



TSI NEWS LETTER

TSI Newsletter

July 2016

From the desk of President – TSI



Dear fellow Tribologists,

It is a sad time for the global Tribology fraternity that the founding father of Tribology and the guiding light for all of us, Prof Hans Peter Jost is no more. It was my good fortune that I could meet Prof. H Peter Jost and talk to him during my visit to London in March this year to participate in “The 50 Years of Tribology” celebrations. He was discussing with me passionately on the enormous work still required to be done to propagate this science to the student community of the world. The spark in him was very much alive.



The grand reception hosted by the Duke of Edinburgh at Buckingham Palace to honour him and his team, who brought out the path-breaking report on Tribology, is a testimony to his greatness and the immense contribution he has made to the world of Tribology. He had relentlessly worked over the years till his death at the age of 95 to propagate this important and relevant message to the world.

It is the time for all of us to celebrate his life and propagate this branch of science he breathed and the promise it holds in creating a better world of productivity and sustainability.

We pray for his soul to rest in eternal peace.

(R SURESH)

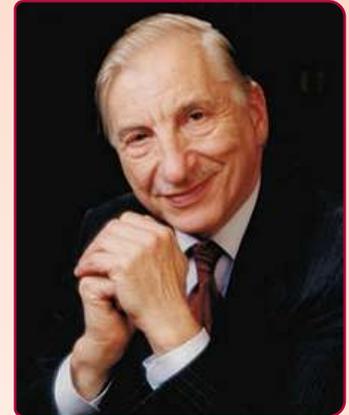
President, Tribology Society of India

NTC-2016 Coming Up.....

The countdown has started for the National Tribology Conference (NTC-2016), scheduled to be held during 8 - 10 December 2016 at IIT-BHU, Varanasi. The event is being organized by Department of Mechanical Engineering, IIT - BHU under the aegis of Tribology Society of India. All are invited to actively participate in this conference. We look forward to seeing all of you at NTC-2016. For further detail please see - (<http://www.tribologyindia.org/pdf/ntc-2016-first-announcement-and-call-for-papers.pdf>)

Obituary : Sir Hans Peter Jost

Tribology Society of India deeply regrets to report the demise of Prof. H. Peter Jost, CBE, on 7th June 2016 at the age of 95. Prof. Jost, globally regarded as the Founding Father of Tribology, trained as an engineer. In 1966 he published the landmark “Jost Report” that marked the birth of modern Tribology and became acclaimed worldwide. Prof. Jost's contribution transformed the way industry and science approached the question of friction and wear. He dedicated his life to guide and advise governments, industry and academia on the cost saving benefits of the application of Tribology.



Prof. Jost was the President of the International Tribology Council (ITC) and a Life Member of the Council of Parliamentary & Scientific Committee at Westminster, as well as an Honorary Fellow of the Institution of Engineering & Technology, the Institution of Mechanical Engineers and the Institute of Materials. Previously he was Director and Chairman of both public and private companies operating in the engineering and technological sectors.

In addition to his appointment as Commander of the British Empire, he also received state honours from the Heads of State of France, Germany, Poland and Austria. In 2011 the Order of the Rising Sun was conferred upon him by the Emperor of Japan. He held two honorary professorships and eleven honorary doctorates including, in January 2000, the first Millennium honorary science doctorate. He has received professional awards and honours in 15 countries.

TSI joins the world Tribology community in condoling the passing away of Prof. Jost, which leaves a great void in the field of research and practice in Tribology that can never be filled.

May his soul rest in eternal peace.

TSI Participation in Special Event: Celebration of 50 Years of Tribology 2nd March 2016, London, U.K.

Tribology is the science of Friction and wear, and Lubrication plays a significant role in minimizing the friction and wear in Mechanical equipment. In 1966 Prof. H. Peter Jost published the groundbreaking Report known as “The Jost Report”, which introduced the term ‘Tribology’ to the world. The findings of the report have led to a deeper understanding of the ways in which Tribology can be of great benefit to productivity in the UK and across the world. The year 2016 marks the 50th Year of that landmark event. To highlight this occasion, prominent figures from the world of Tribology, representing Tribology-related organizations across the world were invited to a special anniversary reception at Buckingham Palace, London, UK, hosted by HRH the Duke of Edinburgh. It is a matter of pride for Tribology Society of India that Mr. R Suresh, President (TSI) was invited to this august gathering.

Late Prof. Peter Jost, President - International Tribology Council, addressed the audience and encouraged those in attendance to continue to promote and engage in science and technology for 'the benefit of industry, the environment and the preservation of finite resources'. To quote him "Tribology is not a specialist subject. It is the physical science based technology of friction. Friction is vital for mankind. Without it people could not move, fish could not swim, birds could not fly. The quality of life for this and future generations will all be helped by the application of the ever-increasing knowledge of Tribology." A technical seminar with talks by world renowned Tribologists from across the globe was held at the Institution of Mechanical Engineers, London, UK to mark this occasion.

In the 50 years since its formal inception, Tribology has garnered global interest, with Tribology Societies, professional chairs and groups established in many countries around the world. This also includes the Tribology Society of India headquartered at IndainOil R&D Centre, Faridabad and members from across industry and academia in India.



HRH the Duke of Edinburgh and Prof. Jost during the glittering ceremony at the Buckingham Palace, London

TSI Team Bids for WTC-2021 at Esslingen Meeting of ITC

Prof. Satish Kailas, Vice President (TSI) and Mr. Ajay Kumar Harinarain, Secretary (TSI) attended a meeting of the International Tribology Council (ITC) at Esslingen, Germany on 11th January 2016. This meeting was presided over by Late Prof. H Peter Jost, President ITC and attended by representatives of various Tribology Societies from across the world. The TSI Team made a presentation regarding the bid submitted by Tribology Society of India for organizing the World Tribology Congress 2021 in India. This was the first step for shortlisting the Societies who would be allowed to make the final bid during the World Tribology Congress at China in 2017. The second and final step in the bidding process will be a presentation before the ITC meeting during the World Tribology Congress at Beijing, China during September 2017, after which it will be put to vote by member countries of the ITC.



A memorable photo of Late Prof. Jost at the Esslingen ITC Meeting

8th TSI Summer School in Tribology (SST): 25-29 July 2016 Organized at Department of Mechanical Engineering, Indian Institute of Science, Bengaluru

The 8th Summer School in Tribology (8th SST) was organized by Tribology Society of India during 25 - 29 July 2016 at Department of Mechanical Engineering, Indian Institute of Science, Bengaluru. A total of 55 participants (26 from Academia and 29 from Industry) enrolled for the event. The 8th SST event was inaugurated by Prof. Vikram Jayaram, Chairman - Division of Mechanical Sciences, IISc. Prof. P. Dutta, Chairman - Mechanical Engineering, IISc, also graced the occasion as Guest of Honour.



8th Summer School in Tribology

25-29 July, 2016

Department of Mechanical Engineering, Indian Institute of Science, Bangalore



विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY



Sitting Row :
(L to R) B V A Rao, A K Mehta, R Suresh, Vikram Jayaram, P Dutta, Satish V Kailas, Satish C Sharma, C S Ramesh
Standing I Row :
(L to R) Shreshail M L, Nagamadhu M, Kavitha Rameshchandra Shah, Solanki Mitulkumar Thakorbhai, Dipak Kumar, V Muthukumar, M Ananth Kumar, G V J Rao, Revathi Rani Aggarwal, Niharika Gupta, N M Dubey, Anshman Dubey
Standing II Row : M Kumar, M S Senthil Kumar, Bhuvnesh Tyagi, Kushal Tripathi, Maheshwar D Jaybhaye, Sumit Kumar Mishra, V Manohar, S K Majumdar, Swamy Maloth, Kanika Gupta,
Standing III Row : L M Pandey, Rajeev Kumar Gupta, Kumar Ojaswi, Karthikeyan, Vivek Rawat, J P Naik, Rahul Vaish, Sudhanva Shetty, Ajay Chouhan
Standing IV Row : Shubha H N, Shiyamsunder, Amit Gupta, Salome. M. Pattar, Ankush N Gholap, Manish Kumar, Dinesh Kumar Verma, Bhupender Singh, Ram Turaga, AshokRaj, C Narayanamoorthy
Standing V Row : Arun Sharma, Pranay, T Chaitanya, Sudheendra Shastry, I Sudhakar, P Pradeep, Vivekanand Patel, Chippa Shriniwas P, Vishal Thakur, Sudesh Singh, Swapnil Yashwant Joshi, Deepak R. Bose, Neeraj Mishra, Sandeep Pawar, Suresh Babu Komarika, Amzad Khan, Siddharth Mishra, Manoj Kumar Khemka

A Group Photo of the Faculty and Participants of 8th SST



A Group Photo of the Faculty and Participants of 8th SST

As in the past five SST programs, the 8th SST was also financially supported by Department of Science & Technology, (DST), Govt. of India. The venue, infrastructure and local support was provided to the TSI organizing team by the Mechanical Engineering Department of IISc. The Technical Program covered a wide spectrum of Tribology through 19 technical sessions. A guest lecture on “50 years of Tribology” was delivered by Dr Ing. B V A Rao, FNAE on 25th July 2016 evening. Prof. N. Vedachallam,

ISRO Distinguished Prof., VSSC -Trivandrum, delivered a much appreciated guest lecture on “Space Tribology” on 28th July 2016. An Industry visit to DUCOM Instruments, Peenya Industrial Area, Peenya, Bengaluru was also arranged as part of the program. An examination based on the Multiple Choice Questions from the technical sessions was conducted on the last day of the program.

Mr. S. Vardhachari, Executive Director, Karnataka State Office of IndianOil Marketing Division was the Chief Guest for the concluding session. Mr. R A Rao, Past President, TSI and the Guest of Honour for the concluding session spoke on “Tribology in Rural Sector”. Mr. Kamal Mukherjee, former GM, SECL - Korba and Member, TSI Executive Committee, gave the Vote of Thanks at the concluding session.

The participation certificates were distributed to all the participants by the chief guest and other dignitaries during the concluding session.



Mr. S.Vardhachari, ED -IndianOil and Mr. R A Rao, Past President (TSI) Handing over 'Participation Certificate' during the concluding session

Complete details of 8th SST event in the form of brochure and technical program can be viewed at the link: http://tribologyindia.org/education_course_archives.htm

In Focus: Tribology Laboratory at the Machine Design Section, Department of Mechanical Engineering, Indian Institute of Technology Madras

The Department of Mechanical Engineering at IIT Madras is the largest in the country and one of the largest in Asia as well. The departmental activities can be categorized into three major streams, namely: Design, Thermal and Manufacturing. Tribology is one of the emerging areas of research work in Machine Design section of the department.

The major areas of focus for research in the field of Tribology are as follows:

- Engine Tribology
- Nano-lubrication
- Wind Turbine Bearing Failures
- Gearbox Tribology & Design
- DLC Coatings & Ceramic Materials
- Hybrid Composite Brake Materials
- Electrostatic Condition Monitoring
- FEM based Wear Modeling

Resources available for Testing and Characterization:

- Pin-on-Disc Tribometer
- Low Speed Piston/Cylinder Rig
- FZG Gear Test Rig
- Bearing Fault Detector Test Rig

- Brookfield Viscometer
- Nikon Stereo Microscope
- Micro-Hardness Tester
- Hardness Tester
- Taylor Hobson Surface Profilometer

The major Tribology activities are presently run by Dr. P. Ramkumar. Currently, he supervises 3 Ph.D, 4 MS research scholars and some undergraduate and postgraduate students in various areas of Tribology research. Further, he is also associated with few consultancy projects from Caterpillar and research collaboration with University of Southampton, UK.

Contact : Dr. P. Ramkumar, Assistant Professor, Machine Design Section, Department of Mechanical Engineering, IIT Madras, Chennai 600 036.
(Email: ramkumar@iitm.ac.in)



Pin on Disc Tribometer



Low Speed Reciprocating Piston Test Rig



FZG Gear Test Rig



Bearing Fault Detector Test Rig

Young Research Scholars in Tribology

Name of Research Scholar : Gananath Doulat Thakre

Title of Ph.D. Thesis : μ -EHL Studies on Line Contacts (2016)

Supervisors : Prof. Satish C Sharma, IIT Roorkee; Dr. S P Harsha, IIT Roorkee; Dr. M R Tyagi, Principal Scientist, Tribology Division, CSIR-IIP Dehradun



Abstract

The term μ -EHL describes the condition in which two non-conformal contacting surfaces are prevented from touching (at the asperities) with the help of a lubricating film. The contact pressures are large enough to cause elastic deformation of surfaces and the surface roughness is of the order of thickness of the lubricant film. μ -EHL has been considered to provide satisfactory answers for the scuffing and micro-pitting failures in lubricated contacts. This work is restricted to theoretical and experimental studies of μ -EHL phenomena in line contacts, with the aim to investigate the importance and significance of micro-EHL parameters, surface roughness, lubricant rheology and the lubricants on the performance of the contact. A thorough scan of literature pertaining to micro-EHL and EHL has been carried out. The work presented in this thesis mainly focuses on the theoretical and experimental investigation of micro-EHL line contacts as those occurring in between spur gears, roller bearings, cam-followers etc. A comprehensive analysis pertaining to the individual and combined influence of the surface roughness, non-Newtonian rheology, texture patterns, lubricant type and transient behavior of the contact has been performed. Further, experimental investigations have been performed on tribo-contact simulators to study the performance of the failure criterion of the micro-EHL line contacts. The numerically simulated micro-EHL contact characteristics and the results obtained from experimental studies have been presented.

Name of Research Scholar : Saurabh Kumar Yadav
Title of Ph.D. Thesis : A Study on the Lubrication of Hydrostatic Thrust Pad Bearings (2016)
Supervisor : Prof. Satish C Sharma, IIT Roorkee



Abstract

In this study, the numerically simulated results have been presented and discussed vis-à-vis the influence of surface texture in combination of non-Newtonian behavior of lubricant, temperature variation and bearing pad deformation on the bearing performance of hydrostatic thrust pad bearings. Finite Element method has been used for deriving system of equations for the discretized lubricant flow field, heat dissipation field and elastic domain field. The computation of fluid film pressure has been performed by using nonlinear Finite Element method. The Newton-Raphson method is used to solve this nonlinear equation. The system equation for discretized lubricant flow field has been derived using Reynolds equation, Galerkin's Technique and usual assembly procedures. After applying boundary conditions, the system of equation has been modified to maintain continuity of equation. Similarly system of equation for temperature has been derived by using Galerkin technique. The system equation for the discretized elastic continuum has been derived using the virtual work principle and the usual assembly procedure. The matched steady state solution of the governing system of equation for the lubricant flow field and bearing elastic deformation field has been established using an iterative solution procedure. The results for the bearing performance characteristics of hydrostatic/hybrid thrust bearing system compensated with capillary, orifice and constant flow valve are presented. The static performance characteristics and dynamic performance characteristics have been computed for the generally used values of bearing operating and geometric parameters. The variation in the bearing performance characteristics is presented and discussed for various values of non-Newtonian and tilt parameter. In conclusion, the results presented in this study indicate that thrust bearing performance characteristics parameters are significantly influenced due to the influence of recess shape, surface texture, restrictor design parameter, restrictor type and type of lubricant behaviour. The results presented in the thesis are expected to be quite useful to the thrust bearing designer.

Name of Research Scholar: Kusahre Prashant Bhanudas
Title of Ph.D. Thesis : Performance of Multi-lobe Non-Recessed Hydrostatic/Hybrid Journal Bearings (2015)
Supervisor : Prof. Satish C Sharma, IIT Roorkee



Abstract

In this study, the numerically simulated results have been presented and discussed concerning the individual/combined influence of wear, non-Newtonian behaviour of the lubricants, surface roughness and thermal effects on the performance characteristics of multi-lobe non-recessed hydrostatic/hybrid journal bearings. The results in the present study have been numerically simulated by using the developed computer program and have been presented for the generally used values of bearing operating and geometric parameters. The generalized Reynolds equation governing the flow of lubricant between the bearing surfaces has been modified by considering the effect of surface roughness in the analysis of journal bearing system. A surface roughness model proposed by Patir and Cheng has been used in the present study. A thermo-hydrostatic solution for multi-lobe non-recessed journal bearing problem have been obtained by solving the relevant governing equations i.e. Reynold's, Elasticity, Energy, Conduction equations. The non-linear equation, in the present work, has been solved using the Newton-Raphson iterative method. The static performance characteristics and dynamic performance characteristics have been computed for the generally used values of bearing operating and geometric parameters. In conclusion, the numerically simulated bearing performance characteristic parameters have been presented for capillary, orifice and constant flow valve compensated symmetric/asymmetric hole-entry journal bearing configurations along with symmetric/asymmetric slot entry journal bearing configurations. The numerically simulated results presented in this study indicate that the performance characteristics of multi-lobe non-recessed journal bearing configurations are significantly affected by the wear defect, non-linear behaviour of the lubricant, surface roughness orientation pattern and thermal effect. The present study further reveals a significant interaction between the influences of wear and non-Newtonian lubricant and thermal effect on the performance characteristics of a symmetric/asymmetric multi-lobe non-recessed journal bearing configuration.

List of New Members of Tribology Society of India

S.No	Life Member (LM) #	NAME	ORGANISATION
1	5785	Mr.Sidheswar S.Shirbhate	Indira College of Engineering and Management, Maharashtra
2	5786	Mr. Bobby Satheesan	Hazzan Trading and Industrial Services Co. Ltd. , Saudi Arabia
3	5787	Dr V Muthu Kumar	Saveetha Engineering College, Chennai
4	5790	Dr. HiralalBhowmick	Thapar University, Punjab
5	5793	Dr. Srinivasa Varma Bhupathiraju	CMR College of Engineering and Technology, Hyderabad
6	5794	Mr. Gaurav Mathur	Global Technical Services, Mumbai
7	5800	MR. DINESH KUMAR VERMA	IIT BHU,Varanasi
8	5801	MR. Manish Kumar	IIT BHU,Varanasi
9	5802	MR. SUDESH SINGH	IIT BHU,Varanasi
10	5803	Mr. Rishi Pareek	SVNIT, Surat
11	5805	Mr. Prajapati Naik	Apex Institute of Technology & Management, Bhubaneswar
12	5806	Mr. Solanki MitulkumarThakorbbhai	SVNIT, Surat
13	5808	Prof. M. Kumar	BAIT, Erode
14	5809	Mr Jagjit Singh Maan	BCET , Gurdaspur
15	5811	Dr I. Sudhakar	MVGR College of Engineering , Vizianagaram
16	5812	Dr Shibaji Kumar Ghosh	Ashland India Private Limited, Thane
Corporate Members (2016-2017)			
1	Corp. Mem.	Mr. Rahul Vaish	M/S Total Oil India Pvt. Ltd. Mumbai
2	Corp. Mem.	Mr. Bhupinder Singh	M/S Total Oil India Pvt. Ltd. Mumbai
Institutional Members(2016-2017)			
1	Inst. Mem.	Dr. Krishnaraja G. Kodancha	B.V.B. College of Engineering and Technology, Hubballi
2	Inst. Mem.	Dr I.G. Sidhalingeswar	B.V.B. College of Engineering and Technology, Hubballi

We extend our hearty welcome to the new Members and look forward to their active contribution in TSI activities

❖ All Members are invited to send their publication materials, suggestions and feedback to Mr. A. K. Mehta, ED (TSI) at the email ID: office.tsi@tribologyindia.org

❖ Compiled by Mr. A. K. Mehta, ED (TSI) and Edited by Dr. Barun Chakrabarti, Vice President (TSI), on behalf of Tribology Society of India. This publication is for free circulation among TSI Members.

