Single-cylinder 125 cc stepped-piston engine for mobility and portable power generation applications

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Abstrak

Two-stroke engines are far simpler than four-stroke engines from a physical perspective. For a given brake output, two-stroke engines are lighter, easier to work on, and provide higher power-to-weight ratio than four-stroke engines, making them suitable for small platform applications. However, conventional two-stroke engines have a reputation for generating smoke and unburned fuel, meaning they may not meet many emissions regulations, now enforced around the world. Thus, for many decades two-stroke engines have not been not favored, giving way to four-stroke engines for dominant applications, especially for mobile power-generation purposes. In the quest to improve the potential of such an engine, a group of researchers from the Automotive Development Centre (ADC), Universiti Teknologi Malaysia (UTM), has developed a 125 cc, air-cooled stepped-piston engine to demonstrate the higher power-to-weight ratio feature, apart from overcoming emission reduction. The engine is designed to mitigate the problem of mixture short circuiting, which is the major hindrance to combustion efficiency. To this end, they have incorporated a three-port stratification strategy into the engine. This paper provides an overview related to the earlier work done to integrate the necessary features and highlights some of the performance features of this unique engine design