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Engine performance during field works and tractors operational period

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Abstract

There is ecological and economic importance for the tractors to be operated correctly: time of engine idling, operation at low and too high loads or high speeds should be shortened. To monitor tractor‘s operating performance, tools and techniques are necessary that would allow to determine the controlled indicators. Such problems are dealt with in this research. The research result gives an overview of possibilities to determine the values of tractor‘s fuel consumption, exhaust emissions and engine load in real operating conditions by using data accumulated in electronic control units.

The proceeding presents research of tractors (Massey Ferguson MF 6499) engine load factor, fuel consumption and engine exhaust emissions within their operational period and during specific field works (ploughing, seeding and other field works). Histograms are presented that show time intervals of the ploughing and seeding process, fuel consumption and emission components (CO_2, NO_x and CO) in engine speed and cyclic fuel injection modes as well as within tractors operational period. Test results are analyzed separately for the processes of technological ploughing and works at headlands. Test results showed that in the ploughing process, the main amount of fuel was consumed and CO_2 emitted during technological process of ploughing, and CO – during the work at headlands. As well proceeding presents average fuel consumption and CO, CO_2 and NO_x emission within tractors operational period.

Detail information on the engine modes that are most used in the operation of tractors, their fuel consumption and exhaust emissions would motivate tractor designers and manufacturers to search for a new direction of technology development in order to reduce fuel consumption and exhaust emissions’ harmful effects on the environment, and also would help to reveal them.

Biography

Algirdas Janulevičius. Dr. Assoc. Prof. Institute of Power and Transport Machinery Engineering, Aleksandras Stulginskis University (ASU). Doctor of Science, 1993. Employment: Associate Professor (1997). Publications: author or co-author of more than 100 scientific publications, 39 inventions. Research interests: transport and power machinery parameters from dynamic, economical and economical point of view.