CHRONICLES

SIXTH SCIENTIFIC CONFERENCE OF THE WESTERN SIBERIAN REGION MINISTRY OF SPECIALIZED HIGHER AND SECONDARY EDUCATION OF THE RSFSR ON MATHEMATICS AND MECHANICS

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The Sixth Scientific Conference of the Western Siberian Region Ministry of Specialized Higher and Secondary Eduction of the RSFSR on Mathematics and Mechanics, dedicated to the 60th anniversary of the Great October Socialist Revolution, was held on September 27-30 at Tomsk University.

The work of the conference was carried out in sections on mathematics and mechanics, including 14 subsections. The conference head 530 papers from universities, scientific-research institutes, and organizations from 37 cities of Siberia, the Urals, and the European part of the country. A large part of the papers were presented by associates of scientific institutes of applied mathematics and mechanics, and the physico-technical and mechanicomathematical faculties of Tomsk University.

The work of the section on mechanics was opened by a paper by E. D. Tomilov (Tomsk), "Gas jets," in which the author gave a detailed review of previously known results on the theory of gas jets and adduced original results of many years of work by the author in this field, summed up and prepared for the publication of a monograph.

The sectional paper of K. V. Kholshevnikov (Leningrad), "Lie transforms," discussed a method for the solution of systems of differential equations, based on contact transforms and the use of Lie groups and series, widely used in celestial mechanics. It is shown using actual examples that this method can be used successfully in the investigation of many other problems in theoretical mechanics.

A large part of the papers read in the subsection on applied aeromechanics were devoted to the study of aerodynamics and the heat and mass transfer of two-phase media, applied to several industrial production processes and to the processing of disperse materials. In particular, in his paper "Investigation of the motion of capsules in a pipeline," V. P. Berman set forth the results of a theoretical and experimental investigation of the principal hydrodynamic characteristics with the hydrotransportation of capsules in a pipeline. A mathematical model of hydrocontainer transportation flow is constructed as a discrete two-phase system, and the empirical data can be used in the design of large industrial hydrocontainer systems.

In the paper of V. Yu. Viklov, F. F. Kopp, A. I. Chernikov, and V. A. Shvab (Tomsk), "Electrification of dispersed materials with interaction with the surface of a solid body," a study is made of the mechanism and the laws of the contact electrification of dispersed products with interaction with the surface of industrial equipment. An experimental investigation is made of the dependence of the mass specific charge acquire by the particles of the product as the result of an individual collision with an element of the surface of the equipment on the velocity vector of the collision and on the particle size.

The results obtained make it possible to evaluate the flammability with the processing of dispersed materials resulting from electrification, in particular, with the pneumatic transport of powders.

In their paper, V. N. Pachin and V. N. Kurochkin (Tomsk) reported the results of an experimental investigation of the process of the grinding of synthetic corundums, titanium carbide, and crystalline boron in a laboratory pulse-type penumatic mill, with application to the production of grinding and polishing powders. The presence of intense surface self-grinding of the material in the investigated apparatus, which allows of a considerable increase in the efficiency of the process of fine grinding, is demonstrated.

The paper of P. N. Zyatikov and A. T. Roslyak (Tomsk) presented the results of air-centrifugal classification of tungsten carbide microparticles and certain other abrasive materials in the "subsieve" region of

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particle sizes, which made it possible to develop the construction of a classifier which, in turn, made it possible to separate micropowders into narrow classes and to attain a classification efficiency equal to 0.8-0.9.

The paper of Yu. A. Biryukov (Tomsk) set forth the results of multifactor experimental investigations of a pneumatic circulating mixer for granulated materials, and a mathematical model of the mixing process is formulated. On the basis of the experimental data, a numerical study is made of the effect of the working characteristics of the apparatus and of the physicomechanical properties of the material on the coefficient of inhomogeneity of the mixture. On the basis of the results obtained, an industrial averager is designed, with a one-time load of 20 tons.

A group of papers, heard at the subsection of the theory of elasticity, strength, and wave dynamics, was devoted to the analytical and numerical investigation of applied questions in the classical theory of elasticity. In his paper "A modification of the integral equations of the plane theory of elasticity," V. I. Tarakanov (Tomsk) proposed a transform of the integral equations, making it possible to carry out a through-calculation of the integral operators around the contour of the region, including the corner points.

In the paper of S. N. Vasil'kovskii (Novosibirsk) "Generalized solutions of plane elastic problems in a computer. The equivalence of MKE and MKR," an investigation is made of the stressed state of elastic samples made of a bimetal under static loads. A generalized solution to the problem is obtained with different conditions at the contact interface.

V. G. Poteiko (Tomsk) in his paper, derived the axisymmetric equilibrium equations and gave their solution for reinforced cylindrical shells in a stress−strain state, in which the reinforcing layers form a certain small angle with the axis of the shells.

In the paper of G. I. Nazarov and N. G. Puchkova (Kiev), "General analytical solution of a problem in the theory of elasticity with two-dimensional inhomogeneity of a body," a generalized Goursat−Muskhelishvili solution was obtained for the case of two-dimensional inhomogeneity of a body, well known in the classical theory.

In a paper of A. N. Kudinov and V. I. Maslovskii (Tomsk), "Evaluation of the stability of a cylindrical shell with nonuniform loading," a determination was made from the point of view of the local stability of the critical load of an articulated spherical shell, loaded by a constant pressure of individual parts of its lateral surface.

Part of the papers given were devoted to the construction of models of media, adequately describing the viscous, elastic, plastic, and hydrodynamic properties of materials. V. V. Burkin and T. M. Platova (Tomsk) in the paper "Results of calculation of the characteristics of the deformation zone with an explosion," on the basis of mathematical modeling of the process of deformation of liquid and elastoplastic media, made a numerical investigation of the effect of the initial radius and the rate of expansion of the explosion cavity on the damping of spherical and cylindrical shock waves.

In the paper of R. A. Krektuleva, T. M. Platova, and N. V. Shilina (Tomsk), "Special characteristics of the behavior of mixed materials with repeated shock loading," a thermodynamically complete equation of state of mixtures is constructed. On the basis of this equation and of the laws of conservation, the parameters of repeatedly shock-loaded copper−tungsten mixtures are calculated as a function of the percentage composition of the components and the loading conditions.

L. A. Alekseev and V. D. Fedorenko (Tomsk) proposed a model of a viscoelastic medium, in which the mechanical behavior of the medium is described taking account of the effect of accumulated damage.

Several papers were connected with investigation of the effect of the microstructure of substances on the properties of macroobjects. A. A. Vorob'ev and V. D. Evseev (Tomsk) in the paper "The physics of the strength of glass," advanced the hypothesis and adduced arguments in support of the determining effect of electrification of the walls of cracks on the strength of glass in various media.

The paper of V. A. Zhdanov and N. A. Stakhina (Tomsk) "Calculation of the parameters of the breakdown of crystal lattices under the action of an electric field and hydrostatic pressure" used the example of a crystal of sodium chloride to calculate the region of stability of a lattice subjected to the combined effect of an electric field and all-around pressure.

V. P. Glazyrin and P. V. Makarov (Tomsk) in their paper "The propagation of elastoplastic waves in solids," discussed primary secondary shock waves from the positions of a dislocation model of plastic deformation.

In the paper of G. V. Stepanov (Kiev), "Comparison between the velocity dependence of the yield point and the time dependence of the strength with splitting for metals," the results of an experimental investigation of the connection between the critical breaking stresses with splitting at the rate of loading and the results of quasistatic tests with a high velocity are used to determine the effect of the deformation rate on the yield point in the range of velocities up to 10^7 sec^{-1}.

Part of the papers given in the subsection on measurement methods in mechanics were devoted to the development and introduction of information-measurement systems using electronic computers and digital measuring instruments (G. S. Ratanov, G. A. Tsyba, G. I. Kuznetsov, V. N. Timofeev, L. G. Shelekhov, and E. P. Boltrukevich, Tomsk). Such systems are used for the collection and analysis of information in experiments with measurement of the temperature and pressure.

A group of papers was connected with questions of the development and application of an automatic system for the analysis of information on the basis of computers. The papers discussed systems for the analysis of films, the recording of experiments, fast processes, and the practical implementation of these systems in the Scientific-Research Institute of Applied Mathematics and Mechanics at Tomsk University (A. A. Kozlov, G. V. Nadokhovskii, V. P. Dolmatov, V. T. Alekseev, and L. A. Bondarev, Tomsk).

Papers devoted to optical methods of measurement were represented by two directions: 1) laser Doppler measuring instruments for the velocity of particles in gas flows (V. P. Alkhimov, V. M. Boiko, A. N. Papyrin, E. G. Zaulichnyi, and V. Ya. Ivanov, Novosibirsk); 2) recording of fields of brightness temperatures in flows (M. P. Bondarev and A. P. Petrov, Novosibirsk).

In the sessions of the subsections and in the concluding plenary session, the participants in the conference remarked on the high scientific level of a majority of the papers presented. In a resolution adopted by the conference, the need to hold an analogous conference on theoretical and applied mathematics and mechanics within 2 years is underlined.