2016 2nd International Conference on Industrial Engineering, Applications and Manufacturing, ICIEAM 2016 - Proceedings, 2017

Automation of diesel engine test procedure

Galiullin L., Valiev R.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016 IEEE.Leading engine manufacturers carry on investigations and R&D work to improve reliability and durability of internal combustion engines (ICE), particularly, diesel engines. Diesel engine examination and testing are the main methods for verifying manufacturing quality of parts and assembly components, units and engine in whole, accuracy of assembling, correspondence of main diesel engine characteristics to the requirements of technical specifications. The types of diesel engine test procedures are regulated by the state standards (GOST) and international standards (ISO), which define the procedures for engine commissioning and requirements to engine performance standards. Manufacturers continue to improve the construction of engines and performance indicators even after their commissioning and installation. A current diesel engine test procedure is a complex and time-consuming process that can be compared with experimental studies. For this reason, automation systems for engine testing (AST) are created. The need for constant improvement of performance standards of diesel engines raise the costs with respect to test procedures in the course of development of new engine prototypes. In particular, high costs are associated with a mismatch between a level of automation of manufacturing and R&D works. Therefore, automation of test procedures is one of the main goals to be achieved in order to improve the level of technology at production and quality of manufactured diesel engines.

http://dx.doi.org/10.1109/ICIEAM.2016.7910938

Keywords

automation, decomposition, diesel, engine, simulation, test

References

[1] Y. Shatnawi, M. Al-Khassaweneh, "Fault diagnosis in internal combustion engines using extension neural network, " IEEE Transactions on Industrial Electronics, 61 (3), art. no. 6511979, pp. 1434-1443, 2014.

[2] Y. Yu, J. Yang, "The development of fault diagnosis system for diesel engine based on fuzzy logic, " in Proc. Fuzzy Systems and Knowledge Discovery, FSKD, 2011, 1, art. no. 6019556, pp. 472-475, 2011.

[3] E.V. Zubkov, L.A. Galiullin, "Hybrid neural network for the adjustment of fuzzy systems when simulating tests of internal combustion engines, " Russian Engineering Research, 31(5), pp. 439-443, 2011.

[4] M. Tian, "Fuzzy neural network diagnose expert system of engine, " in Proc. ICICIP, 2012, art. no. 6391477, pp. 154-156, 2012.

[5] L.A. Galiullin, "Automated test system of internal combustion engines, " in Proc. IOP Conference Series: Materials Science and Engineering, 2015, 86 (1), art. no. 012018, pp. 1-6.

[6] Z. Fan, M. Huang, "Fuzzy rule set based engine fault diagnosis, " in Proc. Asia-Pacific Power and Energy Engineering Conference, APPEEC, 2009, art. no. 4918394, pp. 17-21.

[7] R.L. Biktimirov, R.A. Valiev, L.A. Galiullin, E.V. Zubkov, A.N. Iljuhin, "Automated test system of diesel engines based on fuzzy neural network, " Research Journal of Applied Sciences, 9(12), pp. 1059-1063, 2014.

[8] E.V. Zubkov, A.A. Novikov, "Regulation of the crankshaft speed of a diesel engine with a common rail fuel system, " Russian Engineering Research, 32(7-8), pp. 523-525, 2012.

[9] R.A. Valiev, A.Kh. Khairullin, V.G. Shibakov, "Automated Design Systems for Manufacturing Processes, " Russian Engineering Research, 35(9), pp. 662-665, 2015.

[10] N. Deng, C.-S. Jiang, "Fault diagnosis technology based on the fusion of neural network and fuzzy Logic, " in Proc. 2012 International Conference on Systems and Informatics, ICSAI, 2012, art. no. 6223649, pp. 419-422.

[11] R.A. Valiyev, L.A. Galiullin, A.N. Iliukhin, "Design of the modern domain specific programming languages, " International Journal of Soft Computing, 10(5), pp. 340-343, 2015.

[12] Z.T. Yao, H.X. Pan, "Engine fault diagnosis based on improved BP neural network with conjugate gradient, " Applied Mechanics and Materials, 536-537, pp. 296-299, 2014.

[13] L. Guihang, W. Jian, W. Qiang, S. Jingui, "Application for diesel engine in fault diagnose based on fuzzy neural network and information fusion, " in Proc. IEEE 3rd International Conference on Communication Software and Networks, ICCSN, 2011, art. no. 6014398, pp. 102-105.

[14] X. Li, F. Yu, H. Jin, J. Liu, Z. Li, X. Zhang, "Simulation platform design for diesel engine fault, " in Proc. International Conference on Electrical and Control Engineering, ICECE, 2011, art. no. 6057562, pp. 4963-4967.

[15] M. Shah, V. Gaikwad, S. Lokhande, S. Borhade, "Fault indentification for I.C. engines using a rtifical nerual network, " in Proc. International Conference on Process Automation, Control and Computing, PACC, 2011, art. no. 5978891.

[16] L.A. Galiullin, R.A. Valiev, "Automated system of engine tests on the basis of Bosch controllers, " International Journal of Applied Engineering Research, 10 (24), pp. 44737-44742, 2015.

[17] R.A. Valiev, L.A. Galiullin, I.S. Dmitrieva, A.N. Ilyukhin, "Method for complex web applications design, " International Journal of Applied Engineering Research, 10 (6), pp. 15123-15130, 2015.

[18] D. Wei, "Design of Web based expert system of electronic control engine fault diagnosis, " in Proc. BMEI, 2011, 1, art. no. 5916978, pp. 482-485.

[19] P.R.A. Valiyev, L.A. Galiullin, A.N. Iliukhin, "Approaches to organization of the software development, " International Journal of Soft Computing, 10(5), pp. 336-339, 2015.

[20] R.A. Valiyev, L.A. Galiullin, A.N. Iliukhin, "Methods of integration and execution of the code of modern programming languages, " International Journal of Soft Computing, 10(5), pp. 344-347, 2015.