



TSI NEWSLETTER

A Quarterly Newsletter from Tribology Society of India

CREATION OF RANCHI REGIONAL CHAPTER

(Sixth National Tribology Centre of TSI)

Background

Ranchi is situated in the heart of mineral rich Chhotanagpur region of Bihar. There are different kinds of industries and institutions in Ranchi including manufacturing/production industries, research centres, design and engineering organizations and technical institutes. Among them the major ones are SAIL (R&D Centre and Engineering & Design Centre), HEC, CCL, CMPDIL, MECON, Usha Martin, Garden Reach, NIFT and BIT (Mesra). Lots of tribological activities are regularly being carried out in these organizations. This instigated **Shri Sudhaker Jha, Executive Director (RDCIS)** to have a **Regional Chapter of the Tribology Society of India (TSI) in this technology city of Ranchi**. Under his guidance therefore a consent taking drive was started by **Shri P.Pathak**, Principal Research Engineer (RDCIS), in February 1998. In this move opinions were drawn from the engineers/scientists of the above organizations towards creation of Ranchi Chapter of the Society. This idea was overwhelmingly welcomed.

Creation

A meeting was convened in the chairmanship of **Shri Sudhaker Jha** at RDCIS on May 15, 1998, which was attended by 27 engineers/scientists/academicians of different organizations. A resolution was unanimously passed in the meeting in favour of the creation of Ranchi Local Chapter of TSI. In the same meeting, it was also decided that the Chapter will have an Executive Committee comprising of President (1 post), Vice-Presidents (2 posts), General Secretary (1 post), Regional Secretary (1 post), Regional Treasurer (1 post), and Executive Members (6 posts). Later following members were selected for the Executive Committee for the year 1998-2000:

President : **Dr.S.K.Bhattacharyya**, Director (RDCIS)
 Vice President : **Shri Sudhaker Jha**, Executive Director (RDCIS)
 Dr.S.N.Prasad, Professor (NIFT)
 General Secretary : **Shri Basudeo Roy**, AGM (RDCIS)

Regional Secretary : **Shri P.Pathak**, P.R.E. (RDCIS)
 Regional Treasurer : **Shri R.Shukla**, P.R.M. (RDCIS)
 Executive Members : **Shri Md.I.Alam**, Head CCMC (CCL)
 Shri S.K.Das, Manager (CET)
 Shri R.S.Prasad, Jr.Manager (CET)
 Shri M.P.Dash, AGM (MECON)
 Shri Sundeeep Sinha, Manager (MECON)

After fulfilling all the requisites, the Chapter was granted approval from the Executive Committee of TSI. The chapter has strength of 40 members including 25 life members.

Inauguration

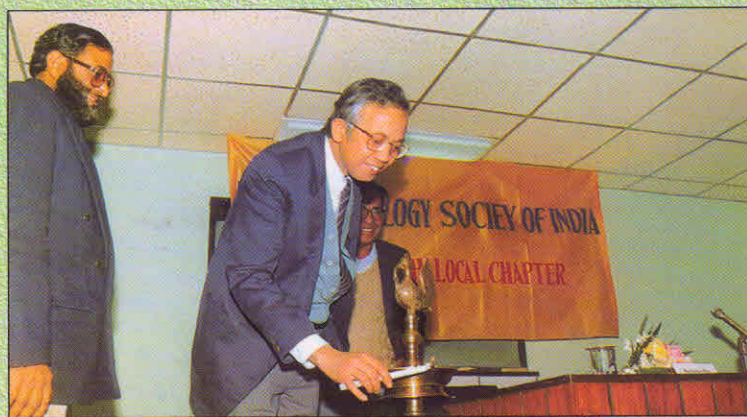
The Chapter was formerly inaugurated by **Dr.S.K.Bhattacharyya**, Director (RDCIS), on December 18, 1998. The inaugural program was attended by large number of engineers, scientists and academicians of Ranchi. In his inaugural address, **Dr.Bhattacharyya** elaborated the need of accelerated research activities in the field of Tribology. He also acknowledged the contribution made by TSI for advancement of tribo-science in India.

In the inaugural function, **Shri Sudhaker Jha** explained about vision of creating the Ranchi Chapter. He emphasized that by its creation, tribologists in and around Ranchi have got a common platform to share their experience. He said that the Chapter will have a calendar of activities, which will include technical talks, short-term courses, seminars/meets and publications.

Shri B.Roy, General Secretary of the Chapter, also addressed the inaugural programme. During the programme presentations were made on the overview of tribological activities in SAIL and CCL at Ranchi, respectively, by **Dr.A.K.Roy**, PRM (RDCIS), and **Md.I.Alam**, Head CCMC (CCL). The Regional Secretary of the Chapter, **Shri P.Pathak**, conducted the proceedings of the inaugural ceremony.



Dr SK Bhattacharyya, President (centre), Shri Sudhaker Jha, Vice President (right) And Shri B Roy, General Secretary (left), gracing the Inaugural Ceremony



Dr SK Bhattacharyya, Director (RDCIS), inaugurating the Ranchi Chapter



Shri Sudhaker Jha, Executive Director (RDCIS), lighting the Inaugural Lamp



A section of audience during inauguration of Ranchi Regional Chapter

ROLE OF TRIBOLOGY FOR ENERGY EFFICIENT TECHNOLOGY

Dr. Har Prashad, BHEL, Corp R&D, Hyderabad

A major preoccupation of modern industry is to develop and continually improve energy efficient technology. This helps to preserve natural resources and minimizes the negative environmental impact of excessive fuel consumption in different areas. **The science of Tribology plays a significant role for energy efficient technology at many different levels and aspects.**

Manufacture

In manufacture, Tribology plays a key role in the forming, cutting and shaping of metals, ceramics and polymers. **Effective application of tribological principles enables not only reduced energy consumption and reduced material losses in manufacture but also help to achieve improved and more tightly controlled surface finish.** This, in turn, is very significant in the development of components to give low friction during tribological interactions.

Engineering Components

Energy efficient technology is the requirement for long life of engineering components such as bearings and piston assemblies. This reduces the energy cost in replacement and the period of inefficient operation, which precedes component failure. Life of engineering components is often limited by wear, rolling contact fatigue, or other forms of surface damage. Obviously, Tribology has direct contribution in this area.

Design and Transmission

Most obvious contribution of Tribology to energy efficient technology is to design rubbing systems with low friction, so that energy-efficient service over their lifetime is achieved. Most efforts so far have gone into designing fuel efficient crankcase engines but there is need to achieve low friction losses in transmissions, compressors and vehicle tyres.

Engines

The development of very high temperature engines is the new energy-saving technologies. These technologies promise large energy-saving benefits but only if critical technical problems concerning effective lubrication of loaded rubbing components at temperatures in excess of 500°C are solved.

Surface Engineering

Innovations in surface engineering are leading to significant energy savings in a variety of applications. These are being realized in two principal ways: (i) by increasing envelope of lightweight materials, and (ii) reducing surface friction through the application of lubricious coatings. The application of metallic coatings to carbon fibre reinforced polymer matrix composites (CFRP) has the capacity to provide considerable weight and power savings for many engineering components. Also, titanium and aluminium alloys can be more widely applied in the automotive and aerospace industries by the use of appropriate coating techniques. Microarc oxidation is one of the methods reviewed. **Recently a number of innovative thin (<10 μ m) composite coatings, applied by physical vapour deposition or**

chemical vapour deposition have emerged. These significantly reduce friction during sliding contact. While providing excellent release characteristics for dry contacts they also show potential to limit the global demand for oil based lubricants. Accordingly, surface engineering is perceived as a major driver for realizing the goal of optimal energy conservation.

Metal Forming

Metal forming operations, particularly those conducted at elevated temperature, are under increasing scrutiny for improved energy efficiency. **The striking features of metal working tribology, particularly for elevated temperature working, is poorly understood and quantified.** There is tremendous scope for research, both experimental and theoretical/computational and has great potential for commercial benefit.

The thin film

One of the most challenging requirements of energy-efficient technology lies in dealing with the *thin film*. The main reasons are basically a progressive reduction in the viscosity of lubricants in many applications and a tendency towards higher operating temperatures in most engineering systems. The use of a lower viscosity oil reduces friction in hydrodynamic contacts and minimizes churning and pumping losses. But higher temperature results from the design and use of smaller, lighter components with correspondingly higher power densities, is a critical problem. Bearings may benefit in energy-saving terms using low viscosity lubricant and can maintain an adequate oil film despite this, in others, such as cam and gears where film thickness are generally much thinner, reduced viscosity may lead to unacceptably high level of wear or friction. This happens in such cases where the different components share the same lubricant but have different operating conditions. **The challenge to tribology is both how to enable components to operate with low friction and long life in the thin film regime and how to find the overall balance of lubricant properties which gives the optimum in energy saving in a system with many different rubbing contacts.**

Also, seals play a very significant role since seals consume a very high proportion of the energy in lubricated systems and modern technology is requiring even tighter sealing in the move towards *seals for life* and *zero leak seal* applications.

Conclusions

In general, energy efficient technology poses challenges to all areas of Tribology, ranging from the highly fundamental – such as the need to understand the origins of solid/solid friction itself, to the wholly practical how to design tyres and road surfaces able to provide both good adhesion and low friction. **The tyre/road contact is a crucial area of energy loss where quite small advances in understanding can yield huge benefits in energy saving.** In all most all fields, Tribology and energy efficiency are interlinked so closely so that any significant advance in our understanding can and will contribute, sooner or later, to energy efficient technology.

INFORMATION FROM INTERNATIONAL TRIBOLOGY COUNCIL

1998 Tribology Gold Medal Winner

Professor Ernest Rabinowicz is the recipient of the 1998 Tribology Gold Medal, the world's highest honour in its field. The award is given for his outstanding contribution in the field of the fundamental principles of friction and wear. The presentation of the Medal and Parchment will be presented to Professor Rabinowicz at a ceremony yet to be arranged.

A plaque to commemorate ITC's Silver Jubilee

The international Tribology Council was founded on 24th September 1973 at a meeting held at the Council Chamber of the Institution of Civil Engineers in London.

To commemorate the Silver Jubilee of this foundation, a plaque will be unveiled at the Council Chamber of the Institution of Civil Engineers in the afternoon of April 13th 1999, prior to a Council meeting of the Institution of Civil Engineers.

Death of Tribology Gold Medallist

It is with the great regret to report the death of Gold Medallist, Professor Fujio

Hirano, who died on November 8th 1998.

A most famous tribologist, Professor Hirano was a past President of the Japanese Society of Tribologists. Professor Hirano will best be remembered for his research in the field of strength of materials and mechanical vibration on wear and lubrication of mechanical elements involving heat transfer, in which spheres his achievements have been wide and outstanding.

He was the author or co-author of over 200 publications covering every tribological subject. In addition to the two awards of the Japan Society of Mechanical Engineering prize, he also won on two occasions, the major prize of the Japan Society of Lubrication Engineers, one for the behaviour of oil film between vibration faces, the second on the mechanism of micro-contact of rolling contacts. In 1981, in recognition of his contribution to cultural science through the investigation into, and teaching of tribology, he was awarded the *Nishi-Nihon Bunka Prize* (West Japan Culture Science Prize).

The tribology world will miss a great Japanese tribologist of his time.

MEET OUR EMINENT TRIBOLOGISTS



Prof. B.C. Nakra

Professor B.C.Nakra did his B.Sc.Engg (Mechanical) from Punjab Engineering College, Chandigarh in 1959 with first class first rank. Later, he did M.Tech. in Machine Design from IIT Kharagpur and **Ph.D. in Vibration Engineering from Imperial College of Science & Technology, London University**. After completing Technical Teacher's Program at IIT Kharagpur, he joined IIT Delhi as a Lecturer in 1962 and has been a Professor in Mechanical Engineering since 1971.

He has been a teacher, researcher and industrial consultant in the areas of machine and structural vibrations, condition monitoring and diagnostic maintenance of machines and tribological components, machine design, instrumentation and automatic controls. His publications dealing with vibration control using viscoelastic materials, dynamics of rotating systems on flexible supports, condition monitoring and fault diagnosis in bearings, gears, pumps & compressors, dynamics of railway braking systems, dynamic design using modal testing & dynamic modifications, appear in several reputed international and national journals and have been widely cited. He has been involved in industrial consultancy and sponsored projects in vibrations and noise control and dynamic design in engines, machine tools and vehicles in addition to the work concerning diagnostic maintenance of bearings, reciprocating compressors, diesel engines, centrifugal pumps & gas turbines using performance monitoring, vibration and acoustic emission, wear debris & temperature monitoring. **He has published books on vibration measurement & analysis, instrumentation, measurement & analysis and theory and applications of automatic controls.** He has served on the editorial board of *Tribology International*, *Maintenance, UK*, *Proc.Physical Sciences*, *INSA*, and *PINSA Journal*.

At IIT Delhi, he has served as Head, Mechanical Engineering Dept, during 1975-78. During this period, he contributed with his colleagues in the setting up of Industrial Tribology, Machine Dynamics & Maintenance Engineering Centre at the institute. Later, he co-ordinated the Indo-Norwegian collaborative program in Tribology during 1983 to 1987, and also served as Head of the centre during the above period and was responsible for initiating a number of research and industrial projects at the centre, in addition to several continuing education programs. **He also served as Dean, UG studies and Deputy Director, Faculty at IIT Delhi and as visiting faculty at Imperial college, London, UMIST Manchester and as Royal Norwegian Council senior scientist at NTH, Trondheim.** Presently he is working as **BHEL Chair Professor** at IIT Delhi.

He has been elected as Fellow of Indian National Science academy, Indian National Academy of Engineering, Indian Academy of Sciences and National academy of sciences, India, Institution of Engineers, Acoustical society of India and Indian Institution of Plant Engineers. He is also a member of Tribology Society of India & ISTAM. He has served as Treasurer and Council member, INSA and is presently a congress committee member of International Union of Theoretical & Applied Mechanics and Secretary, Advanced Maintenance Management program of Indian Institution of Plant Engineers. He has delivered several keynote addresses including that at the XI national conference in Industrial Tribology on *Mechanical Signature Analysis for Condition Monitoring and Diagnostics*. **He has received C.V.Raman Award, and Institution of Engineers award with his colleagues for his research publications.**

TSI News Letter congratulates Professor Nakra for his distinguished services to the science of Tribology.



Dr.S.P. Srivastava

Dr.S.P.Srivastava is currently Executive Director of Indian Oil Corpon., Research & Development Centre a Faridabad. **He is one of the well-known lubricant technology professional of India. He is a rare blend of Science manager who combines science with quality and environment and is responsible for installing both ISO 9001 and ISO 14001 management system in IOC R&D Centre.**

Dr.Srivastava obtained M.Sc. and D.Phil from University of Allahabad in 1965 and joined Central Fuel Research Institute, Dhanbad in 1966 and then moved to Regional Research Laboratory in 1969 where he continued till 1972. In these CSIR laboratories, he worked on various areas of coal, coal-chemicals, protein from petroleum, crude oil additives and commercialized several processes. After joining IOC R&D Centre in 1973, Dr.Srivastava pioneered research work on lubricant science and technology. **He and his team developed complete**

range of lubricants, which are marketed by IOC under the brand name of SERVO. Dr.Srivastava contributed and participated extensively in various national and international seminars. He has more than 200 research papers and 20 patents to his credit. Author of two books on High Polymer and Free Radical. The book on Free Radical in Hindi won U.P.Govt. Literary award. He is a member and fellow of several professional societies of India and abroad and is currently chairman of Indian Society of Analytical Scientists (Delhi Chapter). He has extensively contributed in formulating Indian and International (ISO) standards on lubricants and fuels. Under his leadership IOC developed several innovative energy efficient, long life and biodegradable products for which IOC R&D Centre has been acclaimed widely.

He has been conferred N.K.MEHRA MEMORIAL LAWSP PIONEER AWARD on lubricants.

TSI News Letter congratulates Dr.Srivastava for his distinguished achievements.

HONOUR



Dr.A.K.Bhatnagar Honoured with Lifetime Achievement Award

Dr.A.K.Bhatnagar, Director (R&D), Indian Oil Corporation Limited and President, NLGI India Chapter was selected for the prestigious Anacon-98 Lifetime Achievement Award in recognition of his outstanding contribution to science and industry. The award instituted by the Indian Analytical Instruments Association is conferred at the Anacon conference every year based on the recommendation of the awards committee.

The award was presented to **Dr.Bhatnagar** by Dr.Anil Kakodkar, Director, BARC at a glittering function at Mumbai on December 17, 1998. Dr.Kakodkar himself is an Anacon award winner.

TSI News Letter congratulates Dr.Bhatnagar for his distinguished achievements.

SECRETARIES OF TSI LOCAL CHAPTERS

DEHRA DUN : Dr.Mahendra Pal, Indian Institute of Petroleum,
DEHRA DUN-248005

MUMBAI : Dr.G.Vasudev, B.P.C.Ltd, Technical Service Dept
'A' Installation, Sewree (E), MUMBAI-400015

PUNE : Dr.Sudhir Rashingkar, RCG Instruments
A1/25, Rambag Colony, Navi Peth, Off Shastri Road, PUNE-411030

NEW DELHI : Dr.C.R.Jagga, Indian Institute of Technology
ITMMEC, Hauz Khas, NEW DELHI-110016

RANCHI : Shri P.Pathak, C/O Rolling Technology Division
RDCIS, SAIL, RANCHI-834 002

BHOPAL : Dr.A.K.Jha, Regional Research Lab (CSIR)
Hoshangabad Road, Near Habibganj Naka, BHOPAL-462026

MEETINGS & CONFERENCES

WORLD TRIBOLOGY CONGRESS 3rd - 7th September 2001- Vienna

Preparatory work for the World Tribology Congress 2001 in Vienna, Austria is progressing. The first information folder is being prepared and is expected to be distributed in April 1999.

For more details please contact:

Dr. Andreas Pauschitz

Organization Manager - WTC-2001

Osterreichische Tribologische Gesellschaft

Floragasse 7/2, A-1040 Wien, AUSTRIA

26th Leeds-Lyon Symposium on Tribology Thinning Films and Tribological Interfaces 14th - 17th September 1999, University of Leeds

Offers of papers for the Symposium are now invited.

For further details, please contact :

Mrs.S.M.Moore

The University of Leeds

School of Mechanical Engineering

Leeds LS2 9JT, U.K.

8th European Space Mechanisms and Tribology Symposium 29th September-1st October 1999, Toulouse-France

For further details please contact :

CTA, 8th ESMATS, 22 Avenue de Purpan
31700 Blagnac, France

STLE/ASME Tribology Conference

October 11th - 13th, 1999

The Hyatt Oriando, Kissimmee, Florida

Topical papers are invited in all fields of Tribology.

For further details contact:

STLE Papers:

William Spilman

Publications Manager

840 Busse Highway, Park Ridge

IL 60068-2376, USA

ASME Papers:

Professor John Tichy

Editor

Journal of Tribology

Rensselaer Polytechnic Institute

Dept of Mechanical Engineering

Aeronautical Engineering & Mechanics

1108th Street, Troy, NY 12180-3590, USA

Second International Conference on Industrial Tribology 1999 December 1st-4th, 1999, Hotel Holiday Inn Krishna, Hyderabad, India

For further details please contact:

Dr.Har Prashad

Organizing Secretary

ICIT - 99, C/O BHEL, Corporate R&D Division

Vikasnagar, Hyderabad-500093, India

12th International Colloquium Tribology Tribology 2000-Plus January 11th - 13th 2000

Stuttgart/Ostfildern, Germany

For further details please contact :

Prof.Dr.-Ing Wilfried J. Bartz

Technische Akademie Esslingen

Postfach 1265, D-73748 Ostfildern, Germany

2nd International Symposium on Aluminium Surface Science And Technology (ASST 2000)

21st - 25th May 2000, Manchester-England

For further details please contact:

2nd Aluminium Surface Science and

Technology Symposium (ASST 2000)

Miss J Adnams

UMIST, Manchester Conference Centre

PO Box 88, Manchester M60 1QD, UK

ITC Nagasaki 2000 Tribology: Voyaging International Tribology Conference October 29th - November 2nd, 2000, Nagasaki, Japan

For further details please contact:

Prof. J Sugimura, Secretary General

Department of Mechanical Engineering

Kyushu University, 6-10-1 Hakozaki

Higashi-ku, Fukuoka 812-8581, Japan

A TWO DAYS WORKSHOP ON USED OIL RECYCLING IN INDIA

Indian Institute of Petroleum, under the aegis of Tribology Society of India is organizing workshop on *Used Oil Recycling in India* on 22nd and 23rd April, 1999 at Dehra Dun. Pertinent areas related to used oil regulations, disposal, recycling, and economic viability will be covered in the workshop.

For further details Please contact :

Dr.S.K.Goyal, Organizing Secretary

IIP, Dehra Dun-248005, Phone : (91)-0135-660099, Fax : (0135)-674481, 671986, Email: goyal satishkumar@hotmail.com

INTERNATIONAL CONFERENCE ON INDUSTRIAL TRIBOLOGY (ICIT '99)



Authors are requested to submit the manuscript to the Organizing Secretary for review by the Technical Review Committee of ICIT-99 not later than April 20th 1999. The plenary lectures will be given on the followings in addition to the earlier communication :

1. Tribology in the Twenty First Century
Professor Bo Jacobson
Lund Institute of Technology, Sweden
2. Synthetic Lubricants of 21st Century
Dr. S. P. Srivastava
Executive Director IOC, R&D, Faridabad

LET'S THINK IT OVER

With rational knowledge, one is tune with the scientific man; with intuitive knowledge added, one is in tune with the total man; with no knowledge added, one is in tune with nature.

- Whisper from Eternity

TO OUR READERS

TSI Members are requested to send short technical communications for Publication in TSI Newsletter to the Editor.