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MODELING OF KNOCKING COMBUSTION IN A SPARK IGNITION ENGINE

The paper presents some results of theoretical and experimental investigation of a knock occurrence during the combustion process in a chamber of single cylinder 360ccm spark ignition engine. Engine combustion modeling involves two zone quasi dimensional model based on flame entrainment theory incorporating knock submodel for unburned mixture, which includes either kinetics of chemical reactions or empirical relation for induction period. Experimental investigation features cylinder pressure measurement with high speed acquisition system. The attention has been paid to the problem of pressure signal processing especially during knocking combustion. Therefore special pressure signal filtration method has been developed for knock identification and study of knock intensity cyclic fluctuations. The main results of theoretical and experimental studies of knocking combustion and their cycle-by-cycle variations, are presented in the paper and good agreements between simulated and measured data are obtained.

Key words: *ignition engine, knocking combustion, two-zone model.*

MODELIRANJE DETONATIVNOG SAGOREVANJA U OTO MOTORU

U radu se iznose rezultati eksperimentalnog i teorijskog istraživanja pojave detonacije tokom procesa sagorevanja u jednocilindričnom vazdušno hlađenom istarživačkom oto motoru. Pojava detonacije je registrovana praćenjem toka pritiska u cilindru pomoću ultra brzog sistema za akviziciju podataka u većem broju uzastopnih ciklusa. Teorijsko istraživanje se bazira na dvozonskom kvazidimenzionalnom modeliranju uz primenu podmodela detonacije. Pojava samopaljenja je modelirana na dva načina: metodom lančanih reakcija i metodom empirijskog indukcionog perioda. Podešavanjem empirijskih parametara oba modela su dala dobro slaganje sa eksperimentima i zadovoljavajuće prediktovale nastanak samopaljenja. U radu se takođe diskutuje analiza signala detonativnog sagorevanja.

Ključne reči: *motor sus, detonativno sagorevanje, dvozonski model.*