Thermal Barrier Coated Diesel Engine With Neural Networks Mathematical Modelling

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Abstract : In this study; piston, exhaust, and suction valves of a diesel engine were coated in 300 mm thickness with Tungsten Carbide (WC) by using the HVOF coating method. Mathematical modeling of a coated and uncoated (standardized) engine was performed by using ANN (Artificial Neural Networks). The purpose was to decrease the number of repetitions of tests and reduce the test cost through mathematical modeling of engines by using ANN. The results obtained from the tests were entered in ANN and therefore engines' values at all speeds were estimated. Results obtained from the tests were compared with those obtained from ANN and they were observed to be compatible. It was also observed that, with thermal barrier coating, hydrocarbon (HC), carbon monoxide (CO), and smoke density values of the diesel engine decreased; but nitrogen oxides (NOx) increased. Furthermore, it was determined that results obtained through mathematical modeling by means of ANN reduced the number of test repetitions. Therefore, it was understood that time, fuel and labor could be saved in this way.

Keywords : Artificial Neural Network, Diesel Engine, Mathematical Modelling, Thermal Barrier Coating
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