DOI 10.15520/sslej.v5i10.2736 http://sslej.in/index.php/sslej Research Article

ISSN: 2456-2408 Social Science learning Education Journal

Simulation of Harmful Fuel Inflamer through Outlet & Maximum Pressure in Cylinder with Temperature in Engine of Vehicles

Run xu

Department of Metallurgical Engineering, Gyeongsang National University, Chinju 52828, Korea

Abstract: *- the toxic fuel is harmful to human health and environment in earth, so that simulation is studied to find the relation of inflamer and time and temperature in Engine is important now. CO and NO is searched with the mass ratio and find the NO is bigger than CO under certain time. Meantime the more value of them contains the more emitted gas will be with the consuming of 7.6lit/h. The CO and NO will incline when their concentration incline from 0.2% to 4%. CO with the engine internal diameter being 87mm is higher than its 75mm. The big one has higher value than the small one. With the increasing temperature the inflamer is high, the temperature is big since the power is big too. It is found that x which is times of RT (room temperature) pressure increases when the temperature increases. Meantime it increases when cylinder length decreases.*

Keywords: *- toxic inflamer; simulation; CO&NO; internal diameter; temperature*

I. Introduction

The toxic fuel is harmful to human health and environment in earth, so that simulation is studied to find the relation of inflamer and time and temperature in Engine is important now. Among them CO&NO is toxic inflamer which is studied to look for the internal relation in vehicles.[1,2,3] Through calculation the temperature of outlet in engine is successful so we can simulate it through engine cylinder. Meantime the specified CO &NO is studied to find the quantity of toxic fuel. The temperature may attain several hundred ℃ is studied in this paper details. In order to search these respects this paper is simulated and investigated. They are harmful after they are melt in our blood. It can result in many disease in our bodies. Meantime it has harm to environment. To be benefit to us the minimum toxic gas may be outlet with many vehicles. It is evaluated that one family has a vehicle ie. Mainly car in every three families in China. There are about three millions cars in Beijing city. So they are huge discharged gas Specially CO and NOX. In this paper we discuss these two toxic fuels detail to search their discharged gas quantity. We look for this minimum gas method for environment and health, which is destination.

The parameter of inflamer force is important at engine cylinder of vehicle. X which is times of RT (room temperature) pressure is named this constant. It is investigated that it is variable with temperature and cylinder length. It has significant role in structuring engine inner cylinder simulation and practical parameters. It is to evaluate the inflamer quantity and velocity from cylinder which includes CO and NOx etc harmful gas. It is convenient for us to control the inflamer and done the prediction and simulate status regardless of experimental measure. It must connect with these measure later to check its precision to be proven its correction.

2. Modeling toxic fuel

According to gas principle formula

$$nRdT = PdV \quad (1)$$

It has $dFV/s = nRdT$ (2)

So $V = nRdTS/dF$ (3)

It gets $V = \frac{8.3*TS}{15\times10}$ (4)

And $F = 0.014*T\pi d^2$ (5)

According to (1)

$F = nRdTS/dV$ (6)

So $F = \frac{nRdT}{dl}$ (7)

Supposes $F = xmg$ (8)

From (7) and (8) it has

$$x = \frac{RdT}{15gdl} \quad (9)$$

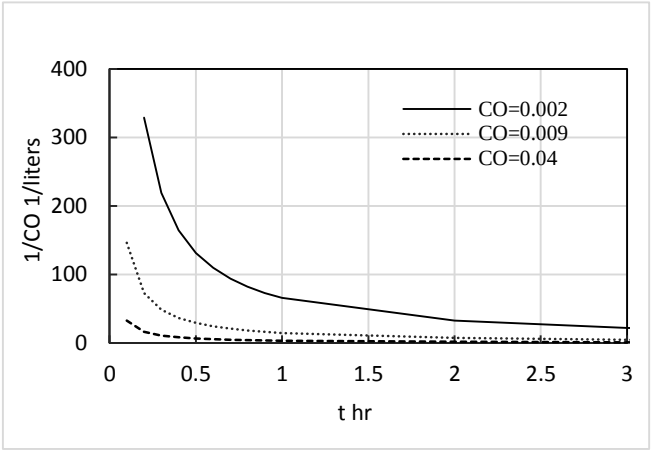
It has $v = \frac{\pi dn}{60*1000}$ (10)

$$1/n = \frac{60*1000}{\pi dv} \quad (11)$$

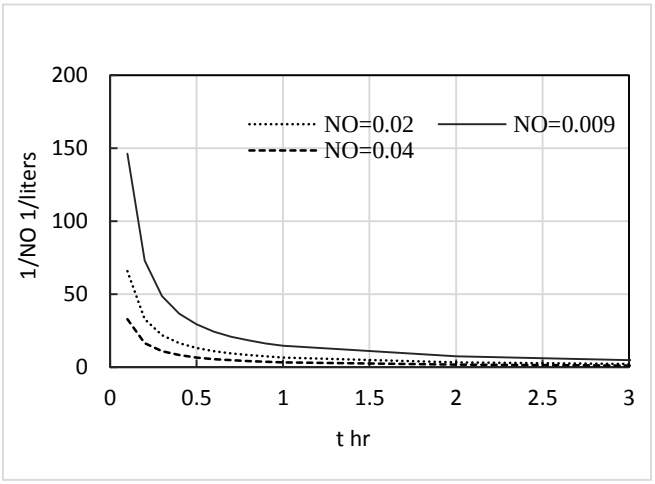
Here, n is moles; T is temperature K; R is 0.082 lit/(mol.K); F is force N; s is square of engine inner square, m^2 , $\pi d_0^2/4$; d_0 is engine diameter m; V is volume of gas in engine; ρ is gas density, $1.29*10^2 Kg/m^3$; d is tire diameter m; n is vehicle rotation r/m.

3. Discussion

As in Figure 1 (a,b) CO and NO is searched to the mass ratio with emitted 2% and find the NO is more than CO under certain time with the consuming of 7.6lit/h. Meantime the more value of them contains the more emitted gas will be. The CO and NO will incline when their concentration incline from 0.2% to 4%. In Figure 2 (a,b) the CO with the engine internal diameter being 87mm is more than its 75mm. With the increasing temperature the inflamer is high, the temperature being big since the speed is big too. It is under 2% concentration of toxic fuel and at the speed of 30Km/h.

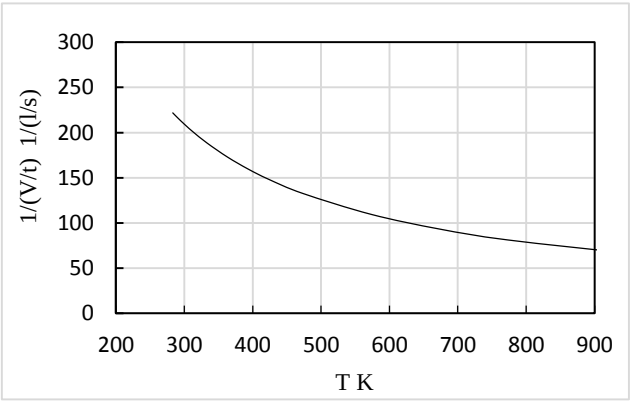


(a) CO

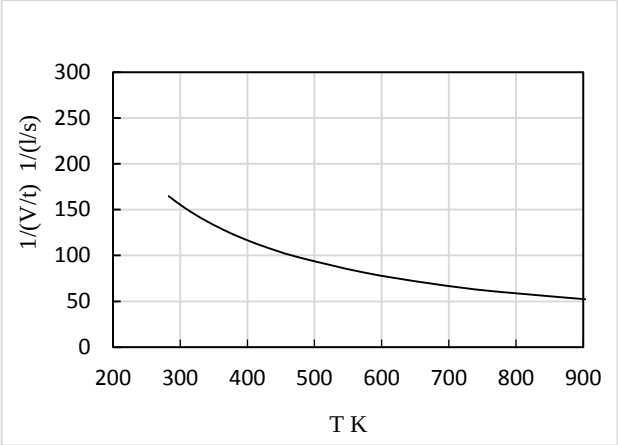


(b) NO

Figure 1 curves of emitting CO&NO and time with 7.6lit/h.

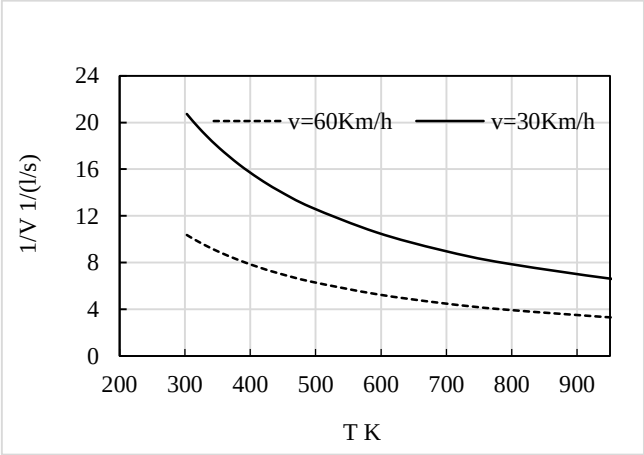


(a) d=75mm

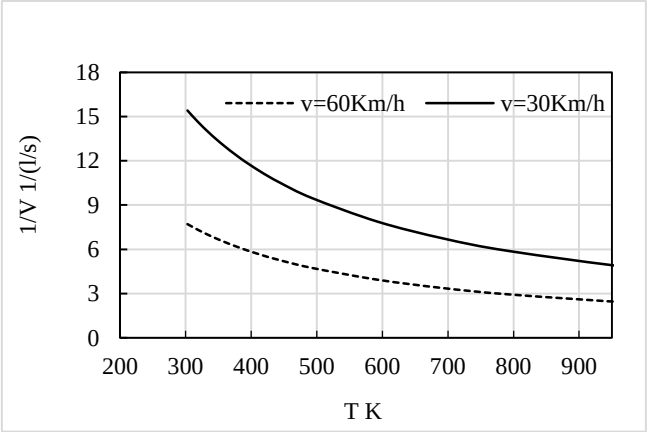


(b) d=87mm

Figure 2 curve of NO_2 and time with variable inner d and stable v=30Km/h under 0.1% concentration.



(a) d=75mm



(b) d=87mm

Figure 3 curve of NO and time with inner d and variable v under 1% concentration.

The research scope of temperature is from room temperature to 650℃. Here it is found that the toxic fuel is increased with the increasing temperature。It is due to the high speed of vehicles. It expresses that the high temperature is attained here in this study. The course of outlet of fuel is necessary so the outlet in pipe is lower than here outlet interface.so the temperature in here is higher than 527℃. As to the definite interface 1/V we know it cannot be clarified. But if 0.02ml/s or above is interface, it is known to be how much. In Figure 2 (a， b) the toxic gas 1/NO2 decreases when temperature inclines at condition of 0.1% NO2 concentration. If the engine cylinder inner diameter is 75mm the data is as Figure 2(a). Meantime if D is 87mm it is as Figure 2(b). The quantity is larger in NO than that in NO2. As Figure 3(a,b) the toxic gas NO is emitted when vehicle speed is 60Km/h and 30Km/h at condition of 2% NO concentration. It is found that it is bigger at 60Km/h than that at 30Km/h and it is bigger at d being 87mm than 75mm.

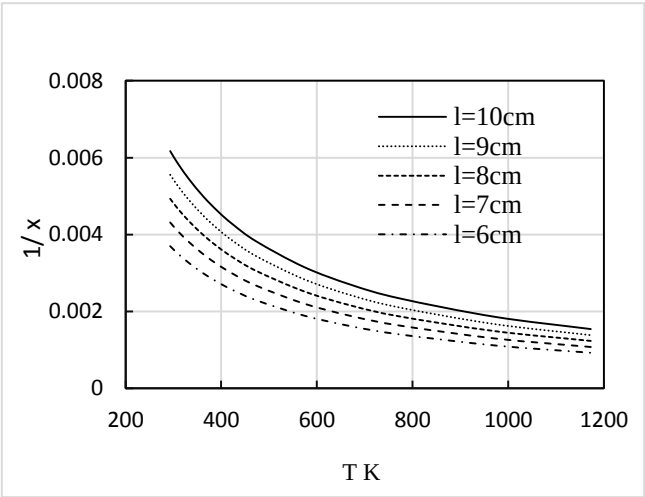


Figure 4 the relationship of 1/x and T with variable l in engine cylinder.

It is found from Figure 4 that x which is times of RT pressure increases when the temperature increases. Meantime it increases when cylinder length decreases. It is status that the cylinder volume is maximum so the times are from several hundreds to bigger one to compare with atmosphere. In this study it is proposed that it is emitting atmosphere whose volume is very much to compare the seal cylinder which is the biggest volume and temperature in cylinder. It is convenient to study in model to evaluate the emitting course from the

biggest engine work end to inflamer through vent pipe because the measure is very difficult to adopt data.

4. Conclusions

CO and NO is searched with the mass ratio and find the NO is more than CO under certain time. CO with the engine internal diameter being 87mm is more than its 75mm. With the increasing temperature the inflamer is high, the temperature is big since the force is big too. It is found that it is bigger at 60Km/h than that at 30Km/h and it is bigger at d being 87mm than 75mm. The CO and NO will incline when their concentration incline from 0.2% to 4%. It is found that x which is times of room temperature pressure increases when the temperature increases. Meantime it increases when cylinder length decreases.

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