ANALYZING DDEC REPORTS

DDEC IV r21 or greater

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Contents:

Reporting Periods

The following covers the reporting time periods for the various data sets within the ECM.

Trip Activity Data (Applies to Trip Activity, Speed/RPM, Engine Load/Rpm, and Over Speed/Over Rev Reports)

Data is stored for the current trip activity. The trip is defined as from one extraction to the next extraction and may cover weeks, months, or years of activity.

Monthly Data

Activity data is stored for the current month as well as for the two prior months.

Daily Engine Usage Report

The Daily Engine Usage report covers the last 30 days within the given trip.

Hard Brake Reports

DDEC stores only the last two (2) hard brake incidents. A new hard brake incident will completely overwrite the oldest incident stored.

Last Stop Record

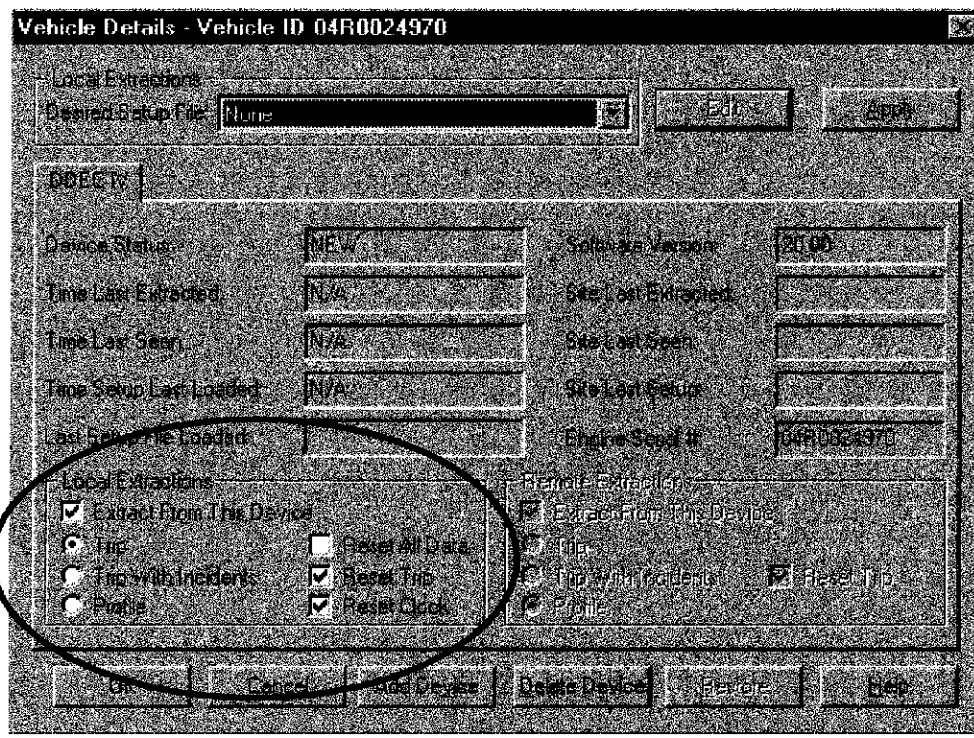
DDEC stores one (1) last stop record. His record will be completely over written once the vehicle comes to another stop.

Life-to-Date Report

DDEC stores all life-to-date information. This data accumulates from the time the vehicle is put into service and is never reset or cleared.

Extraction Tips

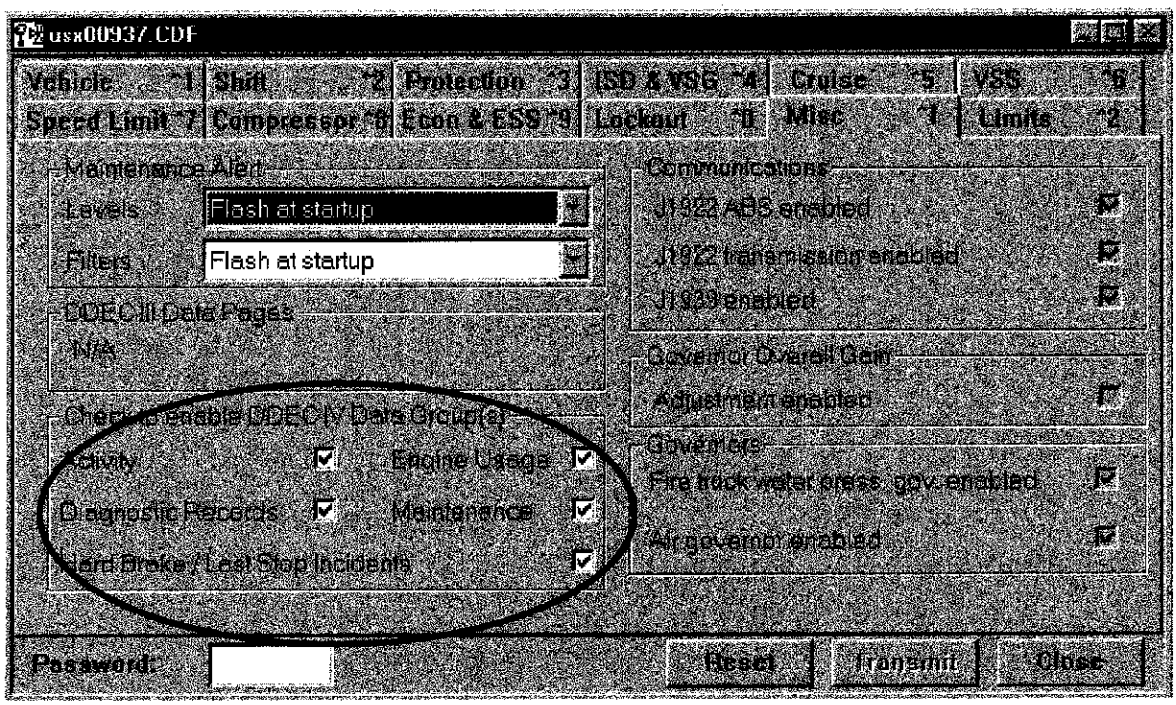
All data sets will be stored until either new data overwrites the old (see reporting periods) or until the trip is cleared. When the data is extracted from the ECM, the default setting is to clear the trip and reset all data. When this is done, all trip data excluding Life-to-Date data is completely removed from the ECM and stored on your extracting PC as an .xtr file which can then be viewed by DDEC Reports or Detroit Diesel Data Summaries. The default setting can be changed for each vehicle by accessing the Vehicle Details screen and selecting your extraction settings. For example, settings could be changed to extract the trip data and only resetting the clock or resetting all data without extracting any trip data.



The first column sets what is extracted from the ECM and the second column selects what will be reset on the ECM. Simply single clicking in the appropriate circle or square will either activate or deactivate the setting.

Customer Calibration Tips

By using Detroit Diesel Diagnostic Link 3.1 or greater, the recording capabilities for individual data groups can be manipulated. By accessing the Misc tab within the calibration template, the changes can be made in the lower left hand field. A check mark indicates that the data group is being recorded on the ECM, if there is no check mark, the data is not being recorded.



Report Analysis Tips: Trip Activity (see sample report on facing page)

1. How much does my idle time reduce my fuel economy?

Driving Fuel Economy - Fuel Economy = loss due to idle time

Example: 6.56 mpg - 6.36 mpg = 0.20 mpg loss, caused by 30.88% idle time

2. How much of my idle time is unnecessary?

Stop Idle time represents individual idle events that exceed 5 minutes in length. Short idle events are usually the result of traffic conditions and are unavoidable. On the other hand, long idle events may be unnecessary and indicate potential idle time savings. The Stop Idle Threshold may be adjusted to suit the user's needs. The default value is 5 minutes.

(Stop Idle Percent/Idle Percent) x 100% = potential idle reduction

Example: (15.96/30.88) x 100% = 51.7%

This percentage may be applied to the fuel economy cost of idling to estimate available savings from reduced idle time.

Example: 0.20 mpg x 51.7 % = 0.10 mpg potential improvement

3. How much time does the vehicle spend at the maximum programmed speed?

Vehicle Speed Limiting data indicates the time that the vehicle is operated at the maximum speed limit that is programmed in the ECM.

4. How does the usage of overdrive affect fuel economy?

Top Gear and Top Gear - 1 indicates the activity in the top two gears of the transmission. In vehicles with overdrive transmissions, this gives an indication of the fuel economy provided by the use of overdrive. In direct transmissions, the data can identify situations where fuel is being wasted by insufficient usage of top gear.

5. Does cruise control save fuel?

Calculate and compare the fuel economy in Top Gear, Top Gear Cruise and Cruise.

For example: Top Gear: 3056.0 mi/428.88 gal = 7.13 mpg
Top Gear Cruise: 419.4 mi/56.25 gal = 7.46 mpg
Cruise: 444.6 mi/59.13 gal = 7.52 mpg
-Improvement with Cruise: 0.33 to 0.39 mpg

6. Do I add the Idle numbers up to get the total idle?

No. Idle Time is the total time that the engine ran while the vehicle is motionless. It is composed of time at idle rpm (not measured directly) plus the time at fast idle rpm's, which we measure as VSG (PTO) time. Stop Idle Time is a component of both Idle Time and VSG (PTO) Time, and represents idle time at any rpm that occurs in individual events that are longer than the Stop Idle Threshold.

7. How much is the vehicle really being used?

Engine utilization indicates the percentage of time the engine is running (Trip Time/Calendar Time). Vehicle Utilization indicates the percentage of time the vehicle is moving (Driving Time/Calendar Time).

For example: Engine Utilization = 132:30:03/(21 days x 24 hours) = 26.29%
Vehicle Utilization = 91:35:13/ (21 x 24) = 18.17%

DDEC® Reports - Trip Activity

Print Date: Oct 25, 1999 03:28 PM

Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592-5000

Trip: 05/07/98 to 05/28/98
Vehicle ID: 22018
Driver ID:
Odometer: 60158.1 mi

Trip Distance	3951.3	mi	Trip Time	132:30:03	
Trip Fuel	621.13	gal	Fuel Consumption	4.69	gal/h
Fuel Economy	6.36	mpg	Idle Time	40:54:50	
Avg Drive Load	48	%	Idle Percent	30.88	%
Avg Vehicle Speed	43.1	mph	Idle Fuel	19.00	gal
Driving Time	91:35:13		VSG(PTO) Time	4:46:38	
Driving Percent	69.12	%	VSG(PTO) Percent	3.61	%
Driving Fuel	602.13	gal	VSG(PTO) Fuel	3.88	gal
Driving Economy	6.56	mpg			
			Stop Idle Time	21:08:32	
Vehicle Speed Limiting			Stop Idle Percent	15.96	%
Time	2:57:23		Stop Idle Fuel	9.00	gal
Percent	3.23	%			
Distance	180.3	mi	Over Rev Limit	1800	rpm
Fuel	22.75	gal	Count	4802	
			Time	26:47:54	
Top Gear			Percent	20.23	%
Time	52:43:01				
Percent	57.56	%	Highest RPM	2118	rpm
Distance	3056.0	mi	Occurred On	05/18/98	
Fuel	428.88	gal			
			Diag. Records	0	
Top Gear - 1			Hard Brake Count	15	
Time	12:33:12		Brake Count	4524	
Percent	13.71	%	Eng. Brake Time	0:00:00	
Distance	482.9	mi			
Fuel	74.00	gal	Optimized Idle Time		
			Active	0:00:00	
Cruise			Run	0:00:00	
Time	7:56:18		Battery	0:00:00	
Percent	8.67	%	Engine Temp.	0:00:00	
Distance	444.6	mi	Thermostat	0:00:00	
Fuel	59.13	gal	Extended Idle	0:00:00	
			Continuous	0:00:00	
Top Gear Cruise					
Time	7:21:57		Fan On Time		
Percent	8.04	%	Total Time	0:00:00	
Distance	419.4	mi	Engine System	0:00:00	
Fuel	56.25	gal	Manual	0:00:00	
			A/C	0:00:00	
Speeding A(>=60 mph and <62 mph)					
Count	718		Pump On Time		
Time	8:40:47		Time	0:00:00	
Percent	9.48	%	Distance	0.0	mi
Speeding B(>=62 mph)			Fuel	0.00	gal
Count	1070				
Time	21:20:39		Coasting Time	0:00:00	
Percent	23.30	%	Coasting Percent	0.00	%
Highest Speed	69.5	mph	Engine Utilization	26.31	%
Occurred On	05/26/98		Vehicle Utilization	18.19	%

Report Analysis Tips: Monthly Activity (see sample report on facing page)

DDEC IV provides data that is collected monthly, based on the calendar in the ECM. A total of three months data is available, composed of the current month plus the previous two months. This is an unprecedented feature, as previous ECM's only record data on a trip basis, which prevents accurate periodic reporting due to trips spanning monthly boundaries.

By collecting data on a monthly basis, vehicle activity may be directly compared to the monthly cost of operation, which is often readily available in most organizations.

DDEC® Reports - Monthly Activity #1

Print Date: Oct 25, 1999 03:30 PM

Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592-5000

Month: May, 1998
Vehicle ID: 22018
Driver ID:
Odometer: 60158.1 mi

Distance	4523.4	mi	Time	157:52:06	
Fuel	714.50	gal	Fuel Consumption	4.53	gal/h
Fuel Economy	6.33	mpg	Idle Time	50:07:22	
Avg Drive Load	47	%	Idle Percent	31.75	%
Avg Vehicle Speed	42.0	mph	Idle Fuel	23.25	gal
Driving Time	107:44:44		VSG(PTO) Time	5:28:04	
Driving Percent	68.25	%	VSG(PTO) Percent	3.46	%
Driving Fuel	691.25	gal	VSG(PTO) Fuel	4.50	gal
Driving Economy	6.54	mpg			
			Stop Idle Time	25:53:37	
Vehicle Speed Limiting			Stop Idle Percent	16.40	%
Time	2:57:23		Stop Idle Fuel	10.25	gal
Percent	2.74	%			
Distance	180.4	mi	Over Rev Limit	1800	rpm
Fuel	23.25	gal	Count	5866	
			Time	30:30:47	
Top Gear			Percent	19.33	%
Time	59:47:59				
Percent	55.50	%	Highest RPM	2118	rpm
Distance	3447.7	mi	Occurred On	05/18/98	
Fuel	482.25	gal			
			Diag. Records	1	
Top Gear - 1			Hard Brake Count	19	
Time	14:36:57		Brake Count	5662	
Percent	13.57	%	Eng. Brake Time	0:00:00	
Distance	558.3	mi			
Fuel	82.13	gal	Optimized Idle Time		
			Active	0:00:00	
Cruise			Run	0:00:00	
Time	7:56:18		Battery	0:00:00	
Percent	7.37	%	Engine Temp.	0:00:00	
Distance	444.6	mi	Thermostat	0:00:00	
Fuel	59.13	gal	Extended Idle	0:00:00	
			Continuous	0:00:00	
Top Gear Cruise					
Time	7:21:57		Fan On Time		
Percent	6.84	%	Total Time	0:00:00	
Distance	419.4	mi	Engine System	0:00:00	
Fuel	55.88	gal	Manual	0:00:00	
			A/C	0:00:00	
Speeding A(>=60 mph and <62 mph)					
Count	815		Pump On Time		
Time	9:18:36		Time	0:00:00	
Percent	8.64	%	Distance	0.0	mi
Speeding B(>=62 mph)			Fuel	0.00	gal
Count	1209				
Time	24:15:35		Coasting Time	0:00:00	
Percent	22.52	%	Coasting Percent	0.00	%
Highest Speed	70.0	mph	Engine Utilization	24.10	%
Occurred On	05/04/98		Vehicle Utilization	16.45	%

Report Analysis Tips: Vehicle Speed/RPM (see sample report on facing page)

This is a trip-based report, so it spans the time from one extraction to the next.

1. Is my vehicle spec'd for good fuel economy?

The Engine Speed Histogram displays the percent of time spent in each of several rpm ranges that cover the entire operating range of the engine. An engine that spends most of it's operating time at or near the DDC recommended rpm has been speced for good fuel economy. The example shows a spec that isn't particularly economical, as 39.1 % (20.2 + 10.3 + 8.6) of the time is spent above 1600 rpm.

When actual fuel economy doesn't agree with the SpecManager prediction, you can compare the actual operating profile reported in this report with the assumptions used in SpecManager.

2. Is my driver using progressive shifting?

The table titled "Percent of Trip Time in Speed and RPM Table" provides the answer. Excessive activity in the lower left corner of the table (high RPM's and low vehicle speed) indicates a driver that isn't using progressive shifting. Driver performance in the example is average, with improvement available below 50 mph.

3. Is my driver coasting downhill to exceed the maximum speed limit set in the ECM?

Activity in the upper right corner of the table (low RPM's and high vehicle speed) indicates the driver is coasting downhill. The example report does not show any coasting activity.

4. Does my driver tailgate?

A high number of brake applications at high speeds or Hard Brake applications may indicate tailgating. The table titled "Percent of Trip Time in Speed and RPM Table" shows both regular and hard brake applications as a function of vehicle speed. In the sample report, almost 6% of the brake applications occurred above 50 mph. Combined with the high frequency (1 every 263 miles) and speed of hard brake applications, the sample report shows a driver that may be pushing too hard.

5. Why are my truck's brakes and/or tires wearing prematurely?

The table at the bottom of the report show all of the brake applications and in which speed bands they occurred. If your driver has an excessive amount of brake counts or has braking events in the higher speed bands, this may reveal causes for premature brake and/or tire wear.

DDEC® Reports - Vehicle Speed/RPM

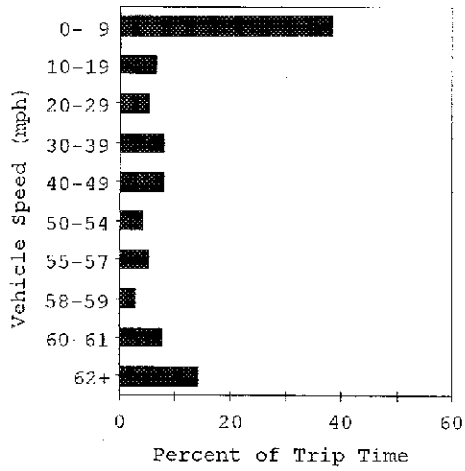
Print Date: Oct 25, 1999 03:31 PM

Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592-5000

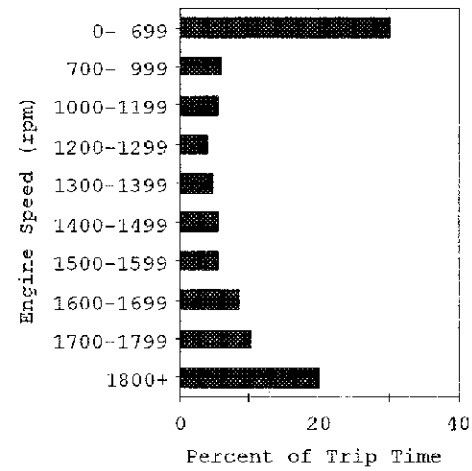
Trip: 05/07/98 to 05/28/98
Vehicle ID: 22018
Driver ID:
Odometer: 60158.1 mi

Trip Distance	3951.3 mi	Trip Time	132:30:03
Trip Fuel	621.13 gal	Fuel Consumption	4.69 gal/h
Fuel Economy	6.36 mpg	Idle Time	40:54:50
Avg Drive Load	48 %	Idle Percent	30.88 %
Avg Vehicle Speed	43.1 mph	Idle Fuel	19.00 gal

Vehicle Speed Histogram



Engine Speed Histogram



Percent of Trip Time in Speed and RPM Table

	Vehicle Speed (mph)										
Engine RPM	0- 9	10-19	20-29	30-39	40-49	50-54	55-57	58-59	60-61	62+	Total
0- 699	28.6	0.9	0.4	0.1	0.1						30.0
700- 999	4.2	0.7	0.5	0.4							5.9
1000-1199	2.0	1.1	0.9	1.2	0.1						5.4
1200-1299	0.9	0.7	0.4	0.9	1.0						3.8
1300-1399	0.6	0.7	0.6	1.4	1.5						4.8
1400-1499	0.5	0.8	0.6	1.4	1.4	0.9					5.5
1500-1599	0.3	0.5	0.7	1.0	0.5	2.4					5.4
1600-1699	0.2	0.3	0.5	0.4	1.3	0.9	4.9				8.6
1700-1799	0.2	0.3	0.3	0.5	1.3		0.4	3.0	4.3		10.3
1800+	0.5	0.5	0.3	0.6	0.9				3.4	14.1	20.2
Total	38.1	6.6	5.2	7.8	8.1	4.2	5.3	3.0	7.7	14.1	
Brakes	2275	619	418	569	370	88	58	40	44	43	4524
Hard Brakes		1	2	5	5	2					15

Report Analysis Tips: Engine Load/RPM (see sample report on facing page)

This report shows the relationship between RPM and % load. This information may be useful in evaluating the suitability of equipment specifications, especially in off-highway applications.

DDEC® Reports - Engine Load/RPM

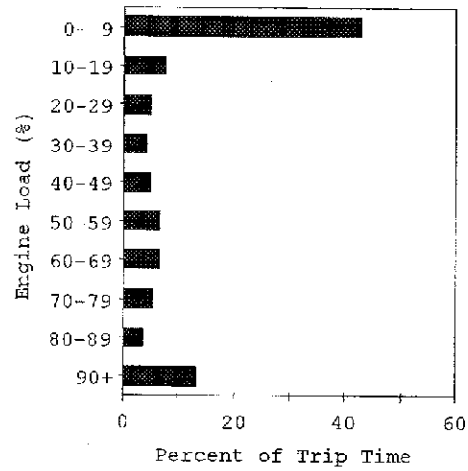
Print Date: Oct 25, 1999 03:32 PM

Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592-5000

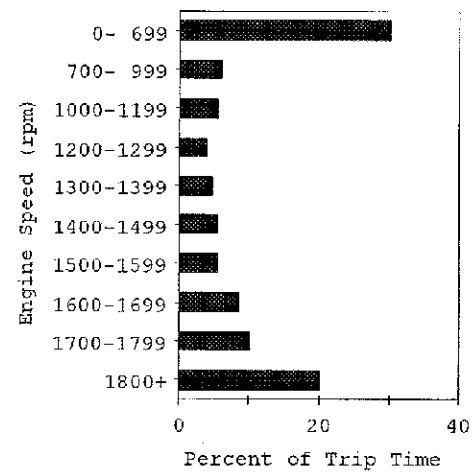
Trip: 05/07/98 to 05/28/98
Vehicle ID: 22018
Driver ID:
Odometer: 60158.1 mi

Trip Distance	3951.3 mi	Trip Time	132:30:03
Trip Fuel	621.13 gal	Fuel Consumption	4.69 gal/h
Fuel Economy	6.36 mpg	Idle Time	40:54:50
Avg Drive Load	48 %	Idle Percent	30.88 %
Avg Vehicle Speed	43.1 mph	Idle Fuel	19.00 gal

Engine Load Histogram



Engine Speed Histogram



Percent of Trip Time in Load and RPM Table

	Engine Load (%)										
Engine RPM	0- 9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	Total
0- 699	26.4	2.1	0.6	0.3	0.2	0.1	0.2			0.2	30.0
700- 999	3.5	0.7	0.5	0.3	0.2	0.1	0.1	0.2	0.2	0.2	5.9
1000-1199	2.7	0.7	0.4	0.3	0.2	0.2	0.3	0.2	0.2	0.2	5.4
1200-1299	1.8	0.5	0.3	0.2	0.2	0.1	0.2	0.2	0.2	0.3	3.8
1300-1399	1.7	0.5	0.3	0.2	0.2	0.2	0.2	0.2	0.2	1.1	4.8
1400-1499	1.6	0.5	0.3	0.3	0.3	0.3	0.2	0.2	0.2	1.7	5.5
1500-1599	1.3	0.5	0.4	0.3	0.2	0.3	0.2	0.2	0.1	1.9	5.4
1600-1699	1.5	0.7	0.7	0.6	0.6	0.8	0.6	0.4	0.3	2.4	8.6
1700-1799	1.2	0.6	0.6	0.6	0.7	1.1	0.8	0.5	0.4	3.7	10.3
1800+	1.3	0.9	1.0	1.2	2.1	3.5	3.8	3.1	1.9	1.5	20.2
Total	43.0	7.6	4.9	4.4	4.9	6.6	6.5	5.2	3.8	13.1	

Report Analysis Tips: Over Speed/Over Rev (see sample report on facing page)

This report provides documentation of situations where the driver exceeds normal operating conditions. It may serve to be useful for investigation of complaints of poor fuel economy or unsafe vehicle operation.

DDEC® Reports - Over Speed/Over Rev

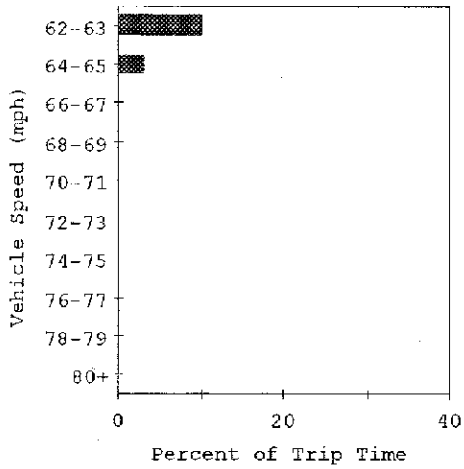
Print Date: Oct 25, 1999 03:32 PM

Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592-5000

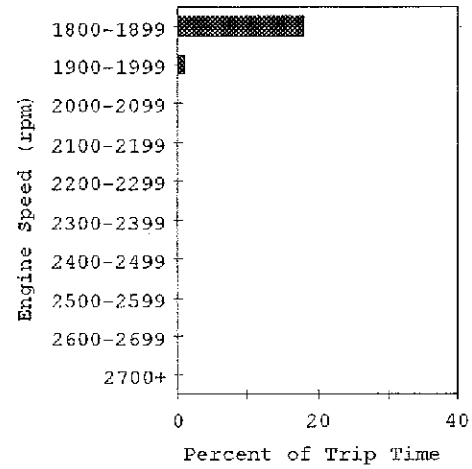
Trip: 05/07/98 to 05/28/98
Vehicle ID: 22018
Driver ID:
Odometer: 60158.1 mi

Trip Distance	3951.3 mi	Trip Time	132:30:03
Trip Fuel	621.13 gal	Fuel Consumption	4.69 gal/h
Fuel Economy	6.36 mpg	Idle Time	40:54:50
Avg Drive Load	48 %	Idle Percent	30.88 %
Avg Vehicle Speed	43.1 mph	Idle Fuel	19.00 gal

Over Speed Histogram



Over Rev Histogram



Percent of Trip Time in Over Speed and Over Rev Bands

Vehicle Speed (mph)

62-63	64-65	66-67	68-69	70-71	72-73	74-75	76-77	78-79	80+
10.63	3.30	0.14	0.02						

Engine Speed (rpm)

1800 1899	1900 1999	2000 2099	2100 2199	2200 2299	2300 2399	2400 2499	2500 2599	2600 2699	2700+
18.77	1.45	0.01							

Report Analysis Tips: Vehicle Configuration (see sample report on facing page)

This report provides important information about how the ECM is configured to record data. Of particular interest:

- Stop Idle Limit defines the length of an idle event that is recorded as Stop Idle Time. For example, if an idle event is less than 5 minutes, it is recorded as Idle Time. If an event is greater than 5 minutes, it is recorded as both Idle Time and Stop Idle Time.

- Top Gear Limit and Top Gear -1 Limit are learned parameters, they are not set by the user. They need to be manually reset so a new value can be learned if the tire size, etc. is changed on the vehicle.

- Config. Change indicates the date the recording configuration was last changed.

- Idle Method is either VSS Idle, Idle Governor Idle or RPM and Load Idle. VSS Idle is usually used for on-highway applications and means that when the engine is running and the vehicle is motionless, idle time is recorded. The other two methods are used when no Vehicle speed sensor is available. They allow idle time recording when the Idle Governor is active in the ECM, or when RPM and Load exceed selected values.

- Reset Lockout prevents the DDR from resetting trip information. This is required to maintain data integrity for fleets that are using DDEC Reports to track fleet performance.

- Fleet Time Zone indicates the standard time for all reports. It is expressed in the hours difference from Greenwich Mean Time (GMT). For example, GMT - 5 hours is Eastern Standard Time (EST).

- When the Maintenance Visual Reminder is enabled, the check engine light flashes 6 times after "ignition on" to indicate that one of the PM intervals is less than the specified threshold percentage.

- Speed, RPM and Load Bands may be set as desired. The top two speed bands also define Overspeed A and B thresholds.

This report can also be used to make sure that all the vehicles in a given fleet are set up the same.

For example: If drastic differences in trip data are reported from two trucks that should be spec'd the same, the data differences could be due to differences in how the ECM has been configured to report data in each of the trucks. Use the Configuration Report to confirm that Stop Idle, Idle Method, Speed Bands, etc. are all set the same.

DDEC® Reports - Vehicle Configuration

Print Date: Oct 25, 1999 03:37 PM

Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592-5000

Trip: 05/07/98 to 05/28/98
Vehicle ID: 22018
Driver ID:
Odometer: 60158.1 mi

Trip Distance	3951.3 mi	Trip Time	132:30:03
Trip Fuel	621.13 gal	Fuel Consumption	4.69 gal/h
Fuel Economy	6.36 mpg	Idle Time	40:54:50
Avg Drive Load	48 %	Idle Percent	30.88 %
Avg Vehicle Speed	43.1 mph	Idle Fuel	19.00 gal

Hard Brake Limit	7.0 mph/s	
Stop Idle Limit	5 min	
Top Gear Limit	29 rpm/mph	
Top Gear-1 Limit	37 rpm/mph	Learned On: 05/07/98

ECM S/W	22.00
ECM Type	DDEC IV
Config. Change	05/21/98

Idle Method	VSS
Idle-Load Limit	- %
Idle-RPM Limit	- rpm

Reset Lockout	Yes
Fleet Time Zone	-5.0 h (EST)

Maintenance Visual Reminder:

Enabled	No
Percentage	- %

Vehicle Speed Bands (mph)	10	20	30	40	50	55	58	60	62
Engine Speed Bands (rpm)	700	1000	1200	1300	1400	1500	1600	1700	1800
Percent Load Bands (%)	10	20	30	40	50	60	70	80	90

Trip Status 4 Extracted but did not reset!

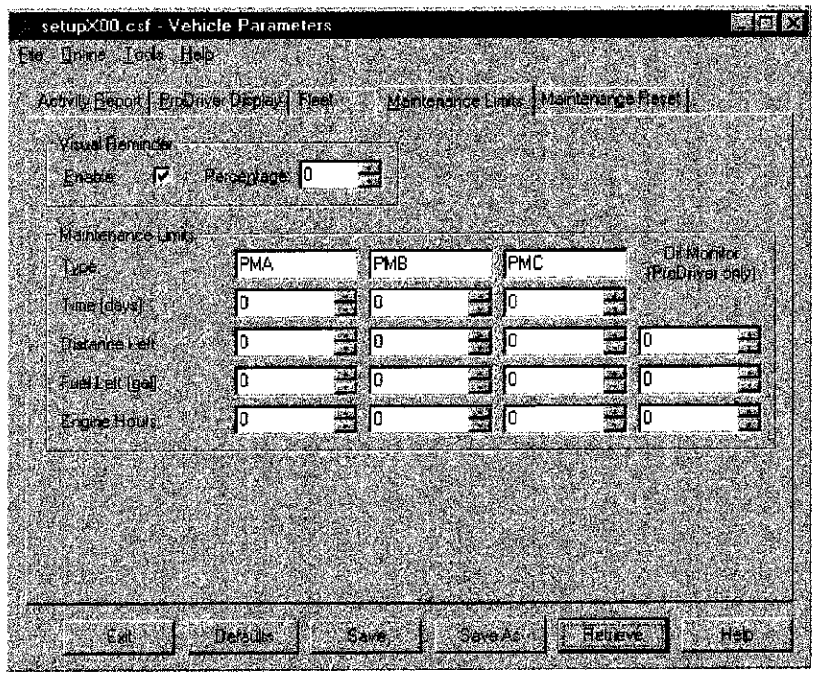
Report Analysis Tips: Periodic Maintenance (see sample report on facing page)

The report tracks 3 maintenance intervals. The default names are PMA, PMB and PMC, but can be customized by the user. Each interval may be tracked by up to four parameters; *Distance Left, Engine Hours Left, Projected Date, Fuel Left (gallons).*

Note: If the user decides maintenance is not be tracked by a certain parameter, ie. Fuel Used, enter "0" under the Fuel column in Maintenance Limits.

- Maintenance Due indicates the current status of each parameter for each of the three intervals.
- Maintenance Limits indicate the selected duration of each interval.
- Last Maintenance indicates when each maintenance item was last performed.

To set the limits for the PM items, open DDEC Reports, then click on the "Tools" pull-down menu. Go down to "Vehicle Parameters" and click on it. Click on the "Maintenance Limits" tab to open the set-up window below.



When PM work is done on the vehicle, follow the steps above, except click on the Maintenance Reset tab to reset the PM tracking in the ECM.

NOTE: The settings you enter on the five tabs (Activity Report, ProDriver Display, Fleet, Maintenance Limits, Maintenance Reset) are saved in a setup file (.CSF file). You can create multiple setup files and apply them to different vehicles in your fleet. Each tab has both a Save and a Save As button; clicking the Save or Save As button will save the settings as they exist on each tab.

To edit a setup file (.CSF file), click File, Open, and select the file you want to edit. After you have changed the settings, click Save to keep the same setup file name, or click Save As and enter a new file name to create a new file with your changed settings. Please refer to Diagnostic Link's On-Line HELP for more details on how to create, save, edit and transmit .CSF files.

DDEC® Reports - Periodic Maintenance

Print Date: Oct 25, 1999 03:38 PM

Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592-5000

Trip: 05/07/98 to 05/28/98
Vehicle ID: 22018
Driver ID:
Odometer: 60158.1 mi

Trip Distance	3951.3 mi	Trip Time	132:30:03
Trip Fuel	621.13 gal	Fuel Consumption	4.69 gal/h
Fuel Economy	6.36 mpg	Idle Time	40:54:50
Avg Drive Load	48 %	Idle Percent	30.88 %
Avg Vehicle Speed	43.1 mph	Idle Fuel	19.00 gal

Maintenance Due

Name	Distance Left (mi)	Eng. Hrs. Left	Projected Date	Fuel Left (gal)
PMA	1218.1	11	05/31/1998	176.88
PMB	3218.1	51	06/10/1998	476.88
PMC	5218.1	91	06/20/1998	776.88

Maintenance Limits

Name	Distance (mi)	Engine Hours	Days	Fuel (gal)
PMA	2000.0	40	10	300.00
PMB	4000.0	80	20	600.00
PMC	6000.0	120	30	900.00

Last Maintenance

Name	Odometer (mi)	Eng. Hours	Date
PMA	59376.2	3318	05/21/1998
PMB	59376.2	3318	05/21/1998
PMC	59376.2	3318	05/21/1998

Report Analysis Tips: Diagnostic Record (see sample report on facing page)

Diagnostic Records are snapshots of engine parameters that are recorded immediately before a fault code is generated. Entries are recorded every 5 seconds, with 12 entries associated with each record. DDEC IV stores the most recent three (3) Diagnostic Records.

Diagnostic Records are useful when troubleshooting faults, especially those that are intermittent in nature.

DDEC® Reports - Diagnostic Record #1

Print Date: Oct 26, 1999 07:51 AM

Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592-5000

Trip: 01/27/99 to 06/25/99
Vehicle ID: 64
Driver ID:
Odometer: 74635.9 mi

Trip Distance	66912.1 mi	Trip Time	3080:37:34
Trip Fuel	12269.38 gal	Fuel Consumption	3.98 gal/h
Fuel Economy	5.45 mpg	Idle Time	1938:10:37
Avg Drive Load	58 %	Idle Percent	62.92 %
Avg Vehicle Speed	58.6 mph	Idle Fuel	577.50 gal

Diagnostic Code: **[44] - Coolant Temperature High**
Diagnostic Time: Jun 19, 1999 07:02 PM (EDT)

Time	Vehicle Speed (mph)	Engine Speed (rpm)	Boost Press (psi)	Oil Press (psi)	Fuel Press (psi)	Air Temp (°F)
19:02:59	67.0	1595	23.1	59.9	0.0	89.5
19:02:54	61.0	1447	23.4	57.6	0.0	88.5
19:02:49	57.0	1344	22.4	55.8	0.0	89.0
19:02:44	55.0	1300	21.8	54.8	0.0	90.5
19:02:39	55.0	1310	21.9	54.9	0.0	90.8
19:02:34	58.0	1364	22.5	56.4	0.0	90.8
19:02:29	60.5	1425	23.1	57.1	0.0	89.0
19:02:24	63.0	1489	23.4	58.8	0.0	86.5
19:02:19	65.5	1556	23.8	60.3	0.0	84.3
19:02:14	68.5	1624	22.9	60.6	0.0	83.0
19:02:09	72.5	1723	21.5	62.0	0.0	83.3
19:02:04	75.5	1784	6.3	62.3	0.0	84.5

Time	Coolant Temp (°F)	Oil Temp (°F)	Fuel Temp (°F)	Engine Load (%)	Throttle (%)	Pulse Width (deg)
19:02:59	-40.0	180.0	111.8	97.5	93.2	26.5
19:02:54	187.3	179.5	111.5	95.5	94.0	27.2
19:02:49	189.0	179.5	111.5	96.5	100.0	26.9
19:02:44	186.8	179.0	111.3	97.0	100.0	27.0
19:02:39	183.5	179.0	111.3	97.0	100.0	27.0
19:02:34	182.5	178.8	111.3	96.0	100.0	27.0
19:02:29	183.8	178.3	111.3	96.0	100.0	27.2
19:02:24	189.0	178.3	111.3	95.5	100.0	27.4
19:02:19	185.8	178.3	111.3	98.0	100.0	27.4
19:02:14	183.8	178.3	111.5	99.5	100.0	26.9
19:02:09	182.5	178.8	111.5	99.5	100.0	25.0
19:02:04	182.3	179.0	111.5	60.0	100.0	14.7

Time	Engine Brake (cylinders)	Cruise	Accel Switch	Brake Switch	Clutch Switch	Diagnostic Code
19:02:59	Off	No	No	No	No	No
19:02:54	Off	No	No	No	No	No
19:02:49	Off	No	No	No	No	No
19:02:44	Off	No	No	No	No	No
19:02:39	Off	No	No	No	No	No
19:02:34	Off	No	No	No	No	No
19:02:29	Off	No	No	No	No	No
19:02:24	Off	No	No	No	No	No
19:02:19	Off	No	No	No	No	No
19:02:14	Off	No	No	No	No	No
19:02:09	Off	No	No	No	No	No
19:02:04	Off	No	No	No	No	No

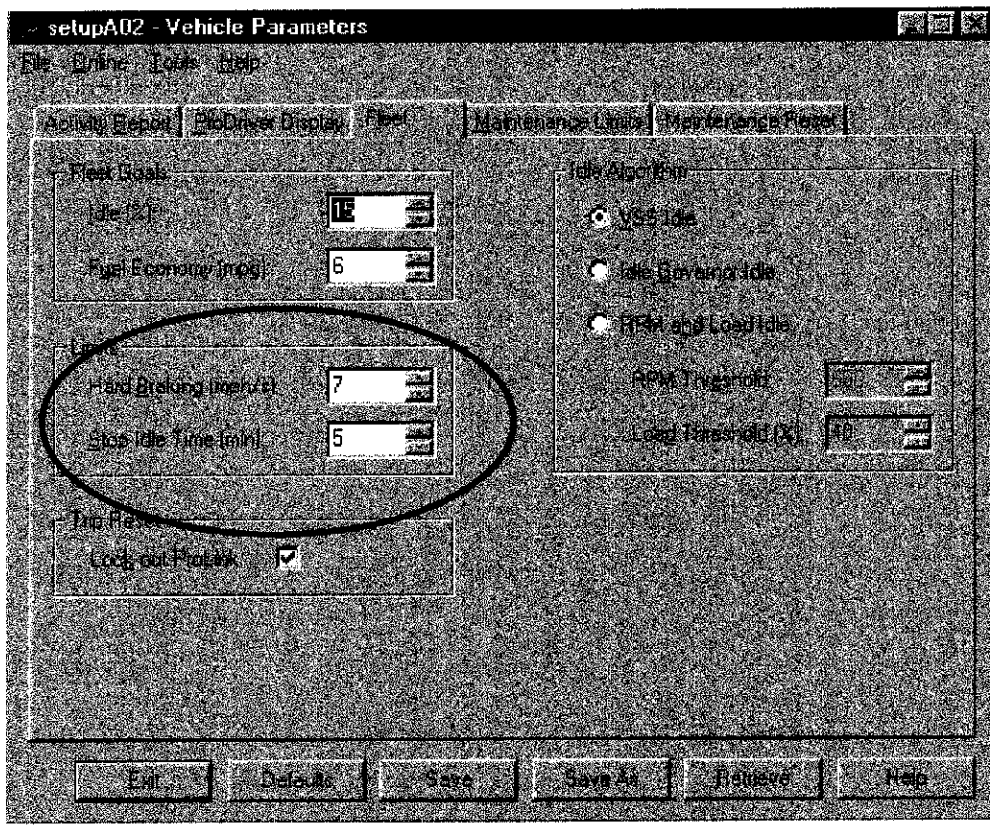
Report Analysis Tips: Hard Brake (see sample report on facing page)

Hard Brake Reports document vehicle and driver activity immediately before and after a vehicle deceleration that is greater than the selected threshold (default = 7 mph/sec). Data is recorded for 60 seconds before the deceleration and 15 seconds after. The date and time of the deceleration is also time-stamped.

Data is available in either tabular or graphic format.

DDEC IV stores the detail of the two (2) most recent Hard Brake occurrences. When a new hard brake occurs, the oldest stored Hard Brake incident is completely overwritten and can no longer be accessed. These 2 Hard Brake Reports can be stored for an unlimited period of time.

7 mph/sec is the factory default "trigger" for Hard Brakes. This value can be changed by the user by accessing the "Vehicle Parameters" window from the "Tools" pull down menu in DDEC Reports. Click on the "Fleet" tab and adjust the value in the Hard Brake box.



NOTE: The settings you enter on the five tabs (Activity Report, ProDriver Display, Fleet, Maintenance Limits, Maintenance Reset) are saved in a setup file (.CSF file). You can create multiple setup files and apply them to different vehicles in your fleet. Each tab has both a Save and a Save As button; clicking the Save or Save As button will save the settings as they exist on each tab.

To edit a setup file (.CSF file), click File, Open, and select the file you want to edit. After you have changed the settings, click Save to keep the same setup file name, or click Save As and enter a new file name to create a new file with your changed settings. Please refer to Diagnostic Link's On-Line HELP for more details on how to create, save, edit and transmit .CSF files.

DDEC® Reports - Hard Brake #1

Print Date: Nov 27, 2001 04:34 PM (EST)

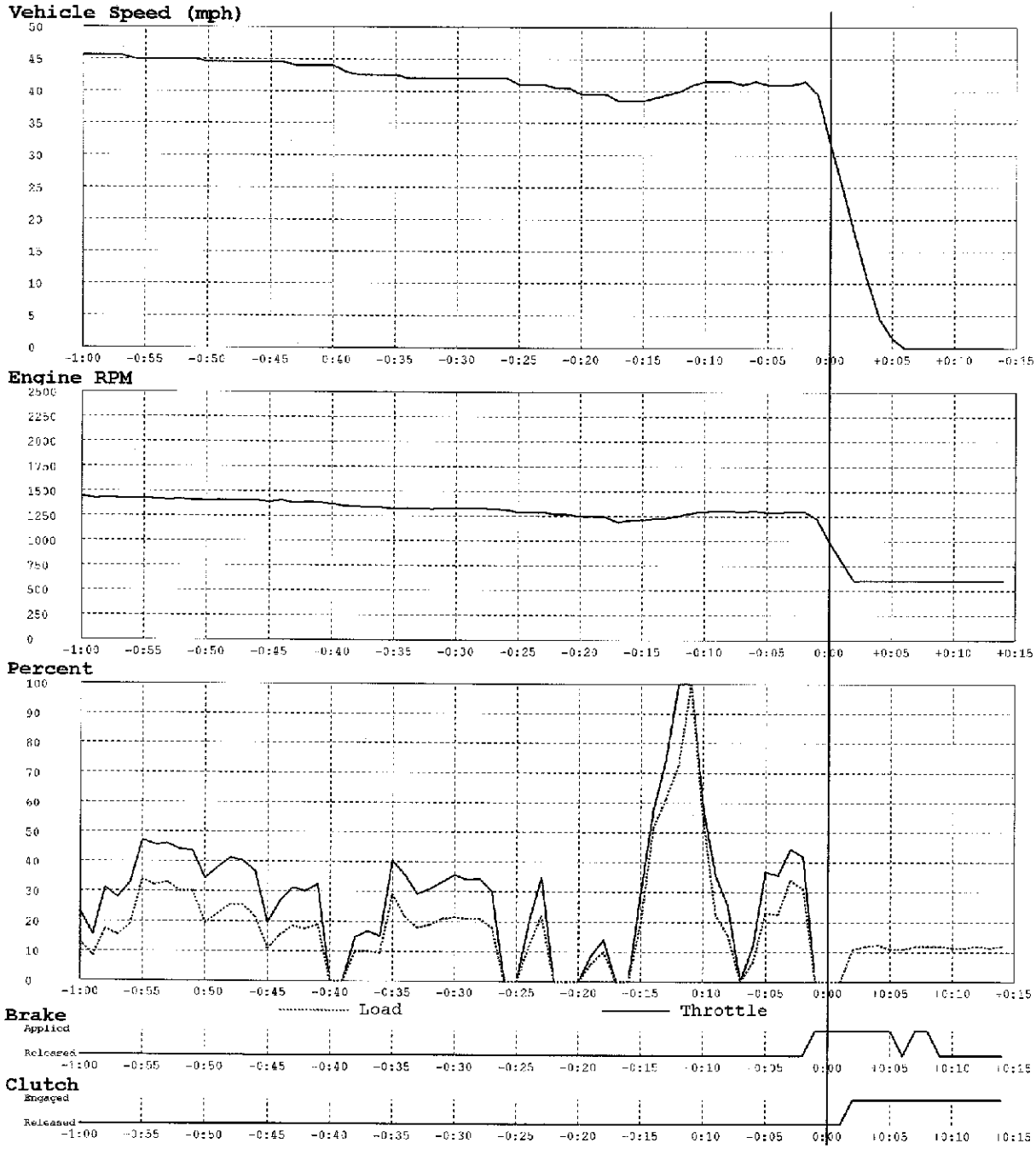
Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592-5000

Trip: 06/06/2000 to 08/16/2001 (EST)
Vehicle ID: 2314
Driver ID:
Odometer: 158086.4 mi

Trip Distance	158086.4 mi	Trip Time	4385:16:26
Trip Fuel	22542.88 gal	Fuel Consumption	5.14 gal/h
Fuel Economy	7.01 mpg	Idle Time	1370:05:50
Avg Drive Load	45 %	Idle Percent	31.24 %
Avg Vehicle Speed	52.4 mph	Idle Fuel	1010.63 gal

Incident Time: 08/15/2001 00:14:25 (EST)

Incident Odometer: 157719.5 mi



Report Analysis Tips: Last Stop Record (see sample report on facing page)

The last two minutes of vehicle activity is stored in a format that is similar to the Hard Brake record. Generally, this record will display the last two minutes of vehicle travel, which will include the last stop made by the vehicle. The recording is made while the vehicle is in motion and continues for 15 seconds after the vehicle becomes motionless or the engine is turned off. This ensures that at least the last 1:45 of vehicle travel is shown.

This information may be useful in investigating an accident where a rapid deceleration was not present to trigger a Hard Brake record.

DDEC® Reports - Last Stop Record

Print Date: Oct 26, 1999 07:53 AM

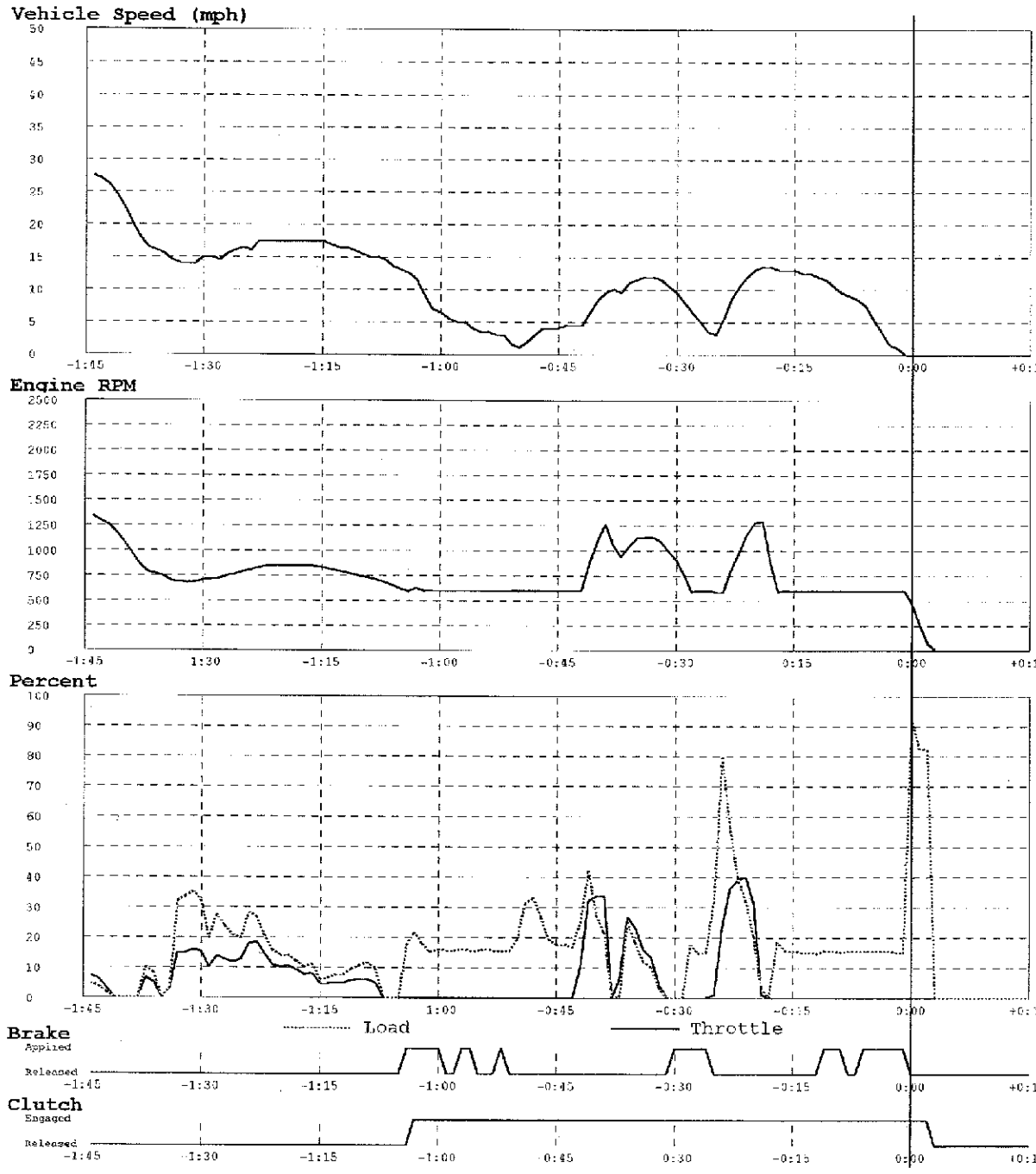
Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592-5000

Trip: 06/02/98 to 06/19/98
Vehicle ID: PDCPM
Driver ID:
Odometer: 58273.6 mi

Trip Distance	5698.9 mi	Trip Time	134:33:33
Trip Fuel	831.13 gal	Fuel Consumption	6.18 gal/h
Fuel Economy	6.86 mpg	Idle Time	18:14:17
Avg Drive Load	46 %	Idle Percent	13.55 %
Avg Vehicle Speed	49.0 mph	Idle Fuel	7.63 gal

Last Stop Time: Jun 19, 1998 02:47 PM (EDT)

Last Stop Odometer: 58273.6 mi



Report Analysis Tips: Profile (see sample report on facing page)

This snapshot of vehicle and driver status is a compact, compromise dataset intended for situations where extraction time is either limited or expensive. It is well suited to wireless, drive-by extractions where the vehicle may only be in range for a short period of time and for cellular and satellite extraction where airtime is expensive. The data is designed to answer questions such as:

- What is the level of vehicle activity? Areas of interest include trip miles, fuel and time.
- Does the driver need counseling for substandard or unsafe performance? Areas of interest include: speeding A and B, over rev, cruise, top gear, coasting, idle, VSG, hard brake, highest speed and RPM.
- Does the vehicle require special attention? Areas of interest include: fuel economy, PMA, B andC, and diagnostic codes.

DDEC® Reports - Profile

Print Date: Oct 25, 1999 04:57 PM

Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592-5000

Trip: 05/07/98 to 05/28/98
Vehicle ID: 22018
Driver ID:
Odometer: 60158.1 mi

Trip Distance	3951.3 mi	Cruise Percent	9 %
Trip Fuel	621.13 gal	Top Gear Percent	58 %
Trip Time	132:30:03	Coast Percent	0 %
		Idle Percent	31 %
Speeding A	9 %	VSG Percent	1 %
Speeding B	23 %	Avg. Drive Load	48 %
		Hard Brake Count	15
PMA Percent Left	26 %	Diagnostic Code	No
PMB Percent Left	63 %		
PMC Percent Left	76 %	Highest Speed	69.5 mph
		Highest RPM	2118 rpm
Over Rev	20 %		

Report Analysis Tips: Daily Engine Usage (see sample report on facing page)

The study of vehicle usage patterns may provide the opportunity to improve vehicle utilization and reduce the number of vehicles in a fleet.

Each day of usage is divided into 12, 2 hour periods beginning and ending at midnight (see segments divided by vertical lines). Each two hour period is further divided into 30 minute intervals (see horizontal lines in each 2 hour period). The graph displays idle time for each day from the top down and driving time from the bottom up. For example, on May 23, the vehicle idled for 15 minutes and was driven for 60 minutes between 8 and 10 am. The report does not indicate the exact time of the activity, but does give an indication of the relative level of usage.

Data is available in both tabular and graphic form. Days where there is no activity are not shown on the report. The report will display information for a maximum of 30 days.

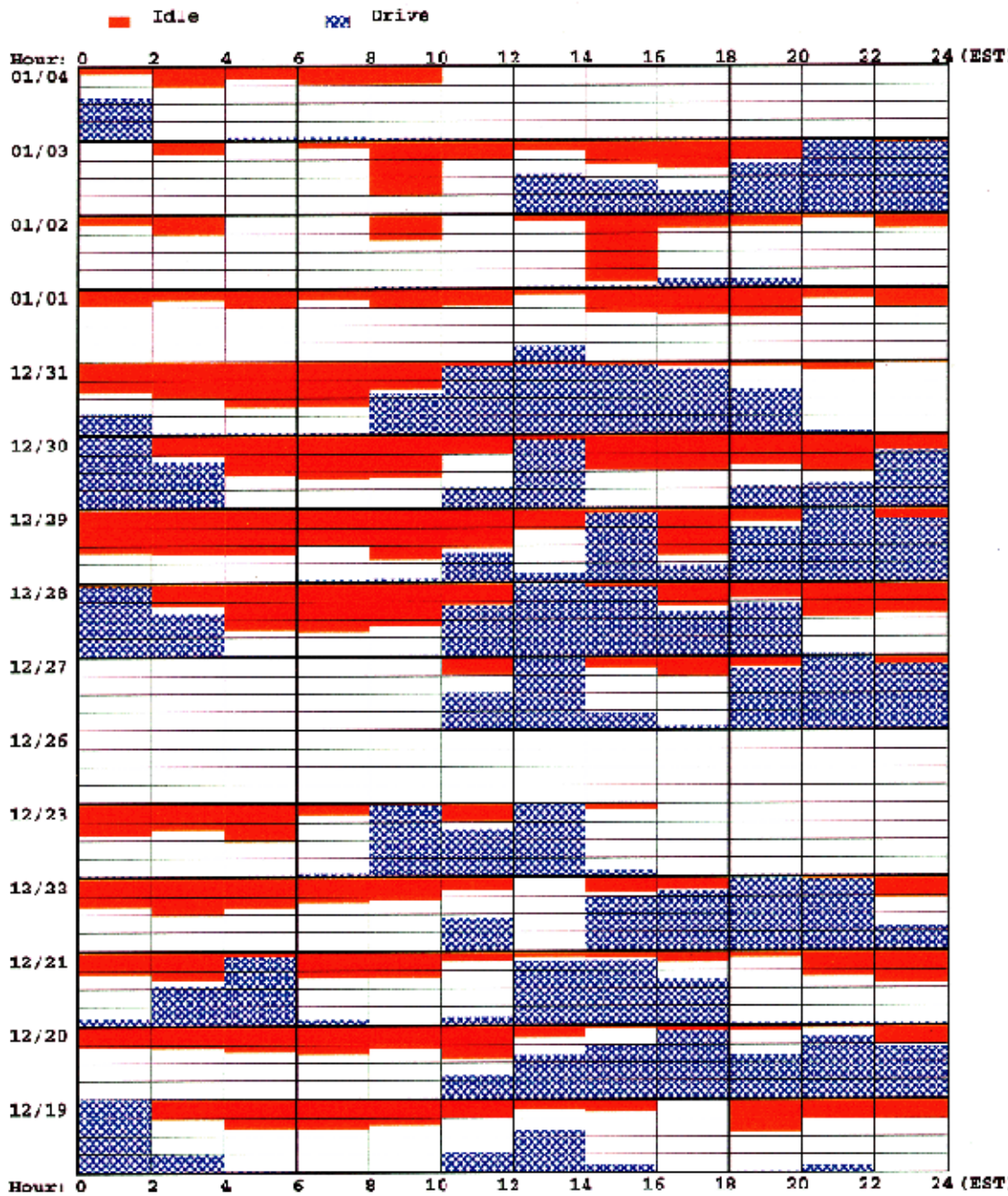
This information has been found to be especially useful to local, route intensive operations, like transit buses or delivery trucks.

DDEC® Reports - Daily Engine Usage

Print Date: Nov 28, 2001 09:35 AM (EST)

Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592 5000

Date Range: 01/04/2001 to 12/04/2000 (EST)
Vehicle ID: 3157
Driver ID:



DDEC® Reports - Daily Engine Usage

Print Date: Nov 29, 2001 09:39 AM (EST)

Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592-5000

Date Range: 01/04/2001 to 12/04/2000 (EST)
Vehicle ID: 3157
Driver ID:

Date:	01/04/2001
Start Time:	00:00:00 (EST)
Odometer:	60422.2 mi
Distance:	58.6 mi
Fuel:	8.25 gal
Fuel Economy:	7.10 mpg
Average Speed:	47.5 mph

Total (hh:mm)	01:14	01:51	20:55
Hour (EST)	Drive (min)	Idle (min)	Off (min)
00:00-02:00	69	8	43
02:00-04:00	0	31	89
04:00-06:00	2	19	99
06:00-08:00	2	27	91
08:00-10:00	1	26	93
10:00-12:00	0	0	120
12:00-14:00	0	0	120
14:00-16:00	0	0	120
16:00-18:00	0	0	120
18:00-20:00	0	0	120
20:00-22:00	0	0	120
22:00-24:00	0	0	120

Date:	01/03/2001
Start Time:	03:02:59 (EST)
Odometer:	60038.7 mi
Distance:	383.4 mi
Fuel:	53.50 gal
Fuel Economy:	7.17 mpg
Average Speed:	48.0 mph

Total (hh:mm)	07:59	04:34	11:27
Hour (EST)	Drive (min)	Idle (min)	Off (min)
00:00-02:00	0	0	120
02:00-04:00	0	20	100
04:00-06:00	0	0	120
06:00-08:00	0	8	112
08:00-10:00	0	90	30
10:00-12:00	0	30	90
12:00-14:00	65	13	42
14:00-16:00	55	36	29
16:00-18:00	36	46	38
18:00-20:00	84	30	6
20:00-22:00	120	0	0
22:00-24:00	119	1	0

Date:	01/02/2001
Start Time:	00:49:58 (EST)
Odometer:	60034.9 mi
Distance:	3.9 mi
Fuel:	3.75 gal
Fuel Economy:	1.04 mpg
Average Speed:	10.2 mph

Total (hh:mm)	00:23	04:28	19:09
Hour (EST)	Drive (min)	Idle (min)	Off (min)
00:00-02:00	0	14	106
02:00-04:00	0	30	90
04:00-06:00	0	0	120
06:00-08:00	0	0	120
08:00-10:00	0	42	78
10:00-12:00	0	0	120
12:00-14:00	0	9	111
14:00-16:00	0	111	9
16:00-18:00	11	20	89
18:00-20:00	12	18	90
20:00-22:00	0	3	117
22:00-24:00	0	21	99

Report Analysis Tips: Life-To-Date (see sample report on facing page)

DDEC IV accumulates data from the time it is first put into service.

DDEC® Reports - Life-To-Date

Print Date: Oct 26, 1999 07:59 AM

Detroit Diesel Corporation
13400 Outer Drive, West
Detroit, MI 48239
(313) 592-5000

Trip: 04/26/99 to 04/26/99
Vehicle ID: 32772
Driver ID:
Odometer: 231660.2 mi

Trip Distance	0.0 mi	Trip Time	0:00:00
Trip Fuel	0.00 gal	Fuel Consumption	0.00 gal/h
Fuel Economy	0.00 mpg	Idle Time	0:00:00
Avg Drive Load	0 %	Idle Percent	0.00 %
Avg Vehicle Speed	0.0 mph	Idle Fuel	0.00 gal

Total Distance	231660.2 mi	Eng. Brake Time	197:56:07
Total Time	5580:40:26	Revolutions/mi	1881
Total Fuel	37237.63 gal	Average RPM	1301
Idle Time	1429:23:42	Avg. Drive Load	47 %
Idle Percent	25.61 %		
Idle Fuel	961.25 gal	Optimized Idle	
		Active Time	0:00:00
		Run Time	0:00:00
VSG(PTO) Time	1275:58:18		
VSG(PTO) Percent	22.86 %		
VSG(PTO) Fuel	855.38 gal	Fan On Time	
		Total Time	948:22:33
		Engine System	297:03:53
Cruise Percent	19.30 %	Manual	0:00:00
Cruise Time	801:23:45	A/C	651:18:40