

Selected approach for specific determination of system state and condition

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Nowadays the system requirements and set up and evaluated in various manners. We have plenty of excellent options available taking into account item technical state or/and other states and talking about diagnostic options.

Tribodiagnosics is one of the independent and good parts to assess the system condition. There have been used mostly life fluids (e.g. oils, lubricants, fuel, etc.) to determine the system state. Although the oil is usually changed in the periods prescribed by the oil producer the oil state is really good indicator of the system condition. The oil state can be diagnosed using more commonly known diagnostics approaches. These correlations between the oil state and the system state are one of the important ones. The suitable modification of the preventive oil exchange periods without affecting the system technical state would be good alternative in the current situation when the financial crisis affects all parts of the society not excluding the technical one. The savings presumption would not have been necessarily related to the period of crisis only. The good steps in the preventive oil exchange modifications might be also transferred into the common times.

The paper deals with the mathematical processing, monitoring and analysis of the oil field data got as a result from the laser spectrography in frame of the tribodiagnostic oil tests. The data got from laser spectrography are usually final data. These kinds of data can determine the number of particles in oil their size, shape and possible source/mode of occurrence (e.g. usually resulting from fatigue, cutting, sliding, etc.). This diagnostic approach has been currently used for oil diagnostic results comparison – usually for comparison of expected system state determined by laser spectrography only. Another very specific method based on chemical analysis of the oil sample is used for terminal system state determination. Such method is used seldom in praxis and needs quite good background. There is not known deeper relation of oil diagnostics data and system related consequences (like determining the terminal state and service optimization – maintenance for instance).

The mathematical methods based on time series and their analysis and calculation processed by suitable method (e.g. ARMA or ARIMA) will be used in the paper for oil data analysis. The results expected will be used for consequent system state determination (e.g. terminal state) or the results will be used for preventive maintenance modelling and consequent proposals for further oil changes. Since we have significant number of oil samples got from mobile means (mostly vehicles) the results will be valid with remarkable level of confidence. Other statistical methods will be used for oil field data processing especially selected non-parametric methods.