NLGI SPOKESMAN

Serving the Grease Industry Since 1933 - VOL. 86, NO. 3, JULY/AUG. 2022

In this issue:…

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Serving the Grease Industry Since 1933 - VOL. 86, NO. 3, JULY/AUG. 2022

ON THE COVER

NLGI
Board of Directors

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118 N Conistor Ln, Suite B-281, Liberty, MO 64068
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PRESIDENT'S PODIUM

Anoop Kumar, Ph. D
Chevron Products Company
NLGI President
2022-2024

It was indeed great pleasure meeting you all in person those who joined us during NLGI's 89th Annual Meeting June 12-15, 2022, at the Westin Harbor Castle in Toronto Canada. As always, it was another successful meeting in spite of COVID constraints. The meeting was packed full of education, technical deliberations, networking, and fun activities. There was a total of 321 attendees, 18 technical presentations, panel discussion on sustainability, sustainability town hall, two education courses, CLGS exam as well as a fantastic awards ceremony highlighting this year's deserving recipients. On behalf of NLGI, I thank you all, member organizations, sponsors, and exhibitors for your continued support of NLGI.

I am both privileged and humbled for getting the opportunity to serve this pioneering institute as your new President. Grease is my passion and serving this not-for-profit society at the helm of affairs is a great honor to me.

I also take this opportunity to express my sincere thanks to Jim Hunt, our past President for his outstanding leadership over the past two years. Despite the unprecedented COVID scenario, we achieved a lot virtually during his tenure and look forward to his guidance, experience and ideas in his role of Immediate Past President with NLGI's Executive Committee.

My affiliation with NLGI started in 1997 when I got a chance to work in formation with the NLGI India Chapter, running its activities until 2008. I am very pleased to note that the NLGI India Chapter is now self-sustaining and a well sought place for its activities in that part of the world. Thanks to my employers, first Indian Oil Corporation Limited, followed by Axel Royal LLC (former Royal Mfg LLC) and now Chevron Products Company, a division of Chevron USA for allowing me to work in this industry and be a part of this great institute.

As world is changing at a faster pace and both challenges and opportunities are presented to the grease industry, the NLGI board of directors felt necessity to revamp our efforts as the leading organization in the global grease industry. Therefore, we recently hired a consultant to guide us on how associations like ours, are faring. Additionally, we want to demonstrate how we can improve our organization by adopting additional best practices and previously learnt lessons.

Based on series of deliberations and workshops, we have identified **six strategic priorities**. My efforts over next two years will be to focus and work on enhancing these guiding principles.

continued on next page...

- **Effective Governance and Leadership:** As we look towards the future, some changes to our governance structure may be needed to create broader member engagement. We will work through the potential changes without sacrificing our core values and principle.

- **Membership Value, Engagement and Growth:** Focused efforts on increasing membership value, engagement, transparency, and growth.

- **Global Outreach:** Expand our global partnerships with NLGI-India, ELGI, CLGI and others in a meaningful way.

- **Industry Trends and Challenges:** Be the leading source for industry issues, trends, and challenges. We will continue to produce our annual worldwide grease production survey, develop grease industry related specifications like the recently launched HPM certification and continue to work on developing specs for future grease industry needs, addressing lithium challenges and be involve in the EV space.

- **Education & Networking Opportunities:** Enhancing education through our basic and advanced lubricating grease courses as well as the hands-on training course. Will also include improved resources including new edition of NLGI's Grease Guide (including a full version as well as individual chapters), along with technical articles in The NLGI Spokesman, NLGI's four coveted certifications and the desired CLGS accredidation.

- **Sustainability:** Be the leading source for sustainability in the grease industry. A task force has been comprised and will focus on different aspects pertinent to our industry. A starting point was this year's conference theme "Finding Green in Grease."

I look forward to serving as NLGI President over the next two years. Please don't hesitate to contact me or NLGI Executive Director, Crystal O'Halloran for any thoughts or feedback you might have on enhancing value for NLGI members. We would love to hear from you!

Thank you very much,
Anoop Kumar, Ph.D


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Industry Calendar of Events 2022

Please contact Denise if there are meetings/conventions you'd like to add to our Industry Calendar, denise@nlgi.org
(Your company does not have to be an NLGI member to post calendar items.)

NLGI India Chapter 24th Lubricating Grease Conference	**August 26-28, 2022**	Visakhapatnam, India	NLGI India Chapter
Lubricant Expo	**September 6 - 8, 2022**	Messe Essen, Germany	Lubricant Expo
ILMA 2022 Annual Meeting	**October 1 - 4, 2022**	Marco Island, FL	ILMA Meetings
ELGI Autumn Events	**October 24 - 27, 2022**	Amsterdam, Netherlands	ELGI Autumn Events

Warm Welcome to our New NLGI Member

Rexol FZC	*Manufacturer*	United Arab Emirates

Advertiser's Index

2022 STLE Tribology and Lubrication for E-Mobility Conference
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Submit an abstract to present at the
2nd STLE Tribology and Lubrication for E-Mobility Conference
at the Southwest Research Institute (SwRI) in San Antonio, Texas,
November 30-December 1, 2022.

Please complete the submission form with your abstract. Abstracts must be 1,000 words or less.
Please note that all presenters must be willing to present in person at the EV conference.

Novel Lithium Free Thickener System: Performance Profile, Characteristics and Target Applications

Dwaine Morris, Shell Global Solutions (US), Inc.

New High-Performance Grease Technology

For the last 80 years, lithium has been the dominant thickener technology for lubricating greases. In fact, globally lithium and lithium complex greases account for approximately 70-75% of all grease production [1]. Lithium based greases have been persistent due their versatility, frictional properties, and cost-effectiveness. However, simple lithium greases have limited operational temperature ranges. Lithium complex greases address most of these shortcomings, but equipment design and customer expectations regarding performance are challenging the ability of these greases to meet customer needs.

In an ironic twist, when lithium-based greases entered the market, promising work on lithium alternatives was halted. Now that industry is seeing increased cost of goods pressures from non-grease related lithium demand, it is forced to evaluate alternatives that were potentially abandoned in the past.

Demand for lithium has increased due to competitive applications such as batteries [2] (Figures 1 and 2). These alternative demands have the potential to erode the cost-effectiveness of lithium-based greases [3].

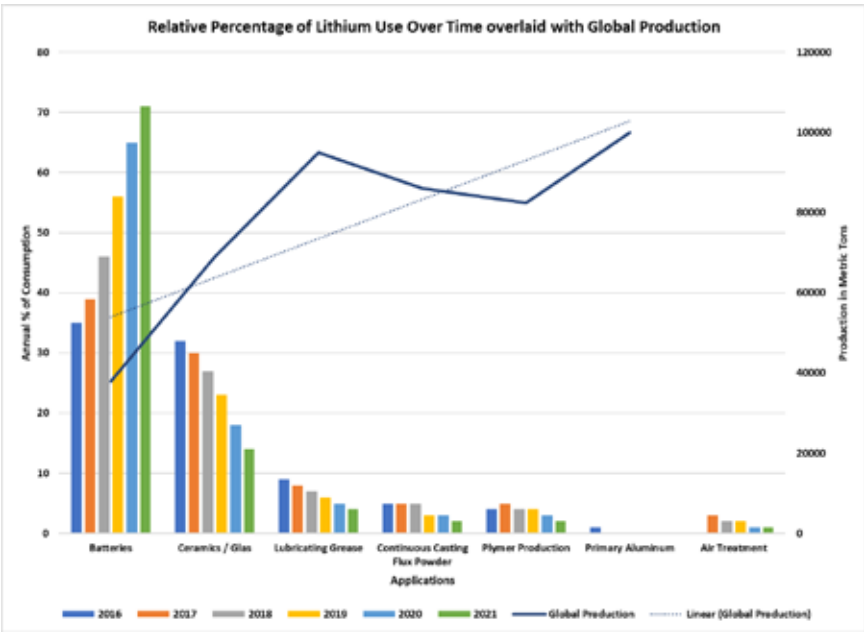


Figure 1 Application demands for Lithium and Production per year

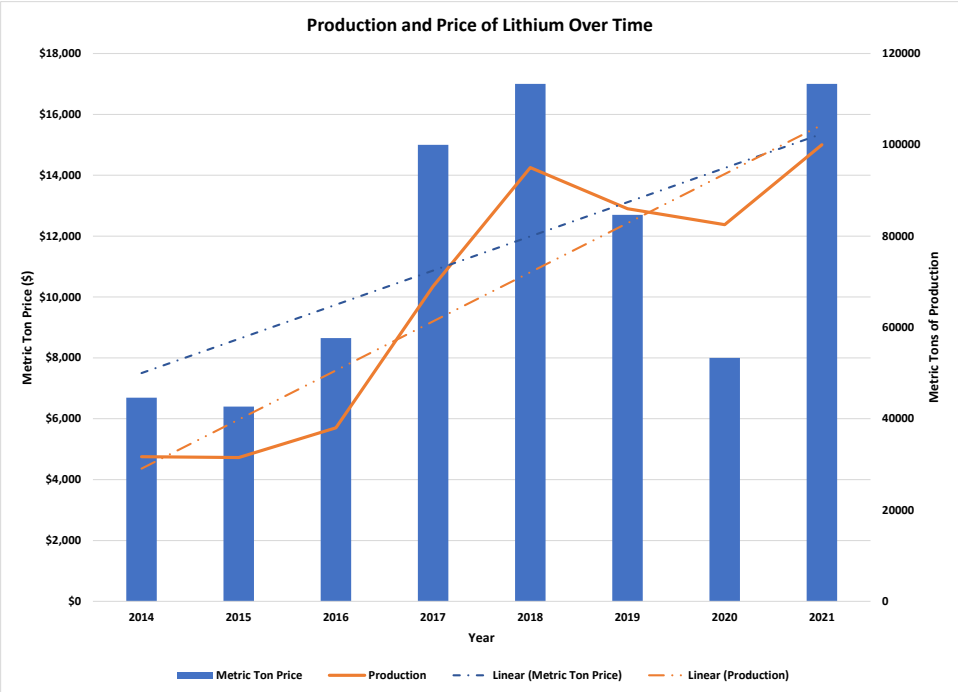


Figure 2 Lithium production and price changes over time

Alternative grease technologies are available but have not gained significantly in market share and have their own limitations. As industry increases its focus on sustainability and carbon intensity, the search for effective, high-performance alternatives to lithium-based greases has accelerated. A new class of greases, not dependent on lithium or other raw materials that have handling challenges would be primed to displace lithium, providing a versatile, high-performance alternative for industrial and transport applications. A novel thickener system **(NTS)** has been developed that can be manufactured in existing production vessels / production lines. This thickener system has demonstrated unique properties and is a promising alternative thickener system that could compete to replace significant lithium-based volumes and provide performance advantages.

Figure 3 Industrial change drivers and trends

Innovation Drivers
In an effort to reduce weight and increase efficiency, many OEMs are designing smaller components. As equipment shrinks, relative loads are increasing, corresponding to increasing operational temperatures. This impacts performance additive choice, base oil selection and lubrication service intervals. Fill-for-life applications are increasing in number and are pushing the limits of standard greases to meet customer expectations (Figure 3).

It is becoming increasingly more obvious that reliance on 80-year-old technology is tenuous at best. As industry focuses on efficiency / reduction of lost work, new technologies are needed. For a world in motion, this is a needed upgrade.

Formulary Insight
A new, patented grease thickener system has been created that enables high-performance, long service life lubricating greases with enhanced frictional properties that increase bearing efficiency. The novel thickener system is a lithium-free, complex grease that incorporates calcium into the thickener matrix. It utilizes a unique blend of acids and method of manufacture that imparts exceptional properties that enable class-leading performance advantages.

Greases formulated with this thickener system have dropping points that exceed that of complexed lithium greases and in line with calcium sulfonate complex greases (250°C to 300°C). The thickener system forms a very thick, tenacious film that can be detected in a bearing running track post-durability testing (SKF R0F). In that test, the grease is subjected to high shear and normal / light loading. There is no re-lubrication of the test bearings, and they are run to failure.

R0F Test Conditions[4]:

Bearing Type	Deep Groove Ball Bearing (6204-2Z/C3) (5 sets of two)
Grease volume fill	Normal (1.4 grams)
Speed	Variable from 5600 to 20,000 RPM (10,000 RPM is standard)
Load	100N axial / 50 N Radial

In the standard test, a L50 life in excess of 1000 hours is the target based on a Weibull distribution of the test bearing set.

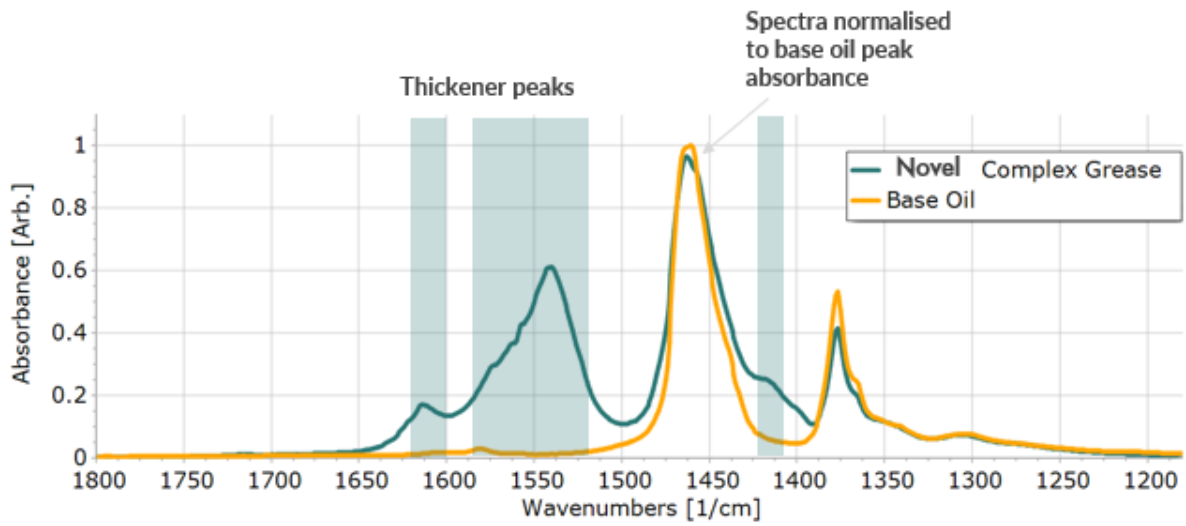


Figure 4 Grease film composition FTIR Spectrum compared to base oil only spectrum

In the graphic (Figure 4) the yellow Fourier transform infra-red (FTIR) trace indicates the base oil spectrum of a grease formulated with the novel thickener system. The green trace, also highlighted in green boxes indicate the FTIR spectrum of a fully formulated grease manufactured with the new thickener system taken from the running track of a post-test R0F bearing. Why this is so significant is that while it has been known that grease thickeners contribute to the bearing raceway films, the extent to which that happens varies from one thickener technology to the other. The normalized intensity of the thickener peaks demonstrates how significant the contribution is relative to that of the base oil (yellow trace).

Performance Profile

Greases manufactured with the NTS are very mechanically stable (even in the presence of excess water), oxidative and water resistant, and have excellent load carrying capacity. The long mechanical service life means that it is well suited for fill-for-life applications. Water resistance makes these greases ideal for use where there is potential for water washout or ingression into the application (steel manufacturing, pulp and paper, or over the road transport). When the heat is on and oxidation is a concern, this thickener system has similar performance as polyureas.

Full-size production batches have excellent performance. Figure 5 is a tabular comparison of production batch averages versus performance of a high-quality lithium grease.

			Mineral ISO 320 NTS	Mineral ISO 220 Li, EP
Performance Parameter	Conditions	Method	Running Avg of Production Size Batches	Typical Values
Dropping point (°C)		IP396	295	>180
Penetration worked (0.1mm)	25°C	ASTM D217	335	285
Oil Separation (%m)	18h @ 40°C	IP 121	0.3	1.6
Oil Separation (%m)	168h @ 40°C	IP 121	1	3.5
Shell Roll (0.1mm)	18h, 65°C +10% water	ASTM D1831	52	70
Four Ball Weld Load (kgf)		ASTM D2596	400	315
Four Ball Wear Test scar diameter (mm)	40kg; 1h; 75°C; 1200rpm	ASTM D2266	0.44	0.6
Copper Corrosion (-)	24h @ 100°C	ASTM D4048	1b max	1b max
Emcor rust test (-)	distilled water	ASTM D6138	0/0	0/0
Emcor rust test (-)	SSW	ASTM D6138	1/2	2/3
Timken OK Value (lbs)		ASTM D2509	60	50
Water Washout (%m)	1h @ 79°C	ASTM D1264	2	4
Water spray off (%m)	5min at 38°C	ASTM D4049	24	30
FAG FE-9 (h)	L50-6000 rpm/1500N, 140°C	DIN 51821	170	
	L50-6000 rpm/1500N, 130°C			200
Oxidation stability (kPa)	100h @ 99°C	ASTM D942	29.0	28

Figure 5 Performance testing results for full-size production batches versus an ISO 220 mineral Lithium based grease for context

Why is the NTS different?

There are three specific areas where grease manufactured with this thickener system are different:

- Versatility in film formation and contribution
- Non-traditional frictional performance
- Friction performance on ‘rough’ surfaces

Formulary Versatility

Using base oil selection to manage film thickness is possible with this thickener system, opening the potential to produce greases that have a thicker film within ISO viscosity grades (compared to lithium for

example) and could facilitate the use of lower viscosity base oils that have an impact on friction, lost work, and other key parameters depending on the application.

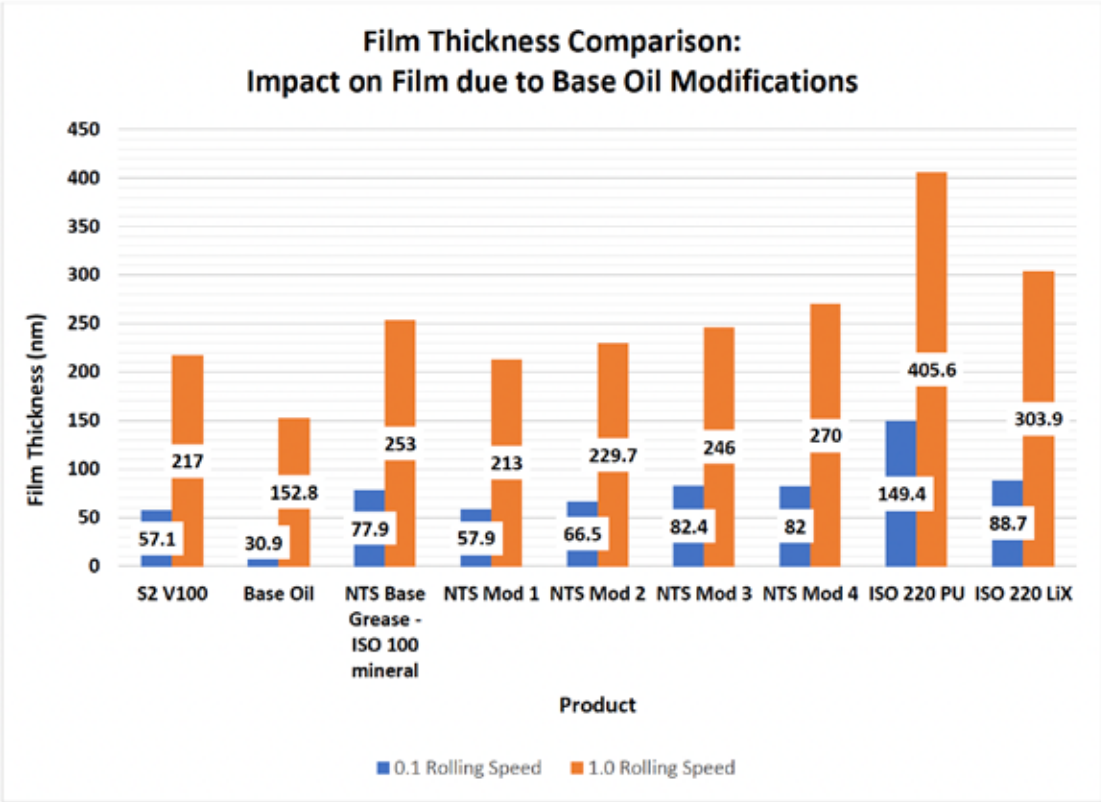


Figure 6 Impact of base oil variation on film thickness

The relative film thickness of ISO 100 greases, produced with the novel thickener system, as base oil modifications are made is illustrated in Figure 6. These were measured using a ball-on-disc tribometer (PCS Instruments) with pure rolling contact. The temperature was 40°C and the test was run at speeds from 10 to 1000 mm/s (0.01 to 1 m/s). The results in figure 4 are those measured at 0.1 and 1 m/s. The film thickness of a standard lithium grease and the base oil that is used to manufacture it are in the first two sets of bars. The base ISO 100 mineral grade grease manufactured with the novel thickener system (NTS) is the next set of bars. Each of the next four sets of successive bars are a 15% base oil substitution of the base grease, illustrating the effect on film thickness that can be achieved with a minority base oil substitution. For context, the last two sets of bars are for ISO 220 Polyurea (Di-urea) and lithium complex greases. It has been well understood that PU greases provide a very thick film at low linear speeds [5,6]. This work aligns with these previous findings. What is important to note is that an ISO 100 grease manufactured with NTS produces nearly the same film thickness as that of an ISO 220 lithium complex.

It is possible to achieve a fluid film thickness that is 24% thicker than the lithium-based ISO 100 grease. The same grease has a measured film thickness that is only 10% thinner than an ISO 220 lithium complex grease (the last set of bars). The implication is that you can reduce viscosity and still have a film thick enough to adequately protect the components.

These results suggest that one may begin to evaluate greases with base fluid viscosity at least one ISO grade lower capable of providing sufficient component protection and provide efficiency gains, reducing lost work. This is potentially very interesting for industrial electric motor and electric vehicle applications.

produced being consumed by electric motors, a 1% overall efficiency gain can remove tons of carbon dioxide while accomplishing the same amount of work. In the case of EV, range impacts are being explored.

Frictional Performance

Beyond the ability to reduce viscosities, the properties of the grease itself are unique with respect to frictional performance. Bearing manufacturers place operational temperature limits based on torque at start up. Industry accepted values (as indicated by bearing manufacturers such as SKF [4]) are suggested based on the ability of a lubricating grease to 'bleed' oil from the grease structure into the bearing contact. This bleed rate decreases with decreasing temperature. At the same time, the apparent viscosity of the grease increases, further increasing torque values. SKF calls this the Low Temperature Limit for the test grease. This varies from one grease to another and can be significantly different depending on which thickener technology is utilized to reach the desired NLGI consistency (thickener content can vary widely to achieve the same NLGI consistency). The general rule is that maximum, starting torque, should not exceed 1,000 mNm (or 1Nm) at the ambient start up temperature. The ASTM D1478 / IP 186 test is the method used to measure this maximum torque.

In the graph below (Figure 7), the first four sets of bars are the measured low-temperature torque results in this test for market available, dedicated electric motor greases. On average, the starting torque is over 4,500 mNm at -40°C. This is considered extremely cold. With these results, none of the market greases would be suitable for intermittent operation in climates where the ambient temperatures reach -40°C / -40°F. Under these ambient conditions, it would be advised to utilize a synthetic grease to reach the recommended torque requirements.

A mineral oil (Group I/II blend) NTS grease of the same ISO grade has drastically lower torque in the same test- by greater than 50% (the 5th set of results). Compare that to the remaining sets of bars that are the results from synthetic ISO 100 greases. The frictional performance of the NTS grease approaches the performance of a synthetic, while utilizing a mineral oil base stock

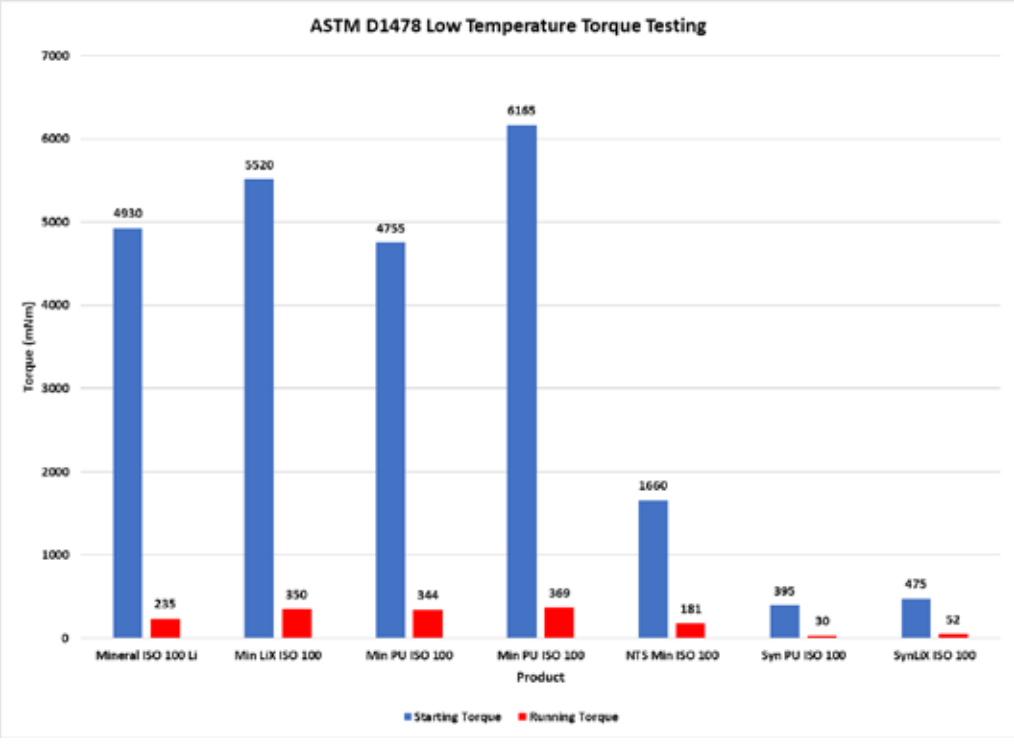


Figure 7 ASTM D1478 Low -Temperature Torque results for comparison

Figure 8 Torque response as ambient test temperature increases

What is even more significant is that this torque gap is consistent, even when starting ambient temperature increases (Figure 8). The effect does not shrink as those temperatures increase. The gap persists and averages ~57%. This is illustrated in the gap between the red and blue lines. The implications on bearing efficiency are significant- regardless of if we are considering industrial or EV/transport bearings.

As industry looks to performance in ultra-high-speed bearings, such as those in electric vehicle applications, grease manufactured with this thickener system can enable efficient bearing operation, offering reduced friction and viscosity for the application. Consider the graphic below:

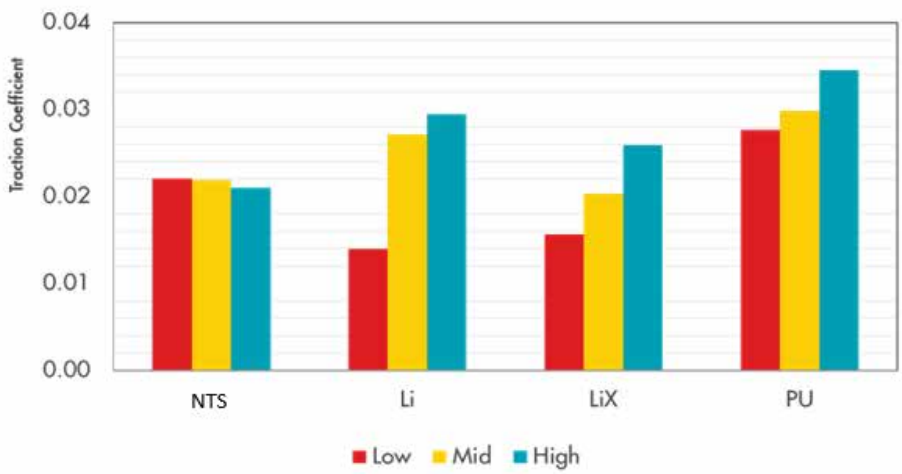


Figure 9 Traction coefficient versus liner speed for various greases

The graph (Figure 9) indicates the friction properties of the test grease as speeds increase in the contact. This data was measured using the mini traction machine (MTM – PCS Instruments). It was run with 5% slide-roll ratio at 40°C. A grease scoop was used to maintain mostly fully flooded conditions. The red bars indicate 10 mm/s liner speed, while the yellow indicates 100 mm/s and the blue bars indicate 1000 mm/s. The frictional response from representative Li, LiX and PU thickened greases respond as anticipated, as linear speed increases, friction increases. However, the grease manufactured with this innovative thickener system exhibits no increase in friction as speeds increase over two orders of magnitude. This is unique behavior that needs to be understood and leveraged to reduce lost work.

"Rough" Surface Frictional Performance

Lastly, surface roughness versus frictional behavior of greases manufactured with this thickener system show performance advantages as well. Required viscosity is a function of surface roughness, speed and operating temperature. Bearing OEMs have proprietary software or equations that, based on their bearing finishes, predict the required viscosity of an oil or grease necessary to provide adequate lubrication. The surface finish comes at a manufacturing cost that ends up in the final cost to the bearing consumer. The NTS greases illustrate frictional performance has been tested on very smooth to 'normal' rough surfaces. When compared to standard lithium, lithium complex and polyurea greases this technology exhibits 'non-standard' behavior where friction does not increase with surface roughness, but actually declines slightly. Again, this behavior needs to be verified and understood before true impacts can be projected.

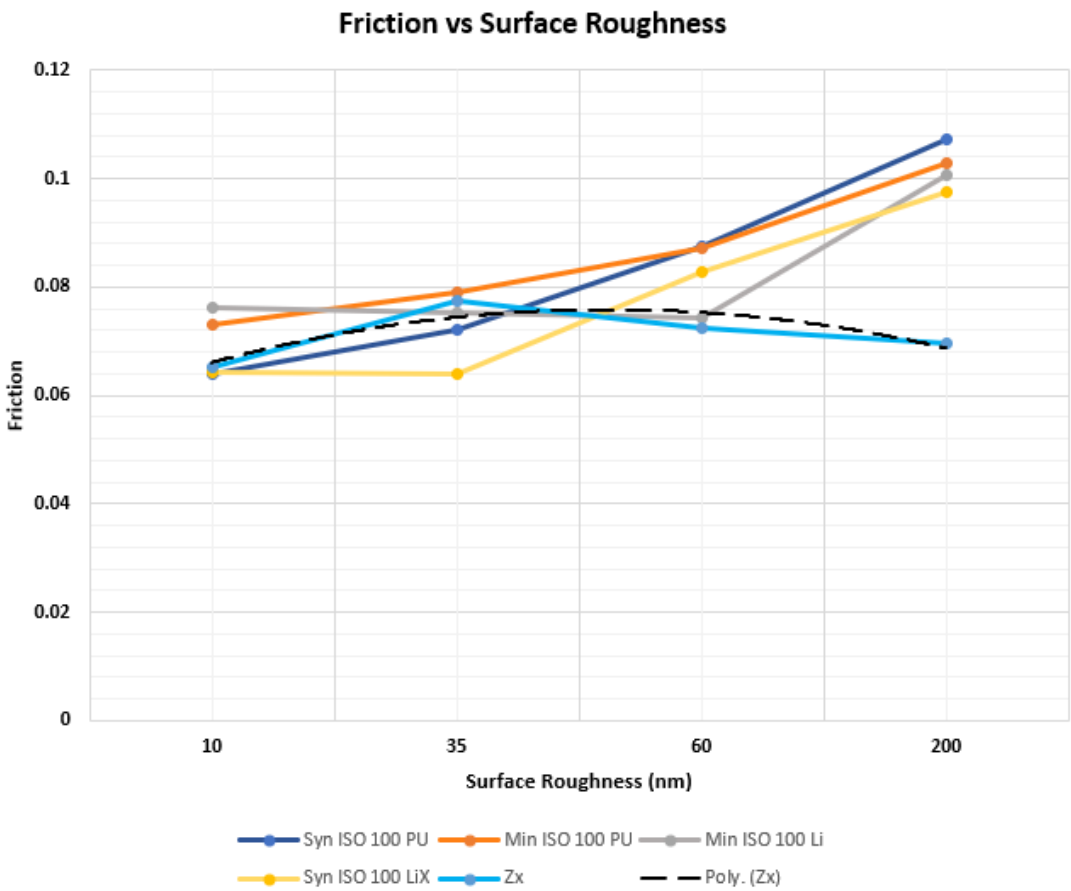


Figure 10 Frictional performance of greases on surfaces of different mean roughness

This data (Figure 10) was generated in a ball on disk tribometer where the surfaces were polished to different average surface roughness. The standard greases illustrate increasing friction as surface roughness increases. Lubricating greases manufactured with NTS behave differently where friction stays essentially flat.

When paired with the speed independent friction illustrated earlier, this is the final, remarkable property of this thickener system. In large industrial bearings, the surface finishing costs escalate with size. The finer the surface, the more costly. By being able to achieve low frictional performance across a wide speed range, the bearing OEMs could find relief from those added costs- directionally making them less costly to the consumer in the end without increasing the viscosity required to lubricate them. And, when viscosity is low, the bearings can run more efficiently.

Why does this matter?
The performance implications of these unique physical properties are ground-breaking. The thicker, tribologically active film enables reduced base fluid viscosities that enable bearing efficiency without sacrificing reliability and component protection. The unique frictional properties of the thickener enable the use of this technology in electric motor (and EV) applications providing constant low friction as speeds vary, again reducing lost work in the bearing.

The payoff is significant with the reduction of lost work relative to sustainability goals. The incremental efficiency gains across a facility (or vehicle) that contains thousands of electric motors can provide a tremendous, aggregated benefit. When one combines the effects of low viscosity, synthetic base fluids and the thickener behavior, the reduction of carbon dioxide emissions across the industry and transport sectors can provide significant benefits as industry strives toward a more sustainable future.

1 National Lubricating Grease Institute Annual Production Survey (2019)
2 Lithium Data Sheet- Mineral Commodity Summaries, US Geological Survey, (2016-2022)
3 Lithium Data Sheet – Mineral Commodity Summaries, US Geological Survey, (2016-2022)
4 “Grease Lubrication in Rolling Bearings”, Lugt, P. (2013)
5 Cann PM, “*Grease Lubrication in Rolling Element Bearings – Role of Grease Thickener.*”, Lubrication Science, 19:183-196 (2007)
6 Di Laurentis N, Kadiric A, Lugt P, Cann PM, “*The Influence of Bearing Grease Composition on Friction in Rolling / Sliding Concentrated Contacts*.”, Tribology International, 94: 624-632 (2016)

Women in Grease
INTEREST NETWORK

Connecting, Sustaining and Educating
Industry Experts Around the Globe

NLGI Women in Grease Interest Network is committed to educating, promoting, advancing, and sustaining industry experts in the lubricating grease industry while emphasizing the need for diversity in management and leadership. This is accomplished by connecting professionals within the industry through networking events, educational workshops and philanthropic endeavors.

OPEN TO ALL MEMBERS!

- Contact nlgi@nlgi.org to join the distribution list.
- Details on inaugural virtual event coming soon.

NLGI Interviews Mr. Chuck Coe
President, Grease Technology Solutions LLC
Round Hill, Virginia, USA

By Mary Moon and Raj Shah

Mr. Chuck Coe
President, Grease Technology Solutions LLC
Past President, NLGI

Although Chuck Coe majored in chemical engineering, his undergraduate education included only a one-hour lecture on lubrication and tribology. That didn't matter because Chuck joined Mobil as an industrial oils technologist and then moved down the hall where he learned to make greases. It didn't take long before Chuck realized that greases are cool! After a successful career at ExxonMobil, Chuck morphed into a consultant. Through these changes, he has remained a loyal supporter, board member and officer of NLGI. To learn more about Chuck's views on the global grease industry, new NLGI HPM Specifications, and NLGI Grease Production Survey, read on!

Education

NLGI: Please tell us a little bit about where you grew up and where you went to school. Were you a science nerd? What were your hobbies and interests?

CC: I grew up in south Jersey, where I went to elementary and high school. Then I went to Penn State University, where I majored in chemical engineering and graduated with a BSChE. I was probably considered an academic nerd, though I didn't think so! At the time, my hobbies were ice hockey and listening to what we now call "classic rock" music with my friends.

NLGI: How did you develop your interest in engineering and science? Did a particular professor, student, course, or project spark your interest in technology?

CC: My interest in STEM probably started with my Dad. He was a chemist, but I thought that chemical engineering would be a more practical career. When I took a vocational interest test at Penn State about choosing the right major, the results flagged both engineering and music. I chose the major where I could eventually make some money!

NLGI: Did you study lubrication or tribology?

CC: In my four years in college as a chemical engineering major, I took one course in petroleum technology. The professor spent one day teaching the class about lubrication! My only formal education in tribology amounted to one page of notes about the Stribeck curve. Maybe tribology was covered in more depth in mechanical engineering courses.

Careers

NLGI: How did you begin your career at Exxon Mobil?

CC: I started my career in the fibers industry. My job appeared to be a dead end, so I started investigating petroleum and chemical companies. A recruiter got me an interview with Mobil for a position as a fuels technologist. The day before my interview, I reviewed my one or two pages of notes on fuels. At the interview, I learned that they were actually looking for a lubricants technologist. I had to do some bluffing in the interview, but I got the job!

NLGI: What was your first job there? How did your career develop?

CC: My first job at Mobil was working as an industrial oil technologist. My responsibilities included working with customer issues and formulating, field testing and evaluating new base

stocks and additives. After about 3 years working with industrial oils, I was moved to the Grease Group. The Grease Group worked in the last aisle in the building and was viewed as purgatory! But it didn't take long before I realized that greases are cool - ten times more interesting than industrial oils!

The Grease Group worked in the last aisle of the building…. But it didn't take long before I realized that greases are cool!

I think greases are really cool because, to me, they are much more challenging than industrial or automotive oils. The manufacturing aspect is so much more important because in most cases, you have to react fats and acids to make soap thickener and then process it in a very controlled fashion to create an intimate relationship between the oil/additives and the thickener.

NLGI: Did a particular mentor, colleague or experience influence your career at ExxonMobil?

CC: My first supervisor in the Grease Group at Mobil was very influential. He wanted me to work in the pilot plant making grease almost every day. Learning how greases are manufactured really hooked me on grease because it was so much more challenging than simply dissolving additives in oil.

NLGI: Do you have any advice for readers who are thinking about joining (or are working for) a multinational corporation?

CC: The good news is that there are many different and diverse opportunities in multinationals. I held positions in lubricants technology, fuels technology management, downstream planning and budgeting, base oil supply, fuels inventory and transportation management, and planning. I also worked on the leadership team for two SAP projects. However, in some multinationals, creativity isn't always fostered, and there may be many controls in place.

NLGI: Please tell us about the turning point in your career that led from ExxonMobil to Grease Technologies Solutions LLC. Did you spend a long time planning to make this transition, or did things quickly fall into place?
CC: Great question! It was a little of both. I was constantly reviewing my forecast of my retirement assets to see when it would be feasible to retire. Then two things happened that told me it was the right time to retire: The discount rate was at an all-time low (which increased the lump sum from my pension plan), and my management would not allow me to take on the role of vice president of NLGI.

NLGI: How did you conceptualize and start your Company?

CC: I had a vision of doing a lot of grease technology training, both customized training for clients and more general training to prepare candidates for the NLGI CLGS exam. Unfortunately, the CLGS certification is what I call a "stealth" certification. Not many people are aware of it, especially in comparison to STLE's CLS certification.

While I do some training for clients, I also do a variety of other things related to grease, including market analysis, product line planning, litigation support, OEM support, novel renewable base fluid and additive evaluations and, of course, the NLGI Lubricating Grease Production Survey.

NLGI: What are some pros and cons about working as an independent consultant?

CC: The pros are that I work (mostly) at my own pace, can choose what I work on, get opportunities to do all sorts of different projects, and don't have to fill out expense account forms! The cons are that because I am around the house, my wife, Patty, thinks I can work on the "honey do" list all the time, even when I'm busy with GTS work!

NLGI: Do you have any advice or suggestions for readers who are interested in going into business on their own and possibly becoming a consultant?

CC: You need a good solid base of knowledge in the field where you want to consult. As my career developed, I felt concerned I was becoming a jack of all trades and master of none. I'm lucky that I had the opportunity to finish my career at ExxonMobil with 6 years of grease technology management. This allowed me to refresh my grease knowledge before retiring.

You need a good solid base of knowledge in the field where you want to consult.

NLGI: Please share your thoughts about what makes a good, effective consultant.

CC: Listen! Make sure you are crystal clear about what the client wants. And don't take on projects that are outside your area of expertise or ones that you don't want to work on.

NLGI: From your perspective, when or under what circumstances does it make sense for a company to hire a consultant?

CC: A company needs a consultant when they a don't have the internal expertise to do something or they simply don't have the time to commit their own employees to do tasks that they can outsource.

NLGI: Please tell us a little about how you and a client company protect intellectual property, proprietary business information or sensitive data. How do you handle these situations?

CC: In many cases, I sign a non-disclosure agreement and follow it's requirements. I never share anything I do or develop for one client with another – if I did, I would go out of business.

Listen! Make sure you are crystal clear about what the client wants.

Grease Industry

NLGI: What is your perspective on the lubricating grease industry worldwide? What are some challenges and opportunities?

CC: The lubricating grease industry is shrinking. There are regional shifts in production to locations where raw material, labor and transportation costs are lower. But a bigger global trend is responsible for the decreasing demand for grease. That is, grease quality is improving, which allows grease to last longer in applications. An increasing number of applications are fill-for-life, and that means no re-greasing, and less grease is used. This leads to opportunities to develop products with higher performance. Products with higher performance have higher prices, meaning larger margins. Globally, the industry will sell less grease but make more money from higher margins.

Globally, the grease industry will sell less grease but make more money from higher margins.

NLGI: Looking forward, what trends do you see influencing the grease industry?

CC: A big trend is the focus on sustainability. Sustainability means many different things to different people. The lubricants industry needs a universal definition and metrics for sustainability. At present, marketers are promoting greases that are biodegradable, or reduce friction and energy consumption, or use recycled raw materials. And grease producers are working to reduce their carbon footprint during the manufacturing process as well as transportation of their products. The increased attention being paid to sustainability is not going to go away.

The lubricants industry needs a universal definition and metrics for sustainability.

NLGI: On February 24 of this year, Russia invaded Ukraine. At the time of this interview, NATO members, the United States, and some of their allies are responding to the invasion by discontinuing purchases of oil and related products from Russia and increasing their imports of LNG and development of wind, solar and other energy sources. Please share your thoughts about implications of these changes for the lubricating grease industry.

CC: This is another challenge for the grease industry and all suppliers of lubricants and raw materials. The war in Ukraine has driven prices up, especially those of base oils, which impacts additive pricing as well. Unfortunately, the war in Ukraine comes on the heels of the COVID 19 pandemic, which reduced both production and demand and continues to affect the global supply chain. Basically, almost everything is in short supply and significantly more expensive than before the pandemic. At present, the war in Ukraine is worsening supply shortages and increasing costs.

NLGI

NLGI: Please tell us a little bit about how you became involved in NLGI.

CC: My first exposure to NLGI was in 1980 when I took the Basic Grease Course. I used what I learned at that Course in my job at Mobil. Then in 2003, I took the Advanced Grease Course. ExxonMobil was a member of NLGI, and I began attending NLGI Annual Meetings. In 2005, I started to represent ExxonMobil on the NLGI Board of Directors and got involved with Board activities.

In 2009, I retired from ExxonMobil, formed Grease Technology Solutions LLC, and applied for corporate membership in NLGI. I re-joined the Board of NLGI in 2010, and I was elected to fill the vice president position. I continued on the Board and cycled through the roles of president and past president; now I continue to sit on the Board.

NLGI: Please tell us about the NLGI Grease Production Survey. What exactly is the Survey? What is the backstory of the Survey? Why is it important? How did you become involved in the Survey? What does it cover? How does someone get a copy of the Survey?

CC: The NLGI Grease Production Survey began in 1957 and has evolved considerably since that time. The Survey provides an annual accounting of global grease production categorized by geographic region, thickener type, and base oil type. It is produced from voluntary submissions of annual grease production data by all known grease manufacturers. It is regarded as the most comprehensive survey of the global grease business. I started compiling the Survey in 2010 after another consultant decided to discontinue doing the Survey.

Copies of the final report of the Survey are available at no charge to member companies at Products (nlgi.org).

The final report on the NLGI Grease Production Survey is available online at no charge to NLGI member companies and companies that participate in the Survey.

NLGI: How do companies benefit from participating in the Survey?

CC: Companies that participate in the Survey receive free copies of the final report regardless of their NLGI membership status.

NLGI: Please tell us about the new NLGI Grease Specifications.

CC: In July 2019, the decision was made to develop a new set of specifications for greases with higher performance and broader utility to the grease industry than the GC-LB certification. These new specifications evolved into what are now the NLGI High-Performance Multiuse (HPM) Grease Specifications.

The HPM Greases Specifications were developed by a steering committee that

included a cross section of stake holders representing grease manufacturers, marketers, original equipment manufacturers (OEMs), and raw material suppliers. Draft specifications were validated and revised iteratively based on many interviews, a virtual workshop, and additional testing to meet a goal of "achievable but challenging" grease performance.

The new HPM Grease Specifications were approved by the NLGI Board of Directors in September 2020.

NLGI: You were very active in the development of the new specifications. What was your role?

CC: I was brought on to the steering committee as a neutral "expert" consultant to help drive the specification development. I worked closely with Mike Kunselman from the Center for Quality Assurance, a company with expertise in developing, implementing, and administering licensing programs.

NLGI: How are the HPM Grease Specifications impacting NLGI and the grease industry?

CC: I think that because the HPM Grease Specifications were developed based on a cross functional steering committee of experts with a massive amount of input by stakeholders in industry, there has been a tremendous amount of support for the new Specifications. I expect the number of certified products will begin to grow significantly over the coming months.

NLGI: How do NLGI members benefit from the new NLGI HPM Grease Specifications?

CC: All manufacturers, marketers, end users and OEMs, including NLGI members, will benefit from this new, high-level specification because it sets a new baseline for grease performance. OEMs and end users can use these HPM Grease Specifications as a baseline and customize their own specifications.

NLGI: Is there work underway to modify grease tests or develop new grease tests to support the new HPM Grease Specifications?

CC: It is necessary to improve the precision of one laboratory test, and ASTM is addressing that need. Another method is not standardized yet by ASTM or other standards organizations; NLGI is working on a draft of a standard for ASTM approval. At present, NLGI has a second project underway to develop additional standards for high temperature and long-life greases, which will likely require the development of a new dynamic grease life test.

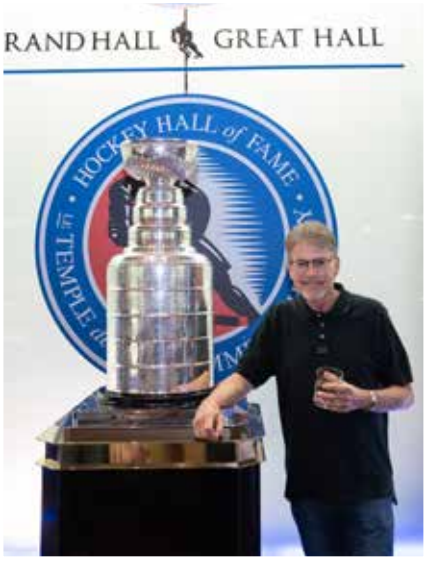
NLGI: How have you benefitted by attending NLGI meetings?

CC: When I worked for ExxonMobil, I benefitted from NLGI meetings by meeting others in the industry and learning about grease from the education courses and technical presentations. Now, as a consultant, I am more involved in teaching the education courses, and I benefit from the incredible networking that occurs at every meeting.

NLGI: Why is NLGI important? How do organizations benefit from NLGI membership?

Spending time with favorite person — Patti Coe

CC: The benefits are networking, education, conducting business, and camaraderie built from the collegial relationships in our association.



NLGI: Do you have any suggestions about how to learn, enjoy and benefit from attending NLGI meetings?

CC: By all means, attend the annual meetings, volunteer to be involved in committees, take education courses, and have fun networking!

Perspectives

NLGI: Please tell us about your family and home.

CC: I'm happily married with 3 kids and 6 grandkids and live in northern Virginia.

NLGI: Do you have time to be involved in family or volunteer activities? Hobbies?

CC: I'm always doing things and going places with family members, as well as travelling as much as possible with my wife, Patty. We enjoy good movies and good red wine!

NLGI: Where is your favorite place to travel?

CC: Europe, mainly to the UK and Ireland.

NLGI: If NLGI members travel to Virginia, do you recommend special things to do and places to visit?

CC: Virginia has become one of the top ten wine producing states in the U.S. There are

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Submit your VALUE-ADD articles to
The NLGI Spokesman

Customer | Grease Knowledge | Industry Content | Supply Chain | Grease Education | Lubricating Grease

The NLGI SPOKESMAN is pleased to announce the launch of a new section within its publication titled "VALUE -ADD." The theme of this new section is to highlight changes, advancements, best practices in lubrication and maintenance, as well as challenges in the grease industry as they relate to customer centricity, general grease issues, suppliers, supply chain, education and other non-traditional technical related topics that are current to the grease industry. NLGI leadership is excited to provide additional value to *The NLGI Spokesman* readers and welcome future articles that bring insight into our industry.

Contact nlgi@nlgi.org for more information on how to submit.

numerous opportunities to taste wines and listen to live music every weekend, in addition to many local craft breweries and distilleries. And of course there are Mt. Vernon, Monticello, and Williamsburg for history buffs and the Skyline Drive for those who appreciate natural beauty. My house is about only a mile from a rutted road that leads up to the Appalachian Trail!

NLGI: Please recommend some of your favorite books or technical journals to NLGI members.

CC: I tend to read more novels than technical books. My favorite books are The Lord of the Rings (J. R. R. Tolkien), Trinity (Leon Uris) and The Pillars of the Earth (Ken Follet). As far as technical journals, I always read The Spokesman, TLT, and my favorite industry magazine, *Lubes 'n' Greases*.

Chuck's Bookshelf

The Lord of the Rings

Trinity

The Pillars of the Earth

NLGI: If you could have dinner with any three people, living or deceased, who would you choose and what would be on the menu?

CC: My wife, Patty, and my Mom and Pop. On the menu: steak au poivre, green beans almondine and scalloped potatoes, with an excellent Bordeaux of course!

This interview series, started in 2019 by Dr. Moon and Dr. Shah, gives NLGI members a bit of insight into the professional and personal lives of their colleagues, developments in the grease industry, and the role of NLGI worldwide. If you would like to suggest the name of a colleague for an interview (or volunteer to be considered as a candidate), please kindly email Mary at mmmoon@ix.netcom.com or Raj at rshah@koehlerinstrument.com.

Dr. Mary Moon is Technical Editor of *The NLGI Spokesman*. She consults, edits, and writes scientific and marketing features published in Lubes'n'Greases and Tribology & Lubrication Technology magazines, book chapters, specifications, and other technical literature specific to lubrication and condition monitoring. Her R&D and project management experience in the lubricant, polymer, and specialty chemicals industries includes inventions, formulation, product development, marketing, and applications of tribology, electrochemistry, rheology, and spectroscopy. She served as Section Chair of the Philadelphia Section of STLE. She is a member of the National Association of Science Writers.

Dr. Raj Shah is currently a Director at Koehler Instrument Company, Long Island, NY where he has lived for the last 25 years. An active NLGI member and he served on the NLGI board of directors from 2000 to 2017. A Ph.D. in Chemical Engineering from Penn State University and a Fellow from the Chartered Management Institute, London, Dr. Shah is a recipient of the Bellanti Sr. memorial award from NLGI. He is an elected fellow by his peers at NLGI, IChemE, STLE, INSTMC, AIC, MKI, Energy Institute and the Royal Society of Chemistry. He has over 300 publications and is currently an Adjunct Professor at the Dept. of Material Science and Chemical engineering, State University of New York, Stony Brook. Currently active on the board of directors of STLE he volunteers on the advisory boards of several universities. More information on Raj can be found at https://www.nlgi.org/nlgi-veteran-member-raj-shah-presented-with-numerous-honors-in-2020/

NLGI COMMITTEE UPDATE

Annual Meeting

Annual Meting Committee Chair: Tyler Jark

The Annual Meeting Committee serves as the advisory group for the Annual Meeting including:

- Developing conference theme
- Selecting speakers
- Determining award recipients
- Solidifying technical sessions
- Direction on the site selection process

2022 Annual Meeting:
See pages 35-60 for recap

NLGI 89TH ANNUAL MEETING
Finding The Green In Grease

2023 Annual Meeting:
NLGI's 90th Anniversary
Hotel Del Coronado
San Diego, CA USA
June 1-4, 2023

2024 Annual Meeting:
La Cantera Resort & Spa
San Antonio, TX USA
June 10-13, 2024

2025 Annual Meeting:
Marriott Harbor Beach Resort & Spa
Fort Lauderdale, FL USA
June 9-12, 2025

Committee Members:
Tyler Jark, Chair
Greg Morris
Wayne Mackwood
Matt McGinnis
Joe Kaperick
Jim Hunt
Tom Schroeder
Josh Sheffield
Muibat Gbadamosi
Crystal O'Halloran, Staff

Please contact nlgi@nlgi.org if interested in joining this committee.

***If interested in serving on a committee/sub-group, complete the volunteer form on the NLGI website. Please don't hesitate to contact NLGI HQ with any questions: 816.524.2500 or nlgi@nlgi.org.**

Retrospective
NLGI Decades

We are excited for next year's 90th annual meeting, June 1-4, 2023, at the Hotel del Coronado in San Diego, CA, USA.

To prepare for the 90th annual meeting, we've decided to look back at our historied 90 years. We will provide remarkable facts over the past 90 years throughout the next six issues. Kicking off the July / August article, we will focus on the 1930s & 1940s. Let's jump into grease history and the formative years of NLGI!

1933

In early 1933 J.R. Battenfeld and Bill Saunders decided that an organization of grease manufacturers would better serve the needs of the grease industry and give it a voice in decisions that would be impactful. With this decided, the first annual meeting was planned. The first annual meeting occurred on June 29, 1933, at the Stevens Hotel in Chicago. (Now recognized as the Hilton Chicago)

Thirty-four people attended the meeting where the National Association of Lubricating Grease Manufacturers, Inc. was formed. NLGI started with twenty-two member companies. With the formation official, NLGI also had its first President, J.R. Battenfeld.

> **First two clauses of the association.**
> The purpose is to promote-
> "The development of standards through research, practical tests, and other available means, the application of which, by individual manufacturers, will insure a proper measure and quality in each of the industry's products, and to collaborate with various technical and trade associations allied."
>
> Allied to this is another clause citing ambitions, Namely-
> "The development through research and promotion of new uses and markets for the industry's products."

1934

The second annual meeting was held at the same hotel as the first. The new President was Martin Chittick of Pure Oil Company.

Fun Fact

Half of those who attended were connected with major oil companies, and the other half were from independent grease manufacturers.

1935

The third annual meeting took place at the Stevens Hotel in Chicago again. The new President was Bill Saunders, Jr.

Fun Fact

Many members could not attend from the west coast because it took at least two days to go by train from California to Chicago.

1936

The fourth annual meeting continued at the same location for two days. The new President was Homer F. Wilhelm of Socony-Vacuum Oil Company.

1937

The first issue of the Spokesman was launched in March. The issue was only four pages and included no articles. Initial space was devoted to news and ideas, which were supposed to increase the grease business.

Our fifth annual meeting changed to the Blackstone Hotel in Chicago. Eight technical presentations occurred that year. The new president was George Miller of American Lubricants, Inc. During this meeting; dues were agreed upon and collected, putting the association on an upward trajectory as it continued to grow.

Fun Fact

Discounted room rates saved our attendees 50 cents, costing $3.50 per night.

1938

The new president was Milt Bower.

Fun Fact

The Standards and Specification Committee was developed.

1939

The new President was E.V. Moncrieff.

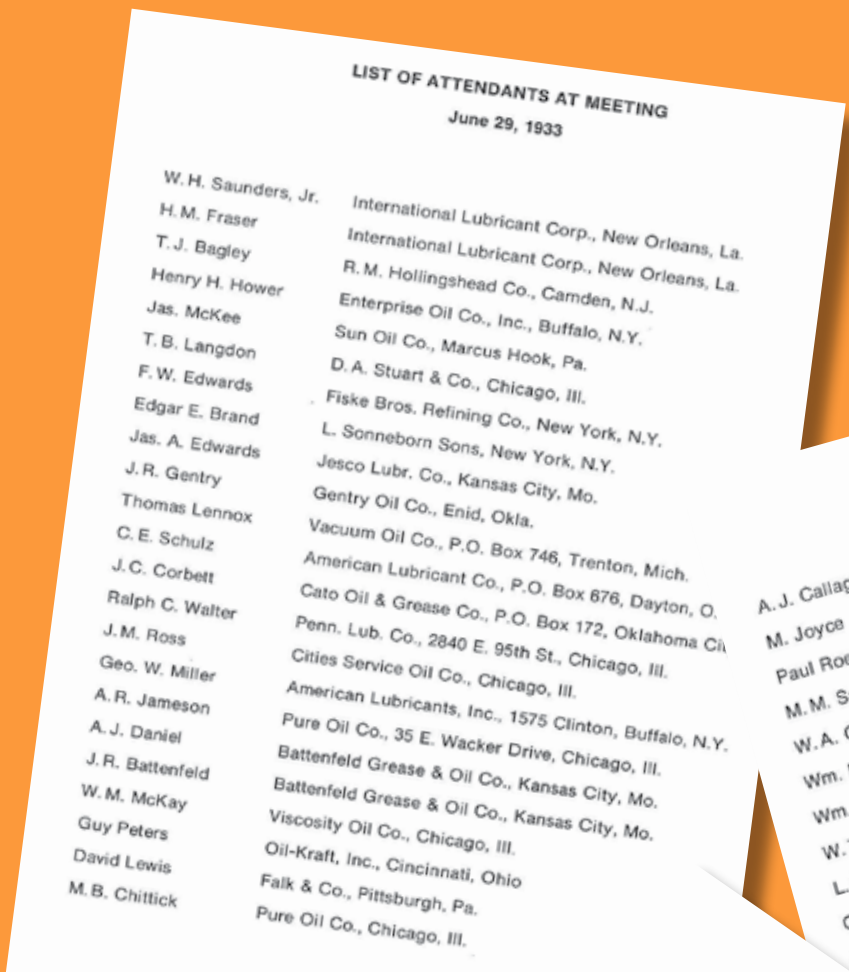
Fun Fact

The annual meeting was shifted to three days.

1940

The Spokesman was increased from four pages to eight pages and started to include papers from presentations presented during the annual meeting.

List of attendees during first annual meeting June 29, 1933



LIST OF ATTENDANTS AT MEETING
June 29, 1933

W. H. Saunders, Jr.	International Lubricant Corp., New Orleans, La.
H. M. Fraser	International Lubricant Corp., New Orleans, La.
T. J. Bagley	R. M. Hollingshead Co., Camden, N.J.
Henry H. Hower	Enterprise Oil Co., Inc., Buffalo, N.Y.
Jas. McKee	Sun Oil Co., Marcus Hook, Pa.
T. B. Langdon	D. A. Stuart & Co., Chicago, Ill.
F. W. Edwards	Fiske Bros. Refining Co., New York, N.Y.
Edgar E. Brand	L. Sonneborn Sons, New York, N.Y.
Jas. A. Edwards	Jesco Lubr. Co., Kansas City, Mo.
J. R. Gentry	Gentry Oil Co., Enid, Okla.
Thomas Lennox	Vacuum Oil Co., P.O. Box 746, Trenton, Mich.
C. E. Schulz	American Lubricant Co., P.O. Box 676, Dayton, O.
J. C. Corbett	Cato Oil & Grease Co., P.O. Box 172, Oklahoma Ci
Ralph C. Walter	Penn. Lub. Co., 2840 E. 95th St., Chicago, Ill.
J. M. Ross	Cities Service Oil Co., Chicago, Ill.
Geo. W. Miller	American Lubricants, Inc., 1575 Clinton, Buffalo, N.Y.
A. R. Jameson	Pure Oil Co., 35 E. Wacker Drive, Chicago, Ill.
A. J. Daniel	Battenfeld Grease & Oil Co., Kansas City, Mo.
J. R. Battenfeld	Battenfeld Grease & Oil Co., Kansas City, Mo.
W. M. McKay	Viscosity Oil Co., Chicago, Ill.
Guy Peters	Oil-Kraft, Inc., Cincinnati, Ohio
David Lewis	Falk & Co., Pittsburgh, Pa.
M. B. Chittick	Pure Oil Co., Chicago, Ill.

A. J. Callaghan	American Oil & Grease Corp., Chicago, Ill.
M. Joyce	Swan-Finch Oil Corp., Chicago, Ill.
Paul Roessuer	Autocraft Oil & Grease Mfg. Co., Ft. Worth, Texas
M. M. Sanderson	Diamond Products Co., Marshalltown, Ia.
W. A. Callaghan	Motor-State Oil & Grease Co., Jackson, Mich.
Wm. R. Pate	Pate Oil Co., 3460 W. Leeds Place, Milwaukee, Wis.
Wm. H. Emig	Mirific Products Co., 24th & Adams, Granite City, Ill.
W. T. Atkins	Skelly Oil Co., Kansas City, Mo.
L. T. Morrow	Vacuum Oil Co., Detroit, Mich.
C. P. Dolan	Allied Grease & Oil Co., Chicago, Ill.
V. B. Day	Cities Service Oil Co., Chicago, Ill.

LIST OF MEMBERS
1933

Allied Grease & Oil Company,	Chicago, Ill.
The American Lubricants Co.,	Dayton, Ohio
American Lubricants, Inc.,	Buffalo, N.Y.
Barnsdall Refineries, Inc.,	Tulsa, Okla.
Battenfeld Grease & Oil Co.,	Kansas City, Mo.
Enterprise Oil Co., Inc.,	Buffalo, N.Y.
Gentry Oil Company,	Enid, Okla.
E. F. Houghton & Co.,	Philadelphia, Pa.
Hulburt Oil & Grease Co.,	Philadelphia, Pa.
International Lubricants Co.,	New Orleans, La.
The Ironsides Company,	Columbus, Ohio
Jesco Lubricating Co.,	N. Kansas City, Mo.
Keystone Lubricating Co.,	Philadelphia, Pa.
Oil-Kraft, Incorporated,	Cincinnati, Ohio
The Ohio Grease Co.,	Loudonville, Ohio
Skelly Oil Co.,	Kansas City, Mo.
H. B. Stahl Co.,	St. Paul, Minn.
The Stevens Grease & Oil Co.,	Cleveland, Ohio
D. A. Stuart & Co.,	Chicago, Ill.
United Petroleum Co.,	Omaha, Nebr.
Waverly Oil Works Co.,	Pittsburgh, Pa.
Sun Oil Company,	Philadelphia, Pa.

1941
Sidney Bevin was President.

1942
Charlie Kerns was elected President. Charlie was the first President elected from the group other than those present.

Fun Fact
The annual meeting moved away from Chicago to the Roosevelt Hotel in New Orleans.

1943
W.H. Oldacre was elected President.

Fun Fact
The annual meeting was held at the Edgewater Beach Hotel in Naples, FL.

1944
B.C. Voshell was President.

1945
The annual meeting was canceled due to government restrictions on travel.

1946
Carl Bolte became editor of the NLGI Spokesman, and it was expanded to 12 pages. He was also Executive Secretary of NLGI.

Fun Fact
During this time, there were 18 people on the Board of Directors.

1947
The first 16-page Spokesman was released in February 1947.

1948
The first Technical Committee column appeared in the Spokesman.

Stevens Hotel in Chicago

CONSTITUTION AND BY-LAWS
of
NATIONAL ASSOCIATION OF LUBRICATING GREASE MANUFACTURERS, INC.

Adopted June 29, 1933

ARTICLE I — NAME

The name of this organization shall be the National Association of Lubricating Grease Manufacturers, Inc.

The principal office of the Association shall be situated in the City of Washington, District of Columbia, with such subsidiary or branch offices as the needs of the Association may require. The principal office, however, to be moved to such other point as may at a later date be designated by a majority of the members of the Association.

ARTICLE II — PURPOSES

The purposes of the Association shall be:

1. To co-operate with the Government of the United States in effectuating the policy of the Government as declared in Title I of the National Industrial Recovery Act.
2. To act as a clearing house for the manufacturers and the trade in the collection and dissemination of lawful information pertinent to the lubricating grease manufacturing industry and to promote the following activities, viz:
   (a) The development of standards through research, practical tests, and other available means, the application of which, by individual manufacturers, will insure a proper measure and quality in each of the industry's products, and to collaborate with various technical and trade associations allied.
   (b) The furtherance of simplification in respect to the items produced by the industry; due consideration being given to economies procurable to the industry, the trade, and the consuming public through avoidance of needless duplication and wasteful multiplication of items.
   (c) The fostering of such industry policies as will (1) tend to maintain free, open and public competition between manufacturers and all classes of trade who serve in distributing the products of the industry; (2) discourage unethical, unfair and unlawful methods of competition.
   (d) The development through research and promotion of new uses and markets for the industry's products.
   (e) The encouragement through industry advertising and publicity of an increased consumption of the industry's products.

(f) The collection of lawful information between manufacturers in respect to production, credits and such other matters as may be of value to the different manufacturers and the trade, for dissemination to member companies only.

ARTICLE III — MEMBERSHIP

1. Any individual, partnership or corporation located in the United States who manufactures grease from basic raw materials is eligible to membership in this Association.
2. Membership in the Association shall be granted to such concerns defined in Section I as shall in seeking membership express a readiness to subscribe to the payment of dues as prescribed by the Board of Directors and abide by the Constitution and By-Laws.
3. The dues of members shall be determined by the Board of Directors on a fair and equitable appraisal of the output of each respective member and the budget requirements of the Association, with a minimum fee of $50.00 per year. The Board of Directors shall be asked to develop a budget for each calendar year, based on which the Board of Directors shall set up a schedule of dues based on tonnage, over and above the minimum fee, the budget and dues to be subject to the approval of the membership by a vote of two-thirds of the members, and subject to any rules or regulations with respect thereto established under the provisions of the National Industrial Recovery Act.
4. Membership in the Association may be terminated by the Board of Directors upon the failure of a member to pay any installment of dues within thirty days after the time designated for such payment by the Board of Directors.

ARTICLE IV — MEETINGS OF THE ASSOCIATION

1. The time and place of holding meetings of the Association shall be determined by the Executive Committee or by the President who shall have authority to call such meetings as may be desirable to conduct the Association's business.
2. At all meetings of the Association each active member shall be entitled to one vote regardless of the number of delegates present. Subsidiaries and divisions of a parent member company shall not be entitled to vote.

ARTICLE V — AMENDMENTS

This Constitution may be amended only (1) by a vote of two-thirds of the active members of the Association and after written notice stating the substance of the proposed change shall have been served on each member at least 30 days before the meeting of the Association at which the vote shall be taken, or (2) by the written assent of all active members.

NLGI LUBRICATING GREASE GUIDE

Seventh Edition

NOW AVAILABLE!

Amazon printed book
$149.99 (members and non-members receive the same price through Amazon)

Full book electronically
$129.99 members
$149.99 non-members
Shop at nlgi.org/store

Each electronic chapter sold individually
$19.99 members
$29.99 non-members
Shop at nlgi.org/store

Total Attendees: 321

Basic Course Participants: 29

Advanced Course Participants: 18

CLGS Exam Participants 4

Number of Technical Presentations: 18

Number of Exhibitors: 22

Golf Tournament Participants: 58

Fun Run Participants: 61

NLGI 89TH ANNUAL MEETING
Finding The Green In Grease

JUNE 12-15, 2022
Westin Harbour Castle
Toronto, ON Canada

ANNUAL MEETING RECAP

Education
- Food Grade Working Group Meeting
- Bio-Based Working Group Meeting
- Grease Particle Working Group Meeting
- Sustainability Town Hall
- Sustainability Panel Discussion
- Technical Presentations
- Basic Grease Course
- Advanced Grease Course
- CLGS Exam

Networking Opportunities
- New Member / First-Time Attendee Reception
- Welcome Reception
- Exhibitor Happy Hour
- Golf Tournament
- Fun Run
- Exhibits
- Breakfast & Lunches
- Afternoon coffee / Snack Breaks
- Closing Night Celebration

WOULD YOU RECOMMEND A COLLEAGUE ATTEND THE NLGI ANNUAL MEETING?
"We find the annual NLGI conference to be a valuable marketing and networking tool for our company, as well as a portal for information relating to grease technology and advancement"

★ ★ ★ ★
Thank you to all who participated in our 2022 Annual Meeting survey. Congrats to our Visa gift card winner

SCOTT RAJALA, SR.
Regional Chief Engineer, Idemitsu Lubricants America Corp
★ ★ ★ ★

GENERAL SESSION

FUN RUN

FUN RUN 1 MILE FEMALE WINNERS

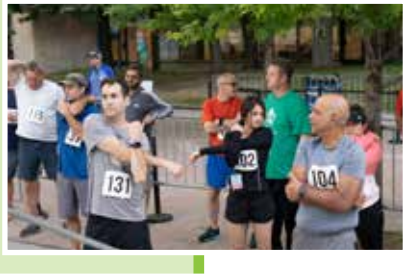
1st Eirini Spilioti
2nd Neera Mistry
3rd Muibat Gbadamosi

FUN RUN 1 MILE MALE WINNERS

1st Rajeev Kumar
2nd Tyler Housel
3rd Ross Dworet

FUN RUN 2 MILE FEMALE WINNERS

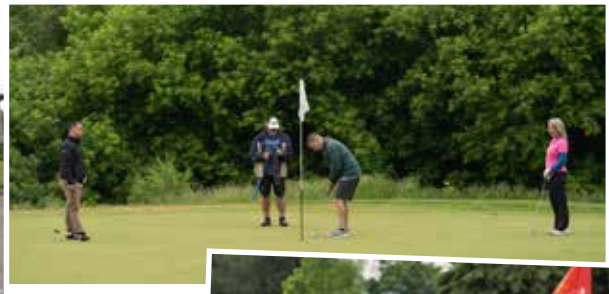
1st Kat Guillen
2nd Katie Clark
3rd Cassie Fhaner



FUN RUN 2 MILE MALE WINNERS

1st Toby Hlade
2nd Kenji Yamamoto
3rd Mauricio Galvez

GOLF TOURNAMENT



PRIZE HOLES

Longest Drive .....Michael Ruth
Closest to Pin .....Chad Chichester
Longest Putt..... Jeremy Kriska
Straightest Drive.....Jim Hunt

1ST PLACE TEAM
Michael Ruth, Bob Gillies,
Joshua Sheffield, Katie Clark

2ND PLACE TEAM
Joe Sankovic, James Wittig,
Alan Voss, Mike Woodfall

3RD PLACE TEAM
Greg McDuffie, Kevin Nolan,
Jim Hunt, Matt Hardy

GOLF TOURNAMENT














SUSTAINABILITY PANEL DISCUSSION

INDUSTRY SPEAKER PANEL PANELISTS

DR. PIET LUGT
Senior Scientist, SKF Research and Technology Development

DR. RYAN EVANS
Director of Research and Development, The Timken Company

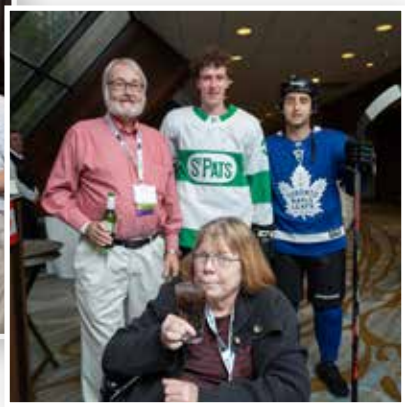
ANDREAS DODOS
Chief Technology Officer, ELDON's S.A.

EDUCATION

WOULD YOU RECOMMEND A COLLEAGUE ATTEND THE NLGI ANNUAL MEETING?
"Yes, it's a great opportunity to connect with wider grease community – good balance of training and industry"

WHY ATTEND THE NLGI ANNUAL MEETING?
"Networking, improving our business and hearing the technical presentations"

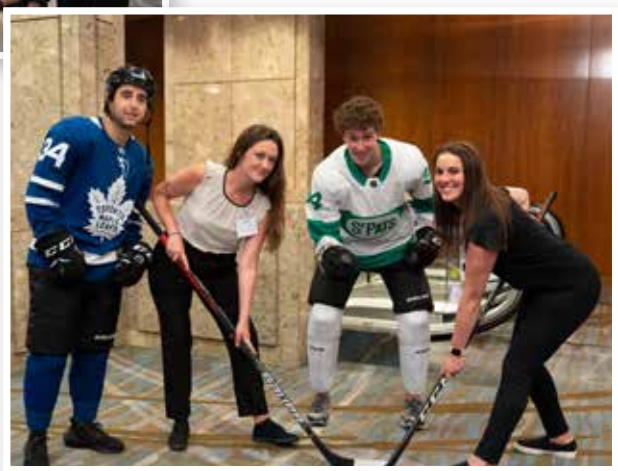
RECEPTIONS



WHY ATTEND THE NLGI ANNUAL MEETING?
"Industry recognition"

RECEPTIONS

WOULD YOU RECOMMEND A COLLEAGUE ATTEND THE NLGI ANNUAL MEETING?
"If you're in the grease industry, this is "the" event to attend"



CLOSING PARTY

"LOVED the closing dinner and celebration at the Hockey Hall of Fame! Brilliant!"










CLOSING PARTY

WOULD YOU RECOMMEND A COLLEAGUE ATTEND THE NLGI ANNUAL MEETING?
"NLGI Annual Meeting is a great opportunity to learn more about the industry while networking with peers, supplier and customers."

AWARD WINNERS

John A. Bellanti Sr. Memorial Meritorious Service

Sponsored by FedChem

This award "acknowledges meritorious service on the NLGI Board for three or more years, or on Technical Committee projects, or to the industry."

This year, the following two recipients were presented with this award.
Ruming (Ray) Zhang, Vanderbilt Chemicals and **Greg Morris**, Shell Global Solutions.

RUIMING "RAY" ZHANG currently holds a position as Global Grease and Aviation Technical Manager at Vanderbilt Chemicals, LLC. He is responsible for developing additive applications and packages for grease and additive applications for jet turbine engine oil based on Vanderbilt's novel additive chemistries and components.

He previously worked for Mohawk Labs/NCH (1995-2004), Infineum (2004-2007), and OM Group (2007-2010), with various titles range from Lubricants Development Specialist, Contributing Technologist to Technical Manager and brings with him extensive knowledge and experience in lubricant and grease formulation, in addition to surface and additive chemistry.

Ray received his B.Sc. and M.Sc. degrees in Chemistry from Fudan University, Shanghai, China in 1982 and 1985 respectively. He obtained his Ph.D. in Physical Chemistry with focus on surface and boundary layer chemistry from University of Illinois at Urbana-Champaign in 1992.

GREG MORRIS is a Chemist (BS West Virginia University) with over 30 years of industry experience both in the laboratory and in field technical sales and support. Since joining Shell in 1998, he has held several commercial and technical roles, including Plant Formulations Chemist, Field Sales and Engineering Services. Throughout his career within Shell, Greg has progressed from local technical staff, to local field sales and support, to regional and national sales roles. With a focus on new business development, he also held a North American role managing a professional sales team.

In 2013, he joined Shell Product Technology as the Grease Product Application Specialist in the Americas region. This role is the vital link between field sales and technical staff to the Research and Development program within Shell bringing the customer closer to Shell's Research and Development efforts relative to lubricating greases.

Effective January 2021, he assumed the responsibility as team lead for the Americas Product Application Specialists. This is a high-performance team of professionals that links Shell's customers to the Product Technology development team intended to deliver innovative solutions to complex challenges. He has served on the NLGI Board of Directors for 8 years, been an active member of the working group for the HPM specification and is the chair for the Research Grant committee. He has also served as the research grant liaison for multiple projects.

Clarence E. Earle Memorial Award

Sponsored by Texas Refinery Corp

This award is presented to an individual "for outstanding contribution to the technical literature relating to lubricating greases during the year."

This year's award goes to two deserving individuals that were at the helm of developing the newest edition of the NLGI Lubricating Grease Guide. The seventh edition includes four new chapters and is a must have for anyone dealing with lubricating greases. This year, the following two recipients were presented with this award.

Dr. Raj Shah, Koehler Instrument Company and **William (Bill) Tuszynski**, The Unami Group, LLC

DR. RAJ SHAH is a Director at Koehler Instrument Company in New York, where he has worked for the last 27 years. He earned his doctorate in Chemical Engineering from The Pennsylvania State University and is a Fellow from The Chartered Management Institute, London.

Dr. Shah was a NLGI Board member from 2000 to 2015 and is the recipient of NLGI's John Bellanti Memorial award and STLE's PM Ku medal. He is on the Advisory board of directors at Farmingdale university, Auburn University and Stony Brook University. He has over 500 publications and has been active in the lubricant and grease industry for over 3 decades.

BILL TUSZYNSKI is a Partner at the Unami Group LLC, providing sales support and consulting services to clients in the chemical and lubricant industries. He has 40 years' experience in a variety of technical, commercial, and management roles in the chemical and lubricant industries.

He is a member of NLGI, STLE, ACS, AIChE, and AAAS. Bill served as editor for Volume 6 of the NLGI Grease Guide, published in 2015 He holds a BS in Biochemistry from Manhattan College and a PhD in Physical Organic Chemistry from Cornell University.

Author Award for Development

Sponsored by Afton Chemical Corporation

The Author Award for Development is presented "for the best paper presented at our Annual Meeting that focuses on formulation, development, and manufacture of finished greases."

This year's recipient is **Joe Kaperick**, Afton Chemical Corporation.

JOE KAPERICK is a Senior R&D Advisor for Greases at Afton Chemical Corporation. Joe began working for Afton as an Analytical Chemist in 1991 and moved to their Richmond, Virginia headquarters in 1994.

Joe received a Master's Degree in Analytical Chemistry from St. Louis University as well as undergraduate degrees in Chemistry, Fine Arts and Classical Humanities. He has been in the Industrial R&D area with a primary focus on Grease since 1999.

Joe is an active member of STLE, ASTM and ELGI, and has been a member of the NLGI Board of Directors since 2007.

Author Award for Application

Sponsored by Chevron Products Company

The Author Award for Application is "for the best paper presented at our Annual Meeting that focuses on selection, application, or use of lubricating grease."

This year's recipient is **Dr. Ashlie Martini**, the University of California Merced.

DR. ASHLIE MARTINI is Professor and Chair of the Department of Mechanical Engineering at the University of California Merced. She obtained her BS and PhD from Northwestern University and has been working in the field of tribology for the past 20 years with research results reported in nearly 200 published papers.

Her research, teaching, and service contributions have been recognized by multiple awards. Professor Martini is an Editor of the journal Tribology Letters and an Associate Editor for the journal Tribology Transactions, and has been the chair of international conferences including the Tribology Frontiers Conference and the Gordon Research Conference on Tribology.

Award for Educational Excellence

Sponsored by Shell Global Solutions (US) Inc.

The award for Educational Excellence is presented "for outstanding instruction as exemplified by subject knowledge and presentation skills in NLGI education courses."

This year's recipient is **Wayne Mackwoodm**, LANXESS Canada Company.

WAYNE MACKWOOD is currently the Global Head of Detergent and Grease Technology for LANXESS, leading a highly skilled, dynamic and dedicated team of chemists at its West Hill, Canada Application Technology Centre. He is a recognized expert in the design, manufacture and use of Calcium Sulfonate Complex Grease and has developed over 150 grease formulations for use in a broad range of applications. He is also active in the development and introduction of new detergent technology and formulations for lubrication, corrosion inhibition, and grease manufacture.

Wayne has spent the majority of his 28-year career as a Scientist but has also held roles in marketing and asset management. He has authored more than a dozen technical papers, been in numerous journal articles, holds two patents, and has given more than 20 presentations at leading conferences and seminars around the world. He has a Masters in Materials Engineering Science, with a focus on Tribology, from the University of Western Ontario.

Wayne has been a member of the NLGI Board since 2011 and is currently serving on the Executive Committee as Vice President. He also served on the STLE Board of Directors from 2008 - 2011 and remains active at the local section level. In 2019 he was awarded the John A. Bellanti Sr. Memorial Award for meritorious service to the NLGI and the grease industry and in 2021 was awarded the NLGI Golden Grease Gun for his work as part of the team that developed the NLGI HPM specification.

Ralph Beard Memorial Academic Award

Sponsored by H.L. Blachford Ltd.

This award acknowledges valuable work within Academia, in the technical development of greases, grease tests, or the promotion of grease usage."

This year's recipient is **Dr. Paul Shiller**, the University of Akron.

DR. PAUL SHILLER retired from a research professor appointment at the University of Akron in 2019 but remains active within the lubricant industry. He moved to the University of Akron as a Research Scientist in an "Open Innovation" collaborative effort between The University of Akron and The Timken Co. in 2011. At The University of Akron, he worked in the Timken Engineered Surfaces lab and the Center for Surface Engineering and Lubrication Research.

Paul received a Ph.D. degree in Physical Chemistry from Case Western Reserve University in Cleveland, OH developing mechanisms for surface reactions at fuel cell electrodes using molecular orbital theory under the guidance of Dr. Alfred B. Anderson. He also has a M.S. degree in Chemical Engineering, M.S. degree in Chemistry and BE degree in Chemical Engineering.

Currently Paul is working at FirstPower Group, LLC developing lubrication products for high voltage substation switchgear applications.

NLGI Founders Award

Sponsored by Climax Molybdenum Marketing Corp.

This award is presented "in recognition of the three founding companies of the NLGI, the Founders Award is presented to a member company that has had a positive impact on the NLGI in the tradition established by these founding fathers."

This year's recipient has a long and valued history with NLGI and was one of the earliest founding members – **Texas Refinery Corp**

TEXAS REFINERY CORP began its' life as Panther Oil and Grease Manufacturing Company on September 9, 1922. TRC is celebrating its 100th Anniversary this year and is owned and operated by the 5th generation of the Pate family in Fort Worth, Texas.

Since its inception, TRC has acquired numerous small lubricant manufacturers throughout the Americas and Europe. TRC's connection to the NLGI came about through the acquisition of The American Lubricants Company. American Lubricants Technical Director, Mr. G.W. Miller was the NLGI's 4th acting President in 1937 & 1938.

Texas Refinery Corp has operated multiple lubricant and agricultural chemical manufacturing facilities in Texas, Ohio, Mexico, Luxembourg and Canada, with product sold under several brand labels. TRC strives to produce ecologically responsible & high-quality lubricants, offering innovative solutions for demanding extreme-duty applications.

Lubes 'N Greases Magazine featured TRC in a cover expose' in 2016 after the completion of their environmentally conscious, ground-up manufacturing facility in Mansfield, Texas…the first of its kind built in North America in more than 2 decades.

Fellows Award

Sponsored by Grease Technology Solutions, LLC

This award "acknowledges valuable work within the Institute in the technical development of greases, grease tests, or the promotion of grease usage."

This year's recipient is **Chad Chichester**, Molykote by DuPont.

CHAD CHICHESTER served in the U.S. Army from 1986- 1992. From there he went to work for Dow Corning from 1992 to 1995. In 1995, Chad worked as a reliability engineer focused on condition-based monitoring, then moved to Molykote Lubricants in 2006 as an application engineer where he has been ever since. Now his focus is primarily on Automotive, and has experience in food and beverage, chemical processing, oil & gas, and general industrial markets.

Chad studied mechanical & electrical engineering at Saginaw Valley State University and is a certified lubrication specialist (CLS). Chad serves on the NLGI Board of Directors, and is one of NLGI's two Technical Co-Chairs, consulting NLGI's Executive Committee. Chad has been an instructor in NLGI's Basic, Advanced, and Application & Maintenance Courses, and serves on several NLGI Committees and Task Forces. He humbly received the NLGI Award for Educational Excellence in 2007, the Clarence E. Earle Memorial Award for technical literature in 2017, the John A. Bellanti Sr. Memorial Award in 2020, and the golden Grease Gun Award in 2021.

NLGI Honorary Membership Award

This award "Entitles lifetime membership to those who, over a period of years, have served the Institute in some outstanding capacity and are not now associated with a member company."

This year's award was presented to two deserving recipients – **Tom Steib** and **Douglas Adams**.

TOM STEIB started in the grease business at Southwest division of Witco in Bakerstown, PA. He began at Southwest as Chief Chemist and progressed to plant manager. In 1993, Tom moved to The Elco Corporation in Cleveland, OH and worked at Elco for 28 1/2 years as VP Manufacturing. He retired from Italmatch in December 2021. Tom served on the board of directors of NLGI for over 20 years and served on various committees during his tenure.

DOUGLAS ADAMS has more than 35 years of experience in the lubrication and additive industries. He began his career at the Southwest Division of Witco Grease plant, where he progressed to be the Laboratory Manager of this plant that manufactured over 30 million pounds of grease annually.

As an active outdoorsman he has a keen focus on the environment. For the past seven years at RSC Bio Solutions he developed high performance, VGP-compliant, Environmentally Acceptable Greases for the industrial marine market.

From 2010 to 2020 he taught an Advanced Grease Education Course at the NLGI Annual Meeting and in 2018 received the Shell Award for Educational Excellence. Most recently, he had the distinct honor to develop the initial Environmentally Acceptable Grease Chapter in the recently published NLGI Handbook.

President's Award

This award is presented in recognition and appreciation for having served the NLGI in the office of president for the previous term.

This year's President Award recipient is **Jim Hunt**, Tiarco Chemicals.

JIM HUNT has been in the industry for over 30 years. He obtained an Associates Degree in Computer Engineered Science in 1985 and has worked for Chemex Paints, Lomas International, Cytec's Polymer Additives and most recently, Tiarco Chemical.

Jim Hunt has been the Global Sales and Marketing Director for Tiarco Chemical for 20 years. It was Jim's initial vision and passion that help to drive the Tiarco Chemical's strategy to be directly involved in the global grease and lubricant market many years ago. The grease and lubricant market remain one of the largest growth markets for Tiarco Chemical.

One of Jim's biggest professional achievements was becoming the NLGI President. Jim has been an active member of the NLGI for more than 10 years. Jim joined the NLGI to bring passion and a high level of commitment to this esteemed institute. He currently remains a proud and honored member of the NLGI Board of Directors. Jim became NLGI President in 2020 during the Covid global pandemic and at one of the most challenging times in the history of the NLGI. During his reign, Jim did a phenomenal job in advancing NLGI's strategic priorities.

Jim's goal has always been to build long term personal and professional relationships that bring value and last a lifetime. Jim always says, "it is never just about the journey. It truly is about the amazing friendships that you make along the way and the people that touch your life.

Golden Grease Gun Award

Sponsored by Koehler Instrument Company, Inc.

This award acknowledges valuable work within the Grease Industry in the development of grease technology, manufacturing, testing, applications and better understanding of grease behavior or the promotion of grease usage."

This year's recipients includes twenty-two individuals as authors and contributors of the latest edition of the NLGI Lubricating Grease Guide, Seventh Edition.

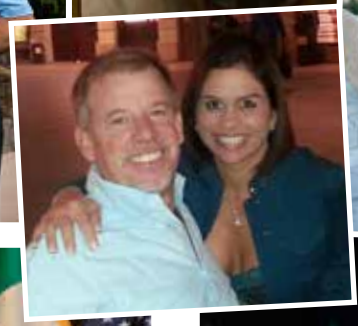
NLGI recognizes the following individuals:

- **Andy Waynick**, NCH Corporation
- **Dr. Gareth Fish**, The Lubrizol Corporation
- **Dr. Anoop Kumar**, Chevron Products Company
- **Ajay Kumar**, Indian Oil Corporation
- **Dr. Kuldeep Mistry**, The Timken Company
- **Dr. Raj Shah**, Koehler Instrument Company
- **John Sander**, Lubrication Engineers, Inc.
- **Casey Budd,** Lubrication Engineers, Inc.
- **Dr. Patrick Taylor**, Klüber Lubrication NA
- **Dirk Ludwig,** Klüber Lubrication München SE & Co. KG
- **Klaus Pommer.** Klüber Lubrication München SE & Co. KG
- **Jayne DeMedeiros,** Nye Lubricants
- **Dr. Jennifer Frias,** Nye Lubricants
- **Roger Miller,** M Consulting, LLC
- **Melissa Quinn,** BP U.K.
- **Philip Booker,** BP U.K.
- **Dr. Carl Kernizan,** KV Tech Consulting, LLC
- **Chuck Coe,** Grease Technology Solutions, LLC
- **Doug Adams**, now retired from RSC Bio Solutions
- **Shawne Edwards-Zollar,** Afton Chemical Corporation
- **Dr. Mary Moon**, Presque Isle Innovations
- **David Turner,** CITGO Petroleum Corporation

THANK YOU TO JIM HUNT

Thank you to Jim Hunt who served as President of NLGI from 2020-2022.

"Jim's leadership was remarkable during the past two years as he maintained strategic focus and execution during unpresented times. We look forward to his continued participation on NLGI's Executive Committee as Immediate Past President," said Crystal O'Halloran, NLGI Executive Director.



EXHIBITORS

ProSys Servo Filling

Bisley International LLC

Koehler Instrument Company, Inc.

Vanderbilt Chemicals, LLC

Patterson Industries Canada - A Division of ALLWELD Company Limited

NSF International

ADEKA USA Corporation

American Refining Group, Inc.

H.L. Blachford Ltd.

Shamrock Technologies, Inc.

Ergon, Inc.

EXHIBITORS

Fluid-Bag LLC

Gehring-Montgomery, Inc.

Optimol Instruments Prueftechnik GmbH

Afton Chemical Corporation

LANXESS Corporation

Savant Labs

Functional Products Inc.

ExxonMobil Product Solutions

King Industries, Inc.

Tulstar Products, Inc.

NASYN Group Inc.

PLATINUM SPONSORS

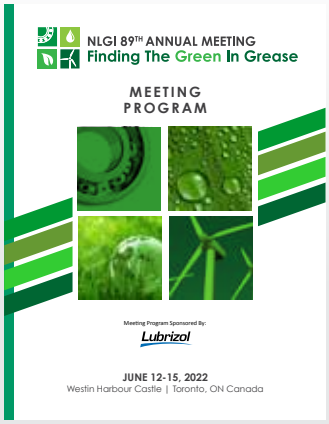
Afton CHEMICAL

Welcome Reception

General Session

NLGI Author Award - Development

Lubrizol



Meeting Program

Battenfeld

Hand Sanitizing Stations

Livent

Fun Run

PLATINUM SPONSORS

DUPONT
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Award for Educational Excellence

First Time Attendee / New Member Reception

ERGON
UNITED BY SERVICE. DRIVEN BY SOLUTIONS.

Mobile App

Tiarco, LLC

Closing Night Dinner

Golf Breakfast

PLATINUM SPONSORS

Chevron

human energy®

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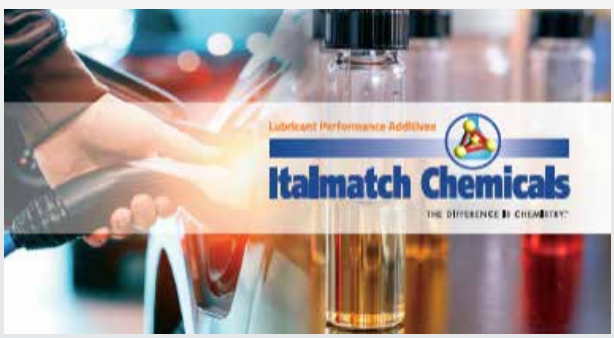
NLGI Author Award - Application

Lubricant Performance Additives

Italmatch Chemicals

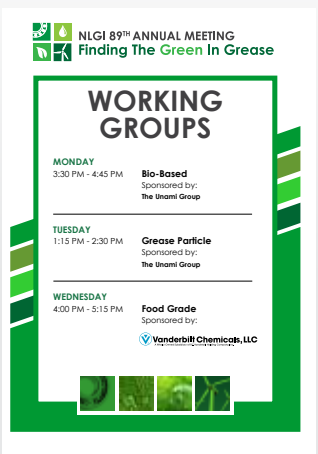


Hotel Key Card

DAUBERT CHEMICAL COMPANY, INC.

Industry Speaker Panel

Vanderbilt Chemicals, LLC
A Wholly Owned Subsidiary of R.T. Vanderbilt Holding Company, Inc.



Food Grade Working Group

Closing Night Dinner

AOCUSA

GOLD SPONSOR

AXEL

AXEL AMERICAS LLC

Closing Night Games

LUBRICATION ENGINEERS®

ASSET RELIABILITY SOLUTIONS™

Networking Lunches

FedChem

John A. Bellanti Memorial Meritorious Award

All Day Coffee Service

ExxonMobil

Charging Stations

SILVER SPONSORS

Patterson Industries Canada, A Division of ALL-WELD Company Limited

Exhibitor Happy Hour

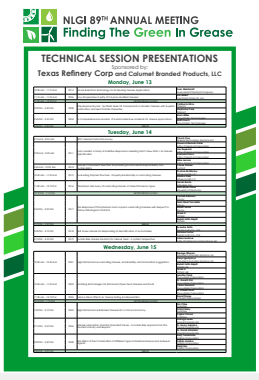
American Refining Group, Inc.

SILVER SPONSOR

LANXESS Corporation

Welcome Reception

Texas Refinery Corp



Technical Sessions

Clarence E. Earle Memorial Award

Bisley International LLC

All Day Coffee Service

BRONZE SPONSORS

Axxess Chemicals LLC

Golf – Hole In One

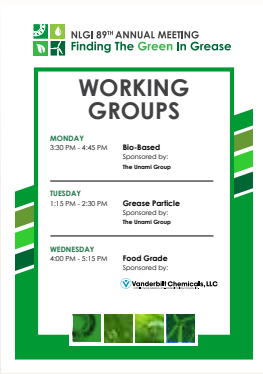
Grease Technology Solutions

NLGI Fellows Award

Climax Molybdenum

NLGI Founders Award

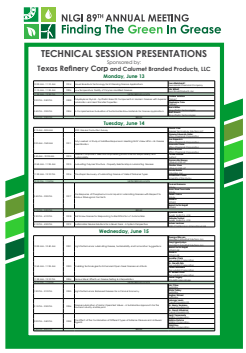
The Unami Group



Kyodo Yushi Co. Ltd.

Golf – Longest Drive

Calumet Branded Products, LLC



NSF International

Food Grade Working Group

Koehler Instrument Company, Inc.

Golden Grease Gun Award

H.L. Blachford Ltd.

Ralph Beard Memorial Academic Award

Golf – Closest to the Pin

Azelis L&MF US

Golf – Straightest Drive

King Industries, Inc.

Exhibitor Passport

High-Performance Multiuse (HPM) Grease Column

Developing and launching a new specification is a grueling task and takes a well-greased machine to make it happen. NLGI retained the Center for Quality Assurance (CQA), a unique company with over 15 years of experience assisting organizations with specification development and licensing programs.

As part of the launch of the new HPM Grease Specification, NLGI established a Marketing Task Force Team composed of Beth Medlen (Morgan Distributing), Chad Chichester (Molykote by DuPont), Chuck Coe (Grease Technology Solutions, LLC), Crystal O'Halloran (NLGI), Joe Kaperick (Afton Chemical), Jim Hunt (Tiarco Chemical and NLGI's current past President), Cindy Esler (CQA) and Mike Kunselman (CQA). Combining NLGI member input with this team's expertise and knowledge has brought the HPM Grease Program to where it is today. The team's goal was to communicate, educate and attract grease end users in the chemical, industrial, and construction industries to HPM Grease certified products. And through advertising, contributions to industry articles, and other communications, the goal was to persuade end users to seek HPM Grease certified products increasing demands on the grease manufacturers.

Often in the background, CQA's Cindy Esler helped hone the HPM Grease Program's communication strategy to include consumer outreach through social media to meet NLGI's marketing goals. The "Put the Ease in Grease" theme was brought to life by this Marketing Task Force. In addition, over ten articles were authored by NLGI membership that fueled the social media campaign.

Over the last 18 months, the campaign targeting grease users and specifiers generated over 1.5 million impressions, representing the number of times the HPM Grease Program has been presented to potential grease users and specifiers in the market. There are over 13,200 interactions with users sharing, commenting, or liking the content

on social media. With over 1,000 followers on LinkedIn, the number continues to grow. In addition, creating a website resource center assisted with the education process for grease users and specifiers. The number of visitors has exceeded 3,000 with over 22,000 page views and still counting.

While the CQA team focused on the specifiers and users of grease, NLGI's Annual Meeting provided an opportunity to dialogue and draw attention to the HPM Grease Program. Hats off to Cindy Esler's ingenuity and creativity, which resulted in the birth of the "Ask me about HPM Grease" sandwich board. If you attended the Annual Meeting, I doubt there was any way you could have missed it! Special mention to Infineum's Pang Lin Ong for starting the trend of photos with the sandwich board. Over 13,000 LinkedIn views were generated from grease aficionados sporting the HPM Grease sandwich board. A big thank you to Olga Lucia Mendez – Proquimsa & Nurex Lubricants, Annie Jarquin – Kline & Company, Andreas Dodos – Eldon's SA, and Andy Waynick – NCH Corporation, Andrew Falwell – Climax, Sally Pavlica - Vanderbilt Chemicals, LLC with Gary de Gala, Nicolás Huber – John Deere, and Greg Morris – Shell Lubricants.

FIVE STEP HPM GREASE CERTIFICATION PROCESS

1. Submit application paperwork
2. Submit qualification sample
3. Submit th signed License Agreement
4. Submit the payment
5. Submit additional Branded Product Names

If you haven't registered your grease products for certification in the HPM Grease Program, please reach out to Mike Kunselman, CQA Program Manager at grease@centerforqa.com to learn more about the process. It is five easy steps to becoming HPM Grease certified. For more details on the specification, pricing and more, please visit https://www.nlgi.org/about-us/high-performance-multiuse-grease/