43003534 Effect of Ethanol Blended Gasoline on Performance and Emission of Current Motorcycles in Thailand

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Many years ago, the Royal Chitralada Projects [RCP] was initiated the utilization of ethanol as an automotive fuel starting in 1986 mainly objected to optimize the surplus of agricultural products. At that time, no one expects that ethanol could be used as automotive fuel. Since then, many organizations have involved in ethanol blended fuel research and development. In January 2001, PTT opened 'the commercial service station for ethanol blended gasoline fuel so-called "gasohol". The new fuel is accepted by definite consumers, perhaps the service stations of gasohol are quite less. By the way, the commercial gasohol is a blending of 10% anhydrous ethanol in 90% of regular grade gasoline [RON 91]. The mentioned gasohol has 95 pctane number[RON 95] and retails at 0.50 baht per litre cheaper than the premium grade gasoline which has RON 95 as well. Recently, the Ministry of Commerce [MOC] has regulated the gasohol's specification by extending the maximum Reid Vapor Pressure [RVP] to 65 kPa (from 62 kPa) and modifying the distillated temperature of which 50% recovery [T_{50}] from 70 – 110 ^{o}C to 65 – 110 ^{o}C. Anyhow, this research intends to study a utiliztion of gasohol [RON 91] in motorcycles both 2-stroke and 4-stroke engines compared to the regular grade gasoline [RON 91].

Ethanol, in general, can easily dissolve in gasoline and improve fuel octane rating as well as MTBE. In addition, ethanol blended gasoline contributes to the lower T_{50} but the higher RVP. Although ethanol has 35% lower in heat of combustion compared with gasoline, the output from the 4-stroke engine using gasohol gave slightly better power than gasoline while the 2-stroke engine gave slightly less power. The tiny difference of power is a result of the leaner combustion of gasohol. Beside, both type of enbines consumed gasohol not more than gasoline.

For engine driveability performance, gasohol improves the cold-start and warm-up driveability. Whilst no difference in torque and speed response versus time when applied full throttle abruptly from idling position. Furthermore, gasohol caused the smoother increasing in speed response curve in the 4-stroke engine.

Both 2-stroke and 4-stroke motorcycles were also tested by European Standard Cycle [ECE 40] on chassis dynamometer to determined fuel economy and emission concentration. The results verified that gasohol affected to the reduction in CO and HC. Consequently, the more completed in combustion of gasohol contributed to the higher in NO_x and CO_2. There was not difference in fuel economy either of engine test result.