

A list of the main scientific results that made it possible to achieve the impact of

The main area in which the Institute's administrative staff makes impact on the development of advanced science is the results of scientific and experimental studies of processes in braking and power systems of various types of rail transport. A significant part of the research carried out by the administrative staff is aimed at improving the processes of carrying out and processing scientific research, creating new and modernising existing types of rail transport and their components in order to improve and enhance technical characteristics.

In 2020-2024, the administrative staff obtained the following key scientific results:

- an abstract and a thesis on the subject: 'Development of the methodology for researching the characteristics and braking systems of passenger and freight cars' for the degree of Doctor of Engineering Science in the speciality 05.22.07 - Rolling stock of railways and train traction were prepared and submitted to the Specialised Academic Council D 26.820.01
- 2 monographs were published in Ukraine;
- 2 articles indexed in Scopus and/or WoS in scientific journals with quartiles Q1, Q2 were published;
- 4 articles indexed in Scopus and/or WoS in scientific journals with quartiles Q3, Q4 were published;
- 3 articles indexed in Scopus and/or WoS in scientific journals without quartile were published;
- 7 articles published in professional scientific journals of Ukraine of category B;
- one textbook was published;
- one patent of Ukraine for utility model was published;
- one certificate of copyright registration for a literary work of a scientific nature was obtained;
- expert evaluation of theses and basic research, applied research, scientific and technical (experimental) developments arranged by the Ministry of Education and Science on a competitive basis;
- Participation in the development of 75 R&D reports.

In particular, scientifically grounded and proven, useful methodological and technical developments are: creation of methodological foundations for assessing brake pad friction coefficients based on the results of tests on inertial benches; development of a method for assessing the braking efficiency of railway rolling stock based on mathematical and computer modelling of braking processes, taking into account the results of experimental studies; improvement of existing approaches and algorithms for finding a rational mode of running a metro train under operation of a metro train under the conditions of applying the criterion of minimum electricity consumption from the contact network and using the method of dynamic programming; further development of the theory of creating energy-efficient metro rolling stock with recovery systems, which is based on the introduction of an on-board capacitive storage device as an additional power source, which will allow efficient use of electricity of a regenerative train and expand its technical capabilities; further development of the scientific fundamentals of theoretical research on determining the rational parameters of on-board capacitive energy storage for metro rolling stock with recovery systems in the direction of using specialised computer models capable of reproducing the processes of real operation of rolling stock with sufficient accuracy, which will reduce the time and financial costs of such research.

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