

## **Interaction of Materials Resistance Science With Other General-Military Disciplines In Engineering Specialties**

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**Abstract:** In the science of material resistance, knowledge of the calculation of the elements of construction and construction to strength, priority and durability is formed, the ability to perform design and inspection calculations. The science of resistance of materials creates its own methods of calculation based on the subjects of physics, higher mathematics, theoretical mechanics, which are General Educational Sciences.

**Keyword:** material, material resistance, integration, consistency, bikrlik, priority, education, methodology.

### **INTRODUCTION.**

When we analyze the science curriculum and working programs of the directions that train engineers in the course of our research, the same thing became known, when we look at them theoretically, teaching with the provision of science integration of the Universal Sciences is one of the current issues. Before building a machine or facility, depending on for what purpose it will be used, the materials that will be needed will be selected. When choosing materials, it is necessary to decide in advance what conditions the dimensions of the machine or essay should be worked on and what kind of loads they should be able to withstand, that is, what external forces should be able to withstand, what stresses should be generated in the parts and what material to withstand these stresses, as well as how to.

The task of the educational process of a higher educational institution is not only to provide educational and scientific information. Rather, the formation of professional qualities and the development of intellectual abilities are of great importance in the training of modern engineers. The training of future engineers on

such a basis is carried out by increasing their scientific and professional training, as well as teaching the subjects that provide training.

In most specialties of higher education institutions, the science of "resistance to materials" is the base construction course, during its development, the knowledge, skills and qualifications necessary for productive work are formed. In the science of material resistance, the ability to calculate the elements of construction and construction to strength, bikrity, priority and durability is formed, the ability to perform design and inspection calculations [1 p.6.]

The science of resistance of materials surrounds the examination of internal forces, deformations that are formed from the impact of external forces on the elements of structures and machines, the state of tension, as well as methods of calculating them for strength, stigma and priority. In order to ensure the normal operation of structures and machines during the period of operation, the elements of their construction must satisfy the necessary conditions of consistency, bikrity and priority. Consistency is said to be the ability to carry certain loads without compromising the structure and its elements. Bikrlik is understood as the ability to resist deformation of the structure and its elements from the influence of external forces. During the period of exploitation, the structures and some elements of them should not form large deformations under the influence of external forces. The priority is said to be the ability of the construction and its elements to maintain a certain elastic balance from the influence of external forces to the initial form.

## **MATERIALS AND METHODS.**

The purpose of teaching the science of resistance of materials is to teach students the methods of determining the internal forces that are formed under the influence of external forces in the elements of construction and machine structures during the period of exploitation, as well as to create skills for the implementation of preliminary engineering calculation project work.

1. The task of the material resistance science is to analyze the state of tension and deformation generated in the elements of buildings, structures and machines from the engineering side, to choose an accounting scheme for construction, to apply the necessary methods for determining the internal forces in their cross-sections, to teach the students the methods for determining the physico-mechanical characteristics of.

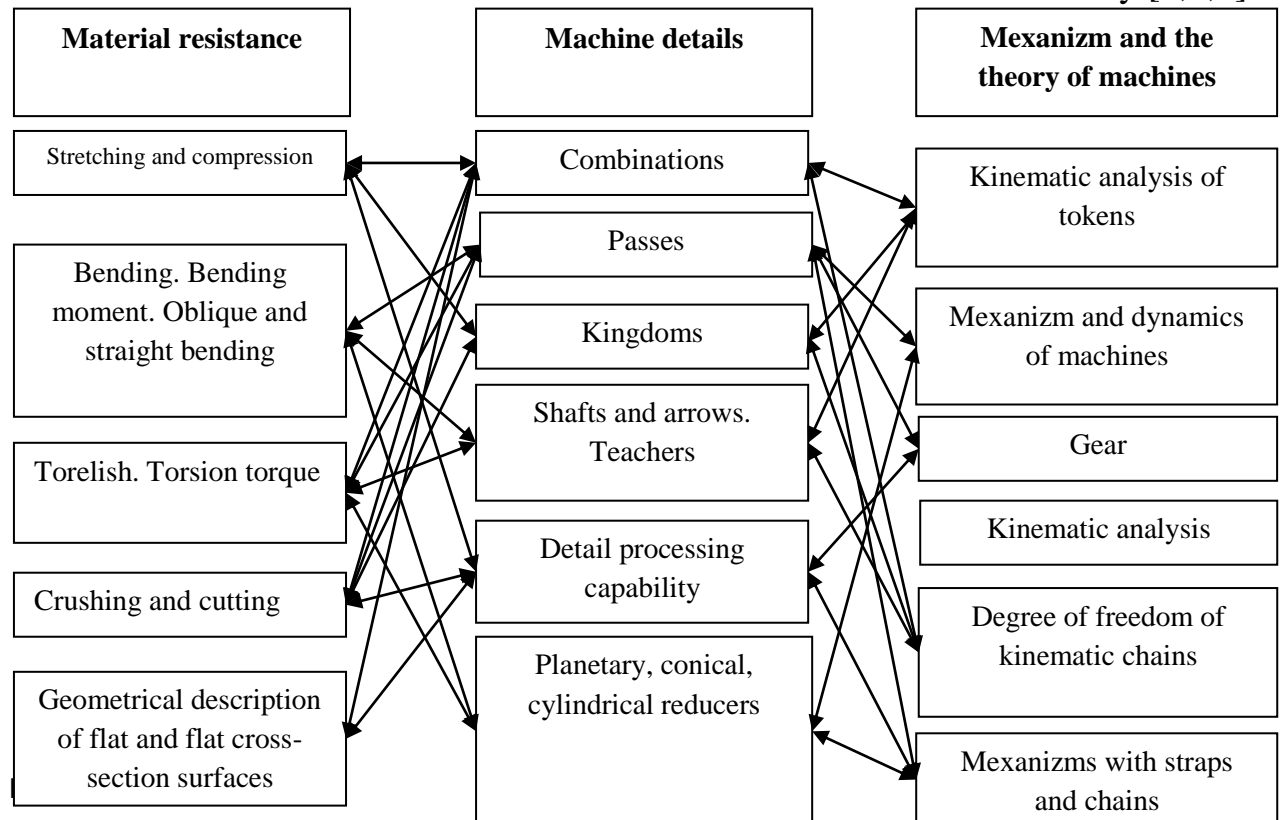
2. The science of resistance of materials creates its own methods of calculation based on the subjects of physics, higher mathematics, theoretical mechanics, which are General Educational Sciences. The science of material resistance serves as the basis in the study of National Science, which plays a key role in the formation of Engineers. On the basis of the laws of materials resistance, calculation formulas, methods of calculating the entire holistic structures will be developed and applied directly to the solution of the issues of practice in the field of construction mechanics, construction structures, earthquake-proofing of structures, grounding mechanics, Foundation and foundation disciplines.

3. The first theoretical work on the resistance of materials was done by the Italian scientist Galileo Galilei. Some of Galileo's theoretical views were mistaken. For example, he incorrectly calculated the coefficient of curvature, even if he correctly determined that the cross-sectional surface is proportional to the square of the height of the cross-sectional surface, the resistance to the bending of the beam, which consists of a straight rectangle. In 1676 R. Hooke determined the proportional connection between the force and the displacement in the stretch; this connection is known as the Hooke law, which is very important in the resistance of materials. In Russia, the science of material resistance was founded from the XVIII century, and in the XIX century from Russian scientists D.I.Hooke, G.S.Golovin, F.S.Yasinsky, A.V.The work done by Galilei and others became world famous. At the beginning of the XX century I.G.Bubnov, B.G.Galerkin, A.N.Y.Krilov, S.P.Tymoshenko, P.F.The work of scientists such as Papkovitch

contributed a significant contribution to the development of resistance science of materials. N from former Soviet scientists.M.Belyaev, M.M.Filonenko-Borodich, V.A.Gastev, A.A.Ilyushin, V.V.Sokolovsky, V.Z.Vlasov and others created independent Sciences from some sections of the resistance of materials. Uzbek scientists on the development of resistance to materials X.A.Rakhmetullin, M.T.Urazboev and others made a big contribution[2,4,5,6].

4. From the influence of forces placed on it in each body, the mutual arrangement of its particles changes, but due to the fact that the total amount of matter contained in it does not change, its mass does not change. Such a case is called deformed body. For example, when Brus stretches, its length changes, and when bending, its shape changes, in the torsion of the Val, where the cross - section is a circle-the dimensions and shape of the volume does not change, but the mutual arrangement of the elementary particles changes. Deformation is understood as a change in the state of mutual positioning of particles of the body, which, as a rule, leads to a change in the size and shape of the body.

The following Figure 1 shows the machine details with the science of material resistance and the interaction of the science of machine and machine theory [3,4,5].



### **1-picture. Material resistance, mechanism and machine theory, interconnectivity of machine detail science.**

From Uzbek scientists J.A. In the scientific research work conducted by Hamidov, the organizational and structural model of interdisciplinary and interdisciplinary disciplines was developed and analyzed in detail [2, p.43-44 ].

We consider the system of formation of professional competence of future Bachelors of technical fields as a general system consisting of several systems that combine many interrelated elements. The need for the organization and management of complex technical systems, the design and maintenance of technical structures, the need to solve problems associated with the study of technical phenomena in the process of educational and cognitive activity of students requires the use of a systematic approach to education.

Integration is the process of developing a single system from multiple heterogeneous systems to restore and improve the quality level of relations between the elements, as well as to remove functional and structural over-production and improve the overall efficiency of the activity. In our opinion, the transition from the already known properties of objects and phenomena studied in the formation of knowledge systems of science to their indicators in a more complete volume, the synthesis of technical knowledge takes place [3, 4, 5, 6]. The growth of the quality of Polytechnic preparations of future bakalavars can be achieved in this direction. One of the main components of educational content is science. The basis of professional activity of future Bachelors in educational activity lies in the development of a system of knowledge of science.

In organizing the work of students in the field of study of technical sciences within the framework of disciplines, we will analyze interdependence relations as a didactic condition for improving students' skills, developing creative thinking and abilities in the educational process, developing students' Scientific Outlook and cognitive skills. V. We adhere to the point of view of Usova [2,4,5]. The teaching

work, like any other, has its structure and composition with its constituent components, has its transformational and conscious nature, materialism, purpose and result and is aimed at creating suitable conditions for the purpose of personal development in the pedagogical process.

Through horizontal integration, we mean the parallel development of skills and knowledge in several areas of technology (for example, the parallel study of technical objects and general models of performance and activity in such disciplines as "machine parts", "Gevlika", "thermal engineering"). To master these disciplines, it is necessary to use the previous knowledge obtained in the study of vertical integration - mathematics, physics, mechanics and other sciences.

The proposed methodology of teaching technical subjects will help to optimize the scheme of integration between the disciplines. The optimization of the scheme of inter-topic relations, in turn, will help to develop a training route for the teaching of general technical subjects. The optimal content of technical training, which determines the sequence of training of certain technical disciplines, can be drawn up accordingly by organizing Predmetlararo links: training routes reflect the order of their study, proceeding from the scheme of predmetlararo links. The synthesis of technical knowledge, the formation of certain systems of knowledge takes place during the transition from the studied properties and the studied phenomena, objects to their indicators in the entire volume. In our opinion, this process is an important indicator of improving the quality of Polytechnic preparation of students and the formation of their professional competence.

Traditional methods and techniques of mastering technical sciences lead to the acquisition of reproductive knowledge, which in turn contributes to a decrease in cognitive activity of interest in thinking and cognition in the study of technical sciences [1, 2, 5]. In addition to providing rational combinations of different methods, forms and means of teaching, we have developed a methodology for the

implementation of a complex of pedagogical conditions taking into account the peculiarities of technical sciences.

## **RESULT AND DISCUSSION.**

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Traditional methods and techniques of mastering technical sciences lead to the acquisition of reproductive knowledge, which in turn contributes to a decrease in cognitive activity of interest in thinking and cognition in the study of technical sciences [4, 5,6,7]. In addition to providing rational combinations of different methods, forms and means of teaching, we have developed a methodology for the implementation of a complex of pedagogical conditions taking into account the peculiarities of technical sciences.

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