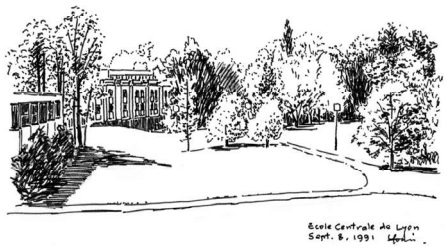
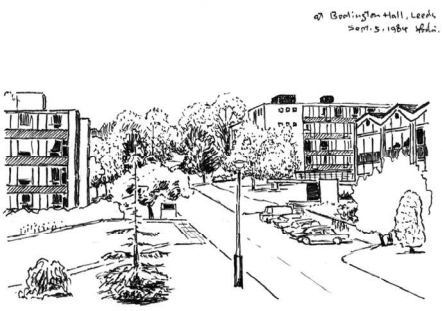
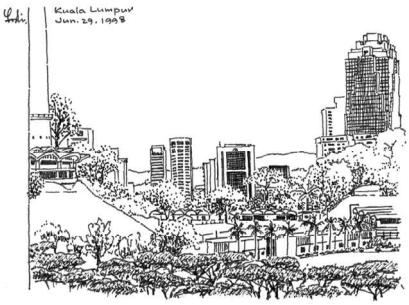
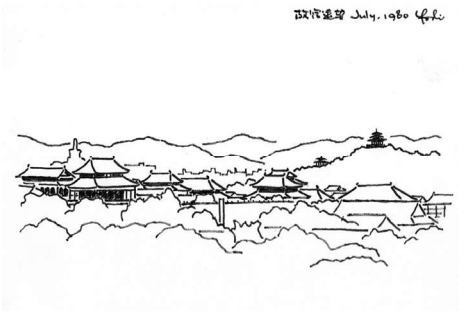
The Japanese Society of Tribologists

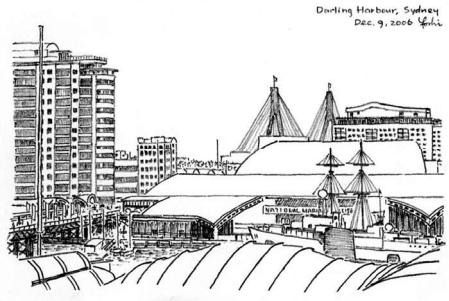
70th Anniversary Commemorative Booklet

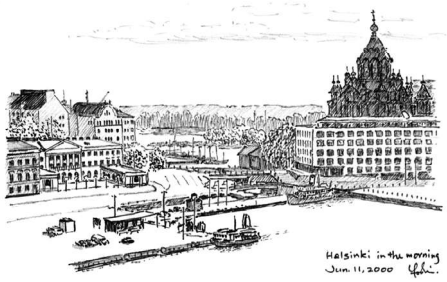


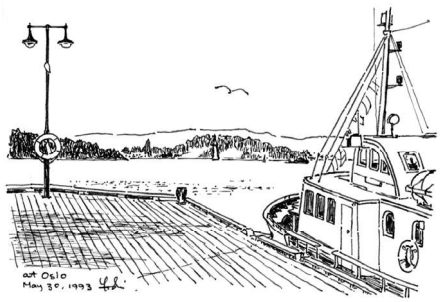


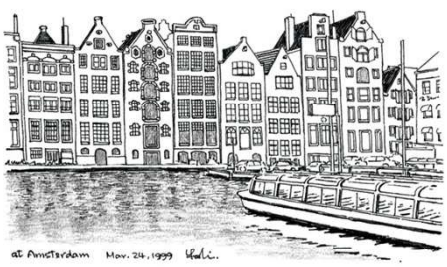












About the Cover Illustrations

The sketches featured on the front and back covers are reproduced from the personal sketchbooks of Professor Yoshitsugu Kimura. Created during his travels, these works capture landscapes and cityscapes with a keen artistic sensibility, reflecting not only his deep appreciation of form and detail but also his rich cultural expression beyond the field of tribology.

Front

Cambridge 1990	Chicago 1995	Luzern 2006
Lyon 1991	Leeds 1984	Berlin 1987
Kuala Lumpur 1998	Beijing 1980	Sydney 2006
Uppsala 1994	Helsinki 2000	Oslo 1993
Coimbra 2002	Praha 1990	Amsterdam 1999

Back

Chamonix 2010	Jungfrau 2012	Mont Blanc 2010
San Francisco 1983	Boston 1978	Budapest 1993
Holderness School 1988	Cavendish Laboratory 1987	Brian Briscoe`s House 1987
Big Ben 2016	Arc de Triomphe in Paris 1994	Great Wall 1998
Madrid 1996	Swansea 1987	Bangkok 1998

Professor Yoshitsugu Kimura (born in 1936) is one of the foremost pioneers in tribology research in Japan, having made outstanding contributions to both fundamental and applied studies of friction, wear, and lubrication. After completing his studies in engineering at the University of Tokyo, he served as a professor at the same institution, where he devoted many years to education and research in design engineering, machine elements, and tribology. He later served as President of Kagawa University, providing distinguished leadership in university administration and contributing significantly to the advancement of both academia and higher education.

He currently holds the titles of Professor Emeritus at the University of Tokyo and Kagawa University, and continues to contribute to the development of tribology in Japan. In recognition of his long-standing and distinguished contributions, Professor Kimura has held leading positions in the Japanese Society of Tribologists and other academic organizations, and has received numerous prestigious awards. Notably, he was awarded the Tribology Gold Medal by the International Tribology Council (ITC), underscoring the exceptional international recognition of his achievements.

In addition to his scientific achievements, Professor Kimura possesses a refined artistic sensibility and has produced numerous sketches depicting landscapes and cityscapes during his travels. The illustration featured on the cover of this booklet is one such work, reflecting his rich expressive activities not only in the academic sphere but also in the cultural domain.

Foreword

This year marks the 70th anniversary of the Japanese Society of Tribologists (JAST), founded in 1956 as the Japan Society of Lubrication Engineers. Over the past seven decades, the Society has benefited from the generous support and cooperation of colleagues from academia and industry in Japan and abroad. Through sustained international collaboration, JAST has contributed significantly to the advancement of tribology and to progress in both scientific research and industrial innovation. We express our sincere gratitude to all those whose dedication has made these achievements possible.

On this commemorative occasion, we are also deeply grateful for the warm congratulatory messages received from related organizations in Japan and overseas. These messages reaffirm that the development of tribology has been supported by enduring domestic and international partnerships.

In recent years, advances in nanotechnology have driven major progress in fundamental tribological research, deepening our understanding of friction, wear, and lubrication at the nanoscale. These developments have expanded both scientific and practical applications, while the Society has continued to support the advancement of industrial technologies in response to evolving needs. Tribology, as an interdisciplinary field grounded in physics, chemistry, and materials science, plays a vital role across diverse sectors, including mechanical systems, electronics, energy, infrastructure, and biomedical applications. In the context of growing global environmental challenges, it is increasingly expected to contribute to the reduction of greenhouse gas (GHG) emissions through improved energy efficiency and sustainable technologies.

Looking ahead, further progress will depend on closer integration with information technologies such as data science and artificial intelligence, along with strengthened global collaboration. It is our hope that this commemorative publication will both reflect on past achievements and serve as a foundation for future development.

Japanese Society of Tribologists

S. Sasaki

Prof. Shinya SASAKI
JAST President

International
Tribology
Council

Congratulations from the International Tribology Council to the Japanese Society of Tribologists (JAST) on their 70th Anniversary!

On behalf of the International Tribology Council (ITC) we are delighted to extend our warmest congratulations to the Japanese Society of Tribologists on the occasion of their 70th anniversary. JAST has been an exemplary national tribology society, with an impressive impact in the field, both in research and practice, and has contributed greatly to the science of tribology and to tribology-related industries, as well as forging strong international collaborations. We pay tribute to the JAST's achievements over seven decades and look forward to its continuing leading role in the future.

International Tribology Council

JAST was a founder member of the International Tribology Council (ITC), when it was created in 1973 as a non-commercial and non-political international association of national tribology societies aiming to facilitate an exchange of views on tribology matters. The ITC has several main tasks, including the organisation of the World Tribology Congress once every fourth year, and recognition of significant contributions to the science and technology of tribology through the award of the Tribology Gold Medal and the Peter Jost Tribology Award, which are awarded annually.

JAST's support of ITC activities has been outstanding. The 4th World Tribology Congress was organised by JAST and the Science Council of Japan in the beautiful and historic city of Kyoto Japan in September 2009. The Congress was an outstanding success with around 1500 registered participants, delegates from over 40 countries with almost 850 papers presented. It featured a technical exhibition, which was open to the public, and attended by elementary school students, who learned about new technological developments and the subject of tribology, as well as the conference delegates. The Congress was honoured by the presence of His Imperial Highness Prince Akishino who kindly gave an Opening Address encouraging the development and application of tribology.

Japan has also been home to many notable tribologists with significant contributions recognised by the award of the Tribology Gold Medal. The five Japanese recipients were: Prof. N. Soda (1981), Prof. F. Hirano (1987), Prof. T. Sakurai (1990), Prof. Y. Kimura (2003), and Prof. Prof. K. Kato (2007).

On behalf of the international tribology community, the Executive Committee of the ITC offer their sincere congratulations to JAST in recognition of their 70 years of historical achievements, as well as for their support and contributions to the global community of tribologists. We hope that JAST will continue to inspire the rest of the international tribology community through its activities in cutting-edge research and practical applications as well as continuing to forge strong ties among societies worldwide.

Prof. Nicholas D. Spencer
ITC President

Ian Sherrington.

Prof I. Sherrington.
ITC Executive Director

Congratulations to JAST from the Asian Tribology Council

Dae-Eun Kim
President
Asian Tribology Council

[Congratulatory Message]

On behalf of the Asian Tribology Council (ATC), I am very pleased to offer my warm congratulations to the Japanese Society of Tribologists (JAST) on its 70th anniversary. This is truly a meaningful milestone. During the past seven decades, JAST has played a leading role in advancing tribology not only in Japan, but throughout the international community. Its contributions—from fundamental research to industrial applications—have helped shape the direction of our field and improved the way tribology is understood and practiced worldwide.

This anniversary gives us a wonderful opportunity to honor the history of JAST and to recognize the dedication of many researchers, engineers, and leaders who have supported the society over the years. At the same time, it also reminds us of JAST's ongoing commitment to innovation, exchange, and learning. We are delighted to celebrate this special moment together with our friends and colleagues in Japan.

[Asian Tribology Council]

The Asian Tribology Council (ATC) connects tribology societies across the Asia–Pacific region and encourages global cooperation, information-sharing, and academic communication. One of ATC's main activities is organizing the ASIATRIB conference every four years, bringing together tribologists from universities, industries, and research institutes in the global arena.

Since the first ASIATRIB in China in 1998, the conference has been successfully held in Korea, Japan, Australia, India, and Malaysia. The most recent conference took place in China in 2024, and we are very much looking forward to the next ASIATRIB which will be held in Korea in 2028. Over the past 25 years, ASIATRIB has grown to become one of the major international gatherings where researchers can share new results, discuss challenges, and explore future directions in tribology.

ATC continues to promote the advancement of tribology throughout the Asia–Pacific region and beyond in alignment with the discipline's foundational objectives—namely, improving energy efficiency, minimizing energy losses, and reducing the environmental concerns associated with moving components. ATC also places strong importance on supporting young researchers, encouraging student participation, and building networks for future collaboration. We believe that nurturing the next generation is essential for expanding knowledge and supporting long-term progress in the field for a sustainable and prosperous future.

[Future Hopes for JAST]

As we celebrate this special occasion, we sincerely hope that JAST will continue to inspire the global community by promoting advanced research, developing practical technologies, and strengthening international connections. Tribology is becoming more important than ever in areas such as sustainability, energy efficiency, advanced materials, and future manufacturing technologies. We believe that JAST will continue to make valuable contributions in these areas and help guide the future direction of our discipline.

Once again, congratulations on your 70th anniversary. We send our warmest wishes to JAST for continued success, new achievements, and many more years of leadership in tribology. We look forward to working together even more closely and contributing jointly to the future development of our field.

Celebrating the 70th Anniversary of JAST

Jose Daniel Biasoli de Mello
Henara Lilian Costa
Roberto Martins Souza

Brazilian Tribology Network (TriboBR)



On behalf of the Brazilian Tribology Network (TriboBR), we are delighted to congratulate the Japanese Society of Tribologists on reaching the milestone of its 70th anniversary. It is remarkable to note that JAST activities started 10 years before the term "tribology" was coined and that, since the beginning, JAST has made essential contributions to the field. The importance of JAST for Brazilian tribologists is easily recognized, for example, by noticing the presence of Japanese works at the great majority of the literature reviews in thesis and dissertations prepared in Brazil, as well as in other publications.

In our country, efforts towards more organized and comprehensive tribology studies began in 1989 and culminated in the consolidation of TriboBR in 2010, when Brazil was accepted as a full member of the ITC (International Tribology Council). Our objective is to promote a network of knowledge and innovation that fosters new minds, researchers, investment from the productive sector, government support, and national and international collaborations, utilizing tribology as a fundamental tool.

In recent years, several of our members have been directly involved in mitigating the enormous challenges associated with energy transition, such as the drastic reduction of pollutant emissions, the consumption of fossil fuels, and global warming. These initiatives are coordinated by the National Institute on Green Tribology for the Energy Transition (CT Trib). Other tribological studies are conducted in parallel, such that, with the contribution of several research groups from different regions of Brazil, TriboBR can address all tribological challenges, from the more traditional ones to those arising from new scientific and technological trends. As a result, TriboBr was honored by the International Tribology Council (ITC) with the task of organizing the 8th World Tribology Congress (WTC 2026), which will be held in Rio de Janeiro, Brazil, in September 2026.

For the future, we hope that JAST will continue its tradition of providing enlightening and inspiring contributions to the field of tribology and that tribologists in Brazil will maintain and expand their collaborations with JAST.

Congratulations!

Brazilian Tribology Network (TriboBR)

A congratulatory letter to the JAST on the occasion of its 70th anniversary

Prof. Xinchun Lu
President
Chinese Tribology Institute

On behalf of the Chinese Tribology Institute, I am deeply honored to extend my warmest congratulations to the Japanese Society of Tribologists on the occasion of its 70th anniversary. For seventy years, JAST has consistently dedicated itself to advancing scientific research, technological development, and knowledge dissemination in the field of tribology, building a solid bridge between fundamental researches and industrial applications. By organizing high-level academic conferences, publishing authoritative scholarly journals, and fostering international collaboration and exchange, the society has not only significantly enhanced Japan's global influence in tribology but also made important contributions to the progress and prosperity of the global tribology community. The society's outstanding achievements in cutting-edge fields such as surface engineering, lubrication technology, wear control, and micro and nano tribology have earned deep admiration and inspiration from peers worldwide.

As an interdisciplinary science involving mechanical engineering, materials science, physical chemistry, and other disciplines, tribology crucial for ensuring the reliable, efficient, and long-lasting operation of mechanical equipment. It plays a significant role in advancing the manufacturing industry and achieving sustainable development. Over the past seven decades, JAST has persistently deepened its research and pioneered innovations in this field, providing continuous intellectual support for technological progress in related industries. Its value and impact are profound.

The Chinese Tribology Institute (CTI) was founded in 1979 with the purpose of leading and promoting the development of tribology discipline in China. CTI is affiliated with the Chinese Society of Mechanical Engineering and is a professional academic organization of about 5000 tribologists in China. CTI regularly holds domestic tribology conferences and forums, including: National Tribology Congress (every two years) attracting about 2000 attendees each time, Youth Tribologists Conference (every year) attracting more than 1000 attendees each time, and Regional Tribology Forums (the Central, Eastern and Western, every year) and Professional Academic Forums (every year). Through these academic events, the academic exchange and technology promotion of tribology in China have been greatly promoted.

CTI is a member of the International Tribology Council (ITC), which values international exchanges. Through hosting international academic events such as the World Tribology Congress, Asia Tribology Conference, China International Conference on Tribology, Bilateral Tribology Forums of CTI-JAST, China-Europe, China-UK, and CTI-STLE, CTI has effectively promoted and strengthened international cooperation and exchanges in the field of tribology.

There are two international journals in the field of tribology, including “Friction”, “Bio-surface and Bio-tribology”, published in China. In the year 2026, a new journal “Tribology Advances” will be lunched. In addition, there are several Chinese tribology journals published in China, which provide important platforms for academic exchanges in the field of tribology.

For a long time, tribologists from China and Japan have maintained in-depth exchanges at different levels. As important academic organizations in the global, particularly Asian, tribology field, the Chinese Tribology Institute and the Japan Society of Tribologists regularly alternate hosting bilateral forums on tribology between China and Japan. To date, twelves forums have been convened. The forum provides a crucial platform for regular exchanges between the two societies, playing a vital role in supporting and promoting bilateral cooperation.

We sincerely wish the Japanese Society of Tribologists greater achievements in the future! We look forward to further enhancing exchanges and expanding cooperation between our two organizations and fellow tribologists, working together to address the challenges of global technological development and jointly composing a more brilliant chapter for the cause of tribology worldwide.

Yours sincerely

Xinchun Lu
Prof. of the State Key Lab. of Tribology in Advanced Equipment
Tsinghua University
President, Chinese Tribology Institute

JAST at 70:
Celebrating a Shared Czech–Japan Tradition in Tribology

Martin Hartl
Director, Institute of Machine and Industrial Design,
Faculty of Mechanical Engineering, Brno University of Technology,
Czech Republic
On behalf of the Czech–Japan Bilateral Tribology Symposium

Please accept my sincere congratulations on the 70th anniversary of the Japanese Society of Tribologists (JAST). It is a privilege to send this message to a society whose roots reach back to the Japan Society of Lubrication Engineers, founded in 1956, and whose evolution reflects the expansion of our field from classical lubrication engineering to the full breadth of tribology—encompassing science, technology, and industrial practice. Over the past seven decades, JAST has not only strengthened tribology within Japan but has also consistently contributed to shaping tribology as a global discipline. Your ability to bring together rigorous fundamentals, careful experimentation, and real industrial needs is something the international community genuinely respects. The tribological mindset—with its focus on interacting surfaces, reliability, durability, and energy losses—has become increasingly important, particularly as we confront urgent environmental and energy challenges and as engineering systems transition toward electrification and higher efficiency. We also sincerely appreciate JAST's clear commitment to global dissemination of research outcomes. Your support of open and rapid dissemination—through international conferences and tlatforms such as the open-access journal "Tribology Online"—sets an example of service to the worldwide tribology community.

The Czech–Japan Bilateral Tribology Symposium is a long-term forum dedicated to scientific exchange and cooperation between Czech and Japanese tribologists. Our goal is simple yet demanding: to establish an exemplary standard where high-quality research can be thoroughly discussed, where young researchers receive constructive feedback, and where collaboration naturally grows from trust and repeated personal interactions. In this spirit, the Czech–Japan Tribology Symposium series has evolved into a respected tradition, alternating between our two countries. The sequence of meetings—Mikulov (2014), Takamatsu (2017), Hnanice (2019), the workshop held in conjunction with ITC Fukuoka (2023), and Luhačovice (2025)—represents not only scientific continuity, but also a continuity of friendship. We are grateful to JAST for providing an international home for such bilateral initiatives. Integrating Czech–Japan activities into JAST-related conference structures has been particularly valuable in connecting our bilateral work with the broader global tribology community.

Our most recent activity was the 5th Czech–Japan Tribology Workshop in Luhačovice (Czech Republic, October 2025). The workshop brought together colleagues from Japanese universities, Czech research teams, and industry to exchange results and discuss next steps—especially in topics where tribology has an immediate societal impact, particularly in areas such as energy-efficient machine elements, reliable components for modern mobility, advanced surface engineering, and biotribology. We intentionally maintain a "high interaction" workshop format: enough structure for technical depth, but also sufficient time for discussions that lead to concrete cooperation. In Luhačovice, the program again demonstrated how much we can learn from the Japanese research culture—its precision, clarity, and strong connection to industrial relevance—while also showing the value of close collaboration with European laboratories and experimental traditions. We also continue to invest in the next generation. Supporting early-career researchers and doctoral students—by providing them with a significant international stage, encouraging joint presentations, and facilitating mobility—has become one of the most effective ways to sustain long-term Czech–Japan cooperation. Finally, we would like to recognise the human bridge that made much of this possible: Professor Motohiro Kaneta. His time in Brno and his continued engagement helped nurture scientific links, raise standards, and inspire younger colleagues to see Czech–Japan collaboration as a natural part of their professional future.

Looking ahead, we wish JAST continued vitality and an even stronger international influence. Tribology will be tasked with delivering "quiet breakthroughs" in the coming years, including lower losses and longer lifetimes, safer mobility, more sustainable manufacturing, and improved medical solutions—often under conditions where classical engineering intuition is no longer sufficient. From the Czech–Japan Bilateral Tribology Symposium, we extend our respect, gratitude, and commitment to continued cooperation. We look forward to the next chapter of Czech–Japan collaboration and to meeting again at JAST conferences and joint workshops.

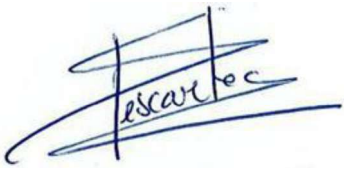
Kokoro yori oiwai mōshiagemasu.

Congratulations from the Tribology Group of the French Mechanical Association to the Japanese Society of Tribologists on their 70 th Anniversary

On behalf of the Tribology group of the French Mechanical Association, I am deeply honoured to extend my warmest congratulations to the Japanese Society of Tribologists on the occasion of its 70th anniversary. For seven decades, JAST has contributed greatly to increase knowledge in the science of tribology, with a huge impact for tribology-related industries. The French Tribology Group pays tribute to the JAST's achievements and contributions to the world community of tribologists.

Tribology Group of the French Mechanical Association

The French Society of Tribology was founded in 1974, with the objective to promote discussion and information between tribologists and users of tribology, between researchers and teachers, between researchers, executives from industry and technology transfer organisations. From 1995 to 1997 it contributed to the birth of the French Mechanical Engineering Association (AFM), a learned society formed from 17 scientific associations. In 1997, the French Society of Tribology merged into the AFM and became the Tribology Scientific & Technical Group of AFM. Today, the French Tribology Group plays an active role in supporting activities and achievements across the main fields of tribology. It promotes knowledge exchange, in particular, through the organization of the annual Francophone Tribology Conference. This conference provides an opportunity for the scientific and industrial communities to exchange views on current scientific issues in tribology and on the future direction of research. The G.A. Hirn award is awarded annually the best thesis in tribology defended in the previous year, to support young researchers. The French Tribology Group also emphasizes international cooperation, acknowledging that the complex issues facing tribology today, can only be solved through joint global efforts. In this regard, many successful scientific collaborations exist between the French and Japanese tribology communities.
We hope that JAST will keep inspiring the international tribology community by promoting cutting-edge research, practical applications, and closer ties among societies worldwide.



Dr., Ing., Sylvie Descartes senior researcher
Coleader of the Tribology Group of AFM
On behalf of the Tribology group of the French Mechanical Association

Greetings from the German Society for Tribology (GfT) on the occasion of the 70th anniversary of the Japanese Society of Tribologists (JAST)

Rolf Luther
Chairman of the Board
German Society for Tribology (Gesellschaft für Tribologie e.V. – GfT)

On behalf of the German Society for Tribology (GfT), I am deeply honored to extend my warmest congratulations to the Japanese Society of Tribologists on the occasion of its 70th anniversary. For seven decades, JAST has been at the forefront of tribology research and practice, making outstanding contributions to science, industry, and international collabo-ration. This anniversary celebrates not only the society's long-standing achievements but also its continuing vision to lead tribology into the future.

The GfT was founded in 1959 with the mission to advance tribology research, promote knowledge exchange, and strengthen the collaboration between academia and industry. Today, our society consists of 275 personal and about 68 corporate members. GfT plays an active role in supporting sustainable technologies and addressing global challenges in mobility, energy efficiency, and advanced manufacturing.

In recent years, our activities have included the "nextlub | International Conference on Tribology and Sustainable Lubrication" – successfully held in 2023 and 2025; the Call for Papers for 2027 has started – as well as several reports on the impact of tribology on CO2-reduction and resource conservation. We emphasize international cooperation, acknow-ledging that the complex issues facing tribology today – such as carbon neutrality, electrifi-cation, and materials innovation – can only be solved through joint global efforts. In this concern, we want to highlight a joint online session at JAST`s ITC and the 65th anniversary of GfT's annual conference, plenary speeches and other contributions of Japanese researchers at GfT's conferences and vice versa.

We hope that JAST will keep inspiring the international tribology community by promoting cutting-edge research, practical applications, and closer ties among societies worldwide.

Juelich, December 29, 2025

R. Lu.

Rolf Luther

Message

Prof. Satish V. Kailas
President
Tribology Society of India
www.tribologyindia.org

[Congratulatory Message]
On behalf of the Executive Committee and all Members of Tribology Society of India (TSI), I am happy to extend my warmest congratulations to the Japanese Society of Tribologists on the occasion of its 70th anniversary. For seven decades, JAST has been at the forefront of tribology research and practice, making outstanding contributions to science, industry, and international collaboration. This anniversary celebrates not only the society's long-standing achievements but also its continuing vision to lead tribology into the future.

[Name of Society/Association]
Tribology Society of India was founded in 1989 at the Corporate R&D Centre of Bharat Heavy Electricals Limited (BHEL) in Hyderabad (India). Currently, the Society operates from the IndianOil R&D Centre at Faridabad (India), with over 2000 active members. It is affiliated to the International Tribology Council (ITC). Over nearly four decades, TSI has been promoting the research, application and practice of tribological principles across the academia and industry. In line with its mission of knowledge sharing, collective learning and collaboration, TSI organizes several programs round the year. These include the IndiaTrib series of international conferences; the week-long annual event, TSI Summer School in Tribology and the various seminars and technical talks on topics of current relevance. TSI also publishes the Journal of Tribology Science & Technology (JTST), formerly known as the Indian Journal of Tribology.

[Recent Activities]
The recent international conferences organized by TSI include the TriboIndia-2023 at NIT Srinagar in October 2023; IndiaTrib-2024 at Kolkata in December 2024 and the upcoming IndiaTrib-2025, being organized at IIT Bhilai in December 2025. The TSI conferences have become well-known events, with large international participation and focus on current themes of global relevance, such as emerging technologies, sustainability, "Green" solutions and digital transformation. In June 2025 TSI organized the 17th Summer School in Tribology, bringing the industry and academia together. This is a highly sought-after annual event, completing its 17th year of continuous run this year, with many of the events receiving financial support from the Government. Enhanced international collaboration is a key focus of TSI. TSI had hosted the ASIATRIB-2014 event very successfully in India in 2014. Building on the initial partnership with STLE and our active participation in ITC events over the years, TSI is keen to explore collaborative initiatives with global entities and technical societies. TSI aspires to host the WTC in India and has been actively bidding for this opportunity over the past few years.

[Future Hopes for JAST]
As one of the leading National Tribology Societies, JAST has been a key enabler in promoting Tribology research, education and practices. We are confident that it will continue to play a prominent role in the global Tribology community in coming years, building on a strong foundation of over seven decades. We look forward to working closely with JAST on areas of mutual interest and offer our best wishes to JAST for continued success in all its endeavours.

Congratulatory Message

Professor Honor Powrie FREng
Tribology Group Chair
Institution of Mechanical Engineers (IMechE)

On behalf of the IMechE Tribology Group, I am deeply honored to extend my warmest congratulations to the Japanese Society of Tribologists on the occasion of its 70th anniversary. For seven decades, JAST has been at the forefront of tribology research and practice, making outstanding contributions to science, industry, and international collaboration. This anniversary celebrates not only the society's long-standing achievements but also its continuing vision to lead tribology into the future.

IMechE Tribology Group

The IMechE Tribology Group was founded in 1960, as the Lubrication and Wear Committee, rebranding to the Tribology Group in 1966, following the publication of the Peter Jost Report on Lubrication (Tribology) Education and Research. Our mission is to promote research & development, education, and knowledge of tribology to industry, academia, and the wider engineering community both in the UK and around the world. Our regular Tribology Group Newsletter reaches over 1600 people, and we actively promote the application of tribological principles across a diverse range of disciplines, for environmental, societal and economic benefit. We are a focal for practitioners of tribology and for those seeking information. We are committed to strengthening collaboration across UK-based Tribology groups, as well as across the globe.

[Recent Activities]

As a group we are very active and have an annual schedule of events including our seminar series 'Tribology and the Journey to Net Zero', which was established in 2022 and has been jointly hosted with the Institute of Physics (IOP) Tribology Group since 2024; we support young researchers through our monthly Postgraduate Tribology Webinars and the Mission of Tribology Day and associated Awards; we encourage industry best practice through our Tribology Training Webinars; we administer the Tribology Trust Bronze and Silver Medals (for UK early career and established tribologists respectively); we organize the annual Donald Julian Groen Prize Lecture for Tribology; and we introduce familiar Tribological concepts to a broader audience through our 'Everyday Tribology' Webinars.

We foster international cooperation through our connections with the International Tribology Council and promotion of esteemed international conferences such as the World Tribology Congress and the annual Leeds-Lyon Symposium on Tribology.

[Future Hopes for JAST]

We hope that JAST will keep inspiring the international tribology community by promoting cutting-edge research, practical applications, and closer ties among societies worldwide.

Congratulations to Japanese Society of Tribology from the Italian Tribology Association

prof. dr. Giuseppe Carbone
President
Italian Tribology Association

Bari
Oct. 25, 2025

On behalf of the Italian Tribology Association (AIT), it is a great honor and pleasure to extend my heartfelt congratulations to the Japanese Society of Tribologists (JAST) on the occasion of its 70th anniversary.

JAST has played a fundamental role in promoting tribology in Japan and globally. Its visionary activities, including the successful organization of the World Tribology Conference in Kyoto, have contributed significantly to strengthening the international network of tribologists and to advancing excellence in this discipline. The Japanese tribology community has long been admired for its scientific rigor, industrial engagement, and openness to collaboration.

We at AIT are deeply appreciative of JAST's longstanding commitment to fostering dialogue across borders. This spirit of international cooperation is more crucial than ever, particularly in light of the urgent global challenges we face, from sustainability and energy efficiency to the need for resilient and smart materials, systems, and manufacturing technologies. Tribology, as a field of interdisciplinary convergence, stands at the heart of many of these solutions.

Founded in 2005, AIT unites researchers, engineers, and professionals from universities, research centers, and industries working in the field of tribology. Our mission is to promote and coordinate national and international activities in tribology across academic, industrial, and societal contexts.

The Association is devoted to spread knowledge in fields such as lubrication, contact mechanics, surface engineering, biomimetics, material science, and computational modeling. AIT is also a national member of the International Tribology Council (ITC).

Our mission includes:
- Fostering cooperation between academia and industry in tribology;
- Supporting innovation in industrial technologies related to surfaces, lubrication, and materials;
- Promoting education through seminars, summer schools, and advanced training;
- Creating and maintaining a dynamic network to disseminate tribological knowledge;
- Encouraging national and international scientific exchanges;
- Supporting young researchers and women in STEM fields through dedicated awards and mentoring initiatives.

Over the past decade, AIT has organized multiple international and national conferences on tribology and related disciplines.
Recent initiatives include:
- AIT Summer Schools, offering hands-on training for PhD students and young researchers;
- Workshops on Industry Challenges in Tribology, with active industrial participation;
- Tribology Awards, including the newly introduced AIT Award (2025 recipient: Dr. Michel Fillon), recognizing outstanding international contributions.

JAST's exemplary journey, from its origin as the Japan Society of Lubrication Engineers in1956 to its current role as a world-leading tribology organization, inspires all of us. Its ability to adapt to new challenges, nurture young talents, and integrate academic excellence with industrial application stands as a model of success.

As JAST enters its eighth decade, we hope it will continue to be an engine of inspiration for the global tribology community. We are eager to explore new opportunities for collaboration between AIT and JAST, including joint events, exchange programs, and coordinated efforts to advance tribology for the benefit of sustainable technology and society.

We warmly thank JAST for its leadership, and we join in celebrating this important milestone. Please accept our most sincere congratulations and best wishes for the continued success and vitality of your Society.

With sincere admiration and best wishes for the 70th anniversary celebrations,

Prof. Giuseppe Carbone
President, Italian Tribology Association (AIT)

In Celebration of the 70th Anniversary of JAST

Minhaeng Cho
President, Korean Tribology Society (KTS)
Professor, Chung-Ang University, Seoul, Korea

On behalf of Korean Tribology Society (KTS), we extend our sincerest congratulations on the 70th Anniversary of JAST. We also extend our collective felicitations to all researchers involved in the field of Tribology. We all know that over the past seven decades, JAST has served as a pioneer in the field of Tribology in Japan, making distinguished contributions and achieving outstanding accomplishments across the scientific and engineering communities, as well as various industrial sectors.

The Korean Tribology Society (KTS), the representative tribology academic society of the Republic of Korea, was founded in 1984 under the name Korean Society of Tribologist and Lubrication Engineers (KSTLE). Later, in 2020, the society changed its name to the Korean Tribology Society (KTS), further broadening its scope of activity and actively engaging in academic pursuits. With our new beginning, KTS has established **'3E' (Efficiency, Energy, and Environment)** as our core values. While striving to build diverse domestic and international partnerships, we are also actively engaged in key national agendas, such as achieving a sustainable society and carbon neutrality.

Currently, approximately 1,000 members are playing pivotal roles in the field of tribology across various industrial and research sectors in Korea. In line with this growth and development, we are diligently preparing to host **ASIATRIB 2028** and look forward to the active participation of JAST members.

Furthermore, KTS and JAST have been alternately hosting the **Korea-Japan Tribology Symposium** in each country. Through an even closer partnership, we hope to facilitate active research exchanges among many researchers from both nations.

Through this partnership, we hope to promote the advancement of tribology in both countries and establish a collaborative model that serves as an international example. Once again, I would like to extend my heartfelt congratulations on the 70th anniversary of JAST's founding.

Thank you.

Message of Congratulations from the Malaysian Tribology Society (MYTRIBOS)

Prof. Dr. Mohd Fadzli Bin Abdollah
President
Malaysian Tribology Society (MYTRIBOS)

On behalf of the Malaysian Tribology Society (MYTRIBOS), I am deeply honored to extend my heartfelt congratulations to the Japanese Society of Tribologists (JAST) on the occasion of its **70th Anniversary**.

For seven decades, JAST has stood at the forefront of tribology research and practice, making outstanding contributions to science, industry, and international collaboration. This remarkable milestone not only celebrates JAST's long-standing achievements but also reflects its enduring vision to advance the field of tribology for future generations.

Since its establishment in 2007, MYTRIBOS has shared a similar mission, to advance tribology research, promote knowledge exchange, and strengthen cooperation between academia and industry. Today, MYTRIBOS represents more than 100 members actively engaged in promoting sustainable technologies and addressing global challenges in mobility, energy efficiency, and advanced manufacturing.

Our collaboration with JAST began in **2014**, when JAST served as a co-organizer for the **Malaysia International Tribology Conference (MITC 2015)** in Penang, Malaysia. In the same year, MYTRIBOS was honored to be invited as part of the **International Advisory Board** for the International Tribology Conference (ITC 2015). Since then, JAST members have actively participated in MYTRIBOS activities including conferences, joint research initiatives, and publications further strengthening our mutual ties.

We greatly value international cooperation, recognizing that the complex challenges faced by the tribology community such as carbon neutrality, electrification, and materials innovation can only be effectively addressed through strong global collaboration.

As JAST celebrates this momentous 70th anniversary, MYTRIBOS sincerely hopes that it will continue to inspire the international tribology community by fostering cutting-edge research, practical innovation, and deeper connections among tribology societies worldwide.

Congratulations once again to JAST on this remarkable milestone.

Honouring Seventy Years of Achievement and Global Impact

Prof. Mitjan Kalin
Laboratory for Tribology and Interface Nanotechnology,
University of Ljubljana
President of Slovenian Society of Tribology

Dear Members of the Japanese Society of Tribologists,

It is both a privilege and an honour to convey my warm congratulations on the occasion of the 70th Anniversary of the Japanese Society of Tribologists (JAST), on my personal behalf and on behalf of the Slovenian Society of Tribology. I would like to express our deep appreciation for JAST's outstanding achievements over seven decades of continuous and dedicated activity in the field of tribology.

The contributions of JAST are globally recognised and highly respected. The publication of the high-quality international journal Tribology Online, the organisation of the internationally renowned International Tribology Conference (ITC) since 1990, and the co-organisation of the ASIATRIB Conference since 1998—bringing together numerous tribology societies across Asia—are among the most impactful activities on a global scale. Through these and many other initiatives, JAST has continuously advanced knowledge, promoted tribology science and technology in Japan, and served as a driving force and vital bridge between academic research and industrial practice. These sustained efforts have resulted in immense contributions to science, technology, industrial development, and international collaboration. This anniversary therefore celebrates not only JAST's distinguished legacy, but also its enduring vision to lead tribology into the future.

The Slovenian Society of Tribology was formally established in 1994 and has since continuously organised the Slovenian tribology conference SLOTRIB every two years. We have also actively participated in and co-founded the European Conference on Tribology (ECOTRIB), with its first edition held in Ljubljana, Slovenia, in 2007. In 2014, we launched a new international conference series dedicated to polymer tribology, POLYTRIB. Through these activities, we are well aware of the essential role that tribology societies play worldwide in promoting the field, advancing knowledge, and fostering meaningful collaboration between scientists and industrial practitioners. In this regard, JAST stands as a global leader.

The Slovenian Society of Tribology strongly supports and values the close cooperation between the Laboratory for Tribology and Interface Nanotechnology at the University of Ljubljana—the principal tribology research group in Slovenia—and several Japanese universities and research institutes. These collaborations include joint bilateral research projects, researcher exchanges, and long-term scientific partnerships. Moreover, I am confident that our societies will continue to actively collaborate within the International Tribology Council, where currently both have active representation on the Executive Board.

We are confident that JAST will continue to lead and inspire the international tribology community by advancing frontier research, promoting real-world applications, and deepening connections among tribology societies worldwide.

With my highest respect and best wishes for continued success in the years ahead.

Prof. Mitjan Kalin, president
Slovenian Society of Tribology

Congratulations to the Japanese Society of Tribologists on Its 70th Anniversary

Rebecca Lintow
Executive Director
Society of Tribologists and Lubrication Engineers (STLE)

On behalf of the Society of Tribologists and Lubrication Engineers (STLE), it is my great pleasure to offer heartfelt congratulations to the Japanese Society of Tribologists (JAST) as the society celebrates its 70th anniversary. For seven decades, JAST has played a vital role in advancing tribology science and practice, contributing invaluable research, innovation, and leadership to the global tribology community. This milestone recognizes not only the rich history but also ongoing dedication to shaping the future of our field.

Established in 1944, STLE's mission is to advance tribology and lubrication engineering by promoting technical education, professional development, and collaboration between academia and industry. STLE serves the needs of more than 15,000 individuals and 200 companies and organizations that comprise the tribology and lubrication engineering business sector. STLE members are experts who research, develop and market the methods and products that make industry more successful and that enhance the well-being of people worldwide. Our members are employed by the world's leading corporations and academic institutions and by governmental agencies dealing with science and technology.

In recent years, our activities with JAST have included hosting the ITC JAST-STLE Early Career Tribologists Symposium, having a track at the STLE Annual Meeting, and collaborating with STLE young tribologists. We also emphasize international cooperation, acknowledging that the complex issues facing tribology today can only be solved through joint global efforts.

STLE deeply values its partnership with JAST and the shared goal of advancing the science and application of tribology. We wish you continued success in inspiring the international community and fostering collaboration, innovation, and excellence for many years to come.

SwissTribology

Congratulations from Swiss Tribology to the Japanese Society of Tribologists

Rowena Crockett
President
Swiss Tribology

On behalf of Swiss Tribology, I am deeply honored to extend my warmest congratulations to the Japanese Society of Tribologists (JAST) on the occasion of its 70th anniversary. JAST is one of the largest and most influential tribology societies in the world. A position at the forefront of tribology has been achieved through outstanding international conferences, which bring together academia and industry to encourage fruitful discussions on all topics within the field of tribology. This has resulted in JAST playing a leading role in shaping the advancement of tribology for both scientists and engineers.

Swiss Tribology

Swiss Tribology, founded in 2006, is very small in comparison to JAST and derives its funding through the organization of technical meetings. We recently organized the highly successful European Conference on Tribology (Ecotrib 2025) in Switzerland and were delighted to welcome many participants from Japan. Swiss Tribology has always fostered a strong relationship with JAST, partly due to the high quality of the JAST conferences but also as a result of scientific collaborations. One of these collaborations was the Swiss-Japanese conference on Tribology held in 2014 in Zurich.

Group photograph of the participants in the Swiss-Japanese Tribology meeting 2014.

We are confident that JAST will continue to inspire the international tribology community by promoting cutting-edge research, practical applications, and closer ties among societies worldwide and wish them all the best for the future.

Rowena Crockett
Swiss Tribology
Zurich, October 2025

Celebrating Seven Decades of Excellence: A Message from TSTT

Jeng-Haur Horng
President
Taiwan Society of Tribology Technology (TSTT)

Congratulatory Message

On behalf of the Taiwan Society of Tribology Technology (TSTT), I am deeply honored to extend my warmest congratulations to the Japanese Society of Tribologists (JAST) on the momentous occasion of your 70th anniversary. For seven decades, JAST has been at the forefront of tribology research and practice, making outstanding contributions to global science, industry, and international collaboration. This anniversary celebrates not only the society's long-standing achievements but also its enduring vision to lead the field of tribology into the future.

About the Taiwan Society of Tribology Technology

Founded in 2012, TSTT is dedicated to promoting academic research and practical applications related to friction, wear, and lubrication, while collectively advancing the industrial application of tribology technology in Taiwan. Our primary missions include:

- **Advancing Knowledge:** Organizing academic and technical activities to foster the continuous advancement of tribology.
- **Knowledge Synthesis:** Collecting the latest global developments in tribology to serve as a vital reference for both academic and industrial sectors.
- **Inspiring Future Generations:** Encouraging interest among the youth to pursue studies and careers in the field of tribology.
- **Exchange & Consultancy:** Establishing a technical exchange platform between industry and academia, and providing expert consultancy for public and private organizations to resolve complex engineering challenges.
- **International Exchange:** Facilitating cross-border research collaboration and knowledge exchange through active participation in international conferences and organizations, thereby enhancing the global visibility and impact of Taiwan's tribology technology.

Our Recent Activities and Initiatives

In recent years, TSTT has remained active through several key initiatives:

- **Annual Conferences:** We alternately host the International Conference on Engineering Tribology and Applied Technology (ICETET) and the Conference on Taiwan Tribology Technology (CTTT) each year.
- **Industry-Academia Integration:** To bridge the gap between researchers and practitioners, we organize an annual Industry-Academia Forum, fostering deep collaboration between manufacturers and the academic community.
- **Nurturing Young Talent:** To encourage students to pursue innovative research, we hold an annual Student Tribology Project Competition.
- **Social Responsibility:** We have established a dedicated foundation to provide emergency financial assistance to students engaged in tribology research, ensuring they can overcome economic hardships and remain focused on their academic pursuits.

Future Hopes for JAST

We are confident that JAST will continue to inspire the international tribology community by promoting cutting-edge research and fostering closer ties among societies worldwide.

Once again, we offer our heartiest congratulations to JAST for your great contributions over the past 70 years!
With warm regards,

Jeng-Haur Horng

Taiwan Society of Tribology Technology

Jeng-Haur Horng
President, Taiwan Society of Tribology Technology (https://www.tstt.org.tw/home)

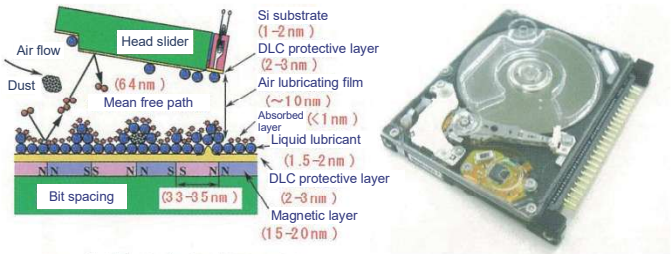
History of Tribo-Technology — Development and Contributions over 70 Years

Topics in Tribo-Technology

1957 Magnetic disk unit with flying head slider acting as an air bearing emerges (⇒ Column 1)
1957 Multi-grade engine oil is developed for all-season use
1961 Around this time, tool steel rolling bearings and polyol ester synthetic lubricating oil begin to be used in jet engine main shaft
1962 Around this time, highly heat-resistant acrylic rubber and fluorine rubber seals begin to be used to meet the requirement of high-speed motor vehicles
1962 Continuous manufacturing equipment for copper-aluminum bimetal is introduced and connecting rod bearings are domestically mass-produced
1964 Many tribo-technologies are developed and contribute to the opening of Tokaido Shinkansen (Bullet Train) (⇒ Column 2)
1965 Fluorine-based lubricant (PFPE) begins to be used in vacuum applications such as space mechanisms
1967 Screw seals, which drastically reduce oil leak, begin to be used in car engines
1967 Development of apex seals is completed and rotary engines are put into practical use (⇒ Column 3)
1968 Basic concept of magnetic fluid seal is proposed and its commercialization begins
1970 Around this time, synthetic oils begin to be used, such as polybutene in two-cycle engines for low exhaust smoke, and polyalphaolefin in four-cycle engines
1970 DLC is synthesized for the first time by Aisenberg and Chabot via ion beam deposition (⇒ Column 4)

World Events（1956 – 1970）

1956 Economic growth called Jimmu Boom leads to a rapid increase in capital investment and the Economic Planning Agency of Japan announces “it is no longer post-war”
1956 Japan joins the United Nations
1956 Japan becomes the world leader in shipbuilding, overtaking the UK and Germany
1957 Soviet Union launches first-ever artificial satellite Sputnik
1957 Japan’s first atomic energy research institute is built in Tokai-mura
1958 Tokyo Tower is completed
1960 NHK and four other companies begin color TV broadcast
1962 Successful first flight of YS-11
1962 First domestically produced electronic copying machine
1963 Japan’s first nuclear power generation
1963 Japan’s first long-distance expressway (Meishin Expressway, Amagasaki – Ritto) opens to traffic
1963 Number of passenger cars owned in Japan exceeds 1 million
1964 18th Olympic held in Tokyo
1964 Domestic consumer electronics company launches the world’s first calculator
1967 European Communities (EC) is inaugurated
1968 Toyama itai-itai disease and Minamata disease is certified as pollution diseases; pollution becomes a social problem
1969 Apollo 11: man’s first step on the moon
1969 Emergence of consumer VCR in two formats — Betamax and VHS
1969 Tomei Expressway opens all lines
1970 Japan World Exposition held in Osaka
1970 Japan launches its first artificial satellite Osumi

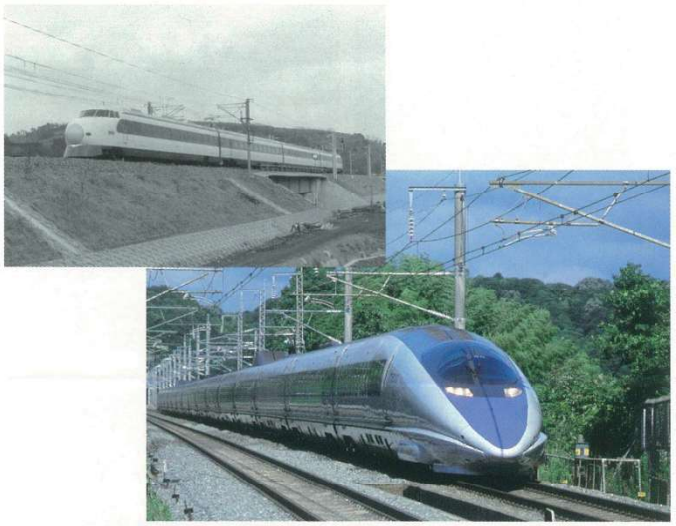


Head/disc interface

HDD for notebook PC (1.8-inch)

Column 1 Emergence and Development of Magnetic Disk Unit

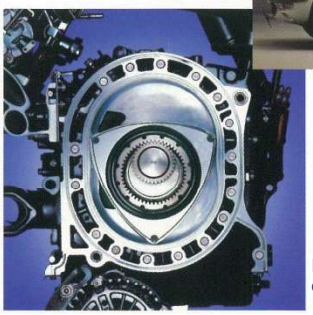
Magnetic disk unit (hard disk drive), which records data onto rotating disks, appeared in 1957 as an external memory device for computers. Subsequently, HDD rapidly progressed in miniaturization and increased recording density due to advanced technologies for the head/disk interface, such as contact start/stop method, thin film magnetic head, fluorine-based lubricant, DLC protective layer and negative pressure head. In 2004, a model with 0.85-inch diameter disk was announced, which can be installed in mobile phones and devices.



Column 2 Tribology Contributes to Shinkansen (Bullet Train) from Its Opening to 300 km/h Operation

The bullet train began service in 1964 at the maximum speed of 210 km/h, where tribology played an essential role for safe high-speed operation. Newly developed were rolling bearings with oil bath lubrication for axles, brakes with low alloy cast iron discs and copper-based sintered alloy linings, pantograph slider plates of iron-based sintered alloy, etc. Technology development such as weight reduction through grease sealed tapered roller bearings and aluminum housings, thermal crack resistant forged steel discs, ceramic particle injection to improve the adhesion of wheels, and arc-resistant slider plates greatly contributed to the recent achievement of 300 km/h.


Cosmo Sports (on sale May 1967)


Internal components of the rotary engine

Column 3 Application of the Rotary Engine

The rotary engine overcame the problem of abrasion between the rotor housing and the apex seal dividing the combustion chamber, and found the world’s first practical use in the famous “Cosmo Sports.” The rotary engine continued to progress for much higher output and fuel efficiency through cutting-edge surface modification, e.g. the electron beam chill applied to the apex seals, side housing and rotor housing.

Documents courtesy of IHI Co., Ltd., Akita Prefectural University, Eagle Industry Co., Ltd., Idemitsu Kosan Co., Ltd., Japan Aerospace Exploration Agency, NOK Corporation, NTN Corporation, Oiles Corporation, Kaji Technology Corporation, Kawamura Research Lab., Inc., KITZ Corporation, Kyushu University, Kyodo Yushi Co., Ltd., National Institute of Advanced Industrial Science and Technology, West Japan Railway Company, JX Nippon Oil & Energy Corporation, JTEKT Corporation, JATCO Ltd., Daido Metal Co., Ltd., Taiho Kogyo Co., Ltd., Railway Technical Research Institute, Toshiba Corporation, TonenGeneral Sekiyu K.K., Toyota Motor Corporation, Nagoya University, Nissan Motor Co., Ltd., Nippon ITF Inc., NSK Ltd., Hitachi Ltd., Honda Motor Co., Ltd., Mazda Motor Corporation, Mitsubishi Heavy Industries, Ltd., Hitachi Construction Machinery Co., Ltd., The University of Hyogo.

Topics in Tribo-Technology

1972 Highly heat-resistant diurea/triurea/tetraurea greases are produced and commercialized in Japan, which begin to be used in the steel industry
1972 Wet friction material products begin to be manufactured in Japan (⇒ Column 5)
1972 Low phosphorus/low ash gasoline engine oil is developed, which prevents catalyst poisoning
1973 Two-cycle engine oil formulated with polybutene for low exhaust smoke is commercialized
1973 Under-race lubrication method for rolling bearings is proposed, which increases DN up to 3 million
1974 Contact start/stop method is used in HDD head loading mechanisms
1975 Fuel-efficient engine oil with friction modifier begins to be used
1977 Hydrostatic non-contact seal is developed for primary coolant pump in the advanced thermal reactor Fugen
1978 Roll-neck bearings with oil seals for rolling mill are put into practical use for the first time in the world
1979 Turbocharger with high-speed floating bush bearings is installed on Japanese cars and high performance engine oil is developed for specific use in turbo cars (⇒ Column 6)
1980 Around this time, large-scale tilting pad bearing with high vibration stability is applied to turbines (⇒ Column 7)

World Events（1971 – 1980）

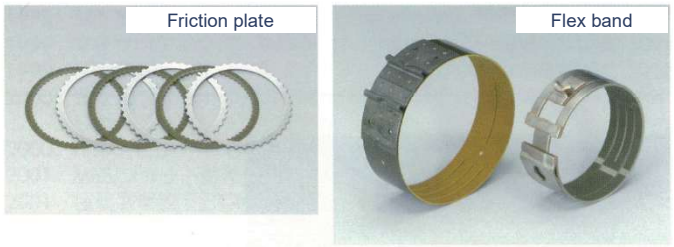
1971 Exchange rate system shifts from fixed ($1 = 360 yen) to floating
1972 Reversion of Okinawa to Japan
1972 CVCC engine is developed by domestic car manufacturer
1972 11th Winter Olympic is held in Sapporo
1973 First global oil crisis due to the outbreak of Yom Kippur War
1974 X-ray CT scanner is developed in the UK
1974 Sunshine Project to develop new energy technologies starts
1975 First Summit (meeting of major industrialized countries' representatives) is held in France
1975 Tokaido/Sanyo Shinkansen (Tokyo – Hakata) opens
1976 Super computer CRAY 1 is announced in the US
1977 Maglev "Linear Motor Car" test drive begins in Hyuga, Miyazaki
1978 Word processor is sold for the first time in Japan (6.3 million yen at the time)
1978 New Tokyo International Airport opens
1979 Second oil crisis
1979 Three Mile Island nuclear power plant accident
1979 Portable audio cassette player "Walkman" is released
1979 Tokyo Summit is held
1980 While Japan tops the US in car production, trade friction escalates
1980 Tsukuba Science City is completed

Application of DLC in mixing faucets

Application of DLC in camera lens seals

Column 4 DLC Expands Its Possibilities

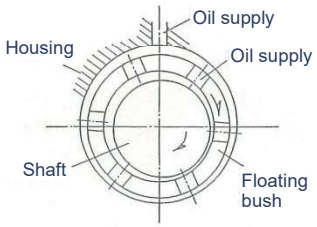
DLC (Diamond-Like Carbon) was first synthesized using the ion beam deposition method by Aisenberg and Chabot around 1970. Since DLC often shows the lowest coefficient of friction of all surface coating materials, high hardness, and low aggressiveness, it has been pushed for use in sliding applications, and recently it has been applied to hard disks as a protective layer, seal components of mixing faucets (figure on the left), and camera lens seals (figure on the right).



Column 5 Domestic Production of Wet Friction Material

Wet friction material for automobile AT (automatic transmission) was first manufactured in Japan in 1973; a composite made of special paper and thermosetting resin was used on the sliding surface of wet clutch friction plates (figure on the left). In 1975 flex band for AT brakes (figure on the right) was produced and later double winding structure with high torque capacity was put into practical use. Being asbestos free since 1983 and till now, it is playing an important role in high performance ATs to improve judder resistance, heat/load durability and torque capacity by impregnation of various modified resin into organic synthetic fiber-based paper.

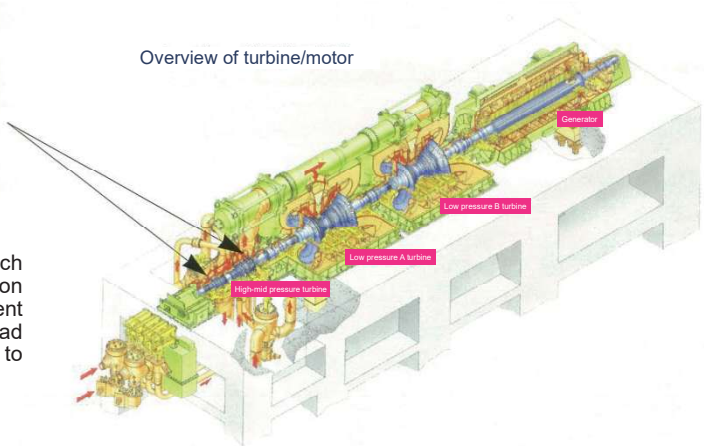
Turbo charger



Floating bush bearing concept diagram

Column 6 Growth of Turbo Charger for Passenger Vehicles

Turbo charger for passenger vehicles (figure on the left) is highly efficient even at a high circumferential velocity of 100 m/s, in which floating bush bearings (figure on the right) supports the rotor with high vibration stability due to the damping effect of outer oil film. Multi-grade engine oil, typically SAE10W-30, has been used as lubricant; synthetic oil with improved thermal and oxidation stability started to be used in response to the increase in thermal loading. Performance has been enhanced by improved cooling systems and oil additives, and also lead-free requirements have been met.



Column 7 Large-Scale Tilting Pad Bearing

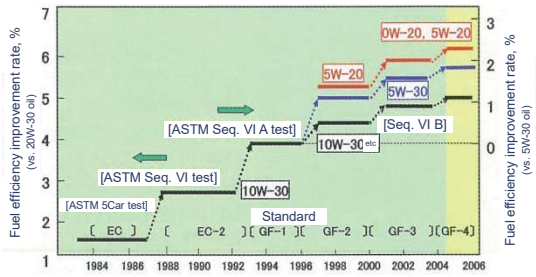
Tilting pad bearings are used in various high-speed rotating machines such as steam turbines, gas turbines, and pumps due to their excellent vibration stability in high-speed rotation and self-aligning property in shaft misalignment conditions. The figure shows the lower half of a load-on-pad (LOP) tilting pad bearing with 6 pads, in the class of 20-inch diameter, used in high to intermediate pressure turbines.

Topics in Tribo-Technology

1981 With increase of using cast-iron crank shafts in motor vehicle engines, Al-Sn-Si bearing metal suitable for the cast shaft is developed and used
1982 Blade sealing technology is established for scroll compressors, which are commercialized for the first time in Japan
1982 ABS (Anti-lock Braking System) is applied to mass production vehicles for the first time in Japan
1982 Regulations relating to fuel-efficient engine oil are introduced (⇒ column 8)
1982 With the aim of improving the anti-wear properties, fiber reinforced aluminum alloys are used in piston ring grooves of diesel engines for the first time in the world
1984 Ceramic rolling bearings are commercialized (⇒ Column 9)
1985 PTFE lip seals are developed and drastically decreases refrigerant leak in car air-conditioning compressors
1985 Tower link bearing of the largest class is developed for the Honshu – Shikoku Bridges, between the Onaruto Bridge, which opens this year and Akashi Kaikyo Bridge, in 1998 (⇒ column 10)
1985 Around this time, magnetic bearing starts to be used in turbo molecular pumps
1986 SQ (slack quench) processing is adopted in railroads, which dramatically improves wear resistance of rails
1987 Dry gas seal for small helium refrigerators used in magnetic levitation trains is developed
1988 Around this time, centralized monitoring of rolling bearings through AE (acoustic emission) starts in steel production lines
1988 Micro-grooved bearings with excellent lubrication performance is put into practical use

World Events（1981 – 1988）

1981 First flight of space shuttle Columbia
1981 Acquired Immune Deficiency Syndrome (AIDS) patient is discovered
1982 Tohoku and Joetsu Shinkansen begins operation
1982 9 domestic audio manufacturers launch compact disc players
1983 Nintendo boom
1983 Dioxins are detected from incinerator fly ash in Japanese cities
1984 World's first 1-megabit VLSI is developed in Japan
1985 Tsukuba Expo '85 on science and technology is held
1985 Gorbachev administration starts and Perestroika is promoted in the Soviet Union
1986 Space shuttle Challenger disaster
1986 Chernobyl nuclear power plant accident
1986 Equal Employment Opportunity Law is enforced
1987 Superconductivity fever
1988 Seikan Tunnel is opened to traffic
1988 Warnings to global warming

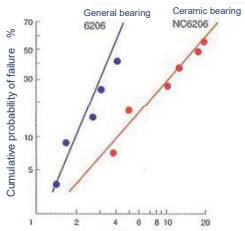


Trend in fuel-efficient oil standard

Column 8 Advances in Fuel-Efficient Engine Oil

Since fuel-efficient engine oil provides an energy-saving effect simply by replacement, it is regarded as an environment-friendly technology for e.g. CO_2 reduction and resource-saving. EC (energy-conserving) oil, which shows a 1.5% increase in fuel efficiency relative to the standard oil (SAE 20W-30), received first approval in December 1982. Currently, high-end oil has achieved 2.3% or more (the value before the degradation test) relative to the standard oil (5W-30). 4% improvement of fuel efficiency is equivalent to a reduction of 5.5 million tons of CO_2.


Ceramic bearing rolling fatigue performance→



Column 9 Ceramic Bearings

In 1984, domestic manufacturer succeeded in the world's first development and commercialization of ceramic bearings using Si_3N_4 (silicon nitride). They have excellent characteristics such as high heatproof temperature of 800°C, high resistance to corrosion and vacuum, low dry friction, and non-magnetism. Moreover, small centrifugal force of the rolling element due to low weight less than 40% of metals enables ultra high-speed rotation. It is mainly used in machine tool spindles, semi-conductor manufacturing devices, transport system of chemical processing devices, automotive engines and HDD of computers.


Akashi Kaikyo Bridge


Tower link bearings with embedded solid lubricant

Tower link during installation

Column 10 Sliding Bearings Support Huge Structures

Akashi Kaikyo Bridge is a three span, two-hinged stiffening girder suspension bridge of 3911 m overall and 1991 m at the central span, which is longest in the Honshu-Shikoku Bridges. The bridge girder is supported by hanger ropes and tower links, and the vertical movement of the bridge girder is prevented by the heat expansion and contraction of the ropes, where ultra-long life bearings with embedded solid lubricant have been installed as an essential mechanical element. Also, the Tokyo Bay Aqua-Line, which was opened to traffic in 1998, adopted seismic isolation bearings in the piers of the sea-spanning bridge in order to absorb impact force and reduce the resonance of the bridge due to earthquakes.

Topics in Tribo-Technology

1989 Conventional line's pantograph slider plates are changed from copper alloys to carbon-based materials
1989 Lubricating oil, sliding bearing, etc. are developed for refrigerator compressors with new refrigerant (⇒ Column 11)
1990 Emergence of high performance (API SG), low viscosity (SAE 5W-30) engine oil using high viscosity index base oil
1991 Long-life rolling bearings with micro-pitting surface finish is developed based on the micro-EHL theory
1992 Around this time, the use of aroma/chlorine-free industrial lubricating oils expands
1992 Progress in solid lubrication technology in reducers and slip rings leads to domestic production of solar array drive mechanisms in artificial satellites
1993 X-ray tube for use in medical CTs using liquid metal hydrodynamic bearing is put into practical use
1993 In order to reduce friction loss, low friction resin coat with optimized binder and solid lubricant is used in car engine pistons for the first time in the world
1993 As environmental protection awareness grows, biodegradable oils and greases come to be used
1994 Large-scale self-lubricating thrust bearing is applied to generator water wheels (⇒ column 12)
1994 First all-Japanese liquid propellant rocket H-Ⅱ using liquid oxygen/liquid hydrogen turbo pumps is launched (⇒ column 13)
1995 Molded-oil seals start to be used in linear guides and ball screws to achieve maintenance-free
1995 Large-scale hydrostatic bearing used in the astronomical telescope Subaru is developed
1996 In order to reduce the head flying height in HDDs, the disk surface texture is disused. Ramp load/unload mechanism is adopted to prevent stiction
1996 Many tribo-technologies, e.g. high-speed injection of ceramic particles to improve adhesion between wheels and rails, contribute to the achievement of 300 km/h operation of Shinkansen

World Events（1989 – 1996）

1989 Emperor Showa passes away; "Heisei" begins
1989 Fall of the Berlin Wall
1989 Montreal Protocol on phasing out the production of ozone depleting substances is agreed at the Meeting of the Parties
1990 Collapse of Japanese bubble economy
1990 Unification of West and East Germany
1991 Dissolution of the Soviet Union
1991 Resource Recycling Promotion Law is enforced
1992 Space shuttle Endeavour with the first Japanese astronaut (Mamoru Mohri) is launched
1992 Tokaido Shinkansen "Nozomi" is introduced
1993 Introduction of EC single market
1994 Kansai International Airport is opened
1995 "First year of the internet" in Japan
1995 PL (Product Liability) Law is enforced
1995 Hanshin – Awaji Earthquake disaster
1995 Unmanned deep sea submersible Kaiko reaches the world's deepest 10,911 m in the Mariana trench
1995 PC operating system "Windows 95" is released
1996 ISO 14001 is enforced
1996 Environmental hormone becomes an issue of concern

Home air-conditioner rotary compressor

Column 11 Efforts to Replace Ozone Depleting Substances

Since the use of ozone depleting substances such as chlorofluorocarbon was restricted to protect the ozone layer and prevent global warming, development of air conditioner and refrigerator suitable for alternative refrigerants started from the 1980s. Since then, the research on the boundary/mixed lubrication mechanism progressed, such as effective chloride formation on metal surfaces, new synthetic oil (polyol ester) was developed, and the compressor mechanism was improved. As a result, refrigerators using alternative refrigerant R-134a were commercialized in 1995, and home air-conditioners using R-410a in 1998. These efforts to replace ozone depleting substances have now led to refrigerators using natural refrigerant R-600a.

LE-7 rocket engine

H-II launch

Column 13 Tribology in All-Japanese Liquid Propellant Rocket H-Ⅱ

All-Japanese H-II rocket for launching application satellites was successfully built. The first stage engine LE-7 was a high-performance, staged combustion cycle engine similar to that adopted in space shuttles. Turbo pumps that force feeds propellants, i.e. liquid hydrogen and liquid oxygen into the combustor, were developed with many tribo-technologies such as high-speed bearings in extremely low temperature fluids, shaft seals between extremely low temperature pumps and high temperature gas turbines. Improved H-IIA rocket with LE-7A engine has been operated since 2001.

Thrust bearing using PTFE on the sliding surface

Column 12 Large-Scale Thrust Bearings Using Resin on the Bearing Surface

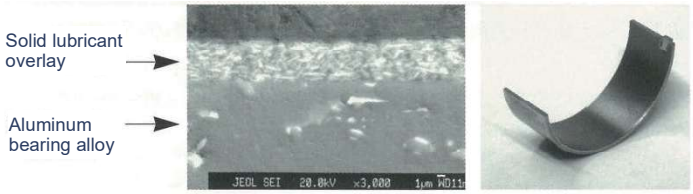
Technology for sliding bearings using resin materials, which have excellent friction and wear properties, was developed and applied to large-scale applications. The figure on the left is a thrust bearing for a water wheel generator with an outside diameter of approximately 2 m, where polytetrafluoroethylene (PTFE) resin containing glass fibers and molybdenum disulfide is bonded on the sliding surface in place of conventional white metal.

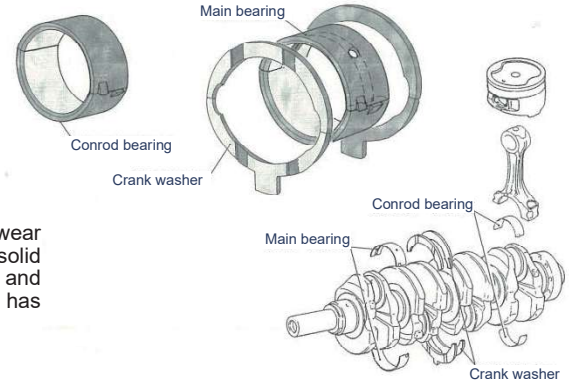
Topics in Tribo-Technology

1998 Seismic isolation bearings are installed in the Aqua-Bridge on Kisarazu side of the Tokyo Bay Aqua-Line, which opens this year
1998 Solid lubricant overlay is developed, which enables lead-free sliding bearings, and it is applied for the first time to engines in 2001 (⇒ column 14)
1998 SAE 5W-20 grade engine oil is commercialized
1999 Low-friction piston with micro-dimple treatment is developed
1999 Half-toroidal CVT is commercialized for the first time in the world (⇒ column 15)
2000 The world's first helical compressor for refrigerators is enabled by establishing wear reduction technology for spiral blades
2000 Hydrodynamic sliding bearings start to be used in HDD spindles
2001 MoS_2 shot treatment technology is applied to car engine pistons
2001 Hybrid ceramic rocket engine bearing achieves a DN value of 3 million level under extremely low temperatures
2003 Greases with base oil MAC (Multiply alkylated cyclopentane), an alternative to PFPE, are domestically produced and applied to e.g. space mechanisms.
2004 5 million DN is achieved in rolling bearings for machine tools
2005 Super-low torque tapered roller bearings are developed, optimizing the amount and flow of oil
2006 Paper machine with the world's highest speed (2000 m/min) using traction transportation is developed, based on a theoretical model of traction between the web and the roller
2006 Sprayed high Si-Al alloy with no environmentally hazardous substances is applied to the swash plate of car air-conditioning compressors
2006 Zinc dialkyldithiophosphate additives are developed, which enable extremely low sulfur engine oil

World Events（1997 – 2006）

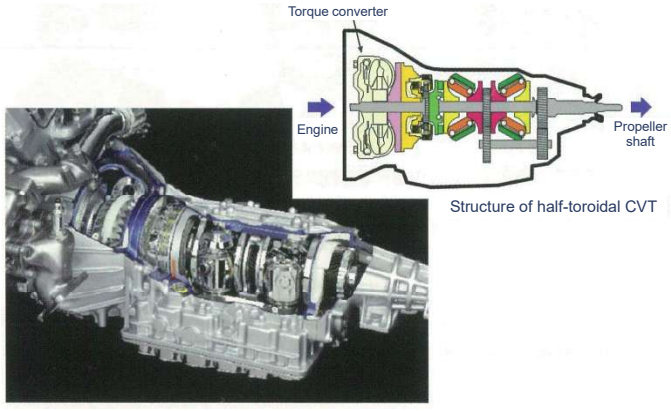
1997 A cloned sheep is born in the UK
1997 NASA probe succeeds in soft landing on Mars
1997 Third Conference of the Parties (COP3) to the United Nations Framework Convention on Climate Change is held in Kyoto
1997 JR's maglev (Linear Motor Car) achieves a speed of 531 km/h in manned operation, a world record for rail vehicles
1998 18th Winter Olympics are held in Nagano
1998 Last flight of YS-11
1999 Year 2000 problem in computers
2000 BS digital broadcast begins
2000 2000 yen note is issued
2001 Synchronized terrorist attacks in the US
2001 Third generation mobile communication system begins to be operated for mobile phones
2002 Unified currency "euro" begins to circulate in 12 EU countries
2002 Japan and South Korea co-host the first World Cup held in Asia
2002 Basic Resident Registration System begins to be operated
2003 Severe Acute Respiratory Syndrome (SARS) spreads around Southeast Asia
2003 Terrestrial digital broadcast begins
2004 Mid-Niigata Prefecture Earthquake causes Joetsu Shinkansen derailment
2004 Banknotes of Japanese yen (except 2000 yen note) are renewed
2005 First World Exposition in the 21st century "Love the Earth Expo" is held in Aichi
2005 Kyoto Protocol comes into effect
2005 JR Fukuchiyama Line derailment accident
2005 Postal Service Privatization Act is approved
2006 Professor Shinya Yamanaka's team at Kyoto University generates iPS cells from mouse fibroblasts
2006 International Astronomical Union adopts the definition of planet; Pluto becomes a dwarf planet





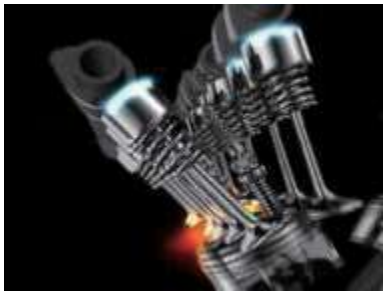
Column 14 Lead-Free Engine Bearings

Solid lubricant overlay technology provides conformability in the initial ruining-in by minor wear of MoS_2 solid lubricant, instead of the use of lead alloys. The world's first application of the solid lubricant overlay to engine bearings was enabled by optimizing the characteristics of MoS_2 and polyamide-imide resin binder. Currently, the whole bearing including the lining substrate has met lead-free requirements.



Column 15 Commercialization of Half-Toroidal CVT

Half-Toroidal CVT is the world's first continuously variable transmission applied to automobiles using the traction drive. Due to high transmission capacity and quick shift response, excellent fuel efficiency and drivability are simultaneously obtained. Commercialization was achieved through analytical research on the traction drive, and development of synchronization technique for four power rollers, shift control system, materials and traction oil with high durability and reliability, high capacity power roller bearings, etc.



Engine components with hydrogen-free DLC coatings

Column 16 Hydrogen-Free DLC Coatings for Engine Friction Reduction

Hydrogen-free DLC synthesized from graphite is completely different from conventional hydrogenated DLC from hydrocarbon gas. This enables significantly low friction under engine oil lubrication due to the adsorption of the oiliness additives and their decomposition products (i.e. hydroxyl radicals) on the surface. Hydrogen-free DLC coatings applied to valve lifters in the valve trains and piston rings in the main moving parts, together with newly developed engine oil suitable for the DLC coatings, have led to a remarkable improvement in engine fuel efficiency.

Topics in Tribo-Technology

2007 Low friction technology via a combination of hydrogen-free DLC coatings and oiliness additives is applied to mass-produced gasoline engines (⇒ column 16)
2007 The world's first X-ray tube rotating mechanism utilizing liquid metal bearing is installed on high-speed CT devices
2009 Ironing process of aluminum using DLC coated die under dry condition becomes commercially available, and contributes to environmental load reduction
2009 Fire-resistant grease for central lubrication system is developed using carefully selected base oil and additives that tend not to generate flammable gases under high temperatures
2010 Lubricant for magnetic disks with highly controlled structure synthesized by direct fluorination of hydrocarbon polyether becomes commercially available and contributes to increased recording density
2011 High performance compressor for hot water supply units is developed based on the analysis of Oldham ring considering the foaming of refrigerant in oil, and optimum texture design for thrust slide bearings
2011 Technology for detecting nano-scale defects on magnetic disk surface is developed using a thermal microsensor integrated into the flying head slider
2012 Gearbox oil with excellent lubrication performance due to development of extreme pressure additives and optimized formulation, and grease with controlled penetration and thickener content, are applied to wind turbine generators (⇒ column 17)
2013 Plastic/rubber sorting technique using the difference in the coefficient of friction is developed, and used in plastic recycling business
2013 Handcart type measurement system for static and kinetic friction coefficient at the shoe/floor interface is developed, which leads to the risk determination for slip and fall accidents, and development of non-slip shoes and flooring
2014 Mirror bore coating technology for automobile engines is developed, which achieves high fuel efficiency and seizure resistance by smoothing cylinder bore surface, and thermal spray coating
2014 High-pressure valves and compressors using sliding materials with excellent characteristics in hydrogen are developed and contribute to the start of commercial operation of hydrogen stations (⇒ column 18)

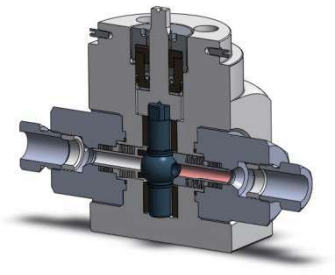
World Events（2007 – 2014）

2007 Niigataken Chuetsu-oki Earthquake
2007 Democratic Party of Japan becomes the leading party in the Japanese House of Councilors election
2007 US sub-prime mortgage crisis causes turmoil in the world economy and finance
2008 Three physicists, Yoichiro Nanbu, Makoto Kobayashi, and Toshihide Masukawa are awarded the Nobel Prize for Physics, and one chemist, Osamu Shimomura, in Chemistry
2008 Bankruptcy of Lehman Brothers
2008 Discovery of iron-based superconductor
2009 Change of government: Democratic Party of Japan wins in a landslide in the Japanese House of Representatives election
2009 New influenza pandemic
2010 Nobel Prize in Chemistry is awarded to Akira Suzuki and Eiichi Negishi
2010 "Hayabusa" returns from asteroid Itokawa
2010 Most severe heat wave in recorded history
2011 Great East Japan Earthquake and Fukushima nuclear accident
2011 Severe flooding in Thailand forces Japanese companies to halt production
2011 Kyushu Shinkansen opens all lines
2012 Professor Shinya Yamanaka is awarded Nobel Prize in Physiology or Medicine
2012 Tokyo Sky Tree opens
2012 Two teams of scientists including Japanese ones discover a possible Higgs boson
2013 Serious pollution in China with "PM2.5"
2013 Mount Fuji is registered as a World Heritage Site
2014 Nobel Prize in Physics is awarded to Isamu Akasaki, Hiroshi Amano, and Shuji Nakamura
2014 "Tomioka Silk Mill and Related Sites" is registered as a World Heritage Site
2014 Mount Ontake erupts
2014 Consumption tax is raised from 5% to 8%

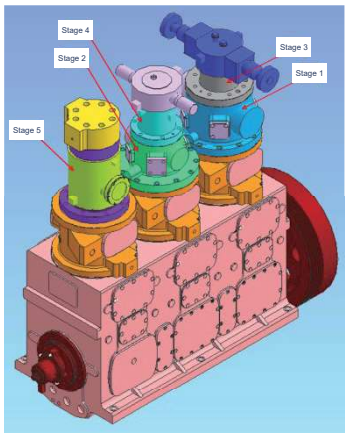
Column 17　Progress of Lubricants for Wind Turbine Generators

After the year of 2000, commercial wind power generation grows rapidly worldwide.

With the rapid development of large and high-efficiency wind turbines, new challenges have arisen in tribology. To improve reliability and reduce the maintenance cost of enlarged machine elements, a new EP additive formulation was developed for gearbox oil to inhibit micropitting. In order to reduce fretting wear, grease manufacturing technology was developed to control the relationship between the penetration and the thickener content of the grease used for main and blade bearings.



98MPa high pressure ball valve



82MPa high pressure hydrogen compressor

Column 18　Tribology in Hydrogen Stations

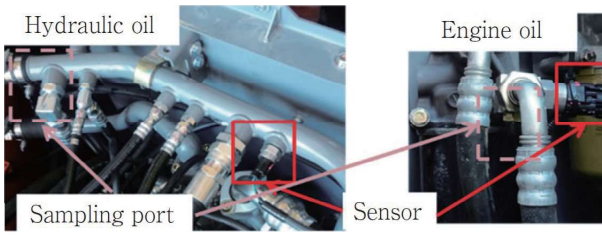
The first fuel cell vehicle was released in market in December 2014. In commercial hydrogen refueling stations built in major cities in Japan, various machine elements have been designed based on knowledge of tribology in hydrogen. Examples include DLC coating for stem, ball and seats in ball valves, polymer composites for piston rings in high-pressure hydrogen compressors and for gland packing in valves, and other materials. All these tribo-systems operate without lubricant because it is necessary to maintain purity of hydrogen gas for fuel cells.

Topics in Tribo-Technology

2015 A polymer-type SAPS-free extreme pressure additive with excellent frictional properties is developed, and mass production of high-quality DLC films is enabled by a magnetic-filtered vacuum arc deposition system
2015 A water-resistant grease for automotive hub units and a surface-textured engine bearing reducing start-up friction are developed
2016 A low-noise grease for ball bearings contributing to reduced motor losses, and a highly reliable alumina–zirconia composite rolling element, are developed
2017 An engine oil achieving both LSPI suppression and improved fuel economy is developed, and friction fade-out control technology for DLC films is established
2018 A DLC-coated rolling bearing with high seizure resistance and a low-torque automatic transmission seal ring using surface texturing are developed
2019 An oil condition monitoring system for construction machinery is developed, enabling condition-based maintenance (⇒ column 19)
2019 An ultra-low-viscosity ATF is developed and contributes to reduced transmission losses (⇒ column 20)
2020 An ultra-long-life tapered roller bearing and advanced material and heat treatment technologies for rolling bearings are developed
2020 A high-performance chlorine-free press oil for stainless steel and performance enhancement technology for electric drive transaxle fluids are developed (⇒ column 20)
2021 Low-friction sealed rolling bearings, durability enhancement technologies for rolling elements, organic–inorganic hybrid solid lubricants, and high-performance water-soluble cutting fluids are developed
2022 Technologies for dynamic friction evaluation and control of automotive shock absorbers, and low-loss, high-sealing mechanical seals using surface texturing, are established
2022 An AE-based method for evaluating DLC adhesion under lubrication, a water-soluble grinding fluid for stainless steel, and a high-efficiency constant velocity joint are developed
2023 A low-friction grease for hub bearings and a diesel engine oil without metallic additives are developed
2023 AI-based virtual screening technology for lubricants is developed, and ultra-lightweight anti-slip shoes are commercialized (⇒ column 21)
2024 An ultra-low-viscosity transaxle fluid for electric vehicles is commercialized (⇒ column 20)
2024 A degradation diagnosis method using lubricating oil image analysis, and a method for subsurface visualization using erosion wear, are proposed

World Events（2015 – 2024）

2015 Prof. Satoshi Ōmura is awarded the Nobel Prize in Physiology or Medicine
2015 Sustainable Development Goals (SDGs) are adopted by the United Nations
2015 COP21 is held in Paris and the Paris Agreement is adopted
2016 Kumamoto Earthquake occurs
2016 Prof. Yoshinori Ōsumi is awarded the Nobel Prize in Physiology or Medicine
2016 The United Kingdom votes to leave the European Union (Brexit)
2017 Donald Trump becomes President of the United States
2017 Shogi player Sota Fujii achieves 29 consecutive wins
2017 Nobel Prize in Physics is awarded for the detection of gravitational waves
2018 Hokkaido Eastern Iburi Earthquake causes a large-scale blackout
2018 Prof. Tasuku Honjo is awarded the Nobel Prize in Physiology or Medicine
2018 Hayabusa2 arrives at asteroid Ryugu
2019 Japanese era changes from Heisei to Reiwa
2019 Consumption tax in Japan is raised from 8% to 10%
2019 Prof. Akira Yoshino is awarded the Nobel Prize in Chemistry
2020 COVID-19 pandemic spreads worldwide
2020 Tokyo Olympic and Paralympic Games are postponed
2020 Hayabusa2 returns samples from asteroid Ryugu
2021 Tokyo Olympic and Paralympic Games are held without spectators
2021 Japan promotes the 2050 carbon neutrality target
2021 Global semiconductor shortage becomes severe
2022 Russia invades Ukraine
2022 Japanese yen weakens to around 150 JPY per USD
2022 Rapidus is established to strengthen Japan's semiconductor industry
2023 Generative AI, including ChatGPT, spreads rapidly
2023 Treated water release from Fukushima Daiichi begins
2023 Japan wins the World Baseball Classic
2024 Noto Peninsula Earthquake occurs
2024 Bank of Japan ends negative interest rate policy
2024 SLIM achieves Japan's first successful lunar landing



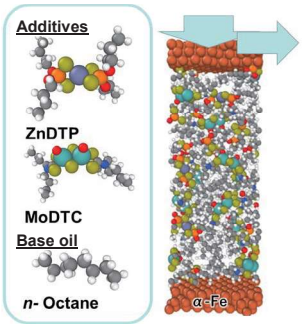
Integration of online sensors into construction machinery


Oil Condition Monitoring System

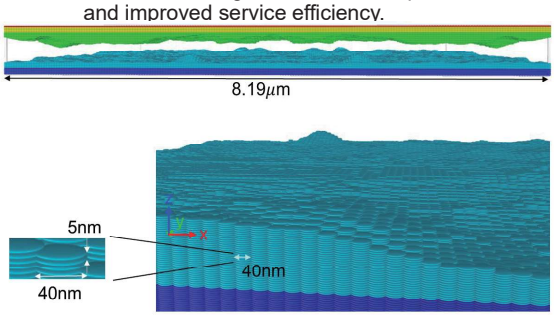
Column19 Development of an Oil Condition Monitoring System for Construction Machinery

To improve oil condition monitoring in construction machinery, an online measurement method using fluid property sensors has been established. Continuous measurement of viscosity, density, and relative permittivity enables quantitative evaluation of oil degradation and contamination. Applicability to biodegradable oils and condition estimation using machine learning combined with operational data have also been demonstrated. These technologies contribute to preventive maintenance and improved service efficiency.


e-Axle, ICE, AT
Conceptual illustration generated using AI.



Analysis of Chemical Reactions of Engine Oil Additives under Sliding Conditions



Seizure Analysis of Real Contact Interfaces Using Coin-Shaped Particles

Column 20 Ultra-Low-Viscosity Driveline Fluids for Electrification

Stricter fuel economy regulations have made reduction of driveline energy losses a key issue. In electric transaxles, lubricants are required for lubrication and motor cooling, driving demand for lower viscosity. Ultra-low-viscosity ATF reduces churning losses and improves fuel economy. Technologies for electric vehicle fluids achieve cooling performance and component protection under high-speed conditions. Both ultra-low-viscosity ATF and electric transaxle fluids have been commercialized and applied in production vehicles. Despite thinner oil films, advances in base oil and additive technologies enable a balance between energy efficiency and reliability.

Column 21 Tribological Simulation Technologies from the Molecular Scale

Applying molecular dynamics simulations to practical oils and solid surface dynamics required advances in both computational power and simulation methodologies. Since the 1990s, these approaches have been applied to various tribological phenomena, and their use has become widespread since the 2010s. Recently, new techniques have been developed, including quantum molecular dynamics for analyzing tribochemical reactions during sliding, coarse-grained dynamics for systems with different length scales such as base oils and polymers, bottom-up particle methods from the atomic level, and AI-based molecular simulators

List of Presidents (1956 — 2026)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NAGAI


Term 4,5
Tokio SASAKI


Term 6,7
Tsutomu
KUWATA


Term 8,9
Yoshio SUGE


Term 10,11,12
Itsuo
KAGEHIRA


Term 13,14,15
Norimune
SODA


Term 16,17,18
Toshio
SAKURAI


Term 19,20
Masao
KUBOTA


Term 21,22
Mitsuru
TOYOGUCHI


Term 23,24
Fujio HIRANO


Term 25,26
Yutaka
KATAYAMA


Term 27,28
Hiroshi AOKI


Term 29,30
Yasukatsu
TAMAI


Term 31,32
Haruo MORI


Term 33,34
Minoru
KASHIMA


Term 35,36
Yukio HORI


Term 37,38
Kouichi
NAKAJIMA


Term 39,40
Heihachiro
OKABE


Term 41,42
Yoshitsugu
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Makoto
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Yoshihiro
SUITA


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Hisashi
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Shirou
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SUGIMURA


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Takero MAKINO


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UMEHARA


Term 69
Masaki EGAMI


Term 70,71
Shinya SASAKI

Tribology Gold Medal


Professor
Norimune Soda
(1981)


Professor
Fujio Hirano
(1987)

Professor
Toshio Sakurai
(1990)

Professor
Yoshitsugu Kimura
(2003)

Professor
Koji Kato
(2007)

Japanese Society of Tribologists Awards

Best Paper Award of Tribology Online

2008 Effect of Step Length and Walking Speed on Traction Coefficient and Slip between Shoe Sole and Walkway: Takeshi YAMAGUCHI, Shintaro HATANAKA, Kazuo HOKKIRIGAWA

Direct Observation of Thermo-Reversible Gel-Lubricants in EHL by FT-IR Micro-Spectroscopy: Kazutoshi TAKAHASHI, Yuji SHITARA, Shigeyuki MORI

2009 Development of Three-Dimensional Non-Contact Surface Profilometer and Application of Evaluation of Impact Erosion of Metal Material Composites: Yoshiro IWAI, Masato KITASHO, Eisuke SENTOKU, Tomomi HONDA, Toru MATSUBARA, Kazuhisa YANAGI

2010 Acoustic Emission Signals and Wear Phenomena on Severe-Mild Wear Transition: Alan HASE, Masaki WADA, Hiroshi MISHINA

Measurements of Impact-Induced Fracto-Emission from Soda-Lime Glass and Simultaneous Observation of the Cracking Process by High-Speed Photography: Seisuke KANO, Yuji ENOMOTO, M. Munawar Chaudhri

2011 Analyses of the Adsorption Structures of Friction Modifiers by Means of Quantitative Structure-Property Relationship Method and Sum Frequency Generation Spectroscopy: Hiroaki KOSHIMA, Hideki KAMANO, Yoshio HISAEDA, Huijin LIU, Shen YE

The Effects of Hydrogen on Microstructural Change and Surface Originated Flaking in Rolling Contact Fatigue: Hideyuki UYAMA, Hiroki YAMADA, Hideyuki HIDAKA, Nobuaki MITAMURA

2012 Friction and Wear of Ferrous Materials in a Hydrogen Gas Environment: Kanao FUKUDA, Masaaki HASHIMOTO, Joichi SUGIMURA

The Effect of UV Irradiation on the Z-Tetraol Boundary Lubricant: Robert J. Waltman, John Newman, Xing-Cai Guo, John Burns, Connie Wiita, Mina Amo

2013 Effect of Environment Gas on Surface Initiated Rolling Contact Fatigue: Hiroyoshi TANAKA, Tatsuhiko MOROFUJI, Kakeru ENAMI, Masaaki HASHIMOTO, Joichi SUGIMURA

Effects of Surface Chemical Properties on the Frictional Properties of Self-Assembled Monolayers Lubricated with Oleic Acid: Koji MIYAKE, Takamasa KUME, Miki NAKANO, Atsushi KORENAGA, Koji TAKIWATARI, Ryo TSUBOI, Shinya SASAKI

2014 Experimental Analysis of the Distribution of Traction Coefficient in the Shoe-Ground Contact Area during Running: Kenta MORIYASU, Tsuyoshi NISHIWAKI, Takeshi YAMAGUCHI, Kazuo HOKKIRIGAWA

Oil-Free Bearings and Seals for Centrifugal Hydrogen Compressor: Hooshang Heshmat, Andrew Z. Hunsberger, Zhaohui Ren, Said Jahanmir, James F. Walton II

2015 Tribological Properties of Copper Molybdate Powder Solid Lubricants under High Temperature Conditions: Yoshinori TAKEICHI, Masato INABA, Kentaro MINAMI, Masahiro KAWAMURA, Marian Dzimko

Friction Modification by Shifting of Phonon Energy Dissipation in Solid Atoms: Seiji KAJITA, Mamoru TOHYAMA, Hitoshi WASHIZU, Toshihide OHMORI, Hideyuki WATANABE, Shinichi SHIKATA

2016 On the Magnitude of Load-Carrying Capacity of Textured Surfaces in Hydrodynamic Lubrication: Kazuyuki Yagi, Hajime Sato, Joichi Sugimura

The Development to Control Simultaneously Viscosity and Separation Temperature of a Two Phase Lubricant for Practical Use: Kamata Kumiko, Kawamura Yasushi, Nagatomi Eiji, Tazaki Hiroyuki, Maruyama Ryuji

Flexible Control and Coupling of Adhesion and Friction of Gecko Setal Array During Sliding: Yu Tian, Dashuai Tao, Noshir Pesika, Jin Wan, Yonggang Meng, Xiangjun Zhang

2017 Development of a New Tapping Tool Covered with Nickel/Abrasive Particles Composite Film for Preventing Chip Snarling and Tool Service Life Extension: Yasuyoshi Saito, Takeshi Yamaguchi, Kei Shibata, Yuki Kadota, Takeshi Kubo, Wataru Watanabe, Kazuo Hokkirigawa

Role of Water and Oxygen Molecules in the Lubricity of Carbon Nitride Coatings under a Nitrogen Atmosphere: Yamada Naohiro, Watari Tomomi, Takeno Takanori, Adachi Koshi

Prediction of Shallow Indentation Effects in a Rolling-Sliding EHL Contact Based on Amplitude Attenuation Theory: Petr Šperka, Ivan Křupka, Martin Hartl

2018 Effect of Electric Field on Adhesion of Thermoplastic Resin against Steel Plates: Motoyuki Murashima, Noritsugu Umehara, Hiroyuki Kousaka, Xingrui Deng

Advanced Control of Frictional Properties on Paper Clutch Materials by a Combination of Friction Modifiers: Tatsumi Go, Hasegawa Shinji, Onumata Yasushi

2019 In Situ Raman Observation of the Graphitization Process of Tetrahedral Amorphous Carbon Diamond-Like Carbon under Boundary Lubrication in Poly-Alpha-Olefin with an Organic Friction Modifier: H Okubo, C Tadokoro, Y Hirata, S Sasaki

Study and Comparison of Lubricity of Green and Commercial Cutting Fluid Using Tool-Chip Tribometer: P S Suvin, Satish V Kailas

A Study of the Lubrication under Impact Loading - Experimental and Analytical Application to Push Belt CVTs: Yuki Ono, Kenji Matsumoto, Yuji Mihara

2020 Intercalation Technology for Preparing a Mica-Organic Hybrid Solid Lubricant and Spectroscopic Evaluation of Its Lubrication Mechanism: K Oshita, S Komiyama, S Sasaki

Lubrication Condition Monitoring of Practical Ball Bearings by Electrical Impedance Method: Taisuke Maruyama, Masayuki Maeda, Ken Nakano

Effect of Lubrication on Friction and Wear Properties of PEEK with Steel Counterparts: Go Tatsumi, Monica Ratoi, Yuji Shitara, Kiyomi Sakamoto, Brian G. Mellor

Development of Highly Durable Sliding Triboelectric Nanogenerator Using Diamond-Like Carbon Films: Shreeharsha H. Ramaswamy, Ryusei Kondo, Weihang Chen, Ichihiro Fukushima, Junho Choi

2021 Estimation Method of Micropitting Life from S-N Curve Established by Residual Stress Measurements and Numerical Contact Analysis: Naoya Hasegawa, Takumi Fujita, Michimasa Uchidate, Masayoshi Abo, Hiroshi Kinoshita

In Situ Raman-SLIM Monitoring for the Formation Processes of MoDTC and ZDDP ribofilms at Steel/Steel Contacts under Boundary Lubrication: Hikaru Okubo, Chiharu Tadokoro, Shinya Sasaki

2022 ZDDP Tribofilm Formation on Non-Ferrous Surfaces: Mao Ueda, Amir Kadiric, Hugh Spikes

Non-Linear Wear Propagation Property and Prediction Method Having Influencing Pitting Failure of Helical Gears: Kumagai Koji, Liu Hanlin, Kurokawa Syuhei

2023 Friction Reduction by Laser Irradiation for a Friction System Using Bearing Steel and Aluminum Alloy in Engine Oil: Kento Ihara, Koshi Adachi

Synergistic Enhancement of the Lubrication Performance of Zinc Dialkyldithiophosphate by Coexistence with Ionic Liquid: Kaisei Sato, Hikaru Okubo, Shouhei Kawada, Seiya Watanabe, Shinya Sasaki

Experiment Study on the Influence of Lubricant Viscosity and Solid Additives on Irregular Cavitation Noise in the Oscillatory Squeeze Film: Xu Liu, Xiaoyang Chen, Rongyu Kang, Dehua Tao, Ben Ni

Proposition of Thermal-Diffusion-Induced Spiral Model for the Rapid Oil-Film Breakdown Process during Scuffing: Mamoru Tohyama, Takashi Izumi, Shuzo Sanda

2024 Durability of Super-Low Friction of Hydrogenated Carbon Nitride Coatings in High-Vacuum Environment: Kazuya Kuriyagawa, Koshi Adachi

Two Origins for Bell-Shaped Velocity-Dependent Friction Coefficient: KELVIN-VOIGT or Standard Linear Solid Viscoelasticity: Toshiki Watanabe, Ken Nakano

2025 Spalling Life Prediction for Rolling Bearings Using a Model with Stress Intensity Factor and Statistical Evaluation of Non-Metallic Inclusions: Hiroki Komata, Sho Hashimoto, Tomoki Doshida, Hiroyuki Uchida, Koji Ueda

Active control of Lubricant Flow Using Dielectrophoresis and Its Effect on Friction Reduction: Motoyuki Murashima, Kazuma Aono, Noritsugu Umehara, Takayuki Tokoroyama, Woo-Young Lee

Timeline of JAST

1955 "Japan Society of Lubrication Engineers (JSLE) prospectus" distributed

1956 JSLE Founders Meeting/Inaugural General Meeting
First chairman is Yuzaburo Nagai
Office opened in the Institute of Science and Technology, the University of Tokyo at Komaba, Meguro-ku, Tokyo
Journal of JSLE "Lubrication" Vol. 1 No. 1 (76 pages of body text, 88 pages with the table of contents and adverts) deposited
1st JSLE Conference
1st JSLE Seminar "Fundamentals and Applications of Lubrication Technology"

1957 Journal of JSLE becomes a periodical (bimonthly)
1st provincial JSLE Conference held in Fukuoka

1958 Round-Table Conference on Bearing and Lubrication (set up in May 1950) absorbed as Round-Table Conference on Lubrication (later on Tribology)

1960 4th Term Annual Meeting and Incorporated Association JSLE Inaugural General Meeting held simultaneously
Journal of JSLE 1st Special Issue on Friction and Wear published
Ministry of Education approved the establishment of JSLE

1961 Honorary membership established
JSLE 5th Anniversary Conference held in each region (until February 1962)
Journal of JSLE Vol. 6 No. 6 published as a Special 5th Anniversary Issue

1965 1st Summer Seminar held in Kiyosato
JSLE 10th Anniversary Conference held in each region (until November)

1966 Journal of JSLE starts being issued monthly
Journal of JSLE Vol. 11 No. 1 issued as a Special 10th Anniversary Issue, with the full table of contents of Vol. 1 – 10 in the appendix

1967 Student membership established
Office moves in the Kikai Shinko Kaikan building at Shibakouen, Minato-ku, Tokyo

1968 Research Committee on Wear established
Dr. Blok Special Lecture

1969 1st Symposium on Wear
Authorized as an academic society specified by the Commissioner of Patents
Research Committee on Dust Management established
Journal of JSLE Vol. 14 No. 7 published as a Special Commemorative 100th Issue
Survey on lubrication research trends started

1970 "Lubrication Handbook" published
Research Committee on Lubricating Greases and Research Committee on Extreme Pressure Lubrication established
"Lubrication Glossary" published

1971 1st Introductory Lecture Course

1972 Research Committee on Solid Lubrication established
1st Autumn Seminar held in Shimosuwa
1st Symposium on Methods of Solid Lubrication

1974 Technical Committees (Research Committees renamed) of the 1st category and the 2nd category established
1st Symposium on Dust Management

1975 Dr. Tabor Special Lecture
Research Committee that controls the Technical Committees established
JSLE–ASLE International Lubrication Conference
International Symposium on Solid Lubrication
Technical Committee on Wear held the IRG-OECD round table conference
JSLE 20th Anniversary Ceremony (Kikai Shinko Kaikan, Tokyo)
JSLE Anniversary Conference held in Osaka

1976 Journal of JSLE Vol. 21 No. 1 published as a Special 20th Anniversary Issue with the full table of contents of Vol. 11 – 20 in the appendix
Best Paper Award established
1st Biotribology Workshop

1977 "Literature Index" first published as a separate volume of the journal of JSLE
Journal of JSLE Vol. 22 No. 11 published as a Special Commemorative 200th Issue

1978 "Case Studies of Lubrication Failure and Countermeasures" (A5 size, 149 pages) published
"Lubrication Handbook (enlarged edition)" published

1979 Technical Committees of the 3rd category established

1980 Honorary member Toshio Sakurai awarded the ASME Centennial Medallion
JAST 25th Anniversary Event held in Tokyo
"Journal of JSLE International Edition" (in English) first published

1981 "Lubrication Glossary — with Commentary" (A5 size, 196 pages) published
Honorary member Norimune Soda awarded the Tribology Gold Medal

1982 1st Symposium on Engine Lubrication
1st Symposium on Rolling Lubrication
1st Contamination Control Workshop

1984 1st Symposium on Seals
1st Symposium on Metal Forming

1985 JSLE ITC (International Tribology Conference) 1985 held in Tokyo

JSLE 30th Anniversary Conference held in Akita
1986 Journal of JSLE Vol. 31 No. 1 published as a Special 30th Anniversary Issue with the full table of contents of Vol. 21 – 30 in the appendix
Journal of JSLE Vol. 31 No. 3 published as a Special Commemorative 300th Issue

1987 "Lubrication Handbook (revised edition)" published
Honorary member Fujio Hirano awarded the Tribology Gold Medal

1989 The journal of JSLE renamed "Tribologist"
"Journal of JSLE International Edition" substituted by "Japanese Journal of Tribology" (English version of the Journal of JSLE)

1990 Prof. Suh Special Lecture
ITC Nagoya 1990
Honorary member Toshio Sakurai awarded the Tribology Gold Medal

1991 Distinguished Tribologists Award and Award for Young Tribologists established
Dr. Jost welcomed to "Tribology" 25th Anniversary Lecture

1992 JSLE renamed "Japanese Society of Tribologists (JAST)" (from September 1)
Dr. Jost becomes a special honorary member

1995 JAST logo established
Tribo-Technology Award established
ITC Yokohama 1995

1996 Journal of JAST Vol. 41 No. 1 published as a Special 40th Anniversary Issue
JAST website opened

1997 1st WTC held in London

1998 1st TVT International Symposium held in Yokohama
1st Asiatrib held in Beijing

2000 ITC Nagasaki 2000 (a time capsule sealed to be opened after 100 years)

2001 2nd TVT International Symposium held in Toyota
"Tribology Handbook" published
2nd WTC held in Vienna

2002 1st Western Japan Tribology Fundamentals Lecture Course in Okayama
400th Tribology Round-Table Conference
2nd Asiatrib held in Jeju
Journal search service via the Internet started

2003 “Tribology of Ceramics” published
“Case Studies of Tribological Failure and Countermeasures” published
Award system reorganized and Awards Committee established

2004 Honorary member Yoshitsugu Kimura awarded the Tribology Gold Medal
1st Tribology Practical Lecture Course
“Sliding Bearing Data Book” published

2005 Third TVT International Symposium held in Tsukuba
ITC Kobe 2005
3rd WTC held in Washington DC

2006 Journal of JAST Vol. 51 No. 1 published as a Special 50th Anniversary Issue
International Journal “Tribology Online” first published
3rd Asiatrib held in Kanazawa

2007 Maintenance Tribology 20th Anniversary Symposium
Honorary members Yukio Hori and Koji Kato awarded the Japan Academy Prize
Honorary member Koji Kato awarded the Tribology Gold Medal

2008 Tribology International Forum started

2009 4th WTC held in Kyoto
“Solid Lubrication Handbook (new edition)” published

2010 1st Tribology Autumn School held in Fukui
1st Japan – China Tribology Advanced Forum held in Morioka

2011 1st Tribology Heritage certification
Tribology counseling service started
ITC Hiroshima 2011
2nd China – Japan Tribology Advanced Forum held in Luoyan

2012 JAST becomes a general incorporated association
3rd Japan – China Tribology Advanced Forum held in Nagoya
1st Malaysia – Japan Tribology Meeting held in Kuala Lumpur

2013 5th WTC held in Turin
4th China – Japan Tribology Advanced Forum held in Beijin
2nd Malaysia – Japan Tribology Meeting held in Kuala Lumpur

2014 5th Japan – China Tribology Advanced Forum held in Fuji
1st Czech – Japan Tribology Workshop held in Prague
1st Swiss – Japanese Tribology Meeting held in Zurich
3rd Malaysia – Japan Tribology Meeting held in Kuala Lumpur

2015 ITC Tokyo 2015 held at Katsushika Campus, Tokyo University of Science
1st International Tribo-Technology Exchange Meeting held in Wuxi, China
6th China – Japan Tribology Advanced Forum held in Wuhan

2016 Journal Tribologist, Vol. 61, No. 1 is published as a 60th anniversary special issue
Technical papers are introduced and submissions begin
Electronic version of Tribologist is launched on J-STAGE
2nd International Tribo-Technology Exchange Meeting held in Bangkok Thailand
7th Japan – China Tribology Advanced Forum held in Nara
4th Malaysia – Japan Tribology Meeting held in Kuala Lumpur
1st Korea – Japan Tribology Sympsium held in Tokyo

2017 Creative Commons licenses are introduced for papers in Tribology Online
3nd International Tribo-Technology Exchange Meeting held in Haiphong, Vietnam
8th Japan – China Tribology Advanced Forum held in Zhenjiang
2nd Japan – Czech Tribology Workshop held in Takamatsu
1st Japan – Taiwan Tribology Symposium held in Amami Oshima
5th Malaysia – Japan Tribology Meeting held in Kuala Lumpur

2018 Memoranda of understanding are signed with STLE (USA) and GfT (Germany)
Tribology Online is indexed in the Emerging Sources Citation Index (ESCI) by Clarivate Analytics
4th International Tribo-Technology Exchange Meeting held in Bangkok Thailand
9th Japan – China Tribology Advanced Forum held in Kitakyushu
2nd Korea – Japan Tribology Sympsium held in Pyeongchang
2nd Taiwan – Japan Tribology Sympsium held in Taipei

2019 International Tribology Conference Sendai 2019 (ITC Sendai 2019) is held
New applied courses (design and experimental/measurement) are launched
An interactive friction science program for school students is held for the first time
5th International Tribo-Technology Exchange Meeting held in Bangkok Thailand
10th China – Japan Tribology Advanced Forum held in Chengdu
3rd Czech – Japan Tribology Workshop held in Hnanice
1st JAST – STLE Young Tribologists Symposium is held in ITC Sendai
3rd Japan – Taiwan Tribology Symposium held in Iwate

2020 Memorandum of understanding is signed with the Taiwan Tribology Society
JAST Tribology Conference 2020 Spring Tokyo (domestic conference) is canceled;
JAST Tribology Conference 2020 Autumn Beppu is held fully online for the first time
3rd Japan – Korea Tribology Symposium is held online in JAST 2020 Autumn Beppu

2021 JAST & STLE joint webinar is held for the first time
Tribology Online is indexed in the Directory of Open Access Journals (DOAJ)

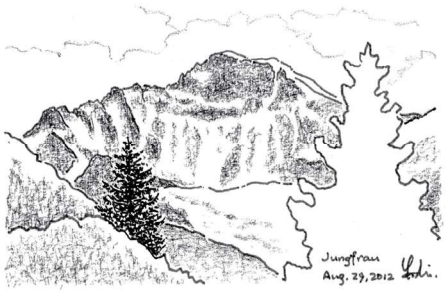
2022 JAST Tribology Conference 2022 Autumn Fukui (domestic) is held on-site for the first time in three years
Next-generation education symposium is held with multiple academic societies
4th Korea – Japan Tribology Symposium held in Goseong-gun

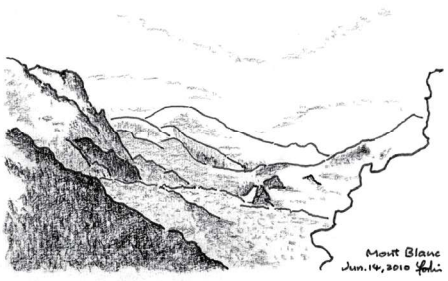
2023 9th International Tribology Conference, Fukuoka 2023 (ITC Fukuoka 2023) is held
Symposia in ITC Fukuoka:
4th Japan – Czech Tribology Workshop
1st JAST – GfT Joint Symposium
2nd Early Career Tribologists Symposium (JAST – STLE)
5th Japan – Taiwan Tribology Symposium
Journal Impact Factor (JIF) of Tribology Online (2022) is released

2024 JAST Tribology Conference 2024 Autumn Nago (domestic) is held, with 10 symposia and 326 presentations, the highest ever
11th Japan – China Tribology Advanced Forum held in Himeji
5th Japan – Korea Tribology Symposium (as an international symposium in JAST 2024 Autumn Nago)
6th Malaysia – Japan Tribology Meeting held in Kuala Lumpur

2025 JAST Tribology Conference 2025 Autumn Hakodate (domestic) is held, with 10 symposia and 348 presentations, setting a new record
12th China – Japan Tribology Advanced Forum held in Wuhan
5th Czech – Japan Tribology Workshop held in Luhacovice
6th Japan– Taiwan Tribology Symposium held in Kaga

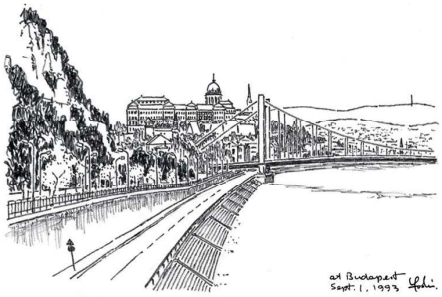

at Chamonix
June 16, 2010 Yoshi.


Jungfrau
Aug. 29, 2012 Yoshi.


Mont Blanc
Jun. 14, 2010 Yoshi


Fisherman's Wharf
San Francisco
Apr. 29. 1983 Yoshi.


Boston
Jun. 23. 1998. Yoshi.


at Budapest
Sept. 1, 1993 Yoshi.

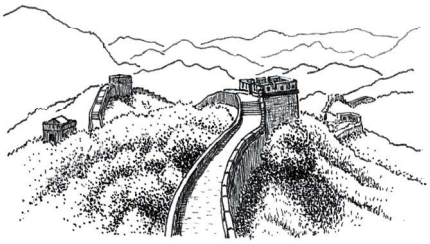

at Holderness School, N.H.
June 23. 1988 Yoshi.

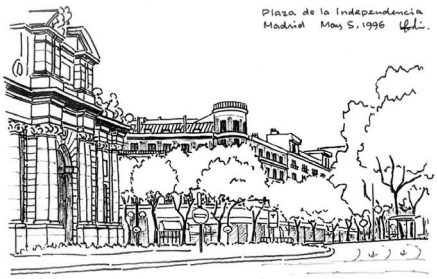

Cavendish Laboratory
June 29, 1987


at the Briccors
Jul. 5, 1987


Big Ben from St James's Park
Oct. 18, 2016 Yoshi.


at Porte Maillot, Paris
Jun. 1, 1994 Yoshi.


The Great Wall. Oct. 15, 1998 Yoshi.


Plaza de la Independencia
Madrid May 5, 1996 Yoshi.


Swansea
Jul. 9. 1987


at Hilton International Bangkok
July 6. 1998 Yoshi.

Japanese Society of Tribologists

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