Wacharin Chantarasuwan 2013: A Computational Fluid Dynamics Study on Improving Raw Fuel Injection Distributions in front of Diesel Oxidation Catalysts. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. Thesis Advisor:
Assistant Professor Ekathai Wirojsakunchai, Ph.D. 88 pages.

To increase conversion efficiency of exhaust gas in advanced catalytic converters of modern diesel engines, the raw fuel injection technique (injecting diesel fuel in front of the catalyst). For more increase the chemical reaction inside the catalytic converter catalyst. Occur raising rapidly exhaust temperature cause a reduce exhaust gas at low temperature. It is found that the flow distribution of the fuel droplets must be uniformly distributed to ensure the uniformity of internal temperatures of the catalyst. If there occurs a hot spot inside due to uneven flow and the internal temperature exceed the melting point of the substrate, this may cause the substrate cracking which leads to the failure of the device.

The current study is aimed to apply a CFD program to study the possibility of improvement of flow distribution of the fuel droplets by using baffle method. The baffles help enhance the dispersion of fuel droplets to ensure uniform mixing well before entering the catalytic converter. The design took into account of the back pressure. The temperature distribution and the conversion efficiency exhaust gas within the catalytic converter. The result of simulation shows that the uniform distribution of fuel droplets by baffles help minimize the temperature distribution and also increase its conversion efficiency. Furthermore, DOE program is employed to study the influence of important factors under various exhaust conditions. In addition, appropriate DOC operating conditions can be well defined and identified appropriate under the conditions required for the system. The results found that temperature and O_2 concentration higher than 260 $^{\circ}$C, 11% by volume and flow rate less than 75 kg/h HC will decrease at least 50%

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