

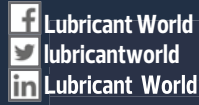
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The Lubricants Industry in (E-)Motion – How Disruptions Sustain Ability



Apu Gosalia – FUCHS PETROLUB

Total opens

state-of-the-art

lubricants plant in Russia

“Increasing quality

expectation turns into added

value in products”

Increase energy efficiency

in injection molding

up to 6-8 percent

Source: ICIS



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Editor's Letter



In the last issue of the year, we are delighted to have on our cover Apu Gosalia, Vice President Sustainability (CSO) & Global Intelligence, Fuchs Petrolub SE. We used the same cover for the Turkey Edition and International Edition. We are closing the year with one of the hottest topics on the sector's agenda: electric vehicles and sustainability. Electric vehicles will not come into our lives very quickly and will not overturn all the balances at once, but global companies that have to be forward-looking and always ready for the future have already started to take

the right steps in the face of the effects of this trend. Apu Gosalia wrote about their works in this field and explained what awaits the lubricant sector in the future.

We interviewed Fabien Voisin, CEO of Total Vostok, and learned about their new facility in Russia, which is equipped with the latest technology. Fabien Voisin shared how this facility will contribute to Total's operations in Russia and the region.

We also feature an esteemed figure from the Turkish lubricants sector in our November-December issue. We had a chat with Alev Gürbüz, who has been a part of the ExxonMobil family for a long time. Alev Gürbüz underlined the importance of quality assurance systems for companies and mentioned the works they carry out as ExxonMobil.

Petrol Ofisi carried out a field study at Akplas, a plastic injection molding plant in Turkey, comparing Petrol Ofisi Hydro Tech HVI-E 32 with Petrol Ofisi Hydro HD 46. The former is a high viscosity hydraulic oil while the latter is the currently used product in the plant. The results of the study were highly satisfying for both parties. Officials from Petrol Ofisi, Adco and Akplas expressed their opinion about the study and showed us how choosing the right product can increase efficiency by 6-8 percent.

I hope the year 2019 comes with promising developments and always brings good news for our sector.

Wishing you a happy and prosperous New Year!

Cansu Tuncer

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Increase energy efficiency in injection molding up to 6–8 percent



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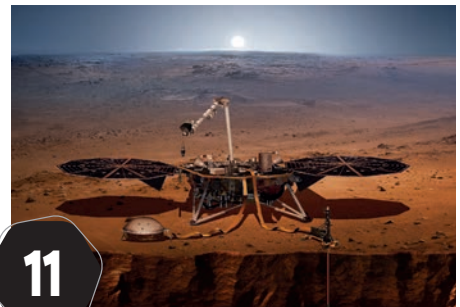
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Luxair and Binter select Turbonycoil 600 for their aircraft

NYCO, the sole European producer of aviation lubricants and expert in the development of synthetic ester-base stocks, is increasing its network of partners. Recently, two more companies – Luxair and Binter – selected Turbonycoil® 600 for their aircraft.

In November, NYCO announced that its longtime partner Binter launched its newest addition, the E195-E2. In 2019 the Embraer aircraft, powered by PW1900, will be flying with Turbonycoil 600, a synthetic standard turbine oil. NYCO turbine oil is qualified on all Pratt & Whitney GTF (Geared Turbofan) engines including PW1100 powering the Airbus A320 Neo.

Later, NYCO announced that the Luxair airline selected Turbonycoil® 600 to be used on its fleet of Boeing 737 New Generation and Bombardier Q400. Luxair serves more than 60 destinations, mainly in Europe and North Africa. The Luxair airline's current fleet includes 6 Boeing 737 NG (8 from 2019) aircraft powered by CFM56-7B engines and 11 Bombardier Dash 8 Q400 powered by PW150A engines.

In collaboration with Pratt & Whitney Canada and Bombardier, since 2017, Luxair's fleet Q400s have undergone a flight test campaign with the Turbonycoil® 600. This qualification will allow NYCO to grow its sales and increase its brand-awareness with regional airlines.

"After a careful assessment of NYCO's product range, certification criteria, and industry track record, a mutually beneficial collaboration emerged as the natural next step. We look forward to formally complete the certification process for the PW150A application, and remain confident to have found a reliable partner." said Cristian Nitulescu, Luxair Head of Engineering & Planning.

"We thank the Luxair teams for their support in qualifying our standard turbine oil on the Q400 and for their trust in switching their Boeing 737 NG fleet to the Turbonycoil® 600." said Pedro Dasi, NYCO new Head of Sales & Marketing for Civil Aviation.

Approved against demanding specifications, including SAE AS 5780 SPC Class and MIL-PRF-23699 STD Class, Turbonycoil® 600 has received certification for use by all major engine manufacturers. It has logged more than 30 years of experience in jet engines of military and commercial aircraft.





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Evonik launches COPI™ at ADIPEC

Evonik, one of the world leaders in specialty chemicals, participates this week at the Abu Dhabi International Petroleum Exhibition and Conference (ADIPEC) held between 12 & 15 November at the Abu Dhabi National Exhibition Center (ADNEC).

"This is the first participation for Evonik in ADIPEC, and we plan to use this platform to bring our latest technologies to the Middle East region," said Dr. Can Turhan, Business Manager for Evonik Oil Additives in Africa, Middle East, Turkey & Bulgaria.

"At this event, we regionally launched COPI™ technology – or Crude Oil Paraffin Inhibitors – targeting companies involved in the extraction, transport and storage of crude oil with solutions for the presence of paraffin wax in oil,"

Turhan added.

COPI™ from the Oil Additives team at Evonik provide benefits in crude oil recovery, flow assurance and storage. This technology modifies the formation and behavior of wax crystals in the oil, dispersing them and preventing them from adhering to surfaces, such as those in pipelines. Therefore, the new solution allows for better flow while transporting crude oil.

Evonik wins HR excellence award

Evonik SEA has received the gold award at the HR Excellence Awards 2018 in Singapore in the category "Learning and Development".

The HR Excellence Awards are the most recognized awards show in the Asia and Middle East region with renowned jury members from international companies such as Microsoft, Vodafone, Kimberly-Clark, Samsung and Hewlett Packard. The program is designed to recognize and celebrate excellence in outstanding human capital strategy and execution. Now in its sixth year, 26 award categories covered all key areas of human resources strategy.

Evonik SEA was awarded for its learning strategy as well as the implementation of the Evonik Global Development Portal (GDP) and Learning & Individualized Library (LILY), where employees have the opportunity to find their individual learning approach and are offered 24/7 available learning content. Other finalists in the category "Learning and Development" included AXA, Vodafone, Singtel and various international banks.



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Nynas celebrates 90th anniversary

When the first refinery of Nynas was taken into operation in 1928, the focus was on providing the Swedish market with fuel. Today, our highly specialized naphthenic oils are included in everything from gearboxes and rubber to adhesives and electrical transformers.

It all started in 1928. One of the great Swedish industrialists, Axel Axelsson Johnson, together with Charles Almqvist, were the men behind the building of Sweden's first large scale oil refinery. At that time, oil was already big business in America.

As the usage of cars had become even more popular in Sweden, the demand for asphalt and gasoline increased. From 1930-1980, Nynas petrol

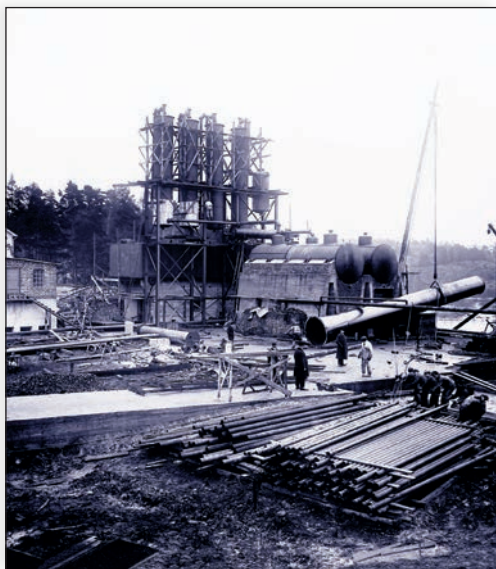
stations was a common sight throughout Sweden. Then came the energy crisis in the 1970s and after rethinking its strategy, Nynas dismantled the network of petrol stations transforming Nynas into a global group of companies with a focus on specialty products.

As the 1990s began, the modern Nynas continued with two business areas and began expanding its sales of naphthenic specialty oils internationally. Today, Nynas is a global leader in naphthenic oils and delivers next generation sustainable and efficient solutions to its customers.

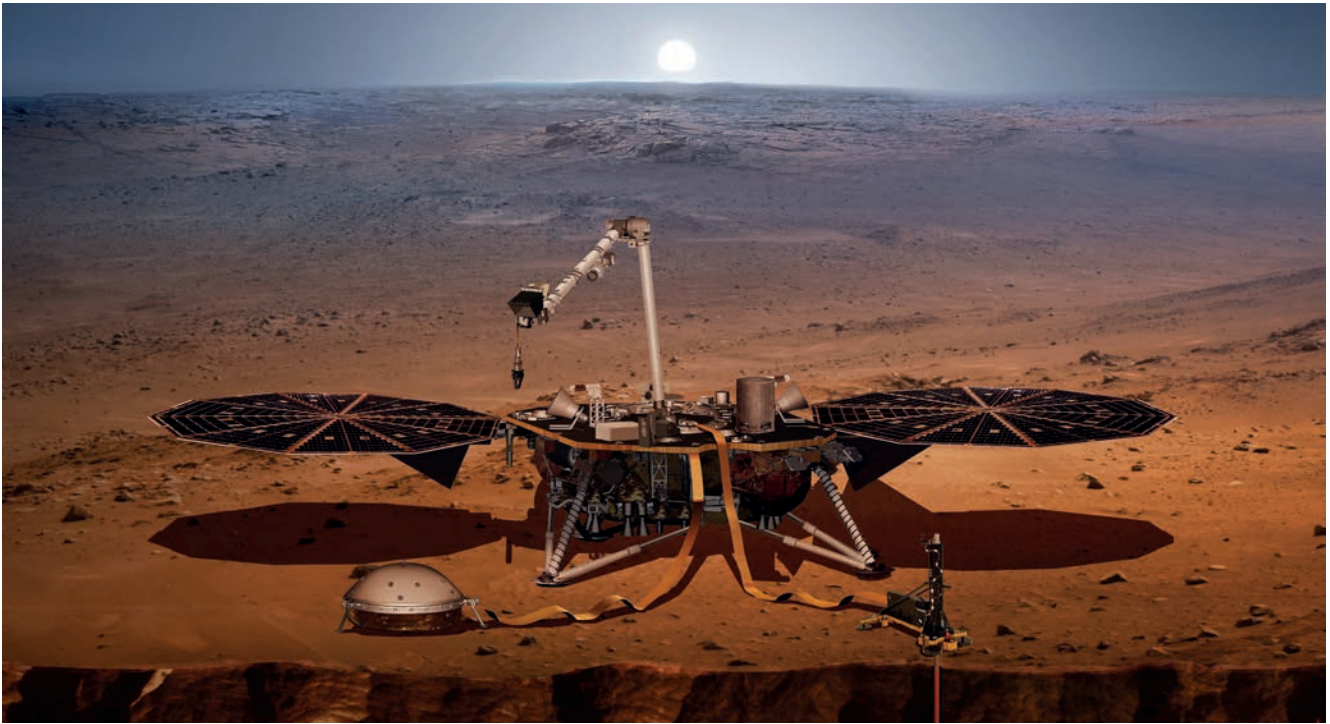
In November, Nynas celebrated 90 years of successes and solutions, research and development, investments and improvements, experience and innovation, acquisitions and partnerships and over 1,000 dedicated employees around the world.



The British tanker S/S Earl arrives with the first load of crude oil delivered to Sweden by ship



Construction of the Nynäshamn refinery, 1928



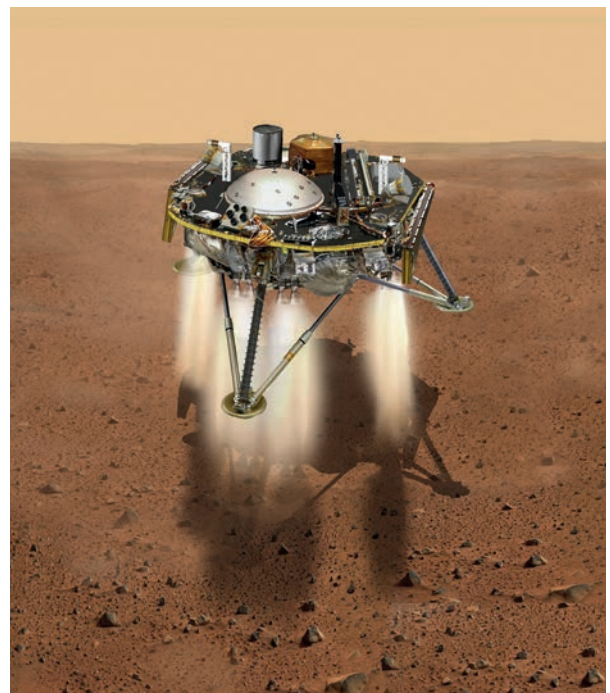
NASA prefers Castrol lubricants for its InSight lander

One of the world's leading engine oil manufacturers, Castrol provides lubricants for use in space in collaboration with NASA. Having been using Castrol lubricating oils in its space projects since the 1960s, NASA resumes its partnership with Castrol for InSight, its latest mission landed on Mars, in addition to the Apollo moon mission, the Hubble space telescope, the International Space Station, previous Mars rovers and numerous satellites.

Castrol products are lubricating many parts in NASA's latest mission to the red planet with the 829-million-dollar lander InSight for the purpose of collecting key information about the formation of Mars as well as other planets. The lander, which blasted off from California on May 5 and began its 485 million-kilometer journey, reached its landing site on a non-descript lava plain, called Elysium Planitia, after 6 months. Castrol products are keeping the scientific instruments to be used during the works in this site.

What is needed from a space lubricant?

Weaker gravity, temperature extremes and fluctuations, and the inability for humans to simply 'go fix' a faulty part all make Mars a hostile environment for a lubricant, and clearly reveals the critical importance of every part. In addition to this, any technical failures can mean mission aborted. That's why NASA prefers a lubricating product which will best suit the application and harsh conditions, will operate smoothly, and more importantly is reliable and durable. Each Castrol product suits the application, the environment and the duration of the task, and they offer the best protection for the longest time with the highest durability in NASA's lengthy missions.





Opet Fuchs is the supplier of first fill lubricants of F-MAX, awarded tractor of Ford Trucks

Opet Fuchs is the supplier of first fill lubricants of new Ford Trucks F-MAX, which is the winner of the 'International Truck of the Year' award. F-MAX was globally launched at the Hannover International Commercial Vehicles Fair (IAA). Opet Fuchs, a leading company in the lubricants industry, also supplies Ford

Otosan approved FMY Lubricants as original spare part for use in the periodical maintenance of F-MAX, which is developed and manufactured in Turkey.

For the first fill of F-MAX, the new haulage tractor of Ford Trucks, Opet Fuchs supplies FMY FORMULA GEAR CD 75W-85 –the world's thinnest heavy commercial differential oil, FMY ATF TYPE A as hydraulic steering oil, and FMY FORMULA XLD 5W-30 as engine oil.

Standing out with its innovative approach, product quality, expertise and competitive power, Opet Fuchs provides services for industrial operations in addition to its successful works in the automotive sector. The company offers products with over 10 thousand formulation to various sectors, including iron and steel, food, glass, wind power, and many others.

Opet Fuchs met with the engineers of the future at TUMKAF

Opet Fuchs participated in the Turkey Engineering Career Fair (TUMKAF), which took place on October 15-16, 2018. Ayşegül Özel Çelenk, Human Resources Manager at Opet Fuchs, stated that the company continues to work at full stretch to bring qualified workforce to the sector while contributing to the national employment.

"TUMKAF has been very fruitful for us to contact the targeted workforce. For two days, we had the chance to meet with the engineers who wants a career in the lubricants sector. We gave information about our company's place in the sector, and shared our sector's expectations," she said. Çelenk also noted that at the end of the fair all students that meet the relevant criteria are invited to the company to meet with the managers and get information about active business life.

Çelenk underlined that they participate in such fairs as well as the career days of universities in order to employ the qualified workforce in the sector. She said, "By means of university visits and fairs, we find the chance to personally contact the candidates who have the qualifications that the sector and our company needs. As Opet Fuchs, we reached 1000 candidates at the TUMKAF Summit. We aim to provide employment opportunities to eligible students for the workforce need of our company in the long term. She noted that they answered the questions of engineers and engineer candidates that visited the Opet Fuchs booth at the fair, and gave information about the career opportunities that the company offers.





"Yılın Kamyonu" Ödülü sahibi
Yeni F-MAX, ilk dolumda
FMY tercih ediyor.



**TÜRKİYE'DE GELİŞTİRİLEN VE ÜRETİLEN
F-MAX'IN ONAYLI MOTOR YAĞI**

Tüpraş supports entrepreneurs through “New Ideas New Businesses” Acceleration Program

As the leader of Turkey's energy industry, Tüpraş has become a strategic partner in the “New Ideas New Businesses” Acceleration Program in 2018. Tüpraş is involved in the program in line with its aim to integrate with the entrepreneurship ecosystem.

Levent Zağra, Assistant General Manager for Investment and Planning at Tüpraş, stated that the company strives to support the entrepreneurship ecosystem and innovative ideas while maintaining their intrapreneurship efforts. He also added: “We aim to contribute to the development of this ecosystem and support early-stage entrepreneurs with the benefit of our experience and know-how. Within our “New Ideas New Businesses” acceleration program, we have contributed to training sessions to monitor the transformation of ideas and provided mentorship to entrepreneurs. We have actively involved ourselves in every stage of the selection process. We believe that the program will cultivate new entrepreneurs who will be able to cooperate with us and contribute greatly to the ecosystem.”

The “New Ideas New Businesses” Acceleration Program (YFYI),” organized by the ODTÜ TEKNOKENT, is Turkey's first and largest technology-focused entrepreneurship program. The YFYI has contributed to the commercialization of more than 200 business ideas and added 1,000 new jobs. Aside from undergraduate, graduate, and PhD students, technology companies from 0 up to 36 months can participate to the YFYI process.



Petroyağ is awarded for great sector performance

The award ceremony for the Sector Performance Evaluation Organization took place for the 11th time this year. Ayhan Zeytinoğlu, Chairman of Kocaeli Chamber of Industry delivered an opening speech at the event, and stated that the contest covered only the province of Kocaeli in the beginning, but then the scope was extended to the East Marmara in 2014. After the year 2015, they started to evaluate the entire

Marmara Region. Zeytinoğlu underlined that the most important thing about the contest is the voluntary participation of companies. He said that their goal is to reward the companies for their contribution to the national economy, and provide them an opportunity to make a comparison in their sector and make up the deficiencies.

Performance criteria consist of 7 main categories, including “efficiency, contribution to employment, investment in branding, financial results, foreign trade volume, contribution to employees, contribution to the society and environment”. Award winners are determined with the consultancy of PwC Turkey and according to the reports prepared on the basis of these criteria.

Petroyağ was granted the “Petroleum and Petroleum Products Industry Sector Award” in the Large Scale Enterprise Category for the year 2018. “This prize is a great indication of the fact that our company makes the right moves in the R&D, Export and Branding fields despite the shrinkage and recession in the national economy. We are proud to crown our 25th year with this award, and I extend my heartfelt thanks to all my friends who contributed to this success,” said Ünal Soysal, Chairman of the Board of Directors at Petroyağ.

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Source: FUCHS PETROLUB

The Lubricants Industry in (E-)Motion - How Disruptions Sustain Ability

by Apu Gosalia

The global lubricants industry is in (e-)motion. Lubricant players are facing at least three major disruptions to the ways they do business today, which will have an impact on the development and pattern of global lubricants consumption in the future, with a decisive question asked behind:

“DrivElectric, Decarbonization, Digitalization – Do Disruptions Damage Demand?”

“DrivElectric”

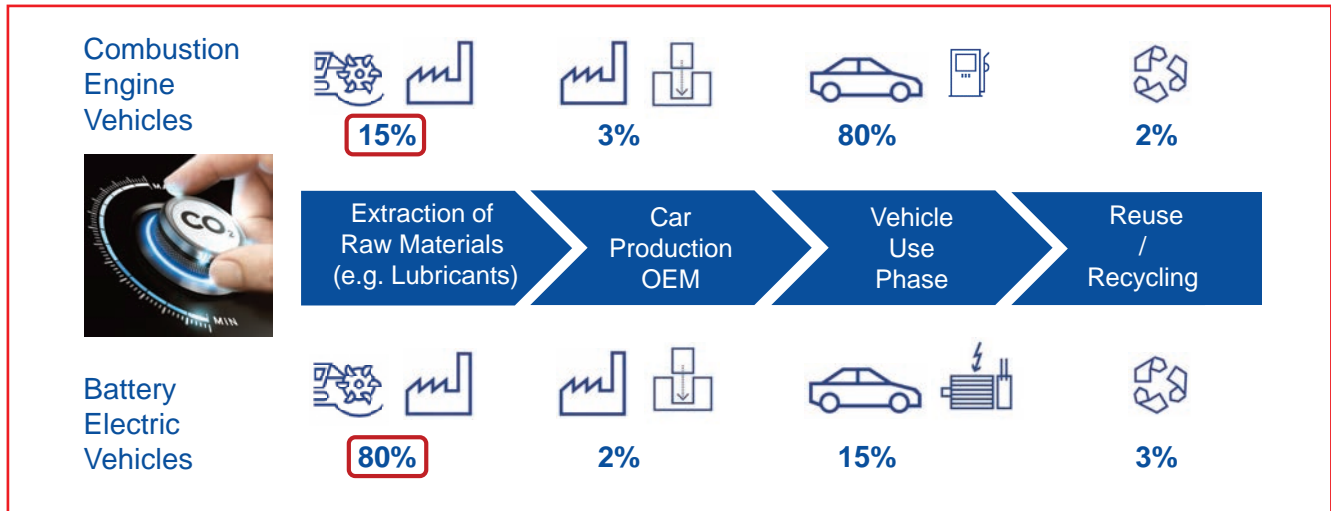
The successful technical breakthrough of electric vehicle technology depends on three factors: competitive car prices, increased driving range and accessible recharge infrastructure. Electric vehicles have different lubrication needs, so factory fill engine and gear oil demand will certainly be negatively impacted, with the combustion engine being replaced by the battery. The same will be the case with metalworking fluids, while aftermarket

demand for automotive lubricants will shrink rather slightly year on year as internal combustion car stock will be replaced. Also, the trend towards light weight, as steel is being replaced with more aluminum and thermoplastics, will lower the demand for forming lubricants and corrosion preventives. However, in every disruption lies not only a threat, but also an opportunity to increase or at least sustain ability. The batteries for e-vehicles for instance will require new formulations of battery cooling fluids, still largely to be researched and developed. First fill grease demand needs to



be evaluated too, as some applications will grow in volume and new applications could come up. The whole infrastructure for electrified cars has partially still to be built, further developed and maintained, which will increase the demand of lubricants e.g. in the construction industry segment. All over all, the impact of e-mobility on global lubricants demand in the next

10 -15 years could be slightly negative on balance by 2 to 3 percent. Demand in Europe could decrease by up to 10 percent and in the United States by up to 20 percent in this time frame, as result of the previously mentioned influences, while lube demand in China could increase by 15 to 20 percent due to increased car sales.



CO₂-Distribution Car Lifetime / Source: FUCHS & BMW Data

“Decarbonization”

There exists a logical bridge between “DrivElectric” and “Decarbonization”. The evolution of e-mobility along with the replacement of the combustion engine by a battery in cars, will also offer new sales opportunities for lube manufacturers based on sustainability criteria. The whole focus of car manufacturers will shift from the use phase to the supply chain regarding their CO₂-distribution, i.e. a measurable low(er) product carbon footprint of a sustainable lubricant will help the car manufacturers to lower their overall CO₂-balance in the future. In this way sustainability is becoming a differentiation criteria and competitive advantage for lube manufacturers' products to their customers. Decarbonization in the lubricants



Apu Gosalia

Vice President Sustainability (CSO) & Global Intelligence
FUCHS PETROLUB SE

industry is not only relevant on the sales side, but much so also on the raw material side. The corporate carbon footprint is a key performance indicator that specifies the amount of greenhouse gas emissions that every company produces. The largest share of the corporate carbon footprint of a lubricant manufacturer at the end of the process and value chain is not produced within the company's own – and therefore directly controllable – limits, but much more in its supply chain. Hence, decarbonization in the lubricants industry will also require global partnerships between lube manufacturers and suppliers, who need to find procedures to reduce the carbon footprint of the raw materials they supply to lubricant blenders, as only in this way they will ultimately be able to significantly and measurably reduce the carbon footprint of their finished lubricants.

“Footprint” vs. “FUCHS print”

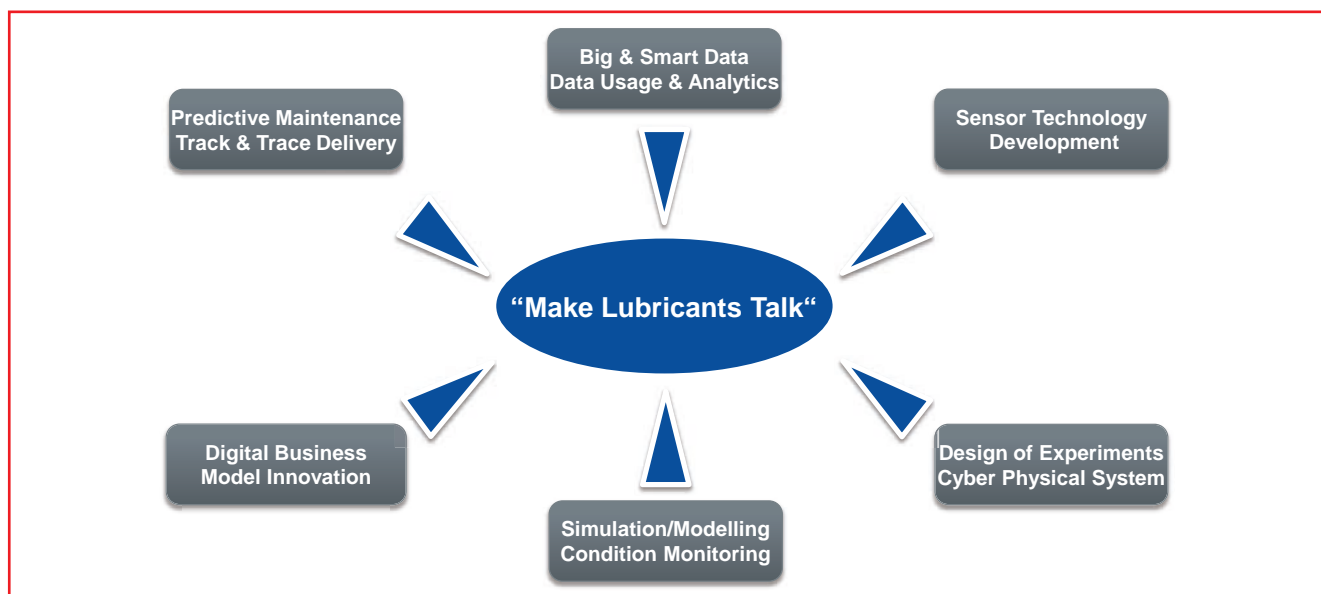
Sustainability Assessment Ecological indicators	“Footprint”				“FUCHS print”
	Raw materials (usage)	Transport (incoming raw materials)	Lubricant production (processing & blending)	Transport (outgoing finished products)	Utilization phase (application)
Energy consumption	n. a.	n. a.	X	n. a.	X
Water consumption	n. a.	n. a.	X	n. a.	X
Waste generation	n. a.	n. a.	X	n. a.	X
CO ₂ emissions	X	X	X	X	X

Source: FUCHS Sustainability Report 2017

“Digitalization”

There exists as well also a logical bridge between “Decarbonization” and “Digitalization”. According to a year 2018 study by the World Economic Forum and the consultancy Accenture, the broader use of digital technology could bring the chemical industry a \$550 billion benefit over the next 10 years, while reducing CO₂-emissions by around 100 million tons. Digitalization is a term referring broadly to employing information technology to make business practices more effective and in this way is an opportunity, as data collection throughout the whole value-chain will be widened compared to today’s standards. An extended exchange in between customer and lubricants company will allow for new services and therewith add extra value to business. On the other side digitalization is a disruptive development that lubricant manufacturers need to handle not only as an opportunity, but also when it becomes a threat. Direct and automated usage of information generated at a later step of the process will affect all steps before and start-up

companies could nudge their way into the lubricants industry, by applying whatever statistics and simulation methods one can think about to substitute and dig in into the traditional relation between lubricant manufacturer and customer. This trend is mostly visible in China in these days. These start-ups can offer directly to the lubricant customer sophisticated tools such as sensoric condition monitoring, data mining and big data – all of which can be used for system modelling in chemical, tribological, logistic and manufacturing areas, i.e. they ultimately offer them to analyze nearly all parts of their operations. In the next step they advise them not only about their lubricant usage in the future, but also on various other aspects of their business – such as the raw materials or equipment they use in their manufacturing process. The potential threat behind to lubricant marketers is, that in this way these start-ups may also determine the lubricant characteristics itself that are needed for the customer and then identify the best source for such performance, with the traditional lube formulating manufacturer developing to nothing less than just a simple toll manufacturer.



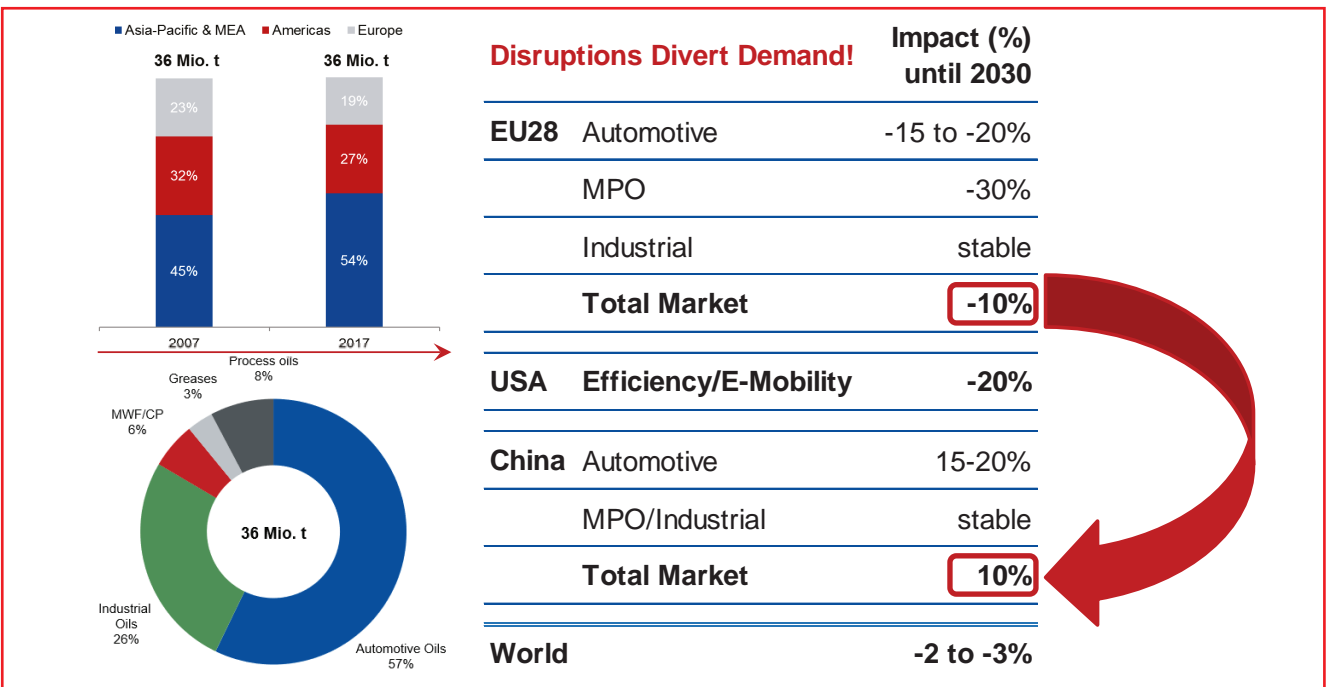
Source: FUCHS Sustainability Intelligence



“Do Disruptions Damage Demand?”

Our initial question can be answered with a clear: “No!”. We need to pay attention to the disruptions of our time, but they cannot kill lubricants (demand). We simply need to adopt to the new realities for the future of our business. However, considering the previously mentioned developments - for instance the impact of electrified cars on the global and regional lubricant consumption shifts - we can also clearly determine three things: “Disruptions Divert Demand!” - “Solution: Sustainability!” and “Sustainability Demands Disruption”. And why so?

Sustainability demands us to radically rethink our business models, not just how we sell our products in the future but how we create value. The issues that come under sustainability – climate change, resource constraints, food security, population growth, poverty and more – are so large and pressing, that they are changing the context in which businesses operate. Sustainability issues will drive waves of change in business sectors, affecting customer needs, resources and technologies available, investor expectations, regulatory requirements and much more. Companies need to come up with radical new products and services just to stay in business.



Global Lubricants Demand / Source: FUCHS Estimation

“How Disruptions Sustain Ability”

How will the European lubricants industry handle all these disruptions of our time and how do they call for sustainability as a solution and business concept? The Union of the European Lubricants Industry (UEIL) announced at UEIL's Annual Congress in Budapest-Hungary in October 2018 the formation of a sustainability task force, which will be chaired by FUCHS, to tackle these questions and to develop a framework to measure the sustainability of lubricant companies in the future. The group will work proactively to define requirements that the European Union is already beginning to introduce for the industry. The task force will commence in January 2019 and will essentially function as a think-tank, with three task force meetings planned in the first year, mainly to be held in Brussels. It will evolve into a full-fledged committee of the association at a later stage. One of our main tasks is to write a framework for lubricant suppliers to report about their sustainability, as the European Union is requiring public interest entities and businesses with at least 500 employees to file non-financial declarations on sustainability and diversity, including information about key performance indicators (KPIs) for ecological impact, such as energy consumption and carbon footprint since 2017. At some point, the regional body will extend that requirement to smaller companies and begin to mandate that businesses meet some level of sustainability. The ecological impact will be one criteria of the sustainability framework to be developed in the task force, but there will also be measures of a business's economic sustainability and of its social impacts. We need KPIs

beyond performance and price for selling lubricants, i.e. also based on sustainability criteria. For the ecological dimension it is important that the industry starts working toward a lifecycle assessment (LCA), measuring impacts at every point in the process and along the value chain. Lubricant companies should receive credit for their social impact, considering that some 30 percent of global energy production is lost to friction, wear and corrosion, while the primary focus of our lubricant industry is to reduce all of these. We reduce more CO₂ with our products in their use phase than we produce in making them. This message needs to reach young people, if the industry is to attract the best talents in the future, as the next generation expects no longer only money, career or job security from their future employers, but also the conviction, to work for a good and sustainable company. It is noteworthy, that organizations other than lubricant companies will be allowed to participate in the task force. For the first time, the entire process and lubricants industry value chain will work together, from raw material suppliers to lube blenders, customers and end-of-life treatment representatives. The task force will cooperate closely with the European Re-refining Industry Section of the UEIL and the union's Health, Safety and Environment Committee, as well as the Sustainability Initiative of the German Lubricant Industry (NaSch), which FUCHS helped to form under the umbrella of the German Lubricants Manufacturers Association (VSI). We also plan to coordinate with external parties. It needs to be a work towards creating a coalition of the willing to find sustainable solutions for dealing with all the disruptions of our time and finding new ways of how we want to develop, produce and sell lubricants in the future.



Source: FUCHS PETROLUB



THE EIGHTH BASE OIL & LUBES MIDDLE EAST 2019

10 - 11 April 2019, Dubai, UAE



The **8th Annual Base Oil and Lubes Middle East Conference (BLM 2019)** is organized by Conference Connection in Dubai, UAE on 10-11 April 2019. BLM 2019 will continue to provide a good spread of topics, high calibre speakers, quality presentations and premium networking opportunities for the base oil and lubricant industry. Leveraging on strong NOC-MPGC relationships, BLM has enjoyed the patronage and support of the Bahrain National Oil Company (BLM 2012), Abu Dhabi National Oil Company (BLM 2013, 2015, 2016 & 2018) and Emirates National Oil Company (BLM 2014, 2017) and in 2019, BLM will be supported by the Emirates National Oil Company. Continuing its focus on the global base oil business, BLM provides both knowledge sharing and networking opportunities, with participation from leading producers, suppliers, manufacturers, re-refiners, traders and end-users from twenty-five countries.

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Increase energy efficiency in injection molding up to 6–8 percent

Akplas, a key actor in plastic injection molding, conducted a field study in cooperation with Petrol Ofisi. According to the results of the field study, it is observed that you can increase energy efficiency up to 6–8 percent by replacing the hydraulic oil used in injection machines with the Petrol Ofisi Hydro Tech HVI-E series.

Energy is one of the most important expense items of the industry. The oils used in hydraulic systems contribute greatly to energy efficiency. A low viscosity oil can cause problems such as internal and external leakage, inadequate lubrication and compressibility, while a high viscosity oil can cause hydrodynamic friction and churning losses. Therefore, balance and the correct viscosity are highly important factors in hydraulic fluids.

Many manufacturers act very carefully while choosing hydraulic oils in order to reduce their energy consumption and achieve higher efficiency, and constantly work to further increase the level of efficiency. Akplas, a key actor in plastic injection molding, is one of these manufacturers.

Operating in the field of plastic injection molding since 1989, Akplas serves the automotive, white goods, heating and cooling industries. With two plants located in Gebze, Kocaeli, Akplas works with leading companies. It carries out continuous global technological researches specific to the product, makes investments in automation, and cooperates with its stakeholders and universities.

In this context, Akplas carried out a field study on the hydraulic oils used in injection machines in collaboration with Adco Oil Additives and Petrol Ofisi, and investigated the impacts of a special formulated hydraulic oil on energy efficiency.

In this field study, Petrol Ofisi's specially formulated high viscosity index Hydro Tech HVI-E series was used. The results of the field study were satisfactory for both sides.



ARZU YILDIRIM
Technical Field Manager
Petrol Ofisi

Critical parameters were carefully measured. Energy consumption was evaluated with great precision. Voltage signals of three phases (L1, L2, L3), initial and final values of the pumps used in the operation, temperature of pump discharges, temperature of the hydraulic oil tank, and ambient temperature were recorded in high frequencies (2500 measurements per second). It was observed that physical work per piece is lower with the Petrol Ofisi Hydro Tech HVI-E 32, which has high viscosity index. Accuracy obtained in statistical studies was determined as 98 percent.

Accordingly, it was seen that Petrol Ofisi HydroTech HVI-E 32 product lowered the electric consumption of the two pumps by 6-8 percent. Moreover, it was identified that Petrol Ofisi Hydro Tech HVI-E 32 heated less than the previously used 46-viscosity lubricant. In addition to the increased efficiency, unit time per piece was also calculated. In this way, it is estimated that there will be an output growth by 7-10 percent. It is also projected that this efficiency will be balanced both in summer and in winter, and the lubricant's life will be almost doubled thanks to the high viscosity index and fluidity control of Petrol Ofisi Hydro Tech HVI-E 32.



HALİL ÖZTÜRK
Technical Sales Specialist
Adco Petrol Katkıları

Petrol Ofisi Hydro HD 46 (current hydraulic oil in use), Petrol Ofisi Hydro HD 46 (reference hydraulic oil changed with the oil in the system) and Petrol Ofisi Hydro Tech HVI-E 32 (high viscosity index hydraulic oil) were measured using energy, temperature and pressure parameters and analyzed under real production conditions in order to compare the energy consumption in Akplas plastic injection plant.

The results obtained in the product tests were highly satisfying. It was seen that significant levels of energy saving is possible by changing the current hydraulic oil in use. It is estimated that choosing the right and efficient product will offer not only energy conservation but also many other gains in the long term.



HAKAN YILMAZ
Process Development Responsible
Akplas

As the use of plastic is increasing in almost every field, plastic injection process is preferred more and more every day. As Akplas, we are a corporate firm with a wide product range and customer network in the field of plastic injection molding. We are always searching for and following any improvements that will provide added value to our company, and we try to reflect such developments in our production.

Electric consumption is one of the most important expenses of plants and factories, and it is an obligation to carry out various studies to make improvements in this regard. Especially in companies that has manufacturing operations mostly in plastic injection, electric consumption is a priority area for improvement. Therefore, we carried out a joint study with Petrol Ofisi and Adco companies with the aim of facilitating the operation of machine pumps and decreasing our electricity consumption by using a specially formulated hydraulic oil in the injection machines in our plant. When we analyzed the results of this one-week study, we observed that electricity consumption of the pumps decreased by 6 percent and thus, continuity of such studies is important.

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“Increasing quality expectation turns into added value in products”

Quality expectation of consumers in the lubricants sector is consistently rising. Brands, which invest in constant development and follow current trends, turn this into an advantage. Product Quality Assurance Manager Alev Gürbüz, a part of the ExxonMobil family for a very long time, elucidated the increasing importance of the quality system.

You have been a member of the ExxonMobil family for a long time. We would like to get to know you better and listen to the story of your first step into the industry.

I completed my primary, secondary and high school education in Eskişehir. I worked in the plastics sector for three years after graduating from METU Department of Chemistry. In the meantime, I completed the Business Administration Expertise Program at Istanbul University. My story in Mobil Oil Türk A.Ş (MOTAŞ) started in the Serviburnu Facility. In this period, I took charge in various positions related to quality and formulation. I served as Europe Quality Coordinator for almost 5 years. Currently, I am taking office as Product Quality Assurance Manager at the Serviburnu Facility. Considering my 27 years in Mobil Oil Türk A.Ş, I think it is obvious that my primary field of interest is the energy sector.

What are your responsibilities in ExxonMobil? Can you please describe your one day at the office?

My responsibilities mainly consist of formulas, the Quality Control Laboratory and the quality system of our laboratory. In addition, I take active role in the quality systems, operation and control integrity of the company. I am also the technical representative of MOTAŞ at PETDER (Petroleum Industry Association).

My day at the office starts with assessing the changing priorities in the laboratory with my team, and updating the day's plan in this framework. We work together with the teams in production, planning and distribution departments during the day. For the rest of the day, I work with our laboratories in the EAME region (Europe, Africa and Middle East), and our Product Technical Consultants and Quality Management Department teams working in these laboratories. As



I take part in various subjects and projects in a highly dynamic and vigorous environment, I lose track of time. I think I owe this to the nice and efficient teamwork both in Turkey and the EAME organization.

How does the quality system work? Can you describe the company's quality policy?

Product integrity and customer satisfaction are the biggest priorities of our company. As a global brand; the product's quality, performance, representation and compliance with legal regulations as well as customer experience and brand identity are proactively managed thanks to our management systems in product integrity. Our commitment to brand and product integrity helps us constantly assess and improve our product integrity management systems.

As Mobil Industrial Oils, we offer developed products to leading industrial equipment manufacturers and help these manufacturers protect their customers' engines and machines, allow them to maximize their performance while improving their energy efficiency. Our expert team provides high quality oils in a reliable way thanks to our strong distribution network, while offering technical implementation services to customers all around the world.

How do you see the increasing quality expectation in the lubricant industry?

Industry and automotive are among the sectors that keep up with the rapidly developing technology. Solutions for increasing productivity come to the fore in the energy sector. In particular, the importance of efficiency in industry is undeniable. Thus, quality expectation has substantially increased in the lubricants sector. This trend is reflected on products as added value and requires



Alev Gürbüz
Product Quality Assurance Manager
ExxonMobil Turkey

constant development in quality management systems.

Consumers are more demanding about product quality. Is this an advantage or a disadvantage for companies?

Today's consumers are more demanding, and therefore manufacturers have to develop new products and solutions to be able to meet these expectations. I think it is an advantage for the companies which can develop their staff and products in this direction.

Lastly, we would like to talk about ExxonMobil's laboratory in Turkey. Can you please give us some information about your analysis, test and R&D works?

Our laboratory is fully equipped with all necessary technical units required for lubricant analyses. We closely follow the latest technology, and attach great importance to updating our equipment in this regard. In addition to the production of test data and the quality system in which the activities related to data production are managed; maintenance and calibration of devices, participation in international test programs, periodic assessment of test methods, statistical quality control analyses, and studies related to environment, safety and security are carried out and trainings are provided in our laboratory.

Our research and development activities are conducted under the control of the R&D department in the US, and ExxonMobil Turkey is regularly informed about the studies and developments.



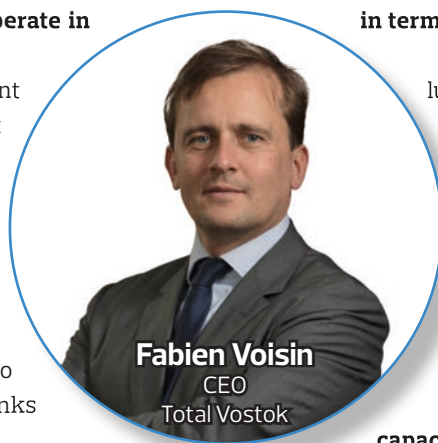


Total opens state-of-the-art lubricants plant in Russia

Total opened a state-of-the-art lubricants oil blending and production plant in Russia with an investment equivalent to USD 50 million in the 10th anniversary of Total Vostok's operations in Russia. We interviewed Fabien Voisin, CEO of Total Vostok, and learned about the strategic features of this plant.

For how many years does Total operate in Russia?

Total products have been present on Russian market since 1993, but 2018 is the anniversary year for us, as 10 years ago the affiliate of Total Marketing & Services, supplying products to the Russian market, was officially registered. These 10 years showed a great potential of the local lubricants market and we plan to continue expanding our presence thanks to localization of our operations.



Fabien Voisin
CEO
Total Vostok

in terms of lubricants?

Total generally views Russia (the 5th lubricants market in the world) as one of its high-priority markets and we work to address the needs of the local consumers. We also always look into opportunities to further improve and develop our products across all fields we are involved in, whether it is automotive or industrial lubricants.

What will be the total blending capacity of the new lubricant plant in Kaluga?

The new plant in Vorsino (Kaluga region) is designed to produce 40,000 tons of automotive and

What is the strategic importance of Russia for Total

is designed to produce 40,000 tons of automotive and



industrial lubricants per year, with an option for its production capacity to be easily scaled up to 70,000 tons per year. It is equipped with a fully automated blending system and ultramodern filling lines.

Which products will you produce in this plant? Will you export these products? If yes, to which countries?

From now on the new Total Vostok plant will produce the entire range of Total and Elf products including: Total Quartz for passenger cars, a wide range of Total Rubia for commercial vehicles engine oil, a full range of industrial Azolla and Equivis hydraulic oils, Seriola and Carter industrial oils as well as Fuel Economy lubricants line, which will allow to significantly reduce fuel consumption of both commercial and passenger vehicles as well as off-road vehicles. The plant will allow supplying products to all markets of the Russian Federation. Moreover, we will export some products to Belarus, Azerbaijan and Central Asia.

Which technologies do you use in this plant? Can you give specific information about the operation principles of this plant?



All production activities are performed within a computer assisted environment. Raw materials are transported by dedicated pipes in order to avoid any contamination between products. Dosage of raw materials is made using mass flowmeters, which allow a high accuracy but as well an optimization of process time. Quality of finished goods made by the plant is monitored during all production steps, by plant laboratory.

Can you briefly evaluate the lubricants industry in Russia? How will this new plant affect Total's operations in Russia and the world?

Total blending plant is the most modern on Russian market – no other blending plants were open in Russian in the last 5 years.

Total is the third foreign operator plant in Russia and the combined capacity of these 3 international brands produces close to 250,000 tons of lubricants. All the rest of the local production is split among 15 other plants belonging to Russian producers. We plan to reach more than 5 percent of Russian market, targeting top-tier segment. This organic growth will be reached thanks to local production. Time to market will be reduced and logistics savings could represent up to 5 percent of cost of product.





Prof. Dr. Ertuğrul Durak
Süleyman Demirel University
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Academic Member
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Lubricants and lubrication from mechanical engineering students' perspective

Mechanical engineering is a field of engineering which studies, researches and provides training about the construction, manufacturing, manufacturing planning, assembly, maintenance-repairation and operation of all kinds of mechanisms, mechanical systems and energy conversion systems. This study focuses on the opinion of the students of mechanical engineering undergraduate program about lubricants and lubrication in general. When the curriculum of mechanical engineering undergraduate program is examined, it is observed that these subjects are partially covered in courses such as Machine Elements, Machine Design, Engines, etc. In Turkey, they are included in the curriculum of major universities such as Boğaziçi University, Süleyman Demirel University, Middle East Technical University, Dokuz Eylül University, Yıldız Technical University, Ticaret University, Bozok University, Pamukkale University, Fırat University, Cumhuriyet University and Piri Reis University as selective courses with the titles

"Lubrication Techniques; Friction-Wear; Friction, Wear and Lubrication; Tribology; Tribology Principles and Practices; Wear and Lubrication in Machine Elements, etc." Moreover, although limited, these trainings are provided as laboratory courses in some departments. Similarly, foreign universities such as Imperial College, Auburn University, Oakland University, Tokyo University of Science, Karlstad University, Penn State University, Northwestern University, etc. have selective courses and/or training, interdisciplinary laboratory practices with the titles "Tribology; Lubrication; Friction and Wear; Surface Technology and Tribology; Introduction to Tribology".

In this study, opinion of two different student groups –students who completed their third year and graduate students of Süleyman Demirel University Mechanical Engineering Department with the condition of having taken the Industrial Lubricant Techniques course. This text discusses the student perspectives on lubrication and lubricants and whether they find sufficient the

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theoretical information they learned during the courses. Questions asked and answers of the students are given below. The former number indicates the percentage of third grade students while the latter number indicates the graduate students.

When did you hear about lubrication and lubricants first?

Machine Elements (32%), Laboratory (38%), Energy Technologies (10%), Introduction to Mechanical Engineering (5%), Material Information (5%), Manufacturing Processes (4%), Other (6%).

Was this information sufficient?

Sufficient (80%, 18%), Not Sufficient (20%, 82%).

What can be done?

Practical courses should be opened (65%, 80%), more comprehensive information should be shared (21%, 8%), it should be supported with visual presentations or videos (14%, 12%).

Which terms have you learned about lubrication and lubricants?

Viscosity (25%, 30%), lubricant-grease (6%), friction force, friction coefficient, wear (11%, 21%), lubrication (lubrication, hydrodynamic lubrication, hydrostatic lubrication, bearing) (10%, 16%), sealing components (2%, 7%), Stribeck curve (7%, 28%), tribology (10%, 22%), oil film (8%), Petroff equation (1%, 15%), other (filter, oil reservoir, oil pump, thickness, cavitation, bearing, oil canal, Sommerfeld number, grease fitting, etc.) (20%, 30%).

Do you think lubrication is an important subject for mechanical engineering practices?

It is important in terms of friction and wear and in terms of machine's life and efficiency (39%, 52%), it is important because it may cause financial loss (31%, 34%), it is important in terms of heat control and the function of machine parts (30%, 14%).

Do you think lubrication is important for machines or systems only for wear and life, or do you think operational costs make it important, too?

It is important for wear and life (14%, 17%), it is

important for operational costs (17%, 25%), it is important both for wear and life and for operational costs (69%, 58%).

What have you learned the most from these courses?

Lubrication must be considered in machine design (9%, 56%), it must be considered in daily life (7%), importance of lubricants and lubrication (51%, 56%), how much it affects the machine's life, maintenance is important (9%, 18%), impact on efficiency (9%, 27%), no answer (15%)

Will the content of these subjects affect your decision when selecting your career path or sector?

Yes (71%, 69%), No (25%, 15%), No Answer (4%, 16%)

Has your thoughts about maintenance and lubrication in machines changed after learning this information?

Maintenance, reparation and lubrication is important (52%, 87%), not much change in thoughts (11%, 7%), No answer (37%, 6%).

This study will be published in Lubricant World magazine, which is distributed worldwide and all across Turkey. Therefore, would you like to deliver any messages with the sector? If any, please share with us.

Yes (15%): The number of Turkish articles should increase, the magazine should reach the students of relevant departments, the magazine should offer employment opportunities, information should be shared on lubricant preferences in the market, seminars should be organized for students, training videos should be prepared, catalogues should be shared with universities, awareness-raising activities should be organized for the public, Turkish products should increase, there should be more opportunities for young engineers, there should be employment opportunities for students in the sector, universities should be supported for experimental studies, companies should focus on R&D, etc. No (27%), No answer (58%).

It is understood that the perspective of our students change when they gain information about lubricants and lubrication; thus we should increase the number of such courses, and universities should organize more training activities in partnership with the industry.





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How to read an oil label?



1. BASE OIL

Lubricants have a principal ingredient called "base oil", which represents 75 to 85 percent of the oil and which may be of mineral (petroleum) or synthetic blends or of synthetic origin.

2. VISCOSITY

The information on viscosity describes the behaviour of a lubricant when the temperature changes. This property is measured with the SAE specification. The higher the number, the more viscous is the lubricant.

3. TYPE OF ENGINE

Indication of the type of engine (petrol engine or diesel engine).

4. PRODUCT PERFORMANCE CLAIMS AND OEM APPROVALS

Confirmation that the lubricant meets the technical requirements as set out by the Original Equipment Manufacturer.

5. QUALITY CLASSIFICATION

There are two specifications to be aware of and these are API (American Petroleum Institute) and ACEA (European Automobile Manufacturers Association). All good quality oils should contain both of these specifications.

ÜRETİMDEN SON TÜKETİME KADAR HER AŞAMADA FROM PRIMARY PRODUCTION TO FINAL CONSUMPTION

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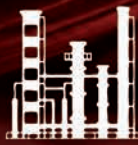
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