

Investigation of Unconventional Fuels in Co-Axial Engines

Authors : Arya Pirooz

Abstract : The effects of different fuels (DME, RME B100, and SME B100) on barrel engines were studied as a general, single dimensional investigation for characterization of these types of engines. A base computational model was created as reference point to be used as a point of comparison with different cases. The models were computed using the commercial computational fluid dynamics program, Diesel-RK. The base model was created using basic dimensions of the PAMAR-3 engine with inline unit injectors. Four fuel cases were considered. Optimized models were also considered for diesel and DME cases with respect to injection duration, fuel, injection timing, exhaust and intake port opening, CR, angular offset. These factors were optimized for highest BMEP, combined PM and NOx emissions, and highest SFC. Results included mechanical efficiency (η_m), efficiency and power, emission characteristics, combustion characteristics. DME proved to have the highest performing characteristics in relation to diesel and RME fuels for this type of barrel engine.

Keywords : DME, RME, Diesel-RK, characterization, inline unit injector

Conference Title : ICAMAME 2014 : International Conference on Aerospace, Mechanical, Automotive and Materials Engineering

Conference Location : Istanbul, Türkiye

Conference Dates : March 24-25, 2014