

EDUCATION IN MECHANICS IN LATVIA HIGHER SCHOOLS

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Summary. The historical review of mechanics development in Latvia from 18. Century till to the present day is given. Variations and birth of mechanical direction courses after Second World War are more considered. It is shown that the main learning subjects in the area of mechanics are included in study programmes for large Latvia higher schools. The main scientifically and textbooks of Mechanics that are made and published by Latvian scientists and professors are given. The main study programs and courses in Latvian higher schools are mentioned.

HISTORY

The first works of mechanics in Latvia were connected with city Jelgava, with Academy of Peters ["Academy Petrina" - which was established by Courland duke Peter's Birons 1775. - academically gymnasium. The educational and scientifically institution of Courland. The regulation and education plans was work out by academician J. G. Zulcer from Berlin Academy of Science]. Here professor V. Beitlers (1745. - 1811.) (Mathematician) published proceedings about aerostatics of air-balloon, then E. Bidemanis (1785. year) designed and lifts of in air several air-balloons. When in 1862. In Latvia was established Riga Polytechnics the next investigations in the field of Mechanics (till First World War) was connected with that higher school. Here may be mentioned Swiss Vilhelms Ritters (1847. - 1906.) with works in graphical static, works of Pirs Bols (1825. - 1925.) in sky body mechanics and others. After First World War professor of Latvia University Alfred Vitols (1875. - 1945.) made investigations in theory of hydraulics and expanded activities in the international scientifically work, but professor N. Rozenauers (1890. - 1970.) made great investigations in kinematics of machines and mechanisms and others. Must be mentioned engineer and inventor Fridrihs Canders (1887. - 1933.) which was born in Riga and graduate the Riga Politechnically institute (1914.). Today one time in two years period Latvian Academy of Science awarded prize of Fridrihs Canders in the field of physics and technical sciences. The first remarkable authors of mechanics textbooks in Latvian language must be mentioned N. Rozenauers: - in the 30-ty years he published in Latvia University several books mainly about kinematics questions. The next period is observed below.

HISTORY OF BOOKS

According to the contents and quantity the courses of Mechanics are different in University of Latvia (LU), Riga Technical University (RTU), Latvia Agriculture University (LLU), Latvia Sea Academy (LJA) and others higher schools in Latvia, but they main goal is the same - to give the students faithful explanation and enough deep understanding about world wide mechanical interactions and motions of objects with they dynamics analysis. It may be shown that courses of mechanics forms fundamental base for higher education and engineering sciences, it helps to students successful adopt further subjects of mechanical cycle according to higher school profile and specialisation.

All books published in Latvian language customary may be separated into three groups.

The first group includes books published in Latvia from 1920. till 1940. Years, the manly all publications are from Latvia University. Here enter many books of N. Rozenauers as well as works of A. Vitols, J. Inveiss, E. Leimanis, J. Muiznieks, E. Veiss, E. Veidemanis and others.

The second group may include books that are translated from Russian language after Second World War.

The third group includes books of Latvian professors, published after Second World War period. In these group professors of LU, RTU and LLU made the large work.

As results they are published many conspectus of lectures, practical and scientifically works. From they considerable are the next books:

1. Course of Strength of Materials. J. Panovko, A. Leppiks, A. Strekis. Latvia State Press. 1955. Riga. - 432. p. (In Latvian).
2. Course of Theoretical Mechanics. O. Ozols, A. Strekis, J. Vasermanis, A. Muiznieks. Riga. 1961. -565. p. (In Latvian).
3. Course of Theoretical Mechanics. O. Ozols, A. Strekis, J. Vasermanis, A. Muiznieks. Publishing office " Zvaigzne". Riga. 1966. - 616. p. (In Latvian).
4. Strength of Materials in Tasks. J. Auzukalns, E. Ceplitis, I. Kalnins, I. Liepins. Publishing office " Zvaigzne". Riga. 1973. - 742. p. (In Latvian).

5. Theory of mechanisms and machines. O. Ozols. Publishing office "Zvaigzne". Riga. 1974. - 418. p. (In Latvian).
6. Theoretical Mechanics in Exercises. Editor O. Kepe (authors: V. Akmentins, O. Kepe, E. Krumins, J. Lauva, J. Mikelsons, A. Muiznieks, J. Svetins, J. Viba). Publishing office "Zvaigzne". Riga. 1976. - 647. p. (In Latvian).
7. V.Kuksenko, V.Tamuzs. Fracture Micromechanics of Polymer Materials. *Riga: Zinatne, 1975* (in Russian; (English translation by Martinus Nijhoff Publ. 1981), - 310 p.
8. Theoretical Mechanics. O. Kepe, J. Viba. Publishing office "Zvaigzne". Riga. 1982. - 577. p. (In Latvian).
9. Strength of Materials. E. Lavendelis. Publishing office "Zvaigzne". Riga. 1986. - 341. p. (In Latvian).
10. Short Tasks in Theoretical Mechanics. Editor O. Kepe. Moscow. "Vissaja skola". 1989. - 368. p. (In Russian).
11. N.Romalis, V.Tamuzs. Fracture of Nonhomogenous Solids. Riga: Zinatne, 1989, 224pp. (in Russian).
12. Theoretical Mechanics. Dynamics. Editors O. Kepe, J. Viba. Riga. RTU. Part I. 1994. - 259. p. (In Latvian), Part II. 1996. - 174. p. (In Latvian)., Part III. 1999. - 183. p. (In Latvian).
13. H. Altenbach, J. Altenbach, R. Rikards. Introduction in Mechanics of Laminated and Sandwich Structures, Deutscher Verlag fuer Grundstoffindustrie, Stuttgart, 1996, 410 p, (in German). Deutscher Verlag fuer Grundstoffindustrie, Stuttgart, 1996, - 410 p, (in German).
14. Dictionary of Mechanics terminology in 4 Th languages (Latvian, English, German, Russian). Editor V. Tamuzs. Publishing office "Latvian National Committee of Mechanics. Riga. 1997. - 253. p.
15. V.Tamuzs, N.Romalis, V.Petrova. Fracture of Solids with Microdefects. New York: Nova Science Publ, 2000, -238 p.

EDUCATION DEPARTMENTS AND COURSES OF MECHANICS IN A LATVIA TODAY

Latvian National Committee for Mechanics (LNCM), (Chairman Prof. Vitauts Tamuzs) and LNCM Seminary (Chief Prof. Janis Viba) has next information about education departments and courses of mechanics in Latvia. The first is an Institute of Polymers Mechanics (director Dr.habil.sc.eng., Juris Jansons) at University of Latvia (LU), Faculty of physics and mathematics. In University of Latvia main study programs and sciences problems in Mechanics are connected with students and professors of physics and mathematics specialisation. The main education courses in Mechanics (Bachelors, Masters and Doctoral study programs) are connected with: - Theoretical mechanics; - Applied mechanics; - Mechanics of Solids; - Fracture Mechanics; - Fatigue; - Mechanics of continuous medium; - Investigation in the field of electrodynamics; - Theoretically and Experimental investigations of materials mechanical properties; - Mechanics of composite materials constructions; - Development of mathematically modelling methods for analysis electromechanical processes and others. <http://www.pmi.lza.lv/>.

At the Riga Technical university (RTU), faculty of Transport and Mechanical Engineering in the Institute of Mechanics (director Dr.habil.sc.eng., prof. Janis Viba) main works in Mechanics are connected with study programs (Bachelors Sc., Eng., Masters Sc., Eng. and Doctoral studies): - Engineering Technology, Mechanics and Mechanical Engineering; - Production Technology; - Railway transport; - Auto transport; - Aviation Transport. The elements of mechanics are used in courses: - Theoretical mechanics; - Technical mechanics; - Strength of materials; - Dynamics and lasting of machines; - Vibration and stability of technical systems; - Numerical analysis in engineering mechanics; - Investigation of impact systems; - Analytical mechanics - EM analysis of constructions; - Non-linear dynamics and chaos; - Biomechanics of muscle systems; - Investigations of composite materials; - Investigation of traffic accidents and others.

At the Latvian Agriculture University (LLU), Technical faculty in the Institute of Mechanics (director Dr.habil.sc.eng., prof. Guntars Uzklings) main works in Mechanics are connected (Bachelors, Masters and Doctoral studies) with specialisation in the fields of: - design of agriculture techniques; - production and maintenance of agriculture techniques; - forest manufacture; - wood-working and others. The elements of mechanics are used in courses: - Theoretical mechanics; - Technical mechanics; - Applied mechanics; - Strength of materials; - Dynamics of machines and others. <http://www.cs.llu.lv/>. At the Latvian Sea Academy in the Institute of Ships Mechanics (director Dr.habil.sc.eng., prof. Juris Cimanskis) main works in Mechanics are connected (Bachelors, Masters and Doctoral studies) with specialisation in the fields of analysis of ships motion stability and dynamics of rotors. In study program "Ships Mechanics" the main elements of mechanics are used in courses: - Theoretical mechanics; - Strength of materials; - Analytical mechanics; - Theory of mechanical vibrations; - Methods of optimisations; - Dynamics and stability of ships motion. <http://www.aic.lv/ENIC/lat>.

The professors and students of higher schools of Latvia have very close contacts with students and scientists inside Baltic region in the field of mechanics, for example: International DAAAM conferences - Tallinn, Vibroengineering conference - Kaunas, Non-linear dynamics, catastrophes and chaos - Riga. The professors of higher schools of Latvia take wide part in the international projects in the field of mechanics (Prof. V. Tamuzs - fracture of composite materials; Prof. R. Rikards - calculation of laminated composite structures, Prof. I. Knets - problems of biomechanics, Prof. J. Viba - vibrations and collisions in connected bodies systems).