



# TSI NEWS LETTER



A Publication from Tribology Society of India

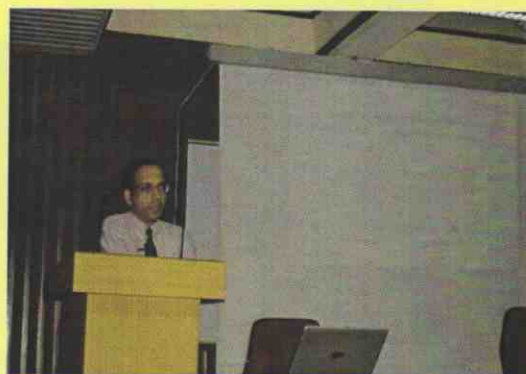
June 2010

## A Round-up of Memorable Events

### MUMBAI CHAPTER : TRIBOLOGY DAY -2009 AND OTHER EVENTS

#### Tribology Day Event – 2009 : TSI Mumbai Chapter

Tribology Day was celebrated on 19th June 2009 at HPD Auditorium, CTCRS Building, Bhabha Atomic Research Centre, Anushaktinagar, Mumbai. The event was attended by about 45 participants from BARC, NPC, L&T and other members from Mumbai and Pune. Following programs were conducted:



Dr. Barun Chakrabarti delivering his Talk

A Lecture was delivered by Dr. Barun Chakrabarti, Principal Technologist, Larsen & Toubro Limited, R&D – E&C Division, Mumbai & Secretary – Tribology Society of India, on topic "Gear Technology – A Tribological Perspective".

The Speaker noted that, traditionally, the gear designers focused mainly on sizing calculations based on defined service factors for a given application. However, the emphasis has now shifted from such macro levels to a more fundamental level of understanding the gear contact mechanism, estimation of contact stresses, evaluation of elasto-hydrodynamic lubrication (EHL) parameters, studying the wear mechanisms and modeling of material / lubricant interactions. The advancements in analytical and experimental techniques in Tribology have greatly benefited the field of gear technology. The designers are now more confident of the performance prediction and design life of gears, while the manufacturers have better control over material properties, surface finish and friction / wear behavior of the gears. In his talk he briefly mentioned a few emerging trends in the domain of current Gear Technology and concluded that Tribology had a vast potential in improving the performance of critical gear drives, specifically with respect to enhancing operational reliability, controlling material wear and minimizing energy losses.



Dr. Chakrabarti unveiling a book on "Nuclear Tribology", Ed. By Mr. N.L. Soni & Mr. P.K.Limaye

A book titled "Nuclear Tribology" was unveiled by Dr. Barun Chakrabarti. The book is edited by Mr. N.L. Soni and Mr. P.K. Limaye and is published by Board of Research in Nuclear Sciences (BRNS). Tribology in nuclear application is considered as a very specialized field, where conventional concepts and practices of design, lubrication and materials may not work effectively. Although there are very few moving components in nuclear plants which see tribological interactions, these components are critical for the operation of nuclear plant. The book discusses the unique characteristics of such nuclear applications and provides insight into the research work dealing with specific design and operational issues in such cases.



Inaugurating the function, Mr. N. L. Soni, Chairman – TSI Mumbai Chapter and Head of Fluid Power & Tribology, Reactor Technology Division – BARC, explained the purpose of such a program. He mentioned that sharing of experience among Tribologists from different areas of design and operation was of prime importance. The objective of highlighting the specialized field of nuclear Tribology was to enable the participants from various industries, institutes and professional bodies to get a basic understanding of the challenges involved in the field of Nuclear Tribology.



Sh. N.L. Soni inaugurating the event



A section of the participants

For the benefit of the participants, Mr. Soni also highlighted the events and activities being planned by TSI Mumbai Chapter.

### **Workshop on “Development of Special High Temperature Lubricants and Hydraulic Fluids for Nuclear Applications”**

A one-day Workshop on “Development of Special High Temperature Lubricants and Hydraulic Fluids for Nuclear Application” was held in November 2009 at Training School Hostel, BARC - Anushaktinagar, Mumbai. Large number of hydraulic oils and lubricants are used in different subsystems of nuclear and subsidiary plants. Selection of these types of items is preliminarily based on OEM. Detail knowledge is required for selecting these types of items for longer life of critical equipment. Indian Oil Corporation (IOC) has agreed to give a detail talk on above topic. This one-day interaction cum workshop was organized with IndianOil R&D Staff, who shared their experience and capabilities to develop, test and deploy such products for some specific critical applications. The Workshop was attended by various delegates of BARC, NPC and other DAE units. Various areas were identified where development work can be carried out for special applications.

### **Seminar on “Tribological Aspects of Rubber Technology”**

A half-day Seminar on “Tribological Aspects of Rubber Technology” was jointly organized by TSI Mumbai Chapter and Indian Rubber Manufacturers Research Association (IRMRA) on 9<sup>th</sup> January 2010 at IRMRA premises in Thane. Dr. S.K.Chakraborty, Director (Acting) - IRMRA and Dr. K Rajkumar, Asst. Director and Quality Manager, delivered lectures in the Seminar. The topics covered included preparation, composition and properties of rubber; compatibility issues under different environments; differences in static / dynamic applications for rubber and damage of rubber compound due to temperature and radiation effects.



### Tribology Day Event – 2009 : Delhi Chapter

Tribology Day Function was held on 19th June 2009 at Indian Oil R&D Centre. The function was presided over by Shri Anand Kumar, Director (R&D), IndianOil and President - TSI. Dr R K Malhotra, Executive Director (R&D), IndianOil and Vice President – TSI, also graced the occasion. Shri C. Mishra, former Chief Technologist - Tata Steel and Tribology Consultant of international repute was the guest Speaker. Though he could not attend the event due to last-minute indisposition, his lecture on **“Tribology – Its Economic Impact and Future Trends”** was delivered by Shri A K Mehta, Executive Director - TSI and a well-known metallurgist and tribology expert.



Shri Anand Kumar, Director (R&D) - IndianOil and President (TSI) addressing the session.

Some of the suggestions given by President (TSI) on this occasion were as follows:

- Conduct of survey in major industries like steel, cement, petroleum about the losses being incurred due to inadequate knowledge and awareness of Tribology in industries located throughout the country. ED (TSI) was advised to initiate the plans to conduct such survey.
- Introduction of Tribology as part of curriculum for undergraduates by Universities and Colleges – approaching AICTE and IITs for inclusion of Tribology courses in curriculum
- Opening of Students' Chapters of TSI in colleges on regional basis
- Conduct of more awareness programs, jointly with academia and R&D institutions
- Publication of Tribology related articles and advantages of best tribology practices through TSI web site
- Internship on Tribology at IIT-Delhi
- Institutionalization of TSI - Students Meet through periodic two-day workshop / program

On the occasion of Tribology Day, TSI Delhi Chapter launched web based publication of **Tribology Research Reference Quarterly Update (TRRQU)**, a compilation of Tribology-related literature and references. The compilation is now being brought out periodically and this is also being hosted on TSI web site. This initiative has received appreciation from researchers and practicing engineers.

During the Tribology Day function, TSI Delhi Chapter announced the initiation of dialogue with Faridabad Industrial Association (FIA). It was also reported that the Delhi Chapter would make efforts to enhance the interaction of TSI with students from engineering colleges from NCR zone. The Chapter would also encourage student memberships and promote participation of students in TSI – Delhi Chapter events.

On this occasion, the Delhi Chapter also announced a major initiative: the organisation of **Tribo-India Conference** in association IIT - Delhi during 11th and 12th December, 2009. The Conference would cover several key areas of concern, including:

- Bearings, Brakes, Clutches, Seals, manual transmission, final drives
- Advanced materials, testing and modeling
- IC Engines
- Smart materials and novel applications
- Base oil and additives
- Lubricants and greases
- Condition monitoring



**Indian Institute of Technology – Delhi and TSI - Delhi Chapter** jointly organized the **First Tribo-India Conference** focusing on **Tribology of Automotive Systems**, during **11 – 12 December 2009** at IIT – Delhi. Shri Anand Kumar, Director (R&D) IndianOil & President - Tribology Society of India, inaugurated the event. Director (IIT), presiding over the session, addressed the delegates and invitees to the inaugural session. The other speakers included Head - Mechanical Department, IIT Delhi, Head - ITMMEC, IIT Delhi, Dr. Harish Hirani, Conference Coordinator and Sh. B.S. Rawat, Chairman TSI-DC. During his inaugural address, Director R&D emphasized the role of Tribology in automobile sector.



**Shri Anand Kumar Director (R&D) IndianOil and President TSI addressing the session.**



**Shri Anand Kumar, Director (R&D) IndianOil and President – TSI, releasing the Proceedings**

Shri Anand Kumar's views on application of tribological principles to reduce friction and improve durability in automobile sectors were well appreciated. He also shared his views on recent developments of surface engineering, materials science and lubricant technology to counter various challenges faced by the automobile industry. He also inaugurated the exhibition of various equipment displayed by the vendors. Director - IIT shared his vision on use of Tribology for the benefit of the industry. Dr. H. Hirani gave brief details about the conference and its objectives. Shri B.S. Rawat thanked the dignitaries for their valuable time and for gracing the occasion.

The conference was jointly organized by the Delhi Chapter of Tribology Society of India (TSI) and Department of Mechanical Engineering & ITMMEC, Indian Institute of Technology - Delhi. The main motive of this conference was to provide a common platform to researchers from industry, R & D organization and academic institute, who were working on automotive systems, to reduce friction and wear in transportation. Tough competition, government regulations and rapid technological advancements in automotive sector clearly point towards the growing need of research efforts in the area of tribology of automotive systems. Usage of higher energy-conserving engine oils, wear resistant and low-friction materials and novel design of automotive components will become increasingly important, for saving of natural resources and lowering the engine friction. The purpose of this Conference was to bring together the tribology fraternity to explore, disseminate and strengthen initiatives in the area of improvements in automotive sectors. The main topics discussed during the Conference included: bearings, brakes, clutches, seals, manual transmission, final drives, advanced materials, testing and modeling, IC Engines, smart materials and novel applications, base oils & additives, lubricants & greases and condition monitoring. More than 60 participants covering oil industry, academia, and automobile industry took part in two-day long deliberations.

The Conference ended with the round –up of two days of deliberations covering various aspects of tribology, lubrication, condition monitoring etc. A Vote of Thanks was proposed by Dr. Pankaj Bhatnagar, Secretary, TSI-Delhi Chapter.



Tribology Society of India - Karnataka Chapter organized a meeting on 29th August 2009. **The Indian Institute of Science, Bangalore** provided the ideal setting of greenery and fresh air, a perfect place to discuss ideas of tribology and its promotion. The meeting was held in the Seminar Hall of the Mechanical Department, IISc. Mr. N. M. Dube, Chairman - TSI-Karnataka Chapter and an avid tribologist, welcomed the members. The program commenced with a brief welcome, followed by an interesting talk given by Dr. Satish Kailas on subject of Friction and Surfaces. This created a good platform for interaction between the members. Ideas for the promotion of Tribology and activities of TSI—KC were discussed by Mr. Anirudh Dube, Secretary - TSI-Karnataka Chapter.



TSI—KC members engrossed in the talk given by  
Prof. Satish Kailas—IISc, Bangalore

A healthy discussion ensued and many vibrant ideas, such as short term courses on tribology, industry - academic collaboration to conduct workshop for students, lecturers and beginners, and several more emerged.

The meeting concluded with discussions regarding proposals for developing an e-forum for tribologists' interactions, tribology-based design, short-term and long-term courses. The meeting saw the presence of scientists from IISc, GTRE, NAL, SKF and GE. The forum also had eminent members from various educational institutions.

The meeting was followed by dinner at Nesara within the IISc campus where members interacted with each other and enjoyed dinner.

### TRIBO 2009

A one-day workshop on Tribology was organized jointly by the Department of Mechanical Engineering, Acharya Institute of Technology, Bengaluru and Tribology Society of India (Karnataka Chapter) on 11 November 2009 at **Acharya Institute of Technology, Bengaluru**. The event was organized with an intention of emphasizing the significance of Tribology among the final year Mechanical Engineering students of various Engineering Institutions in and around Bengaluru. A total of **96 participants** (including students and faculty members) from various Institutions participated in the event. The event was co-sponsored by DUCOM Instruments Pvt. Ltd.

**Dr. K. Balaveera Reddy**, Former Vice Chancellor, Visvesvraya Technological University, inaugurated the workshop and **Dr. G.P. Prabhukumar**, Principal, Acharya Institute of Technology, presided over the inaugural function. **Dr. H.B. Niranjan**, Vice Principal, Acharya Institute of Technology gave introductory speech.

The inauguration was followed by the Technical Sessions I and II. The technical Session I had talks by the following distinguished speakers on the topic mentioned below.

- Prof. Satish V. Kailas, Department of Mechanical Engineering, I.I.Sc., talked on the topic **Fundamentals of Tribology**

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[hc@LNTENC.com](mailto:hc@LNTENC.com) so that necessary improvements can be taken up in future. – Thanks.*



- Mr. V. Martin, Deputy General Manager, I.O.C.L., Faridabad, gave a presentation on **Lubricants, Greases and their properties.**

The Technical Session II (after lunch) had the following talks:

- Mr. M. Radhakrishnan, Consulting Engineer, gave an expert lecture on **An overview on Bearings.**
- Mr. N.M. Dube, Chairman, TSI - Karnataka chapter delivered an expert talk on **Tribotesting - Practical aspects of Tribology.**

The Technical Sessions were followed by a Valedictory function. Mr. N.M. Dube graced the function as the Chief Guest. Dr. H.B. Niranjana presided over the function. The Certificates of participation were distributed among the participants.

### **Recent Advances in Eco-Friendly Lubricants (RAIEFL-2010) : 8 – 9 April, 2010**

Department of Mechanical Engineering, Indian Institute of Science (IISc) – Bangalore and the Karnataka Chapter of TSI joined hands to organize **RAIEFL-2010** during **8 – 9 April 2010** at IISc Campus. In view of the ever-increasing focus on environmental protection and sustainability, the theme of this National Workshop was extremely relevant. The program was inaugurated by Dr K. P. Naithani, ED – LT, IndianOil-R&D Centre, in presence of senior faculty members of IISc and a large gathering of delegate comprising engineers, researchers and students from all over the country. The two-day program included fourteen informative technical lectures delivered by eminent speakers and two commercial presentations by DUCOM – Bangalore and CETR – USA. The Sponsors for the program included Bureau of Research in Nuclear Sciences (BRNS), Ministry of earth Sciences (MoES) – Government of India, Bharat Petroleum Corporation Ltd. (BPCL), Council of Scientific & Industrial Research (CSIR), Indian Oil Corporation Ltd (IOCL), DUCOM, CETR and MAGNUM. Prof. Satish V. Kailas and Dr. R. T. Naik of IISc played a vital role as Organizers of this excellent event.

[www.tribologyindia.org](http://www.tribologyindia.org)

*The TSI Website is gearing up for major make-over.....*

*Please keep visiting the website and make the most of its features.  
We look forward to your valuable suggestions and feedback!*

**It is time for Celebrations !**

*Let us commemorate the creation of TSI in  
June 1989, by celebrating Tribology Day  
during June 2010.*





**Participants in the 1<sup>st</sup> Summer School in Tribology**

In 2009, TSI took a significant step towards its commitment for spreading quality Tribology education in the country. Realizing the lack of Tribology curricula and academic programs in the country, TSI launched a very innovative awareness program through the **First Summer School in Tribology (SST)**, aimed primarily at the teaching faculty from major engineering colleges. TSI believes that through properly designed Tribology curricula, the engineers will be better equipped to handle the responsibility for improving and maintaining the reliability of plants and equipment. The Summer School was also intended to promote closer interaction of academia with practicing engineers from industry.

The 4-day Summer School was organized during **10 – 13 June 2009** at **IndianOil Institute of Petroleum Management (IIPM), Gurgaon**. It was attended by 60 participants (30 each from academia and industry). While the industry delegates were charged nominal fees for the residential program, the entire cost of travel, board-&-lodging and course fees for the members of academia was borne by TSI, as its contribution to the cause of nation-building.

The program was inaugurated by Shri B N Bankapur, Director Refineries, IndianOil. We also had the gracious presence of Shri Anand Kumar, President (TSI) and Director R&D, IndianOil; Dr RK Malhotra, Vice President (TSI) and ED (IOC-R&D); Shri K K Gupta, ED (IIPM) and Shri J L Raina, Secretary General and CEO of Petrotech Society, during inaugural session. Petrotech Society and IIPM joined hand with TSI for this unique event. There were 19 Technical Sessions and a visit to IOCL-R&D Labs, spread over 4 days. Eminent Tribologists from the industry and academic / research institutes delivered the lectures. The course provided a broad overview of Tribology, touching upon a wide spectrum of topics. To entertain the participants, IIPM organized one cultural evening at the Institute.

The Valedictory Session was addressed by Dr G K Sharma, Past President (TSI), followed by brief presentations by 10 groups of participants, covering the theme of Tribology education in India and the role of TSI. A CD covering all technical presentations, participants' group presentations and all pictures taken during the program was sent to all the participants and speakers as Proceedings of the SST.



Subsequently, TSI contacted the participants of the 1<sup>st</sup> SST to obtain feedback on their learning and the status of implementation of Tribology education in their institutes. Responses received from some of the participants showed encouraging progress in this direction. A brief on the Summer School on Tribology has been posted on the website.

A few glimpses of the 1<sup>st</sup> SST are shown in the pictures below.



Mr. Bankapur delivering the inaugural address



Mr. Anand Kumar addressing the participants



A view of the cultural evening



Dr. G. K. Sharma delivering the valedictory address



IIPM – Venue of the program

*TSI is now organizing the 2<sup>nd</sup> Summer School on Tribology during 21 – 24 June 2010 at IIPM - Gurgaon. The brochure of the program is available in TSI website [www.tribologyindia.org](http://www.tribologyindia.org). The second edition of the event is based on similar pattern as the 1<sup>st</sup> SST. The preparations are now in an advanced stage.*



On 1<sup>st</sup> November 2009, Tribology Society of India entered into a pioneering collaboration with the Society of Tribologists and Lubrication Engineers (STLE), USA, with a vision of establishing TSI as a global brand in the area of Tribology. The collaboration agreement envisages joint TSI-STLE programs for Tribology education and training, administration of STLE Certification Examinations in India and collaborative publishing of technical contents in journals and newsletters of each organization.

As the first initiative under this collaboration, TSI organized the **1<sup>st</sup> TSI – STLE Joint Tribology Education Program** during **17 – 19 February 2010 at IIPM – Gurgaon**. The following three courses were conducted under this program:

- ❖ “Basic Lubrication” on 17 February ‘10 (attended by 35 participants)
- ❖ “Advanced Lubrication” on 18 February ‘10 (attended by 38 participants)
- ❖ “Condition Monitoring” on 19 February ‘10 (attended by 31 participants)

There were 12 participants who attended all 3 one-day programs, 8 participants who attended both Basic and Advanced Lubrication Program and 10 participants who attended Advanced Lubrication and Condition Monitoring Program. The participants’ profiles show a wide spectrum of industries and research organizations. The faculty from STLE included Dr Robert M Gresham (Bob), Director of Professional Development – STLE and Mr. Mike Johnson (Mike), CEO - Advanced Machine Reliability Resources (AMRRI). Course Attendance Certificates, signed jointly by STLE and TSI, were given to all participants for the respective courses attended by them. The participants also received a set of lecture presentations. The feedback received from the participants indicates a high level of satisfaction. The Speakers from STLE were given mementoes by TSI. As a goodwill gesture, they were sent on a one-day sight-seeing trip to Agra with two of the course participants. This was highly appreciated by the guests. STLE has formally sent their feedback on the program, expressing high degree of satisfaction on the level of participation and excellent arrangements made by TSI.



Encouraged by the success of the first joint education program, STLE has offered to conduct the second such program in February 2011. Preparations for the event have already been initiated. Details will be announced in due course through the TSI Website.



Dr. Robert Gresham



Mr. Mike Johnson



In keeping with the TSI tradition of organizing biennial Tribology Conferences, the 7<sup>th</sup> International Conference on Industrial Tribology (ICIT-2010) has been launched. The Conference will be organized by R&D Centre for Iron & Steel (RDCIS), the premier R&D Unit of Steel Authority of India Limited (SAIL), under the aegis of TSI. The event will be held in Ranchi during 2 – 4 December 2010. The theme of the Conference is “Tribology for Steel & Mining Industry”. The Inaugural function will be on 2<sup>nd</sup> December 2010 morning and the Conference will conclude with a Valedictory function at noon on 4<sup>th</sup> December 2010.

The Conference was formally launched through a glittering ceremony organized at RDCIS – Ranchi on 29 March 2010. Mr. A. S. Mathur, Executive Director In-Charge (RDCIS) and Mr. Anand Kumar, President (TSI) and Director (R&D) – Indian Oil, addressed a press conference on this occasion and released the Conference brochure, containing the First Announcement & Call for papers. The program was attended by senior members of RDCIS and TSI. The event received excellent media coverage.



Mr. A. S. Mathur and Mr. Anand Kumar releasing the ICIT-2010 First Announcement during the inaugural function at RDCIS – Ranchi on 29 March 2010

Three pre-Conference Education Courses will be held at the same venue during 1<sup>st</sup> December 2010. These are: (a) Condition Based Maintenance Systems; (b) Advances in Wear Resistant Materials & Coatings, and (c) Basics of Tribology (*reserved for only students of local engineering colleges at a nominal fee*).

The following TSI-related programs will be held on the sidelines of the Conference : (a) TSI Executive Committee Meeting on 1<sup>st</sup> December 2010 (b) TSI Executive Committee Elections (on 3<sup>rd</sup> December 2010) (c) TSI General Body Meeting on the evening of 3<sup>rd</sup> December 2010.

Details of Plenary Lectures, Technical Sessions, Poster Sessions, Business Meets and Exhibition are being worked out. Cultural programs will be organized on the evenings of 2<sup>nd</sup> and 3<sup>rd</sup> December 2010.

*We look forward to meeting you all in Ranchi during ICIT-2010!*