

BI 05 Investigation of CI engine performance when diesel supply is supplemented by raw bio gas or LPG

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In this work, a conventional diesel engine was run in dual fuel mode to generate electricity by supplying raw biogas and LPG separately at various proportions and the engine performance was observed under various loading conditions. It was observed that the engine runs smoothly with supplemented raw biogas or LPG saving upto 15% or 80% of diesel respectively. The specific fuel consumption was also decreased when the engine runs in dual fuel mode. Vibration amplitude of the engine was measured to compare the stability of the combustion process at various ratios of dual fuel operation. It was observed that LPG makes the engine run smoother than when it runs on diesel alone. However raw biogas increased the engine vibration at certain levels of dual fuel operation. Generally it can be observed that dual fuel operation is economically beneficial and the diesel engine performance too is better than or comparable to that of 100% diesel operation particularly at high engine loads. When the two dual fuel modes are compared, the engine performance on LPG is better than that of raw biogas. Economically, biogas dual fuel mode is better than the LPG dual fuel mode and both dual fuel modes are better than the pure diesel. No external energy was spent on filtering out carbon dioxide from raw biogas to improve its calorific value, because the gas purification would not be cost effective.

Keywords: dual fuel engine, raw bio gas, LPG