VOLVO CONSTRUCTION EQUIPMENT
MATRIS REPORT

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Company name	Dealer	Report Issuer
volvo	arnold machinery	

Contact name	Technician	Primary Application
mike seifert	CE Tech	Sand, gravel and pebble

Site	Workorder	Ground Condition

MATRIS Reading, Summary / Recommendation

Machine model	SerialNo	Operating Hours	Reading Date
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Main equipment	Type	Equipment
	Tyre size/class	Sold without tyres
	Body extensions	Not mounted
	Tail-gate	Not mounted
	Extra spillguard	Not mounted
	Wear plates	Not mounted
	Pattern	None

Machine model	SerialNo	Operating Hours	Reading Date
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Machine utilization (%)

Neutral (Idle): 35.7
Gear engaged: 64.3
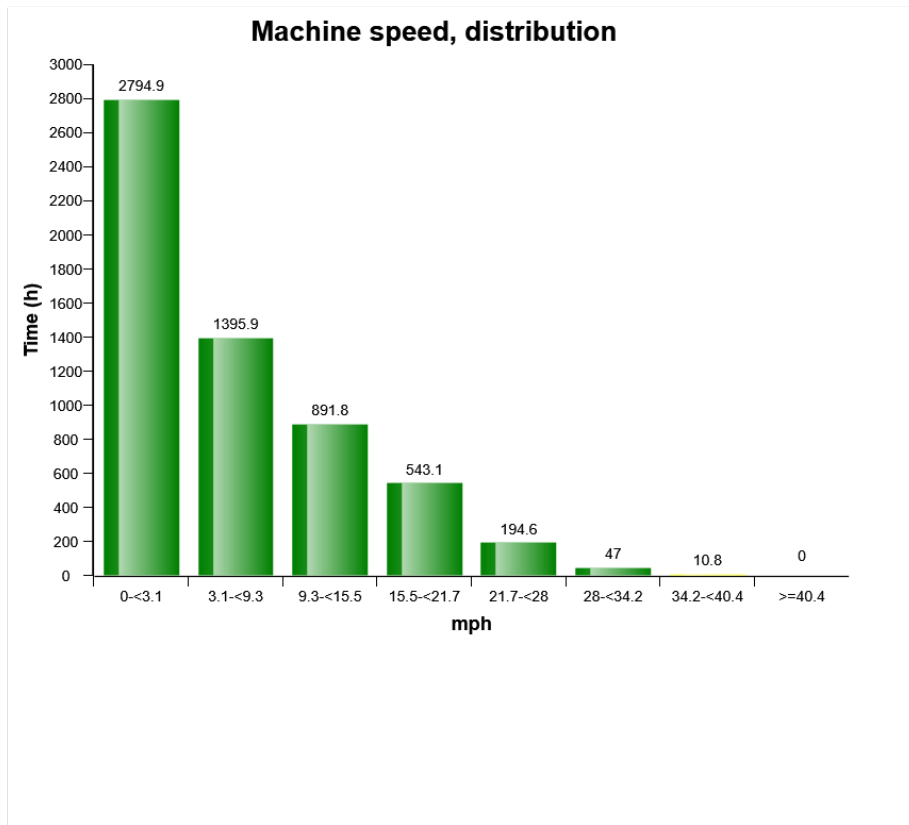
Total logged time (h) = 5279.4
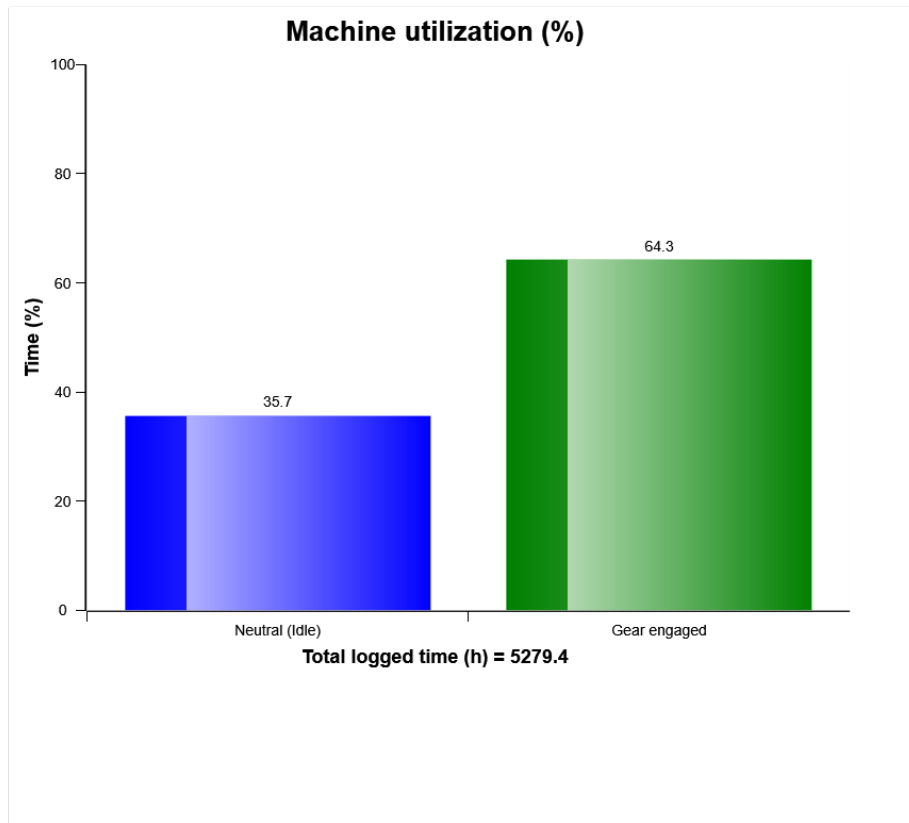
The diagram shows a simplified presentation of the machines utilization based on the relation between time in gear and time in neutral. The "Gear engaged " includes both forward and reverse gears.

This presentation of the machines utilization can only be seen as a guideline value since a full calculation of the machines utilization is more advanced. E.g. "Neutral" includes time for loading and dumping which should be seen as operating time.

High percentage of neutral time may indicate that the machine is underused due to e.g. under dimensioned loading tool or oversized hauler fleet

Machine model	SerialNo	Operating Hours	Reading Date
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Machine speed, distribution

Chart — Time (h) on vertical axis, mph on horizontal axis:

- 0-<3.1: 2794.9
- 3.1-<9.3: 1395.9
- 9.3-<15.5: 891.8
- 15.5-<21.7: 543.1
- 21.7-<28: 194.6
- 28-<34.2: 47
- 34.2-<40.4: 10.8
- >=40.4: 0

The presentation shows the time in hours in speed-intervals for the machine.

Note that the interval 0-3,1 mile/h includes machine not in motion. If the machine has been operated above 34,2 Mile/h there is a risk of engine over speed, check "Engine speed, over 2100 rpm"
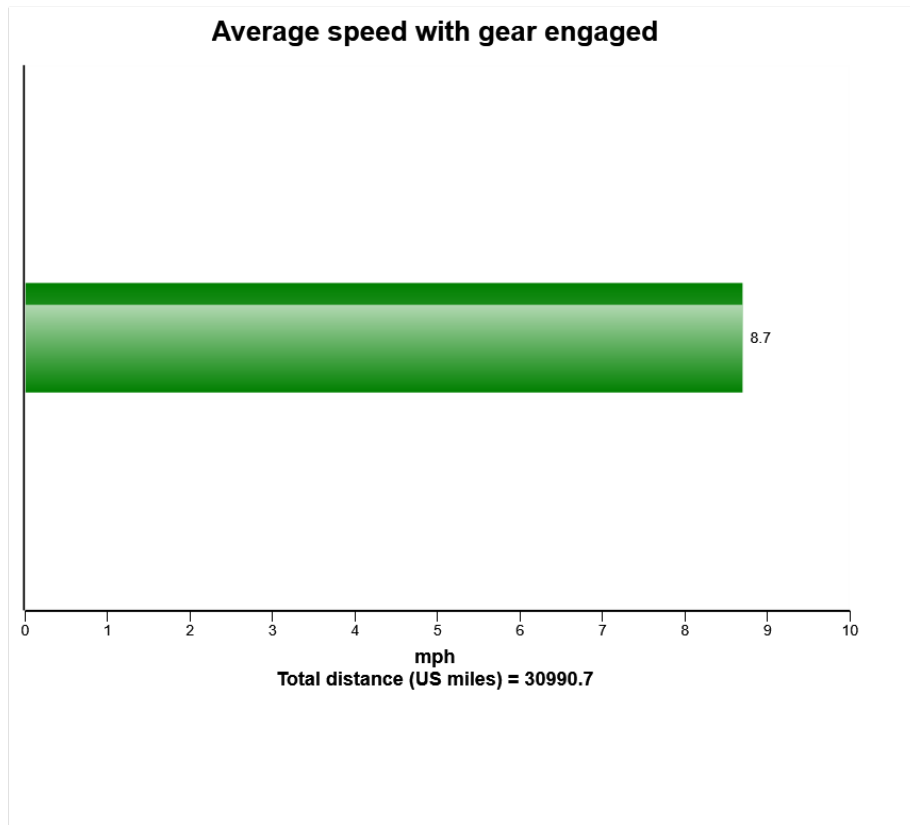
Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Average speed over total operating hours

mph
Total distance (US miles) = 30990.7
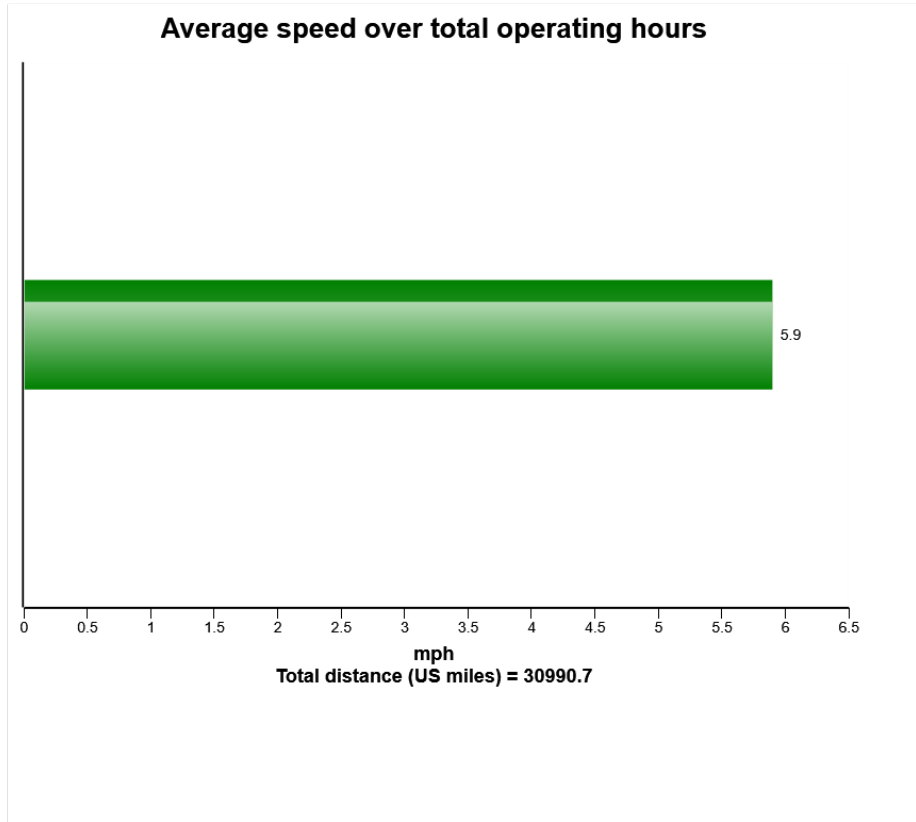
The diagram shows the machines average speed based on the total operating hours

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Average speed with gear engaged

8.7

mph
Total distance (US miles) = 30990.7

The diagram shows the machines average speed based on the operating hours with gear engaged.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Fuel consumption

US-gallon

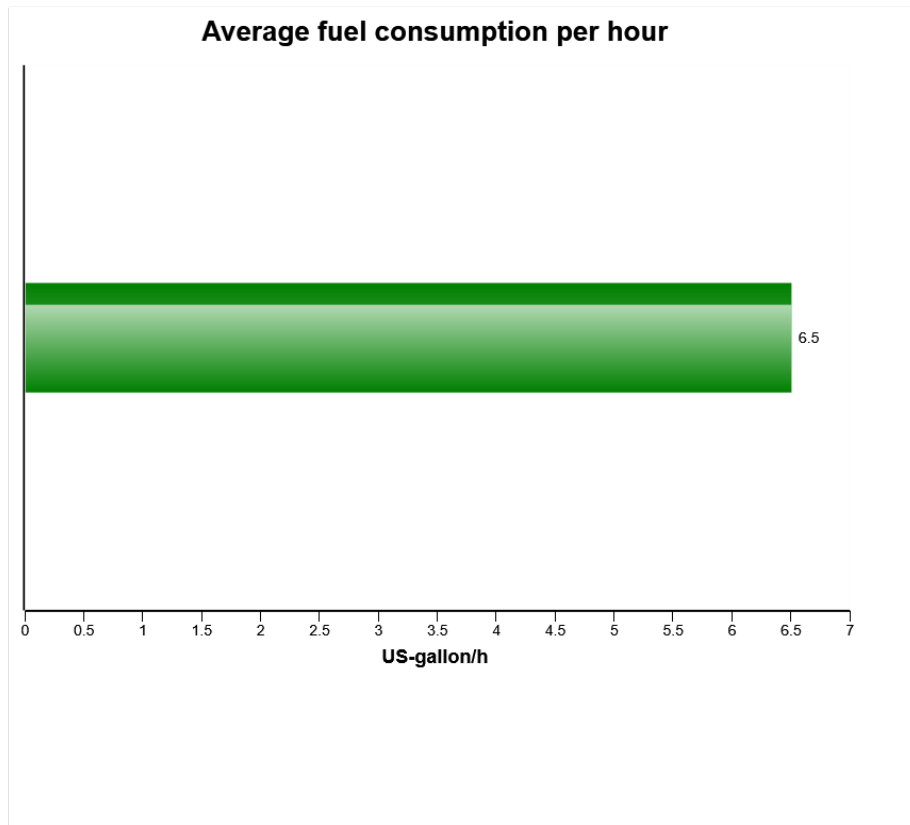| Total fuel consumption	Fuel consumption with gear engaged	Fuel consumption, idle
39056	36945	2111

Total logged time (h) =
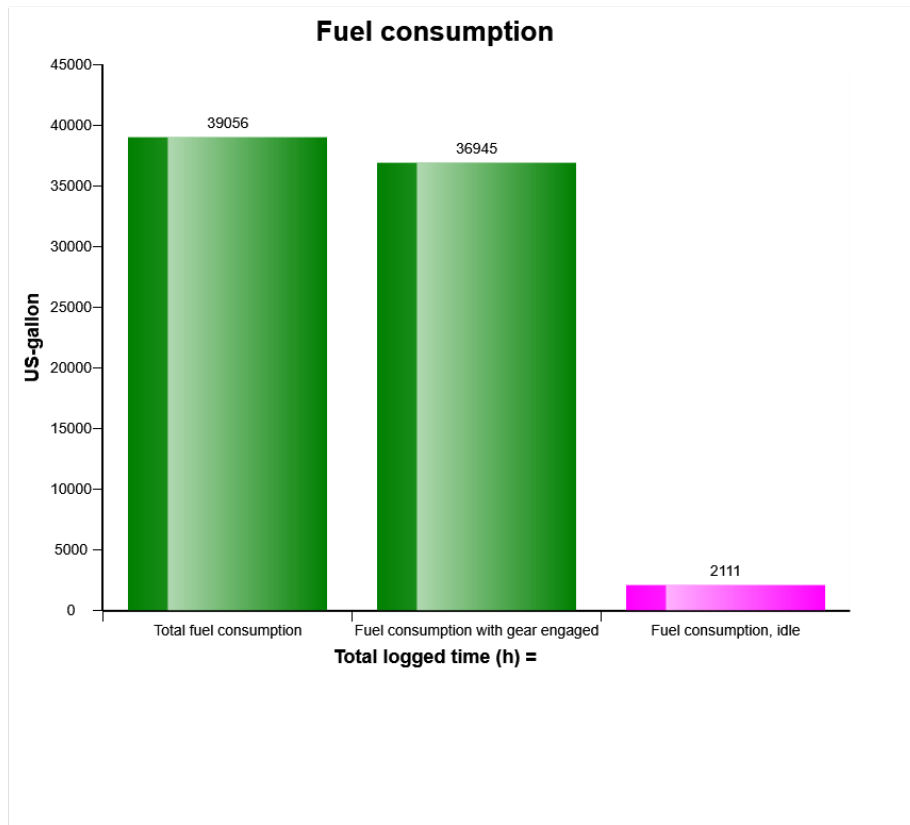
The diagram shows the total fuel consumption, fuel consumption with gear engaged and fuel consumption during idle.

High fuel consumption during idle can indicate that the machine is not fully utilized.

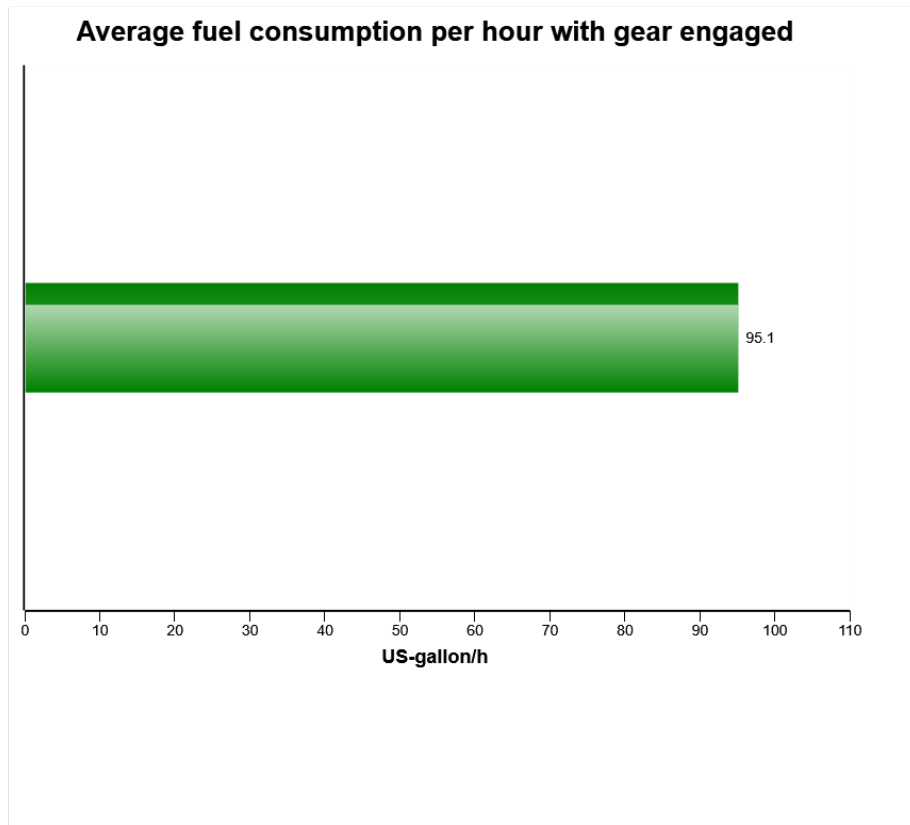| Machine model	SerialNo	Operating Hours	Reading Date
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Average fuel consumption per hour

6.5

US-gallon/h

The diagram shows the average fuel consumption based on total operating hours

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Average fuel consumption per hour with gear engaged

95.1

US-gallon/h

The diagram shows the average fuel consumption based on operating hours with gear engaged

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Average fuel consumption

US-gallon/h

95.1

6.5

Total fuel consumption

Fuel consumption with gear engaged
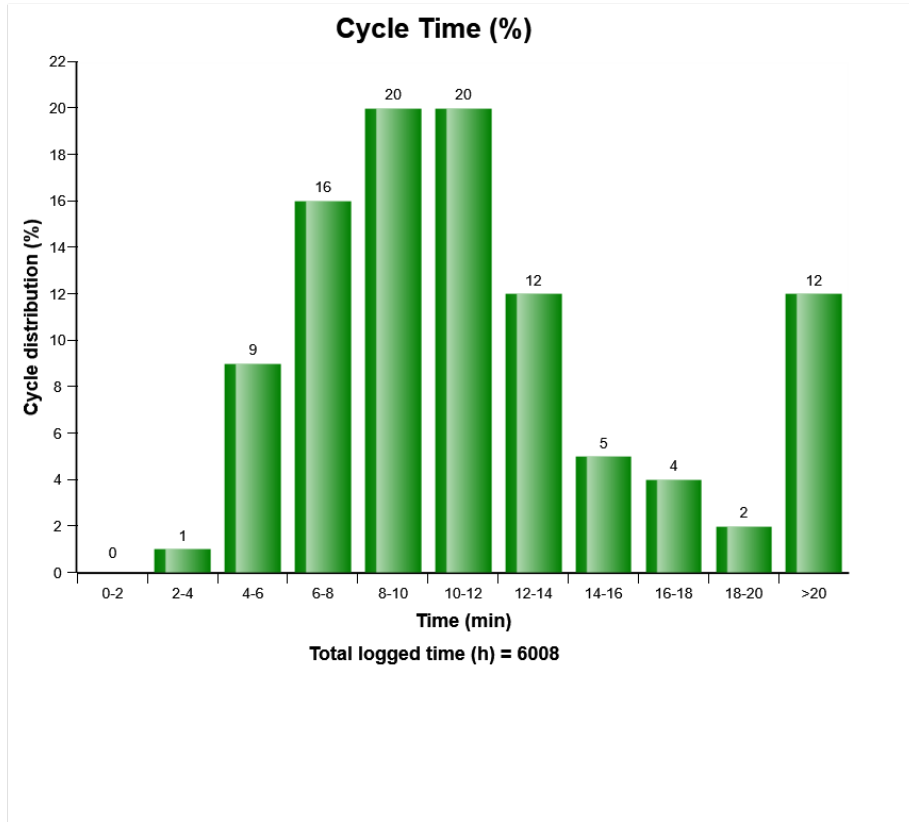
Total logged time (h) = 6008.1
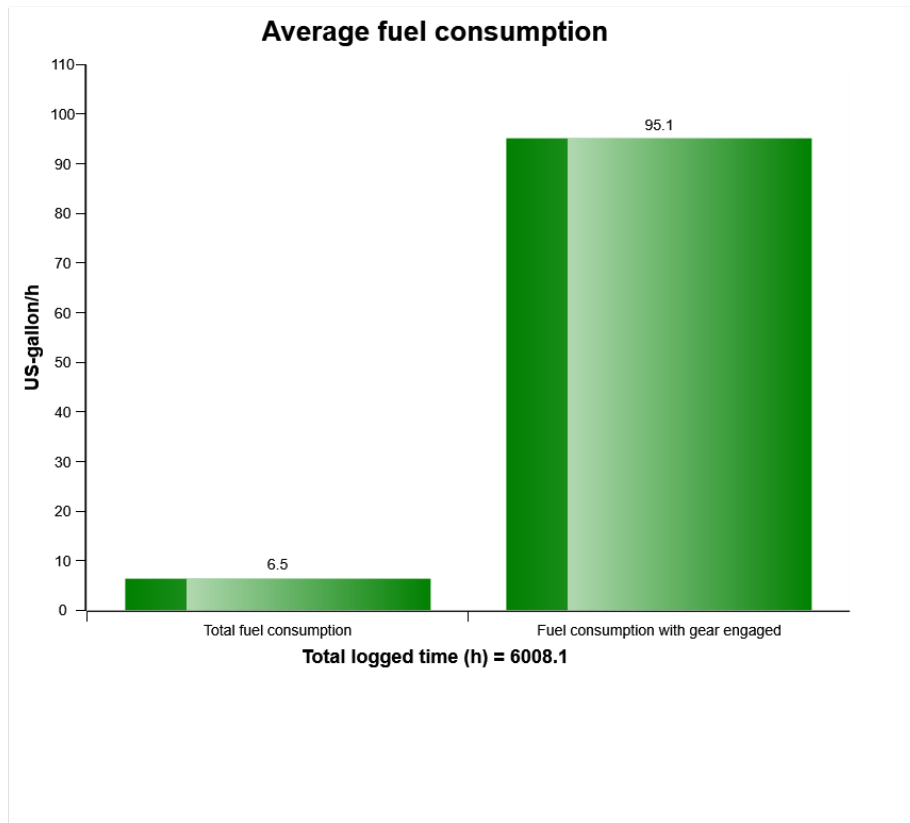
The diagram shows the total average fuel consumption versus average fuel consumption with gear engaged.

Big difference between the bars can indicate that the machine is not fully utilized, high idle lowers the total average fuel consumption.
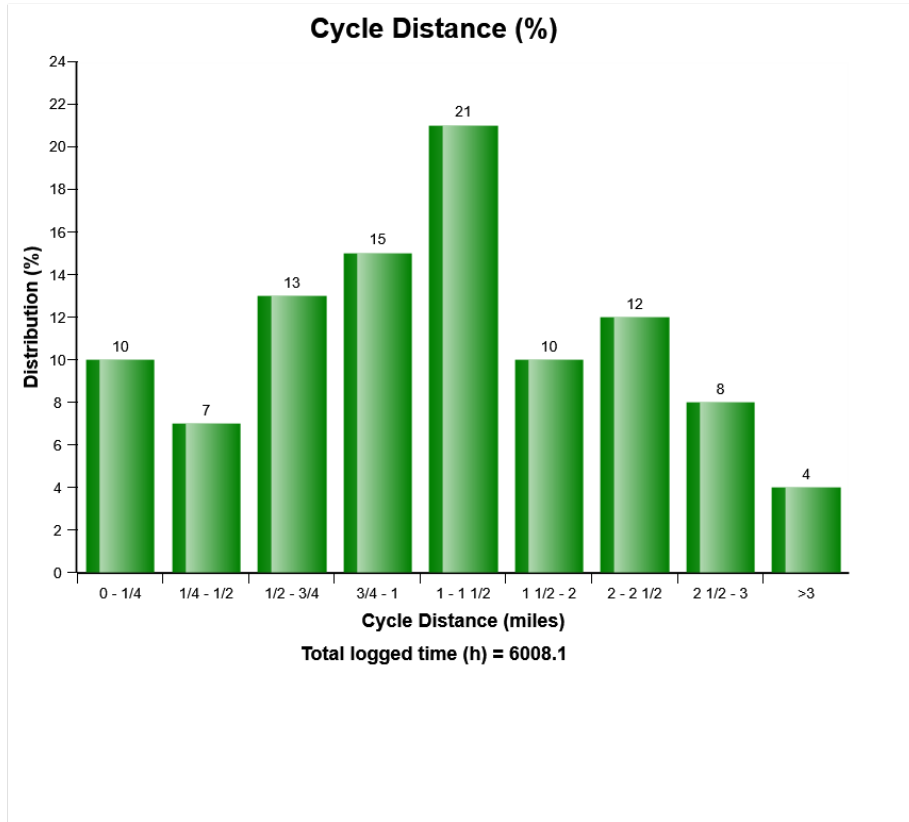
Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Cycle Time (%)

Cycle distribution (%)

Time (min)	Value
0-2	0
2-4	1
4-6	9
6-8	16
8-10	20
10-12	20
12-14	12
14-16	5
16-18	4
18-20	2
>20	12

Total logged time (h) = 6008

The diagram shows the distribution of the working cycle time. The time between 2 valid cycle registrations is registered. Time starts from lifting the body.

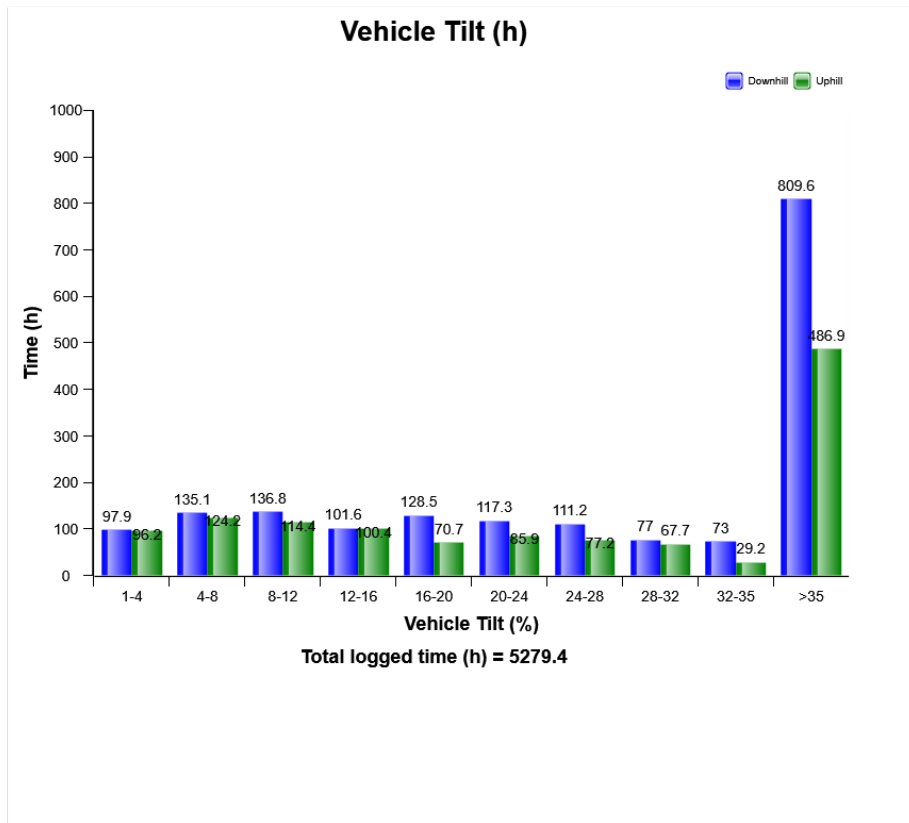| Machine model	SerialNo	Operating Hours	Reading Date
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Cycle Distance (%)

The diagram shows the distribution of the working cycle distance. The distance driven between 2 valid cycle registrations.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Vehicle Tilt (h)

The diagram shows the distribution of the longitudinal tilt in percent (not degrees), the criteria to get registrations is that the vehicle speed exceeds 1km/h (0,62mph) and that the engine is on.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Accumulated performance
Total logged time (h) =

Total logged time (h) =	
Fuel consumption (US-gallons)	
Production (ton,US)	
Ton/h	
Ton/gal	
Fuel efficiency (US Gal/ton)	
Number of cycles	
Cycles overloaded (%)	
Load utilisation / cycle (%)	

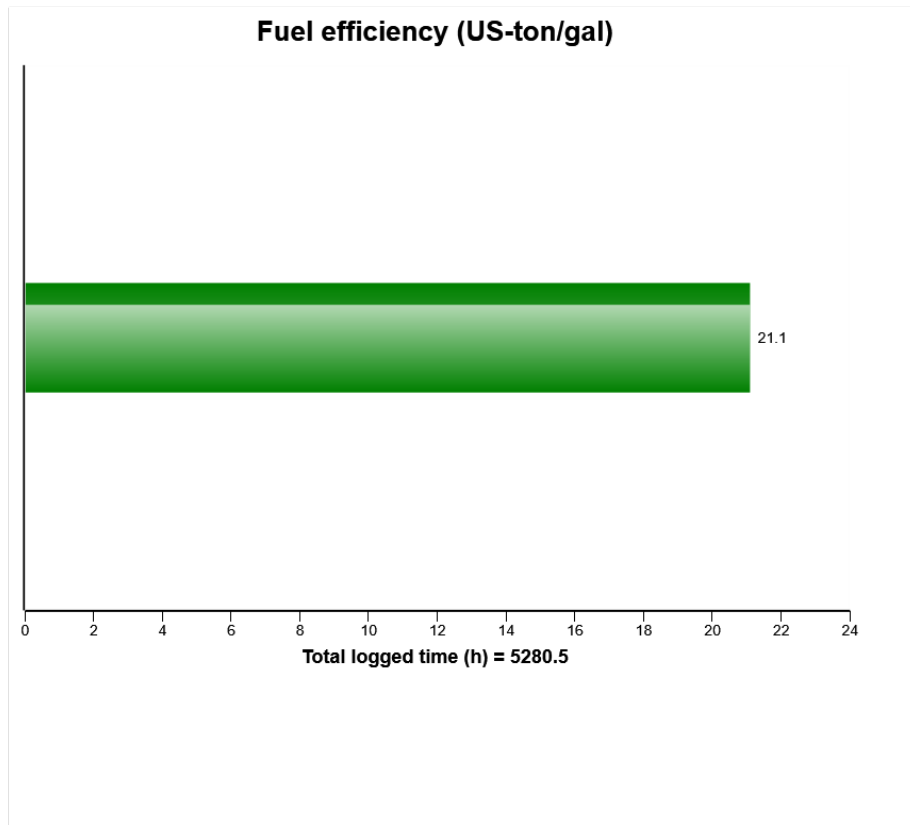The table shows the accumulated values for respectively area stated in the table.

Values are saved over the life of the machine only when the engine is running.

5280.5
33301
701142
132.8
21.1
0.05
18238
2
89

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Fuel efficiency (US-ton/gal)

21.1
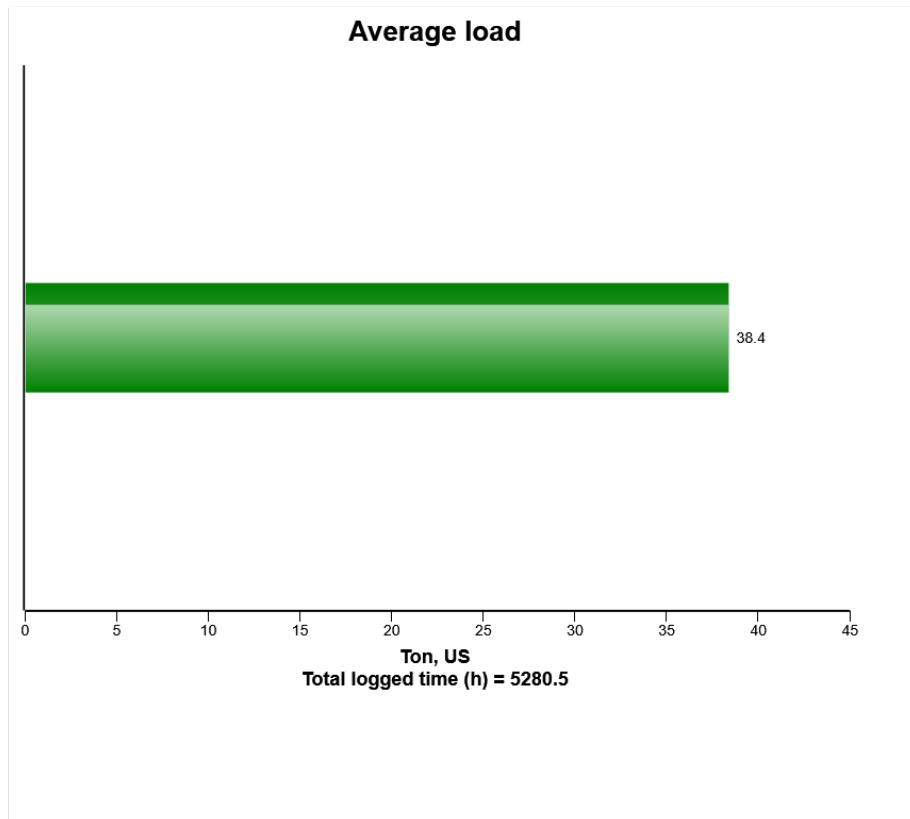
Total logged time (h) = 5280.5

The presentation display the average produced tonne per fuel unit over the machines lifetime

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Average load

Ton, US
Total logged time (h) = 5280.5

An error has occurred while processing HtmlTextBox 'htmlTextBox1':
'WordSection1' is an unexpected token. The expected token is '"' or '''. Line 1, position 18.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Average cycle time

-642.8

| -644 | -643 | -642 | -641 |

Minute
Total logged time (h) = 5279.9

<div style="border:1px solid red; color:red;">
An error has occurred while processing HtmlTextBox 'htmlTextBox1':
'WordSection1' is an unexpected token. The expected token is '""' or '"'. Line 1, position 18.
</div>

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Average cycle distance

US miles
Total logged time (h) = 5279.9

An error has occurred while processing HtmlTextBox 'htmlTextBox1':
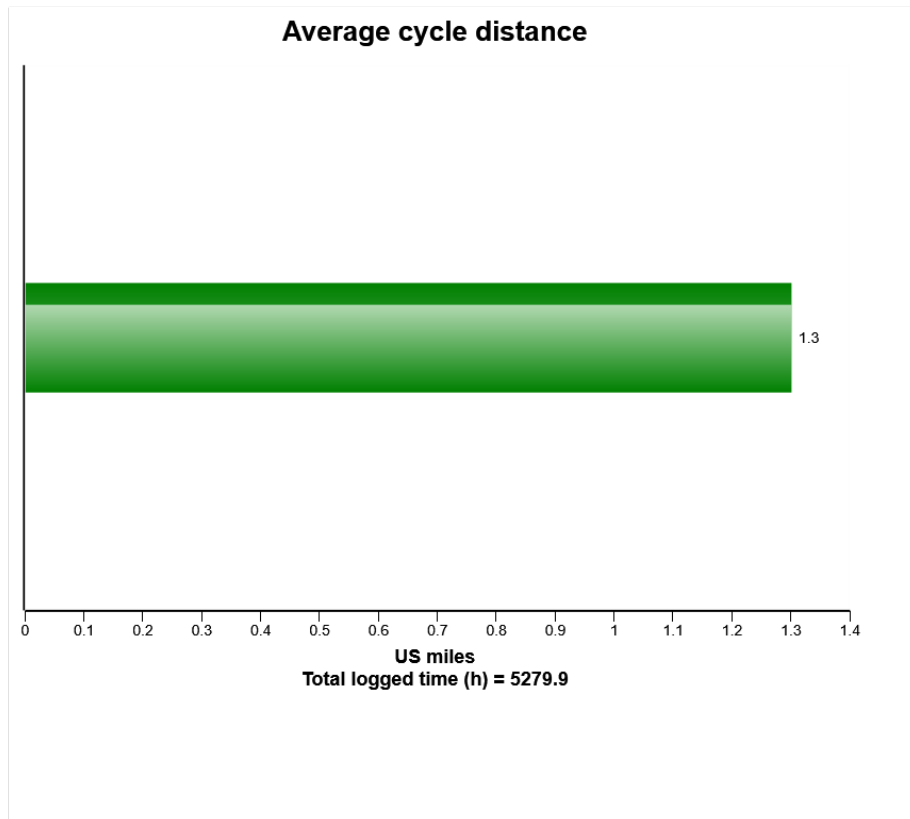'WordSection1' is an unexpected token. The expected token is '"' or '''. Line 1, position 18.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Average number of cycles per hour

3.5

Total logged time (h) = 5280.5

The presentation shows the average number of cycles per hour over the machines lifetime.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Average carry back per cycle

4.3

Ton, US
Total logged time (h) = 5279.9

An error has occurred while processing HtmlTextBox 'htmlTextBox1':
'WordSection1' is an unexpected token. The expected token is '"' or '"'. Line 1, position 18.
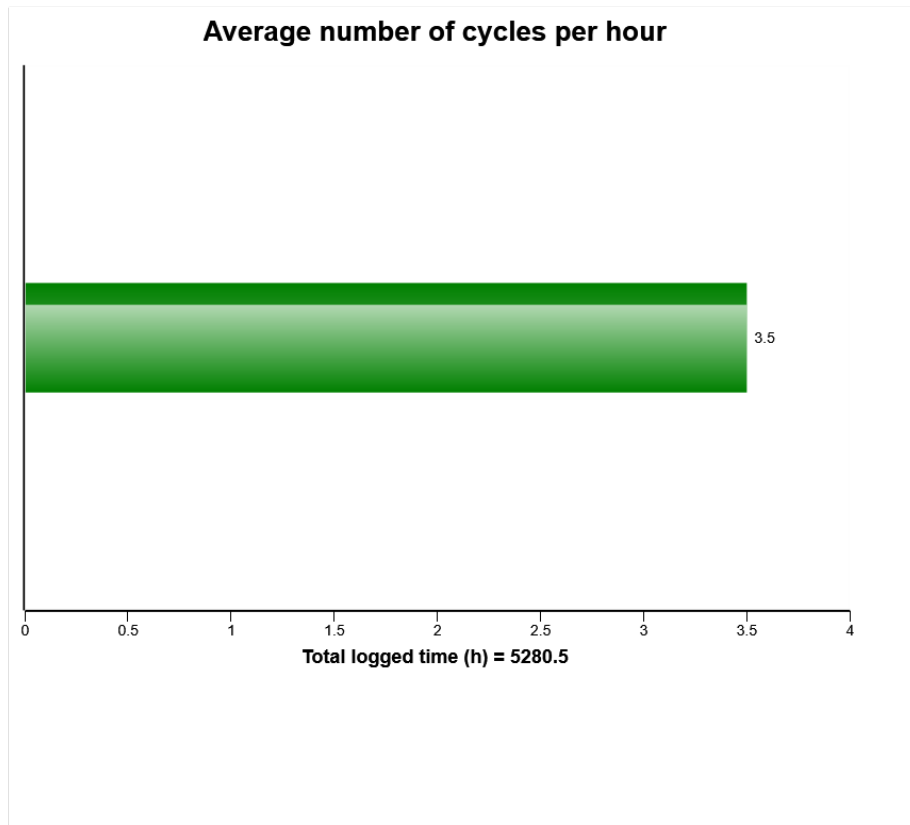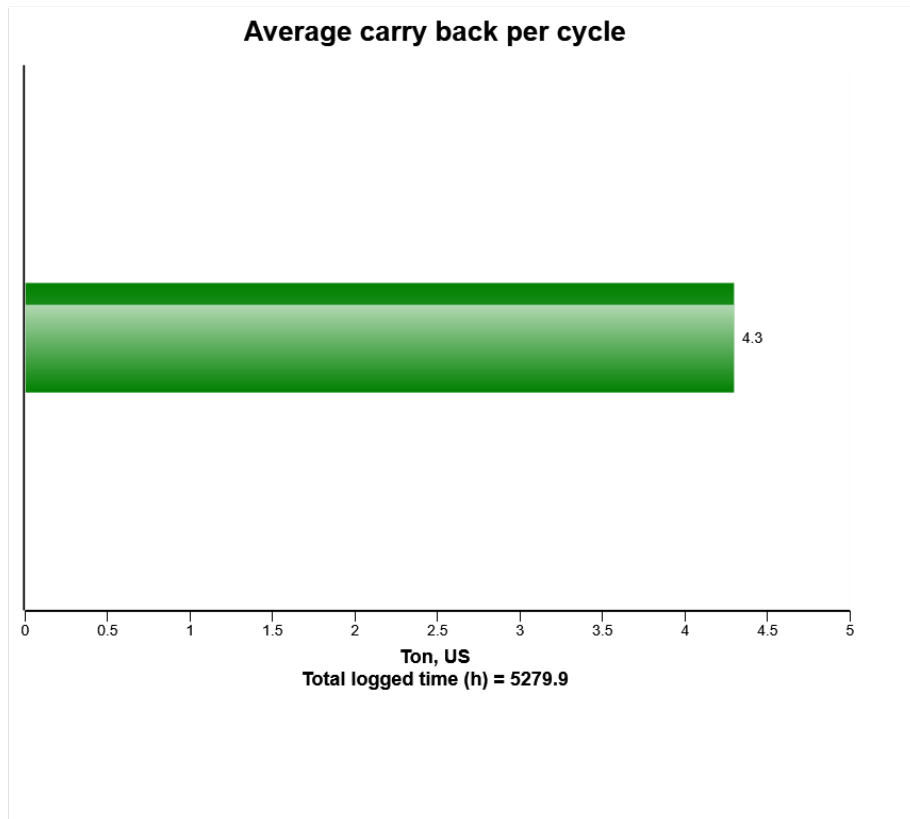
Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Overloaded cycles (%)

Total logged time (h) = 5279.9

An error has occurred while processing HtmlTextBox 'htmlTextBox1':
The ':' character, hexadecimal value 0x3A, cannot be included in a name. Line 1, position 656.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Distribution distance empty vs loaded vs overloaded (km)

Chart showing Total distance (US miles):
- Empty: 8975.3
- Loaded: 13434.6
- Overloaded: 649.4

Much time operated with overload puts unnessesery stress to the machine which could lead to shorter machine life and higher repair and maintenance cost.

Much time operated empty could indicate that the machine has been operated a lot when not in production.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

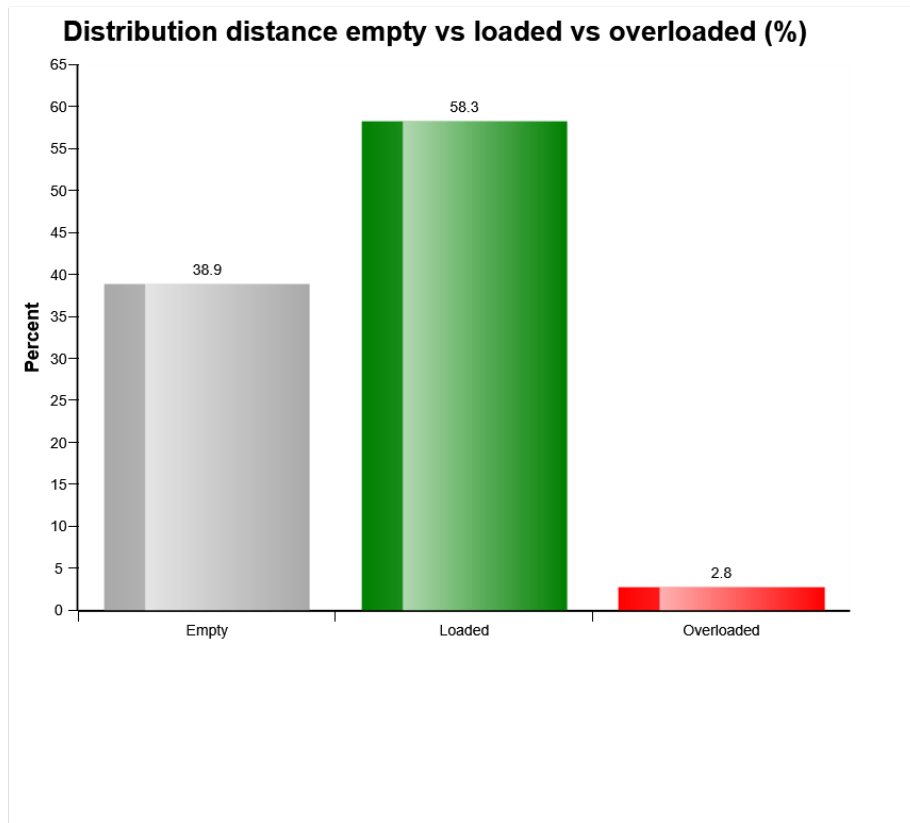**Distribution distance empty vs loaded vs overloaded (%)**

Much time operated with overload puts unnessesery stress to the machine which could lead to shorter machine life and higher repair and maintenance cost.

Much time operated empty could indicate that the machine has been operated a lot when not in production.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Engine coolant temperature, distribution (%)

Y-axis: Time (%), from 0 to 110

Temperature (°F)	Time (%)
<167	4
167-208.4	96
208.4-217.4	0
>217.4	0

X-axis: Temperature (°F)

Total time (h) = 6006

Definition:

The graph shows the time distribution of the temperature, while engine running.

Explanation:

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar   = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.

It is normal to have registrations in this region.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Green bar = Normal working temperature. The Major part of the registrations shall be in this region.

Yellow bar =   High working temperature. It is normal to have some registrations in this region.

Red bar   = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Engine coolant temperature, distribution (h)

Y-axis: Time (h)
X-axis: Temperature (°F)

- <167: 238.2
- 167-208.4: 5767.9
- 208.4-217.4: 0
- >217.4: 0

Total time (h) = 6006.2

Definition:

The graph shows the time distribution of the temperature, while engine running.

Explanation:

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar   = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.

It is normal to have registrations in this region.

Green bar = Normal working temperature. The Major part of the registrations shall be in this region.
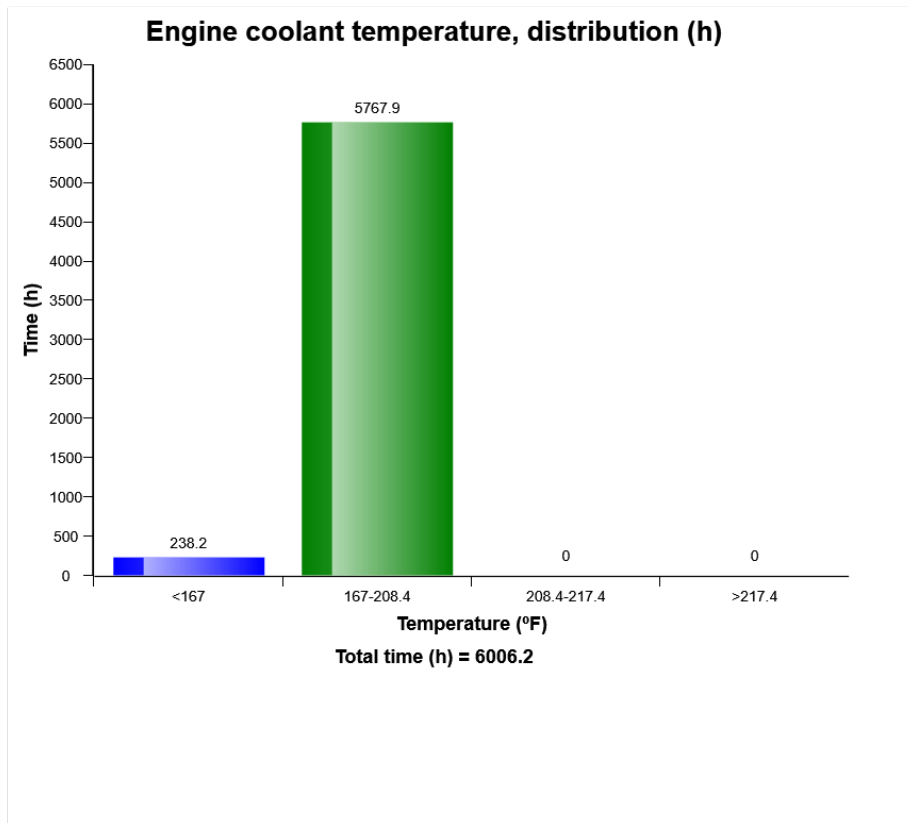
Yellow bar = High working temperature. It is normal to have some registrations in this region.

Red bar = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Engine speed, distribution (%)

Time (%) vs Engine speed (rpm)

- 1000-1200: 3.4
- 1200-1400: 15.5
- 1400-1600: 22
- 1600-1800: 12.6
- 1800-2000: 2.6
- 2000-2200: 1.5
- >2200: 0

Engine speed (rpm)
Engine run time 5279.4

An error has occurred while processing HtmlTextBox 'htmlTextBox1':
'WordSection1' is an unexpected token. The expected token is '""' or '''. Line 1, position 18.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Engine speed, distribution (h)

Engine speed (rpm)

Engine run time 5279.4

An error has occurred while processing HtmlTextBox 'htmlTextBox1':
'WordSection1' is an unexpected token. The expected token is '"' or '''. Line 1, position 18.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Start at different engine coolant temperatures (%)

Temperature (ºF)

Total number of occurences = 3998

Definition:

The graph shows the distribution of engine coolant temperature, at the starting moment.

Explanation:

Y-axis: Number of engine starts

X-axis: Engine coolant temperature.

A great proportion of engine wear is due to cold starts. Try to avoid extremely cold starts. Try using an electric coolant heater.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Under the graph the total number of engine starts is displayed.

Also see " *Number of starts / hour*" to get a complete picture of engine starting.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Start at different engine coolant temperatures

Total number of starts: 3998

Definition:

The graph shows the distribution of engine coolant temperature, at the starting moment.

Explanation:

Y-axis: Number of engine starts

X-axis: Engine coolant temperature.

A great proportion of engine wear is due to cold starts. Try to avoid extremely cold starts. Try using an electric coolant heater.

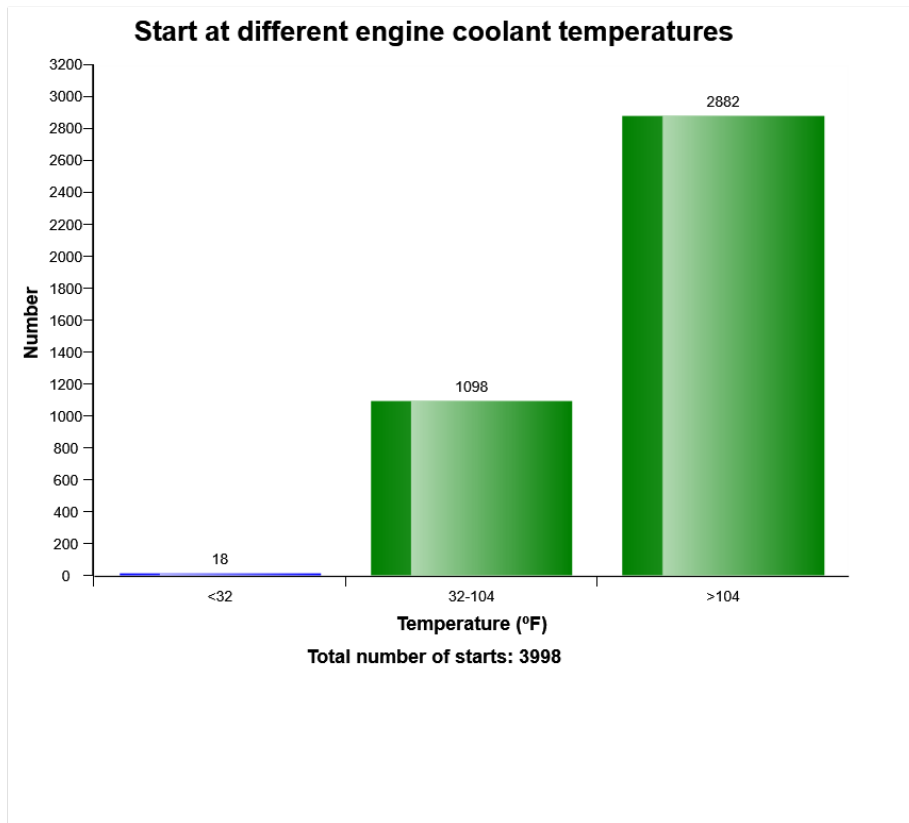| Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Under the graph the total number of engine starts is displayed.

Also see " *Number of starts / hour*" to get a complete picture of engine starting.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Average number of starts per hour

0.7

| 0 | 0.05 | 0.1 | 0.15 | 0.2 | 0.25 | 0.3 | 0.35 | 0.4 | 0.45 | 0.5 | 0.55 | 0.6 | 0.65 | 0.7 | 0.75 |

Total number of starts: 3998

Definition:

The graph describes the average number of engine starts per engine running hour.

Explanation:

X-axis: Number of average starts per hour.

The actual time used for calculation, is time with engine on

If the fuel consumption is high one reason may be that the engine is not turned off often enough, perhaps machine is left idling for long periods. Check " Machine utilization".

The value can vary a lot depending on in which application the machine is used.

To see at which different temperatures engine is started see" Start at different engine temperatures."

Machine model	SerialNo	Operating Hours	Reading Date
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Green bar = Number of average starts per hour

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

High engine coolant temperature
Total number of occurences = 1

	Op hours	Year	Month	Day	Hour	Minute	Duration (sec)
B	0	2000	0	0	0	0	0
C	0	2000	0	0	0	0	0
D	0	2000	0	0	0	0	0
E	0	2000	0	0	0	0	0
F	0	2000	0	0	0	0	0
G	0	2000	0	0	0	0	0
H	0	2000	0	0	0	0	0
I	0	2000	0	0	0	0	0
J	0	2000	0	0	0	0	0
A	1520	2016	7	29	13	10	30

Definition   :

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating hours is displayed in the first column, followed by year, month, day, hour and minute to show when an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed.

Duration :

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

Extreme value :

The extreme value column displays the most extreme value during the event.

Extreme (°F)
32
32
32
32
32
32
32
32
32
228

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Criteria :

The criteria to get an registration, is that the alarm signal for high engine coolant temperature is active and that the diesel engine is running.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Idle time before shut down (%)

Low speed shutdown= 202
Total number of engine shutdowns= 204

Definition:

This graph shows the distribution of delayed time at low idle speed until the engine is turned off.

The delayed time distribution for each bar is shown on top of its column in percentage.

The sum of bars is 100%.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

High engine oil temperature
Total number of occurences = 0

	Op hours	Year	Month	Day	Hour	Minute	Duration (sec)
A	0	2000	0	0	0	0	0
B	0	2000	0	0	0	0	0
C	0	2000	0	0	0	0	0
D	0	2000	0	0	0	0	0
E	0	2000	0	0	0	0	0
F	0	2000	0	0	0	0	0
G	0	2000	0	0	0	0	0
H	0	2000	0	0	0	0	0
I	0	2000	0	0	0	0	0
J	0	2000	0	0	0	0	0

Definition :

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating hours is displayed in the first column, followed by year, month, day, hour and minute to show when an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

Duration :

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

Extreme value :

The extreme value column displays the most extreme value during the event.

Extreme (°F)
32
32
32
32
32
32
32
32
32
32

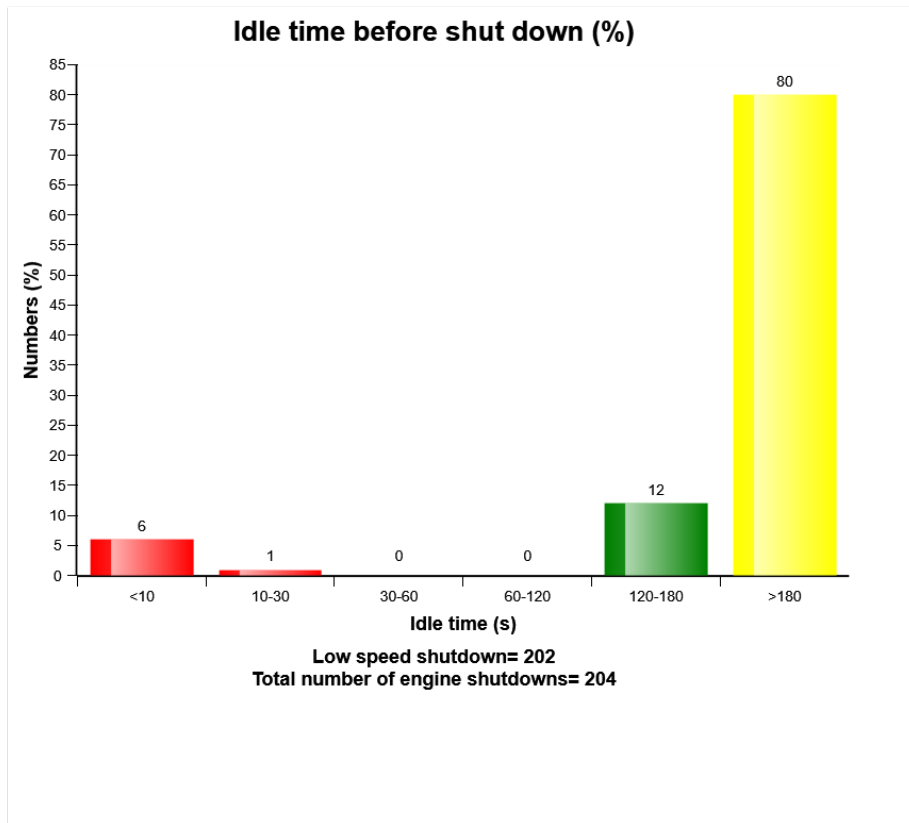| Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Criteria :

The criteria to get an registration, is that the alarm signal for high engine oil temperature is active and that the diesel engine is running.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Regeneration duration
Total number of occurences = 34

Op hours	Year	Month	Day	Hour	Minute	Duration (min)
1891	2017	5	9	9	58	32
2032	2017	5	31	14	12	39
2032	2017	5	31	13	43	12
2532	2017	9	19	14	41	46
3032	2018	1	10	15	33	46
3530	2018	5	3	6	26	19
3531	2018	5	3	19	26	38
4033	2018	8	15	10	9	30
4033	2018	8	15	10	7	1
4033	2018	8	15	9	30	36
4531	2018	11	13	12	33	26
4532	2018	11	13	13	30	39
4711	2019	5	20	16	23	66
5171	2019	9	5	9	17	62
5224	2019	9	10	22	56	26
5304	2019	9	22	6	0	57
5493	2019	10	12	14	54	47
5505	2019	10	15	10	50	46
5804	2019	11	13	8	28	54
5910	2019	11	22	10	4	57

An error has occurred while processing HtmlTextBox 'ExplanationTxb':
The 'span' start tag on line 1 position 43 does not match the end tag of 'BR'. Line 1, position 153.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Water level warning in water separator
Total number of occurences = 1

Op hours	Year	Month	Day	Hour	Minute	Duration (min)
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
5874	2019	11	18	19	12	0

An error has occurred while processing HtmlTextBox 'ExplanationTxb':
'WordSection1' is an unexpected token. The expected token is '"' or '''. Line 1, position 18.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Transmission oil, temperature distribution (%)

The diagram shows the transmission oil temperature in various temperature ranges. The time is displayed in the following ten temperature ranges:

<32ºF Temperatures below 32ºF

32-<86ºF Temperatures from 32ºF until 86ºF

86-<140ºF Temperatures from 86ºF until 140ºF

140-<158ºF Temperatures from 140ºF until 158ºF

158-<176ºF Temperatures from 158ºF until 176ºF

176-<194ºF Temperatures from 176ºF until 194ºF

194-<212ºF Temperatures from 194ºF until 212ºF

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

212-<230ºF Temperatures from 212ºF until 230ºF

230-<248ºF Temperatures from 230ºF until 248ºF
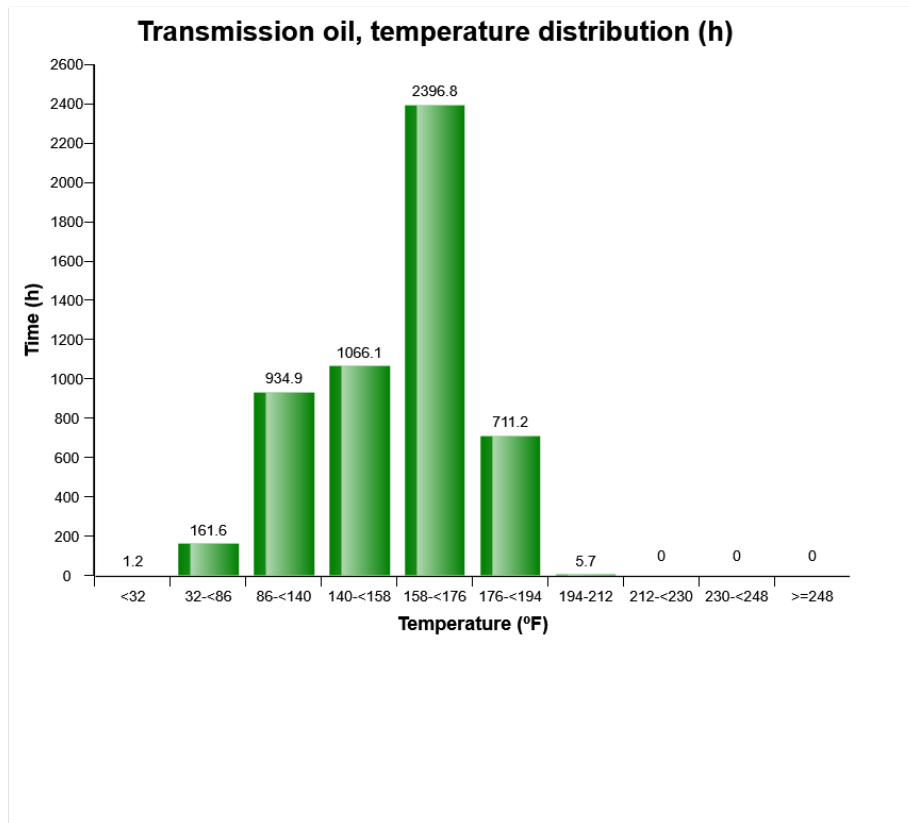
>248ºF Temperatures over 248ºF

The bar that describes temperatures from 230ºF until 248ºF is yellow and means that the oil has began to be overheated. Driver has been given orange central warning

The bar that describes >248ºF is red and means that the oil has been overheated. Driver has been given red central warning.

Oil temperatures exceeding 230ºF must be avoided since the properties of the oil are degraded

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Transmission oil, temperature distribution (h)

The diagram shows the transmission oil temperature in various temperature ranges. The time is displayed in the following ten temperature ranges:

<32ºF Temperatures below 32ºF

32-<86ºF Temperatures from 32ºF until 86ºF

86-<140ºF Temperatures from 86ºF until 140ºF

140-<158ºF Temperatures from 140ºF until 158ºF

158-<176ºF Temperatures from 158ºF until 176ºF

176-<194ºF Temperatures from 176ºF until 194ºF

194-<212ºF Temperatures from 194ºF until 212ºF

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

212-<230ºF Temperatures from 212ºF until 230ºF

230-<248ºF Temperatures from 230ºF until 248ºF
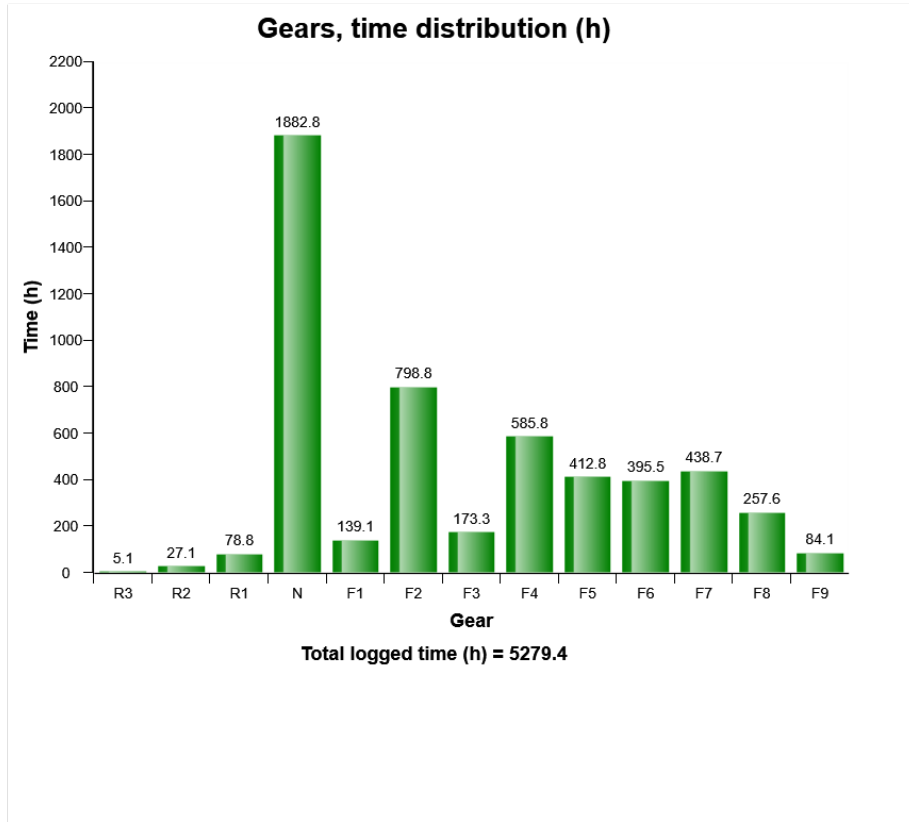
>248ºF Temperatures over 248ºF

The bar that describes temperatures from 230ºF until 248ºF is yellow and means that the oil has began to be overheated. Driver has been given orange central warning

The bar that describes >248ºF is red and means that the oil has been overheated. Driver has been given red central warning.

Oil temperatures exceeding 230ºF must be avoided since the properties of the oil are degraded
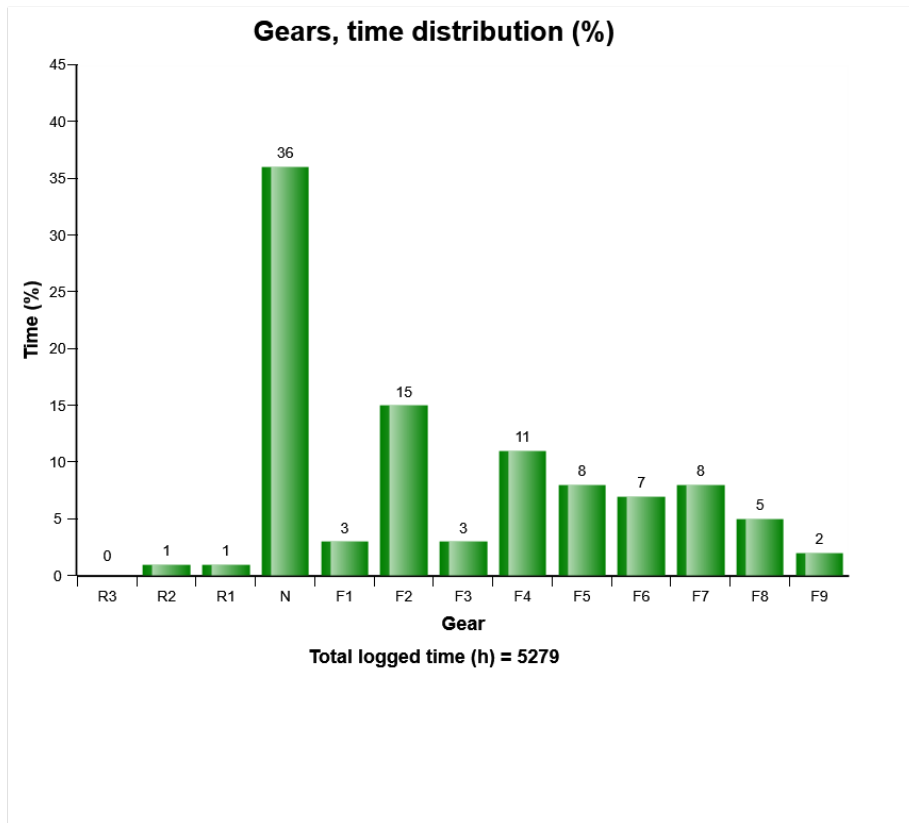
Gears, time distribution (h)

The diagram shows the time for each gear. Each bar represents a gear.

How the time is distributed between the gears depends on the operating conditions.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Gears, time distribution (%)
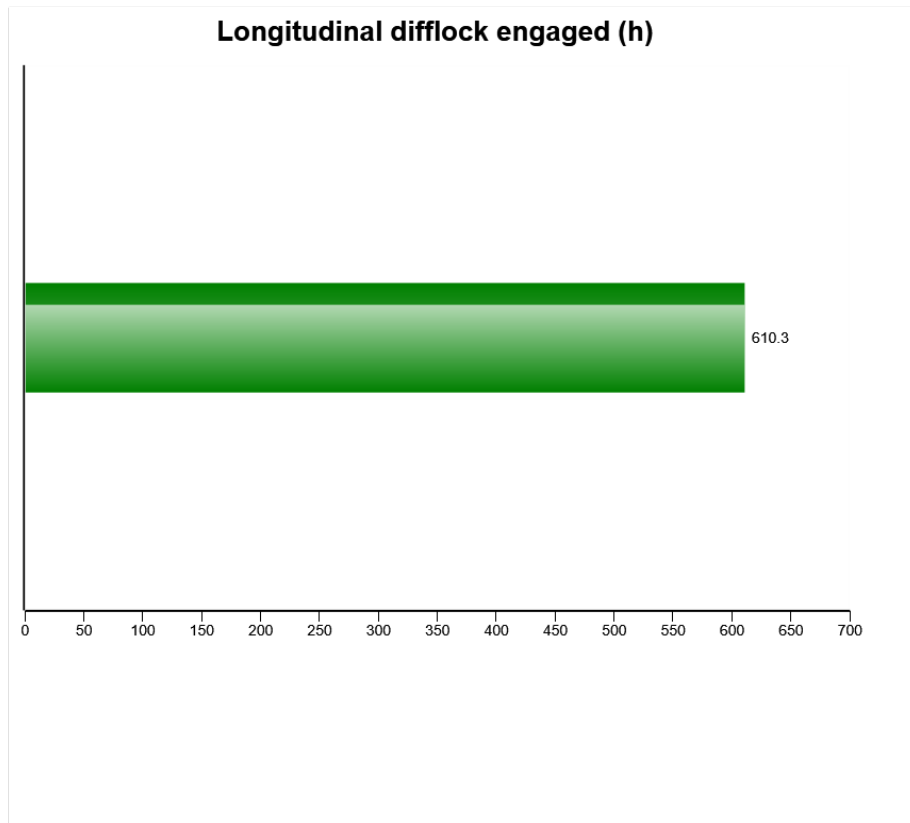

Total logged time (h) = 5279

The diagram shows the time for each gear. Each bar represents a gear.

How the time is distributed between the gears depends on the operating conditions.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Longitudinal difflock engaged (h)

610.3

0   50   100   150   200   250   300   350   400   450   500   550   600   650   700

The diagram shows how long time in hours the longitudinal difflock has been engaged. The presentation only shows time when the machine is moving as this is when the wear on the difflock occurs. The difflock should always be disengage when not needed to avoid unnecessary wear.

VOLVO

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Longitudinal difflock use related to machine in motion (%)
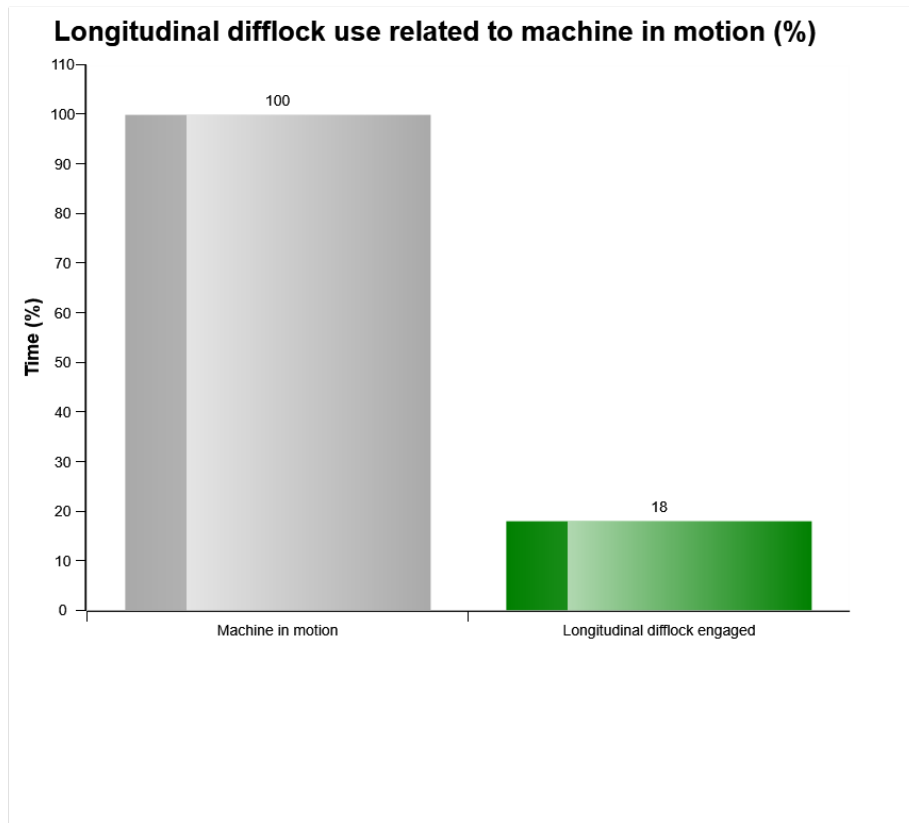
The diagram shows the percentage of engaged longitudinal difflock in relation to machine in motion.

The longitudinal difflock should always be disengaged when not needed to reduce wear.

The normal use of the longitudinal difflock in relation to the time that the machine has been operated depends on the operating conditions. Generally, the more offroad applications the machine operates in, the higher the longitudinal difflock use shall be in relation to the time that the machine has been operated. Also operating in uphill conditions on slippery surface can require longitudinal difflock.

Also check " Longitudinal difflock engaged (h)"

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Transmission oil pressure low
Total number of occurences = 5

Op hours	Year	Month	Day	Hour	Minute	Duration (sec)	Extreme (psi)
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
1727	2016	10	7	14	21	281	415
1727	2016	10	7	14	18	123	473
1728	2016	10	7	14	26	23	483
3054	2018	1	11	10	50	13	1716
3702	2018	6	20	9	42	0	0

Definition   :

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating hours is displayed in the first column, followed by year, month, day, hour and minute to show when an

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed.

Duration :

The duration of each event is shown after the timestamp of the event.

**The duration is counted as long as the criteria is fulfilled.**

Extreme value :

The extreme value column displays the most extreme value during the event.

Criteria :

In order for an occurrence of low transmission oil pressure to be recorded in a data point and the count to increment by 1, the transmission oil pressure state must change from "normal" or "error" to "low." The event of low transmission oil pressure will end when the status changes from "low" back to "normal" or "error."

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019
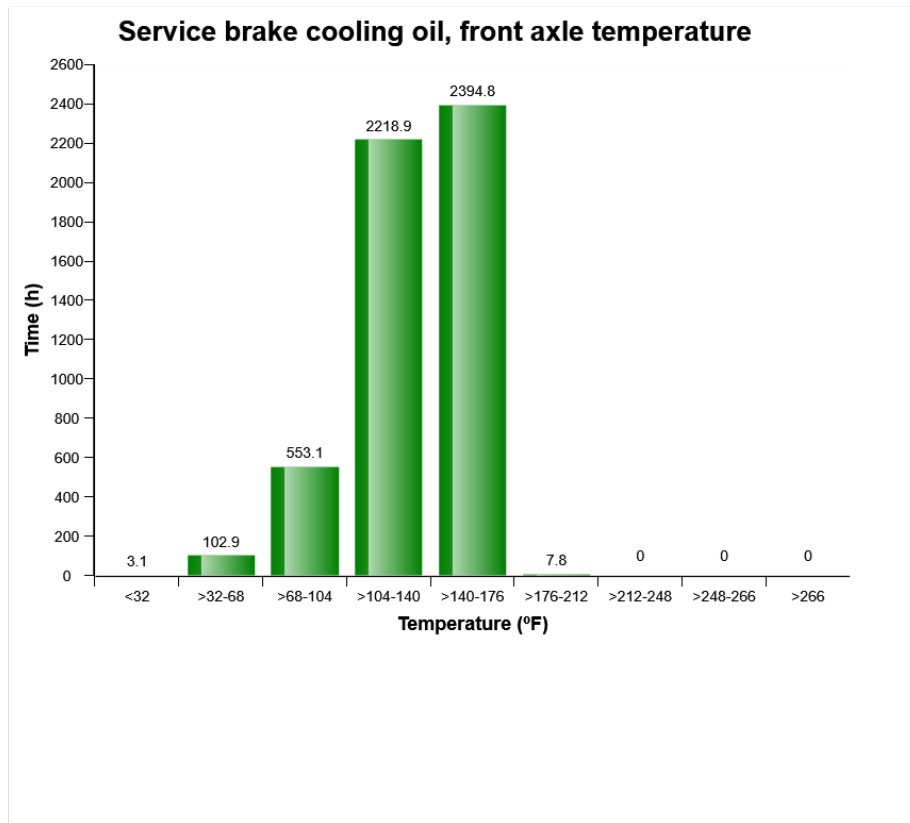
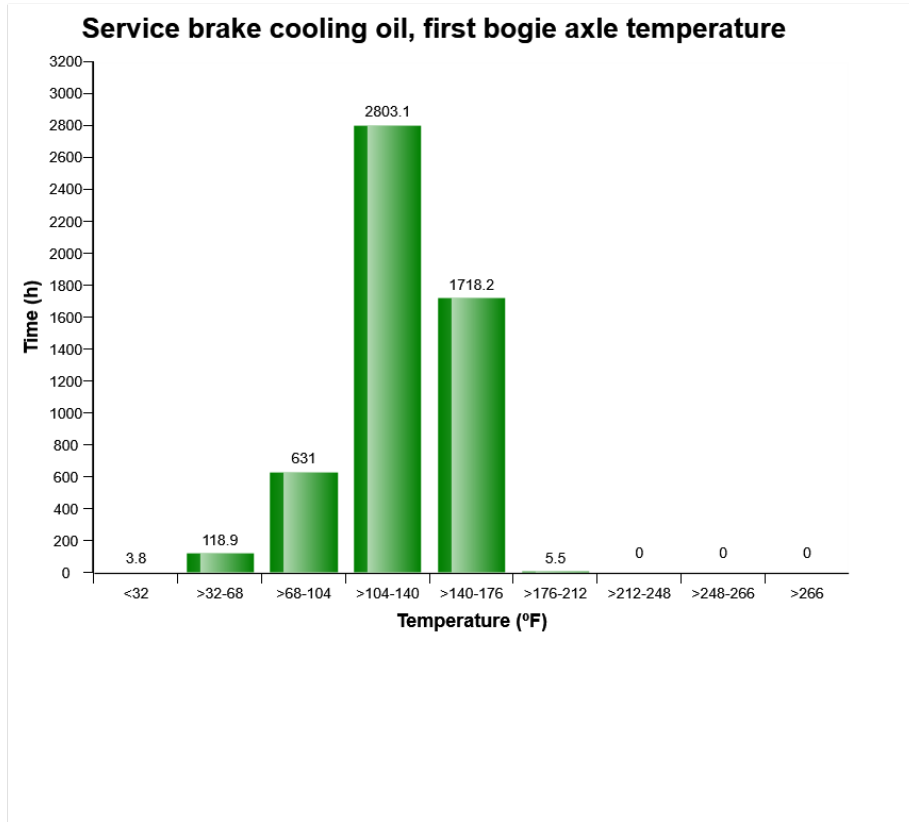**Service brake cooling oil, front axle temperature**

The diagram shows the front axle brake cooling oil temperature. The temperatures are divided into ranges, yellow bar (>248-266ºF) and red bar (>266ºF) shows abnormal temperatures. The temperature is registered in the line from the front axle to the oil cooler, that is, the warmest oil in the circuit.

The temperature shown by yellow and red bars degrade the properties of the cooling oil, and may be the result of incorrect and hard operation of the machine. Check the brake pressure distribution in the diagram "Service brake pressure, distribution (%)". If the brake cooling oil temperature is high despite normal distribution of service brake pressure, there is probably a malfunction in the brake cooling circuit

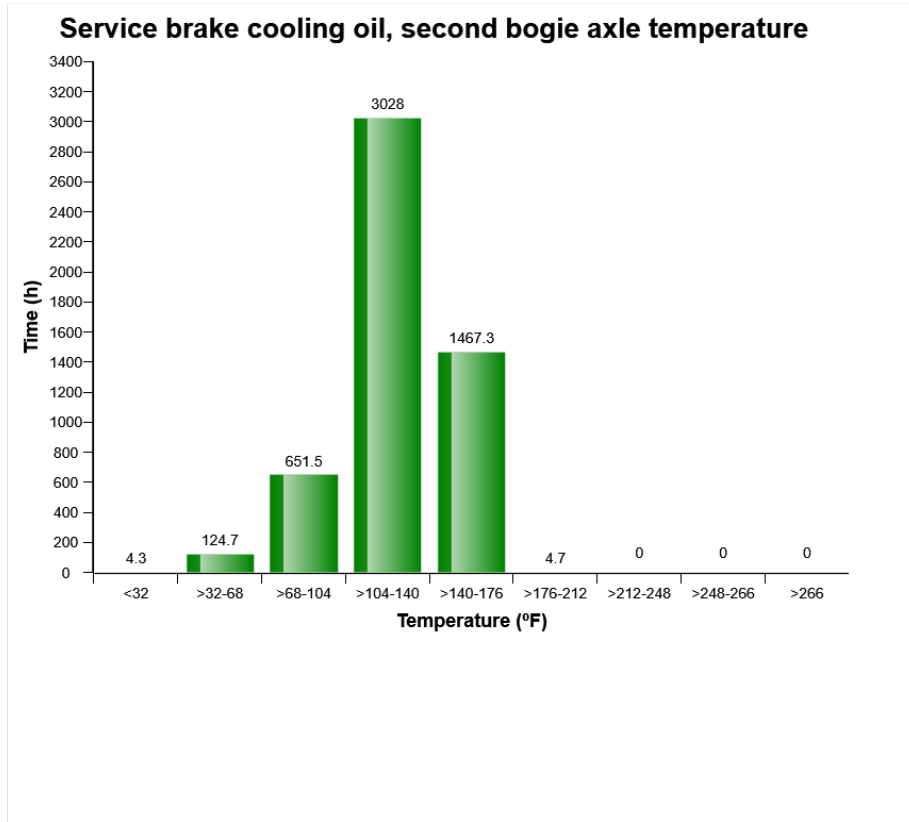**Service brake cooling oil, first bogie axle temperature**

The diagram shows the first bogie axle brake cooling oil temperature. The temperatures are divided into ranges, yellow bar (>248-266ºF) and red bar (>266ºF) shows abnormal temperatures. The temperature is registered in the line from the first bogie axle to the oil cooler, that is, the warmest oil in the circuit.

The temperature shown by yellow and red bars degrade the properties of the cooling oil, and may be the result of incorrect and hard operation of the machine. Check the brake pressure distribution in the diagram "Service brake pressure, distribution (%)". If the brake cooling oil temperature is high despite normal distribution of service brake pressure, there is probably a malfunction in the brake cooling circuit.

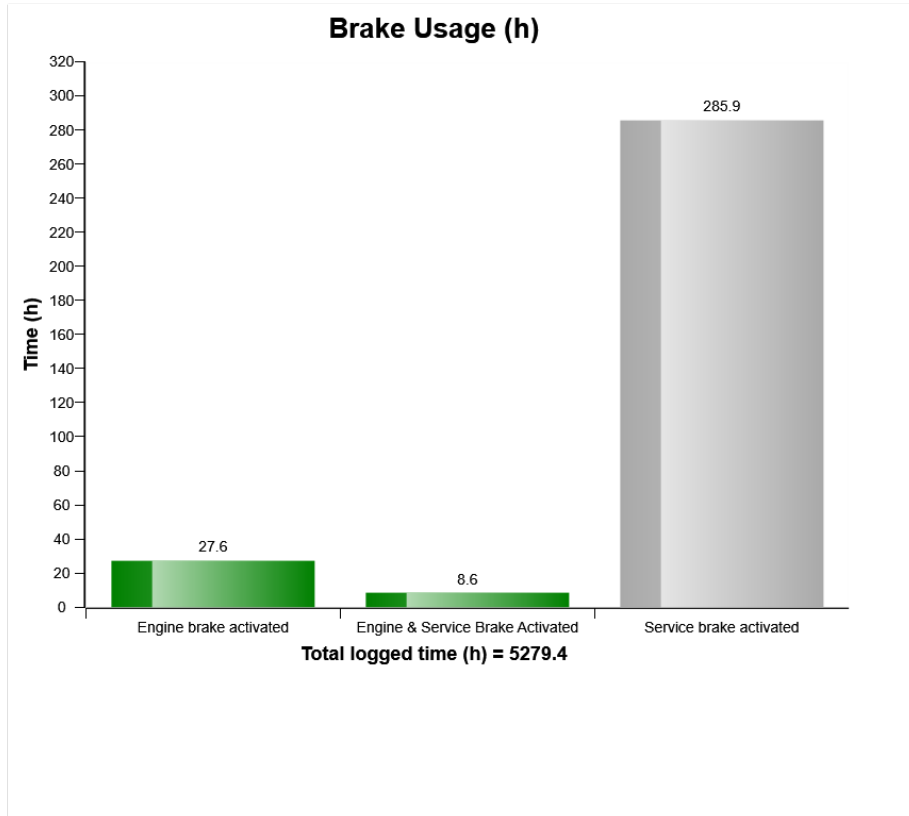**Service brake cooling oil, second bogie axle temperature**

The diagram shows the front axle brake cooling oil temperature. The temperatures are divided into ranges, yellow bar (>248-266ºF) and red bar (>266ºF) shows abnormal temperatures. The temperature is registered in the line from the second bogie axle to the oil cooler, that is, the warmest oil in the circuit.

The temperature shown by yellow and red bars degrade the properties of the cooling oil, and may be the result of incorrect and hard operation of the machine. Check the brake pressure distribution in the diagram "Service brake pressure, distribution (%)". If the brake cooling oil temperature is high despite normal distribution of service brake pressure, there is probably a malfunction in the brake cooling circuit.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Brake Usage (h)

Bar chart titled "Brake Usage (h)" with Y-axis labeled "Time (h)" ranging 0 to 320:
- Engine brake activated: 27.6
- Engine & Service Brake Activated: 8.6
- Service brake activated: 285.9

Total logged time (h) = 5279.4

An error has occurred while processing HtmlTextBox 'htmlTextBox1':
'WordSection1' is an unexpected token. The expected token is '"' or '''. Line 1, position 18.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Brake Usage (%)

Time (%)

- Engine brake activated: 8.6
- Engine & Service Brake Activated: 2.7
- Service brake activated: 88.8

Total logged time (h) = 5279.4
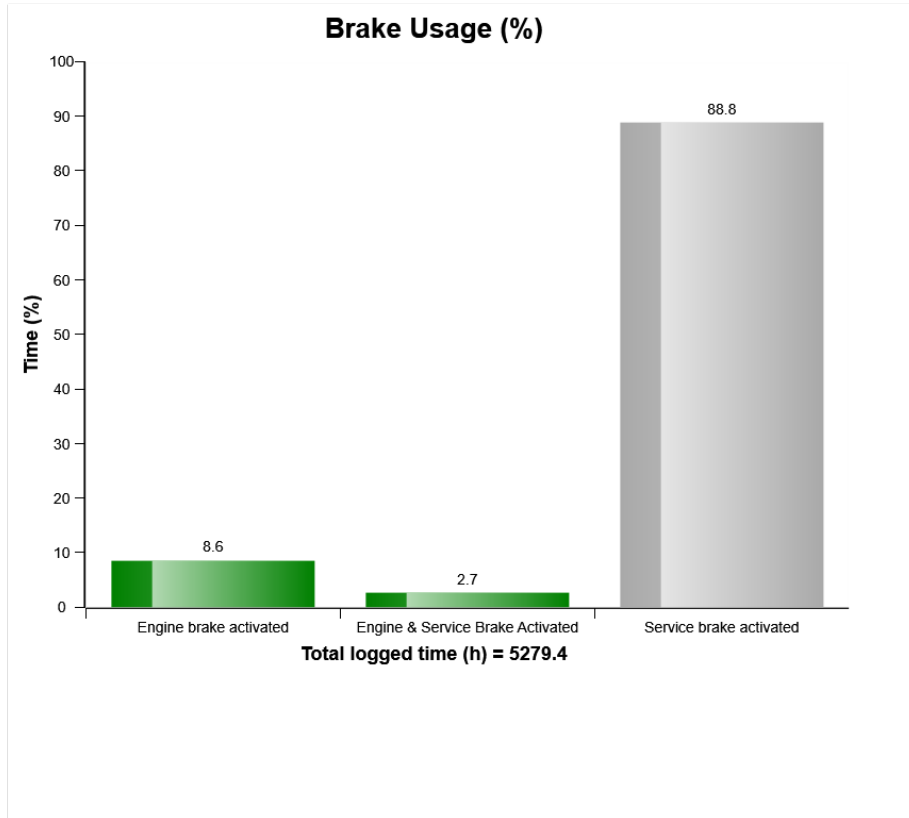
An error has occurred while processing HtmlTextBox 'htmlTextBox1':
'WordSection1' is an unexpected token. The expected token is '"' or '''. Line 1, position 18.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Low Brake Servo Pressure
Total number of occurences = 37

	Op hours	Year	Month	Day	Hour	Minute	Duration (sec)
H	3762	2018	6	28	13	31	0
I	4109	2018	8	21	7	43	0
J	4216	2018	9	28	9	16	0
A	4408	2018	10	22	7	10	0
B	4530	2018	11	2	7	8	0
C	4691	2018	12	9	20	26	12
D	4693	2019	3	27	3	30	11
E	4696	2019	5	2	0	30	0
F	5028	2019	8	9	8	50	0
G	5028	2019	8	9	8	50	0

Definition　:

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The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

Duration :

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

Extreme value :

The extreme value column displays the most extreme value during the event.

Extreme (psi)
2225
2281
1779
2126
1884
2200
1333
2151
2107
2138

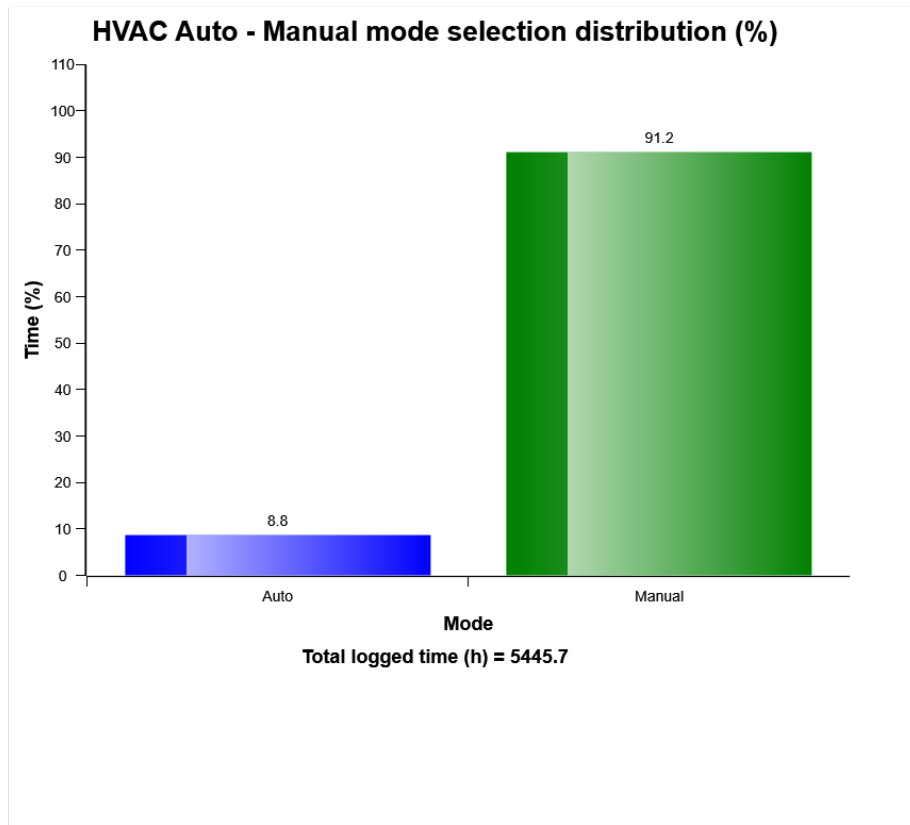| Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Criteria :

In order for an occurrence of low brake servo pressure to be recorded in a data point and the count to increment by 1, the low brake servo pressure state must be alarm. Gear not in Neutral and engine must be on.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

HVAC Auto - Manual mode selection distribution (%)

Time (%)

110
100
90 — 91.2
80
70
60
50
40
30
20
10 — 8.8
0

Auto   Manual

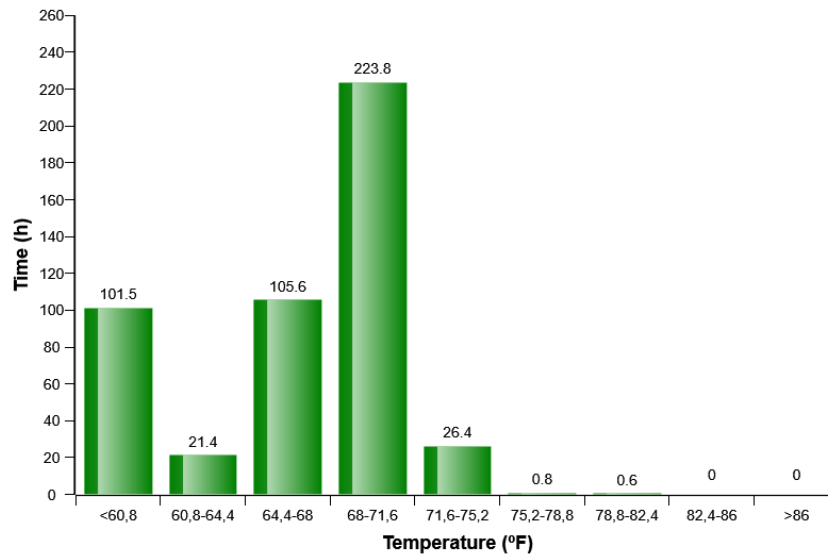**Mode**

Total logged time (h) = 5445.7

Definition:

The diagram describes auto-manual mode sele ction distribution of HVAC system in machine while it Works. The share of each mode compared to Total time of HVAC operation is displayed.

VOLVO

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

HVAC air temperature setting in auto control mode distribution (h)
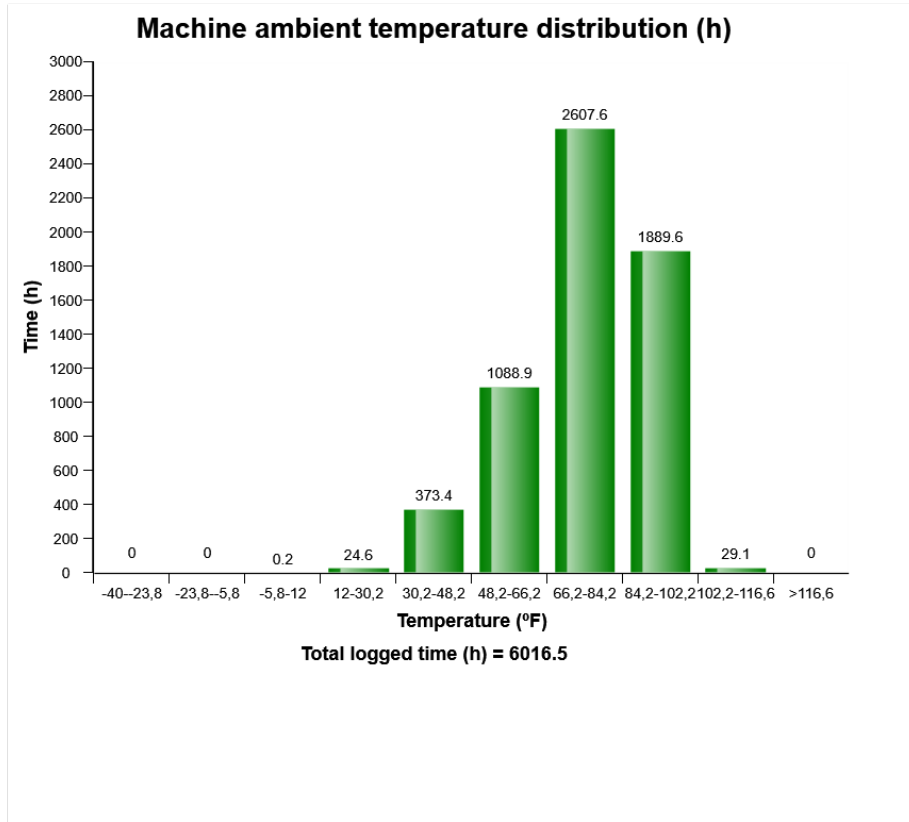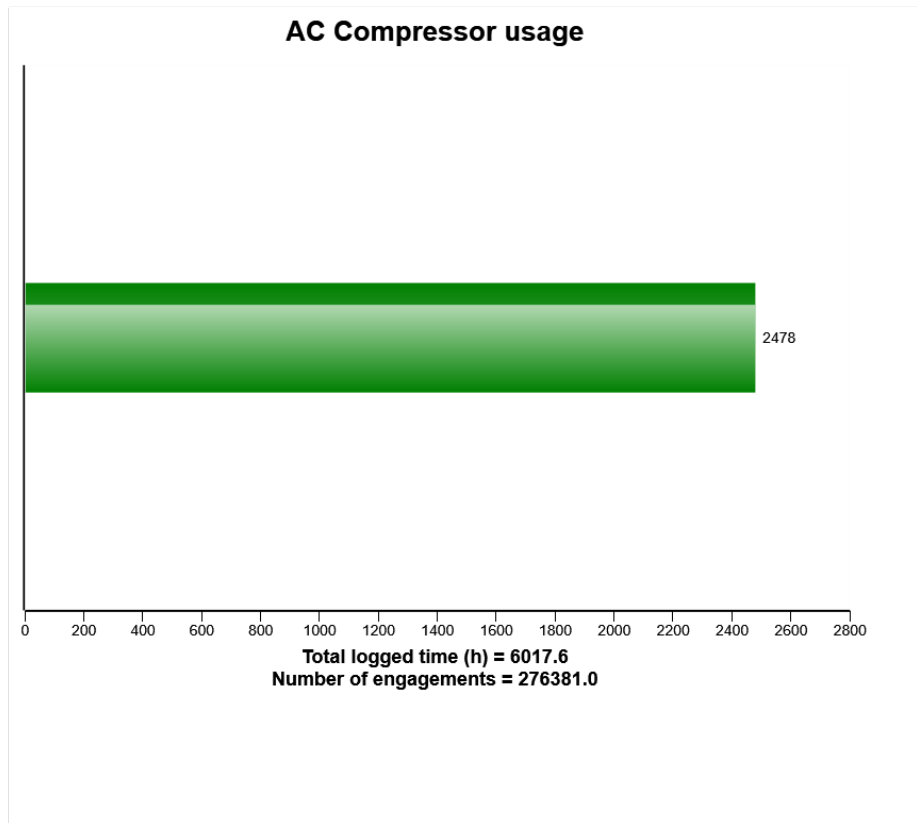

Definition:

The diagram describes air temperature setting distribution for HVAC auto control mode established by operator in Cabin

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Machine ambient temperature distribution (h)

Total logged time (h) = 6016.5

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

AC Compressor usage

2478

Total logged time (h) = 6017.6
Number of engagements = 276381.0

Definition:

The graph shows the total time of AC compressor engagement.

Explanation:

Green bar: Total time in hours, AC compressor has been engaged.

Under the graph the total engine running time (in hours) is displayed.

Total number of AC compressor activations is also displayed.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

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HVAC air flow direction in manual mode distribution (h)
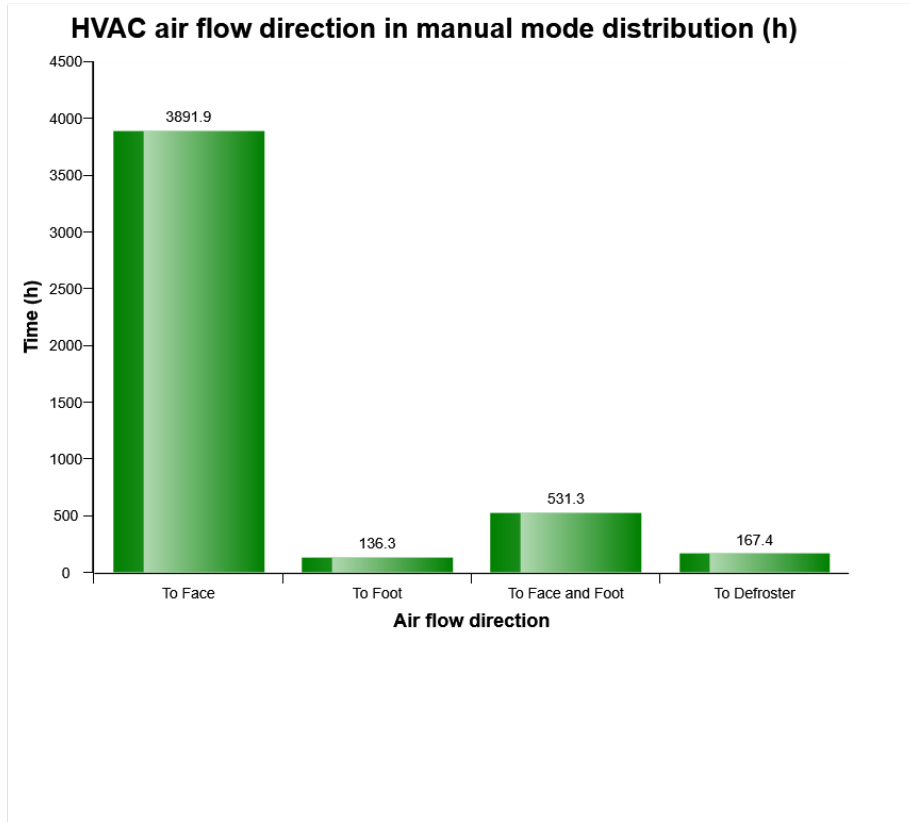
Definition:

The diagram describes air flow direction distribution for HVAC manual control mode established by operator in Cabin.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

HVAC air blower motor speed in manual mode distribution (h)

Time (h)

1023.5	2081.8	689.7	931.8

1st speed   2nd speed   3rd speed   4th speed
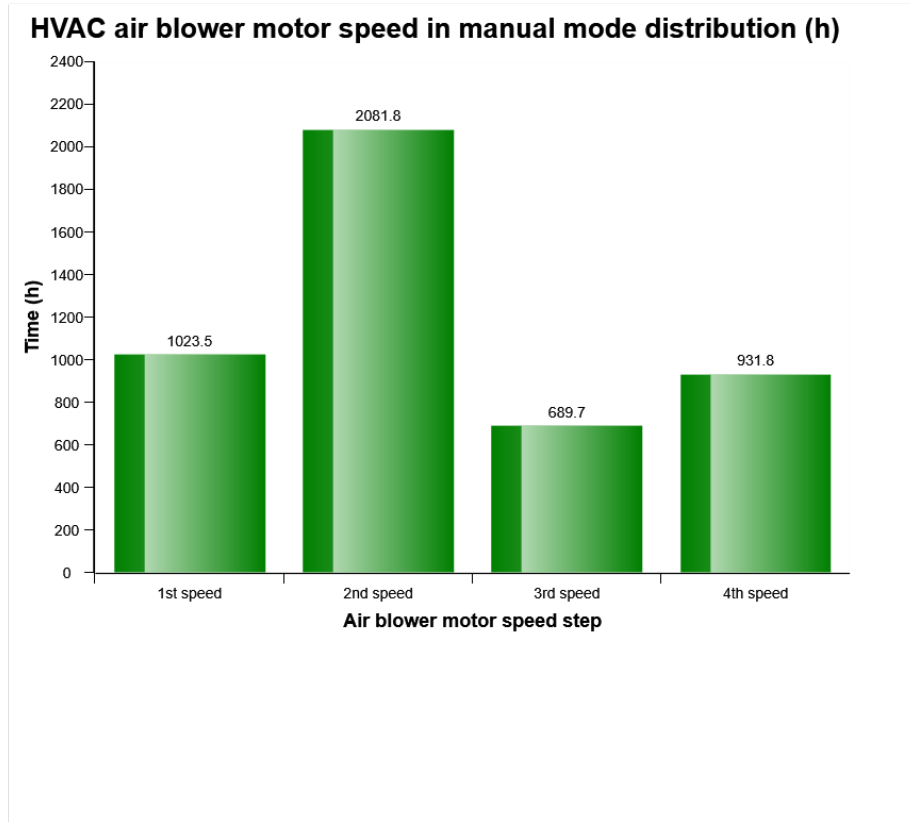
Air blower motor speed step

Definition:

The diagram describes air blower motor speed distribution for HVAC manual control mode established by operator in Cabin.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

AC High Pressure
Total number of occurences = 105

Op hours	Year	Month	Day	Hours	Minute	Duration (sec)	Extreme (° F)
5095	2019	8	26	16	49	149	111
5095	2019	8	26	16	28	141	108
5095	2019	8	26	16	33	31	108
5095	2019	8	26	16	36	176	109
5095	2019	8	26	16	45	146	109
5095	2019	8	26	16	55	85	113
5096	2019	8	26	17	25	22	113
5096	2019	8	26	17	22	95	113
5096	2019	8	26	17	17	217	113
5096	2019	8	26	17	13	70	113
5096	2019	8	26	17	9	77	113
5096	2019	8	26	17	3	184	113
5096	2019	8	26	17	30	169	113
5096	2019	8	26	17	26	125	113
5096	2019	8	26	17	0	131	113
5107	2019	8	27	16	26	15	100
5108	2019	8	27	17	50	16	100
5131	2019	8	29	16	29	12	100
5305	2019	9	17	15	47	17	97
5305	2019	9	17	15	46	33	97

Definition   :

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating hours is displayed in the first column, followed by year, month , day , hour and minute to show when

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

Duration :

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

Extreme value :

The extreme value column displays the most extreme value during the event.

Criteria :

Logging is performed when, High AC Pressure signal is active. Ambient temp is viewed.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

AC Boiling Protection
Number of engagements = 0

Op hours	Year	Month	Day	Hour	Minute	Duration (sec)	Extreme (° F)
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32

Definition   :

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating hours is displayed in the first column, followed by year, month , day , hour and minute to show when

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

Duration :

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

Extreme value :

The extreme value column displays the most extreme value during the event.

Criteria :

Logging is performed when, Boiling protection signal is active. Ambient temp is viewed.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

AC System Cut Out Pressure
Total number of occurences = 55

Op hours	Year	Month	Day	Hour	Minute	Duration (sec)	Extreme (° F)
2742	2017	10	21	7	47	1613	32
2742	2017	10	21	7	32	627	70
2743	2017	10	21	8	34	-53378	77
2743	2017	10	21	8	20	172	75
2743	2017	10	21	8	27	195	75
2746	2017	10	21	12	28	9547	88
2749	2017	10	23	7	48	-50589	73
2749	2017	10	23	7	27	1163	86
2753	2017	10	23	12	30	16678	86
2758	2017	10	24	7	41	-51008	72
2758	2017	10	24	7	19	491	70
2758	2017	10	24	7	30	561	70
2762	2017	10	24	11	59	1079	77
2763	2017	10	24	12	32	9232	32
2765	2017	10	25	9	16	125	59
2765	2017	10	28	8	22	66	63
2765	2017	10	31	8	47	101	61
2765	2017	10	25	7	15	21	82
4885	2019	7	5	7	8	63	72
5028	2019	8	9	9	45	33	88

Definition   :

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating hours is displayed in the first column, followed by year, month , day , hour and minute to show when

an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

Duration :

The duration of each event is shown after the timestamp of the event.

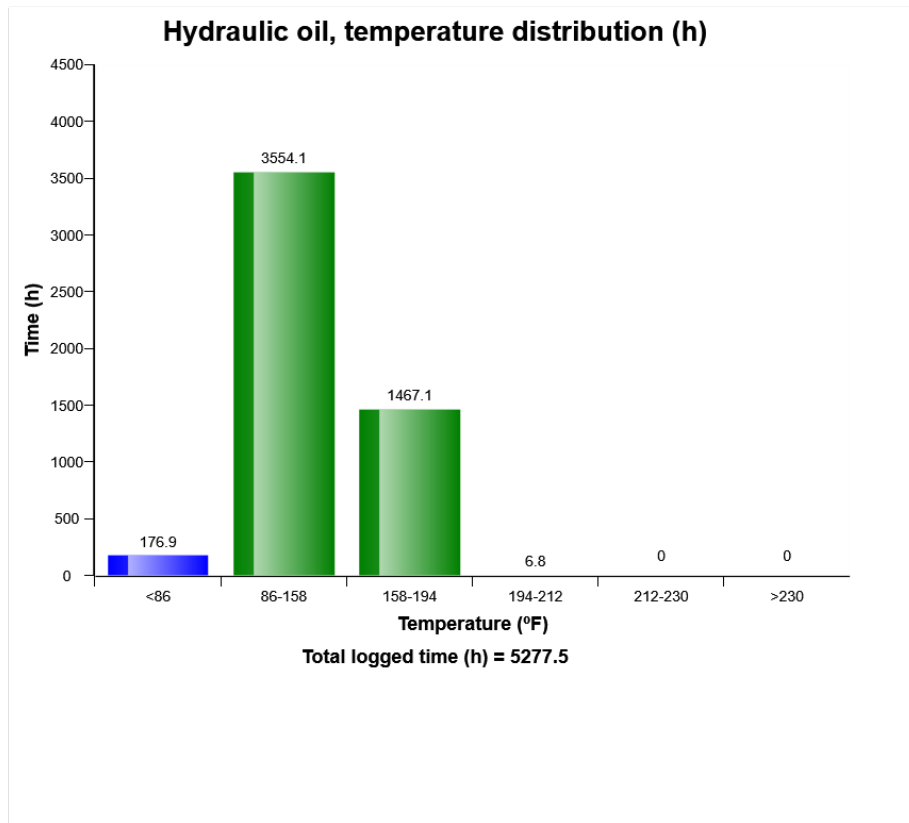The duration is counted as long as the criteria is fulfilled.

Extreme value :

The extreme value column displays the most extreme value during the event.

Criteria :

Logging is performed when, AC cut out pressure signal is active. Ambient temp is viewed.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Hydraulic oil, temperature distribution (h)

Y-axis: Time (h)
X-axis: Temperature (°F)

- <86: 176.9 (blue bar)
- 86-158: 3554.1
- 158-194: 1467.1
- 194-212: 6.8
- 212-230: 0
- >230: 0

Total logged time (h) = 5277.5

Definition:

The graph shows the time distribution of the temperature, while engine running.

Explanation:

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.

It is normal to have registrations in this region.

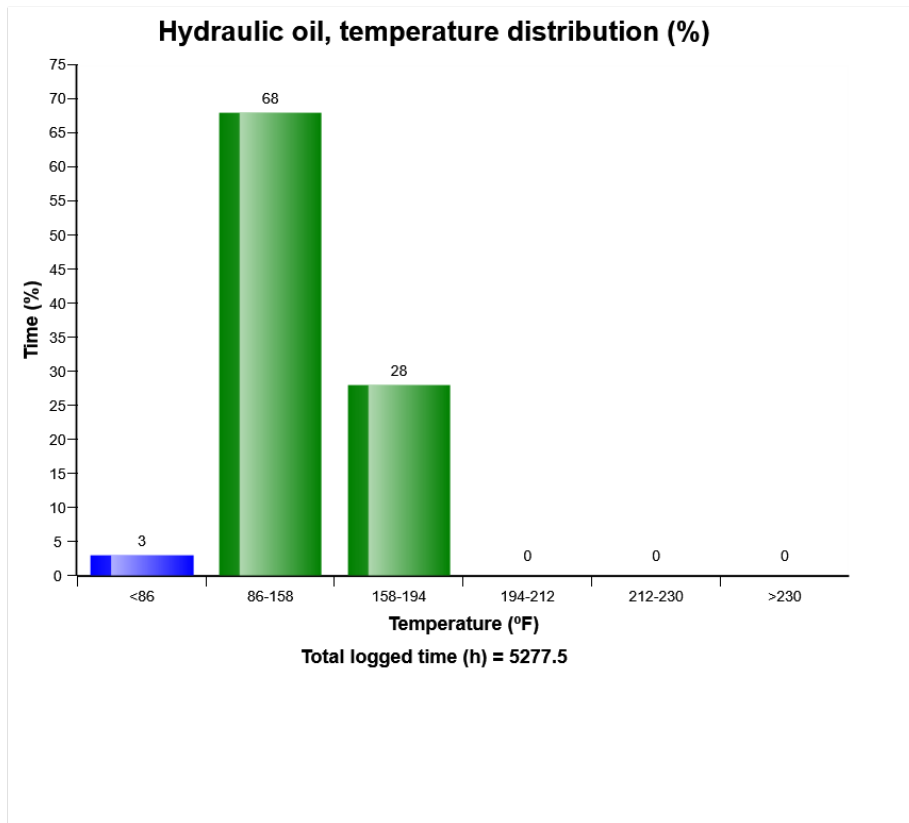Green bar   = Normal working temperature. The Major part of the registrations shall be in this region.

Yellow bar   =   High working temperature. It is normal to have some registrations in this region.

Red bar   = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Hydraulic oil, temperature distribution (%)

Y-axis: Time (%), from 0 to 75

- <86: 3
- 86-158: 68
- 158-194: 28
- 194-212: 0
- 212-230: 0
- >230: 0

Temperature (ºF)

Total logged time (h) = 5277.5

Definition:

The graph shows the time distribution of the temperature, while engine running.

Explanation:

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.

It is normal to have registrations in this region.

Machine model	SerialNo	Operating Hours	Reading Date
A40G	340454	6065.7	19/12/2019

Green bar = Normal working temperature. The Major part of the registrations shall be in this region.

Yellow bar = High working temperature. It is normal to have some registrations in this region.

Red bar = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.