

# Charles A. Gay

By Karl M. Phipps  
Managing Editor

*This 30-year training veteran and senior data analyst discusses strategies in testing and interpreting oil samples.*

(Photo courtesy of Analysts Inc.)



## Charles Gay The Quick File:

### Work Experience

Currently a senior data analyst at Analysts Inc., Atlanta, Ga. Involved in data interpretation of test data, providing corrective action comments and proactive maintenance recommendations for customers along with training and sales support. Specializing in heavy industry involving analytical ferrography, micropatch and magnetic plug evaluation, refrigeration/refrigerant test data interpretation, power generation, including nuclear, coal and wind power, fuels, coolants and specialty lubricants. Since 1980 he has provided technical support and training for Komatsu North America. Previously worked as a laboratory manager for a joint venture lubricant testing laboratory in Jakarta, Indonesia.

### Education

Associate of Science in Business Administration -  
DeKalb College, 1976

### Honors & Accomplishments

- STLE member since 1983
- STLE Atlanta Section chairman, 2000-present
- Oil Monitoring Analyst (OMA I), 2000
- Certified Lubrication Specialist, 1995
- Developed magnetic plug debris analysis matrix, 2004
- Developed visual exam of debris/micro-filter patch test matrix, 1998

### TLT: What is the relationship with oil sampling among end-users?

**Gay:** It has been my experience that from an end-users' perspective, oil sampling can be a love/hate relationship. During my 37 years of working in the industry, the strength of an oil sampling program depends heavily on educating and communicating with the end-user.

A successful relationship between an oil analysis lab and oil-sampling program requires that the lab educate its clients in order to sell services or to retain the customer. Fortunately, thanks to STLE's efforts there are local section presentations, the annual meeting, certification programs, education courses and Webinars that cover a wide variety of topics on oil analysis that help to educate both the novice and the expert.

Meanwhile, there are several industry training companies and other similar organizations that are usually associated with major fluid testing labs which provide services to the typical end-user. However, fluid analysis companies continue to be the preferred education provider for their clients.

### TLT: What factors should you consider in choosing an oil analysis provider?

**Gay:** There is a wide variety of testing facilities available in the marketplace that are affiliated with independent laboratories, oil companies, lubricant distributor programs and major equipment manufacturers. The testing offered and associated costs vary widely.

However, there are four key factors to consider when choosing a provider to meet your fluid testing needs: pricing, depth of knowledge, operational needs and reporting requirements. The general rule of thumb is that basic testing may meet your needs for easy-to-repair or replacement equipment, however, testing on

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more sensitive equipment with high uptime requirements and expenses may require a more complex lubricant and component-monitoring program.

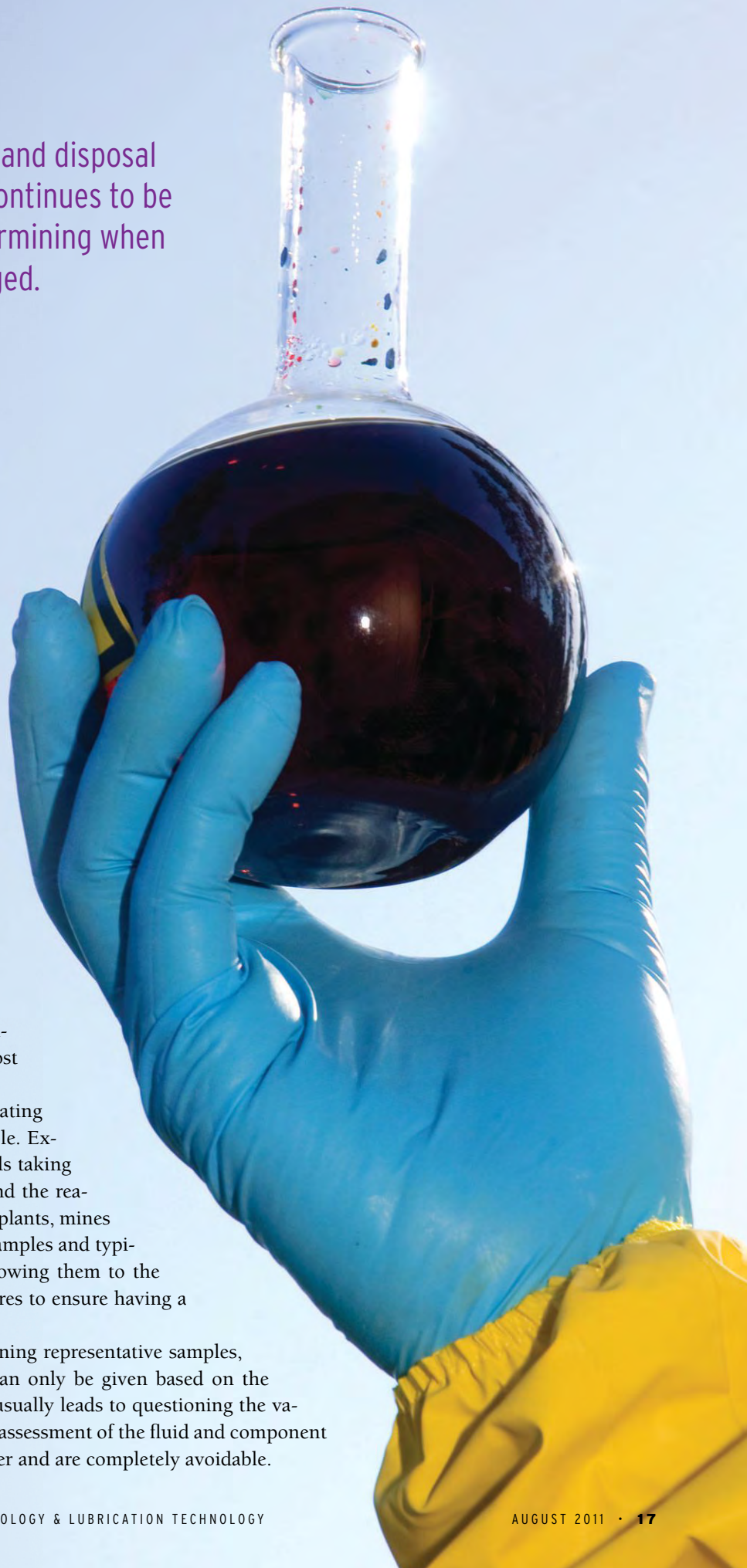
Education and communication play a major role in the program user's ability to select the appropriate testing for their operation. Recommendations are usually provided from the service provider, but the overall effectiveness of the program is ultimately managed by the end-user. You should select a program that you and your staff can use properly and understand.

**TLT: What makes a good fluid analysis program?**

**Gay:** Obtaining a representative sample of the in-service fluid from a component is a requirement for a good fluid analysis program. Every application has an ideal sampling method, and maintenance personnel should consider which is most appropriate for their operation and environment.

A good fluid analysis program involves educating sampling personnel of the importance of their role. Experience shows that in many cases the individuals taking the samples usually do not completely understand the reasons for sampling. As a general rule, new hires in plants, mines or shops are usually assigned the task of taking samples and typically do so with little or no training. Before throwing them to the wolves, make sure to provide training for new hires to ensure having a good fluid analysis program.

Proper sampling methods are critical in obtaining representative samples, and laboratory analysis and recommendations can only be given based on the sample submitted. A non-representative sample usually leads to questioning the validity of the sample by the laboratory or incorrect assessment of the fluid and component conditions. Both of these are costly to the end-user and are completely avoidable.



## **TLT: What are the issues with oil sampling?**

**Gay:** Proper and consistent sample labeling are major issues in the industry. Well-trained, established and knowledgeable sampling personnel are more likely to identify the component being sampled consistently. Inconsistent labeling is particularly common in large industrial plants with many different sections or profit centers and a large number of components of the same make and model. Labeling or tagging the components with a unique identifier usually works best. A good approach offered by some labs is to generate a label for each component with the customer's chosen unit identification and a corresponding unique number in the laboratory database. If the reference points don't match, you should contact the customer before proceeding.

In cases where clients aren't dealing with the same equipment and identifiers every time, a sample information form should be filled out completely and consistently and submitted with the sample for analysis. As the sample information form is typically provided by the testing facility, it indicates the testing to be performed, payment selection, the distributor network and the destination of the sample report. Well established sampling programs with properly trained personnel typically submit sufficient information with their samples.

Sometimes, sample bottles are labeled or marked at sam-

pling, and the sample information form is filled out later by office personnel. Though this can work well, a well-intended technician can easily be bitten by untrained office personnel. Thus, proper training of office personnel in recording the correct information on the form is a must if this approach is taken.

Though training of these individuals and the time it takes to fill out the form correctly are time-consuming, the importance of these tasks cannot be over emphasized. It is not just busy work, and the gains realized in the sampling program usually result in a positive reaction. In some cases, obtaining sufficient proper information on the samples submitted is still an issue. This is astonishing as lacking or improper information usually causes delay in processing at the laboratory and may result in thousands of dollars in costs. A good laboratory must stress the importance of sample information as part of their training programs.

Submission of samples to testing facilities is also a recognized problem of significant proportion. Most service providers track the sampled date (if provided), date it was received at the laboratory and the date of report generation. This is also true of hand-delivered samples. However, all too often, a call is received stating a sample or group of samples will be sent via overnight carrier only to be later determined the sample was not received the following day. The follow-up call inquiring about the outcome of testing (usually the day after supposed shipping), almost always begins with, "How was the sample shipped?" A typical response is that the sample was passed along to someone in the office or shipping department. Almost always, the instructions requiring overnight shipping did not get communicated to shipping personnel. The sample is either still on their desk or was shipped by other means. These types of communication errors also contribute to delays and may potentially lead to thousands of dollars in costs. Thus, conveying the importance of sample submission is also a critical portion of any training program. If the sample doesn't make it to the laboratory, testing cannot commence and the status of the fluid and the component it came from remain unknown.

## **TLT: What are the challenges in interpreting oil samples?**

**Gay:** As previously mentioned, data generated on a sample and the resultant interpretation of the fluid and component is critically dependent on receiving a representative sample and sufficient information about the component and lubricant in service. If this information is incomplete or the testing performed is not broad enough for the application, a proper assessment of the lubricant or component can't be made. Incorrect information on the component will lead to incorrect application of guidelines established based on thousands of data points from like or similar equipment. Though sometimes broad in nature, some OEMs also provide guidelines which can't be applied if the information is not present.

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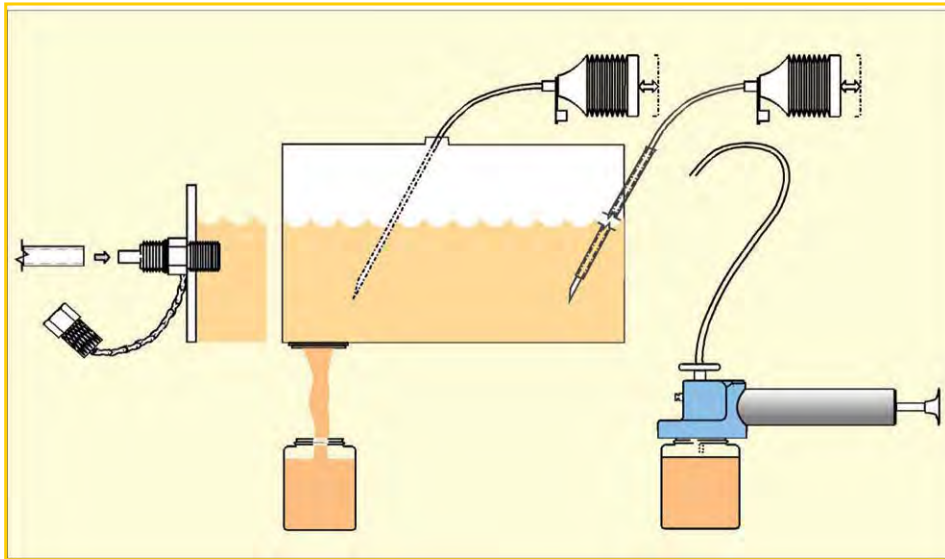


Figure 1 | Illustration of some sampling methods including the QSS sampling valve, bellows bottle, vacuum pump and drain. (Courtesy of Analysts Inc.)

Overcoming these challenges can sometimes be accomplished with the use of trend analysis. This works well by close examination of percent change in test results in comparison to sample histories from the component. This too is limited by the testing and information provided. Differentiation in testing methodology, one-of-a-kind components and components without a sampling history are the most common factors that hinder establishing and applying the correct

knows everything related to the client's equipment, maintenance capabilities and lubricant in service. This misconception may be part of the reason samples are frequently received with no information on the form or oil in an unlabeled sample bottle.

**TLT: What future developments do you foresee in oil analysis programs?**

guidelines.

Increased communications with the client about the component and lubricant application are critical in overcoming the challenges faced. Only then can the change in results and lubricant/component conditions be fully understood. This communication may result in the recommendation of additional testing or result in a broader scope of testing for the application. For example, higher volumes of in-service lubricant generally require more in-depth testing to actually assess the serviceability of the fluid. A major misconception commonly encountered is that the service provider already

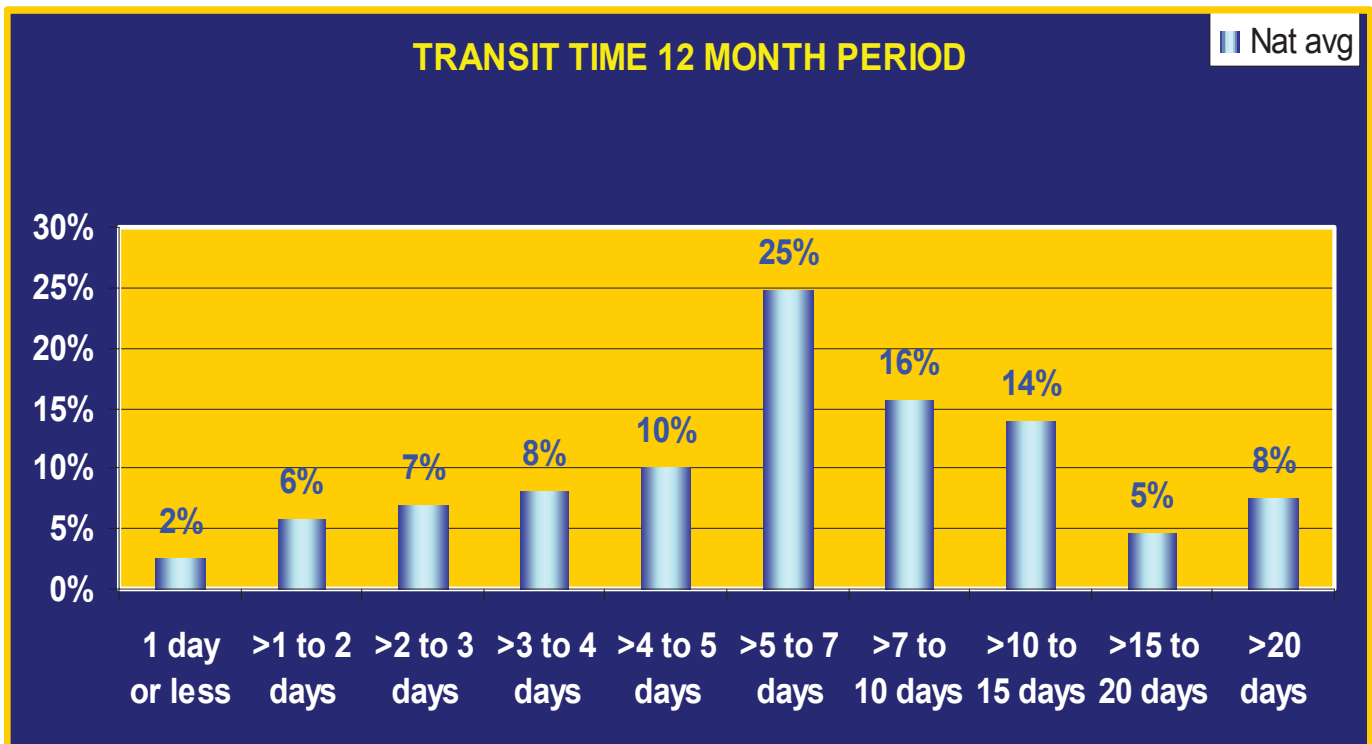


Figure 2 | Transit time in days for hand-delivered samples, overnight, second-day delivery and USPS. (Courtesy of Analysts Inc.)

**Gay:** The future of oil analysis programs shows great promise in bridging the communication gap with the use of computer systems common on most new equipment. The computer systems make obtaining the necessary information easier for end-users and equipment manufacturers. At some point, they may even be integrated with laboratory databases and provide more accuracy and information available to data analysts, resulting in better overall assessment of lubricant and component condition.

In addition, field technicians will be better educated than ever before on broader subject matters, as there are now several courses being offered to maintenance technicians and management personnel. This increase in knowledge is one of the best things to have happened in our industry. Changes in technology and enhanced laboratory instrumentation continue to be a factor in developing better maintenance programs. However, having a knowledgeable client-base has been one of the largest factors in having a good fluid analysis program.

**TLT: What steps can practitioners take to get the most out of their oil sample?**

**Gay:** The fluid analysis that *you* are hopefully using is one of the least expensive components in a maintenance program. This analysis allows for a proactive approach to maintenance

in terms of detecting and correcting minor problems, leading to lower costs and less downtime. As the cost of lubricants and disposal increase, fluid analysis continues to be a key component in determining when a fluid needs to be changed. As we all know, keeping your lubricants clean and dry is the first steps to enhance a lubricant's life.

As lubricant costs increase, other methods of monitoring fluid conditions and reclamation or reconditioning of fluids have increased in popularity. Online sensors for vibration, magnetic chip detectors and temperature-monitoring devices, which have been the norm in the aviation industry for many years, are now becoming the norm in some industrial and automotive applications. Furthermore, online fluid testing has been around for over 30 years and will continue to grow in popularity and effectiveness. There are even online warning sensors that alert the operator of significant changes and when further investigation is required. However, these techniques only contribute a portion of what is necessary for a successful maintenance program.

The best programs contain a well-devised maintenance and sampling plan, well-educated plant engineers and maintenance personnel and the appropriate testing conducted at a well-informed and experienced oil analysis laboratory. **TLT**

*You can reach Charles Gay at [cgay@analystsinc.com](mailto:cgay@analystsinc.com).*