include dealerships, service stations, and independent garages.

Purpose

This study was designed to evaluate the ability of the commercial repair industry to set idle adjustments to manufacturer's specifications.

Selection and Test Procedures

Vehicles selected for this project were recruited primarily from the FY79 Passenger Car Emission Factor Program. Vehicles which arrived at the contractor's facility missing their idle mixture limiter caps were chosen for this study. Two hundred and twenty-two such vehicles out of a total of 1225 passenger cars tested were taken to commercial facilities by various persons in the contractor's organization (secretaries, engineers, technicians, etc.). The following procedures were employed:

Before leaving the contractor's facility - Vehicle identification information was recorded on worksheets provided by EPA. Idle readings (CO, HC, RPM) were also measured and recorded. Any evidence that the vehicle was in a testing program (e.g., data packets or exhaust connectors) was removed from the vehicle. A repair facility was contacted to set up an appointment to have idle mixture and speed adjusted. If possible, all adjustments were to be performed while the driver waited. No reference was made to any affiliation with an emission testing lab or that this was to be part of an EPA study.

At repair facility - The driver requested that the idle mixture and speed be adjusted to manufacturer's specifications. If questioned why, it was stated that they had heard that this is a very important adjustment from a number of standpoints, such as fuel economy and engine performance. If the mechanic insisted that other maintenance be performed, the driver stated that he wanted only the idle adjusted at this time to see what difference it made. If the mechanic said that he did not know how to set it to specifications, he was asked to set it as best he could. Notes were made (although not in the mechanic's presence) of any of his comments and actions. Observations regarding instruments and tools used as well as cost data were also recorded on the worksheets.

After returning to the contractor's facility - ICO, IHC, and IRPM were measured and recorded, as were the number of ¼ turns necessary to lightly seat the idle mixture screws. The mixture screw settings were not measured prior to sending the vehicle to the commercial repair facility in order not to disturb the as-received settings. Idle parameters were then adjusted to manufacturer's specifications by contractor mechanics and the location of the idle mixture screws relative to the lightly seated position was recorded. ICO, IHC and IRPM were again measured and recorded. New limiter caps were installed in the center position. The vehicle was then returned to its owner.

Discussion

Idle Test Results - The results of each of the 225 vehicles involved in this project are listed in the Appendix. The contractor for St. Louis, Washington, D.C. and Phoenix was Automotive Testing Laboratories (ATL), while Automotive Environmental Systems, Inc. (AESI) was the contractor for Los Angeles. The results for each city are summarized below.

St. Louis - Eighty three 1975-1979 model year passenger cars were taken to commercial repair facilities. The results of these adjustments are summarized in Figure 1. After adjustment at commercial repair facilities, idle HC concentration increased by 87% and idle CO increased by 30%. The engine RPM values, representing the average absolute difference from manufacturer's specifications, were essentially unchanged. The average cost for these adjustments was $4.97. A histogram showing the number of ¼ turns required for proper adjustment of the idle mixture screws after return from the commercial repair facility is also included in Figure 1.

Washington D.C. - Sixty one 1977-1980 model year passenger cars were taken to commercial repair facilities. Their results are summarized in Figure 2. After adjustments at commercial repair facilities, idle HC concentration increased by 23% and idle CO remained unchanged. Again, the engine RPM values, representing the average absolute difference from manufacturer's specification were virtually unchanged. The average cost was $4.67. A histogram showing the number of ¼ turns required for proper adjustment after return from the commercial repair facility is also included in Figure 2.

Phoenix - Forty eight 1975-1978 model year passenger cars were taken to commercial repair facilities. The results of these adjustments are summarized in Figure 3. After adjustment at commercial repair facilities, idle HC concentration increased by 40% and idle CO decreased by 7%. The engine RPM values, representing the average absolute difference from manufacturers specifications, decreased by 28%. The average cost of these adjustments was $5.32. A histogram showing the number of ¼ turns required for proper adjustment of the idle mixture screws after return from the commercial repair facilities is also included in Figure 3.

Los Angeles - Thirty 1975-1978 passenger cars tested in 1979 by Automotive Environmental Systems Inc. as part of the FY 77 Emission Factor Program are included in this report. These thirty passenger cars were also taken to commercial repair facilities for adjustments. The results of these adjustments are summarized in Figure 4. After adjustment at commercial repair facilities, idle HC decreased by 38% and idle CO decreased by 28%. The engine RPM values, representing the difference from manufacturer's specifications, decreased by 18%. The repair facilities in Los Angeles appeared to do a much better job than in the other cities. On the other hand the average cost of repairs in Los Angeles was $16.76. This is substantially higher than in the other cities. The factors of cost and quality may be due to California's licensing of mechanics and repair facilities.

Results of the Federal Test Procedure - Although the Federal Test Procedure (FTP) was not performed on these vehicles after they returned from the repair facility, the FTP emissions for the fleet were collected and averaged based on the presence of limiter caps upon arrival at the laboratory. These averages are listed in Table 1. The values here indicate that vehicles without limiter caps have average HC and CO emission levels which exceed those where the limiter caps are intact.

Conclusions

1. Only minor adjustments would be required to allow most vehicles to pass a basic I/M test.

2. The commercial repair industry does not currently adjust idle mixture and speed properly.

3. A lack of training and proper equipment (tachometers and exhaust analyzers) is apparent in the performance of this type of maintenance.

4. In order to conduct successful Inspection/Maintenance programs, some incentives and a major effort in mechanic training will be required to ensure that idle adjustments are made properly.

References

1. J. T. White, "An Evaluation of Restorative Maintenance on Exhaust Emissions from In-use Automobiles", SAE Paper 780082, March, 1978.

2. J. C. Shelton, "Effectiveness of Idle Adjustment on Light-Duty Trucks at Commercial Repair Facilities," EPA-AA-TEB-80-17, June 1980.

Table 1

Emission Levels and Fuel Economy Versus Presence of Limiter Caps

Site	Limiter Caps on?	N	FTP HC	FTP CO	FTP NOx	FTP MPG	HFET	Idle (N) IHC	Idle (N) ICO
St. Louis	Yes	187	1.25	17.78	1.78	16.8	23.9	102	0.78
	No	117	2.60	34.51	2.02	15.4	23.0	200	2.34
Total/wtd. Avg.		304	1.77	24.22	1.87	16.3	23.6	140	1.38
Washington	Yes	224	1.10	11.52	2.12	16.4	24.0	*	
	No	82	2.16	31.71	1.88	15.4	23.1		
Total/wtd. Avg.		306	1.38	16.93	2.06	16.1	23.8		
Phoenix	Yes	195	0.96	14.37	1.89	16.5	23.2	*	
	No	102	1.47	20.72	2.29	15.8	23.0		
Total/wtd. Avg.		297	1.14	16.55	2.03	16.3	23.1		
Los Angeles	Yes	81	1.02	11.92	1.50	16.8	**	59	0.18
	No	95	1.85	27.45	2.47	13.6	-	140	1.06
Total/wtd. Avg.		176	1.47	20.30	2.02	15.1	-	102	0.66

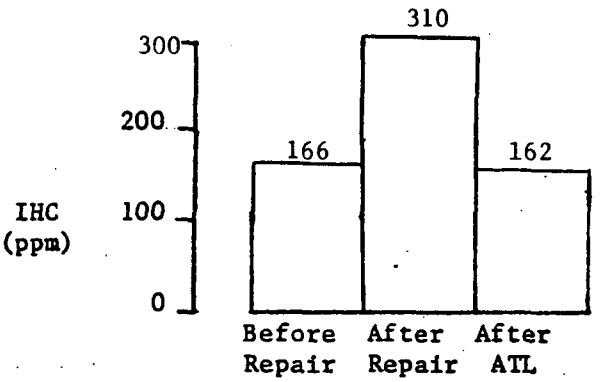
* Idle in neutral was not measured in Washington and Phoenix.

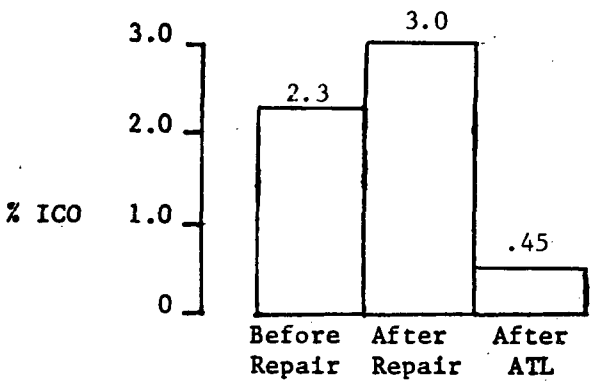
** HFET was not run for FY77 Program in Los Angeles.

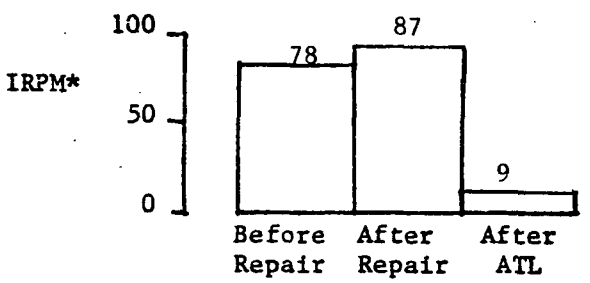
Figure 1

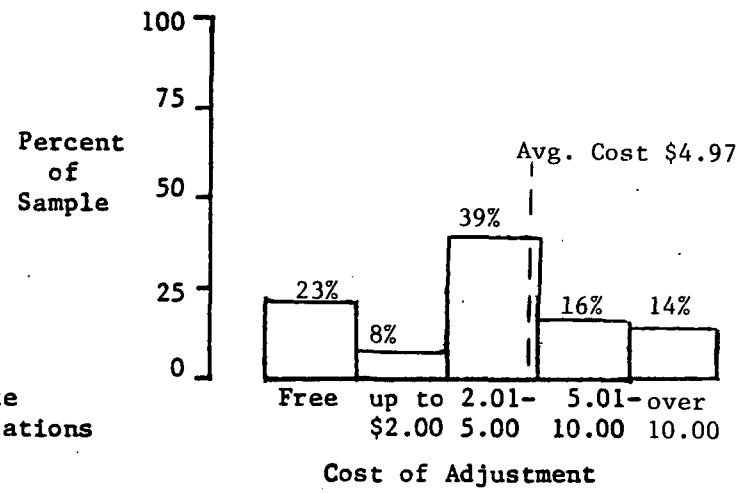
Effectiveness of Idle Adjustments at Commercial Repair Facilities

Eighty Three 1975-1979 Cars
St. Louis

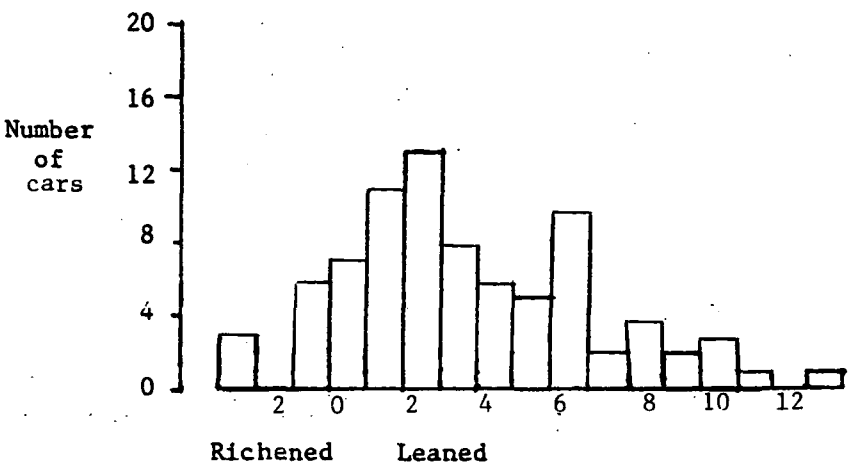








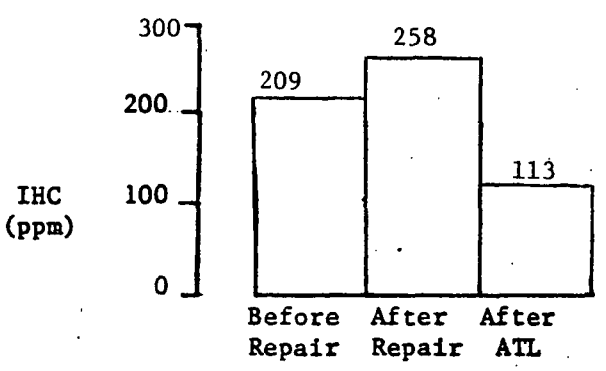
* These numbers are the average absolute difference from manufacturer's specifications

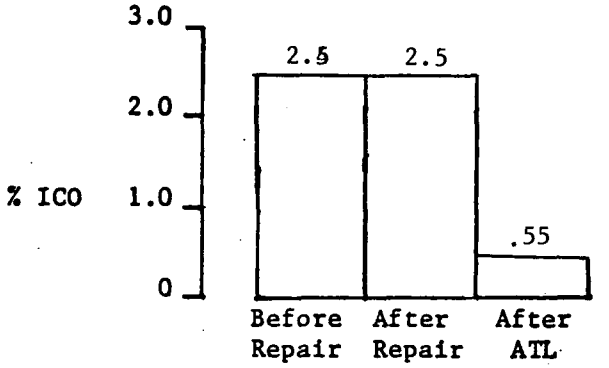


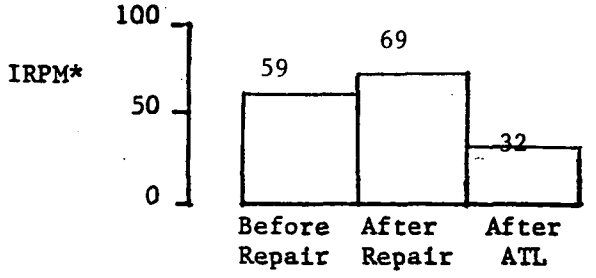
Number of ¼ turns required for proper adjustment after return from commercial repair facility

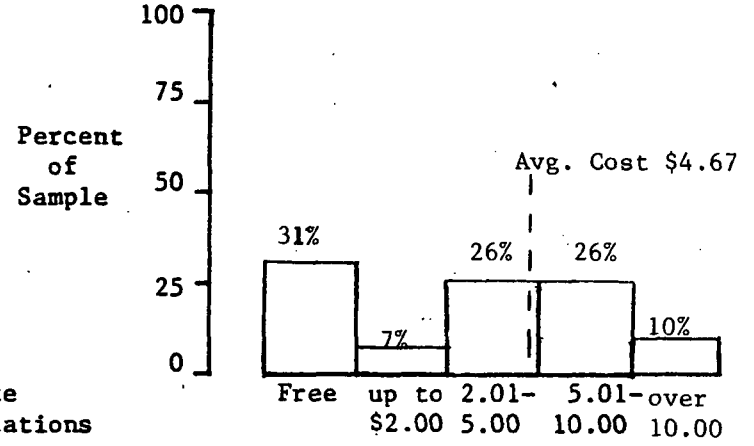
Figure 2

Effectiveness of Idle Adjustments at Commercial Repair Facilities
Sixty one 1977-1980 Cars
Washington D.C.

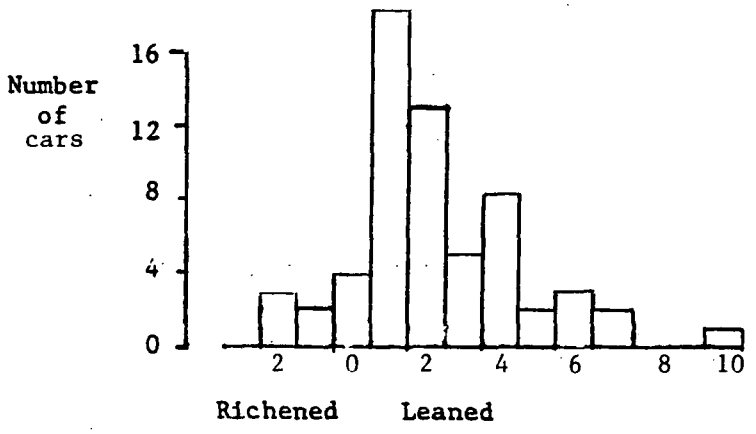








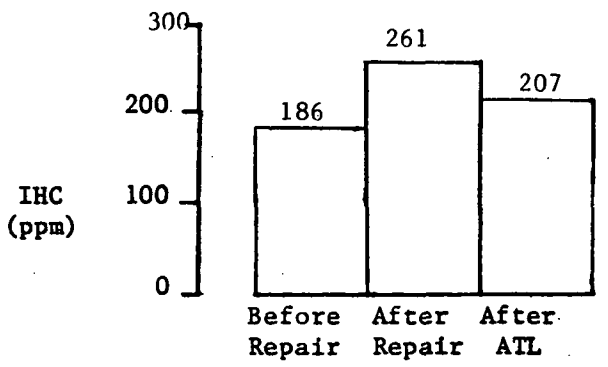
* These numbers are the average absolute difference from manufacturer's specifications

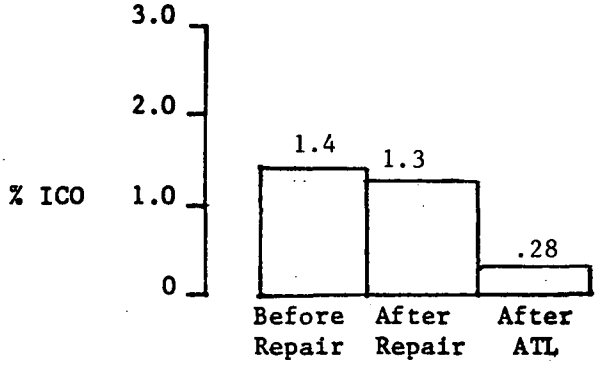


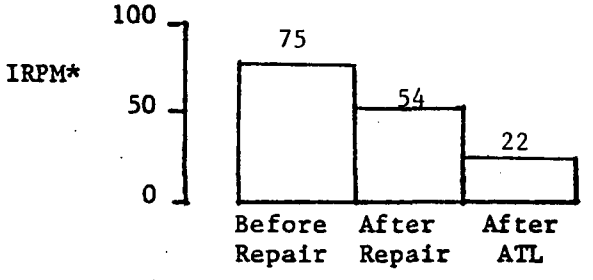
Number of ¼ turns required for proper adjustment after return from commercial repair facility

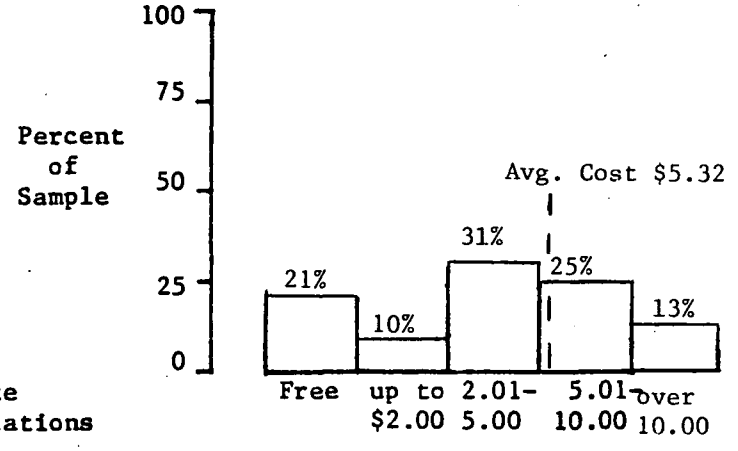
Figure 3

Effectiveness of Idle Adjustments at Commercial Repair Facilities
Forty Eight 1975-1978 Cars
Phoenix

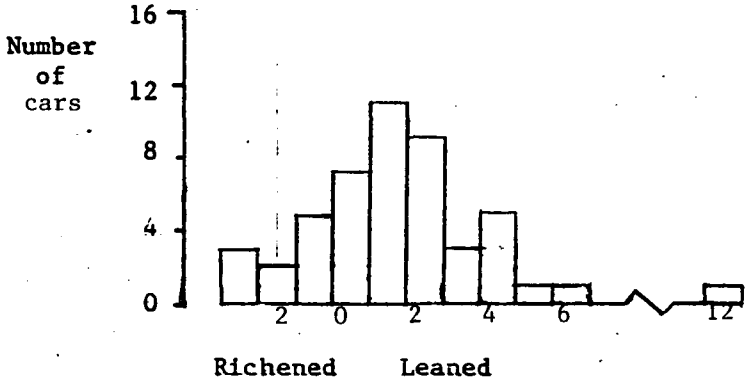








* These numbers are the average absolute difference from manufacturer's specifications

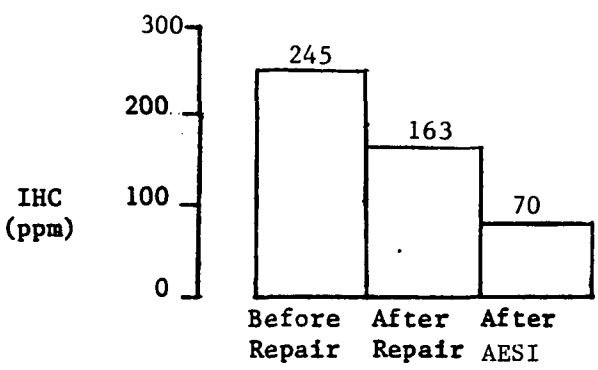


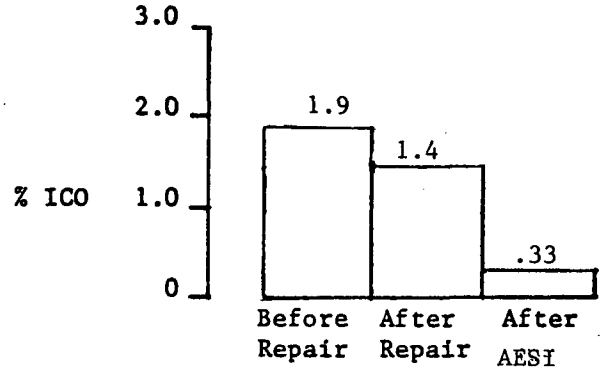
Number of ¼ turns required for proper adjustment after return from commercial repair facility

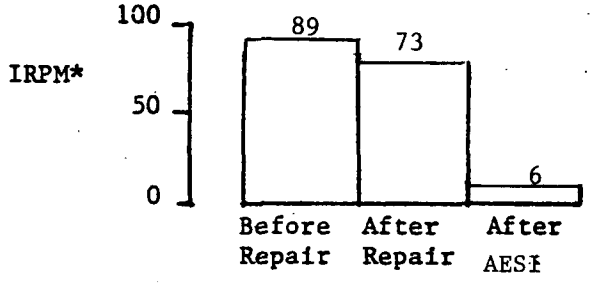
Figure 4

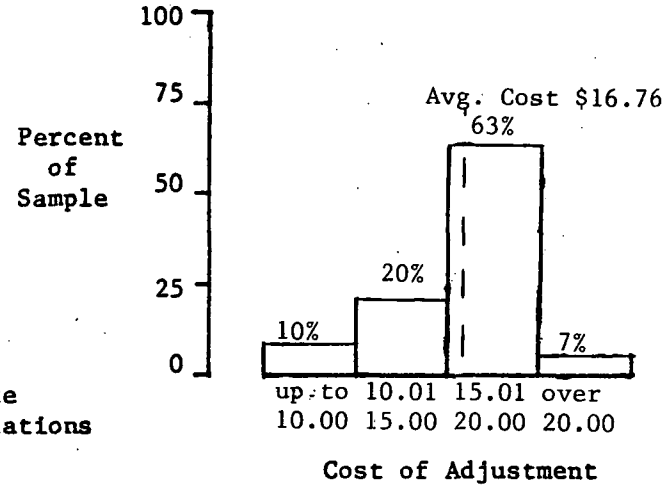
Effectiveness of Idle Adjustments at Commercial Repair Facilities

Thirty 1975-1978 Cars
Los Angeles

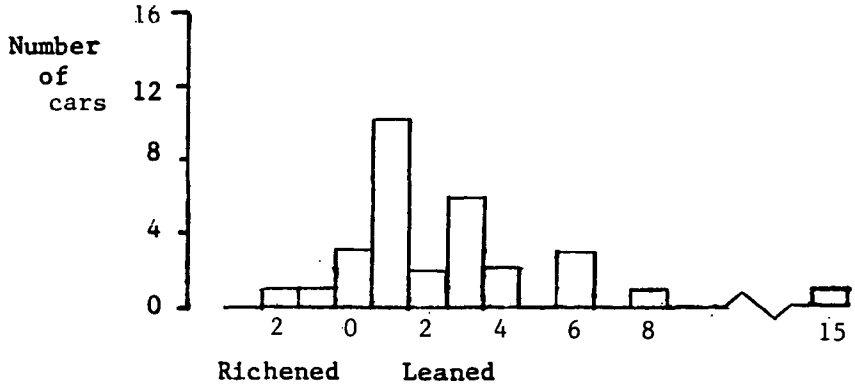








* These numbers are the average absolute difference from manufacturer's specifications



Number of ¼ turns required for proper adjustment after return from commercial repair facility

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
ST. LOUIS

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ½ Turns of Mixture Screws** Left	Differences in ½ Turns of Mixture Screws** Right	Additional Comments
5816	OLds. Cutlass	645	6.55	480 -(70)	Phillips 66	Used a screw driver & took it for a ride	0	480	5.8	470 (-50)	280	.1	560 +10	-4	-6	Driveability slightly worse after lab setting
6787	FORD Granada	9	.02	520 (-130)	Standard	used analyzer, screw driver, Idle was set too high	3.00	360	1.1	620 (-30)	90	.25	660 +10	-6	+3	Driveability better after lab setting
9626	Toyota Celica	0	.01	910 (+110)	Seeger Toyota	mech. said it was perfect needs no adj	0	40	.05	850 (+50)	30	.05	800 0	-10	N/A	No Difference in driveability
9625	Toyota Celica	0	.03	980 (+180)	Village Square Service	Used screw driver, wrench	3.50	30	.1	1450 (+650)	30	.25	800 0	-6	N/A	No Difference in driveability
8702	OLDS. Cutlass	0	.01	650 (+150)	Central City Standard	used analyzer, screwdriver exhaust hose	3.00	480	2.0	540 (+40)	60	.05	480 -20	-2	-2	No Difference in driveability
9556	Dodge Staw	41	.02	730 (0)	Standard	used analyzer, screwdriver wrench. Mech. said idle was too fast	9.50	170	1.3	680 (-50)	110	.05	740 +10	-8	0	No Difference in driveability
9550	Chry Staw	0	.04	680 (-50)	Standard	mech. adj. idle mixture with screwdriver	0	150	2.0	780 (+50)	40	.05	730 0	-7	-4	No Difference in driveability
9528	Chev Camaro	124	1.49	720 (+45)	Mobil	used a screw driver	2.00	230	1.9	720 (+45)	40	0	700 +25	-8	N/A	No Difference in driveability
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

*Number shown in parenthesis is the difference in RPM from the manufacturers specifacations. (+=greater then,-=less then)

**"+" = number of ½ turns in the "rich" direction. "-" = number of ½ turns in the "lean" direction

(2)

Effectiveness of Idle Adjustments at Commercial Repair Facilities

ST. LOUIS

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ¼ Turns of Mixture Screws** Left	Differences in ¼ Turns of Mixture Screws** Right	Additional Comments
9562	FORD MUST.	712	7.81	840 (-10)	MOBIL (Jim's)	Mechanic felt Idle too slow used screwdriver, timing light	5.00	1200	6.0	950 (+100)	50	.05	850 0	-2	N/A	Facility mechanic set timing to TDC — Spec is +6° Driveability poorer
8672	Chev. Mont.	180	3.46	580 (+80)	MOBIL (Florissant)	Mechanic said Idle was set too fast Used screwdriver, tachometer	2.00	420	4.8	500 (-)	200	.1	500 0	+7	+8	No Change in driveability
8664	Chev. Electra	384	4.01	780 (+80)	MOBIL (DeBold's)	Did the adj outside of the garage used screwdriver	2.00	500	4.8	900 (+200)	830	1.0	700 0	-6	-6	Rough Idle
8715	Toyota Celica	44	.25	940 (+140)	Ed's Motor Service (Tune-Up)	"Idle set low" used socket	5.00	130	.1	900 (+100)	80	.15	800 0	-1	N/A	No Change in driveability
5804	Chev Vega	150	3.56	800 (+100)	SHELL (Airport)	Mixture & idle set high	8.50	320	5.6	880 (+180)	180	.25	750 +50	-2	N/A	Driveability poorer
8679	Dodge Staw	3	.03	750 0	Standard (Colonial)	Idle a little off Sun analyzer, Screwdriver	3.00	70	.2	850 (+100)	90	.05	750 0	-1	-1	No Change in driveability
9568	FORD Granada	134	3.05	720 (+120)	TEXACO (Greadview)	Idle set lean Sun analyzer, screwdriver, test drive	12.00	230	2.3	700 (+100)	190	.1	600 0	-2	N/A	No Change in driveability
7734	Chev MONZA	170	5.00	780 (+130)	TEXACO (Peddock)	Said he adj mix so more gas goes through Sun analyzer, screwdriver	8.50	390	8.4	680 (+30)	130	.1	650 0	-8	N/A	No change in driveability
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

*Number shown in parenthesis is the difference in RPM from the manufacturers specifacations. (+=greater then,-=less then)

**"+" = number of ¼ turns in the "rich" direction "-" = number of ¼ turns in the "lean" direction

(3)

Effectiveness of Idle Adjustments
at Commercial Repair Facilities
ST. LOUIS

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ½ Turns of Mixture Screws** Left	Differences in ½ Turns of Mixture Screws** Right	Additional Comments
7249	FORD Granada	602	1.49	560 (-90)	Shell Station	Used carb cleaner, screwdriver, listened to idle in different gears	$5.00	190	6.5	560 (-90)	500	0	500 (-150)	-4	-6	Idle improved after lab set
9570	FORD Stan	41	1.42	600 (-200)	Fleet gas	Said idle was too slow - adjusted timing	-0-	1000	8.2	590 (-210)	55	.6	800 0	-11	N/A	Slight improvement in drivability after lab adj.
8675	Chev Stan	6	.04	570 (+70)	Mobile Station	Use carb cleaner, and screwdriver	3.50	90	.05	510 (+10)	150	.05	500 0	0	0	No change
5822	DATSUN B210	34	.186	700 (+50)	Standard	Used screwdriver	0	70	.6	680 (+30)	175	1.65	650 0	-2	N/A	Drivability improved after lab set
6778	Buick Regal	50	1.62	630 (+30)	Shell	Used tachometer	4.50	135	.6	640 (+40)	100	.40	620 (+20)	0	-1	No Change
6790	Mercury MONA	47	.12	720 (+120)	Mobile	Used screwdriver	-0-	175	2.3	700 (+100)	100	1.1	600 0	+1	N/A	No Change
9553	Dodge Omni	391	8.31	1180 (+280)	Standard	Used screwdriver	-0-	340	5.2	1220 (+320)	30	0	900 0	-10	N/A	Drivability improved with lab set
5805	Chev. Mali.	580	.01	610 (+10)	Shell	Sun HC/CO & screwdriver	7.50	200	.1	550 (-50)	220	.15	600 0	+1	-2	No change
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

*Number shown in parenthesis is the difference in RPM from the manufacturers specifacations. (+=greater then,-=less then)

**"+" = number of ½ turns in the "rich" direction
"-" = number of ½ turns in the "lean" direction

(4)

Effectiveness of Idle Adjustments
at Commercial Repair Facilities
ST LOUIS

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ½ Turns of Mixture Screws** Left	Differences in ½ Turns of Mixture Screws** Right	Additional Comments
8654	Buick Century	95	.51	670 (+70)	Phillips 66	- could not see mechanic -	4.00	275	3.7	600 (0)	280	1.70	600 0	+1	+5	No change
9631	Datsun 210	60	.76	880 (+180)	JMP Imports	- could not see mechanic	15.00	140	1.1	900 (+200)	130	.4	700 0	+1	N/A	No change in driveability
7752	Ford Staw	536	2.31	690 (+40)	Standard Station	- USED screwdriver, Sun HC/CO analyzer	5.50	120	2.4	620 (-30)	450	3.2	650 0	-1	0	acceleration improved.
8677	Chry. New York	104	1.76	720 (-30)	Phillips 66	USED screwdriver	4.00	160	2.6	790 (+40)	170	1.6	770 (+20)	-1	-2	Bad miss after Lab adjustment
5818	Plymouth Fury	22	.76	800 (-100)	Shell	USED SCREWDRIVER	5.50	120	2.0	980 (+80)	60	.5	900 0	-3	-8	No change
7772	Toyota Celica	9	.34	1250 (+400)	Standard	USED SCREWDRIVER, SUN ANALYZER, CARB CLEANER	12.50	30	.55	850 (0)	100	.3	800 (-50)	-1	N/A	No change
9582	Ford LTD	66	.02	480 (-120)	Motor Station	USED SCREWDRIVER CARB CLEANER	-0-	400	5.0	580 (-20)	100	.05	650 (+50)	+2	-2	Driveability improved after lab set
6788	Ford STAW	405	.01	570 (-80)	Texaco	USED SCREWDRIVER, SUN ANALYZER.	15.95	270	.05	540 (-110)	140	.05	650 0	+5	-3	No change
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

*Number shown in parenthesis is the difference in RPM from the manufacturers specifacations. (+=greater then,-=less then)

**"+" = number of ½ turns in the "rich" direction
"-" = number of ½ turns in the "lean" direction

(3)

Effectiveness of Idle Adjustments at Commercial Repair Facilities

ST. LOUIS

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ½ Turns of Mixture Screws** Left	Differences in ½ Turns of Mixture Screws** Right	Additional Comments
8665	Chev Monza	114	1.76	960 (+160)	Service Center	None Screwdriver	2.50	250	1.85	670 (-130)	150	1.0	800 0	0	0	No change in driveability
7735	Chev. Camaro	536	7.65	550 (0)	Ralphs Standard	Mechanic said idle mixture was a little off. used a tach. & Screwdriver	2.00	330	3.0	650 (+100)	270	.15	550 0	-1	NA	Slight decrease in driveability
7736	Chev. Nova	449	5.0	530 (-20)	Mobile	Mechanic said mixture was too rich & idle speed too Low. used a tach., screwdriver	3.00	440	4.5	580 (+30)	330	.25	550 0	-6	-6	No change in driveability
6779	Chev Monza	160	.09	640 (-60)	Mobile	Mechanic said mixture was a little lean, used a screwdriver	0	240	1.8	700 (-)	300	.20	700 0	-1	-1	No change in driveability
5824	Toyota Celica	147	.34	820 (-30)	Mobile	Mechanic said rpm was too high & needed mixture adjustment used screwdriver.	2.50	40	.25	1180 (+330)	50	.7	850 0	+3	+3	Slight increase in driveability
8689	FORD LTD	19	.03	600 (0)	Ron's Shell	Mechanic said left mixture screw was too rich. Used a screwdriver and tachometer.	4.50	230	3.8	600 (0)	180	.15	600 0	-3	-4	Slight increase in driveability
8710	Pontiac Firebird	19	.03	580 (+80)	Grandview Service Station	Used screwdriver, exhaust hose, gumout	12.00	290	1.0	550 (+50)	290	.15	500 0	-1	-2	decrease in driveability
7779	Buick Regal	114	5.0	580 (-20)	Phillips 66	Mechanic said Left mixture screw was alright, but right screw was off. used a screw driver, removed limiter cap	4.50	220	3.6	580 (-20)	40	.05	600 0	-11	-1	Slight decrease in driveability
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

*Number shown in parenthesis is the difference in RPM from the manufacturers specifacations. (+=greater then,-=less then)

**"+" = number of ½ turns in the "rich" direction "-" = number of ½ turns in the "lean" direction

(6)

Effectiveness of Idle Adjustments
at Commercial Repair Facilities
ST. LOUIS

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ¼ Turns of Mixture Screws** Left	Differences in ¼ Turns of Mixture Screws** Right	Additional Comments
7773	Toyota Corolla	0	.42	820 (-30)	Shell	Mech. said he set idle speed "so it wont get away from you. used a screwdriver	1.00	30	.7	720 (-130)	30	.35	850 0	-3	N/A	Slight decrease in driveability
8705	Plymouth Volare	0	.02	790 (+40)	Shell	used screw driver	0	20	.01	970 (+220)	70	.15	750 0	+1	+1	increase in driveability
9605	Plymouth Horizon	3	.03	1120 (+220)	MOBIL	mech. said mixture wass too rich & idle speed too high used a screwdriver	1.50	180	1.5	840 (-60)	80	.05	900 0	+3	+3	Slight decrease in driveability
8663	Chev. Staw	492	6.25	680 (+30)	Texaco	Mech. said fast idle speed & HC readings were still slightly out of specs & correction would take major repair	5.00	300	1.6	650 (-)	200	.1	650 0	-3	-3	NO Change in driveability
8707	Pontiac Sunbird	199	.86	940 (-60)	Standard	Mech. said mixture screw was too rich used a tach. & screwdriver.	6.50	270	1.0	980 (-20)	230	.5	1000 0	-5	NA	slight decrease in driveability
9583	Lincoln Cont	19	.19	670 (+70)	Phillips 66	used a screwdriver.	4.00	200	5.2	700 (+100)	180	1.2	600 0	-2	-5	Slight decrease in driveability
8651	AMC Gremlin	0	.03	590 (-10)	Standard	Used a screwdriver	7.95	1720	9.0	250 (-350)	30	.05	600 0	-6	NA	NO change in driveability
6797	Datson B210	31	.91	740 (+90)	Shell	mech. said carb. was set leaner, now for better gas mileage	16.95	230	3.2	760 (+110)	350	1.5	740 (+90)	-4	NA	No change in driveability
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

*Number shown in parenthesis is the difference in RPM from the manufacturers specifacations. (+=greater then,-=less then)

**"+" = number of ¼ turns in the "rich" direction
"-" = number of ¼ turns in the "lean" direction

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
ST. LOUIS

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ¼ Turns of Mixture Screws** Left	Differences in ¼ Turns of Mixture Screws** Right	Additional Comments
5802	Buick Skylark	233	9.19	690 (-10)	Good-year	Used sun machine & screwdriver	17.50	380	6.9	700 (-)	170	.25	700 0	+0	0	No change in driveability
5808	Chev ELCAMINO	28	.05	625 (+25)	General Auto Repair	Used a screwdriver	0	170	1.5	580 (-20)	90	.2	600 0	-3	+2	Slight increase in driveability
9572	FORD Granada	108	3.35	660 (+60)	Standard	Used a sun tester, & a screwdriver	16.80	220	2.1	670 (+70)	55	.05	600 0	-2	N/A	Slight decrease in driveability
8652	Buick Skylark	0	.05	770 (+170)	Shell	Used a screwdriver	0	260	.20	800 (+200)	45	.03	700 (+100)	0	-1	Increase in driveability
6784	Chev Staw	0	.03	740 (+140)	SUNOCO	Used a screwdriver	0	180	.9	710 (+110)	130	0.	600 0	-5	-7	Increase in driveability
6789	Chev Malibu	196	.91	635 (+35)	MOBIL	Mech. said reason for trouble could be a bent mixture screw + a collapsed hose from + heating manifold. used a screwdriver	4.50	460	3.0	660 (+60)	350	2.5	600 0	+4	-2	Increase in driveability
8095	Mercury Cougar	41	.07	620 (+20)	Standard	Used Screwdriver AND TACHOMETER	3.00	220	2.5	600 (-)	160	.5	600 0	+1	-3	Better after facility worse after Lab.
9555	Dodge Aspen	284	8.31	710 (-15)	Airport Skelly	Used SCREWDRIVER AND TACHOMETER	5.00	190	2.8	850 (+125)	80	.05	725 0	-2	-2	NO CHANGE IN DRIVEABILITY
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

*Number shown in parenthesis is the difference in RPM from the manufacturers specifacations. (+=greater then,-=less then)

**"+" = number of ¼ turns in the "rich" direction
"-" = number of ¼ turns in the "lean" direction

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
ST. LOUIS

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ¼ Turns of Mixture Screws** Left	Differences in ¼ Turns of Mixture Screws** Right	Additional Comments
5811	FORD MUST.	209	.27	650 (-50)	Air Handles Auto Service	SAID IT was running RICH HE ADJUSTED IDLE MIXTURE	13.00	100	.45	660 (+50)	280	.15	700 0	-2	0	SLIGHTLY WORSE DRIVEABILITY AFTER LAB.
6793	Plymouth Staw	291	2.76	700 (-50)	Shell	USED Gumout, Screwdriver	4.00	430	5.2	780 (+30)	170	.3	800 (+50)	-13	NA	NO CHANGE IN DRIVEABILITY
5801	AMC Hornet	362	9.37	600 (+50)	Shell	USED SCREWDRIVER TO ADJ. MIXTURE AND IDLE speed SCREWS SAID ADJ. was RICH	0	30	.25	580 (+30)	20	.05	550 0	-2	NA	BETTER AFTER FACILITY
7750	FORD THND	822	7.01	550 (-75)	Phillips 66	USED TACHOMETER AND SCREWDRIVER	3.00	400	2.2	680 (+55)	70	.05	620 (-5)	-2	-3	NO NOTICEABLE CHANGE IN DRIVEABILITY
7760	Plymouth STAW	0	.06	880 (+180)	Phillips 66	USED SCREWDRIVER To Adj. MIXTURE AND CURB IDLE SCREWS	3.50	100	.15	600 (-100)	60	.1	700 (0)	+1	-1	Drveability emprovement After Lab
5815	Mercury MONG.	3	.29	730 (+80)	Standard	USED SCREWDRIVER TO SET MIXTURE AND CURB IDLE SCREWS	0	360	7.0	590 (-60)	150	.5	650 0	-5	-12	DRIVEABILITY BETTER AFTER LAB. SET
7742	Chev. Caprice	405	6.85	560 (+60)	Shell	USED SCREWDRIVER	6.50	420	1.4	550 (+50)	460	.25	500 0	0	-6	DRIVEABILITY WORSE AFTER LAB. SET
8691	FORD LTD	176	7.01	620 (+20)	Shell	USED SCREWDRIVER TO SET MIXTURE AND CURB IDLE SCREWS	1.00	580	2.3	600 (0)	100	.15	600 0	+1	-9	NO CHANGE IN DRIVEABILITY
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

*Number shown in parenthesis is the difference in RPM from the manufacturers specifacations. (+=greater then,-=less then)

**"+" = number of ¼ turn in the "rich" directi
"-" = number of ¼ turn in the "lean" directi

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
ST. LOUIS

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %CO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %CO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %CO	Lab Set IRPM	Differences in ¼ Turns of Mixture Screws** Left	Differences in ¼ Turns of Mixture Screws** Right	Additional Comments
7747	FORD Granada	384	4.74	640 (+40)	Mobil	Took Carb off Tightened 6 bolts reinstalled, Cleaned used Diagnostic machine checked and set timing, Adj Screws	17.80	420	5.5	560 (-40)	220	.25	600 0	-5	N/A	worse after Lab had spark knock after facility Adj ok after Lab set
8924	Chev CAPE	514	9.01	650 (+150)	Mobil		5.00	400	1.9	500 -0	300	.3	500 +0	-4	0	
5806	Chev MONT	121	1.99	620 +20	SHELL	USED BRAIN Sun MACHINE AND Screwdriver	5.00	230	2.3	660 +60	130	.1	660 +60	-2	-1	Better driveability after facility set
8656	BUICK Regal	12	.06	450 -50	MOBIL	used tach. screwdriver Turned screws out until smoothest - Idle then set RPM	5.00	470	5.4	560 +60	450	.25	500 0	-10	-8	NO NOTICEABLE CHANGE
7766	DATSON B210	114	.36	720 +20	SHELL	used Analyzer scope tach and screwdriver	12.50	100	.6	860 +160	40	.25	700 0	-2	N/A	NO NOTICEABLE CHANGE
8697	Mercury Cougar	163	5.96	660 +60	SHELL	used Scope Adj MIXTURE AND RPM	8.50	150	2.7	680 +80	130	.4	600 0	-5	-1	Slightly worse driveability after Lab set
8694	Mercury Bobcat	173	4.49	820 +20	STANDARD OIL	used Screwdriver AND TACH.	9.00	275	4.5	810 +10	130	.2	800 0	-3	N/A	Better driveability after LAB set
5819	Plymouth Skow	124	4.01	820 +70	MOBIL	used Screwdriver, Tach, Changed Timing	11.85	180	3.4	680 -70	50	.25	750 0	+2	-8	No noticeable Change
AVERAGES		IHC	%CO	IRPM*			Cost	IHC	%CO	IRPM*	IHC	%CO		Left	Right	

*Number shown in parenthesis is the difference in RPM from the manufacturers specifacations. (+=greater then,-=less then)

**"+" = number of ¼ turn in the "rich" directi
"-" = number of ¼ turn in the "lean" directi

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
St. Louis

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ¼ Turns of Mixture Screws** Left	Differences in ¼ Turns of Mixture Screws** Right	Additional Comments
8684	Ford Granada	193	6.10	600 0	STANDARD OIL	used Tach. & Screwdriver	0.0	290	5.4	580 -20	100	.35	600 0	-6	-6	NO NOTICEABLE DRIVEABILITY CHANGE
5814	Ford Staw	41	.11	650 -50	MOBIL	USED SCREWDRIVER ADJ BY EAR	3.50	60	.4	700 0	60	.2	700 0	-1	+1	NOTICEABLY BETTER AFTER FACILITY ADJUSTMENT
9634	Datson 510	31	.51	780 +180	SHELL	USED TACH. AND SCREWDRIVER	10.00	440	7.5	690 +90	250	.8	600 0	-6	-6	BETTER DRIVEABILITY AFTER LAB SET
5813	Ford Tori	180	3.78	530 -120	GAS Station	USED Screwdriver	5.00	460	7.8	490 -160	60	.1	650 0	-5	-4	NO NOTICEABLE DRIVEABILITY CHANGE
7758	Olds Royal	47	1.07	630 +130	GAS station	USED TACH AND Screwdriver	4.50	290	3.6	530 +30	330	.1	500 0	-1	-8	SAME DRIVEABILITY
5812	Ford Maverick	25	.86	670 +70	PHILLIPS 66	MECHANIC HAD SCREWDRIVER BUT APPEARED NOT TO USE IT.	0.0	90	1.3	680 +80	80	.05	600 0	-7	N/A	SAME DRIVEABILITY
6789	Ford Staw	44	.01	600 -50	SUNOCO	USED SCREWDRIVER AND SET MIXTURE AND IDLE RPM by EAR	6.00	1550	8.2	460 -190	90	.05	650 0	-5	-1	NO CHANGE IN DRIVEABILITY
7753	Mercury Marquis	19	.02	640 +40	TEXACO	ADJUSTED IDLE RPM	0.0	840	8.9	580 -20	70	.05	650 +50	-7	-7	WORSE DRIVEABILITY AFTER LAB SET
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

*Number shown in parenthesis is the difference in RPM from the manufacturers specifacations. (+=greater then, -=less then)

**"+" = number of ¼ turn in the "rich" directi
"-" = number of ¼ turn in the "lean" directi

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
ST LOUIS

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ¼ Turns of Mixture Screws** Left	Differences in ¼ Turns of Mixture Screws** Right	Additional Comments
8714	TOYOTA CORONA	9	.06	740 -110	SUNOCO	USED TACH. AND SCREW	0.0	180	1.2	1160 +310	220	.8	850 0	0	NA	NO CHANGE IN DRIVEABILITY
8660	CHEV. CHEVETTE	360	7.32	860 +60	SHELL	USED SCREWDRIVER	3.00	425	4.9	750 -50	35	4.8	800 0	0	0	NO CHANGE IN DRIVEABILITY
6781	CHEV MALI	196	.91	635 +35	MOBIL	USED SCREWDRIVER TO SET MIXTURE SCREW	450	460	3.0	660 +60	350	2.5	600 0	+4	-2	Driveability BETTER after Lab. set
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

*Number shown in parenthesis is the difference in RPM from the manufacturers specifacations. (+=greater then,-=less then)

**"+" = number of ¼ turn in the "rich" directi
"-" = number of ¼ turn in the "lean" directi

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
(WASHINGTON) D.C

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %CO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %CO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %CO	Lab Set IRPM	Differences in ½ Turns of Mixture Screws** Left	Differences in ½ Turns of Mixture Screws** Right	Driveability Additional Comments
7721	Buick Skylark	589	5.10	540 (-60)	Sunoco	Mechanic said he didn't have proper tools but he used a screwdriver	2.00	230	3.4	600 0	160	.9	650 +50	0	-1	No Difference in Driveability.
7736	Chev Nova	432	5.10	680 (+80)	Exxon	Mechanic noted that car needed inspection sticker used engine analyzer	10.50	600	7.0	780 (+180)	600	3.5	700 +100	-2	NA	No Difference
0796	Plymouth Horizon	7	0	950 (+50)	Sunoco	engine analyzer used	9.95	60	.05	780 (-120)	25	0	940 +40	1	1	Slightly worse After Lab Adjustment
8707	Pontiac Sunbird	286	5.89	650 (0)	Mobil	He said Idle mixture did not need Adjusting Adjusted Engine Speed	0	130	1.4	550 (-100)	70	.09	650 0	-4	-4	no difference
8724	Subaru DL	57	.58	1040 (+190)	Texaco	mechanic said it was ok and shouldn't be Adjusted	0	70	.35	1020 (+170)	90	.6	850 0	-5	-5	no difference
7759	Plym Volaré	143	.84	630 (-70)	Gulf	A screwdriver was the only tool used	4.50	30	.10	670 (-30)	15	.05	700 0	-1	-1	Slightly worse After Lab Adjustment
7751	Ford LTD II	936	5.25	560 (-65)	Sunoco	He adjusted the screws on the carburetor with A screwdriver	3.00	820	6.0	600 (-25)	4	1.0	625 0	-2	-3	Slightly better After Lab Adjust
8697	Mercury Cougar	43	.03	640 (+40)	Gulf	Mechanic Hooked up car to Analyzer. said it was ok Did not Adjust	0	100	.05	640 (+40)	100	.04	600 0	-1	-1	Slightly Better After Lab. Adjust
AVERAGES		IHC	%CO	IRPM*			Cost	IHC	%CO	IRPM*	IHC	%CO		Left	Right	

*Number shown in parenthesis is the difference in RPM from the manufacturers specifacations. (+=greater then,-=less then)

**"+" = number of ½ turn in the "rich" directi
"-" = number of ½ turn in the "lean" directi

(2)

Effectiveness of Idle Adjustments at Commercial Repair Facilities (WASHINGTON) D.C.

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ¼ Turns of Mixture Screws** Left	Differences in ¼ Turns of Mixture Screws** Right	Additional Comments
8716	Toyota Corona	13	.23	740 -110	EXXON	Used Analyzer, Set Carb with Screwdriver to toyota Spec. book	6.50	50	4.5	690 -160	55	.18	850 0	0	-1	No difference
7742	Chev Caprice	153	5.56	560 +60	GULF	Used Sun Tune-up Instr. MECHANIC SAID HE would not CHANGE unless IT NEEDED IT	6.00	100	2.0	520 +20	30	.05	500 0	-5	-6	Slightly BETTER AFTER LAB SET
8713	Toyota Corona	17	0	840 +90	SHELL	HE ADJUSTED IDLE SCREW	7.50	280	1.85	900 +150	190	.5	840 +90	-2	0	Slightly WORSE AFTER LAB SET
8664	Chev Malibu	199	.68	630 +30	ARCO	ADJUSTED 2 screws with Tool	3.00	100	0.0	580 -20	30	0.0	590 -10	-1	0	No Difference
8688	FORD Thunderbird	96	.68	670 +70	MOBIL	USED WRENCH TO REMOVE SLOW CLOSING THROTTLE	0.0	150	.7	660 +60	100	.5	600 0	-2	-2	NO DIFFERENCE
9577	FORD Fairmont	23	0	600 -50	GULF	USED TACK-DWELL-VOLT meter. SAID VALUUM LINE WAS off. connected Line	0.0	60	.05	600 -50	40	.05	620 -30	-3	-3	NO Difference
8696	Mercury Cougar	282	2.89	580 -20	AMOCO	USED ELECTRICAL System ANALYZER	4.00	580	5.0	540 -60	50	.05	620 +20	0	-1	NO Difference
8710	Pontiac Lemans	292	2.09	570 +70	TEXACO	USED Screwdriver	3.00	40	.0	500 0	40	.0	500 0	0	0	NO difference
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

*Number shown in parenthesis is the difference in RPM from the manufacturers specifacations. (+=greater then,-=less then)

**"+" = number of ¼ turn in the "rich" directi "-" = number of ¼ turn in the "lean" directi

driveability

(3)

Effectiveness of Idle Adjustments
at Commercial Repair Facilities
(WASHINGTON) D.C.

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ¼ Turns of Mixture Screws** Left	Differences in ¼ Turns of Mixture Screws** Right	driveability Additional Comments
9625	Toyota Celica	3	0	840 +40	EXXON	USED ATLAS TUNE-UP TESTER	10.50	35	.05	880 +80	40	.05	820 +20	-1	0	No difference
9608	Plymouth Volaré	239	4.38	725 0	EXXON	HOOKED UP ENGINE TO ANALYZER SAID WAS SET TO SPECS.	0.0	360	4.60	730 +5	40	.1	725 0	-2	-8	No difference
7761	Plymouth Fury	322	7.86	550 -200	EXXON	USED Screwdriver	4.00	350	4.60	660 -90	210	1.5	750 0	0	-2	No difference
7762	Pontiac Sunbird	90	1.74	600 0	TEXACO	USED Screwdriver	3.00	320	4.20	620 +20	150	1.5	620 +20	-2	-3	Slightly worse AFTER LAB Adj.
8714	Toyota Corona	0	0	970 +120	SHELL	HE SAID it Sounded And looked OK	0.0	60	.05	950 +100	55	.04	900 +50	-2	-2	Improvement AFTER LAB SET
7737	Chev Impala	90	0	550 -50	AMOCO	USED Screwdriver	3.00	420	4.5	610 +10	370	3.8	600 0	-2	0	Improvement After Lab set
8706	Plymouth Fury	37	0	760 +10	TEXACO	MECHANIC ASKED what WAS wrong	5.00	60	.15	650 -100	120	.10	780 +30	+1	+1	Slightly BETTER AFTER FACILITY ADJUSTMENT
8689	FORD LTD II	432	7.29	580 -20	AMOCO	MECHANIC SAID ADJUSTMENTS would MAKE CAR RATTLE ADJUSTED with screwdriver	0.0	550	7.5	560 -40	80	.04	600 0	-2	-2	BETTER AFTER LAB ADJUST
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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**"+" = number of ¼ turn in the "rich" directi
"-" = number of ¼ turn in the "lean" directi

(4)

Effectiveness of Idle Adjustments at Commercial Repair Facilities (WASHINGTON D.C.)

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %CO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %CO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %CO	Lab Set IRPM	Differences in ½ Turns of Mixture Screws** Left	Differences in ½ Turns of Mixture Screws** Right	DriveAbility Additional Comments
9584	LINCOLN CONT.	612	2.28	570 (-30)	EXXON	MECHANIC SAID AIR FILTER NEEDED REPLACING. ADJUSTED WITH SCREWDRIVER	3.00	700	3.5	540 (-60)	150	.20	800 (+200)	-4	-3	WORSE AFTER LAB. ADJUST
7750	FORD THND.	819	4.10	600 (-25)	EXXON	SAID MIXTURE WAS off ADJUSTED WITH SCREWDRIVER	5.00	800	5.6	540 (-85)	140	.05	625 (0)	0	-1	BETTER AFTER LAB. ADJUST
9574	FORD FAIRMONT	432	5.72	880 (+30)	TEXACO	Pulled spark plug, SAID I needed a new rotor, started to ADJUST SCREW AND stopped	7.50	200	4.6	860 (+10)	170	2.0	880 (+30)	-3	-3	NO Difference
9606	Plymouth HORIZON	156	1.51	900 (0)	EXXON	USED Sun Analyzer w/ Tail pipe probe sun reading @ IDLE HC 100ppm CO 1%	0.0	120	1.0	900 (0)	40	.02	900 (0)	-2	N/A	NO difference
8703	Olds Delta	278	.68	570 (+20)	TEXACO	Set Timing, checked RPM, Idle Carb., He said CAR needed NEW EGR Valve	6.50	500	.45	610 (+60)	125	.05	570 (+20)	-13	-13	WORSE after LAB. ADJUST
8695	Mercury COUGAR	146	2.68	550 (-50)	EXXON	USED SCREWDRIVER	10.00	340	3.4	640 (+40)	170	.70	600 (0)	-4	-2	NO difference
9626	Toyota Celica	0	0	780 (-20)	EXXON	USED AUTOSCAN 4030 AND SCREWDRIVER to set Carb.	9.95	60	.03	850 (+50)	60	.03	850 (+50)	0	N/A	NO difference
9627	Toyota Celica	3	0	740 (-60)	TEXACO	ADJUSTED WITH SCREWDRIVER	5.00	130	2.0	770 (-30)	20	.10	800 (0)	-2	-2	NO difference
	AVERAGES	IHC	%CO	IRPM*			Cost	IHC	%CO	IRPM*	IHC	%CO		Left	Right	

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(3)

Effectiveness of Idle Adjustments
at Commercial Repair Facilities
WASHINGTON D.C.

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ½ Turns of Mixture Screws** Left	Differences in ½ Turns of Mixture Screws** Right	Additional Comments (drivability)
8652	Buick Stan	27	0	620 (+20)	EXXON	USED Screwdriver SAID HE LACKED PROPER TOOLS	0.0	120	0	580 (-20)	100	0	620 (+20)	+2	+2	SLIGHTLY WORSE AFTER LAB ADJ.
7772	Toyota Celica	23	.68	840 (+40)	SUNOCO	ATL PERSON NOT ABLE TO OBSERVE	10.00	100	1.0	700 (-100)	60	.7	820 (+20)	-1	N/A	Slightly WORSE AFTER LAB Adj.
8656	Buick Lesa	17	.05	580 (+30)	DUKE-PICKETT GAS STATION	USED ENGINE MACHINE	9.60	250	.40	560 (+10)	160	.15	600 (+50)	-2	-1	Better after facility Adj: worse after Lab. Adj.
8692	Ford Stan	73	0	560 (-90)	MOBIL	USED Screwdriver	4.80	180	3.4	580 (-70)	100	1.8	670 (+20)	-2	-2	NO Difference
0822	Toyota Tercel	0	0	830 (+180)	SHELL	Could NOT OBSERVE MECHANIC	0.0	345	4.5	760 (+110)	25	.05	750 (+100)	-6	-6	WORSE AFTER LAB SET
7735	Chev Camaro	319	3.35	620 (+20)	EXXON	Could NOT OBSERVE MECHANIC	7.95	480	5.5	560 (-40)	130	.3	680 (+80)	-7	NA	WORSE AFTER LAB SET
9644	Mazda RX7	40	.14	700 (-50)	EXXON	USED SUN INSTRUMENT	7.50	40	.1	650 (-100)	40	.0	700 (-50)	+1	+2	BETTER AFTER LAB. SET
7745	Dodge Stan	53	.01	800 (+100)	AMOCO	USED CARB. ADJ. Tool AND Screwdriver	0.0	115	.2	880 (+180)	30	.04	700 (0)	0	-2	BETTER AFTER LAB. SET
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
WASHINGTON D.C.

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %CO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %CO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %CO	Lab Set IRPM	Differences in ½ Turns of Mixture Screws** Left	Differences in ½ Turns of Mixture Screws** Right	Additional Comments (driveability)
7731	Cadillac Deville	388	5.25	680 +80	EXXON	USED Carb. Adj. Tool SAID Engine had Vacuum Leak	0.0	65	.7	700 +100	100	.8	600 0	-6	+3	BETTER AFTER Lab. Set
7755	Olds SPRM	292	8.66	560 -40	mobil	used fuel mix gauge and flexible screwdriver	11.40	50	1.0	560 -40	55	.5	600 0	0	0	BETTER AFTER LAB. Set
8708	Pontiac Sunbird	17	.02	660 +60	PHillip 66	mechanic observed GAS CAP missing USED screwdriver	10.00	40	0	670 +70	40	0	600 0	0	0	BETTER AFTER LAB. SET
8693	Linc. Cont.	279	3.47	540 -40	ARCO	Adjusted CARB with screwdriver	0.0	310	5.2	620 +40	250	.24	600 +20	-2	-1	NO Difference
9629	Toyota Staw	3	0	800 0	TEXACO	Adjusted with screwdriver	3.00	60	.25	700 -100	30	.05	850 +50	-7	N/A	No difference
7758	Olds NNTY	587	2.09	570 +20	EXXON	Adjusted with screwdriver	4.50	450	4.4	600 +50	280	.90	610 +60	-1	-2	NO difference
7726	AMC STAW	130	1.74	880 +280	EXXON	Checked Vacuum at Idle HE SAID IT WAS High And Carb didn't need Adjusting	0.0	250	4.75	830 +230	90	.5	640 +40	-1	-1	Slightly Better after Lab Set
0821	Toyota Corona	0	0	750 +50	EXXON	WAS NOT ALLOWED TO WATCH	9.50	40	.05	700 0	30	.05	700 0	-1	-1	NO Difference
AVERAGES		IHC	%CO	IRPM*			Cost	IHC	%CO	IRPM*	IHC	%CO		Left	Right	

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
WASHINGTON D.C.

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ½ Turns of Mixture Screws** Left	Differences in ½ Turns of Mixture Screws** Right	Additional Comments
9585	MERCURY ZEPH	279	6.22	700 0	SUNOCO	USED SCREWDRIVER and TACH JUST SET IDLE DOWN TO 700 RPM	0.0	330	6.0	740 +40	120	.2	720 +20	-4	NA	NO CHANGE IN DRIVEABILITY
9649	RENAULT	7	0.0	740 -10	MOBIL	USED SCREWDRIVER	5.95	50	.02	950 +200	50	.5	850 +100	+2	NA	NO CHANGE IN DRIVEABILITY
8673	CHEV CAPR.	344	3.35	530 +30	EXXON	THE CAR WAS CONNECTED TO AN ENGINE COMPUTER FOR ALL POSSIBLE ADJUSTMENTS	24.95	375	2.0	600 +100	30	0	610 +110	-3	-4	NO CHANGE IN DRIVEABILITY
8675	CHEV IMPA	160	1.22	570 +70	TEXACO	HE ADJUSTED MIXTURE SCREWS AND DROPPED IDLE	2.00	375	1.0	550 +50	80	.04	580 +80	-4	-3	NO CHANGE IN DRIVEABILITY
8691	FORD LTD	120	2.18	570 -30	AMOCO	USED SUN TESTER AND SCREWDRIVER	10.00	160	1.8	560 -40	60	.03	630 +30	-3	-4	NO CHANGE IN DRIVEABILITY
8698	OLDS. CUTLASS	344	3.23	630 +30	EXXON	DIDN'T HAVE INSTRUMENT TO CHECK RPM BUT HE SAID IT Appeared better	5.00	650	6.5	560 -40	170	.5	650 +50	-4	-4	Driveability better after facility worse after Lab.
?8715	TOYOTA CELICA	10	.79	960 +160	GULF	USED SCREWDRIVER	0.0	50	.9	820 +20	60	.1	800 0	-6	NA	NO CHANGE IN DRIVEABILITY
7728	BUICK REGA	213	6.57	570 -30	SUNOCO	USED TACH	2.00	700	8.8	510 -90	200	1.5	650 +50	-4	-4	NO CHANGE IN DRIVEABILITY
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
WASHINGTON D.C

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ½ Turns of Mixture Screws** Left	Differences in ½ Turns of Mixture Screws** Right	Additional Comments
7727	BUICK SKY.	589	5.1	540 -60	GAS STATION	NO Comments	2.00	230	3.4	600 0	160	.9	650 +50	0	-1	NO CHANGE IN DRIVEABILITY
7733	CHEV VEGA	3	.2	850 +150	MOBIL	HE ADJUSTED SCREW ON CARB.	0.0	80	.8	820 +120	70	.3	800 +100	-1	-1	NO CHANGE IN DRIVEABILITY
7736	CHEV NOVA	430	5.10	680 +80	GAS. STATION	NO Comments	10.50	600	7.0	780 +180	600	3.5	700 +100	-2	-2	NO CHANGE IN DRIVEABILITY
7739	CHEV MONTE CARLO	27	.13	600 +100	AMOCO	SAID CARB. Needs Cleaning	12.00	255	1.6	580 +100	270	1.6	500 0	-1	-1	NO CHANGE IN DRIVEABILITY
7773	TOYOTA CELI	7	.43	850 0	GULF	USED SCREWDRIVER	0.0	50	.8	820 -30	60	.4	850 0	-2	N/A	NO CHANGE IN DRIVEABILITY
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
Phoenix

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ½ Turns of Mixture Screws** Left	Differences in ½ Turns of Mixture Screws** Right	Additional Comments
7769 3/27/79	Honda CVCC 91 CID	63	.79	730 (-20)	Exxon Station	mechanic uncertified used emission tester.	5.00	100	1.3	870 (+120)	80	.13	760 +10	-7	0	No Difference in driveability
7771 3/5/79	Toyota St Wag 97 CID	28	1.26	900 (+50)	Chevron Station	mechanic said he went to a chevron ignition course. Used HC & CO analyzer and screwdriver	9.50	120	.18	1000 (+150)	115	.2	900 +50	+2	+1	No Difference
7773 3/5/79	Toyota St. Wag 134 CID	56	1.76	650 -150)	Texaco Station	mechanic is not certified but had a course in emissions. looked at emission sticker + spec book. Used screwdriver	7.50	134	2.5	650 -(150)	53	.07	850 +50	-7	0	No Difference
6776 3/19/79	AMC St Wag 258 CID	91	1.47	500 (-50)	Chevron Station	no adjustment by mechanic used analyzer	3.00	60	.5	740 (+190)	50	.5	650 +100	-1	0	No Difference
6777 3/29/77	Buick City 350 CID	9	.14	630 (+30)	Arco Station	mechanic is certified and made no adjustment on car. Used analyzer	0	120	.1	630 (+30)	50	.02	605 +5	-2	-2	Slightly worse in quality of acceleration after lab set.
6779 3/21/79	Chevy Vega 140 CID	787	.07	550 (-150)	Chevron Station	mechanic said you could get better gas mileage if you used some 'gunk' carburetor cleaner. mechanic was certified. used analyzer	5.00	390	1.2	860 (+160)	390	.4	860 +160	+1	0	No Difference
6780 3/2/79	Chevy Nova 250 CID	9	.02	600 (+50)	Shell Station	mechanic said car was running too lean. Used analyzer, screwdriver	4.50	310	5.98	500 (-50)	190	.2	560 +10	-5	0	Slight improvement in driveability after garage + lab set.
6783 3/27/79	Chevy St Wag 350 CID	169	.96	580 (-20)	Chevron Station	mechanic is uncertified, said you just have to know how to use equipment. Used analyzer	2.00	30	.25	590 (-10)	30	.25	600 0	0	0	No Difference
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
Phoenix

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ½ Turns of Mixture Screws** Left	Differences in ½ Turns of Mixture Screws** Right	Additional Comments
8674 4/4/79	Chevy Camaro 350 CID	38	.03	580 (+80)	Texaco Station	Car had full advance at idle, so mechanic switched vacuum. Used a screwdriver, tach, infrared HC+CO analyzer.	8.00	75	.2	600 (+100)	70	.5	560 +60	+1	+2	Driveability better after garage and lab set.
8690 4/2/79	Ford T-Bird 351 CID	351	.35	620 (+20)	Chevron Station	Used analyzer, timing light, dist. wrench, screw driver mechanic said car may not pass test with air filter on.	12.95	150	.02	680 (+80)	60	.03	600 0	0	+2	No Difference in driveability
8693 4/18/79	Lincoln Cont. 460 CID	413	8.26	670 (+90)	Texaco Station	mechanic was asked if he had to be certified — he said no. carburator was rich used a screwdriver	0	300	5.4	680 (+100)	175	.1	580 0	-3	0	NO DIFFERENCE in driveability
8694 4/20/79	Mercury Zeph 200 CID	169	3.73	755 (+105)	Chevron Station	mechanic uncertified, said idle was too high. Used screwdriver.	2.00	180	.33	560 (-90)	170	.19	700 +50	-1	0	Driveability slightly worse after lab setting
8697 4/7/79	Mercury Zeph 302 CID	122	.02	700 (+100)	Fed Mart Station	mechanic said car was running too lean, used HC +CO analyzer and screwdriver.	12.00	500	.28	720 (+120)	600	1.0	600 0	-1	+1	acceleration from stop is better after garage and lab set
8706 4/7/79	Plymouth Fury 318 CID	44	.09	600 (-150)	Union 76	mechanic was certified. Used analyzer	0	400	.2	650 (-100)	150	.15	750 0	-1	-1	NO DIFF. in driveability
8713 3/15/79	Toyota Corro 71 CID	6	.03	830 (+80)	Chevron Station	mechanic said car will get better gas mileage and pass emissions with a lean burn. Used analyzer and screwdriver.	8.50	50	.02	1140 (+390)	80	.02	750 0	0	0	Slight improvement in driveability after lab + garage setting.
8714 3/15/79	Toyota Corro 71 CID	19	.02	960 (+110)	Norms auto care	No adjustment by mechanic (2nd car in 2yrs. that read "0")	5.95	40	.02	980 (+130)	50	.02	850 0	-1	0	No Diff. in driveability
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
Phoenix

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ¼ Turns of Mixture Screws** Left	Differences in ¼ Turns of Mixture Screws** Right	Additional Comments
8715 3/9/79	Toyota Celica 134 CID	53	.13	850 (+50)	Mobile Station	car is clean and will get good gas mileage. Used HC + CO analyzer.	0	51	.13	850 (+50)	80	.4	800 0	+2	0	NO Difference in Driveability
8716 4/3/79	Toyota Celica 134 CID	53	.17	840 (+40)	Mobile Station	mechanic said all carbs adjust the same. carb only off by ¼ turn. Used screwdriver	0	65	.85	910 (+110)	80	.4	880 +80	-2	0	slightly worse driveability after lab set.
8724 3/23/79	Subaru St Wag 97 CID	185	5.17	860 (+10)	Clements garage + service	mechanic said he couldn't adjust anything to make it run better. Used analyzer.	0	230	4.0	910 (+60)	150	.3	870 +20	-7	0	No Difference in Driveability
7726 2/26/79	AMC Pacer 258 CID	41	1.33	550 (-50)	Newitts area Service	mechanic set screws for lean mixture. Used analyzer, screwdriver	2.00	310	5.4	480 (-120)	123	.84	600 0	-2	-1	accelerated easier but idled rough after garage set.
7727 2/27/79	Buick Skylark 231 CID	209	1.01	640 (+40)	Woodin's Service	Used analyzer	10.95	248	.08	620 (+20)	351	.5	600 0	+1	-5	slightly worse driveability after garage + lab set.
7731 3/28/79	Cadillac Deville 425 CID	94	.03	680 (+80)	Shell Station	mechanic certified, used HC + CO analyzer, no adjustments	0	600	.4	600 (0)	380	.25	650 +50	+1	-1	worse driveability after lab set.
7735 3/30/79	Chev Chevette 98 CID	153	2.99	800	Exon Station	mechanic said chevetts were bad, noticed bad oil leak. used screwdriver + wrench	4.00	40	.2	870 (+70)	30	.02	800 0	-1	0	very slight improvement in driveability after lab + garage set.
7738 3/28/79	Chev Impala 350 CID	228	.9	580 (+80)	Country Club Union + towing	mechanic had no training used HC + CO analyzer and screwdriver	5.00	90	.02	515 (+15)	70	.02	500 0	-1	+1	slight improvement in driveability after lab + garage set.
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
Phoenix

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ¼ Turns of Mixture Screws** Left	Differences in ¼ Turns of Mixture Screws** Right	Additional Comments
7740 3/26/79	Chevy Caprice 350 CID	9	.02	450 (-50)	Country Club Exxon	Used HC + Co analyzer, wrench	11.88	150	1.0	620 (+120)	70	.02	500 0	+3	-6	No Difference in driveability
7744 4/24/79	Dodge Aspen	272	7.46	850 (+100)	Texaco station	mechanic not certified used screwdriver	5.00	170	.6	870 (+120)	100	.06	760 +10	+1	-1	No Difference
7747 3/26/79	Ford Mustang 171 CID	119	1.92	740 (+40)	Exxon Station	mechanic certified, used HC + CO analyzer, screwdriver	11.95	200	.8	840 (+170)	90	1.5	760 +60	-3	-2	No Difference
7749 2/28/79	Ford Granada 302 CID	191	.02	660 (+10)	Broadway Union 76 Service	mechanic said car needed plugs, used infrared analyzer + screwdriver	5.00	558	2.7	540 (-110)	180	.04	680 +30	0	+1	worse Driveability after lab set.
7751 3/27/79	Ford St Wag 351 CID	828	.02	630 (-20)	Shell Station	mechanic is certified, adjusted car for a leaner burn, used analyzer	9.95	520	.02	490 (-160)	200	.1	660 +10	0	-1	slighty worse Driveability after lab set.
7752 2/27/79	Ford LTD 400 CID	310	1.26	600	Dave's Service Center	used infrared analyzer Checked emission sticker for specs.	7.95	227	1.1	580 (-20)	141	.01	640 +40	0	-2	No Difference in driveability
7760 3/26/79	Plym St Wag 318 CID	0	.02	1140 (+440)	Chevron Station	mechanic had no previous training. Used analyzer	0	35	.02	1140 (+440)	70	.03	710 +10	-1	-2	worse Driveability after lab set (rough idle)
7761 4/9/79	Plym Volare 318	248	3.09	800 (+100)	Texaco station	USED HC + CO analyzer and screwdriver	5.00	140	.2	810 (+110)	140	.35	720 +20	+2	+3	No Difference
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
Phoenix

Date & Vehicle Number	Make & Model	Before Repair Facility IHC	Before Repair Facility %ICO	Before Repair Facility IRPM*	Type of Facility	Service Person's Comments	Cost	After Repair Facility IHC	After Repair Facility %ICO	After Repair Facility IRPM*	Lab Set IHC	Lab Set %ICO	Lab Set IRPM	Differences in ¼ Turns of Mixture Screws** Left	Differences in ¼ Turns of Mixture Screws** Right	Additional Comments
6784 3/6/79	Chev. Caprice 400 CID	31	.02	580 (-20)	Shell Station	mechanic suggested to replace air filter. Used tach, screwdriver and analyzer	4.50	350	5.99	600 (0)	105	.03	600 0	-5	-6	improvement in driveability after lab set
6786 3/28/79	Ford Gran 302 CID	476	1.68	540 (-110)	Chevron Station	mechanic is certified used analyzer and screwdriver	8.00	800	2.0	540 (-110)	1000	.3	650 0	+2	-2	worse driveability after lab set.
6787 3/16/79	Ford Gran 302 CID	496	5.84	700 (+50)	Exxon Station	Used analyzer and screwdriver	7.50	400	.5	630 (-20)	370	.5	670 +20	0	+1	Slight improvement after lab set.
6790 4/3/79	MERC MONG 400 CID	538	.69	600 (-50)	Exxon Station	mechanic set car to manufactures specs. USCO ANALYZER	8.00	350	.02	640 (-10)	300	.03	660 +10	-4	-3	improvement of driveability after lab set.
6793 3/19/79	Plym Volare 225 CID	134	1.14	750	Chevron Station	mechanic did take some classes. Used screwdriver HC+CO analyzer	9.50	250	.2	830 (+80)	200	.2	760 +10	-1	+7	No difference in driveability
6794 4/2/79	Plym St. Wag 318	351	.30	760 (+10)	Union 76 Station	mechanic said it should pass emission test but HC is unstable. used analyzer	4.00	500	.3	900 (+250)	1600	.3	750 0	0	-2	worse drivability after lab set.
6799 3/31/79	Toyota Celica 134 CID	28	.46	1200 (+350)	University service	mechanic was certified No adjustment. Used scope.	12.95	50	1.1	1160 (+310)	100	.9	850 0	-3	0	No Difference
5802 4/5/79	Buick Apollo 231	393	6.85	560 (+60)	Exxon Station	mechanic said it would pass state test, he was certified. Used HC+CO analyzer	5.00	300	.8	550 (0)	350	.2	560 +10	-1	0	improvement in acceleration after lab set
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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Effectiveness of Idle Adjustments
at Commercial Repair Facilities
Phoenix

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5804 4/20/79	Chevy Vega 140 CID	138	1.92	790 (+40)	Union 76 Station	mechanic was certified. idle was set to high. Used screwdriver	2.00	500	8.2	750 (0)	130	.08	760 +10	-12	-12	worse driveability after lab set
5805 3/21/79	Chevy Malibu 350 CID	75	.05	700 (+100)	Mobil Station	mechanic said nothing was wrong. USED screwdriver	0	800	.12	580 (-20)	280	.22	620 +20	+2	+3	improvement in drive ability after lab set.
5808 3/19/79	Chevy St Wag 400 CID	84	.02	500 (-100)	Chevron Station	mechanic set egr to burn leaner. Used screwdriver + scope	0	430	1.3	520 (-80)	190	.15	600 0	-2	-2	No Difference
5810 4/4/79	Dodge St. Wag 318 CID	38	.22	760 (+10)	Exxon Station	mechanic went to school. Used screwdriver + open box wrench.	4.00	300	.35	850 (+100)	70	.02	750 0	-3	-2	Slight improvement in driveability, after lab set.
5815 4/2/79	MERC MARQ 460 CID	59	2.8	550 (-100)	Exxon Station	mechanic went to auto school (has been working on cars since 6 yrs. old). Used screwdriver	3.00	150	4.2	600 (-50)	150	1.5	650 0	-5	+1	improvement in driveability after lab set.
5817 3/13/79	Olds Cutlass 350 CID	16	.02	660 (+110)	Texaco Station	mechanic had no special schooling, made no adjustment Used analyzer.	5.00	160	.1	700 (+150)	110	.02	600 +50	-4	-4	slight improvement in driveability after lab set.
5821 4/9/79	Pontiac Catalina 400 CID	600	.74	580 (-70)	Texaco Station	mechanic is certified car was burning too rich made adjustment Used screwdriver.	2.00	400	.4	600 (-50)	295	.25	700 +50	-4	-5	No difference
5824 4/5/79	Toyota Corona 97 CID	88	1.14	860 (+10)	Union 76 Station	mechanic is certified Used screwdriver + HC + CO analyzer.	8.95	200	.4	850 (0)	110	.38	900 +50	-1	0	No difference
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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at Commercial Repair Facilities
FY-77 LOS ANGELES

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6177 3/8/79	PONTIAC VENTURA	20	3.00	525 (-75)	GAS STATION	MECHANIC SAID VEHICLE NEEDED NEW AIR FILTER USED SCOPE AND CARB. GUM-OUT SPRAY	14.00	100	1.10	580 (-20)	90	.40	575 (-25)	-3	—	SLIGHT IMPROVEMENT AFTER ADJUSTMENT
6184 3/5/79	TOYOTA CORONA	15	.02	775 (-125)	GAS STATION	MECHANIC SAID I NEEDED SPARK PLUGS CHANGED USED SCOPE, GUMOUT SPRAY	13.00	50	.03	725 (-125)	40	.02	850 (-50)	0	—	SLIGHT IMPROVEMENT AFTER ADJUSTMENT
6192 5/23/79	FORD LTD	700	10.00	600 (-50)	GAS STATION	MECHANIC SAID HOSE TO AIR FILTER MISSING, FIRING GOOD (950 RPM) BEFORE HC 650 PPM, CO 9.0 % AFTER HC 340 PPM, CO 3.5% ENGINE HC TESTER	19.95	500	2.50	575 (-75)	500	2.20	650 (0)	-1	-1	
7211 4/19/79	OLDS CUTLASS	25	.03	590 (+40)	GAS STATION	MECHANIC SAID CO% CHECKED COULD HELP CAR RUN BETTER AND GET BETTER MILEAGE ANALYZER & SCREWDRIVER	15.00	20	.03	575 (+25)	15	.02	550	-3	-3	
7213 4/19/79	OLDS CUTLASS	20	.01	440 (-110)	GAS STATION	AFTERWARDS MECHANIC SAID IDLE CO WAS 3% OFF USED ANALYZER, SCOPE, SCREWDRIVER	18.50	25	.01	550 (0)	15	.01	550	-1	-1	
5220 4/28/79	FORD ELITE	290	1.20	550 (-50)	GAS STATION	MECHANIC SAID CARB NEEDS WORK SET IDLE CO & IDLE RPM ANALYZER, SCOPE, SCREWDRIVER	18.50	200	3.00	535 (-65)	100	.30	650 (+50)	-14	-15	
5221 4/24/79	FORD PINTO	20	.05	900 (0)	GAS STATION	MECHANIC SAID ROUGH IDLE CARB. TOO RICH SCOPE, SCREWDRIVER, ANALYZER	19.95	40	.02	750 (-150)	10	.01	900 (0)	+1	—	NO CHANGE
6222 4/24/79	MERC STAW	670	8.00	425 (-225)	UNION 76 GAS STATION	USED SCREWDRIVER, SCOPE, ANALYZER	15.00	400	2.20	500 (-150)	150	.30	650 (0)	+9	-5	
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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5223 4/20/79	CHEV CAPRICE	200	3.10	600 (0)	DEALER	USED SCOPE, ANALYZER MFR. SPECIFICATIONS	17.69	50	.03	530 (-70)	45	.02	600 (0)	-2	0	
7224 4/30/79	CHEV. CAMARO	740	2.50	300 (-200)	DEALER	NO COMMENTS	27.84	200	2.20	550 (+50)	200	1.60	500 (0)	-1	-1	
5225 4/26/79	CHEV. MONZA	50	.05	720 (-30)	GAS STATION	MECHANIC SAID IDLE CO OFF 5% AND IDLE RPM OFF 300 RPM SCOPE, ANALYZER, SCREWDRIVER	15.00	40	.05	700 (-50)	30	.05	750 (0)	-1	—	
6227 4/27/79	LINCOLN CONT.	425	8.20	400 (-250)	DEALER	MECHANIC SAID CAR NEEDED TUNEUP SET IDLE CO AND IDLE RPM	15.18	600	8.50	390 (+260)	30	.01	650 (0)	-8	-4	
5228 4/30/79	PONTIAC GR VILLE	50	.02	525 (-75)	DEALER	NO COMMENTS WAS NOT ALLOWED IN SERVICE AREA	18.00	30	.01	600 (0)	30	.01	600 (0)	-1	0	
5229 4/30/79	FORD PINTO	40	.05	625 (-75)	DEALER	NO COMMENTS WAS NOT ALLOWED IN SERVICE AREA	13.00	50	.10	690 (-10)	20	.02	700 (0)	-1	-1	
6230 4/30/79	BUICK REGAL	100	.05	480 (-120)	DEALER	NO COMMENTS WAS NOT ALLOWED IN SERVICE AREA	22.00	40	.10	585 (-15)	40	.03	600 (0)	-4	-3	
5235 5/7/79	CHEV. CAMARO	1100	.50	510 (-90)	DEALER	MECHANIC SAID MOTOR IN BAD SHAPE NEEDS MAJOR TUNEUP AND WORK ON MOTOR ASKED TO WAIT IN WAITING ROOM	17.69	450	2.00	430 (-170)	80	.70	600 (0)	+3	-9	
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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6239 5/7/79	OLDS STAW	60	.01	650 (+50)	DEALER	NO COMMENT LEFT CAR AT DEALERSHIP	20.00	60	.01	575 (-25)	60	.01	600 (0)	-4	+1	
5241 5/9/79	TOYOTA CELICA	40	.90	650 (-200)	DEALER	NO COMMENT NOT ALLOWED IN SERVICE AREA	10.00	10	.50	810 (-40)	10	.40	850 (0)	+1	—	
5246 5/21/79	FORD RANCHERO	10	.01	550 (-150)	GAS STATION	MECHANIC SET IRPM FROM 650 TO 800 USED ENGINE ANALYZER, SCREW DRIVER	19.95	10	.02	600 (-100)	5	.01	700 (0)	-7	+1	
6247 5/14/79	MERC COUGAR	150	.01	650 (+50)	GAS STATION	NO COMMENTS USED ENGINE ANALYZER, SCREWDRIVER	19.95	30	5.75	560 (-40)	20	.02	650 (+50)	-9	-2	
5248 5/21/79	FIAT 131 S	500	4.00	850 (0)	GAS STATION	MECHANIC SAID ENGINE HAS ROUGH IDLE, REPLACED #3 PLUG WIRE TIPS ENGINE ANALYZER, HCEC Tester	19.95	200	4.50	790 (-60)	175	3.00	850 (0)	-6	—	
5250 5/25/79	merc MONARCH	50	.01	460 (-140)	DEALER	MANAGER SAID BASE of CARB. WAS LOOSE	17.67	30	.01	550 (-50)	25	.01	600	-3	—	
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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8015 6/1/79	FORD Fiesta	970	3.75	800 (-50)	GAS station	MECHANIC SAID CARB. TOO RICH SO HE TURNED SCREW DOWN	5.00	900	3.00	575 (-275)	190	.05	850 (0)	-8	—	
5034 5/31/79	FORD GRANADA	30	.30	650 (0)	Dealer	MANAGER SAID VACUUM HOSE OFF Timing OFF, VAC VOM ADV. Hitting compressor NOT ALLOWED IN SHOP	17.67	100	.60	570 (-80)	90	.60	650 (0)	0	0	
6040 6/1/79	FORD PINTO	30	.20	825 (-25)	Dealer	NOT ALLOWED IN SHOP	17.67	10	.01	900 (+50)	5	.01	850 (0)	-1	—	
6045 6/8/79	FORD GRANADA	20	2.25	700 (0)	DEALER	NO COMMENTS NOT ALLOWED IN SHOP	17.67	20	2.00	700 (0)	20	.04	700 (0)	-4	-4	
7063 6/8/79	PONTIAC GR. PRIX	110	.01	525 (-25)	DEALER	HC 100 RPM, CO 3%	17.67	500	.15	515 (-35)	40	.01	550 (0)	-2	0	
5065 5/31/79	FORD PINTO	350	.06	1050 (+150)	DEALER	MANAGER SAID CAR would be Done in 1/2 Hr to US AIR NOT ALLOWED IN SERVICE AREA	17.67	50	.10	800 (-100)	40	.10	900 (0)	0	—	
7070 6/5/79	OLDS STAW.	15	.01	625 (+75)	INDGARAGE INSTA-TUNE	MECHANIC EXPLAINED HOW TO PROPERLY PLUG UP EGR SYSTEM USED TACH. & SCREWDRIVER	4.00	15	.01	600 (+50)	10	.01	550 (0)	+1	-4	
8127 5/24/79	FORD PINTO	550	10.00	500 (-250)	DEALER	MECHANIC TOLD ME TO WAIT UP FRONT	17.67	150	8.10	740 (-10)	25	.01	750 (0)	-3	—	
AVERAGES		IHC	%ICO	IRPM*			Cost	IHC	%ICO	IRPM*	IHC	%ICO		Left	Right	

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