

## ***80 birthday of Prof. DSc. Nyagol Manolov***

### **Main achievements of Professor Nyagol MANOLOV, DSc, Academician of the Interdisciplinary Civic Academy**

The essence in the creative work of Prof. N. Manolov in the field of tribology is in the force of the circumstance, that his conscious life coincides with the appearance and development of tribology as interdisciplinary science.

His creative scientific ambitions were completely submitted to tribology and he was bent to this science with his entire determination, perseverance and inspiration.

### **Main study and achievements of Prof. N. Manolov**

#### **I. In the field of tribology science and research**

##### **1. Study of the contact states of bodies**

- Contact states with lumped variables: contact deformation, contact gap, contact porosity, factual contact area, contact conductance, contact capillarity, contact displacement (preliminary dislocation) of bodies.

- Contact states with distributed variables: distribution of pressure, deformations, interstices, contact area, contact conductance, displacement and rotations of bodies.

##### **2. Study of the contact interactions and processes between solid bodies**

- Study on friction, wear and contact conductance (ultrasonic, pneumo-hydraulic and thermal) of bodies with lumped and distributed variables.

##### **3. Interaction of monophasic and multiphase jets, streams and flows with solid surfaces. Disperse tribosystems.**

- Study on friction, wear and running-in of surfaces by means of air streams and flows.

##### **4. Main achievements related to above studies**

- Ultrasonic method for determination and study of factual contact area; Doctor Dissertation defended in 1970 in Moscow.

- The pneumo-hydraulic method in tribology. Doctor es technical science dissertation defended in 1985 in Sofia.

- General Law of the contact interaction of bodies and taking account the communicative potential of contact.

- New “three-variables” form of the laws of friction, wear, deformation, capillarity and running-in for contact joints.
- Effect of the pneumo-hydraulic contact impermeability of bodies.
- Effect of the pneumo-hydraulic extremum.
- Technology for production of calibrated pneumo-hydraulic valves.
- Application of contact conductance for control of roughness and serviceability of contact joints in industry.
- Method for control and regeneration of automobile filters.

## **II. Educative and lecturer’s activity**

### **1. Introduction of tribology in the process of education of the Technical University - Sofia**

- Development and approval of five programs of studies in tribology: Tribology in transport; Tribology in mechanical engineering; Tribology in power engineering; Tribology in engineering design; The contact approach in engineering practice.

- Introduction of parts of tribology in the educational activity in mechanics and physics of the Technical University - Sofia.

- Establishment and equipment of educational-research laboratory of tribology at the Technical University - Sofia.

- Attained academic rank Professor in tribology in 1990.

### **2. Qualification and re-qualification of research, teaching and industrial specialists in tribology:**

- Postgraduate qualification and re-qualification of engineering and technical specialists from industry;

- Guidance and training of graduates, PhD students, research workers, assistant and associate professors in tribology; defended 10 doctor dissertations, 8 attained academic ranks, 5 associate professorships and 2 full professorships.

### **3. Publication and introduction of 5 teaching aids in tribology:**

- Mechanics for foreign students;
- Laboratory practical training in mechanics and tribology;
- Statics with friction;
- Mechanics in interdisciplinary style;
- Overall tribology.

### **III. Scientific-methodological and organizational work**

1. Chief of the Laboratory of Tribology since its foundation in 1974 until the retirement in pension in 2000;

2. Author of the National Conception for the development of tribology in Bulgaria, with state approval in 1987;

3. Founder of the Society of Bulgarian Tribologists in 1993, of the Balkan Tribological Association in 1993 and of the Interdisciplinary Civil Academy in 2000;

4. Founder and honorary editor of the Journal of the Balkan Tribological Association and Editor-in-Chief of the Journal “Contacts” of the Interdisciplinary Civil Academy;

5. Honorary chairman and member of the Society of Bulgarian Tribologists and the Balkan Tribological Association;

6. Honorary member of the Federation of the Science-Technical Unions in Bulgaria; Winner of three national awards: First prize for science-technical youth creative work; medal for science-technical achievements “Prof. Asen Zlatarov”; medal for higher scientific achievements in the name of Academician Angel Balevski.

7. Chairman of the weekly civil lecture course and forum from 2000 till the present moment.

### **IV. Interdisciplinary problems of tribology**

#### **1. New terms, principles and approaches in tribology**

- Introduction and substantiation of new interdisciplinary notions in tribology: tribological wholeness, third beginning, functional atom, contact zero, contact approach, principles of unity, variety, development and essence of the whole; general tribological law for contact interaction.

#### **2. Development of theoretical interdisciplinary problems of tribology**

- Theory of the functional atom;
- Theory of the contact approach;
- Theory of the four interdisciplinary cross-sections (as definition, spatial, temporary and functional) of the tribological wholeness;
- Introduction of three criteria for the functional state and development of the tribological whole: lack of balance, risks and stability of the whole.

#### **3. 12 monographic works for the expansion of the theoretical development and research:**

- Conception for the development of tribology in Bulgaria

- The problems and tribology
- The paradigm of the third culture
- The situation
- Trialism
- The third beginning
- Model of tribology
- Extremal problems of tribology
- Tribology and interdisciplinarity
- The pneumo-hydraulic method in tribology
- Tribological problems of the hydro-plastic treatment of metals
- The contact approach
- Mechanics in interdisciplinary style
- Overall tribology
- Pneumo-tribometry
- Physics of the tribomechanical properties of solid bodies

**V. Recapitulation:** 300 publications, 20 books, 40 inventions, spirited civil activity in Bulgaria and in the region of the Balkans, creation of Bulgarian interdisciplinary school of tribology.