

ASI TODAY

A newsletter for customers of Analytical Sensors & Instruments Ltd.

Spring/Summer 2006

From the President's Desk



Peter Cai, President

Dear Customers & Friends:

Greetings from Shanghai, China. I have been working diligently at our branch, Aurora Scientific Instrument (Shanghai) Co., Ltd. in Shanghai since late last year to improve our China group's management. In the last few years, a lot of our customers have had needs to grow their business with us at Aurora, due to the global demand on low cost manufacturing. Those needs have brought rapid growth to Aurora. We have been very excited by this growth, however, we also suffered some growing pain at the same time. Though this growing pain is normal for small organizations, we did not want to neglect it or allow our customers' interest to be affected.

In order to improve our branch management to match the challenges, we started the Lean Manufacturing Management at Aurora starting late

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Leadership in a Small Business

Coming from Engineering, it's no surprise that this section of the newsletter often describes processes, the step by step methods, we use for a multitude of tasks. For this issue, however, there is only one small mention of a truly well defined "process" and then the remainder of this article has very few defined edges or boundaries.

Our process of the month describes how many of the articles for this newsletter are written. Most often the procedure is one of assignment. A person is assigned a topic and then writes, what is hopefully, an interesting article that is somehow founded in the workings of ASI. The assignment for this column was "write about effective leadership in a small organization".

We don't plagiarize but let's google that in order to get some starting ideas. Do you

Perhaps this is where our EVP, Capt. Williams, U.S. Army (reserve) found the idea.

know that you get no returns for "effective leadership in a small organization". Undeterred, we type in the same terms without the "effective". Ah ha, now we're getting some place. Maybe 10-12 returns many of them having to do with small unit leadership in the military. Perhaps this is where our EVP, Capt. Williams, U.S. Army (reserve) found the idea.

We're a relatively small growing company with many business issues that are not

unique to us, but they may be difficult to treat in military terms.

The google search did yield a good starting point though: "The fact is, we manage such things as activities and resources--but we lead people. When management actions require communicating decisions or guidance to others, that becomes a leadership issue."

So when we try to be effective leaders, we must be effective managers and we manage people and projects around the globe, but does this mean we are always effective "leaders" even if we are effective managers? Is this why the google search resulted in so few "hits"? We all work hard to become better managers, but let's look at the other topic for a few paragraphs. Let's talk a bit about Leadership at ASI.

A prized memento on the wall is a poster given by colleagues at a company during one of those "it's your last day, let's have a cake and wish you well" events. It was printed on a plotter and signed by coworkers and friends, some unforgettable but quite honestly some of the faces are difficult to put to names after all these years, but the message is a good one. As with many such messages, we can't promise that we follow it perfectly at all times, but it provides guidance and we do try to live up to what it says.

It says: "Leadership does not begin with power, but rather with a compelling vision or goal of excellence. One becomes a leader when he or she is able to communicate that vision in such a way that others feel empowered to achieve success".

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Business System is placing quality testing at the lowest levels. Yes, we have always tested 100% of our products before they ship out the door, but the hope of putting more testing requirements at the lowest level is a much higher rate of quality products at the end of the manufacturing floor (shipping).

I can already see the returns on this single process change, as our yields on formerly low yield products are increasing, my scrap rate is decreasing every week and my purchasing agent is getting bored!

I may be stretching the truth a little with the last one, but Kelvin Wu (ASI Purchasing) is very happy with his decreased inventory requirements, however slight. As Peter Cai has said to me from the day I interviewed with ASI - 'every penny counts'.

I would also like to take a moment to recognize someone very dear to me, Beverly Rock, who has suffered greatly this year. Beverly was a 'Rock' at ASI and we all miss her dearly.

All in all, I am very happy to report that ASI is in great health, sales are up (thanks to everyone out there) and our quality is better than ever - thanks to our incredible employees. I hope that everyone is happy with the performance of ASI employees, and I recognize that some of you have had a recent change in account manager - don't worry, Dennis Finch and I are keeping them under close eye as we train them to be the best account representatives you could ask for!

In the end, remember that Dennis and I are only an email (or phone call) away and we are always happy to take everyone's call. I look forward to hearing from you over the next quarter and wish you all great sales and satisfaction in your business.

Best Regards,

Brian Williams

Executive Vice President

people propHiles



**KeFen He, FangTai Li, Angie Woo, JinJie Li
Assembly Floor Leaders**

In this edition of the ASI Newsletter we would like to introduce you to some of ASI's Assembly Floor Leaders. These individuals are responsible for the management of a team or group and also daily assembly of your products. Everyday they are working hard to build your products to the highest standards.

KeFen He joined ASI in 1997 as an assembly employee. Her primary area is laboratory and environmental products. KeFen has excelled at ASI for years, cross training new employees in assembly functions and serving as a mentor for many on the shop floor. In her own words: "I love the job I do very much." KeFen lives with her husband who works for an oil company. They have a daughter who is an architect. KeFen enjoys jogging, swimming and basketball during her time off.

FangTai Li started at ASI in 1996 as a cable group leader and was promoted this year to Assistant Manufacturing Manager. Mr. Li (as he is know at ASI) is well known as the go-to person on fixtures and process development. In addition he enjoys making gadgets by himself to relax. We are very pleased with Mr. Li's new role at ASI, and his support of the company's mission to

deliver quality products can be seen throughout the assembly floor.

Angie Woo start working at ASI in the quality control department in 1993. Later Angie was promoted to lead the quality control department and moved to assembly later in 2003 to help with cross training and bring quality control concepts to the assembly floor. She has two daughters, both studying in college. Angie enjoys playing and watching sports, and especially enjoys going to the movies.

JinJie Li started working for ASI in 1998 on the assembly floor. She has been an exemplary employee at ASI, involved in cross training and leadership of an assembly cell for several years. JinJie currently has a son in the 12th grade who is planning to attend a university next year. JinJie, her husband, and son enjoy shopping together on the weekend, and playing sports as a family.

We at ASI would like to thank these employees for their many years of faithful service to the organization and are proud to bring them to your attention.



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Quality Management

The products we sell and deliver to you, our customer, are only part of the value you receive when you buy from ASI.

Once the product is in your hands and you put it into service, our job now begins anew.

- What if there are questions?
- What if the product doesn't perform as expected?
- What if you need assistance with using the product correctly?

These are all important aspects of what ASI delivers to you. Our job doesn't end once you are using the product. In fact, supporting you, the customer, is just as important to us as providing you with a quality product.

I had an occasion to attend a large industry trade show recently. I watched as a customer of ours assisted a user with questions and use of the product ASI had provided. The exhibitor took the time to ask about the user's problems and how the product was not meeting the expectations for this user.

I noticed that the exhibitor spent time to explain the important aspects of assembly, maintenance and calibrating the product before actually addressing the measuring of samples. The whole exercise took about 15 minutes.

At the end, the user was amazed at how simple the whole process was. Of

course, the exhibitor did not miss the opportunity to introduce other products they were promoting at the trade show.....that's what those events are all about, after all.

So, how does this apply to ASI?

When you buy products from ASI, you will not only receive a high quality product, but you will also receive our promise to help you with that product any way we can.

We promise that we will;

- Provide a high quality product that meets your expectations.
- Help you understand the correct use, care and maintenance of that product.
- Help with your application for the product.
- Suggest an appropriate product for your application.
- Do whatever is necessary to satisfy you and provide you with the value you expect.

Call us to discuss you application or requirements. We'll make suggestions and offer a solution. If we can't help, we'll find someone who can.



ASI at PITCON 2006

Measuring the pH level of soil

The pH level of soil indicates the acidity or alkalinity of the soil, which determines the fertility of the soil. This measurement is assigned a number from 0 to 14, with 0 being the most acidic and 14 representing a more alkaline or basic soil. The most neutral soil would be represented by a 7.

By measuring the pH levels in soil, crops can be more productive, plants can be healthier, and less fertilizers can be used (which protects the environment). The pH levels are important because they effect the availability of nutrients and microorganisms in the soil. This quality can help sustain biological productivity and promote quality animal health. Quality soil is fundamental to the ability of agriculture to meet basic human needs, including the cycling of water.

There are several different methods used to measure the pH levels of the soil. Some are based on a simple observation of the plants grown in the soil or an observation of any symptoms that arrive in the plants, such as diseases. Other methods are more proactive such as using dyes and determining the level of pH by comparing the color(s) observed. The use of litmus paper can also determine the pH. The soil is mixed with distilled water and litmus paper is inserted. The paper turning red would indicate an acidic soil and blue would

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Measuring continued from page 4...

indicate more alkaline.

Testing kits are also available in which a sample of soil is mixed with water, which uses barium sulfate in a powdered form. The changes in the water color determine the acidity or alkalinity that in turn provides us with a number from 0 to 14.

The most reliable and traditional method of measuring the pH continues to be with the use of a pH electrode. Under this method, an electrode is inserted into moistened soil which measures the activity of hydrogen ions, thus providing us with a unit familiar to us as the pH level. This trusted method is widely used, accepted, and produces accurate results.

Soil contains the most nutrients when the pH is 6.5. At a higher level, nutrient elements such as phosphorous, iron, manganese, copper and zinc become less valuable to plant life. Levels below 6.5 can be toxic to some sensitive plants because, among other things, the manganese can become toxic.

Once the pH level is determined, nutrients can be added to adjust the level to a preferred number. As an example, pH levels can be lowered by adding nutrients such as sulfur, iron sulfate or aluminum sulfate, phosphate, and ammonium nitrate.

Measuring soil pH is a proactive approach to maintaining superior soil quality, which determines if the soil is in good condition for its current uses. It also enables us to return to the soil the vitality it so generously shares.

Warranty Question

Question : I returned my products over three weeks ago and have not seen a report or my product returned, does ASI provide a status update once the investigation is completed?

Answer : ASI generally does not provide a status update until the investigation of the product is complete. That being said, three weeks is a very long time, and if you have concerns - or it is a priority product - please let us know up front. Most of the time, the reason for the delay is the product is being rebuilt and will ship within the three weeks from the return date.

Use of pH in Fish Farms

We have all probably heard or seen the term pH. In this industry it is somewhat of a household name. Finding the value for pH is vital in determining an important characteristic of a solution, the two characteristics that are represented by pH are Acidity and Alkalinity. When measuring pH the activity of hydrogen ions (H+) in water will decide if the environment is acidic or basic. pH is measured on a scale from 0 to 14 with 7 being neutral neither acidic or alkaline.

The optimal pH for fish is between 6.5 and 7.5. The pH in water has a significant influence on the action of toxic solution and the activity of a number of other substances such as ammonia, hydrogen sulfide and heavy metals on fish. Water pH analysis is essential for fish farm owner when trying to monitor their fish's living conditions. Fish perform all their bodily functions in water, water can determine the success or failure for fish to do their everyday functions. Evaluating other elements like chemical and physical qualities are extremely important in order to operation a fish farm successfully. The factor examined when selecting a location for a fish farm is pH, and is usually the first sign of abnormality of fishing grounds. In fact pH from fish is measured to determine the freshness of a fish.

There are roughly three ways when measuring pH:

- 1. Indicator methods include two methods. The first involves comparing the standard colors red and blue corresponding to a known pH with the color of an indicator absorbed in testing liquid using buffer solution. The other is taking pH testing paper which is soaked in the indicator, and then absorbing the paper in the test liquid to determine if it corresponds to its rightful color.
2. Metal- electrode methods: Hydrogen, quinhydrone, antimony Hydrogen-electrode method is standard among the many methods for measuring pH. The values derived using other methods that are trusted only when they match measurements of the hydrogen electrode method. Quinhydrone-electrode method involves dipping the tip of a polished

antimony rod in the testing solution with a reference electrode, measuring the difference in potential between the two. Antimony-electrode methods are only used in cases of high degree of accuracy is not required.

3. Glass-electrode methods: This method is commonly used for pH measurements because of the quick response, accurate measurement, they have high reproducibility, rarely are affected by oxidation, and measures pH of various solutions.

When selecting a site to develop a fish farm one should study the elements of that prospective area. The pH of the selected site should preferably be in the range of 7.8-8.3 and should not exceed 8.5. It is also important to measure the pH of the water immediately after the water is sampled.

Look for ASI to help you succeed in your conceivable task of developing or maintaining a fish farm. With a wide variety of glass and plastic pH electrodes that meet all demands, there should be no project that is unrealistic in reaching that goal.

Warranty Question

Question : Over the last week of measurements my pH electrode has drifted significantly, and the calibration is not holding. How could I check my electrode to determine if it is still good or not?

Answer : The quickest method is to take a known good pH electrode and compare the elements (sensing half cell and reference half cell). To do this you could simply take a multi meter, place a lead on the reference of each electrode, place them in solution and see if you get 0 mV on the display. If you get something outside of +/- 10-20 mV's, your reference has failed. If not, you can take the pH (suspect probe) half cell and the reference (known good) half cell and connect them to your meter and test the solution - bad readings - bad probe.



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This month we would like to further explore the article on soil pH.

How variable is soil pH?

With the advent of precision agriculture, soil variability within an agricultural field has become the focus of many studies. It has been shown that the



natural variation in field landscape (including terrain, parent material, surface water movement, etc.) and past and/or present management can cause significant variation in soil pH, lime requirement, and other soil properties. For example, the chart (bottom center) illustrates the distribution of soil pH within three Nebraska fields. In these fields the coefficients of variation (one of the indicators of relative variability) were 4%, 9%, and 8%, respectively. This means that the majority of a field with an average pH of 6.0 may have soil pH varying between 5.0 and 7.0. Small areas with a soil pH outside this range are not uncommon.

In general, soil pH is believed to have coefficients of variation ranging between 2% and 16%, which is low compared to soil nutrients or certain physical properties (e.g., saturated hydraulic conductivity). In addition, soil pH does not change abruptly, and soil samples taken close together tend to have smaller differences between pH measurements than samples collected farther apart.

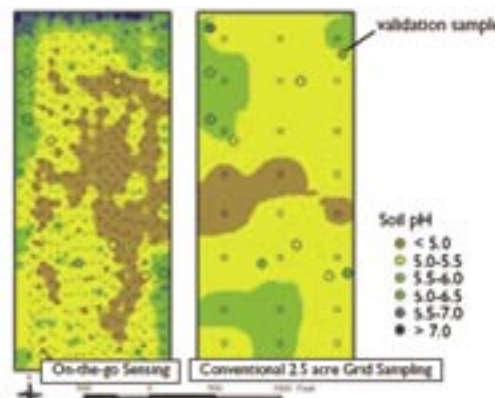
Therefore, soil pH has “spatial structure.” Although the degree of this spatial structure changes from field to field, similarities in soil pH measurements can be observed at maximum distances of 60 - 900 ft.

What is site-specific management of soil pH?

One of the goals of precision agriculture is to manage agricultural inputs according to changing local field conditions in order to increase profitability and reduce environmental waste of agricultural inputs. According to many adopters, variable rate liming is one of the profitable and popular practices in site-specific crop management. In addition to acidic field areas, having knowledge of areas with alkaline soil conditions (high pH) can be useful to avoid lime application in these areas and also aid in the selection of crop varieties tolerant to problems associated with high pH (e.g., iron chlorosis). Currently, variable rate lime prescription maps are generated based on soil samples collected manually and analyzed in laboratory conditions. These samples are usually obtained with a 2.5-acre sampling frequency (Soil Sampling for Precision Agriculture, ECOO-154).

How can the accuracy of soil pH maps be improved?

Since the beginning of precision agriculture approach, several researchers and manufacturers pursued the development of on-the-go soil sensors to accurately map pH (and other soil properties) at a relatively low cost. Below is an example of the map an on-the-go soil measurement system would provide versus your standard 2.5 acres core sample would provide.



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ENGINEERED
SPACE



More than just electrodes, more than just mechanical engineering

When customers come calling on ASI, we often take them on a short ‘dime’ tour of our facility if they have never visited before - or would just like to look under the ‘hood’ a little. One of the stops is a small room where our engineering staff has their cubicles. Some customers smile, as they understand the pressure of trying to control space - while others are amazed at how much is completed in such a small area.

In reality, our engineers use the space they have extremely well - understanding that their job is not just designing electrodes, or CAD drawings. Engineers at ASI are actively involved with our production people, lab staff and quality department (not to mention sales!).

Our engineers have a duty beyond design, they are also responsible for working with production on assembly steps, process control for production, mold testing, etc. These activities are physical, hands on so that our engineers have felt your products and see the problems first hand. This is the level of commitment that ASI has to our customers - to not let you down by allowing someone to change your product that has never actual seen it!

Warranty Question

Question : If I have soaked an ASI model 43 Nitrate electrode overnight in a low standard, why does it not respond when I try to calibrate.

Answer : This is a common problem with the nitrate electrodes (any model). Soaking overnight in a standard ‘numbs’ the membrane to any changes and needs to be air dried for at least 12 to 24 hours before you try to use it again. Next time you want to soak the electrode prior to use, try only soaking it for 10-20 minutes and then calibrating.

New to ASI



Over the last several months ASI has had a few new additions to our organization that we would like to share with you.

Kimberly Morgan (left) joined ASI in April as an OEM Account Manager. Kimberly's background is in wireless technology and sales. She earned her bachelors degree from Texas State University in 1997. She is a quick study and has made several strides in learning ASI technology and products. Kimberly lives in Houston with her son Marshall who is 3 years old.

Bonnie Vargo (left-center) joined ASI in April as the Customer Service Manager. Bonnie earned her bachelors degree from Stephen F. Austin State University. She is an experienced Customer Service Manager who is looking forward to helping you with any issues you may have. Bonnie lives in Houston with her husband, Alex.

Carol Ferguson (right-center) joined ASI in March as the Executive Administrative Assistant. Carol is an very experienced administrative assistant with many years of successful accomplishment in this field. She lives in Richmond and has grown sons.

Rico Dickerson (right) joined ASI in March as an OEM Account Manager. Rico earned his bachelors degree at Eastern Oregon University in 2005. You may have met Rico at PITTCON 2006 where he received his first taste of the analytical instruments industry. Rico has bi-lingual (English/Spanish) skills verbally and written. Rico lives in Houston with his son.

We welcome all of these new hires to the ASI family. ASI is proud to have them working in our organization.

Leadership *continued from page 1...*

You may be able to place the date within a few years by the open use of "buzzwords" such as "empowered", "communicate", "vision", "goal" and "power" but age doesn't diminish the meaning or the strength of the message.

At ASI and within our Shanghai facility, Aurora, these are some of the basic principles that we use to guide our actions and our business. We work to succeed together - together within our companies and with our customers. We communicate, share our goals, and strive to reach them as when we do reach our goals it helps our customers reach theirs and we all move forward.

Leadership at ASI and Aurora is built on the visions of our President, Peter Cai. Peter has for many years used the mission statement: "ASI will become the world's foremost electrochemical sensors manufacture in quality, price and customer satisfaction". Now I realize that mission statements are becoming something you did in business school, or at your last job - but we see that mission statement as the foundation for ASI/Aurora. Every employee in the company knows that this is our goal, and they are all working towards it by following their leadership. By expressing the ultimate goal to our employees, it helps them to understand just a little bit more why we are changing, adapting to different business strategies, manufacturing strategies, and new senior / middle managers. This allows our employees to take an active role in helping us reach this goal.

Our senior leadership is getting a few gray hairs lately but part of Leadership is in preparing the next generation. At each company, you will find young, intelligent, hardworking people of many origins all working together.

When the time comes for the senior executives to move on, we hope and firmly believe that those people you deal with so often at ASI and Aurora will still be there reaching for the vision or goal of excellence, for their benefit and yours.

Leadership is the willingness to allow your employees to reach your ultimate goal.



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President *continued from page 1...*

last year. Since then, we have had success in improving our manufacturing management. A perfect example was this simple case: recently we have been manufacturing a small electronic device for one of our customers. This device was designed by our customer. Prior to the Lean Manufacturing Management improvements, Aurora manufactured those devices in large batches (hundreds in a batch). The result for that batch manufacturing management was a high failure rate at the end of each batch. Late last year, we started "ONE PIECE FLOW" Lean Manufacturing Management. Since then, we reduced the failure rate in manufacturing for that device to below 0.1%, which is a great improvement!

At the same time we started pushing the Lean Manufacturing System into Aurora management, I decided to take over the General Manager's responsibility at Aurora to oversee this change. Now, I am personally in charge of Aurora's overall management. I am confident that with our determination, Aurora will grow positively to match the changes and to provide better service to all of our customers. In the next 12 months, I will totally reorganize Aurora in a way that we will be better prepared to meet future challenges. You will see more new faces and more professionals at Aurora over the next several months. We will provide you all with better service from Aurora.

Thank you all again for your support. May the Lord abundantly bless all of us in this exciting 2006.

Peter Cai

Peter Cai
President



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