USE OF INFORMATION TECHNOLOGIES IN TEACHING THE DISCIPLINE "MODELING TECHNOLOGICAL PROCESSES OF ROAD TRANSPORT ENTERPRISES"

Dykha O., Rudyk O., Golenko K.
Khmelnytskyi National University, Khmelnytskyi, Ukraine

Abstract. For the educational discipline "Modeling of technological processes of road transport enterprises" in the SolidWorks Simulation and Ansys Workbench environments, the basic principles and provisions of automated design in the field of computer modeling of units, assemblies and parts of vehicles, as well as devices for their repair (lifts, jacks, stands, pullers etc.). The main attention is paid to the theory and practical use of finite element methods and the acquisition of skills in the design and calculations of road transport details. Mandatory elements of research in SolidWorks and practical skills of modeling various load modes of road and special vehicles in Ansys Workbench are defined. In order to extend the service life of structural elements and parts of road transport, methods of their restoration and increase in wear resistance are defined.

Keywords: cars, modeling, SolidWorks Simulation, Ansys Workbench.

Introduction. The educational discipline "Modeling of technological processes of road transport enterprises" is a mandatory component of the professional training of higher education applicants for special. 274 "Motor transport" (bachelor). A student who has successfully completed the study of the discipline must: skillfully use the conceptual apparatus of the specialty; to understand the structure and dynamics of technological processes of motor transport enterprises; be able to use numerical methods for solving static and dynamic problems of solid body mechanics; work with SolidWorks package of application programs for flat and solid modeling; to have engineering calculations of solid models for strength in mechanical engineering (SolidWorks Simulation and Ansys Workbench).

The main attention is paid to the theory and practical use of finite element methods (FEM) and the acquisition of skills in the design and calculation of parts and components of road transport, as well as devices for their repair.

The purpose of the work. The purpose of the discipline: to give an idea of the basics of numerical methods for solving static and dynamic problems of solid mechanics, as well as algorithms and features of the numerical implementation of these methods; teach to apply approximate methods to solve specific problems that arise in scientific and technical practice; master the skills of using automated design systems in the field of technological processes of motor vehicle enterprises.

Formulation of the problem. For the educational discipline "Modeling of technological processes of road transport enterprises" it is necessary to form the basic principles and provisions of automated design in the field of computer modeling of parts, units and aggregates of vehicles, as well as simulation of various modes of their field tests and operating conditions in SolidWorks Simulation and Ansys environments Workbench.

Solving the problem. Mandatory elements of research in SolidWorks are [1, 2]: static analysis of the model and the process of creating the MSE grid; the possibility of replacing the material of the part; analysis of the stress state of the model to save its material; stress sensing at critical points (fig.1); fatigue strength in a dangerous section; possible loss of stability; the maximum load (assuming a linear static analysis) that the modeled part can withstand (without its destruction) with a given safety factor; the influence of fasteners on the performance of parts, the quality of the grid on the accuracy of calculations, changes in the direction of load on the stability

of parts, variations in the size of individual elements of the part on the coefficient of safety margin, of blow on the stability of wheeled machine parts; ensuring the passability of automobile equipment.

The purpose of the independent works of the discipline is to acquire practical skills regarding the features of modeling various load modes of road and special vehicles, as well as their components, followed by analysis of the stress-strain state, thermal loads, aerodynamics, heat transfer, convection, friction etc.

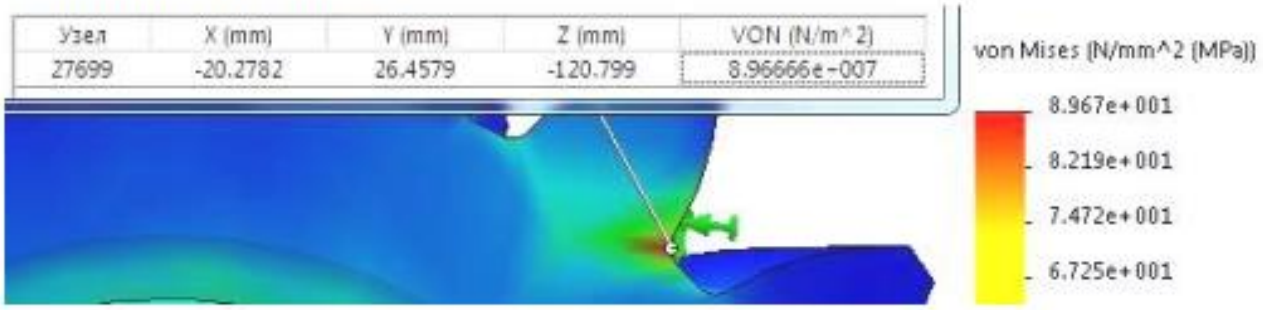

Fig. 1. Probing of stresses in a dangerous section near their maximum values

Students as a result of independent work in the Ansys Workbench environment [3]: investigate the peculiarities of the formation of boundary conditions for the simulation of field tests; gain experience working with hybrid models represented by rod and shell elements, experiment with Ansys Workbench functionality when importing and processing them; acquire practical skills in the formation of a mesh of finite elements, investigating the peculiarities of the breakdown of the model; analyze the obtained results of stresses, deformations, displacements, forces and moments, deformation energy, etc., establish regularities and dependencies of indicators (fig. 2).

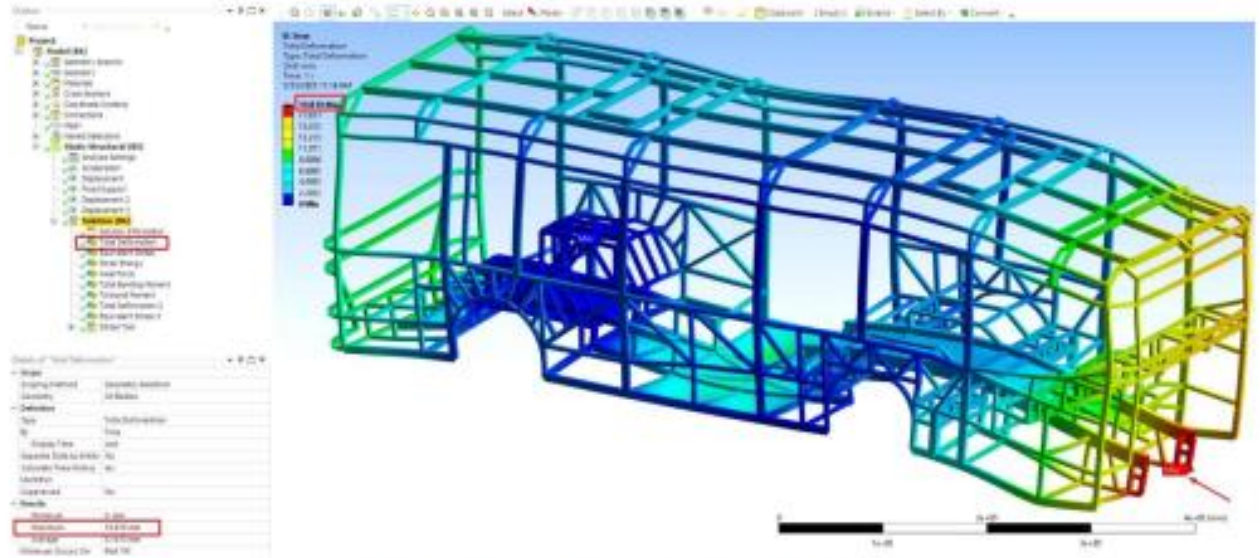

Fig. 2. Map of deformations of the model

Conclusion. Therefore, the implementation of information technologies in the study of the discipline in question: professionally orients the listeners; provides thorough training in the specialty, which is connected with continuity in teaching; activates scientific and research activities, increasing graduates' employment guarantees.

The educational and professional program "Automotive transport" also includes the opportunity to receive in-depth professional training in the analysis of the causes of the failure of structural elements and parts of automobile transport and the development of advanced technologies for their maintenance, repair, restoration and increase in wear resistance in order to extend the service life.

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THE CAPABILITIES OF AI FOR CHEMICAL EDUCATION

Kharchenko Yu.[1], Babenko O.[1], Zudina L.[2]
[1]Sumy State Pedagogical University named after A.S. Makarenko, Sumy, Ukraine
[2]RWTH Aachen University, Aachen, Germany

Abstract. The aim of investigation is to study the potential and limitations of using large language models (LLMs) for teaching Chemistry. The objective of the study is to conduct comparative analysis of ChatGPT and Gemini performance across chemistry disciplines; and identify key challenges in their application. The objective and purpose are to use LLMs like ChatGPT and Gemini for solving chemistry tasks related to Structure of Matter, Organic Chemistry, Environmental Chemistry, and Laboratory Chemical Practice, and other available generative AI-based tools aimed at assessing their viability for enhancing chemical education in Ukrainian higher education. We used the test questions spanning reproductive and productive levels requiring analysis and logical reasoning. And we have conducted a comparative evaluation against average Ukrainian student performance. As a result, LLMs showed potential in certain areas of Chemistry, mainly in matters that did not require logical reasoning, but were generally inferior to students. Key challenges included grasping nuances, abstract concepts, recognizing formulas/equations, limitations of logical reasoning, and language barriers. Although LLMs are promising, implementation requires addressing the identified limitations.

Keywords: high school, artificial intelligence, LLM, chemistry education, ChatGPT, Gemini.

Introduction. Artificial intelligence is increasingly being integrated into the educational process to enhance student learning and improve teaching practices. AI-powered learning tools can offer personalized learning experiences, automate routine tasks, and offer real-time feedback and assessment. As numerous studies by scientists around the world show, AI has the potential to be a useful tool in teaching and learning chemistry, in particular for creating interactive simulations, answering questions and feedback on student work [1]. It can be used to create personalized learning experiences for students [2] and much more. However, it is important to carefully examine the role and use of AI in the context of chemistry education, taking into account the peculiarities of Chemistry as a scientific discipline.

The purpose of the work. The aim of our research was to study the use of powerful LLMs (large language models) such as ChatGPT and Gemini (Google Bard), as well as some other generative artificial intelligence tools, in the study and teaching of Chemistry. The findings obtained are intended to contribute to the expansion of knowledge regarding the integration of AI into education and to provide practical information for educators and administrators who are looking for ways to harness the potential of AI technologies to improve chemistry education in Ukrainian educational institutions.

Formulation of the problem. Considering the increasing involvement of AI in the educational process, it is necessary to highlight the boundaries of its capabilities, identify the key