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TSI NEWSLETTER

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Issue 2 : JAN - MAR 1993

A PUBLICATION OF
TRIBOLOGY SOCIETY OF INDIA

Registered Society (Registration No.1391)
Regd. Office : BHEL Corp. R&D. Vikas Nagar, Hyderabad - 500 093.

From the Editor's Desk

Dear Members,

The second newsletter of our Society is now in your hands. It is our earnest desire that this newsletter should become one day a coveted technical journal of our Society.

For this dream to be realised, it is essential that all of us hold aloft our togetherness. We request you to send us technical brief, new items, etc. which can be shared with others. Knowledge shared is knowledge gained.

Considering the Scope of the area of the Science of tribology viz., lubricants, rolling elements and surface modification, we have members from oil companies, bearing companies besides numerous other industrial, academic and research institutions.

The size and enormity of the industries belies the number of members we have in the Society. The number of members can be easily ten times the present strength.

Towards this goal, we have appended the membership form of the Society, We earnestly request you to enrol some more members.

All of us eagerly look forward to our convention in March 93 in Dehradun.

Best wishes for a happy and prosperous 1993.

With warm regards,

K. Balasubramanian
(Editor)

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AN APPEAL

So bogged down most of us are in day-to-day mundane things, I wonder how many of us can stand up at the end of the day, end of the week, month or even a year, and feel the satisfaction of having contributed some thing lasting to the society (not necessarily TSI) at large. No doubt, our first allegiance is to our benefactor (the boss in office/home? the company? the nation? the God?), but surely we owe something to our co-inhabitants of this planet. I think we got to take off periodically from our very busy routine, and do something outside our narrow periphery.

In the first issue of the relaunched TSI News Letter mailed to over 350 members and well-wishers of TSI, an appeal was made for contributions (not money), in terms of information, ideas, experiences, etc. I am sure, the readers must be giving their serious consideration to this appeal.

I am suggesting, just for the sake of provoking thoughts of members, two specific areas regarding which they may wish to say, do or initiate something.

1. Rural applications of tribology
2. Environmentally friendly lubricants.

We look forward to hear from readers their views in this regard.

R A Rao
Vice-President, TSI

NCIT-93 - AN OPPORTUNITY FOR FURTHERANCE OF TRIBOLOGY MOVEMENT

The X National Conference on Industrial Tribology (NCIT-93) meets at Indian Institute of Petroleum, Dehradun on 25-26 March, 1993. This is an event that takes place once in two years, and, regrettably with not much of activity in between.

About 60 papers are expected to be presented at NCIT-93, some in parallel sessions. There will be opportunities for members and attendees to ventilate their ideas and share their experiences not only on the subject matter being presented, but also on newer applications of Tribology. TSI also look forward to suggestions from participants of NCIT-93, on how to bring closer liaison between academic and research institutions and the user industry in propagating the concepts of Tribology.

TRIBOLOGY CENTERS IN INDIA-2
INDIAN INSTITUTE OF TECHNOLOGY, MADRAS

I.I.T. Madras has facilities for TRIBOLOGY Testing and Research in the Departments of Applied Mechanics, Mechanical Engineering, Metallurgy, Chemistry and Regional Sophisticated Instrumentation Centre. Research has been been concentrated in the areas of surface engineering and tribomaterials including ceramics, lubrication mechanics, bearing design and stability, tribomonitoring, lubricant and additive chemistry.

Facilities include tribometers such as Pin and Disc, Four Ball Tester, Disc machine, Gear machine, bearing testing machines and analysers, viscometers, spectrometers (IR, Atomic absorption etc.), Ferrograph and Particle analysers. Some of the current research topics are:

1. Thermal, Elastic and non-newtonian effects in journal bearings of various types.
2. Dynamic analysis of industrial rotors.
3. Condition monitoring of machinery and machinery elements; development of an expert system.
4. Tribology data base.
5. Friction, wear and noise studies in sintered bearing.
6. Surface treatment studies to improve wear and fatigue characteristics.
7. Wear studies on cutting tools, coated carbides and ceramics.

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THE QUEST FOR BETTER SURFACES

Convention breaks surface engineering down into three techniques, namely, modification of a surface without altering its chemistry, diffusion treatment to actually alter the surface chemistry, and adding surface layers, perhaps by welding or plating. The importance of attaining the right surface and not adopting a policy of adding components as the need overtakes the project has now been recognised.

Increasingly detailed and accurate data is allowing engineers to specify the right combination of substrate composition/design and surface treatment cycle: what is generally accepted is the substrate and surface must form a synergy rather than operate as separate entities. There are, of course, uncertainities. Users are concerned of possible loss of quality; industry - wide standards are few and far in between; there is general ignorance of new developments.

These challenges are recognised by UK Government. A domestic market for surface engineering is set a value of 560 million pound sterling.

Along with Department of Trade and Industry, the National Centre of Tribology (part of UKAEA) is undertaking a collaborative programme to advance surface engineering. The Programme, to be known as QUEST, is to tackle two main problems.

First, there is the needs for validated tribological performance data and a framework for such data to be disseminated throughout UK industry.

Second, a basis must be provided for higher quality and consistency, while finally innovations by treatment suppliers must be increased with regard to emerging technologies (it has been estimated that these make up 5 - 7.5% of total market and are expanding at 1% per annum).

QUEST follows the previous project CAST (Coatings and Surface treatments) and will bring together suppliers and users via focused research projects. This collaborative approach is considered vital if the UK is to meet European and other Challenges.

Extract from SURFACE TECHNOLOGY INTERNATIONAL September 1992, Page 21.

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IMPORTANCE AND CONTROL OF CLEANLINESS IN STEAM TURBINE OILS

C.R. JAGGA ITMMEC, IIT, NEW DELHI

In the context of industrial lubrication and fluid power transmission practices, the term cleanliness stands generally of maximum allowable particulate contamination in the fluid circulating between the lubricated parts of the mechanisms. For the purpose of emphasizing the need of the cleanliness monitoring and ascertaining its level, power generation turbines are an interesting system. An industrially important study (1) in this area has been made at IIT, Delhi.

A study by Electric Research Institute (EPRI) on root causes of failure of turbine bearing systems indicated that more than fifty percent of all bearing failures were due to contamination of the lubricating oil. These failures are primarily caused by foreign particles in the oil which have been introduced into the lubrication supply system during shop manufacture, site installation or a maintenance outrage.

Sources of these foreign particles include: Corrosion scale, weld base, coal dust, flyash, sand or foreign material dropped into reservoir or bearing pedestals. Water is another contaminant most prevalent in a steam turbine lubrication system. Chemical contaminants resulting from deterioration of the oil, mainly brought about by oxidation, further compound the contamination-related service problems such as coil colour deterioration, sludging and foaming as well as valve sticking, rusting of the equipment and wear damage. Importance of proper flushing (3) and maintenance (4) has been reported.

International cleanliness standards for lube oils and hydraulic control fluids used in steam turbine systems are to be observed for assuring their good maintenance. This calls for an effective contamination control and analytical monitoring of contaminants. Solid contamination levels in fluid are assessed and quantified using automatic particle counters (APC).

Additionally, identification of particulate matter circulating with the lubricating oil can be done using techniques like ferrography in conjunction with scanning electron microscopy (SEM) and energy dispersive X ray analysis (EDAX) to locate the source of wear in the system.

The oil oxidation products, water and solid contaminants act as 'toxins' for the turbine oil and these must be checked and removed from the lubrication circuit to assure long life of the oil and health of the turbine system. This can be achieved, first by preventing entry of solid contaminants into the system and second by in-process purification during operation.

Purification may consist of continuous by-pass system, full-flow treatment, combination of the two incorporated into the circulation system, independent purification units connected permanently to the large reservoir or separate bath units to purify drained lubricants for reuse. The independent continuous purification system gives the highest over all efficiency.

In this system, used oil is drawn from the reservoir by an independent pump, delivered to a centrifuge or filter or both and after purification, returned to the system. In most of the super steam turbine power generation systems in India, partial flow filtration using 37 micron Duplex filters along with intermittent by-pass centrifuging with 5-15 percent charge are being used.

Some of the power Stations being erected presently will introduce full flow filtration through Duplex filters, and both axial thrust bearings and journal bearings will be fed with a highly decontaminated oil. Centrifuging, used in clarifier and purifier modes, removes both water and particulate matter to a great extent.

References :

1. Particulate Contamination Analysis of Lubricating oil samples from Steam Turbine Power Plants" - for BHEL, Hardwar, 1988 - C R Jagga, ITMMEC, IIT, Delhi.

2. "Failure Cause Analysis turbine Bearing Systems, Phase-I Development of Data Collection Plan", EPRI CS IBOI-SY Summary Report April 1981 - cited in J Lubrication Techn., Nov 1982, K F Dufraineetal, "Wear of Steam Turbine Journal Bearings at low Operating Speeds".

3. "Flushing Procedure for T-6 Lube Oil Systems", Walter, O.L.; Goumous, J.N.; Power Engineering, Nov 1977, pp 100-103.

4. "How Regular Bearing Inspection and Maintenance Boost Reliability", Durkin, T., & Mening, R.; Power, Oct 1978, pp 49-50.

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TRIBOLOGY SOCIETY OF INDIA

(Registration No.1391)
(Affiliated to International Tribology Council, U.K.)

Application for Membership

To
The Honorary Secretary,
Tribology Society of India,
BHEL, Corp. R & D Divn.,
VIKASNAGAR,
HYDERABAD - 500 593.

Dear Sir,

I/We desire to become a Member of the Tribology Society of India. I/We agree that I/we will be governed by the Rules and Regulations of this Society as long as I/we remain as members.

1. **MEMBER/DONOR MEMBER**

Full Name (Capitals) _____ Designation _____
First Name Second Name Surname

Abbreviated Name _____

Date of Birth _____

Academic Qualifications with year and University/Educational Institution*

_____

_____

_____

Professional Experience*

Office Address _____ Phone _____

_____ Grams _____

_____ Telex _____

_____ Fax _____

2. **STUDENT MEMBER**

Full Name (Capitals) _____
First Name Second Name Surname

Abbreviated Name _____

Date of Birth _____

*Separate sheet can be attached, if required.

Academic Qualifications with year and University/Educational Institution *
Student of _____ Class/Year _____ Course_____
University/Institute
Address _____
Certified that Shri/Ms._____is a bonafide student of this Institute.

Signature _____
Head of the Institute

3. **INSTITUTIONAL MEMBER**

Name of the Organization _____
Address _____
Phone _____ Grams _____ Telex _____ Fax _____
Brief Profile of Organization*
_____
_____
_____
Name of Representative _____ Designation

I/We sent herewith Rupees _____ by cash/M.O./ Cheque No. _____dated _____drawn on _____ being my/our entrance fee and subscription for year
Date : _____ Signature _____

Application supported by :

1. Signature _____
   Name _____
   Membership No. _____
   Address _____

2. Signature _____
   Name _____
   Membership No. _____
   Address _____

Membership Fees

The entrance fees and the annual subscription for Membership of the Society shall be as follows :

	Class of Membership	Entrance fees	Annual Subscription
1.	Ordinary Member	Rs.20/-	Rs.40/-
2.	Student Member	Rs.10/-	Rs.20/-
3.	Institutional Member	Rs.5,000/- or Rs.10,000/-	Nil
4.	Donor Member	Rs.500/-	Nil

Bank charges may be added for outstation cheques, as per following rates : Rs.5/- for Rs.40/- and Rs.60/- and Rs.11/- for Rs.500/-

* Separate sheet can be attached, if required.

FORTHCOMING EVENTS

1. Society of Tribologists and Lubrication Engineers (STLE) - Annual Meeting, 1993
   May 17-20, 1993 - Calgary, Alberta, Canada

2. ASME/STLE - Tribology Conference (1993)
   October 24-27, 1993 - International Hotel, New Orleans, USA

   Address for Correspondence : Society of Tribologists and Lubrication Engineers

   840 Busse Highway, Park Ridge
   Illinois, USA 60068

3. EUROTRIB'93 - 6th International Congress on Tribology
   August 30-Sept. 2, 1993 - Budapest, Hungary

   Correspondence : Eurotrib'93 Secretariat
   Hungarian Chemical Society
   H-1027 Budapest, Fo Utca 68
   Hungary

Invitation for Papers

The Editor-in-Chief of TRIBOLOGY INTERNATIONAL, Dr. Brian Briscoe invites papers from traditional areas of strength - mechanical engineering, lubrication and wear - and also from new developing applications such as ceramic processing, novel composites, particle technology, food engineering and geophysics.

Interested authors can please contract Shri S.K. Biswas, Department of Mechanical Engineering, Indian Institute of Science, Bangalore 560 012.

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From

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