Sounding Board

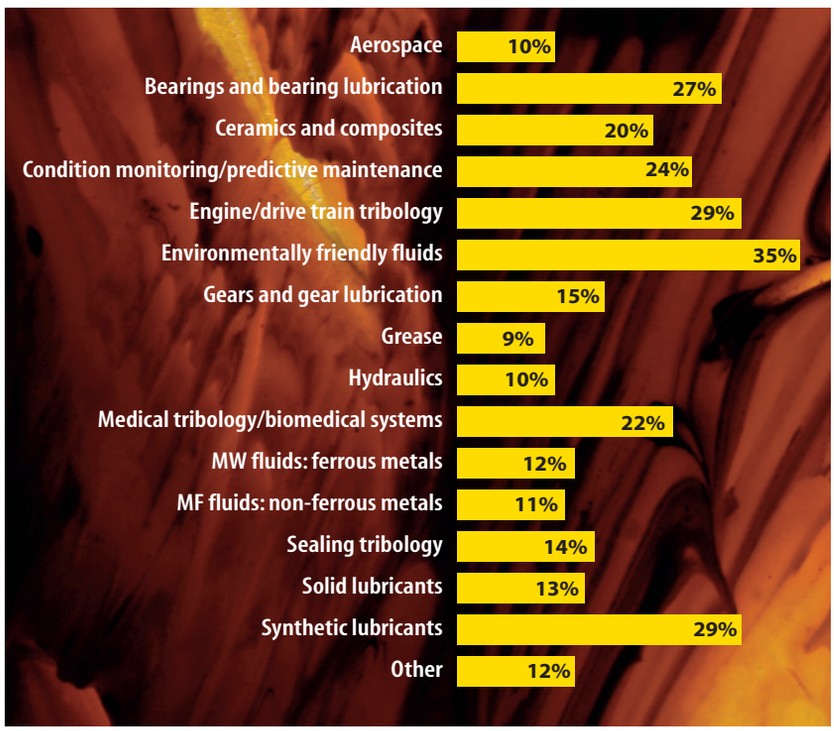
>> If you had a large sum of money that you could dedicate to any one area of tribology research or a tribology project, which would you choose and why? <<

Which one of the following factors do you think is most responsible for current deficiencies in tribology R&D?

Lack of corporate funding	25%
Lack of government funding	12%
Lack of private funding	6%
Lack or imminent loss of experienced researchers	9%
Lack of qualified incoming research staff	13%
Lack of understanding about or appreciation of tribology	42%
Equipment inadequacies/shortages	2%
Lack of standard test methodologies	7%
Lack of important questions left to solve	2%
Other	8%

Based on responses from 255 TLT readers. Total exceeds 100% because some readers chose more than one answer.

Which of the following areas do you think would yield the most beneficial results if they received more funding for research? Choose up to three.



Based on responses from 255 TLT readers. Total exceeds 100% because readers were asked to choose their top three choices.

Research is a topic near and dear to the hearts of TLT readers—a record 255 of them answered this month's question. Top vote-getters for areas deserving more research funding included biotribology, environmentally fluids and synthetics. Are tribologists underappreciated? 42% of them say the main obstacle preventing more research is "lack of understanding about or appreciation of tribology." And 75% of respondents say there is not enough tribology research being conducted today.

Controllable bearing technology. The long-term effects include improved stability of the rotordynamic system, improved load capacity of the bearing, reduced equipment wear and extended equipment life and improved safety.

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Base oils. With the wide selection of base oils in the marketplace, we need to know more about the advantages and/or disadvantages of upgrading existing refineries to the higher group of base oils.

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A universal oil that could be used in transmissions, engines, gearboxes, hydraulics and bearings—and be food grade, fire resistant and biodegradable.

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Research to develop highly efficient fuels and lubricant additives in order to greatly increase the efficiency of equipment and reduce fuel consumption and air-polluting emissions.

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I would have an online particle counter installed on our most critical equipment. This would allow us to monitor and trend

the oil at the drains. From a predictive and real-time standpoint, this is the only major parameter for which we lack real-time data.

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Nanotribology, in particular nanoadditives. Today's lube additive technology is grossly inefficient. Most of the chemical makeup of additives is hydrocarbon chains required to solubilize the functional portion of the additive. EP and antiwear additives are examples.

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Training for employees taking samples. All the money spent on test equipment doesn't mean anything if the sample isn't representative of the oil in use.

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Microlubricants for both cutting and forming metals. This technology eliminates most of the major problems experienced by the end-user such as corrosion, waste, premature shelf life and hazardous materials.

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Synthetics. More products are moving toward extended drain or fill for life while having to perform under a wider range of temperatures and varying degrees of loads.

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The efficacy of ceramic-engineering plastic composites as they might be applied to higher-temperature piston-bore boundary conditions in IC engines, exotic high-pressure hydraulic systems, etc. The idea is to understand and improve basic material self-lubrication while increasing heat transfer away from marginally lubricated regions and improving the structural integrity and endurance of the resulting system.

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Air bearings for transportation. The research could be applied to people-moving sidewalks or mass conveyors/ferries that would move cars along common stretches of freeways.

Dynamic viscosity. We measure viscosity and try to define its importance in the lubrication of components, but we never really know how it will react under load for different film thicknesses and resistance. The benefits would make for more efficient lubricating films with lower planning resistances.

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Technology transfer. Academics and industry researchers are still not getting the message through to machine designers and manufacturing units. Too much emphasis is placed on analysis of elements and not enough on synthesis of systems.

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Micropitting in gear teeth. This seems to be a more relevant topic with the continual emergence of wind turbines.

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Lubricant degradation in piston assemblies. There needs to be more research into the residence time in and flow rates through the piston assembly as well as the rate of degradation when in the ring zone. This, linked with chemical analysis and study, will aid in understanding how lubricants degrade.

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I would look for a solid-lubricated bushing to replace rolling element bearings in low-speed, high-load applications. I believe the potential exists in diamond-like carbon coatings.

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A program to understand the flow of the air-oil mix in gearboxes and sumps. An analytical modeling process that could predict flows and churning losses could be used to optimize designs at much lower cost and schedule time than current methods.

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Oil analysis. There have not been many new things in the industry, and I feel that a large sum of money would provide the much-needed research in this area.

Biotribology. The improvements in knee joints, hip joints and the like would benefit large numbers of people.

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Energy-efficient test procedures. We need a standard test.

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Sliding friction. We deal a lot with drawing and stamping operations. The goal would be to develop more application and cost-effective products.

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Education. There are still too many people at all levels of manufacturing, from lubricators to vice presidents, who don't understand the importance of proper lubrication.

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Filtration. Most new equipment doesn't even have filters. Anything bigger than 15 microns can do damage to bearings. Without good filters, companies are crashing equipment—without even understanding why! <<

Editor's note: *Sounding Board is based on an e-mail survey of 7,200 TLT readers. Views expressed are those of the respondents and do not reflect the opinions of the Society of Tribologists and Lubrication Engineers. STLE does not vouch for the technical accuracy of opinions expressed in Sounding Board, nor does inclusion of a comment represent an endorsement of the technology by STLE.*