

Second Quarter CTTRANSIT

Demonstration and Evaluation of Hybrid Diesel Electric Transit Buses

October, November, December 2003

Report No. CT-170-1884-02-04-1



PROGRAM PARTNERS

CTTRANSIT

Allison Transmission

Horiba Instruments Inc.

New Flyer Bus Industries

University of Connecticut

CDOT Division of Research

The East Coast Hybrid Consortium

CDOT Bureau of Public Transportation

Connecticut Academy of Science and Engineering

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16. Abstract The project goal is to identify the next generation of transit vehicles for future fleet replacement that are cost effective, reliable, produce fewer emissions, and have improved fuel economy compared to the standard heavy-duty diesel powered bus. Data are being collected to produce an estimated life-cycle cost analysis, using emissions information, mileage, fuel economy, power production, brake pad wear, maintenance and repair costs. Bus operator surveys are also being performed. Two 2003 model year 40 ft low floor New Flyer Allison hybrid diesel electric buses were placed into service in June 2003. Performance data collection began on July 1, 2003 on these buses as well as two virtually identical 2002 model year 40 ft low floor New Flyer standard diesel buses. The hybrids and base buses operate in virtually identical conditions on equivalent routes each day.			
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Second Quarter
CTTRANSIT
Demonstration and Evaluation of
Hybrid Diesel Electric Transit Buses

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This project was sponsored by the Connecticut Department of Transportation in Cooperation with the U.S. Department of Transportation, Federal Highway Administration. The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented. The contents do not necessarily reflect the views or policies of the Connecticut Department of Transportation or the U.S. Department of Transportation, Federal Highway Administration. This report does not constitute a standard, specification, or regulation. This is an interim report for this project and the reader should be cautioned that the data has not yet been fully analyzed.

Second Quarter
CTTRANSIT
Demonstration and Evaluation of
Hybrid Diesel Electric Transit Buses
Summary of Activities and Findings

- Two 2003 model year 40' low floor New Flyer Allison hybrid diesel electric buses were placed into revenue service in mid-June. Performance data collection began on July 1st on these buses as well as two virtually identical 2002 model year 40' low floor New Flyer standard diesel buses.
- The test buses were randomly assigned to operate on every route in the system in order to test their capability and versatility in different operating conditions. These routes vary in passenger loads, operating speed and terrain. In order to make the test data as comparable as possible a standard base diesel bus was assigned to "shadow" a hybrid bus on following trips each day. The hybrids and base buses therefore should operate in virtually identical conditions each day.
- Performance data collected included route and driver assigned, noon temperature and weather, miles operated, fuel and oil consumed, road calls, trouble codes, maintenance performed and cost of maintenance and repair.
- To date the new hybrid buses have operated exceptionally well. They have been popular with our customers and our Bus Operators. Formal surveys of each of these groups is scheduled to take place in the next quarter.
- During the first and quarters the hybrids demonstrated better reliability and lower maintenance costs than both the standard fleet average and the standard diesel base comparison buses. In December the hybrids had 6% better fuel economy than their comparison base buses and 37% better fuel economy than the CTTRANSIT overall fleet average.
- The emissions testing component of the test program will begin in the next quarter. It has taken a little longer than expected to get all the emissions testing equipment configured for a mobile environment than was anticipated. We think all the bugs have now been worked out and that we are ready to go with this part of the project.
- The mobile test protocol was finalized this quarter. Three standard bus routes were selected. The E-Farmington Avenue service is our heaviest ridership route and is representative of a common transit route with frequent stops to board and alight passengers. The Enfield express is a high speed park and ride which uses the HOV lanes on the interstate highway and has only one initial pickup and one final destination stop. The Avon Express is a route which traverses a very steep grade over Avon Mountain.
- The Project Manager attended the International Electric Vehicle Symposium in Long Beach, California in mid-November. Over eighty electric, hybrid and fuel cell vehicles were demonstrated at the event. He also made a site visit of the ISE manufacturing plant which is one of the premier integrators of hybrid and fuel cell buses.
- To date we have been very pleased with our two hybrid buses reliability and performance. Although they had two road calls in December we note that they were fuel pump problems on the internal combustion engine and were not hybrid design related. We have had no battery problems at all and historically this area has been the biggest problem with electric drive design vehicles. We continue to be slightly disappointed with the vehicle fuel economy which although it is significantly better than a similar new diesel bus is not as high as we had hoped it would be.

CTTRANSIT DECEMBER, 2003 HYBRID BUS TEST PROGRAM DATA

Total Fleet	Fleet Total	Fleet Avg
Miles	1,013,557.00	2,612.3
Fuel - Gallons	279,622.00	720.7
Oil - Quarts	2,963.00	7.6
Road Calls	327	0.8
Maintenance Parts Cost	\$217,298.17	\$562.95
Maintenance Labor Cost	\$126,254.02	\$327.08
Total Maintenance Cost	\$343,552.19	\$890.03
Total Cost/Mile	\$0.34	\$0.34
Miles/Gallon Fuel	3.62	3.62
Miles/Quart Oil	342.1	342.1
Miles/Road Call	3,099.6	3,099.6



Base Comparison Buses	201	202	201 & 202	Base Avg	Hybrid vs Base
Miles	4,606	4,937	9,543	4,772	-918
Fuel - Gallons	1,006.1	1,038.3	2,044.4	1,022.2	-245.5
Oil - Quarts	3.0	0.4	3.4	1.7	-0.9
Road Calls	0	0	0	0	1.0
Maintenance Parts Cost	\$1,385.99	\$0.00	\$1,385.99	\$693.00	-\$615.29
Maintenance Labor Cost	\$161.05	\$52.08	\$213.13	\$106.57	\$34.89
Total Maintenance Cost	\$1,547.04	\$52.08	\$1,599.12	\$799.56	-\$580.40
Total Cost/Mile	\$0.34	\$0.01	\$0.17	\$0.17	-\$0.11
Miles/Gallon Fuel	4.58	4.75	4.67	4.67	6.29%
Miles/Quart Oil	1,535.33	12,342.50	2,806.76	2,806.76	61.5%
Miles/Road Call	N/A	N/A	N/A	N/A	N/A

Hybrid Buses	H301	H302	H301 & H302	Hybrid Avg	Hybrid vs Fleet
Miles	3,684	4,023	7,707	3,854	1,241
Fuel - Gallons	757.4	796	1553.4	776.7	56.0
Oil - Quarts	1.2	0.5	1.7	0.9	-6.8
Road Calls - Hybrid Related	0	0	0	0	-0.8
Road Calls	1	1	2	1	0.2
Maintenance Parts Cost	\$122.63	\$32.79	\$155.42	\$77.71	-\$485.24
Maintenance Labor Cost	\$150.70	\$132.20	\$282.90	\$141.45	-\$185.63
Total Maintenance Cost	\$273.33	\$164.99	\$438.32	\$219.16	-\$670.87
Total Cost/Mile	\$0.07	\$0.04	\$0.06	\$0.06	-\$0.28
Miles/Gallon Fuel	4.86	5.05	4.96	4.96	36.88%
Miles/Quart Oil	3070.00	8046.00	4533.53	4533.53	92.45%
Miles/Road Call - Hybrid Related	0	0	0	N/A	N/A
Miles/ Road Call Total	3684.0	4023.0	3853.5	3853.5	753.9

CTTRANSIT
H301 and 201 BUS TEST DATA
DECEMBER, 2003

			H301				201								
NOON			RUN NO.	BLOCK #	BADGE #	FUEL	MILES	MPG	RUN NO.	BLOCK#	BADGE #	FUEL	MILES	MPG	% MPG CHANGE
DATE	TEMP.	CONDITIONS													
12/01/03	38	Ptly. Cloudy	Tripper			14.3	64	4.48	Tripper			21.5	108	5.02	-10.90%
12/02/03	34	Ptly. Cloudy	11	L-2	1138	48.1	245	5.09	7	L-1	1165	55.5	254	4.58	11.30%
12/03/03	28	Clear	Tripper			43.7	186	4.26	Tripper			37.6	170	4.52	-5.86%
12/04/03	38	Ptly. Cloudy	Tripper			40.5	174	4.30	Tripper			21.1	97	4.60	-6.54%
12/05/03	24	Cloudy	Tripper			13.5	69	5.11	Tripper			8.9	35	3.93	29.97%
12/06/03	24	Snow							Tripper			25.9	121	4.67	
12/07/03	33	Ptly. Cloudy							Tripper			37.2	182	4.89	
12/08/03	38	Clear	181	Q-2	1228	30.3	133	4.39	24	Q-4	1621	32.1	126	3.93	11.83%
12/09/03	28	Ptly. Cloudy	200	E-3	1346	27.5	124	4.51	201	E-4	1465	33.2	158	4.76	-5.25%
12/10/03	38	Ptly. Cloudy	7	L-1	1165	48.1	246	5.11	11	L-2	1138	54.7	249	4.55	12.35%
12/11/03	55	Rain	Tripper			14.3	83	5.80							
12/12/03	33	Ptly. Cloudy	Tripper			25.7	122	4.75	Tripper			42.6	211	4.95	-4.16%
12/13/03	30	Ptly. Cloudy							Tripper			18.3	89	4.86	
12/14/03	28	Light Snow							Tripper			59.4	288	4.85	
12/15/03	33	Ptly. Cloudy	Tripper			18.7	95	5.08	Tripper			1.8	8	4.44	14.30%
12/16/03	37	Clear	Tripper			10	43	4.30	Tripper			14	59	4.21	2.03%
12/17/03	47	Rain	Tripper			34.4	147	4.27	Tripper			32.8	133	4.05	5.39%
12/18/03	38	Clear							Tripper			12.2	62	5.08	
12/19/03	37	Ptly. Cloudy	11	L-2	1138	43.8	239	5.46	7	L-1	1165	53.2	252	4.74	15.20%
12/20/03	33	Ptly. Cloudy	117	X-1	1767	50.1	270	5.39	118	X-2	1530	31.2	153	4.90	9.90%
12/21/03	32	Clear	827	KT-3	1759	25.7	116	4.51	825	KT-2	1731	33.4	134	4.01	12.50%
12/22/03	51	Ptly. Cloudy	Tripper			27.7	132	4.77	Tripper			42	200	4.76	0.07%
12/23/03	50	Cloudy	127	YM-1	1635	30.2	165	5.46	18	YM-2	1321	55	267	4.85	12.55%
12/24/03	56	Rain	23	Q-1	1666	31	142	4.58	204	Q-3	1511	32.5	123	3.78	21.03%
12/25/03	42	Cloudy	420	E-1	1036	18.2	85	4.67	406	E-2	1329	33.8	173	5.12	-8.75%
12/26/03	36	Cloudy	Tripper			49.4	248	5.02	Tripper			12.2	47	3.85	30.31%
12/27/03	41	Ptly. Cloudy	114	L-1	1165	46.9	244	5.20	115	L-2	1414	52.7	263	4.99	4.25%
12/28/03	43	Clear							Tripper			40.6	200	4.93	
12/29/03	51	Ptly. Cloudy	Tripper			16.4	88	5.37	Tripper			47.6	179	3.76	42.69%
12/30/03	51	Ptly. Cloudy	820	K-4	1694	24.1	100	4.15	142	K-2	1752	30.8	106	3.44	20.57%
12/31/03	45	Ptly. Cloudy	200	E-3	1346	24.8	124	5.00	201	E-4	1465	32.3	159	4.92	1.57%
Totals						757.4	3,684	4.86				1,006.1	4,606	4.58	6.25%

CCTSTRANSIT
H302 and 202 BUS TEST DATA
DECEMBER, 2003

			H302				202								
NOON			RUN NO.	BLOCK #	BADGE #	FUEL	MILES	MPG	RUN NO.	BLOCK#	BADGE #	FUEL	MILES	MPG	% MPG CHANGE
DATE	TEMP.	CONDITIONS													
12/01/03	38	Ptly. Cloudy	Tripper			23.1	113	4.89	Tripper			56.5	249	4.41	11.00%
12/02/03	34	Ptly. Cloudy	Tripper			15.8	86	5.44	Tripper			57.9	307	5.30	2.66%
12/03/03	28	Clear							127	YM-1	1691	35.8	183	5.11	
12/04/03	38	Ptly. Cloudy							Tripper			24.6	118	4.80	
12/05/03	24	Cloudy							Tripper			53	220	4.15	
12/06/03	24	Snow							Tripper			29.9	125	4.18	
12/07/03	33	Ptly. Cloudy							Tripper			33.3	201	6.04	
12/08/03	38	Clear	Tripper			46.3	216	4.67	Tripper			41	172	4.20	11.21%
12/09/03	28	Ptly. Cloudy	206	U-3	1478	45	212	4.71	12	U-1		39	167	4.28	10.02%
12/10/03	38	Ptly. Cloudy							Tripper			36.4	181	4.97	
12/11/03	55	Rain	36	Bx-535	1693	50.4	290	5.75	22	X-2	1089	51.2	267	5.21	10.34%
12/12/03	33	Ptly. Cloudy	Tripper			32.3	176	5.45							
12/13/03	30	Ptly. Cloudy	Tripper			37.4	176	4.71	Tripper			47.8	211	4.41	6.61%
12/14/03	28	Light Snow													
12/15/03	33	Ptly. Cloudy	Tripper			43.2	208	4.81							
12/16/03	37	Clear	127	YM-1	1691	30.9	175	5.66	18	YM-2	1321	45.1	219	4.86	16.63%
12/17/03	47	Rain	12	U-1	822	31.7	162	5.11	206	U-3	1429	53.1	264	4.97	2.79%
12/18/03	38	Clear	Tripper			71.3	386	5.41	Tripper			31.9	162	5.08	6.60%
12/19/03	37	Ptly. Cloudy							22	X-2	1089	52.2	276	5.29	
12/20/03	33	Ptly. Cloudy	809	Bx-519	1769	53.5	269	5.03	166	Bx-507	1751	42.5	179	4.21	19.38%
12/21/03	32	Clear	814	E-2	1685	39.8	167	4.20	819	E-1	1670	28	119	4.25	-1.27%
12/22/03	51	Ptly. Cloudy	Tripper			10.6	45	4.25	Tripper			15	76	5.07	-16.21%
12/23/03	50	Cloudy	10	F2-4	1130	30.6	166	5.42	14	F2-1	1035	48.8	203	4.16	30.41%
12/24/03	56	Rain	198	E-8	1455	31.2	146	4.68	120	E-13	1439	38.6	181	4.69	-0.21%
12/25/03	42	Cloudy	Tripper			26	137	5.27				10.5	46	4.38	20.28%
12/26/03	36	Cloudy	Tripper			26.7	117	4.38				12.6	57	4.52	-3.13%
12/27/03	41	Ptly. Cloudy	118	X-2	1530	42.5	243	5.72	117	X-1	1565	47.2	243	5.15	11.06%
12/28/03	43	Clear	813	TN-1	1755	32.7	163	4.98	176	TN-2	1620	35.2	161	4.57	8.98%
12/29/03	51	Ptly. Cloudy	Tripper			37.8	168	4.44	Tripper			19.7	91	4.62	-3.79%
12/30/03	51	Ptly. Cloudy	Tripper			9.5	44	4.63				51.5	259	5.03	-7.90%
12/31/03	45	Ptly. Cloudy	Tripper			27.7	158	5.70							
Totals						796.0	4,023	5.05				1,038.3	4,937	4.75	6.29%

CTTRANSIT NOVEMBER, 2003 HYBRID BUS TEST PROGRAM DATA

Total Fleet	Fleet Total	Fleet Avg
Miles	933,083.00	2,374.3
Fuel - Gallons	254,888.00	648.6
Oil - Quarts	2,637.00	6.7
Road Calls	198	0.5
Maintenance Parts Cost	\$258,567.98	\$669.87
Maintenance Labor Cost	\$121,226.00	\$314.06
Total Maintenance Cost	\$379,793.98	\$983.92
Total Cost/Mile	\$0.41	\$0.41
Miles/Gallon Fuel	3.7	3.7
Miles/Quart Oil	353.8	353.8
Miles/Road Call	4,713	4,713



Base Comparison Buses	201	202	201 & 202	Base Avg	Hybrid vs Base
Miles	4,051	4,441	8,492	4,246	-1975.5
Fuel - Gallons	900.6	1,014.2	1,914.8	957.4	-494.85
Oil - Quarts	6.2	0.0	6.2	3.1	-3.1
Road Calls	0	0	0	0	0.5
Maintenance Parts Cost	\$172.21	\$341.27	\$513.48	\$256.74	-\$254.91
Maintenance Labor Cost	\$165.53	\$339.68	\$505.21	\$252.61	-\$100.15
Total Maintenance Cost	\$337.74	\$680.95	\$1,018.69	\$509.35	-\$355.06
Total Cost/Mile	\$0.08	\$0.15	\$0.12	\$0.12	-\$0.05
Miles/Gallon Fuel	4.50	4.38	4.43	4.43	10.68%
Miles/Quart Oil	653.39	#DIV/0!	1369.68	1369.68	N/A
Miles/Road Call	N/A	N/A	N/A	N/A	N/A

Hybrid Buses	H301	H302	H301 & H302	Hybrid Avg	Hybrid vs Fleet
Miles	2,020	2,521	4,541	2,271	-104
Fuel - Gallons	409.5	515.6	925.1	462.55	-186.0
Oil - Quarts	0.0	0.0	0.0	0.0	-6.7
Road Calls - Hybrid Related	0	1	1	0.5	0.0
Road Calls	0	0	0	0	-0.5
Maintenance Parts Cost	\$0.00	\$3.66	\$3.66	\$1.83	-\$668.04
Maintenance Labor Cost	\$61.86	\$243.06	\$304.92	\$152.46	-\$161.60
Total Maintenance Cost	\$61.86	\$246.72	\$308.58	\$154.29	-\$829.63
Total Cost/Mile	\$0.03	\$0.10	\$0.07	\$0.07	-\$0.35
Miles/Gallon Fuel	4.93	4.89	4.91	4.91	34.09%
Miles/Quart Oil	N/A	N/A	N/A	N/A	N/A
Miles/Road Call - Hybrid Related	N/A	2521	4541	4541	-171.5
Miles/ Road Call Total	N/A	2521	4541	4541	-171.5

CTTRANSIT
H301 and 201 BUS TEST DATA
NOVEMBER, 2003

			H301					201							
NOON			RUN NO.	BLOCK #	BADGE #	FUEL	MILES	MPG	RUN NO.	BLOCK#	BADGE #	FUEL	MILES	MPG	% MPG CHANGE
DATE	TEMP.	CONDITIONS													
11/01/03	73	Clear	137	F1-1	Tripper	29.3	133	4.54							
11/02/03	59	Cloudy													
11/03/03	74	Ptly. Cloudy	12	T-2	Tripper	25.2	115	4.56	30	T-4	Tripper	17.4	96	5.52	-17.29%
11/04/03	51	Light Rain	118	X-1	Tripper	44.4	256	5.77	119	X-2	Tripper	13.5	55	4.07	41.52%
11/05/03	47	Drizzle	Tripper	Tripper	Tripper	23	128	5.57			Tripper	50.6	182	3.60	54.73%
11/06/03	52	Ptly. Cloudy							28	U-1	822	37.3	169	4.53	
11/07/03	53	Ptly. Cloudy							199	E-13	1511	39.4	176	4.47	
11/08/03	36	Clear	118	X-1	Tripper	43.7	190	4.35							
11/09/03	36	Clear	819	KT-2	Tripper	29.5	128	4.34							
11/10/03	41	Ptly. Cloudy							200	E-16	Tripper	23.6	96	4.07	
11/11/03	40	Cloudy							12	T-2	Tripper	17.4	92	5.29	
11/12/03	50	Cloudy							99	E-4	Tripper	50.8	222	4.37	
11/13/03	55	Ptly. Cloudy							24	Q-4	Tripper	34.9	144	4.13	
11/14/03	40	Ptly. Cloudy							125	N-1	Tripper	51.1	258	5.05	
11/15/03	47	Ptly. Cloudy							118	X-1	Tripper	53.2	252	4.74	
11/16/03	41	Clear							806	KT-3	Tripper	33.2	194	5.84	
11/17/03	41	Ptly. Cloudy	28	U-1	Tripper	13.5	50	3.70	115	U-2	Tripper	42.8	202	4.72	-21.53%
11/18/03	51	Ptly. Cloudy	99	E-4	1465	28.1	157	5.59	141	E-1	1346	29.7	129	4.34	28.64%
11/19/03	55	Rain							Tripper	Tripper	Tripper	40.6	174	4.29	
11/20/03	55	Cloudy							12	T-2	Tripper	40.5	196	4.84	
11/21/03	56	Clear	201	E-4	Tripper	22.4	97	4.33	200	E3	Tripper	50.9	215	4.22	2.52%
11/22/03	57	Clear	171	Q-3	1614	31.9	171	5.36	815	Q-4	1558	34.3	121	3.53	51.95%
11/23/03	57	Clear	815	L-2	1558	27.9	164	5.88	817	L-1	1772	39	200	5.13	14.62%
11/24/03	46	Clear	19	Bx-540	Tripper	21.1	90	4.27	26	Bx-550	1369	36.5	144	3.95	8.12%
11/25/03	42	Ptly. Cloudy	119	X-2	Tripper	35	146	4.17	118	X-1	Tripper	23.9	115	4.81	-13.31%
11/26/03	42	Clear							18	YM-2	1321	46.8	235	5.02	
11/27/03	45	Clear	36	Bx-535	Tripper	34.5	195	5.65							
11/28/03	52	Light Rain							175	Bx-538	1658	31.7	145	4.57	
11/29/03	41	Cloudy							Tripper	Tripper	Tripper	32	128	4.00	
11/30/03	46	Clear							Tripper	Tripper	Tripper	29.5	111	3.76	
Totals						409.5	2,020	4.93				900.6	4,051	4.50	9.66%

CTTRANSIT
H302 and 202 BUS TEST DATA
NOVEMBER, 2003

			H302					202							
NOON			RUN NO.	BLOCK #	BADGE #	FUEL	MILES	MPG	RUN NO.	BLOCK#	BADGE #	FUEL	MILES	MPG	% MPG CHANGE
DATE	TEMP.	CONDITIONS													
11/01/03	73	Clear	127	YM-1	1760	36.4	195	5.36	123	YM-2	1437	35.1	179	5.10	5.05%
11/02/03	59	Cloudy							824	E-2	Tripper	38.4	145	3.78	
11/03/03	74	Ptly. Cloudy							36	BX 535 X/C	Tripper	46	205	4.46	
11/04/03	51	Light Rain							29	BX506 N/L	Tripper	37.8	139	3.68	
11/05/03	47	Drizzle							10	F2-4	Tripper	68	361	5.31	
11/06/03	52	Ptly. Cloudy							204	K-1	Tripper	40.7	190	4.67	
11/07/03	53	Ptly. Cloudy	208	F1-1	Tripper	13.4	50	3.73	13	F1-2	Tripper	50.9	181	3.56	4.93%
11/08/03	36	Clear													
11/09/03	36	Clear													
11/10/03	41	Ptly. Cloudy	22	X-2	Tripper	16.4	82	5.00	36	BX 535 X/O		31.1	104	3.34	49.52%
11/11/03	40	Cloudy	10	F2-4	Tripper	36.1	146	4.04	14	F2-1	Tripper	16.8	59	3.51	15.16%
11/12/03	50	Cloudy	36	BX 535 X/C	Tripper	15	73	4.87	22	X-2	Tripper	16.5	79	4.79	1.65%
11/13/03	55	Ptly. Cloudy	23	Q-1	Tripper	31.9	141	4.42	201	Q-2	Tripper	36.4	131	3.60	22.82%
11/14/03	40	Ptly. Cloudy							204	K-1	Tripper	47.6	180	3.78	
11/15/03	47	Ptly. Cloudy			Tripper	5.9	30	5.08				49.8	270	5.42	-6.21%
11/16/03	41	Clear										36.1	192	5.32	
11/17/03	41	Ptly. Cloudy							175	531 U/BD	Tripper	40.6	197	4.85	
11/18/03	51	Ptly. Cloudy	123	YM-2	Tripper	4.9	19	3.88	127	YM-1	Tripper	51.3	213	4.15	-6.61%
11/19/03	55	Rain	18	YM-2	1691	38.4	228	5.94	127	YM-1	Tripper	37.2	182	4.89	21.36%
11/20/03	55	Cloudy	23	Q-1	1349	30.9	142	4.60	181	Q-2	1228	36.5	127	3.48	32.07%
11/21/03	56	Clear	10	F2-4	Tripper	35.1	146	4.16	14	F2-1	Tripper	48.6	204	4.20	-0.90%
11/22/03	57	Clear	127	F1-2	1691	38.6	186	4.82	137	F1-1	1642	34.1	137	4.02	19.94%
11/23/03	57	Clear	810	X-1	1750	30.1	163	5.42	820	X-2	1694	34.4	174	5.06	7.06%
11/24/03	46	Clear	14	F2-1	1035	40.3	198	4.91	10	F2-4	1135	35.2	151	4.29	14.53%
11/25/03	42	Ptly. Cloudy	18	YM-2	1321	43.1	229	5.31	127	YM-1	1691	41.3	181	4.38	21.24%
11/26/03	42	Clear	820	E-1	Tripper	13.9	70	5.04	824	E-2	Tripper	31.3	150	4.79	5.08%
11/27/03	45	Clear													
11/28/03	52	Light Rain	824	E-2	Tripper	33.1	178	5.38	820	E-1	Tripper	10.8	45	4.17	29.06%
11/29/03	41	Cloudy	22	X-2	Tripper	23.8	116	4.87	36	BX 535 X/C	Tripper	32.6	145	4.45	9.58%
11/30/03	46	Clear	825	KT-2	1731	28.3	129	4.56	827	KT-3	1759	29.1	120	4.12	10.54%
Totals						515.6	2,521	4.89				1,014.2	4,441	4.38	11.66%

CTTRANSIT OCTOBER, 2003 HYBRID BUS TEST PROGRAM DATA

Total Fleet	Fleet Total	Fleet Avg
Miles	1,093,592.00	2,818.5
Fuel - Gallons	294,502.00	759.0
Oil - Quarts	2,918.00	7.5
Road Calls	214	0.6
Maintenance Parts Cost	\$331,353.88	\$843.14
Maintenance Labor Cost	\$161,809.69	\$411.73
Total Maintenance Cost	\$493,163.57	\$1,254.87
Total Cost/Mile	\$0.45	\$0.45
Miles/Gallon Fuel	3.7	3.7
Miles/Quart Oil	374.8	374.8
Miles/Road Call	5,110.2	5,110.2



Base Comparison Buses	201	202	201 & 202	Base Avg	Hybrid vs Base
Miles	4,576	4,064	8,640	4,320	-400
Fuel - Gallons	1,015.0	953.4	1,968.4	984.2	-212.15
Oil - Quarts	19.2	10.2	29.4	14.7	-7.7
Road Calls	0	0	0	0	0.0
Maintenance Parts Cost	\$23.45	\$437.24	\$460.69	\$230.35	\$1,109.10
Maintenance Labor Cost	\$110.42	\$638.96	\$749.38	\$374.69	-\$232.60
Total Maintenance Cost	\$133.87	\$1,076.20	\$1,210.07	\$605.04	\$876.50
Total Cost/Mile	\$0.03	\$0.26	\$0.14	\$0.14	\$0.24
Miles/Gallon Fuel	4.51	4.26	4.39	4.39	15.68%
Miles/Quart Oil	238.33	398.43	293.88	293.88	90.6%
Miles/Road Call	N/A	N/A	N/A	N/A	N/A

Hybrid Buses	H301	H302	H301 & H302	Hybrid Avg	Hybrid vs Fleet
Miles	3,288	4,552	7,840	3,920	1,101
Fuel - Gallons	633.3	910.8	1544.1	772.05	13.0
Oil - Quarts	2.8	11.2	14.0	7.0	-0.5
Road Calls - Hybrid Related	0	0	0	0	-0.6
Road Calls	0	0	0	0	-0.6
Maintenance Parts Cost	\$2,615.48	\$63.40	\$2,678.88	\$1,339.44	\$496.30
Maintenance Labor Cost	\$106.33	\$177.86	\$284.19	\$142.10	-\$269.63
Total Maintenance Cost	\$2,721.81	\$241.26	\$2,963.07	\$1,481.54	\$226.67
Total Cost/Mile	\$0.83	\$0.05	\$0.38	\$0.38	-\$0.07
Miles/Gallon Fuel	5.19	5.00	5.08	5.08	36.73%
Miles/Quart Oil	1174.29	406.43	560.00	560.00	33.08%
Miles/Road Call - Hybrid Related	0	0	0	N/A	N/A
Miles/ Road Call Total	0	0	0	N/A	N/A

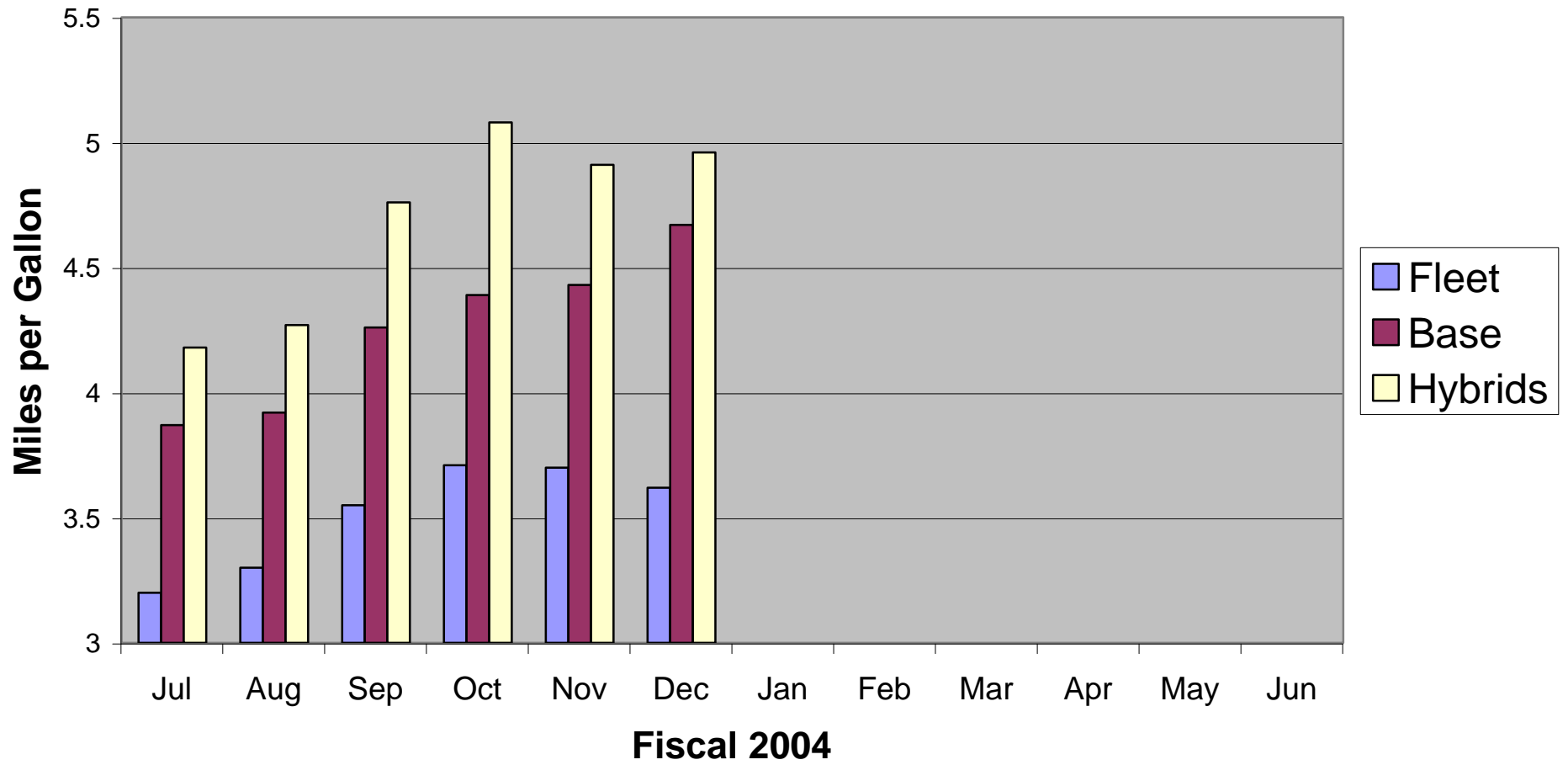
CTTRANSIT
H301 and 201 BUS TEST DATA
OCTOBER, 2003

			H301					201							
NOON			RUN NO.	BLOCK #	BADGE #	FUEL	MILES	MPG	RUN NO.	BLOCK#	BADGE #	FUEL	MILES	MPG	% MPG CHANGE
DATE	TEMP.	CONDITIONS													
10/01/03	64	Clear	11	L-2	1165	46.9	243	5.18	7	L-1	1681	49.4	261	5.28	-1.93%
10/02/03	58	Clear	19	N-2	1645	31.8	179	5.63	125	N-1	1427	32.9	152	4.62	21.84%
10/03/03	51	Clear	12	T-2	Hold	16.1	72	4.47	30	T-4		32.9	169	5.14	-12.94%
10/04/03	53	Cloudy	118	X-1	1666	43.9	252	5.74	119	X-2	1316	51.2	273	5.33	7.66%
10/05/03	63	Clear	819	KT-2	1631	27.6	129	4.67	806	KT-3	1658	27.1	120	4.43	5.55%
10/06/03	54	Clear	115	U-2	Tripper	30.7	137	4.46	28	U-1		39.2	164	4.18	6.67%
10/07/03	55	Clear	200	E-16	1465	38	191	5.03	199	E-13	1635	40.5	176	4.35	15.66%
10/08/03	66	Clear	15	T-3	1080	32.3	145	4.49	12	T-2	994	35.4	135	3.81	17.72%
10/09/03	71	Clear	141	E-1	1746	27.9	139	4.98	99	E-4	1392	37.8	179	4.74	5.21%
10/10/03	67	Ptly Cloudy	199	E-13	Tripper	24.5	112	4.57	200	E-16		54.2	209	3.86	18.55%
10/11/03	71	Ptly Cloudy													
10/12/03	61	Rain													
10/13/03	67	Clear							24	Q-4		14.1	59	4.18	
10/14/03	64	Ptly Cloudy							125	N-1		23.2	117	5.04	
10/15/03	60	Ptly Cloudy							115	U-2		13.3	65	4.89	
10/16/03	61	Clear							141	E-1		46.2	174	3.77	
10/17/03	53	Ptly Cloudy										46.5	215	4.62	
10/18/03	58	Clear							119	X-2		52.8	275	5.21	
10/19/03	61	Light Rain							819	KT-2		32.9	135	4.10	
10/20/03	53	Clear							12	T-2		37.2	170	4.57	
10/21/03	67	Ptly Cloudy	99	E-4	Hold	19.8	94	4.75	141	E-1		37.2	187	5.03	-5.56%
10/22/03	43	Cloudy							110	Q-3	1569	31.5	124	3.94	
10/23/03	40	Cloudy	11	L-2		45.1	242	5.37	Hold						
10/24/03	42	Ptly Cloudy	19	N-2	1645	32.6	179	5.49	125	N-1	1427	30.2	150	4.97	10.55%
10/25/03	56	Clear	119	X-2	1316	45.1	263	5.83	118	X-1	1439	49	243	4.96	17.59%
10/26/03	61	Light Rain	819	KT-2	1631	26.5	128	4.83	806	KT-3	1658	26.7	118	4.42	9.29%
10/27/03	63	Rain	36	Bx-535	1693	54.9	306	5.57	22	X-2	1089	53.9	190	3.53	
10/28/03	63	Ptly Cloudy	199	E-13		45.4	252	5.55	200	E-16		16.3	81	4.97	11.70%
10/29/03	54	Cloudy	24	Q-4	1621	26.6	126	4.74	110	Q-3	1306	34.5	127	3.68	28.68%
10/30/03	56	Clear							115	U-2		50.6	230	4.55	
10/31/03	64	Ptly Cloudy	141	E-1	Tripper	17.6	99	5.63	99	E-4		17.9	78	4.36	29.09%
Totals						633.3	3,288	5.19				1,015	4,576	4.51	15.11%

CTTRANSIT
H302 and 202 BUS TEST DATA
OCTOBER, 2003

			H302					202							
NOON			RUN NO.	BLOCK #	BADGE #	FUEL	MILES	MPG	RUN NO.	BLOCK#	BADGE #	FUEL	MILES	MPG	% MPG CHANGE
DATE	TEMP.	CONDITIONS													
10/01/03	64	Clear	141	E-1		30.2	165	5.46	99	E-4		22.7	103	4.54	20.41%
10/02/03	58	Clear	14	F2-1	1035	38.1	173	4.54	10	F2-4	1135	20.8	100	4.81	-5.55%
10/03/03	51	Clear							36	BX 535 X/0		34.5	146	4.23	-100.00%
10/04/03	53	Cloudy							123	YM-2		34.9	179	5.13	-100.00%
10/05/03	63	Clear	820	E-1		11.3	53	4.69	Hold						
10/06/03	54	Clear	142	K-2	1550	26	102	3.92	204	K-1	1515	33.3	120	3.60	8.87%
10/07/03	55	Clear	208	F1-1	1456	39.3	176	4.48	13	F1-2	1130	46.5	159	3.42	30.97%
10/08/03	66	Clear	175	531 U/BDL/N		24.9	129	5.18	29	BX506 N/U		44	165	3.75	38.15%
10/09/03	71	Clear	14	F2-1	1035	38.5	175	4.55	10	F2-4	1135	37.8	137	3.62	25.41%
10/10/03	67	Ptly Cloudy	22	X-2	1089	45.3	248	5.47	36	BX 535 X/0	1693	43.3	204	4.71	16.20%
10/11/03	71	Ptly Cloudy	127	YM-1	1667	39	201	5.15	123	YM-2	1437	18.2	75	4.12	25.07%
10/12/03	61	Rain	820	E-1	1749	28.8	141	4.90	824	E-2	1762	5.5	25	4.55	7.71%
10/13/03	67	Clear	23	Q-1	1349	38.9	219	5.63	Hold						
10/14/03	64	Ptly Cloudy	36	BX 535 X/0		26.3	137	5.21	22	X-2		14.3	70	4.90	6.41%
10/15/03	60	Ptly Cloudy	142	K-2		12.8	55	4.30	204	K-1		29.3	130	4.44	-3.16%
10/16/03	61	Clear	10	F2-4	1135	26.1	147	5.63	14	F2-1	1035	47.1	221	4.69	20.03%
10/17/03	53	Ptly Cloudy	29	BX506 N/U	982	35.1	180	5.13	175	531 U/BD	1770	38	175	4.61	11.36%
10/18/03	58	Clear	123	YM-2	1437	28.9	153	5.29	127	YM-1	1435	44.9	202	4.50	17.68%
10/19/03	61	Light Rain	824	E-2	1762	31	146	4.71	820	E-1	1749	31.4	145	4.62	1.99%
10/20/03	53	Clear	23	Q-1		31.3	139	4.44	201	Q-2		35.3	152	4.31	3.13%
10/21/03	67	Ptly Cloudy	10	F2-4		37.8	145	3.84	14	F2-1		31.5	122	3.87	-0.96%
10/22/03	43	Cloudy	13	F1-2	1130	27.4	153	5.58	208	F1-1	1456	48.7	182	3.74	49.42%
10/23/03	40	Cloudy	22	X-2		34.4	173	5.03	36	BX 535 X/0		24.8	99	3.99	25.98%
10/24/03	42	Ptly Cloudy	14	F2-1		35.9	174	4.85	10	F2-4		30.2	102	3.38	43.50%
10/25/03	56	Clear	123	YM-2	1437	32.7	173	5.29	127	YM-1	1288	27.5	146	5.31	-0.35%
10/26/03	61	Light Rain	820	E-1	1749	28.7	141	4.91	824	E-2	1762	36.1	141	3.91	25.78%
10/27/03	63	Rain	123	YM-2		17.7	94	5.31	127	YM-1		43.7	182	4.16	27.52%
10/28/03	63	Ptly Cloudy	824	E-2		57.9	275	4.75	820	E-1		14.5	50	3.45	37.74%
10/29/03	54	Cloudy	22	X-2	1089	45.4	266	5.86	36	BX 535 X/0	1693	26.9	125	4.65	26.09%
10/30/03	56	Clear	23	Q-1		37.1	200	5.39	201	Q-2		46.9	223	4.75	13.38%
10/31/03	64	Ptly Cloudy	175	531 U/BDL/N		4	19	4.75	29	BX506 N/U		40.8	184	4.51	5.33%
Totals						910.8	4,552	5.00				953.4	4,064	4.26	17.25%

CTTRANSIT BUS FUEL ECONOMY



Bus Type	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Fleet	3.2	3.3	3.55	3.71	3.7	3.62	0	0	0	0	0	0
Base	3.87	3.92	4.26	4.39	4.43	4.67	0	0	0	0	0	0
Hybrids	4.18	4.27	4.76	5.08	4.91	4.96	0	0	0	0	0	0



FLEET MILES & MILES PER GALLON
DECEMBER, 2003

HARTFORD DIVISION

<u>Make & Series</u>	<u>No.</u>	<u>Current Month</u>			<u>Prior Year Month</u>			<u>Difference</u>		
		<u>Miles</u>	<u>Gallons</u>	<u>MPG</u>	<u>Miles</u>	<u>Gallons</u>	<u>MPG</u>	<u>Miles</u>	<u>Gallons</u>	<u>MPG</u>
NFI S-40 201-240	40	170,479	37,632	4.53	163,331	35,364	4.62	7,148	2,268	-0.09
NOVA 1121 9637-9649	10	34,442	8,591	4.01	40,291	10,363	3.89	-5,849	-1,772	0.12
MCI 911-915 & 9001-9200	77	138,971	41,329	3.36	186,279	55,435	3.36	-47,308	-14,106	0.00
NFI 6V92 9301-9338	38	92,459	30,264	3.06	86,612	28,566	3.03	5,847	1,698	0.02
NFI S-50 9339-9340 & 9401-9428	30	78,462	19,064	4.12	65,121	16,252	4.01	13,341	2,812	0.11
NFI S-50 941-965	25	52,037	10,006	5.20	59,679	10,843	5.50	-7,642	-837	-0.30
NFI Hybrid H301 & H302	2	7,665	1,557	4.92	N/A	N/A	N/A	N/A	N/A	N/A
MCI Commuter 303-309	7	21,139	4,651	4.55	N/A	N/A	N/A	N/A	N/A	N/A
<u>Hartford Totals</u>	229	595,654	153,094	3.89	601,313	156,823	3.83	-34,463	-9,937	0.06

NEW HAVEN DIVISION

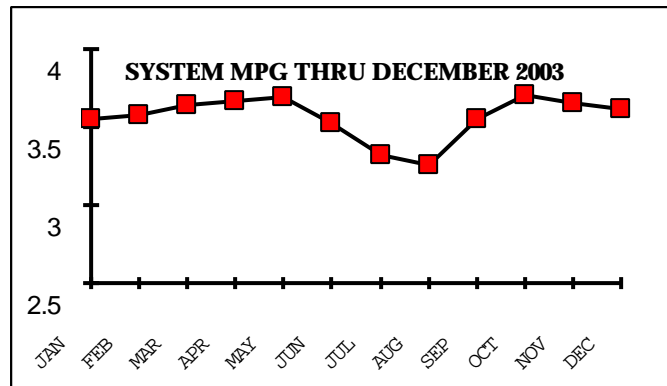
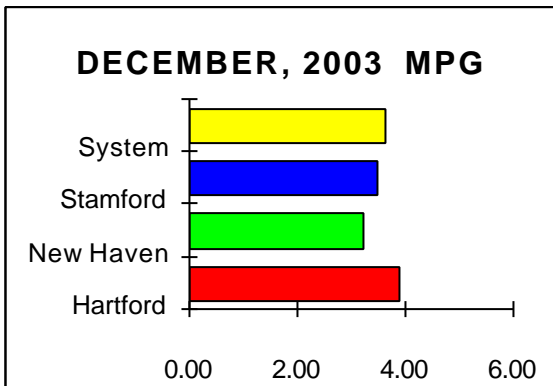
<u>Make</u>	<u>No.</u>	<u>Current Month</u>			<u>Prior Year Month</u>			<u>Difference</u>		
		<u>Miles</u>	<u>Gallons</u>	<u>MPG</u>	<u>Miles</u>	<u>Gallons</u>	<u>MPG</u>	<u>Miles</u>	<u>Gallons</u>	<u>MPG</u>
NOVA 1121 9601-9623	23	69,794	20,166	3.46	73,576	20,857	3.53	-3,782	-691	-0.07
ElDorado 9901-9903	3	1,954	645	3.03	3,233	1,246	2.59	-1,279	-601	0.43
MCI 9101 - 9186	84	219,029	69,117	3.17	211,444	67,547	3.13	7,585	1,570	0.04
<u>New Haven Totals</u>	110	290,777	89,928	3.23	288,253	89,650	3.22	2,524	278	0.02

STAMFORD DIVISION

<u>Make</u>	<u>No.</u>	<u>Current Month</u>			<u>Prior Year Month</u>			<u>Difference</u>		
		<u>Miles</u>	<u>Gallons</u>	<u>MPG</u>	<u>Miles</u>	<u>Gallons</u>	<u>MPG</u>	<u>Miles</u>	<u>Gallons</u>	<u>MPG</u>
NOVA 1121 9626-9636	14	30,974	10,010	3.09	27,873	8,738	3.19	3,101	1,272	-0.10
ElDorado 9904-9913	10	10,487	4,013	2.61	8,146	3,440	2.37	2,341	573	0.25
NFI S-40 101-126	26	63,999	17,787	3.60	69,035	18,710	3.69	-5,036	-923	-0.09
NFI S-40 127-132	6	21,666	4,790	4.52	21,892	4,687	4.67	-226	103	-0.15
<u>Stamford Totals</u>	56	127,126	36,600	3.47	126,946	35,575	3.57	3,101	1,272	-0.10

SYSTEM

<u>Make</u>	<u>No.</u>	<u>Current Month</u>			<u>Prior Year Month</u>			<u>Difference</u>		
		<u>Miles</u>	<u>Gallons</u>	<u>MPG</u>	<u>Miles</u>	<u>Gallons</u>	<u>MPG</u>	<u>Miles</u>	<u>Gallons</u>	<u>MPG</u>
<u>All buses</u>	395	1,013,557	279,622	3.62	1,016,512	282,048	3.60	-2,955	-2,426	0.02





**FLEET MILES & MILES PER GALLON
NOVEMBER, 2003**

HARTFORD DIVISION

Make & Series	No.	Current Month			Prior Year Month			Difference		
		Miles	Gallons	MPG	Miles	Gallons	MPG	Miles	Gallons	MPG
NFI S-40 201-240	40	162,778	36,586	4.45	112,247	23,964	4.68	50,531	12,622	-0.23
NOVA 1121 9637-9649	10	31,510	8,085	3.90	36,168	9,305	3.89	-4,658	-1,220	0.01
MCI 911-915 & 9001-9200	77	119,544	35,461	3.37	203,136	59,970	3.39	-83,592	-24,509	-0.02
NFI 6V92 9301-9338	38	84,146	27,341	3.08	93,104	29,522	3.15	-8,958	-2,181	-0.08
NFI S-50 9339-9340 & 9401-9428	30	68,180	16,437	4.15	69,075	16,022	4.31	-895	415	-0.16
NFI S-50 941-965	25	44,941	8,600	5.23	58,610	10,841	5.41	-13,669	-2,241	-0.18
NFI Hybrid H301 & H302	2	4,496	927	4.85	N/A	N/A	N/A	N/A	N/A	N/A
MCI Commuter 303-309	7	18,058	3,957	4.56	N/A	N/A	N/A	N/A	N/A	N/A
Hartford Totals	229	533,653	137,394	3.88	572,340	149,624	3.83	-61,241	-17,114	0.06

NEW HAVEN DIVISION

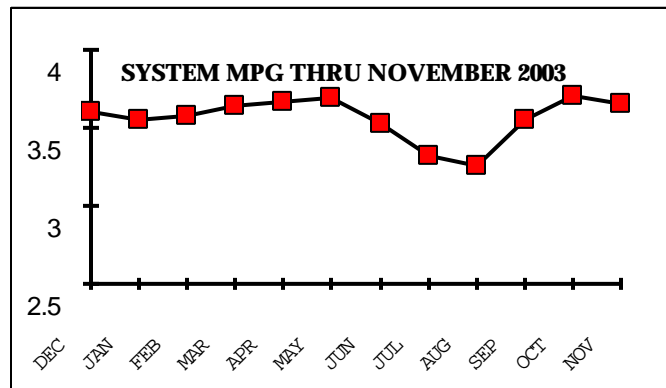
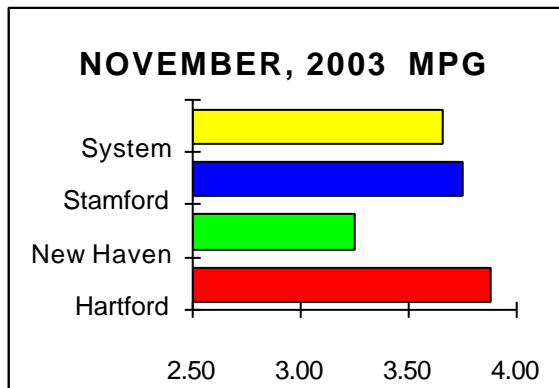
Make	No.	Current Month			Prior Year Month			Difference		
		Miles	Gallons	MPG	Miles	Gallons	MPG	Miles	Gallons	MPG
NOVA 1121 9601-9623	23	67,029	18,934	3.54	71,325	19,781	3.61	-4,296	-847	-0.07
EIDorado 9901-9903	3	1,256	525	2.39	2,678	1,039	2.58	-1,422	-514	-0.19
MCI 9101 - 9186	84	197,287	62,362	3.16	213,145	66,485	3.21	-15,858	-4,123	-0.04
New Haven Totals	110	265,572	81,821	3.25	287,148	87,305	3.29	-21,576	-5,484	-0.04

STAMFORD DIVISION

Make	No.	Current Month			Prior Year Month			Difference		
		Miles	Gallons	MPG	Miles	Gallons	MPG	Miles	Gallons	MPG
NOVA 1121 9626-9636	14	26,249	8,478	3.10	35,584	9,495	3.75	-9,335	-1,017	-0.65
EIDorado 9904-9913	10	10,004	3,120	3.21	7,721	2,575	3.00	2,283	545	0.21
NFI S-40 101-126	26	73,365	18,811	3.90	70,074	18,447	3.80	3,291	364	0.10
NFI S-40 127-132	6	24,240	5,264	4.60	22,354	4,849	4.61	1,886	415	-0.01
Stamford Totals	56	133,858	35,673	3.75	135,733	35,366	3.84	-9,335	-1,017	-0.09

SYSTEM

Make	No.	Current Month			Prior Year Month			Difference		
		Miles	Gallons	MPG	Miles	Gallons	MPG	Miles	Gallons	MPG
All buses	395	933,083	254,888	3.66	995,221	272,295	3.65	-62,138	-17,407	0.01





FLEET MILES & MILES PER GALLON
OCTOBER, 2003

HARTFORD DIVISION

Make & Series	No.	Current Month			Prior Year Month			Difference		
		Miles	Gallons	MPG	Miles	Gallons	MPG	Miles	Gallons	MPG
NFI S-40 201-240	40	179,346	40,129	4.47	96,604	19,686	4.91	82,742	20,443	-0.44
NOVA 1121 9637-9649	10	35,392	8,737	4.05	39,427	9,275	4.25	-4,035	-538	-0.20
MCI 911-915 & 9001-9200	77	145,363	42,615	3.41	257,429	63,865	4.03	-112,066	-21,250	-0.62
NFI 6V92 9301-9338	38	95,523	31,000	3.08	110,284	32,635	3.38	-14,761	-1,635	-0.30
NFI S-50 9339-9340 & 9401-9428	30	83,287	19,737	4.22	88,608	19,633	4.51	-5,321	104	-0.29
NFI S-50 941-965	25	55,610	10,350	5.37	66,056	11,415	5.79	-10,446	-1,065	-0.41
NFI Hybrid H301 & H302	2	7,858	1,537	5.11	N/A	N/A	N/A	N/A	N/A	N/A
MCI Commuter 303-309	7	19,293	4,214	4.58	N/A	N/A	N/A	N/A	N/A	N/A
Hartford Totals	229	621,672	158,319	3.93	658,408	156,509	4.21	-63,887	-3,941	-0.28

NEW HAVEN DIVISION

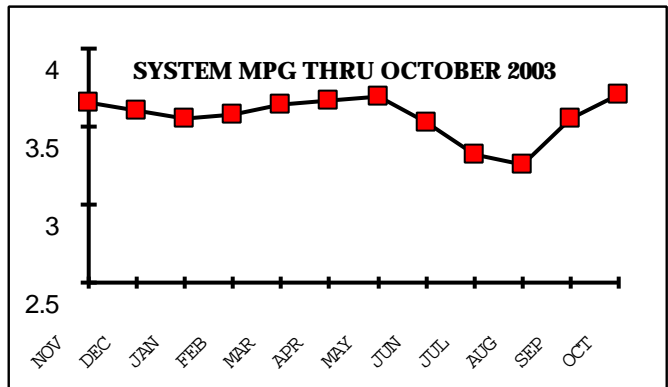
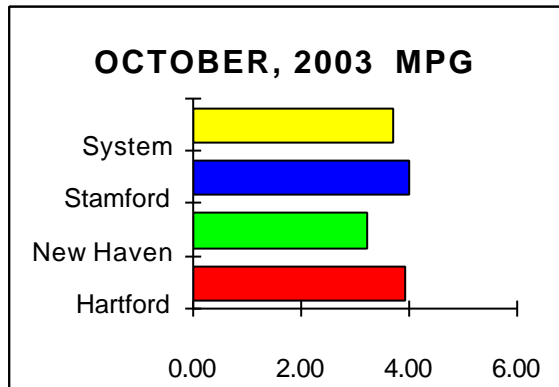
Make	No.	Current Month			Prior Year Month			Difference		
		Miles	Gallons	MPG	Miles	Gallons	MPG	Miles	Gallons	MPG
NOVA 1121 9601-9623	23	69,283	19,797	3.50	76,821	21,640	3.55	-7,538	-1,843	-0.05
ElDorado 9901-9903	3	1,552	615	2.52	3,330	1,304	2.55	-1,778	-689	-0.03
MCI 9101 - 9186	84	224,019	71,430	3.14	228,324	72,309	3.16	-4,305	-879	-0.02
New Haven Totals	110	294,854	91,842	3.21	308,475	95,253	3.24	-13,621	-3,411	-0.03

STAMFORD DIVISION

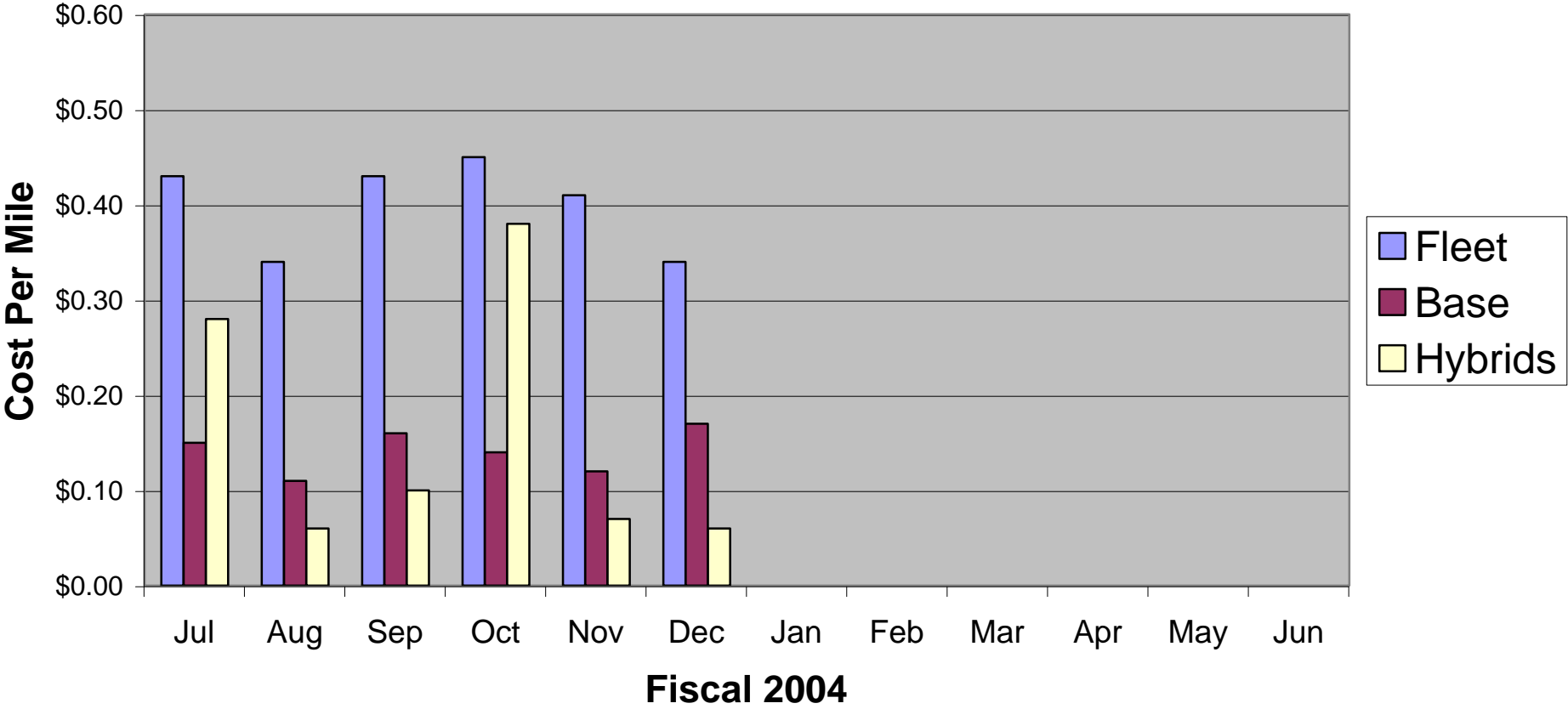
Make	No.	Current Month			Prior Year Month			Difference		
		Miles	Gallons	MPG	Miles	Gallons	MPG	Miles	Gallons	MPG
NOVA 1121 9626-9636	14	31,754	9,323	3.41	32,344	9,409	3.44	-590	-86	-0.03
ElDorado 9904-9913	10	14,116	4,057	3.48	8,717	2,800	3.11	5,399	1,257	0.37
NFI S-40 101-126	26	103,041	24,918	4.14	77,851	20,992	3.71	25,190	3,926	0.43
NFI S-40 127-132	6	28,155	6,043	4.66	21,244	4,483	4.74	6,911	1,560	-0.08
Stamford Totals	56	177,066	44,341	3.99	140,156	37,684	3.72	-590	-86	0.27

SYSTEM

Make	No.	Current Month			Prior Year Month			Difference		
		Miles	Gallons	MPG	Miles	Gallons	MPG	Miles	Gallons	MPG
All buses	395	1,093,592	294,502	3.71	1,107,039	289,446	3.82	-13,447	5,056	-0.11

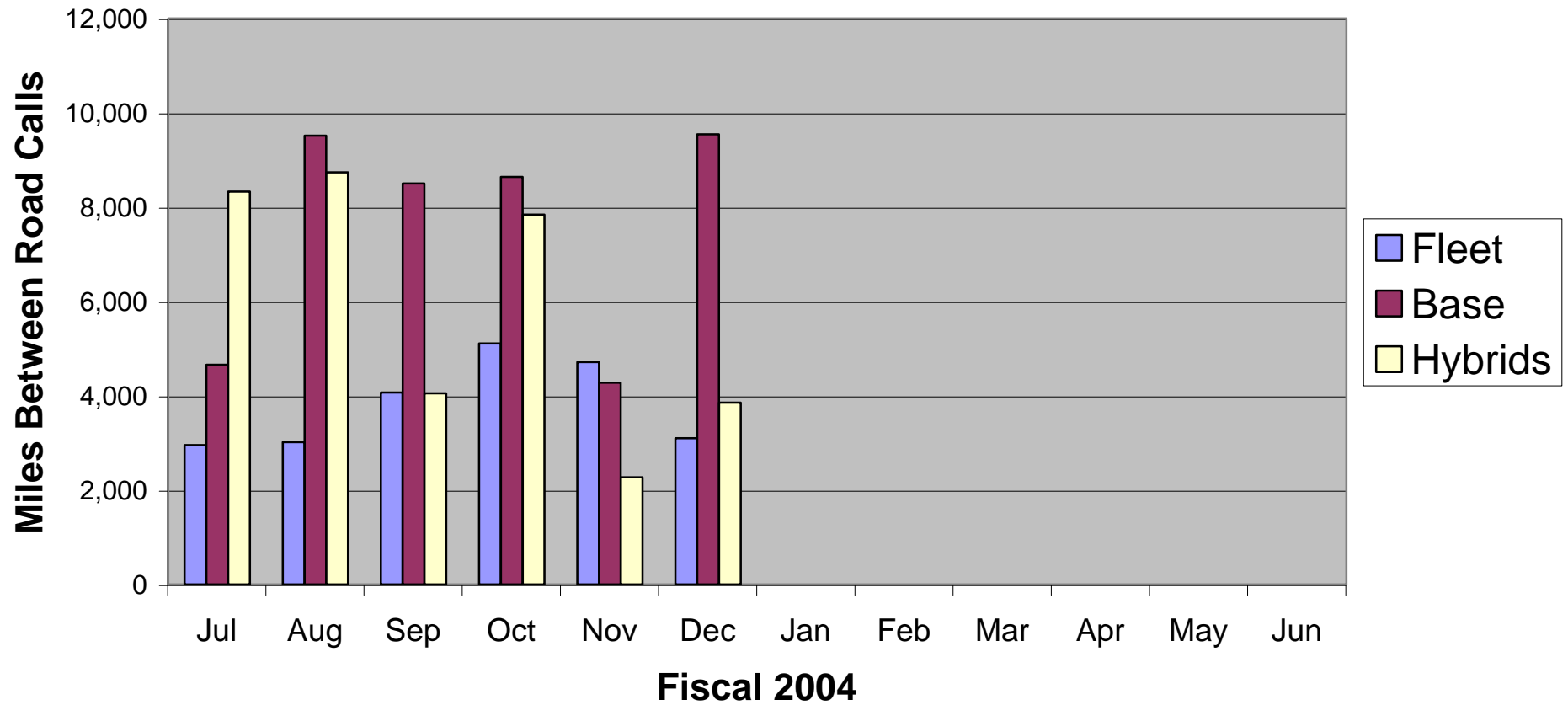


CTTRANSIT BUS MAINTENANCE COST PER MILE



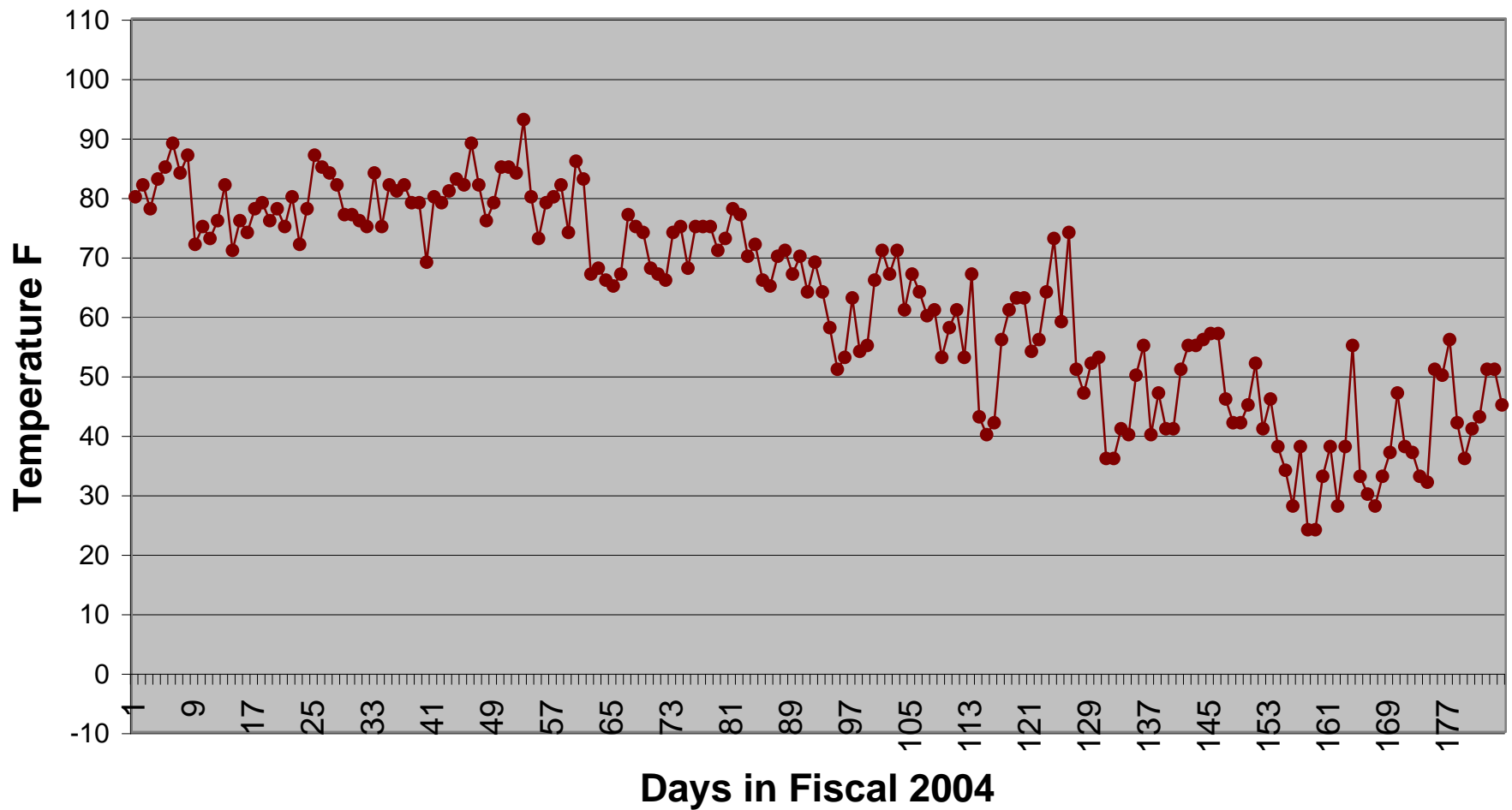
Bus Type	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Fleet	0.43	0.34	0.43	0.45	0.41	0.34	0	0	0	0	0	0
Base	0.15	0.11	0.16	0.14	0.12	0.17	0	0	0	0	0	0
Hybrids	0.28	0.06	0.10	0.38	0.07	0.06	0	0	0	0	0	0

CTTRANSIT BUS MILES BETWEEN ROAD CALLS



Bus Type	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Fleet	2955	3016	4068	5110	4713	3100	0	0	0	0	0	0
Base	4656	9515	8501	8640	4276	9543	0	0	0	0	0	0
Hybrids	8329	8737	4051	7840	2271	3854	0	0	0	0	0	0

HYBRID BUS DAILY NOON IN-SERVICE FIELD TEMPERATURE



WO	Asset Task Part Number	Asset Description Task Description/Work Done	Opened	Closed	Hours	Labor Cost	Parts Cost	Equip Cost	Vend Cost
Asset	301	New Flyer Hybrid Bus							
0396577	1 301	New Flyer Hybrid Bus Front Door Glass-Broken. Front Glass-Replaced.	12/29/03	12/29/03	0.58	12.18	58.13	0.00	0.00
0394587	1 301	New Flyer Hybrid Bus pac brake n.g. r/r pac brake / diagnose eng. lite	12/02/03	12/02/03	2.00	42.68	0.00	0.00	0.00
0391867	1 301	New Flyer Hybrid Bus Perform the E Check in accordance with Task Card service .bus	10/29/03	10/29/03	0.50	10.48	0.00	0.00	0.00
0390375	1 301	New Flyer Hybrid Bus MODIFY EXHAUST SYSTEM same	10/13/03	10/13/03	1.00	21.34	9.62	0.00	0.00
0392307	1 301	New Flyer Hybrid Bus mirror repair mirror	11/04/03	11/04/03	1.00	20.26	0.00	0.00	0.00
0389772	1 301	New Flyer Hybrid Bus Not Counting Coin's Replaced Coin Mech.	10/06/03	10/06/03	0.50	10.65	2544.86	0.00	0.00
0396289	1 301	New Flyer Hybrid Bus Perform the E Check in accordance with Task Card service bus	12/23/03	12/23/03	0.25	5.24	0.00	0.00	0.00
0395416	1 301	New Flyer Hybrid Bus Perform the B Check in accordance with Task Card b-insp	12/11/03	12/15/03	4.00	85.36	64.50	0.00	0.00
0394731	1 301	New Flyer Hybrid Bus Perform the E Check in accordance with Task Card service bus	12/03/03	12/03/03	0.25	5.24	0.00	0.00	0.00
0392689	1 301	New Flyer Hybrid Bus Perform the A Check in accordance with Task Card	11/07/03	11/10/03	2.00	41.60	0.00	0.00	0.00

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 Closed Work Order Costs by Asset

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WO	Asset Task Part Number	Asset Description Task Description/Work Done	Opened	Closed	Hours	Labor Cost	Parts Cost	Equip Cost	Vend Cost
		Perform the A Check in accordance with Task Card							
0390143	1 301	New Flyer Hybrid Bus	10/09/03	10/13/03	4.00	85.20	70.62	0.00	0.00
		Perform the C Check in accordance with Task Card							
		Perform the C Check in accordance with Task Card							
Asset	301	New Flyer Hybrid Bus	Subtotal -->		16.08	340.23	2747.73	0.00	0.00

WO	Asset Task Part Number	Asset Description Task Description/Work Done	Opened	Closed	Hours	Labor Cost	Parts Cost	Equip Cost	Vend Cost
Asset	302	New Flyer Hybrid Bus							
0392179	1 302	New Flyer Hybrid Bus TRANS. COOLER LEAKS replace cooler	11/03/03	11/03/03	8.00	170.72	3.66	0.00	0.00
0391768	1 302	New Flyer Hybrid Bus FRONT & REAR DOORS OUT OF ADJUSTMENT ADJUST	10/28/03	10/28/03	2.00	40.52	0.00	0.00	0.00
0396640	1 302	New Flyer Hybrid Bus Perform the B Check in accordance with Task Card b-insp	12/29/03	12/30/03	4.00	85.36	32.79	0.00	0.00
0395950	1 302	New Flyer Hybrid Bus Perform the E Check in accordance with Task Card service bus	12/18/03	12/18/03	0.25	5.24	0.00	0.00	0.00
0394961	1 302	New Flyer Hybrid Bus Perform the A Check in accordance with Task Card as above	12/05/03	12/10/03	2.00	41.60	0.00	0.00	0.00
0394037	1 302	New Flyer Hybrid Bus Perform the E Check in accordance with Task Card service bus	11/24/03	11/24/03	0.50	10.48	0.00	0.00	0.00
0391860	1 302	New Flyer Hybrid Bus Perform the C Check in accordance with Task Card Perform the C Check in accordance with Task Card	10/29/03	10/31/03	4.00	85.36	55.57	0.00	0.00
0391111	1 302	New Flyer Hybrid Bus Perform the E Check in accordance with Task Card service .bus	10/21/03	10/21/03	0.50	10.46	7.83	0.00	0.00
0390416	1 302	New Flyer Hybrid Bus Perform the A Check in accordance with Task Card Perform the A Check in accordance with Task Card	10/13/03	10/14/03	2.00	41.52	0.00	0.00	0.00
Asset	302	New Flyer Hybrid Bus	Subtotal -->		23.25	491.26	99.85	0.00	0.00
			Grand Total -->		39.33	831.49	2847.58	0.00	0.00

CTTRANSIT Hybrid Bus Trouble Codes

Date	H301	H302	Notes
10/06/03	All clear	No Code But Note	Indicated transmission fluid was one quart over. It has been found that the two minute waiting period for a cold bus check is insufficient. Up to 5 minutes or a drive around the facility will set the bus for proper level check. The dipstick is not considered as accurate as the electronic level sensor per Allison.
10/06/03	All clear	D1=6634= Can Link lost with eng. Controller, long time out D2=2312=Push Button Shift Selector	These codes had no adverse affect on the bus operation
11/03/03	OL Hi 01qt.	D1=2815=Clutch 1 pressure failed on shutdown D2=5615=Range2 verification-disabled clutch D3=5614=Range2 verification-limit transmission output torque D4=8132=Motor B overspeed - warning D5=7421=inverter B Motor overspeed D6=5613=range 1 verification - disable clutch D7=5612=range1 verification-limit transmission output torque D8=2816=No code info	
11/11/03	D1 = Engine Torque Verification= stop system C276 = High current detected C277=failure in the injection control valve C449=fuel pressure exceeded maximum C456= fuel pressure accumulator not changing	D1-2816 = There is no listing D2-5614=Range 2 verification-Limit Transmission Output Torque D3-5613=Range 1 verification - Disable Clutch D4-5612=Range 1 Verification - Limit Transmission Output Torque D5-5615=Range 2 Verification - Disabled Clutch D2-2815=Clutch 1 pressure failed on Shutdown D8-2916 = there is no listing	Cummins injection control valve found to be faulty
11/13/03	D1 = 2312 = pushbutton shift selector	All Clear	2312 is usually generated by switching off power to the transmission keypad only, while power is still applied to the system. It is a Cummins engine issue.
11/24/03	D1 = 6523 = Enginge Torque Verification	D1 = 6634 = Can link lost	No adverse bus operations
12/01/03	All Clear	D1=6634	Not cleared from previous week

CTTRANSIT Hybrid Bus Trouble Codes

Date	H301	H302	Notes
12/08/03	D1=2312 Push button shift selector	D1=7605 Battery State of Charge Low Warning	No adverse bus operations
	D2=6523 Engine torque verification	D2=6634 Can link lost with engine controller	
		D3=7452 Inverter B, AC current invalid	
		D4=6523 Engine torque verification	
12/14/03	All Clear	D1=7605 Battery Ste of Charge Low - Warning	No adverse bus operations
		D2=6634 Can Link lost with engine controller	
		D3=7452 Inverter B, AC current invalid	
		D4=6523 Engine torque verification	
12/31/03	D1=7014 Controller Watchdog timeout TCM	D1=6618 Can link lost with Inverter A	No adverse bus operations
	D2=6513 Engine Controller Warning	D2=Can link lost with Inverter B	
		D3=Can link lost with Engine Controller	
		D4= Can link lost with Vehicle Controller	
		D5=6513 Engine controller warning	
		D6=7319 Inverter A CAN link with TCM lost	
		D7=7419 Inverter B CAN link with TCM lost	
		D8=6629 Can link lost with Minor Engine Messages	