СЕКЦІЯ 6. ІННОВАЦІЙНІ МЕТОДИКИ НАВЧАННЯ У ПРОЦЕСІ ПРОФЕСІЙНОЇ ПІДГОТОВКИ ФАХІВЦІВ

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THE USE OF INNOVATIVE TECHNOLOGIES AS A MEANS OF ENHANCING STUDENT LEARNING

Innovative teaching methods are teaching methods that involve new ways of interaction "teacher-student", a certain innovation in practical activities in the process of mastering the educational material.

Today, purposeful and comprehensive training of a specialist is required, including a wide range of not only information knowledge, skills, but also information competencies related to the search, extraction and critical analysis of information, the ability to independently acquire and produce new knowledge. In other words, we are talking about the formation of an information culture of the future specialist.

Along with the use of various innovative technologies, it is necessary to use teaching methods in the educational process of the university, stimulating the cognitive activity of students. The use of the latest innovative technologies helps to solve pedagogical and methodological problems that are difficult or impossible to solve with traditional methods. Innovative and traditional teaching methods should harmoniously complement each other as part of a single educational environment of the student.

The transformation of post-industrial society into a global information society, based not only on knowledge, but also on the competence of specialists, significantly actualized the problem of innovative approaches to the organization of educational processes. Therefore, high requirements are put forward to the education

system: it must prepare specialists for activities in a dynamic world where non-standard tasks constantly arise before a person.

When training specialists in higher education, the use of innovative forms and methods must be combined with an understanding of the goals and objectives of education and training. Innovative methods create conditions for the formation and consolidation of professional knowledge, skills and abilities of students, contribute to the development of the professional qualities of the future specialist. The use by teachers of innovative methods in the learning process helps to overcome stereotypes in teaching, the development of creative abilities, the development of new approaches to professional situations.

The activities of engineers in modern professional reality are multifunctional. It includes the design of technological processes and the choice of technological equipment, control over the proper operation of equipment, rational organization of interaction between people and technology, increasing the efficiency of its use, etc. The rapid change of technology requires constant retraining of technical specialists. Therefore, the task of improving the efficiency and quality of higher engineering education is currently more relevant than ever.

The main feature of modern graphic training of engineers in the specialty "Automobile Transport" is 3D modeling using computer-aided design systems, since information models are present at all stages of the life cycle of car parts.

One of the optimal varieties of computer-aided design systems for higher education institutions is SolidWorks (SW), which is based on a parametric object-oriented methodology that allows you to get a 3D model from a 2D sketch. One of the CAE-applications of this CAD is SW Simulation, which allows you to carry out: calculations for the strength of parts and assemblies using contact elements, critical forces and forms of stability loss; linear static, frequency, thermal, joint thermostatic analyzes; nonlinear calculations; design optimization, etc.

An example of the use of SW in a technical university can be a study, in which a transmission rack is designed, designed for lifting and moving loads during the installation and dismantling of components and assemblies from cars (fig. 1). At the same time, with the help of SW Simulation, a static analysis of the base was carried out (fig. 2).

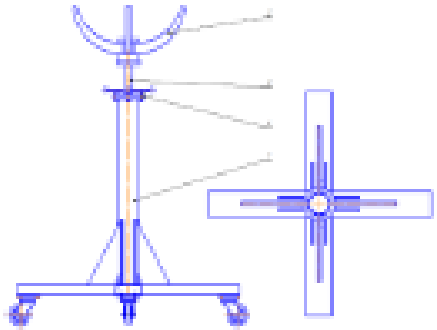
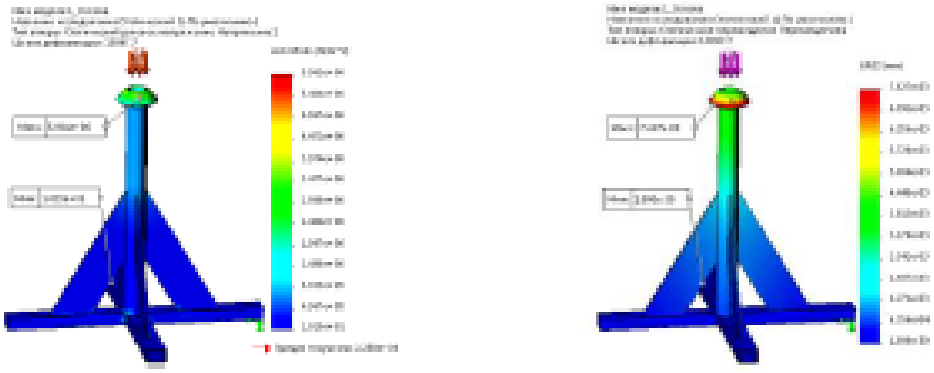


Figure 1 – Assembly drawing of the transmission riser for dismantling units from the car (1 – base)



a b

Figure 2 – Contour graphs of total stresses (a) and movements (b) of the base

In [1], a study of the operability of the stand for the diagnosis of automotive equipment was carried out (fig. 3), and with the help of SW Simulation, a static analysis of bearing supports was carried out (fig. 4).

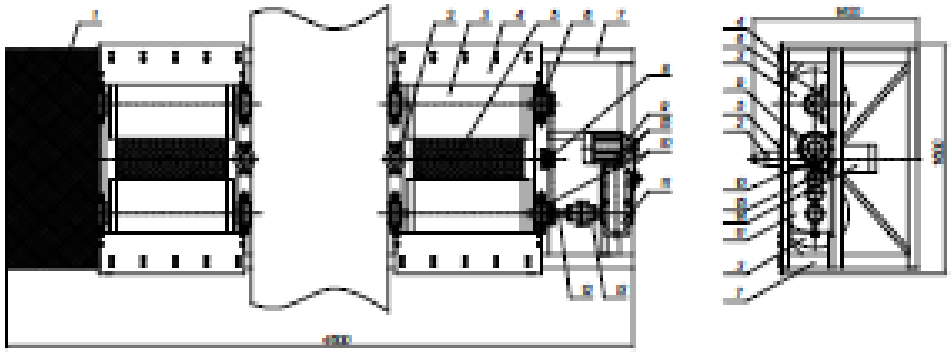


Figure 3 – General view of the stand for diagnostics of automotive equipment (6 – bearing support)

a b

Figure 4 – The results of the calculation of the bearing support for strength: a – Von Mises tension; b – the resulting movement of URES

Competency-oriented problems were considered as a separate type of training problems (their results of solving are associated with subject activity) on the example of designing a bearing puller from a shaft-gear (fig. 5, a) followed by a stable calculation of the power screw (fig. 5, b).

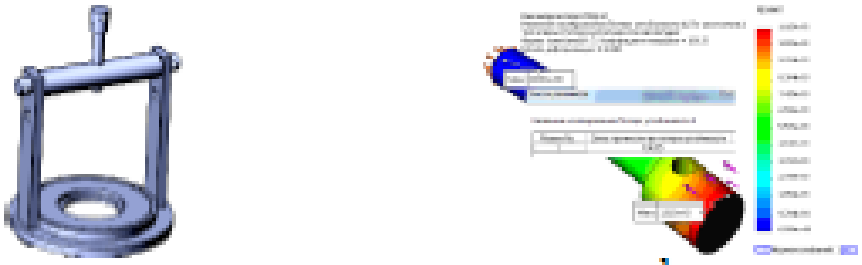


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Figure 5 – Geometric a model of the bearing puller (a) and resulting amplitude and safety margin with loss of stability (b)

The authors [2] designed a screw puller of ball radial single-row bearings of the crankshaft (fig. 6, a) followed by the use of SW Simulation for calculations on the static strength of the collet (fig. 6, b).

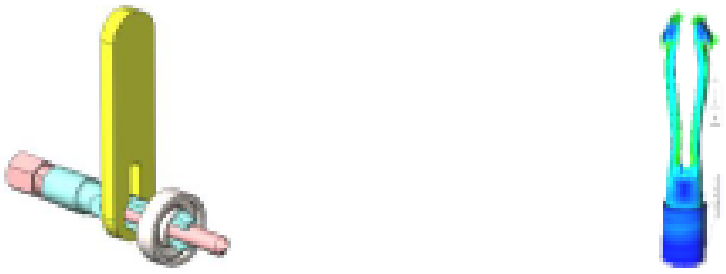

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Figure 6 – Screw puller of bearings from crankshafty (a) and epura distribution of total stresses von Mises tsanga (b)

At the bottom of the issues of improving the quality of professional training of specialists in the near future is the introduction of modern computer and educational technologies into the educational process [3]. Therefore, a device for compressing the springs of the front suspension was designed (fig. 7) with the corresponding calculation of the static strength of the lower plate (fig. 8).

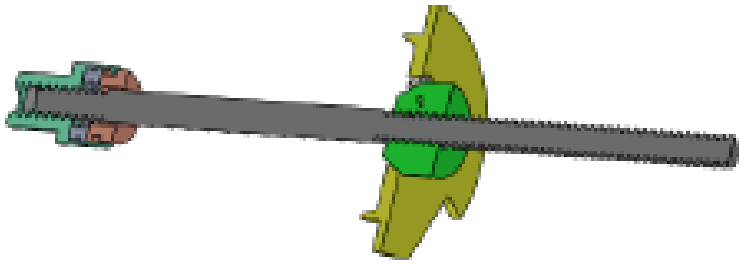
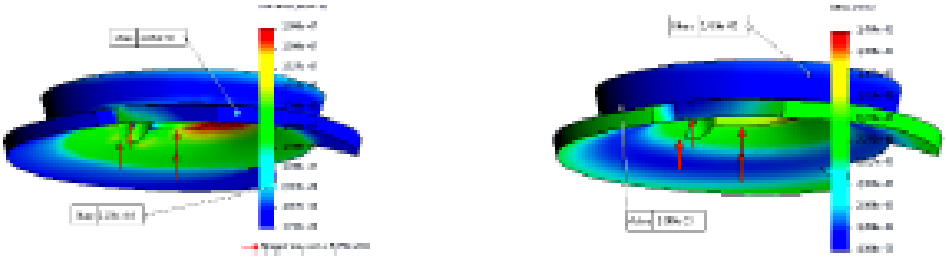


Figure 7 – 3D model of the device for compressing the springs of the front suspension



а б

Figure 8 – Diagrams of distribution of nodal stresses (a) and movements (b) of the lower plate

The use of SolidWorks causes increased interest in creative tasks, the opportunity to test your knowledge and get qualified advice. In addition, SolidWorks increases the possibilities of setting educational tasks and managing the process of their implementation, involves students in the educational process, contributing to the widest disclosure of their abilities, activation of mental activity.

The introduction of SolidWorks into the study of automotive disciplines not only professionally orients future employees, provides in-depth training in the specialty related to continuity in teaching, but also contributes to the intensification of research activities, increasing guarantees of further employment of graduates.

So, introduction of innovative technologies in the professional training of a future specialist is a necessary element in the formation of the foundations of professionalism.

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INNOVATIVE TECHNOLOGIES IN THE TRAINING OF COMPETITIVE SPECIALISTS

Traditional training and its classical forms do not meet modern requirements. Therefore, it is necessary to develop and apply new methods that are closer to real professional activity and help to form and develop professional and creative thinking in students.

An important role in the development of research skills belongs to the student scientific circle (SNK) of the Department of Tribology, Automobiles and Materials Science of our university. An important feature of this SNK is that students and undergraduates come to the circle, the choice of profession of which is conscious. Their effort to increase the level of knowledge and interest in the future specialty