基于柴油机局部时段振动加速度的缸内燃烧状况　Combustion Estimation Based on Vibration Acceleration Signal from Start of Combustion to Peak Pressure Appearance Timing

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关键词：　柴油机 缸内燃烧状况 振动加速度 特征参数

摘　要：　柴油机燃烧峰值压力出现前燃烧过程对应的局部振动信号与缸内燃烧状况密切相关。对比分析了195型及495T型柴油机在该局部时段内振动加速度、缸内压力及其各阶导数的时域波形，基于波形间的相关性，提出了利用振动加速度信号的拐点推测燃烧过程特征点的方法。对比不同工况时局部时段内的缸内压力、压升率、振动加速度及压力升高加速度的时域波形及频谱能量，发现振动加速度信号最大时域波动量及特定频带的能量与缸内燃烧状况密切相关，可作为表征缸内燃烧状况的特征参数，试验结果表明选取的特征参数是有效的。There is close connection between vibration signal and combustion status before peak pressure. Comparison was carried out among the vibration acceleration signal, cylinder pressure, rate of pressure rise and pressure rise acceleration before peak pressure. Based on the similar trend waveform, a novel method using inflection of vibration acceleration to estimate combustion process feature points was proposed. Contrast was also carried out among cylinder pressure, rate of pressure rise, time domain waveform and frequency component amplitude of vibration acceleration and pressure rise acceleration. Results showed that the maximum time domain fluctuation and frequency component amplitude of vibration acceleration are closely related with combustion status and the information can be used as characteristic parameters to reflect combustion status. Experiments were carried out and the result verified that the characteristic parameters were feasible.

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