

Fuel Consumption VS Engine Coolant Temperature of C15 Caterpillar Desiel Generator

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A stakeholder who has an engine coolant product asked me to do analysis to prove that, this coolant will enhance the performance of an internal combustion (IC) engine. His assumption state that, the perfotmance enhancement will decrease the fuel cosumption, elongate the oil lubricant life and elongate the life of the engine. Firstly, I told him we need to check if there's a direct relationship between the fuel consumption and the temperatrue of the engine, after we make sure the existence relatoinship between fuel cosumption and the engine temperature we can do further analysis to prove this enhancement from various aspects.

Import tidyverse libraray for data analysis

```
## -- Attaching packages ----- tidyverse
1.3.1 --

## v ggplot2 3.3.5      v purrr  0.3.4
## v tibble  3.1.6      v dplyr  1.0.7
## v tidyr   1.1.4      v stringr 1.4.0
## v readr   2.1.1      v forcats 0.5.1

## -- Conflicts -----
tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()     masks stats::lag()
```

Import the data set

```
DB <- read.csv("C15_data_base.csv")
```

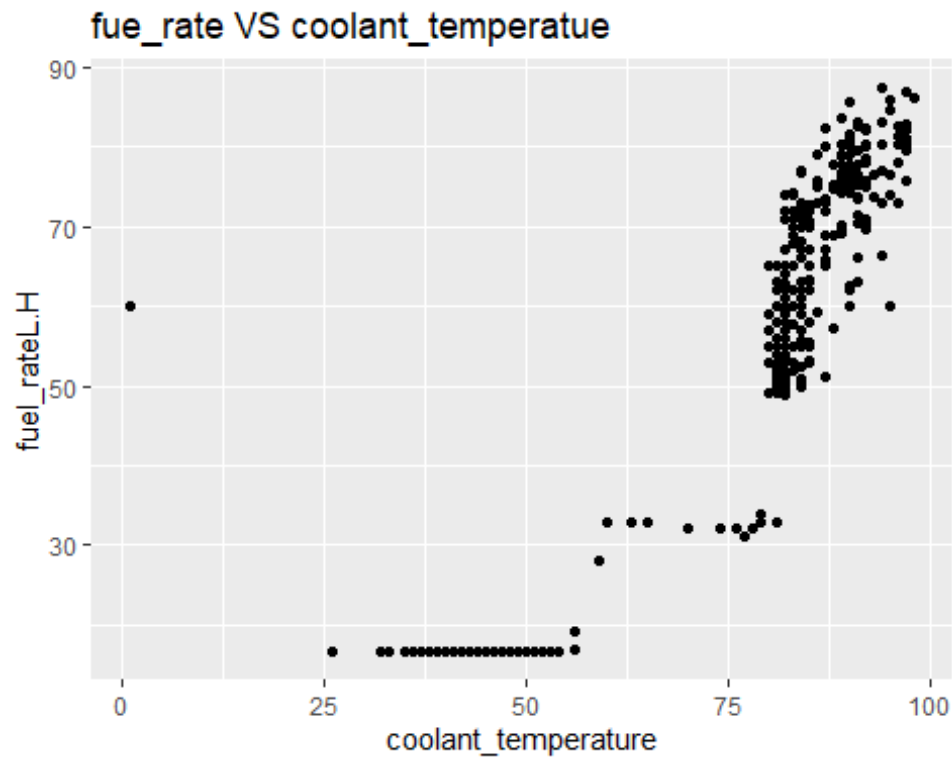
Shows data set sample

```
head(DB)

##   load. load_KW fuel_rateL.H coolant_temperature
## 1   0%      0      16.65          26
## 2  40%     160      52.00          81
## 3  49%     196      62.00          81
## 4  36%     144      50.00          81
## 5  30%     120      49.00          80
## 6  41%     164      53.00          81
```

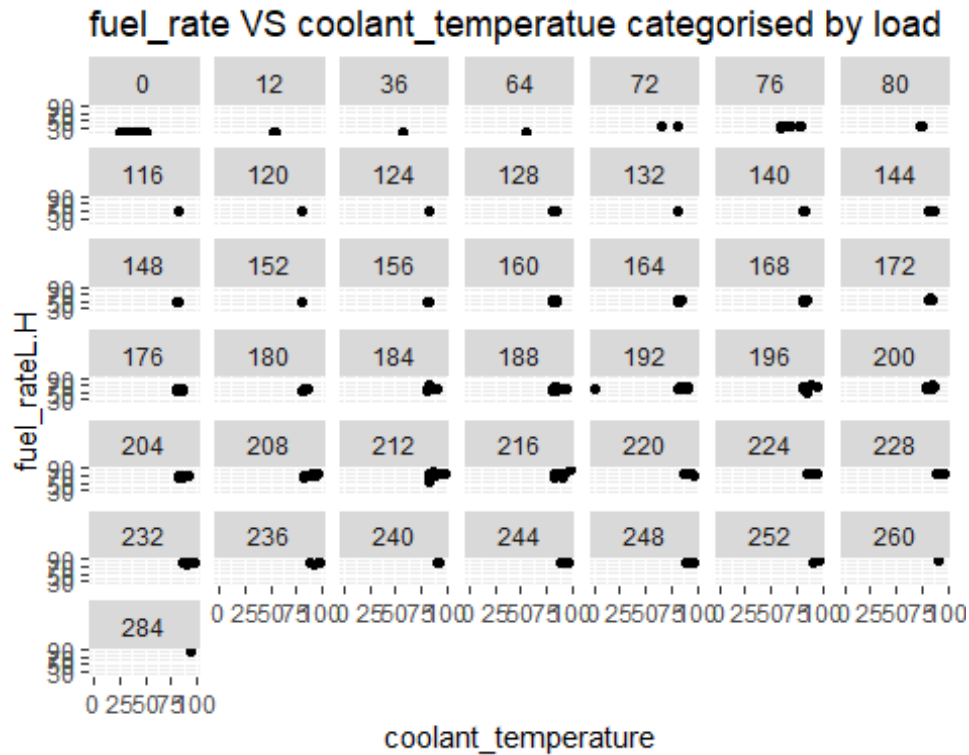
Data visulaization " fuel_rate VS coolant_temprature

```
ggplot(data = DB)+
  geom_point(mapping=aes(x=coolant_temperature, y=fuel_rateL.H))+
  labs(title="fue_rate VS coolant_temperatue" )
```



The above graph shows a positive correlation between fuel_rate and coolant_temperature which means when the temperature is increasing the fuel consumption is also increasing.

```
ggplot(data = DB)+  
geom_point(mapping=aes(x=coolant_temperature, y=fuel_rateL.H))+  
facet_wrap(~load_KW)+  
labs(title="fuel_rate VS coolant_temperatue categorised by load" )
```



This graph shows the same data as the previous graph but here data is categorised to each load. This graph also show a positive correlation between fuel_rate and coolant_temperature in some specific load.

Findings

1- It's clear there's a direct relationship between fuel rate and the engine coolant temperature.

Recommendations

2- We need to collect more data of the engine performance before using the product and after to analyze the both situation then show the result of how the product will enhance the engine performance, reduce fuel consumption, utilize the maximum the capacity and elongate the oil lubricant life.