



ANALYSIS OF DIESEL AND RAPESEED METHYL ESTER PROPERTIES IN CEUP FUEL PIPELINE USING FREQUENCY DEPENDENT DAMPING MODEL

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Abstract - During a fuel injection cycle pressure inside Combination Electronic Unit Pump (CEUP) fuel injection system varies from low (~50 bars) to very high (~1500 bars) in fractions of seconds depending on the operating conditions. Physical properties of fuel including density, acoustic wave speed and bulk modulus also vary as a function of rapidly varying fuel pressure. A detailed analysis of these key fuel properties with our improved frequency dependent model with viscous damping developed in MATLAB is presented for both diesel and biodiesel fuel Rapeseed Methyl Ester (RME). Quantitative analysis of developed model confirms that model predictions are quite realistic and accurate across range of operating conditions of diesel engine.

Index terms: Density, Acoustic wave speed, Bulk modulus, Frequency dependent damping, Diesel, Rapeseed Methyl Ester.