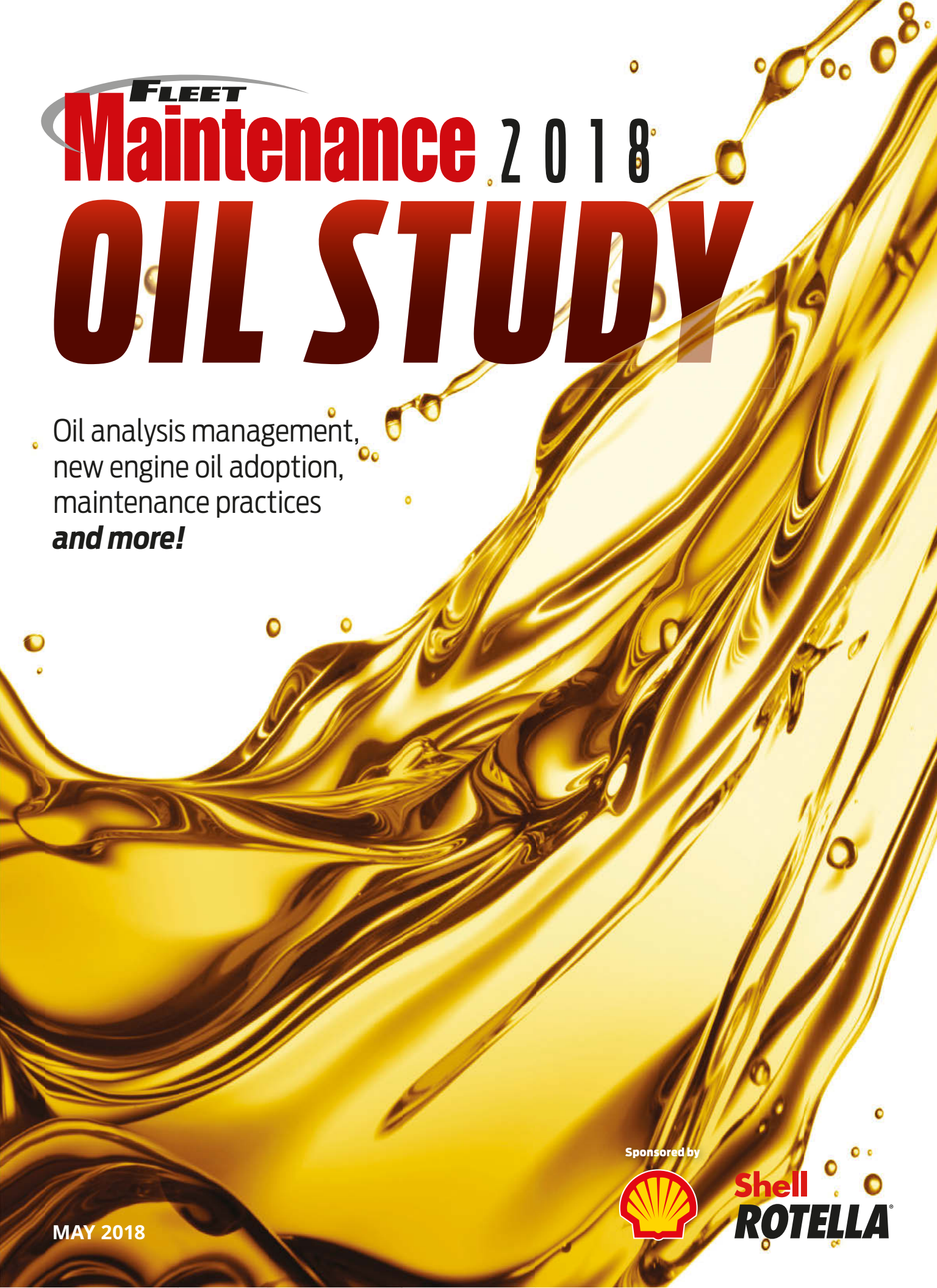
FLEET

Maintenance 2018 OIL STUDY

Oil analysis management, new engine oil adoption, maintenance practices ***and more!***



Sponsored by

Shell ROTELLA®

MAY 2018

THEY MAY NOT SEE YOUR HARD WORK **BUT WE DO**

Your job demands something most people can't see — hard work and dedication. We see the relentless efforts you put in day in and day out. It doesn't go unnoticed. That's why we work just as hard to make sure our most advanced technology is in every bottle of Shell *Rotella*® engine oil. Because we know just as well as you, that sometimes hard work is its own reward. Learn more at insiderotella.shell.com

Shell ROTELLA®

The Engine Oil That Works As Hard As You.™

Fleet Maintenance

SouthComm Business Media

Published by SouthComm Business Media, Inc
PO Box 803
1233 Janesville Ave
Fort Atkinson, WI 53538
920-563-6388
800-547-7377

2018 *Oil Study*

Fleet Maintenance partners with Shell Rotella to present this year's study results

By *Fleet Maintenance* Staff

Maintaining a safe, efficient and profitable operation are the primary goals of any fleet. To attain these goals, fleets must focus on maximizing vehicle uptime and minimizing operational costs. At *Fleet Maintenance*, our ultimate goal is to provide best practices on fleet maintenance and repair.

Oil analysis can play a key role in helping to keep vehicles running efficiently and reduce maintenance and repair costs. In particular, oil analysis can aid in detecting engine issues before they become problematic. While preventative maintenance measures like this are decidedly a benefit, fleets are varied in their approach to if and when they conduct oil analysis.

To measure current practices and benefits to oil analysis, *Fleet Maintenance* has conducted an oil study for the third year in a row. Along with details on the adoption, frequency and methods fleets employ to conduct oil analysis, the results of this study also cover general oil preferences and usage trends.

Survey feedback provides a window into how peers operate, and allows fleets to consider adjustments to processes as needed.

This year, *Fleet Maintenance* worked with Hannover Research to provide further in-depth analysis on different engine oil trends. In partnership with Shell Rotella, the results of the latest oil study have been incorporated into this *2018 Fleet Maintenance Oil Study* supplement.

Table of contents

Takeaways

An overview of the highlights from the *2018* Fleet Maintenance *Oil Study*:

- Of the individuals surveyed, **92 percent indicated they influence the decision making process** for purchasing lubricants; 59 percent were the primary decision maker for these purchases.
- The breakout for fleets amounts to about **one-third of each vehicle class**:
  - » **31 percent are heavy duty** (Classes 7 and 8).
  - » **32 percent are medium duty** (Classes 4, 5 and 6).
  - » **37 percent are light duty** (Classes 1, 2 and 3).
- **71 percent of respondents have 100 or fewer vehicles in their fleet.** The remaining 29 percent have 100 or more vehicles.
- As it relates to oil analysis, **20 percent of respondents indicated they do not conduct oil analysis** on fleet vehicles.
- For those fleets that do conduct oil analysis, most consider the practice effective. **87 percent indicate oil analysis provides early warnings of lubricant or engine problems**.
- **Nearly half of respondents think oil analysis reduces engine wear and maintenance costs** because oil analysis prevents major failures and assists with scheduling maintenance and oil changes. Among those managers, **four in five estimate that oil analysis saves them at least $500 annually.**

Over the next several pages, we provide a general overview of the survey results, insights into fleets' current oil practices as it relates to oil analysis and other maintenance, along with current oil preferences and purchasing trends.

Please note: percentages indicated throughout this supplement are rounded to the nearest whole number. Because of this, some totals may be more than 100 percent.

Oil Analysis Practices

Frequency of engine oil analysis

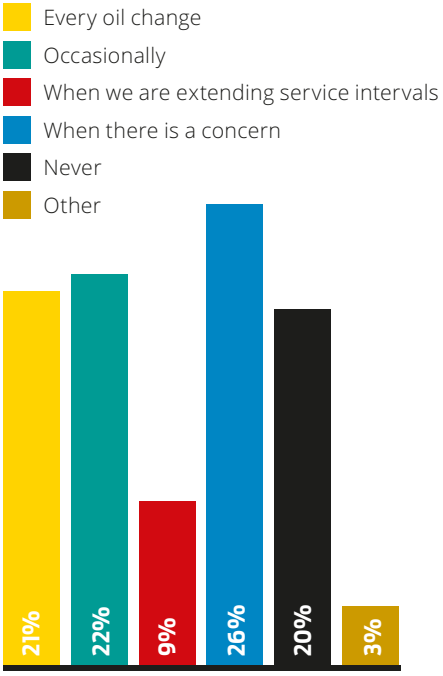
Oil analysis programs allow fleets to gauge the health of an engine, optimize oil drain intervals, increase equipment reliability and track efficiency in maintenance programs. Even though a majority of fleets recognize the benefits of analysis, it seems most operations, particularly smaller fleets, lack a standard analysis procedure and conduct it rather infrequently.

Remember, oil sampling and analysis on a regular basis allows a fleet to establish a baseline of normal wear which can help indicate when contamination and abnormal wear is occurring.

These survey results may indicate a need in the industry for better training, equipment and oil management programs to make analysis a priority. For those fleets conducting oil analysis, 43 percent indicated that customer service was the most important purchase criterion for oil analysis tools and equipment. Thirty-one percent of fleets indicated that the Shell Rotella brand did the "best job" at helping them understand the importance of oil analysis.

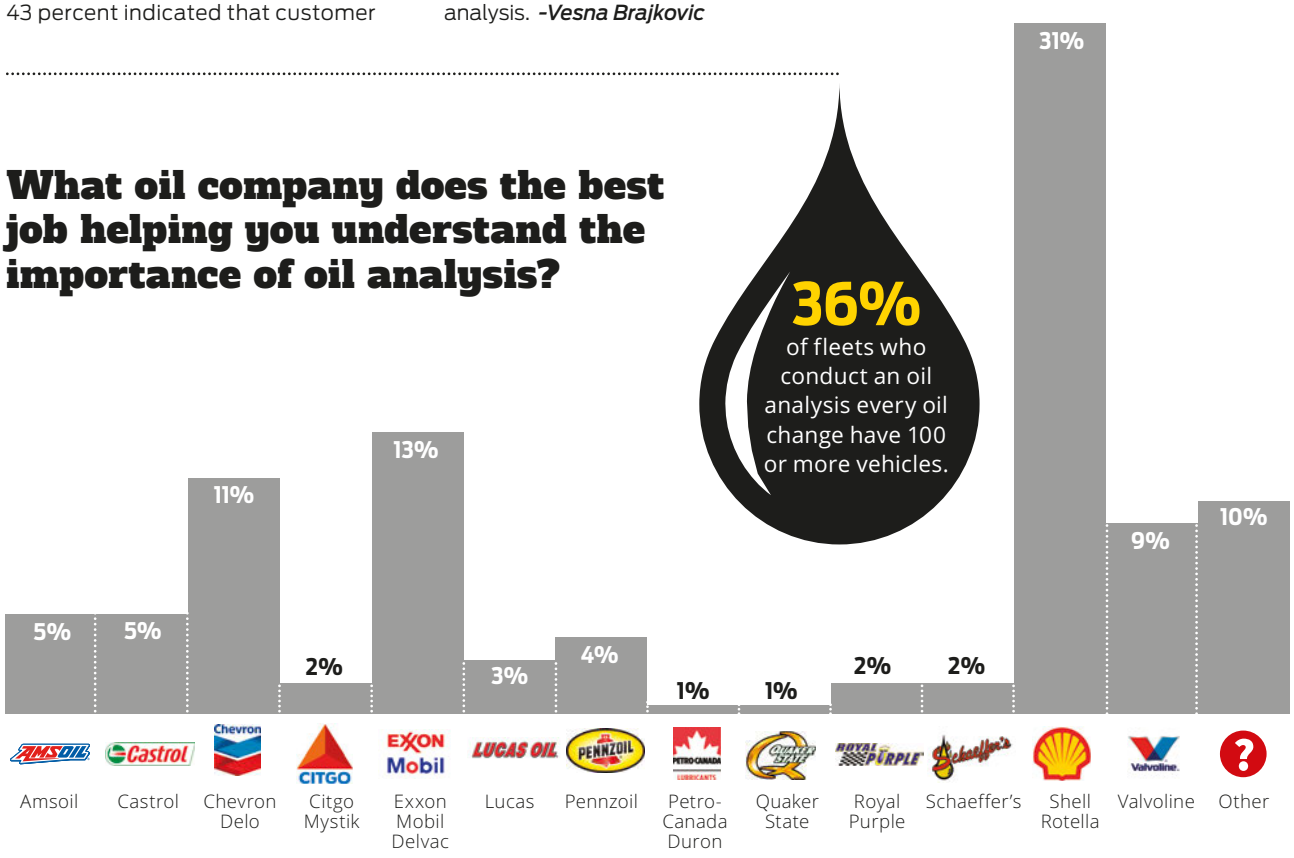
While fleets are across the board when it comes to how often they conduct oil analysis, from 21 percent conducting it every oil change, to 20 percent indicating they never do, there seems to be a consensus when it comes to the normal mileage intervals for conducting the analysis. A majority of fleets conduct analysis under the manufacturer's recommended intervals (33 percent) or every 12,000 miles (31 percent). In this section, see a breakdown of when and how fleets are conducting oil analysis. *-Vesna Brajkovic*

How often do you normally conduct oil analysis on engine lubricants?

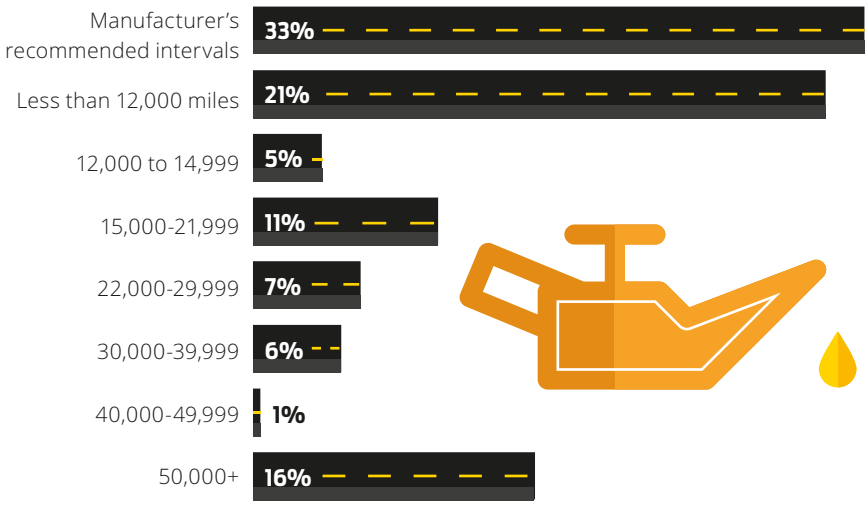


What oil company does the best job helping you understand the importance of oil analysis?

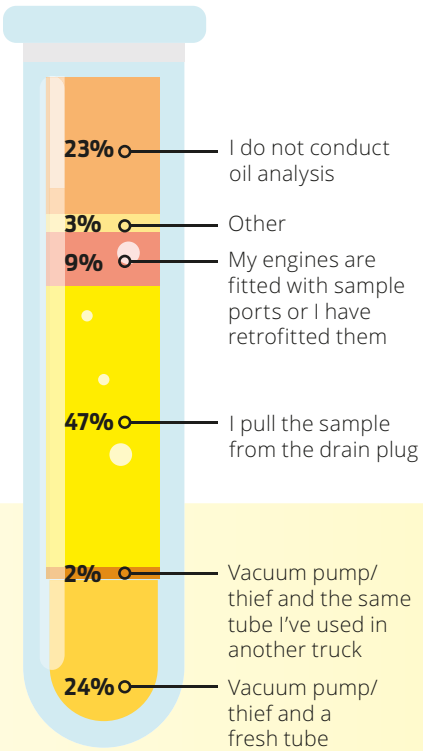
36% of fleets who conduct an oil analysis every oil change have 100 or more vehicles.



What are the normal mileage intervals for conducting engine oil analysis for your fleet's vehicles?

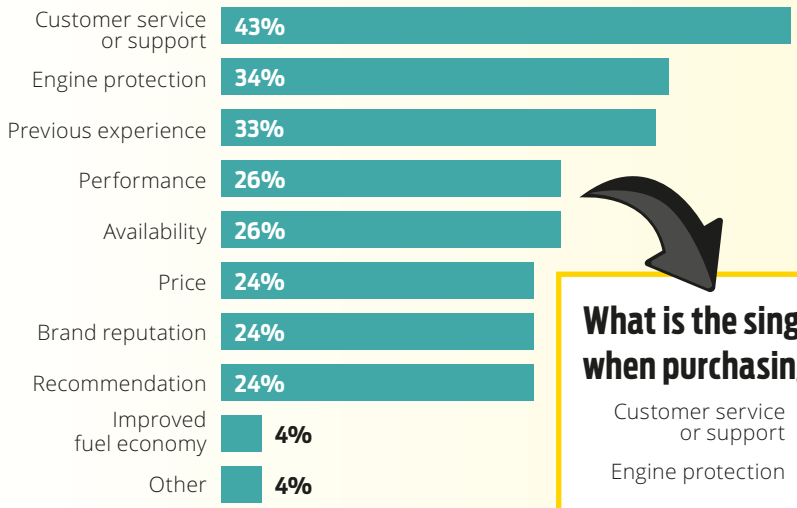


When conducting oil analysis, what tools and equipment do you use?

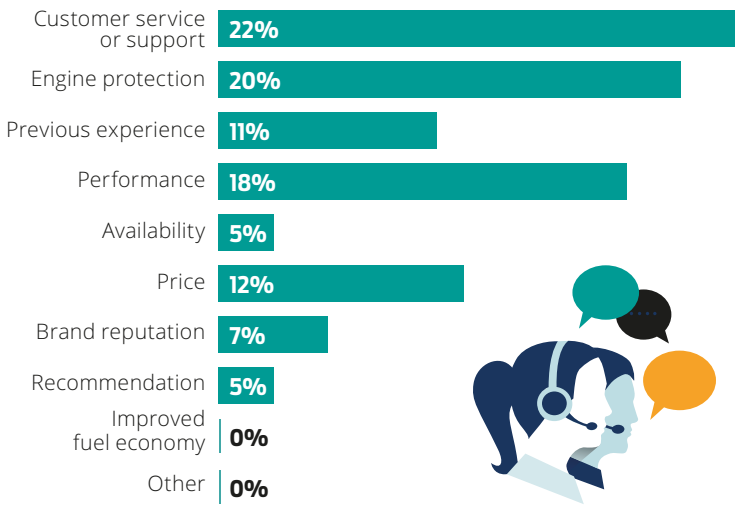


What are the buying criteria considered when purchasing oil analysis tools and equipment?

Respondents selected all that apply.



What is the single most important consideration when purchasing oil analysis tools and equipment?



Perception and Benefits of Oil Analysis

Detecting early warning signs of engine wear

Regardless of the frequency in which oil analysis is performed or the methods used, the majority of fleets (84 percent) agree oil analysis can provide early warning signs of lubricant and engine problems.

In a fleet operation, anticipating component failures before they happen is essential to ensure uptime and prevent costly breakdowns. Forty-eight percent of the fleets surveyed indicated analyzing oil has helped reduce engine wear and maintenance costs for their fleet, saving between $500 and more than $5,000 annually.

An oil analysis report can show a fleet many things about a vehicle, from viscosity of oil to oxidation levels. But the single most important criterion the majority of fleets look for in an oil analysis report is wear metals, like iron, lead and copper.

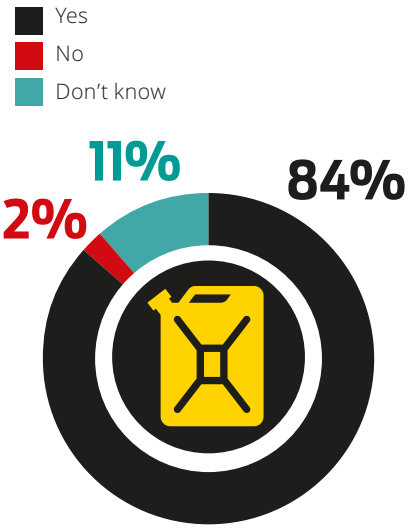
Wear metals in lubricants can be a good indication of engine wear, so early detection in an oil analysis report allows fleets to avoid future problems.

While just 24 percent of fleets look for TBN/TAN in their oil reports, those who do often consider it be the single most important oil analysis figure.

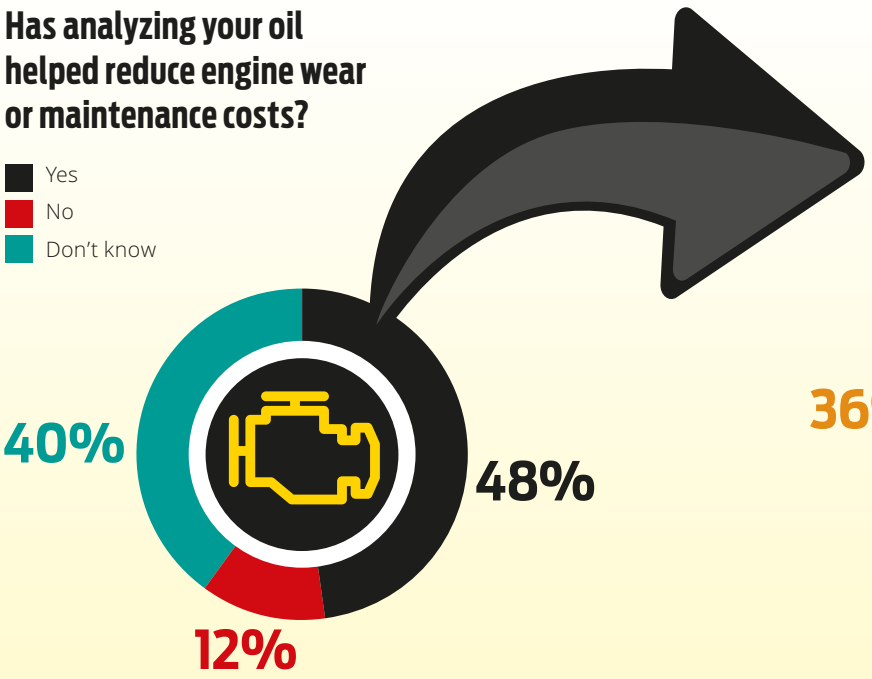
TBN/TAN stands for Total Base Number and Total Acid Number. A high concentration of acidic components can lead to corrosion and sludge buildup; engine oils are formulated with alkaline to combat this issue. In general, the alkaline additives eventually deplete, which indicates the need for an oil change. Keeping track of these numbers with oil analysis may give fleets a better understanding of how their oil is formulated and when to change it.

In the following section, the infographics detail how fleets today view oil analysis and the main benefits of conducting them. ***-Vesna Brajkovic***

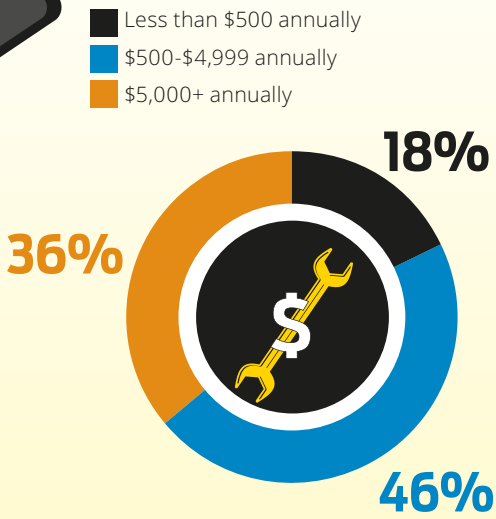
Do you think oil analysis can provide early warning signs of lubricant or engine problems?



Has analyzing your oil helped reduce engine wear or maintenance costs?

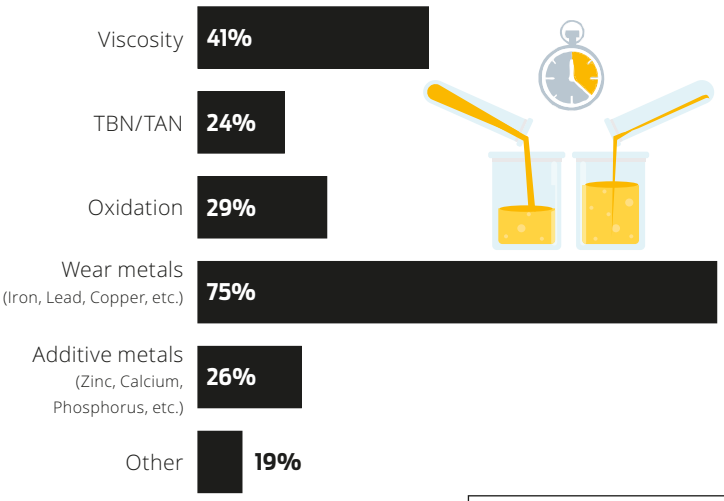


How much in repair or maintenance costs have you saved by using oil analysis?

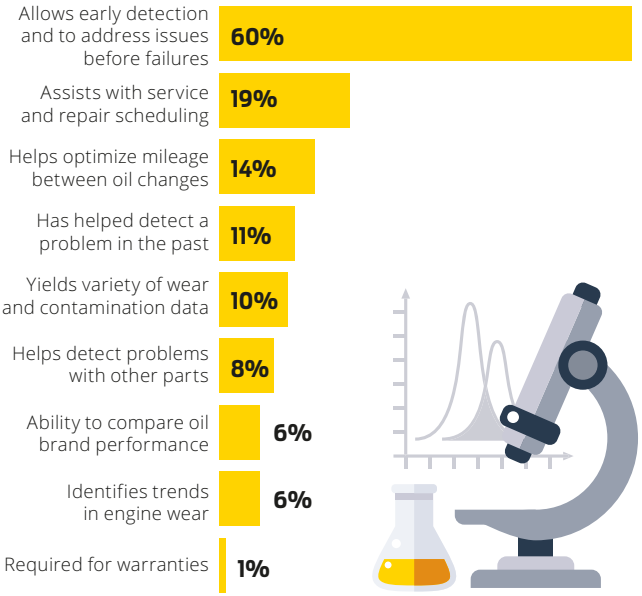


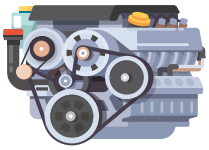
What are the most important figures you look for on your oil analysis report?

Respondents selected all that apply.



How has oil analysis helped reduce engine wear or costs?





How do you primarily measure engine wear?

51%
Multiple oil analysis reports showing a trend

26%
Oil sample visually shows debris

10%
Single report showing wear metals spiking

13%
Other

Current Oil Practices

Fleet oil management methods and brand preferences

When it comes to best practices for engine oil, fleets have many decisions to make – from drain intervals to which products they purchase. Because of the vital role engine oil plays in minimizing metal-to-metal contact and reducing friction and wear, those decisions don't come lightly.

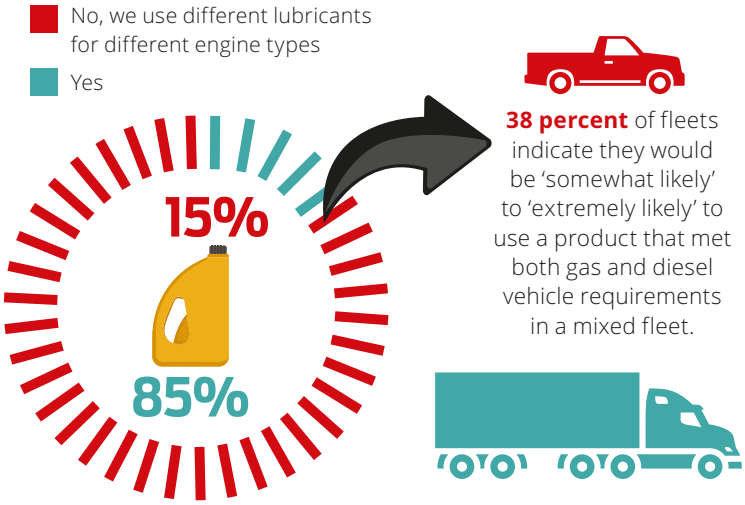
Ultimately, the biggest consideration when selecting an engine oil is engine protection (72 percent), and previous experience with the product (64 percent). These results mirror those of the *2017* Fleet Maintenance *Oil Study*, where respondents also indicated these same two criteria as the most important for choosing a particular brand of oil. This shows fleet managers, most of whom have decision-making authority when it comes to lubricant selection, value proven results and protection over factors like price and additional services.

Of the oil brands on the market, Shell Rotella is the most recognized among fleet managers, with 86 percent indicating they are familiar with the brand, and the majority (34 percent) selecting the brand as their preferred oil. About 75 percent of fleets are also familiar with Valvoline, Exxon Mobil Delvac, Pennzoil and Castrol. While there are different brand preferences for individual fleets, most of them adhere to standard engine oil practices, such as the manufacturer's recommended draining interval, or draining oil every 12,000 miles or less (40 percent).

In this section, the infographics highlight current oil practices, as well as oil purchasing and brand preferences.

-Vesna Brajkovic

Do you use the same lubricants for both your gas and diesel vehicles?



Which of the following best describes your role in the selection and purchase of lubricants?

What are the normal mileage intervals for draining oil from your fleet vehicles?

30%	Manufacturers recommended intervals
40%	Less than 12,000 miles
12%	12,000-14,999 miles
9%	15,000-21,999 miles
3%	22,000-29,999 miles
3%	30,000-39,999 miles
1%	40,000-49,999 miles
3%	More than 50,000 miles

Oil Preferences

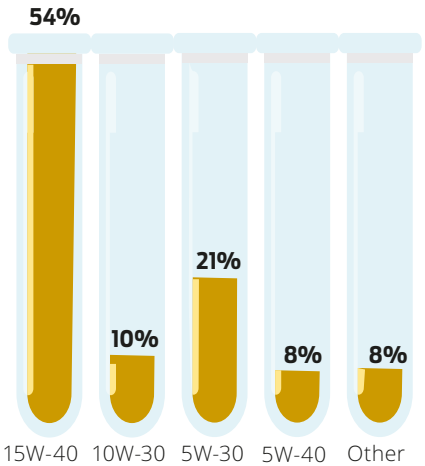
What matters most?

Top nine criteria considered when selecting an engine oil brand

Which of the following criteria do you consider when selecting an engine oil brand? (Respondents selected all that apply.)

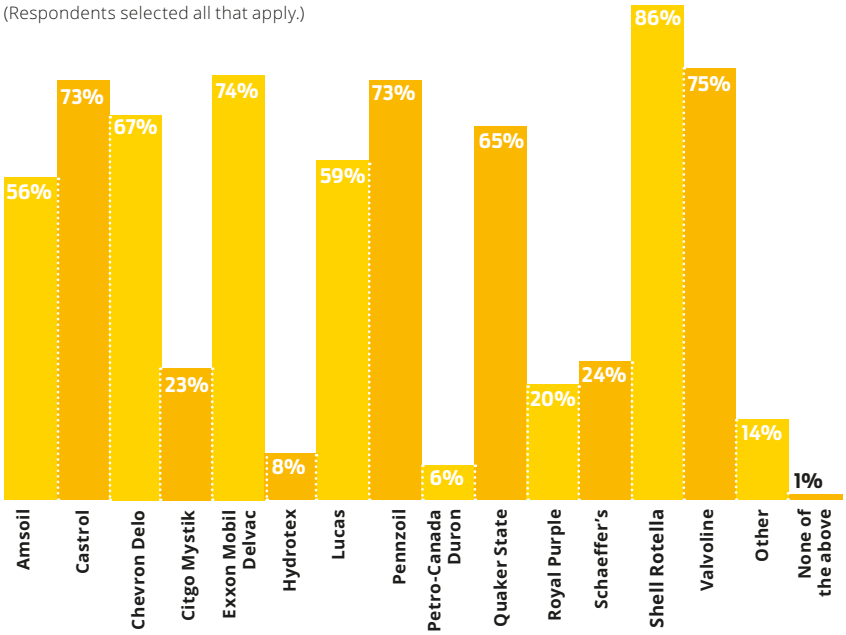
72%	Engine protection
64%	Previous experience
59%	Performance
48%	Brand reputation
41%	Price
28%	Additional services including oil analysis
26%	Improved fuel economy
22%	Recommendation
4%	Other

Is there a preferred viscosity weight that you use?

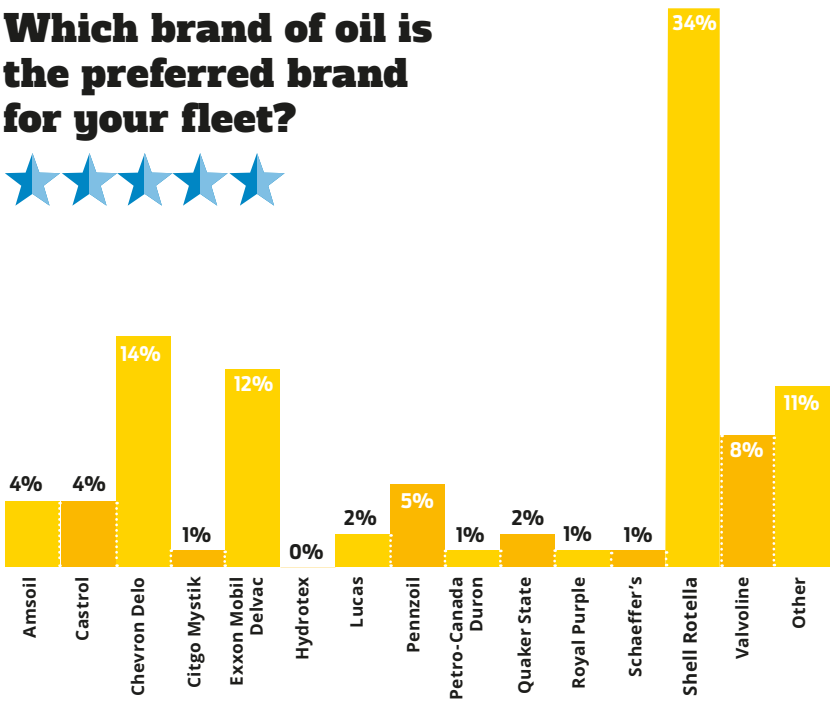


Which of the following brands of oil are you familiar with?

(Respondents selected all that apply.)



Which brand of oil is the preferred brand for your fleet?



LET'S SHOW THEM THE OTHER

Let's show them an industry that works day and night to deliver groceries for shelves, toys for children, products for homes.
Let's show the proud dad who carries on a hardworking trucking heritage.
Let's show the dedication, the community involvement, and the care.
Let's show them the other side of the story.
Learn more at insiderotella.shell.com

Shell ROTELLA®

The Engine Oil That Works As Hard As You.™

CK-4 and FA-4 Implementation

Current understanding and adoption

Licensing of the American Petroleum Institute's CK-4 and FA-4 heavy duty diesel engines oils – formerly known as PC11A and B – began on December 1, 2016. The new categories improve upon the existing standards by enhancing protection against oil oxidation, safeguarding against engine wear and protecting against degradation of low- and high-temperature properties.

With the introduction of the new engine oils, some fleets began implementing the oils into their operations. Of those fleets, 85 percent note they have had no obstacles in using the new engine oils.

While one-fourth of fleets introduced CK-4 oil for all vehicles and another 23 percent implemented use of FA-4 for new vehicles entering their fleets, 38 percent of respondents indicated they were unaware of the new oils altogether. It is important to note 42 percent of the fleets surveyed manage light duty vehicles, which the new oils are not marketed to. Even so, of the heavy duty fleets, 28 percent were also unaware, meaning there could be a need in the industry for increased education and promotion.

The following infographics show if and how fleets are adopting CK-4 and FA-4 into their fleets. ***-Vesna Brajkovic and Stefanie Von Rueden***

With the introduction of CK-4 and FA-4, how did you introduce this new generation of oil into your fleet?

(Respondents selected all that apply.)

23% Adopt usage only for new vehicles entering the fleet with FA-4

25% Use CK-4 immediately in all vehicles since this oil is backward compatible

10% Test/monitor FA-4 in new vehicles and gradually begin using CK-4 in older vehicles

9% Other

38% I am not aware of these new oils and have not yet started planning

Have you encountered obstacles in using CK-4 and FA-4?

(Respondents selected all that apply.)

The majority of respondents **did not encounter obstacles** when using CK-4 and FA-4 oil.

Adoption of CK-4 and FA-4 engine oil since 2016

In December 2016, the North American lubricants industry witnessed its biggest specification overhaul in history with the launch of the new American Petroleum Institute CK-4 and FA-4 heavy duty diesel engine oils.

Fleet Maintenance magazine has conducted reader studies to monitor the awareness, impact and adoption of these new oils among fleets. Those results were published in the *2017* Fleet Maintenance *Oil Study*, and since then more fleets are implementing the new oils. But still, a large percentage are unaware of the new oil specification.

Last year, 33 percent of fleets indicated they would start using CK-4 immediately in all vehicles since the oil is backwards compatible, 28 percent indicated they would adopt FA-4 usage in all new vehicles and 26 percent were not aware or had not started planning.

Since then, 60 percent of fleet operators currently use, or plan to use, FA-4 oil for some or all of their vehicles. Notably, the majority of fleets said they have not encountered any obstacles in implementing the oils.

Still, 28 percent of heavy duty fleets in the most recent study indicated they are not aware of the oils or had not started planning. This could indicate a need in the industry for more education, or support from oil companies.

As more fleets begin to use the new oils, understand their compatibility and see their benefits, it is anticipated that there will be more widespread utilization across heavy duty fleets. ***-Vesna Brajkovic***

Are you using or planning to use FA-4 oils for any of your vehicles that allow it?

YES

15% Yes, for all new vehicles

22% Yes, for specific vehicles or models

20% Don't know

NO

11% No, but we are planning to use it for all new vehicles

10% No, but we are planning to use it for specific vehicles or models

22% We have no plans to FA-4 oils

Current Maintenance Practices

What fleets use and where they use it

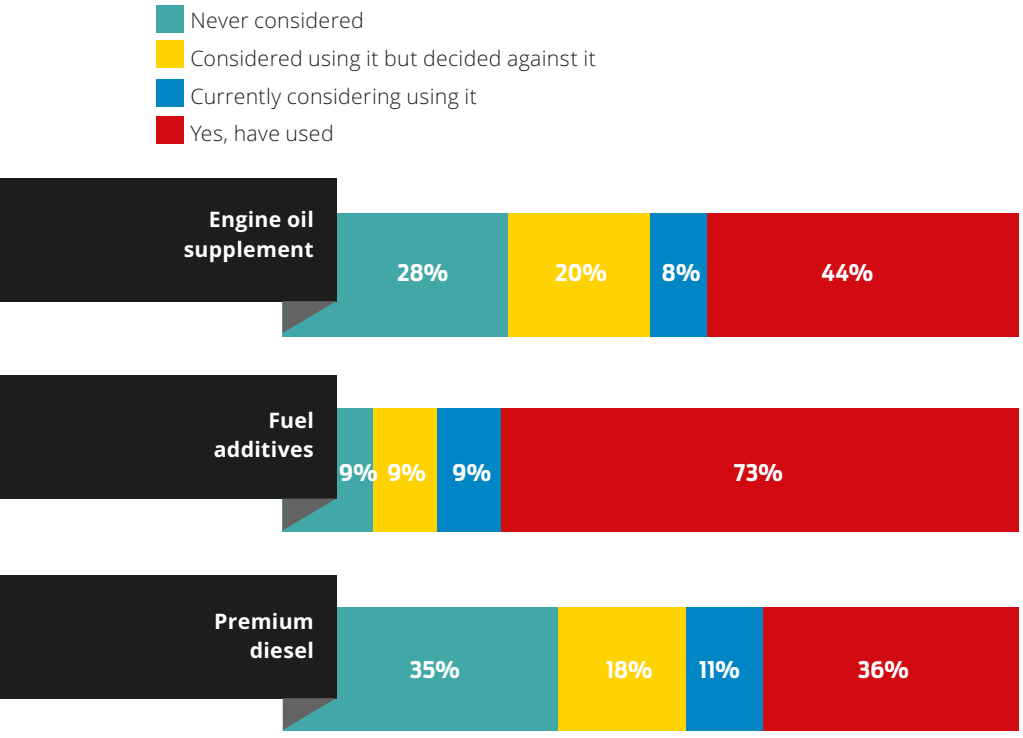
Of those surveyed, 91 percent of fleets indicated they have direct or supervisory influence over maintenance practices. While those maintenance practices are dependent on the specific needs of a fleet, there are some common trends among fleet maintenance managers, as illustrated in the data results.

For example, nearly three quarters (73 percent) of fleets have used fuel additives, and almost half (44 percent) have used an engine oil supplement. Additionally, most fleets use some form of synthetic products in their fleet vehicles. Synthetic transmission oil was the most widely adopted, with 79 percent of fleets using this synthetic fluid. About half of heavy duty vehicles used synthetic engine oil (49 percent), while 83 percent of light duty vehicles used synthetic.

Maintenance is more than fixing things that are broken, it's about adhering to best practices in order to predict, and ideally prevent, major repairs from happening. One step is measuring engine wear. Fifty-one percent of fleets measure wear by viewing multiple oil analysis reports showing a trend. (See page 4 for more background on oil analysis.) Twenty-six percent measure engine wear by physically seeing debris in an oil sample.

The following infographics show the current maintenance practices of fleets when it comes to products they use and how they use them, as well as how facilities across the U.S. are set up. ***-Vesna Brajkovic***

Have you used or have you considered using any of the following?



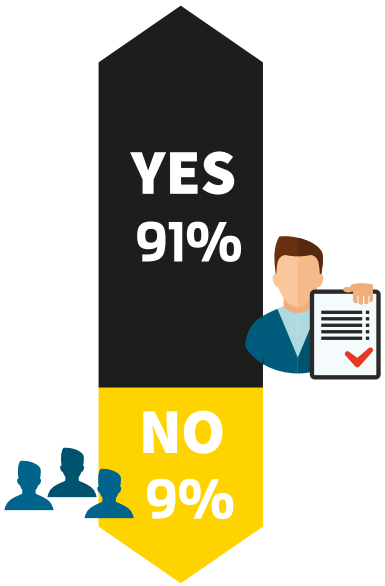
Small fleets, consisting of less than 10 vehicles, are more likely to have used all of these products

64%
have used an engine oil supplement

85%
have used fuel additives

47%
have used premium diesel

Do you have direct or supervisory influence over maintenance work?



Where is your fleet maintenance most often performed?

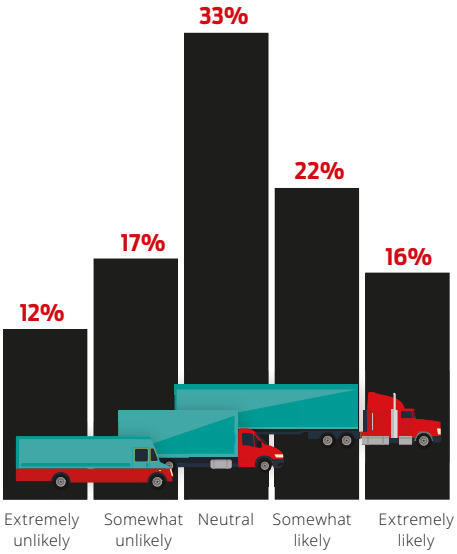
71%
On-site

15%
Contract maintenance provider/ Independent repair facility

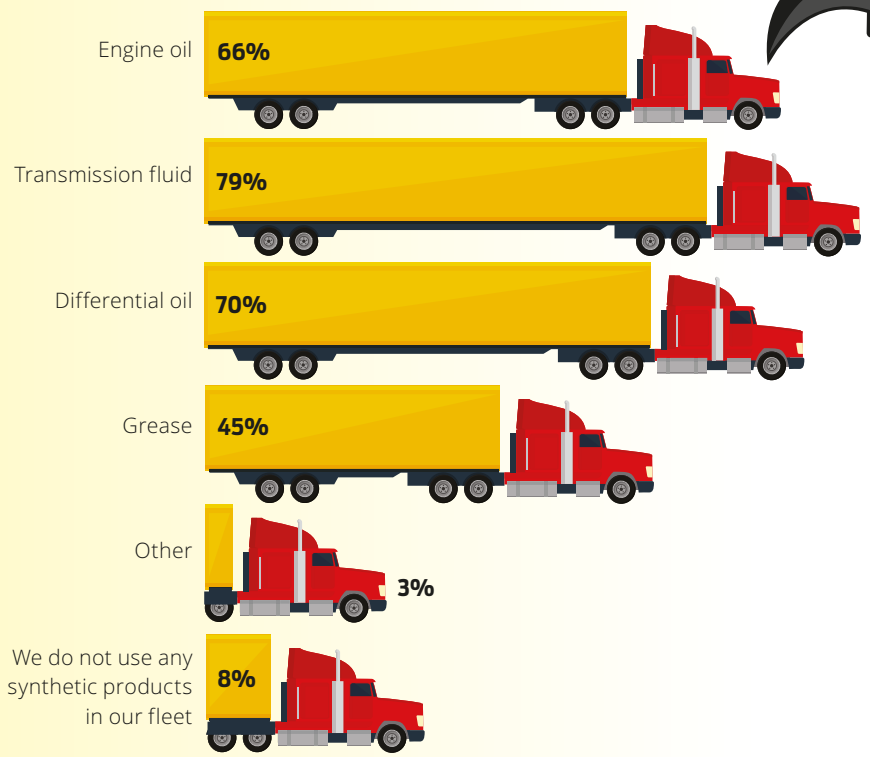
12%
Centralized company facility

2%
Other

If there were a product that met both gas and diesel vehicle requirements, how likely would you be to use it for your mixed fleet?



Do you use any of the following synthetic products in your fleet?



Breakout of vehicle types that use synthetic engine oil

83%
Light duty

63%
Medium duty

49%
Heavy duty

Demographics

An overview of the respondents

Respondents of the *2018* Fleet Maintenance *Oil Study* manage fleets ranging from light to heavy duty, serving industries from government and public safety to managing common carrier and operating independent repair facilities.

The fleets represented in this study provide a cross section of all vehicle classes, with a nearly one-third split for the primary vehicle class serviced in their fleets between light duty, medium duty and heavy duty vehicles. While a fleet may have a vehicle class category as their primary vehicle type, more than half (59 percent) indicated a mixed fleet.

The majority of vehicles are owned (86 percent) and maintained in an on-site facility (71 percent), with about half keeping vehicles in the fleet for more than 10 years.

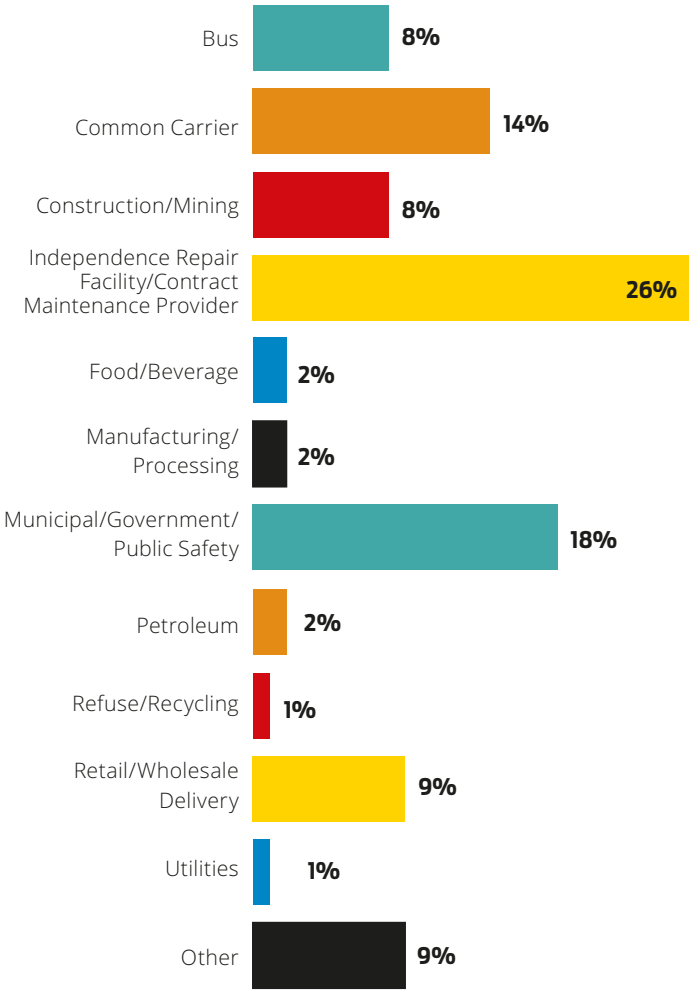
Types of vehicles

Diesel and gasoline are the most common fuel types among fleets, with 74 percent indicating some or all vehicles run on gasoline, and 88 percent run some or all diesel, a statistic that mimics other industry data showing the popularity of diesel fuel among Class 4 through 8 vehicle purchasers. Nearly 80 percent of registered medium and heavy duty vehicles in 2017 were diesel, according to IHS Markit commercial vehicle research director Andrej Divis at the 2018 NTEA Work Truck Show.

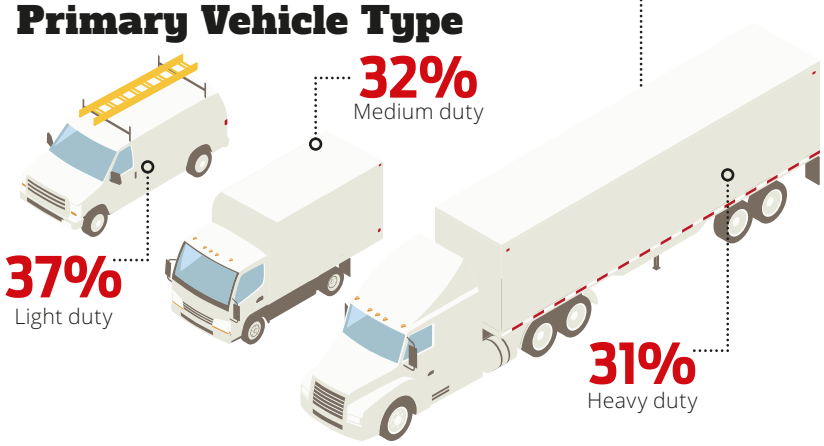
While alternative fuels lag, the study indicates a trend towards fleets operating a mix of diesel and gasoline vehicles along with a few alternative fuel options. As it relates to alternative fuels, hybrid vehicles are the most popular among all fleets, with hydrogen being the least popular.

The following infographics help breakdown the surveyed fleets by type, industry and size. ***-Vesna Brajkovic***

Which of the following best describes the industry you currently work in?



Primary Vehicle Type

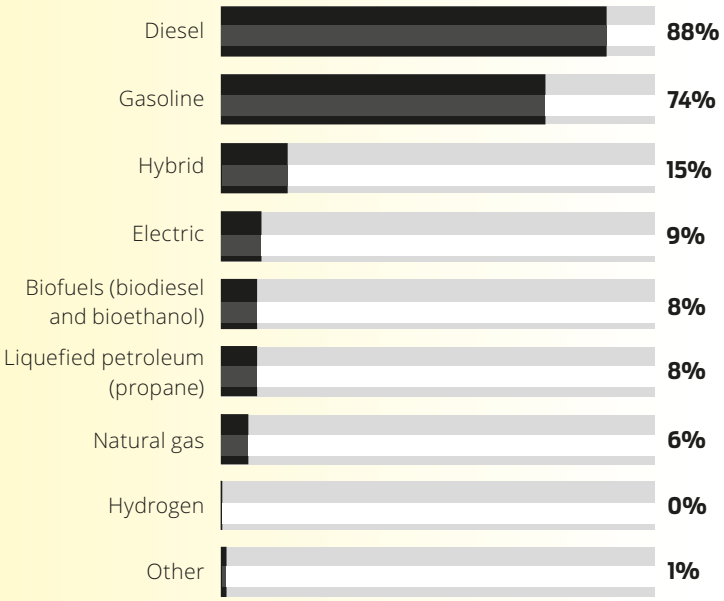


The majority of respondents indicated they maintain a mixed fleet: **75 percent have light duty** (Classes 1, 2 and 3), **59 percent medium duty** (Class 4, 5 and 6) and **62 percent heavy duty** (Class 7 and 8) in their fleet.

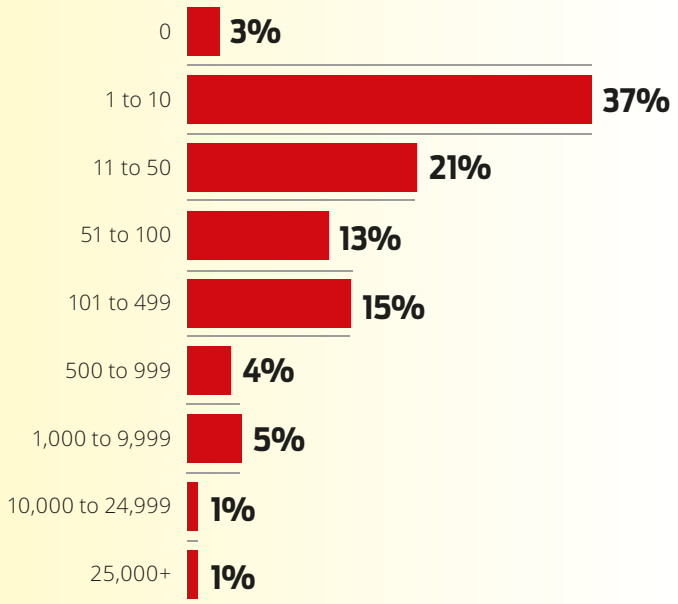
51% of fleets keep their vehicles for 10 or more years. On average, **2 percent** keep their vehicles for less than three years.

Which of the following types of vehicles do you have in your fleet?

(Respondents selected all that apply.)



How many vehicles are in your fleet?

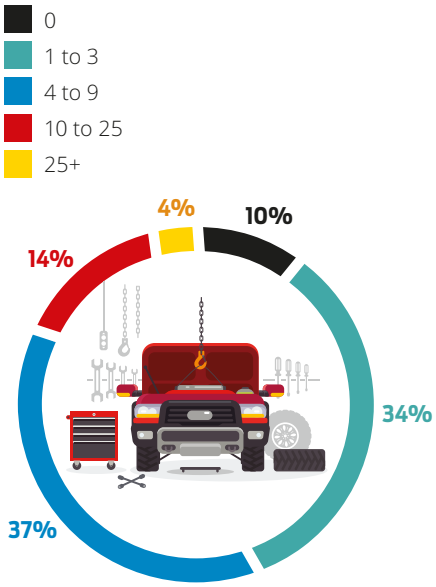


Do you lease or own the vehicles in your fleet?

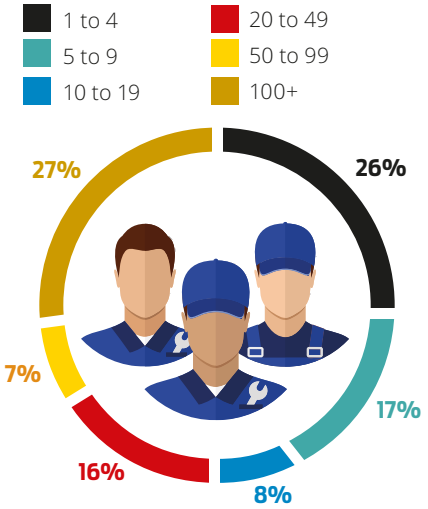
86%

own 91 to 100 percent of their fleet.

How many bays are at your primary location?



How many individuals are employed by your company?



Shell and AirFlow Truck Company Debut Energy-Efficient Class 8 Truck

The Starship Initiative truck combines technologies available today for increased fuel economy benefits

SHELL AND AIRFLOW TRUCK COMPANY have designed and built a hyper-fuel -efficient Class 8 truck capable of reducing the energy usage associated with the transportation of goods. This next-generation concept truck, called the Starship Initiative, uses technologies that are currently available today to minimize the amount of energy it takes to transport a load of cargo from one point to another.

"We seek projects such as the Starship Initiative to keep Shell at the leading edge of technology development and energy efficiency," said Bob Mainwaring, technology manager for innovation, Shell Lubricants. "The transportation industry is constantly changing, and our goal is to be at the forefront of innovation by collaborating with companies like AirFlow and others to develop creative solutions that provide benefits for years to come."

With new fuel economy regulations on the horizon and the need for continuing advances in fuel economy and emissions reductions, Shell Lubricants recognizes that a holistic approach to making fuel economy gains is important. This includes advances in engine and drive train technology, the use of low viscosity synthetic lubricants, aerodynamic designs, adopting efficient driving methods and more.

The body of the Starship Initiative tractor is a bespoke aerodynamic design made of carbon fiber. This includes the side skirts, hood, and front end. A custom, Department of Transportation (DOT)-approved wrap-around windshield was designed specifically for the truck. The trailer includes energy efficient features such as full side skirts to reduce drag and a 5,000-watt solar array on top of the trailer to power interior accessories and reduce the energy load.

The Starship Initiative truck is powered by a 2017 Cummins X15 Efficiency 6-cylinder engine with 400 horsepower and 1850-foot pounds of torque. The standard engine has been calibrated with the transmission to run at very low speeds and down to 800 rpm.

Shell provided technical consultation on engine and drivetrain components, as well as recommendations for lubricant needs for use in the Starship Initiative truck. The engine uses Shell Rotella® T6 Ultra 5W-30 motor oil, which is a low viscosity API FA-4 engine oil that has been formulated to provide better fuel economy, improved high and low temperature performance and meets the requirements for many low emissions engines.

The Starship Initiative provides Shell with an opportunity to test Shell Rotella® T6 Ultra 5W-30 in a cutting edge vehicle prior to its introduction to market. Shell will be able to gain valuable information for creating lower viscosity engine oils without sacrificing performance.

The truck will use a number of other full synthetic Shell Lubricants products including Spirax S6 GXME 75W-80 transmission oil, Spirax S5 ADE 75W-80 differential oil and Spirax S6 GME 40 wheel hub oil. In addition, Shell Rotella Extended Life Coolant will provide excellent high-temperature protection and heat transfer. Shell Rotella Diesel Exhaust Fluid, a high purity diesel exhaust fluid, will also be in the truck.

Starship Initiative Testing

The Starship Initiative will undertake a cross-country run in May that will begin in California and end in Florida carrying a real load of cargo: clean reef material destined for a new reef installation off the coast of Florida later this summer. AirFlow and Shell will seek to reduce the energy usage associated with the transportation of goods through improved fuel-economy for a Class 8 truck and the measurement of freight ton efficiency.

"For more than 30 years, Shell has employed co-engineering to increase efficiency and reduce emissions," said Mainwaring. "The relationship with AirFlow Truck Company and other suppliers to build the Starship Initiative is part of a collaborative process led by Shell that encourages co-engineering and has resulted in a Class 8 truck that will be used to challenge how trucking efficiency is defined."

Advances in engine and drive train technology, the use of low viscosity synthetic lubricants, aerodynamic designs, and efficient driving methods all contribute to increased fuel economy and freight ton efficiency.

*Kline & Company, "Global Lubricants Industry November 2017: Market Analysis and Assessment.

SHELL ROTELLA®
SUPERRIGS
TRUCK BEAUTY CONTEST
June 14-16, 2018
White's Travel Center, 2440 Raphine Road, Raphine, Virginia 24472

SuperRigs is North America's premier truck beauty contest offering $25,000 in cash and prizes. This free event is family friendly with a three-day music festival, fireworks, and a light contest. Plus, a truck parade, over 30 historic trucks, free health checks and more. Join us for this amazing event.

SHELL ROTELLA® SUPERRIGS 2018

TRIBUTE TO TOUGHNESS
RAPHINE, VIRGINIA

Sam's CLUB®

White's Travel Center RAPHINE, VA

MAC Trailer

Rotella.com/Superrigs **WhitesTravelCenter.com**

VehicleServicePros.com/10119348

HARD WORK COMES WITH YOUR TERRITORY ADVANCED TECHNOLOGY COMES WITH OURS

What's inside makes all the difference. That's why every bottle of Shell *Rotella*® T6 Full Synthetic Heavy Duty Engine Oil with Triple Protection Plus™ technology has been enhanced with fully synthetic base oil plus advanced additive technology to provide protection against wear, deposits and oil breakdown.
Learn more at rotella.com

Shell
ROTELLA

The Engine Oil That Works As Hard As You.

VehicleServicePros.com/10119348