

Air Filter Throughput Impact Experimental Study on Internal Combustion Engine Fuel Efficiency

International Conference BUILDING INNOVATIONS

ICBI 2020: Proceedings of the 3rd International Conference on Building Innovations
pp 215-224 | Cite as

- Bogdan Korobko (1) [View author's OrcID profile](#) ([View OrcID profile](#))
- Anatolii Kryvorot (1) [View author's OrcID profile](#) ([View OrcID profile](#))
- Maksym Skoryk (1) [View author's OrcID profile](#) ([View OrcID profile](#))
- Viktor Virchenko (1) [View author's OrcID profile](#) ([View OrcID profile](#))

1. National University «Yuri Kondratyuk Poltava Polytechnic», , Poltava, Ukraine

Conference paper

First Online: 23 September 2021

- 37 Downloads

Part of the [Lecture Notes in Civil Engineering](#) book series (LNCE, volume 181)

Abstract

The article discusses the estimated indicators of fuel efficiency of vehicles. It was established that analytical and experimental data on determining the fuel efficiency of vehicles have a significant discrepancy. It was found that well-known mathematical models do not take into account the purity of the air filter element for fuel efficiency. Experimental studies were performed and processed, mathematical dependence between the specified parameters was established: air filter throughput and angular speed of crater shaft of internal combustion engine. The obtained mathematical dependence, in the form of a second degree polyonomy, is suitable for use according to the criteria of Student and Fisher. It is determined that in the future the found regression equation can be used to determine the fuel consumption of cars depending on the pollution of the air inlet system of engines.

Keywords

Vehicle Fuel costs Planning an experiment

This is a preview of subscription content, [log in](#) to check access.

References

1. Sakhno VP, Bezborodova GB, Mayak MM, Sarai SM (2004) Automobiles: Traction-speed properties and fuel efficiency /Textbook/. - K: B-w "KWC", 2004, p 174. 15. Table 19. Bibliographer. 30. Titles. 30 ISBN 966-7192-55-5
[Google Scholar](https://scholar.google.com/scholar?q=Sakhno%20VP%2C%20Bezborodova%20GB%2C%20Mayak%20MM%2C%20Sarai%20SM%20%282004%29%20Automobiles%3A%20Traction-speed%20properties%20and%20fuel%20efficiency%20%2FTextbook%2F.%20-%20K%3A%20B-w%20%2E2%80%9CKWC%2E2%80%9D%2C%202004%2C%20p%20174.%2015.%20Table%2019.%20Bibliographer.%2030.%20Titles.%2030%20ISBN%20966%2E2%80%937192%2E2%80%9355%2E2%80%935) (https://scholar.google.com/scholar?q=Sakhno%20VP%2C%20Bezborodova%20GB%2C%20Mayak%20MM%2C%20Sarai%20SM%20%282004%29%20Automobiles%3A%20Traction-speed%20properties%20and%20fuel%20efficiency%20%2FTextbook%2F.%20-%20K%3A%20B-w%20%2E2%80%9CKWC%2E2%80%9D%2C%202004%2C%20p%20174.%2015.%20Table%2019.%20Bibliographer.%2030.%20Titles.%2030%20ISBN%20966%2E2%80%937192%2E2%80%9355%2E2%80%935)
2. Farobin YE, Shuplyakov VS (1983) Otsenko of xpluationnyh voyages for interdunarodnyh transports. Transport, p 200
[Google Scholar](https://scholar.google.com/scholar?q=Farobin%20YE%2C%20Shuplyakov%20VS%20%281983%29%20Otsenko%20of%20xpluationnyh%20voyages%20for%20interdunarodnyh%20transports.%20Transport%2C%20p%20200) (https://scholar.google.com/scholar?q=Farobin%20YE%2C%20Shuplyakov%20VS%20%281983%29%20Otsenko%20of%20xpluationnyh%20voyages%20for%20interdunarodnyh%20transports.%20Transport%2C%20p%20200)
3. Lytvynov AS, Farobyn YE Makmobile: Theory of Explutation of Svistystvo
[Google Scholar](https://scholar.google.com/scholar?q=Lytvynov%20AS%2C%20Farobyn%20YE%20Makmobile%3A%20Theory%20of%20Explutation%20of%20Svistystvo) (https://scholar.google.com/scholar?q=Lytvynov%20AS%2C%20Farobyn%20YE%20Makmobile%3A%20Theory%20of%20Explutation%20of%20Svistystvo)
4. Osnovenko MY, Sakhno VP (1992) Automobiles: Training. Guide. NMK NAO, p 344
[Google Scholar](https://scholar.google.com/scholar?q=Osnovenko%20MY%2C%20Sakhno%20VP%20%281992%29%20Automobiles%3A%20Training.%20Guide.%20NMK%20NAO%2C%20p%20344) (https://scholar.google.com/scholar?q=Osnovenko%20MY%2C%20Sakhno%20VP%20%281992%29%20Automobiles%3A%20Training.%20Guide.%20NMK%20NAO%2C%20p%20344)
5. Grishkevych AI (1986) Automolysly: Theory. Student for the esc. - Mn. Vis. Shk, p 208
[Google Scholar](https://scholar.google.com/scholar?q=Grishkevych%20AI%20%281986%29%20Automolysly%3A%20Theory.%20Student%20for%20the%20esc.%20-%20Mn.%20Vis.%20Shk%2C%20p%20208) (https://scholar.google.com/scholar?q=Grishkevych%20AI%20%281986%29%20Automolysly%3A%20Theory.%20Student%20for%20the%20esc.%20-%20Mn.%20Vis.%20Shk%2C%20p%20208)
6. Klympush OD, Rubtsov VA, Gutarevych YF (1988) Ecoeconomy drowning on a car transport. Technics, p 144
[Google Scholar](https://scholar.google.com/scholar?q=Klympush%20OD%2C%20Rubtsov%20VA%2C%20Gutarevych%20YF%20%281988%29%20Ecoeconomy%20drowning%20on%20a%20car%20transport.%20Technics%2C%20p%20144) (https://scholar.google.com/scholar?q=Klympush%20OD%2C%20Rubtsov%20VA%2C%20Gutarevych%20YF%20%281988%29%20Ecoeconomy%20drowning%20on%20a%20car%20transport.%20Technics%2C%20p%20144)
7. Govorushchenko NY (1990) Ecoeconomy drowning toxicity on the car transport/N.Y. Govorushchenko. Transpornt, p 135
[Google Scholar](https://scholar.google.com/scholar?q=Govorushchenko%20NY%20%281990%29%20Ecoeconomy%20drowning%20toxicity%20on%20the%20car%20transport%2FN.Y.%20Govorushchenko.%20Transpornt%2C%20p%20135) (https://scholar.google.com/scholar?q=Govorushchenko%20NY%20%281990%29%20Ecoeconomy%20drowning%20toxicity%20on%20the%20car%20transport%2FN.Y.%20Govorushchenko.%20Transpornt%2C%20p%20135)
8. Korobko B, Zadvorkin D, Vasyliiev I (2017) Study of the operating element motion law for a hydraulic-driven diaphragm mortar pump. Eastern-Eur J Enterprise Technol 4(7-88):25-31. <https://doi.org/10.15587/1729-4061.2017.106873> (https://doi.org/10.15587/1729-4061.2017.106873)

9. Korobko B (2016) Investigation of energy consumption in the course of plastering machine's work. *Eastern-Eur J Enterprise Technol* 4(8–82):4–11.
<https://doi.org/10.15587/1729-4061.2016.73336>
(<https://doi.org/10.15587/1729-4061.2016.73336>)
10. Korobko B, Virchenko V, Shapoval M (2018) Feed solution in the pipeline aith the compensators mortar pump of various design solutions pressure pulsations degree determination. *Int J Eng Technol (UAE)* 7(3):195–202.
<https://doi.org/10.14419/ijet.v7i3.2.14402>
(<https://doi.org/10.14419/ijet.v7i3.2.14402>)
11. Korobko B, Khomenko I, Shapoval M, Virchenko V (2020) Hydraulic single pump with combined higher volume compensator operation analysis.
https://doi.org/10.1007/978-3-030-42939-3_12
(https://doi.org/10.1007/978-3-030-42939-3_12)
12. Korobko B, Vasyliiev I (2017) Test method for rheological behavior of mortar for building work. *Acta Mechanica Et Automatica* 11(3):173–177.
<https://doi.org/10.1515/ama-2017-0025> (<https://doi.org/10.1515/ama-2017-0025>)
13. Fleahin VG, Gludkin OP, Gurov AI, Hanyn MA (1997) Soviet experimentation: preparation, conducted, analizov/Pod ed. O.P. Gludkina. *Radio and Svyaz*
[Google Scholar](https://scholar.google.com/scholar?q=Fleahin%20VG%2C%20Gludkin%20OP%2C%20Gurov%20AI%2C%20Hany%20MA%20%281997%29%20Soviet%20experimentation%3A%20preparatio%20n%2C%20conducted%2C%20analizov%2FPod%20ed.%20O.P.%20Gludkina.%20Radio%20and%20Svyaz) (<https://scholar.google.com/scholar?q=Fleahin%20VG%2C%20Gludkin%20OP%2C%20Gurov%20AI%2C%20Hany%20MA%20%281997%29%20Soviet%20experimentation%3A%20preparatio%20n%2C%20conducted%2C%20analizov%2FPod%20ed.%20O.P.%20Gludkina.%20Radio%20and%20Svyaz>)
14. Vanhatalo E, Bergquist B, Vaˆnnman K (2013) Towards improved analysis methods for twolevel factorial experiments with time series responses. *Qual Reliab Eng Int* 29(5):725–741
[Google Scholar](https://scholar.google.com/scholar?q=Vanhatalo%20E%2C%20Bergquist%20B%2C%20Va%2C%A8nnman%20K%20%282013%29%20Towards%20improved%20analysis%20methods%20for%20otwolevel%20ofactorial%20experiments%20with%20time%20series%20respon%20ses.%20Qual%20Reliab%20Eng%20Int%2029%285%29%3A725%E2%80%93741) (<https://scholar.google.com/scholar?q=Vanhatalo%20E%2C%20Bergquist%20B%2C%20Va%2C%A8nnman%20K%20%282013%29%20Towards%20improved%20analysis%20methods%20for%20otwolevel%20ofactorial%20experiments%20with%20time%20series%20respon%20ses.%20Qual%20Reliab%20Eng%20Int%2029%285%29%3A725%E2%80%93741>)
15. Vanhatalo E, Vaˆnnman K (2008) Using factorial design and multivariate analysis when experimenting in a continuous process. *Qual Reliab Eng Int* 24(8):983–995
[Google Scholar](https://scholar.google.com/scholar?q=Vanhatalo%20E%2C%20Va%2C%A8nnman%20K%20%282008%29%20Usi%20ng%20ofactorial%20design%20and%20multivariate%20analysis%20when%20e%20xperimenting%20in%20a%20continuous%20process.%20Qual%20Reliab%20Eng%20Int%2024%288%29%3A983%E2%80%93995) (<https://scholar.google.com/scholar?q=Vanhatalo%20E%2C%20Va%2C%A8nnman%20K%20%282008%29%20Usi%20ng%20ofactorial%20design%20and%20multivariate%20analysis%20when%20e%20xperimenting%20in%20a%20continuous%20process.%20Qual%20Reliab%20Eng%20Int%2024%288%29%3A983%E2%80%93995>)
16. Mukhachov VA (2007) Planning and election of the results of the experiment: Uchebnoe assistance.—Tomsko: Tomsk State University of Management Systems and Radoelectronists, 2007. - 118 s ISBN 966-552-11-7: 325.60.
<http://www.springer.com/lncs> (<http://www.springer.com/lncs>). Accessed 21 Nov 2016

Copyright information

© The Author(s), under exclusive license to Springer Nature Switzerland AG 2022

About this paper

Cite this paper as:

Korobko B., Kryvorot A., Skoryk M., Virchenko V. (2022) Air Filter Throughput Impact Experimental Study on Internal Combustion Engine Fuel Efficiency. In: Onyshchenko V., Mammadova G., Sivitska S., Gasimov A. (eds) Proceedings of the 3rd International Conference on Building Innovations. ICBI 2020. Lecture Notes in Civil Engineering, vol 181. Springer, Cham. https://doi.org/10.1007/978-3-030-85043-2_21

- First Online 23 September 2021
- DOI https://doi.org/10.1007/978-3-030-85043-2_21
- Publisher Name Springer, Cham
- Print ISBN 978-3-030-85042-5
- Online ISBN 978-3-030-85043-2
- eBook Packages [Engineering](#) [Engineering \(RO\)](#)
- [Reprints and Permissions](#)

Personalised recommendations

SPRINGER NATURE

© 2020 Springer Nature Switzerland AG. Part of [Springer Nature](#).

Not logged in Not affiliated 185.19.6.120