The Valley CAN Tune In &Tune Up 2005 Program

Fresno, California

Sponsored by Valley CAN

With Assistance from the Advanced Transportation Technology Center
Fresno City College
and
California Bureau of Automotive Repair
Breathe Easier Program

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INTRODUCTION

The Valley CAN Tune In & Tune Up 2005 (TI&TU) Program was conducted in Fresno, California on Saturday, September 17, 2005. The objectives of the Program were to evaluate the effectiveness of remote sensing in identifying high-emitting vehicles for repairs and to determine the cost-effectiveness of the 2005 Fresno TI&TU Program. Relationships established between Valley CAN and the Advanced Transportation Technology (ATT) Center at Fresno City College and the State Bureau of Automotive Repair (BAR) contributed to the program's success. With the assistance of publicity on the radio and other means, approximately 1000 vehicle owners inquired about the program. Motorists were asked to drive past a remote sensing device (RSD), which was operated by staff from the BAR. Three hundred thirty-two "beam blocks" occurred, in which vehicles drove past the RSD and an attempt was made by the device to make emission measurements. In practice, not every beam block produces a valid RSD reading for carbon monoxide (CO), exhaust hydrocarbons (HC), and nitric oxide (NO), the pollutants of interest in this program.

After the first few minutes of the RSD testing, BAR staff increased the remote sensing high emitter cutpoints from 4% to 5%, 500 to 1000 ppm, and 500 ppm to 1000 ppm, for CO, HC, and NO, respectively. Of the 332 beam blocks, BAR staff reported valid RSD measurements for all three pollutants from 160 vehicles. BAR staff reported that a significant number of drivers did not drive past the remote sensor under steady driving conditions; hence, no valid RSD reading was obtained for those vehicles. Ninety-nine, or 62%, of the vehicles with valid emission readings qualified as high emitters according to at least one of the three high-emitter RSD pollutant cutpoints. Twenty-three of the vehicles exceeded the CO cutpoint, 29 exceeded the HC cutpoint, and 70 exceeded the NO cutpoint. The sum of these high emitter pollutant categories exceeds 99 vehicles, because it is possible for vehicles to be high emitters for more than just one pollutant.

TI&TU Program staff provided repair vouchers worth up to $500 in repair costs to 172 motorists of vehicles that participated in the Program. The vouchers were good for Smog Check-related repairs at A-1 Auto Electric in Fresno.

In addition to the RSD testing, motorists were directed to an on-site diagnostic testing station, where ATT students provided written information regarding possible causes of their vehicles' emission problems. At that station, BAR staff also conducted underhood inspections to provide vehicle owners with more information regarding the condition of their vehicle.

The following sections describe data collected during the 2005 Fresno TI&TU Program and emission reductions resulting from repairs to the high-emitting vehicles.

REMOTE SENSING DATA

Figure 1 is a scatter plot of valid CO and HC remote sensing data for the 160 vehicles with valid readings. Figure 2, also for CO and HC, is an expanded scale for lower value readings displayed in Figure 1. These plots show a feature similar to other data sets of vehicle exhaust emissions, where there is a moderate correlation between CO and exhaust HC emissions for the majority of vehicles with a few high HC values, independent of the CO readings. These latter high HC values are due to emission control system malfunctions such as misfires. Figure 3 displays the relationship observed between CO and NO emissions. Generally, when vehicles are running rich (high CO and/or HC), their NO emissions are low, and when vehicles are running lean (high NO), their CO and/or HC emissions are low.

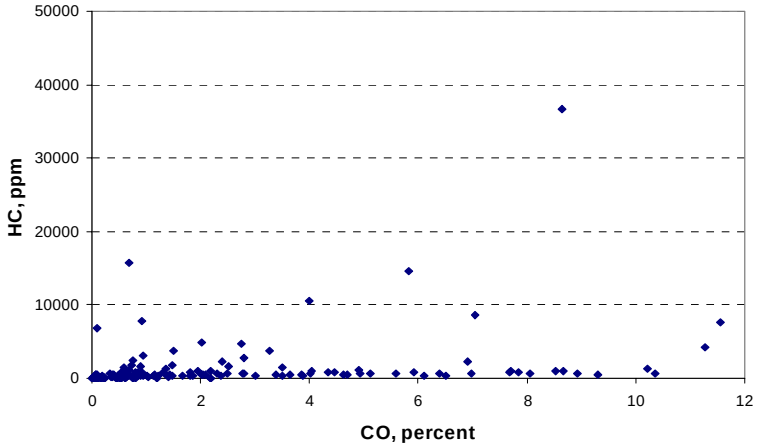

Figure 1. Remote sensing CO vs. HC emissions, 160 vehicles.

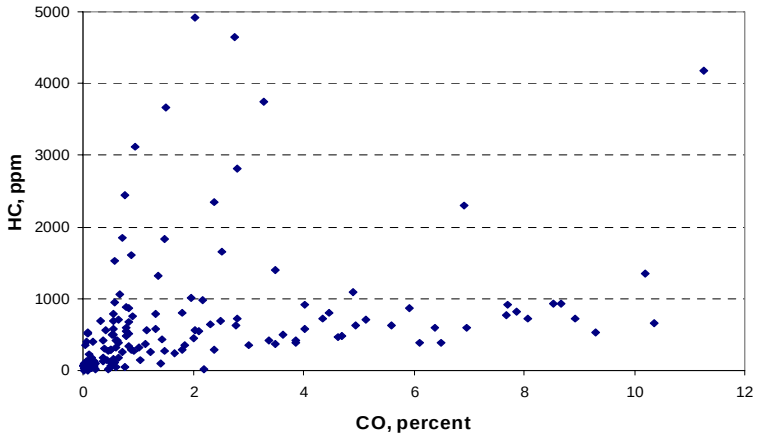

Figure 2. Remote sensing CO vs. HC, smaller value readings; a subset of Figure 1 data.

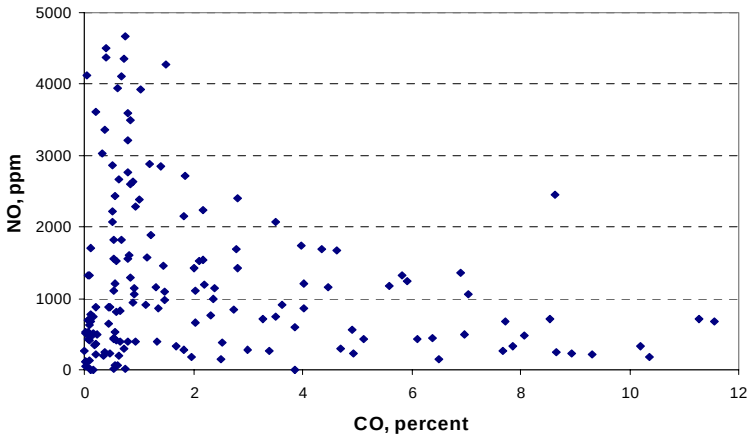

Figure 3. Remote sensing CO vs. NO emissions, 160 vehicles.

VEHICLE AND REPAIR DATA

Ninety-seven vehicles began the repair program, where vehicles were first given a California Smog Check test and inspection at A-1 Auto Electric in Fresno. All vehicle data including Smog Check repair results are provided in the Appendix. The model year distribution of vehicles participating in the Program is shown in Figure 4.

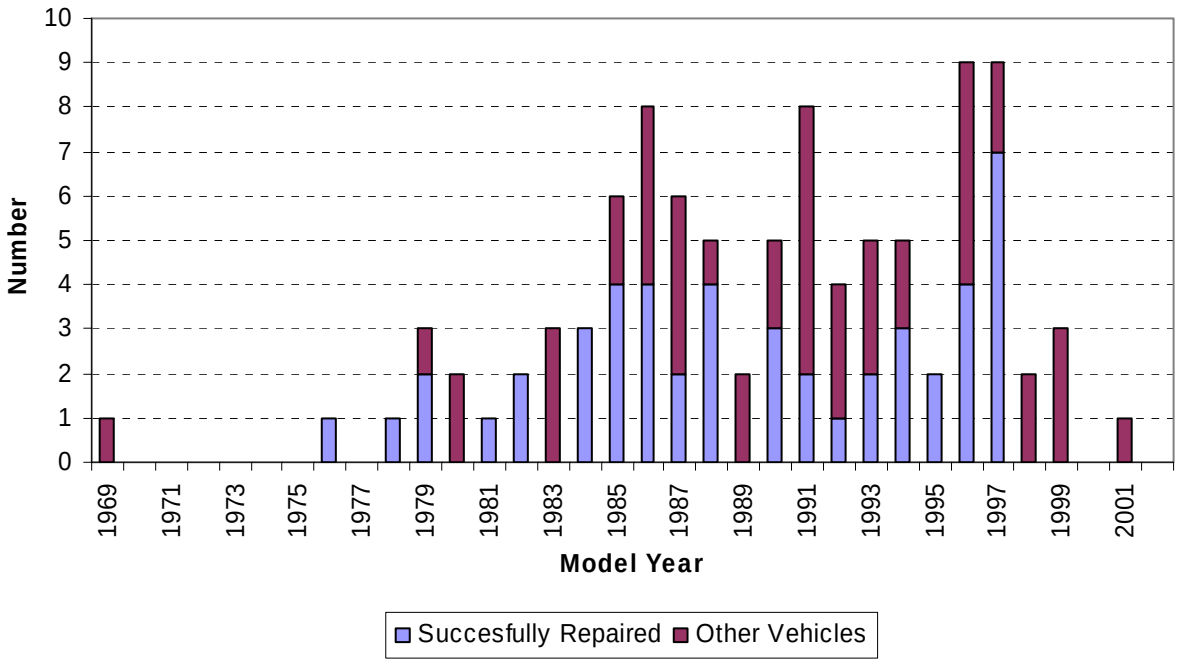

Figure 4. Model year distribution of the vehicles entering the Fresno Tune In & Tune Up Program.

Vehicles were given both emissions tests in the Smog Check program, the ASM5015 and the ASM2525, which are steady-state loaded mode tests carried out on a dynamometer. Table 1 provides the status of the 97 vehicles that entered the repair program and their average costs of repair.

Table 1. Status of vehicles entering 2005 Fresno TI&TU Program.

Vehicle Class	Average Repair/Diagnosis Cost/Vehicle
Successfully Repaired, n = 48	$575
Successfully Repaired but no pre-repair emissions data, n = 11	$531
Partial Repairs, n = 10	$235
Left Program, n = 10	$126
Couldn't Repair, n = 2	$394
Exempt, n = 2	$228
Didn't Test, n = 7	$16
Passed Smog Check, n = 7	$52

Forty-eight vehicles that initially failed the Smog Check test were successfully repaired according to Smog Check criteria for each vehicle. The average repair cost was $575; the minimum cost was

$119 and the maximum value was $1219. Twenty-four vehicles' repair expenses exceeded the $500 voucher amount. Eleven vehicles were successfully repaired to meet the Smog Check standards, but there were no pre-repair emissions data made available for emission reduction calculations. Ten vehicles were partially repaired, but for a number of reasons, their repairs were not completed according to Smog Check criteria. The average cost of partial repairs for this group was $235. The owners of vehicles in the group labeled "Left Program" did not want their vehicles to be repaired, and the average cost is the cost of diagnosis charged by the repair shop. Two vehicles could not be repaired according to the program criteria. Two vehicles entered the repair program but were exempt from the Smog Check program due to age or vehicle type. However, some repairs were performed on those two vehicles. Seven vehicles could not be tested, either because the motorist did not want the vehicle to be repaired, or the vehicle repairs would have been more costly than the value of the vehicle.

Only seven of the vehicles entering the repair program passed the Smog Check test. However, this does not necessarily mean that those vehicles were "clean" according to Smog Check standards. It has been shown in several independent studies that "broken" vehicles have extremely variable emissions (these vehicles are known as "flippers"), and it is possible for them to pass an emissions test on one occasion and subsequently fail on the next test, even administered on the same day. Because the motorists driving past the remote sensor sometimes passed the remote sensor at driving conditions other than those needed for reliable remote sensing readings, it is also possible that readings appropriate for proper diagnosis were not obtained.

SMOG CHECK EMISSION REDUCTIONS

Table 2 summarizes the pre- and post-ASM emissions data for the 48 vehicles that were successfully repaired according to Smog Check criteria for those individual vehicles. The values shown in the table are the average of the ASM5015 and ASM2525 emission tests. Emission reductions of 94%, 65%, and 53% were achieved for CO, HC, and NOx, respectively, for the successfully repaired group of vehicle vehicles.

Table 2. Pre- and post-repair emissions data for the Fresno vehicles in TI&TU 2005.

	Ave. Before-Repair ASM Emissions			Ave. After-Repair ASM Emissions		
Vehicle Class	**CO, %**	**HC, ppm**	**NOx, ppm**	**CO, %**	**HC, ppm**	**NOx, ppm**
Successfully Repaired, n = 48	1.39	131	710	0.09	46	335
Successfully Repaired but no pre-repair emissions data, n = 11	--	--	--	0.06	36	184
Partial Repairs, n = 10	1.58	265	535	--	--	--
Left Program, n = 10	2.81	242	660	--	--	--
Couldn't Repair, n = 2	0.50	131	322	--	--	--
Exempt, n = 2	--	--	--	--	--	--
Couldn't Test, n = 7	--	--	--	--	--	--
Passed Smog Check, n = 7	0.16	67	352	--	--	--

Also shown above are pre-repair average ASM readings for the vehicles in each subgroup, where emissions data were available. Notable are the higher average pre-repair CO and HC emissions for the 10 vehicles for which the motorists chose not to participate in the TI&TU 2005 repair program.

Figure 5 illustrates the average pre- and post-repair ASM emissions for the 48 vehicles that were successfully repaired according to Smog Check criteria, resulting in average ASM emission reductions of 94, 65, and 53% for CO, HC, and NOx, respectively.

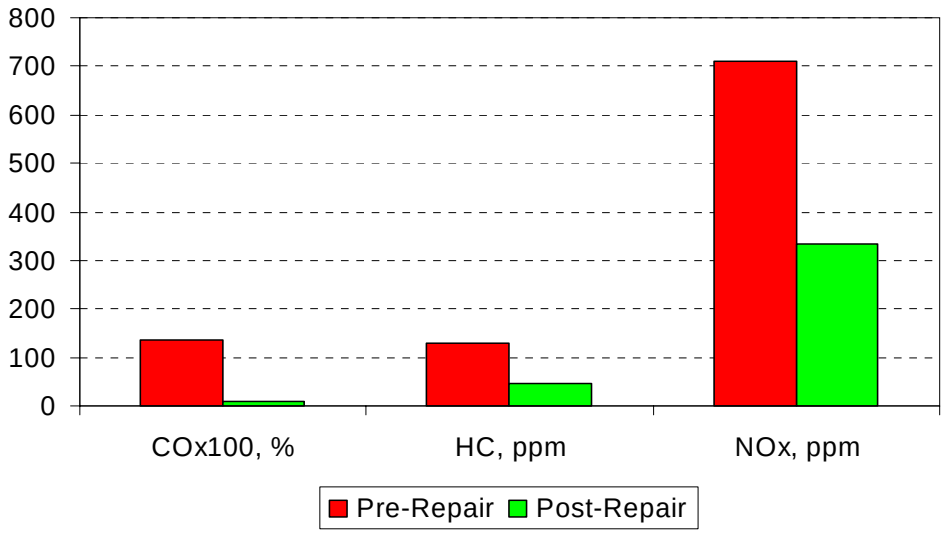

Figure 5. Pre- and post-repair average ASM emissions for the successfully-repaired 48 vehicles.

PRIOR SMOG CHECK PROGRAM PARTICIPATION

We accessed the California Bureau of Automotive Repair (BAR) and CARFAX® web sites to evaluate the status of all vehicles that entered the 2005 Fresno TI&TU Program. The objective of this task was to find out whether the vehicles in the 2005 TI&TU Fresno Program had participated in the Smog Check program prior to September 17, 2005 and whether or not the vehicle passed or failed the Smog Check inspection. We were able to access BAR Smog Check and/or CARFAX® records for the 97 vehicles. The results are shown in Table 3 below.

Table 3. Prior Smog Check Program Participation of Vehicles in 2005 TI&TU Fresno Program

Vehicle Class	Pass	Fail	Fail as Gross Polluter	Inconsistent Odometer Reading	Days Since Previous Smog Check (Min/Max/Mean/Median)
Successfully Repaired, n = 48	24	24	9	14	16/ 3312/ 508/ 304
Successfully Repaired but no pre-repair emissions data, n = 11*	8	2	0	1	7/ 1865/ 821/ 800
Partial Repairs, n = 10	6	4	2	3	3/ 1348/ 587/ 758
Left Program, n = 10	3	7	5	1	19/ 1075/ 312/ 232
Couldn't Repair, n = 2	1	1	0	1	137, 1597
Exempt, n = 2	--	--	--	--	--
Couldn't Test, n = 7	3	3	2	2	7/ 1316/ 487/ 275
Passed Smog Check, n = 7	6	1	0	4	10/ 2296/ 375/ 598

* One vehicle in this category did not have any Smog Check records in the BAR data base.

The table shows that for vehicles that were successfully repaired, half had failed their previous Smog Check inspection, with 9 of the 48 having previously failed as a gross polluter. For the

vehicles that passed the Smog Check upon entering the Fresno TI&TU Program, only 1 had failed its prior Smog Check inspection. The CARFAX® data reports showed that nearly one-third of the successfully-repaired vehicles had questionable odometer readings, where the recorded vehicles' mileage suggested evidence of odometers that were disconnected or had been tampered with. Only 22 vehicles out of the entire 97 vehicle data set had periods since their previous Smog Check longer than the biennial inspection cycle, suggesting that at a significant portion of the vehicles in the program might not have been currently registered. Current registration data might be obtained from the Department of Motor Vehicles; this was outside the scope of this analysis.

Two vehicles of the 99 were exempt from the Smog Check program because of their age. Forty-two of the remaining 97 vehicles had failed their most recent Smog Check inspection between 3 and 728 days before September 17, 2005, and there were no BAR data indicating that those vehicles had been repaired prior to entering the TI&TU Program. The median interval of the failing vehicles was 75 days prior to the Fresno program. The CARFAX® records showed that 18 of the 42 previously-failing vehicles were gross polluters according to Smog Check criteria. The remaining 51 vehicles participating in the program passed their most recent Smog Check inspection 163 to 3312 days prior to September 17, 2005, with a median interval of 771 days. The CARFAX® data showed that twenty-five, or about one-fourth of the 97 program vehicles, had questionable odometer readings, where the reported vehicles' mileage suggested evidence of odometers that were disconnected or had been tampered with. There were a small number of inconsistencies within the BAR Smog Check records and between the BAR and CARFAX® records.

COMPARISON WITH THE 1995 CALIFORNIA I/M PILOT PROGRAM

In 1995, the California Air Resources Board tested a set of more than 600 vehicles using the Federal Test Procedure (FTP), IM240, ASM 5015, ASM2525, and the two-speed idle tests using the BAR90 analyzer. In that unique study, vehicles were tested according to all of the above emissions tests, and the vehicles that failed the IM240 or the ASM test were repaired according to emissions criteria using the test that they failed. BAR-employed technicians repaired the failing vehicles, and their pre- and post-repair emissions data were collected at State of California-operated facilities. The California I/M Pilot Study provided the maximum possible repair benefit obtainable in an inspection and maintenance (I/M) program, as the mechanics were employed by the State, and their performance was monitored in a centralized I/M program format with no motorist intervention. The emissions reductions obtained in the Valley CAN TI&TU 2005 Program are compared with those from the California Pilot Program in Table 4.

Table 4. Pre- and post-repair emissions data from the 2005 Fresno TI&TU and 1995 California I/M Pilot Programs.

	Pre-/Post-Repair Ave. ASM Emissions			Percent Reduction		
Program	**CO, %**	**HC, ppm**	**NOx, ppm**	**CO**	**HC**	**NOx**
TI&TU 2005	1.39/0.09	131/46	710/335	94	65	53
CA I/M Pilot	1.36/0.22	160/50	884/419	84	69	52

Although there is a ten-year difference and vehicle model years/technologies are different for the two programs, the similarities between pre- and post-repair emissions levels, along with percent emission reductions, are quite similar. The emission reductions obtained in the Fresno TI&TU

2005 Program are as effective as those obtained in the government-monitored California I/M Pilot Program.

COSTS OF EMISSION REDUCTIONS

Using statistical relationships derived from the California I/M Pilot Study, where regression relationships were calculated between ASM emission reductions and corresponding FTP data, it is possible to derive rough approximations of tons/year of emission reductions from this Program. Although there is scatter among the different emission test types regarding emission reduction relationships, we used these statistical relationships to estimate total emission reductions for the 48-vehicle fleet, assuming that the repairs are effective for 10,000 miles. Estimated reductions would be different if the duration of repairs differs from the 10,000-mile assumption for repair effectiveness. These estimates are provided in Table 5.

Table 5. Emission reductions from the 48 successfully-repaired vehicles, assuming repair effectiveness for 10,000 miles.

Emission Reductions	CO	HC	NOx
Pounds per vehicle	540	49	29
Pounds from 48 vehicles	25,918	2,355	1,393
Tons from 48 vehicles	13	1.2	0.70

The 48 vehicles were repaired according to Smog Check criteria at a total cost of $27,594, or $575 per vehicle. Because it is not possible to apportion the repair types to specific emission reductions, we can provide two calculations in terms of dollars/ton for TI&TU 2005 Program effectiveness. If we sum the pollutants CO + HC + NOx, the cost-effectiveness of the program is $1900/ton for exhaust emission reductions. The cost-effectiveness for HC + NOx emissions together is $14,900/ton. Because Smog Check repairs include those that reduce evaporative or nontailpipe HC, these costs are upper limit costs for the three pollutants. If evaporative or nontailpipe HC emission reductions could have been measured in this program, the true cost-effectiveness values would be lower than the ones given here. It is noteworthy that five vehicles entering the program were identified by the repair shop as smoking vehicles. At the time of the 2005 TI&TU Program, California's Smog Check program did not test for particulate matter (PM) exhaust emissions, so it is not possible to calculate PM emission reductions that might have been obtained in this program.

DURATION OF PROGRAM REPAIRS

As a follow-on to the repair program, an effort was made to recruit 20 vehicles approximately one year after their TI&TU repairs, to evaluate the effectiveness and duration of the Smog Check repairs made in the program. Eleven vehicles were brought in to the A-1 Auto Electric Shop for a Smog Check inspection, and tested as if they were being given a regular Smog Check. One of the 11 vehicles was not tested, because it had an engine knock. Of the remaining 10 vehicles, seven passed the emissions portion and only three failed the emissions portion of the Smog Check inspection. The average length of time between the 2005 TI&TU repairs and follow-up Smog Check inspection was 295 days for the vehicles that were successfully recruited and the average mileage accumulation of these vehicles was 5900 miles since their repairs.

CONCLUSIONS

The Valley CAN Tune In & Tune Up 2005 Program was conducted on September 17 in Fresno, California, where high-emitting vehicles identified by remote sensing devices were repaired according to Smog Check criteria. Similar to what has been shown in California studies as early as 1989, remote sensing successfully identified high-emitting vehicles in need of repairs, with a very low false failure rate. Remote sensing cutpoints of 5%, 1000 ppm, and 1000 ppm for CO, HC, and NO were used to determine whether a vehicle was identified as a high emitter and therefore qualified for repairs at the A-1 Auto Electric Repair Shop. Vehicle owners were provided with a $500 voucher to assist in repairing their high-emitting vehicles. Ninety-seven vehicles entered the repair program; 59 were successfully repaired to Smog Check criteria at an average cost of $567 per vehicle. Owners of 10 vehicles chose not to participate in the repair program; 10 additional vehicles were only partially repaired, with two vehicles exempted from the Smog Check repair because of their age. Only seven of the 97 vehicles passed the Smog Check test following their identification by remote sensing as a high emitter; there are a number of reasons why this is possible, including emissions variability from “broken” vehicles, as well as lack of appropriate driving conditions by motorists when passing by the remote sensor.

Very impressive emission reductions were obtained from the effectively-repaired 48 vehicles having complete data in this program; their emission reductions were comparable to those obtained from repaired vehicles in the 1995 California I/M Pilot Program. The Fresno Tune In & Tune Up Program achieved average ASM emission reductions of 94, 65, and 53% for CO, HC, and NOx, respectively, for the successfully repaired vehicles. If each of these vehicles was driven 10,000 miles per year and the emission reductions lasted for 10,000 miles, each vehicle’s emissions would be reduced by a total of 540, 49, and 29 pounds per year of CO, HC, and NOx, respectively. The 48 successfully-repaired vehicles emissions would be reduced by 13, 1.2, and 0.7 tons for CO, HC, and NOx, respectively.

The cost-effectiveness of the 2005 Fresno Tune In & Tune Up Program for the 48-successfully-repaired vehicles was $1900/ton for the sum of carbon monoxide, exhaust hydrocarbons, and nitrogen oxide emissions. For exhaust hydrocarbons and nitrogen oxides combined, the cost of emission reductions was $14,900/ton. These are upper-limit values, because reductions of evaporative or nontailpipe hydrocarbons emissions obtained by performing Smog Check repairs were not measured in this program. Five vehicles entering the Program were identified by the repair shop as smoking vehicles.

The majority of vehicles participating in the Program appeared to be currently registered, because about 75% had received their most recent biennial Smog Check inspection within two years prior to the TI&TU Program in September 2005. A limited effort to evaluate repair effectiveness showed that 7 out of 11 recruited vehicles passed the emissions portion of the Smog Check inspection about 300 days after being repaired, indicating that the repairs were very effective for these previous high-emitting vehicles.

Nearly all of the vehicles identified by remote sensing and repaired according to Smog Check criteria in the 2005 Fresno TI&TU Program required significant emissions-related repairs. Additional program benefit would have been obtained if all participating vehicles had been completely repaired.

ACKNOWLEDGMENTS

We thank the Valley CAN Program for financial support of this program. We also acknowledge BAR staff for operating the remote sensor used to identify high-emitting vehicles in this study, the BAR Breathe Easier Program, and the A-1 Auto Electric Repair Shop in Fresno for providing vehicle repairs and repair information on the 2005 TI&TU Program vehicles.

APPENDIX

Fresno 2005 TI&TU Vehicle Data Set

Successfully-Repaired Vehicles

					Date of Last	Smog Check	Pre-Repair ASM5015			Post-Repair ASM5015			Pre-Repair ASM2525			Post-Repair ASM2525		
Year	Make	Model	Odometer	Total Cost	Smog Check	Result	HC	CO	NO	HC	CO	NO	HC	CO	NO	HC	CO	NO
1990	Honda	Accord EX	229674	$748.72	7/17/2004	P	14	0.01	1744	97	0.49	789	9	0	934	44	0.21	211
1997	Acura	Integra GS	112460	$457.86	9/3/2003	P	65	0.19	39	42	0.13	68	34	0.06	39	24	0.07	27
1978	Chevy	Pickup C10	8625	$330.16	7/1/2005	F	20	0	2246	22	0	336	16	0	1731	18	0	401
1982	Buick	Regal	53025	$741.03	6/17/2005	T	91	0.24	1348	105	0.07	39	68	0.19	593	88	0.14	28
1994	Chevy	S10 Blazer	164968	$328.79	8/2/2004	F	109	0.09	317	55	0.01	27	58	0.03	276	47	0.01	35
1988	Honda	Accord LX	185913	$393.17	8/8/2005	F	25	0.07	2239	13	0.16	800	23	0.06	2067	13	0.15	744
1986	Ford	Econoline E150	2562	$118.93	2/15/2000	F/P	126	0.06	587	128	0.07	710	73	0.02	512	69	0.02	577
1996	Nissan	200SX SE	60854	$289.65	7/7/2005	F	35	0.15	547	65	0.13	436	34	0.13	571	44	0.09	430
1985	Oldsmobile	Cutlass Supreme	57642	$549.08	11/21/2003	P	441	11.66	78	21	0.01	25	457	12.08	77	46	0.03	16
1992	Saturn	SL2	209777	$491.79	6/25/2002	P	192	0.44	1241	115	0.1	3	182	0.46	1321	56	0.03	5
1996	BMW	318is	69678	$744.08	4/1/2004	P	54	0.28	104	10	0.03	38	28	0.18	55	9	0.03	20
1985	Dodge	Pickup D150	27481	$315.49	9/1/2005	T	154	0.25	893	59	0.01	332	103	0.91	357	37	0	406
1979	Ford	Pickup F250	50846	$401.32	10/4/2003	P	277	1.62	130	28	0.02	132	318	0.8	157	42	0.01	103
1997	Toyota	Corolla	130711	$793.12	8/8/2003	P	100	0.25	85	20	0.01	5	45	0.08	26	22	0.01	224
1982	Toyota	Cab & Chassis	66789	$498.75	8/31/2005	F	168	2.51	1083	122	0.03	1475	162	3.42	1052	64	0	1322
1986	Ford	LTD	8419	$131.90	10/29/2003	P	46	0.15	1040	65	0	725	18	0.09	951	29	0	631
1990	Cadillac	Fleetwood	133434	$314.03	10/15/2003	F/P	105	0.19	276	38	0.01	586	36	0.01	1240	39	0.01	412
1997	Dodge	Caravan	118226	$836.14	2/4/2004	P	35	0.15	759	1	0	20	26	0.12	524	0	0	16
1994	Toyota	Camry LE	182057	$717.16	4/7/2005	F/P	91	0.38	885	8	0.01	22	97	0.35	737	11	0.01	13
1985	Pontiac	Firebird Trans AM	73917	$497.60	8/31/2005	F	294	0.57	370	76	0	80	242	0.68	359	55	0.01	73
1996	Nissan	Maxima SE	133586	$749.61	12/2/2003	F/P	53	0.05	391	42	0.05	373	24	0.01	334	14	0.01	293
1985	Ford	Tempo GL	74679	$682.74	6/9/2003	F/P	175	3.14	584	148	0.43	816	118	2.18	856	100	0.34	971
1993	Mercury	Sable LS	90033	$374.31	4/1/2005	F	81	0.5	90	19	0.02	83	50	0.42	137	8	0.03	71
1995	Mitsubishi	Eclipse GS	109164	$1,163.92	6/24/2005	F	25	0.04	2018	7	0	4	23	0.02	1905	7	0	9
1990	Ford	Taurus GL	4531	$333.80	7/7/2005	F	282	5.16	497	70	0.07	743	282	5.1	348	70	0.04	584
1984	Buick	Skylark Custom	66676	$198.90	8/27/2005	F	207	5.95	36	80	0.84	1108	209	6.18	10	51	0.46	607
1997	Kia	Sportage EX	116984	$698.63	4/20/2005	F	54	0.02	106	46	0.02	175	33	0.01	296	29	0.01	194
1996	Dodge	Intrepid	191488	$637.80	7/23/2005	A	26	0.37	138	23	0.01	418	24	0.32	86	8	0.21	43
1997	Dodge	Pickup R1500	108611	$696.96	8/17/2005	F	103	0.87	2865	21	0.02	7	106	0.95	2758	38	0.05	39
1991	Ford	Explorer	12647	$549.55	9/15/2003	P	192	4.95	320	50	0.05	442	189	4.84	308	23	0.08	168
1997	Plymouth	Breeze	116265	$1,134.78	8/30/2005	F	89	0.49	39	34	0.05	0	55	0.29	34	27	0.05	0
1988	Ford	Bronco	56575	$261.81	1/22/2004	P	155	1.22	583	105	0.28	683	155	1.3	474	82	0.29	584
1987	Nissan	Sentra	113314	$1,291.58	4/8/2005	F	296	7.98	221	17	0.01	642	321	8.29	108	34	0.02	125
1991	Chevy	Pickup C1500	230721	$634.76	11/11/2003	F/P	169	0.63	2139	49	0	457	84	0.3	1282	32	0	296
1986	Ford	Tempo GL	52370	$552.63	9/20/2003	F	72	0.04	309	59	0	263	41	0.01	342	51	0	255
1997	Dodge	Caravan	109119	$500.00	7/18/2005	F	53	0.33	1175	25	0.01	445	46	0.35	1093	26	0.03	753
1988	Chrysler	Fifth Avenue	1420	$748.63	8/8/2003	F/P	66	0.34	13	44	0.66	105	47	0.07	51	45	0.55	98
1995	Lexus	ES 300	148325	$347.25	7/2/2005	F	81	0.04	134	81	0.06	156	44	0.02	71	48	0.02	79
1981	Chevy	El Camino Classic	50390	$498.49	3/5/2005	F/P	669	0.1	595	109	0.24	249	628	0.07	599	88	0.25	190
1976	Chevy	El Camino	74415	$356.69	3/3/2003	P	220	1.15	984	63	0	1429	235	1.71	714	53	0	1102
1986	Ford	Escort LX	6551	$500.00	7/19/2001	P	363	2.28	1463	56	0.04	29	298	1.75	1534	64	0.03	28
1993	Chevy	Corsica LT	136243	$941.25	11/27/2001	F/P	49	0.1	853	83	0.02	66	25	0.04	422	38	0.03	13
1988	Toyota	Pickup	1524410	$801.30	6/13/2005	F	195	1.34	no data	28	0	no data	158	4.56	no data	28	0.02	no data
1994	Lincoln	Mark VIII	138076	$500.00	6/8/2005	F	11	0.04	1581	47	0.04	214	9	0.02	1590	32	0.02	82
1984	Nissan	200SX	126744	$516.29	8/23/1996	P	148	0.43	1090	44	0.3	571	109	0.33	836	43	0.31	644
1987	Honda	Civic	159173	$1,184.57	5/24/2003	P	75	0.04	475	9	0.3	6	58	0.01	1049	10	0.15	7
1984	Toyota	Pickup	242792	$500.00	6/27/2005	F	173	2.24	422	52	0.13	27	176	2.24	383	35	0.01	83
1979	Ford	Courier	20927	$539.01	8/19/2005	F	255	6.62	216	49	0.08	1284	226	6.7	165	38	0.13	1051

Partially Repaired Vehicles

					Date of Last	Smog Check	Pre-Repair ASM5015			Post-Repair ASM5015			Pre-Repair ASM2525			Post-Repair ASM2525		
Year	Make	Model	Odometer	Total Cost	Smog Check	Result	HC	CO	NO	HC	CO	NO	HC	CO	NO	HC	CO	NO
1983	Ford	Econoline E150	8190	$498.39	12/11/2002	P	755	2.02	623				1018	1.84	507			
1996	Pontiac	Grand Am SE	140457	$766.59	9/14/2005	F	56	0.08	8				23	0.04	0			
1996	Lincoln	Continental	158491	$151.50	5/19/2003	P	78	0.17	290				30	0.01	214			
1985	Ford	Bronco II	64656	$230.17	9/12/2003	F/P	213	3.92	784				239	2.32	1464			
1985	Chevy	Caprice Classic	44452	$167.46	3/14/2003	F/P	208	3.34	861				215	2.76	1044			
1980	Toyota	Corolla	29196	$84.47	1/8/2002	P	no printout of results available						no printout of results available					
1997	Ford	Mustang	170082	$80.10	4/19/2005	F	no printout of results available						no printout of results available					
1992	Geo	Storm	216710	$213.41	7/30/2003	P	296	2.94	359				216	2.36	270			
1991	Chevy	Astro	265417	$80.10	8/26/2005	F	297	0.23	no data				60	0.15	no data			
1990	Honda	Accord DX	121353	$80.10	7/30/2005	F	no printout of results available						no printout of results available					

Vehicles that left Program

					Date of Last	Smog Check	Pre-Repair ASM5015			Post-Repair ASM5015			Pre-Repair ASM2525			Post-Repair ASM2525		
Year	Make	Model	Odometer	Total Cost	Smog Check	Result	HC	CO	NO	HC	CO	NO	HC	CO	NO	HC	CO	NO
1987	Hyundai	Excel GL	110118	$125.10	8/24/2005	F	577	0.09	2056				364	0.05	1149			
1991	BMW	318is	152593	$125.10	2/7/2004	F	125	0.38	856				92	0.31	570			
1980	Chevy	Caprice Classis	85301	$125.10	10/8/2002	P	236	7.12	206				243	7.32	186			
1987	Nissan	Sentra	139528	$125.10	2/21/2005	F	110	0	1601				61	0	1243			
1991	Ford	Taurus GL	54301	$134.81	4/16/2004	F/P	no data received						no data received					
1997	GMC	Safari	190129	$125.10	6/16/2005	F	48	0.02	37				28	0.01	748			
1993	GMC	Safari	156496	$125.10	8/18/2005	F	441	8.08	268				487	8.47	281			
1990	Mitsubishi	Eclipse	178838	$125.10	8/29/2005	F	255	0.36	1575				128	0.31	798			
1999	Acura	3.2TL	126238	$125.10	11/12/2004	P	49	0.05	120				20	0.01	66			
1986	Mazda	B2000	221621	$125.10	1/4/2005	F	554	8.49	52				537	9.45	66			

Couldn't Repair Vehicles

					Date of Last	Smog Check	Pre-Repair ASM5015			Post-Repair ASM5015			Pre-Repair ASM2525			Post-Repair ASM2525		
Year	Make	Model	Odometer	Total Cost	Smog Check	Result	HC	CO	NO	HC	CO	NO	HC	CO	NO	HC	CO	NO
1986	Pontiac	Firebird	12928	$663.33	5/4/2001	P	221	0.68	547				208	0.72	391			
1996	Chrysler	Sebring Lxi	204621	$125.10	5/3/2005	F	56	0.32	196				40	0.28	153			

Exempt Vehicles

					Date of Last	Smog Check	Pre-Repair ASM5015			Post-Repair ASM5015			Pre-Repair ASM2525			Post-Repair ASM2525		
Year	Make	Model	Odometer	Total Cost	Smog Check	Result	HC	CO	NO	HC	CO	NO	HC	CO	NO	HC	CO	NO
1969	Oldsmobile	Delta 88	38099	$366.43	No record of any kind													
1979	Mercedes Bz	280SE	170186	$90.00	1/19/2000	P												

Vehicles not tested

							Pre-Repair ASM5015			Post-Repair ASM5015			Pre-Repair ASM2525			Post-Repair ASM2525		
Year	Make	Model	Odometer	Total Cost	Date of Last Smog Check	Smog Check Result	HC	CO	NO	HC	CO	NO	HC	CO	NO	HC	CO	NO
1991	Chevy	Corsica LT	210218	$0.00	6/1/2005	F												
1988	Dodge	Colt	184382	$0.00	9/10/2005	F												
1987	Plymouth	Colt Vista	153999	$0.00	6/17/2005	F												
1991	Ford	Escort LX	22038	$0.00	7/2/2004	P												
1983	Ford	Mustang GT	18884	$36.90	2/9/2002	P												
1987	Toyota	MR2	19199	$0.00	2/5/2003	F/P												
1992	Geo	Prizm	163607	$0.00	TX vehicle; no CA data													

High-emitter vehicles (measured by RSD) that failed the Smog Check that were repaired; but had no pre-repair emissions data

							Pre-Repair ASM5015			Post-Repair ASM5015			Pre-Repair ASM2525			Post-Repair ASM2525		
Year	Make	Model	Odometer	Total Cost	Date of Last Smog Check	Smog Check Result	HC	CO	NO	HC	CO	NO	HC	CO	NO	HC	CO	NO
1998	Kia	Sephia	107671	$952.86	2/25/2005	F				8	0.02	60				5	0.01	286
1986	Toyota	Cab & Chassis	90661	$90.15	8/9/2000	P				37	0.05	no data				89	0.29	no data
1993	Jeep	Grand Cherokee	166889	$333.87	9/10/2005	F				31	0.02	no data				23	0	no data
2001	Toyota	Corolla CE	85556	$226.76	No record of any kind					25	0.02	319				10	0	55
1993	Jeep	Grand Cherokee	157350	$796.14	2/28/2003	P				47	0.02	21				35	0.02	12
1996	Toyota	Corolla DX	76164	$357.19	12/2/2003	P				15	0.01	7				7	0	31
1991	Toyota	4Runner SR5	216481	$1,103.74	1/15/2003	P				6	0	no data				28	0	no data
1998	Honda	Civic DX	172481	$596.07	7/15/2003	F/P				23	0.23	111				11	0.11	97
1986	Ford	Aerostar	66959	$62.95	8/8/2002	P				35	0.02	232				14	0.01	165
1989	Cadillac	Eldorado	149918	$320.54	9/9/2003	P				108	0.24	641				77	0.21	408
1999	Ford	Pickup F150	105431	$91.61	3/27/2003	P				61	0.03	79				28	0.01	9

High-emitter vehicles (measured by RSD) that passed Smog Check

							Pre-Repair ASM5015			Post-Repair ASM5015			Pre-Repair ASM2525			Post-Repair ASM2525		
Year	Make	Model	Odometer	Total Cost	Date of Last Smog Check	Smog Check Result	HC	CO	NO	HC	CO	NO	HC	CO	NO	HC	CO	NO
1996	Nissan	Altima GXE	168091	$58.25	9/7/2005	F	41	0.12	356				20	0.08	127	20	0.08	127
1992	Ford	Explorer	41328	$53.25	10/25/2004	P	62	0.19	593				26	0.02	302	26	0.02	302
1983	Toyota	Camry DX	149174	$45.00	1/28/2004	F/P	132	0.09	244				56	0.03	70	56	0.03	70
1994	Ford	Probe GT	129411	$45.00	7/25/2003	F/P	84	0.28	653				32	0.02	71	32	0.02	71
1989	Ford	Bronco II	39958	$53.25	6/5/1999	P	78	0.29	401				27	0.07	21	27	0.07	21
1994	Ford	Explorer	77980	$53.25	3/24/2005	P	23	0.08	84				13	0.01	61	13	0.01	61
1999	Dodge	Dakota	125383	$53.25	9/15/2003	P	51	0.06	136				27	0.02	43	27	0.02	43