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BY PAUL QUINN

Buckman's MBA can automate a mill's microbiological control program avoiding equipment breakdown and process variations

MBA: RAISING THE ALARM BAR



Fig. 1 -The MBQ value compared with the traditional Petri Film microbiological enumeration values (MB).

n today's competitive paper market, the papermaker can't wait for plate counts to incubate for 24-48 hours to make decisions. ATP results, although much quicker, are only relative and can be affected both false negatively and positively by various factors. Both of these tests are only as accurate as the person running the test and the frequency at which they are done. Today's papermaker needs to be more proactive and quick to respond to ensure the process is in control. By the time the plate counts are read or the ATP test performed a process could be out of control, and tons of paper in jeopardy. A broke tank with high bacteria counts could escalate a pitch outbreak in a coated mill. A spore count excursion in a liquid packaging mill could put tons of product at risk, resulting in costly claims. On the other hand, a defective bleach pump stuck in the on position could elevate wet-end chlorine levels and quickly corrode a costly Yankee dryer in a tissue mill.

All of the described scenarios can be eliminated with the use of the Buckman MicroBio AdvisorTM (MBA), a wet-end on-line measuring device that measures key process variables and uses this data to adjust the biocide feed to keep the process in microbiological control.

The MicroBio Advisor (MBA) is the best ad-

ditional insurance policy in the market. The MBA will monitor the process and alert mill personnel of equipment break down or process variable change that can affect the biocide chemistry control and ultimately the microbial cleanliness of a paper machine. The MBA can also be in feedback control mode so that it can control the biocide feed rate and keep the microbiological control program in a desired range.

A common fear when using some biocide chemistries is corrosion. With the MicroBio Advisor monitoring your system, high alarms for chlorine can be set to keep your expensive equipment from experiencing a corrosive environment.

The MicroBio Advisor samples a low consistency process flow and measures every 20 minutes. It can measure dissolved oxygen differential, total chlorine, oxidation/reduction potential (ORP), and pH. Dissolved oxygen consumption/uptake is a clear indicator of aerobic microbiological activity. The MBA collects a process sample and takes a measurement of the dissolved oxygen (D.O.) at time zero. This sample is held in the collection pod and measured again fifteen minutes later. The difference in D.O. is calculated and multiplied by a factor. This value is referred to as the microbio quotient or MBQ. The higher the MBQ value the higher the





microbiological activity in the sample. This can be used to predict trends before they become problematic.

A strong correlation between the MBQ value and traditional plate count enumeration has been established in several mills and confirmed by a paper customer's R&D group. The MBQ value has eliminated the need for traditional plate counts and ATP measurements. The time spent on these lag testing methods can now be spent on continuous improvement projects at the customer's mill. Some will argue that ATP is an instant feedback test, and while a true statement, the test is normally only conducted one to maybe three times per day. The MBA is collecting a sample 72 times per day. (Fig. 1).

A lightweight coated mill in the US Midwest is using Busan® 1215 as the cornerstone of its microbiological control program. This mill changes thick stock furnishes by grade, sometimes utilizing 100% kraft and other times incorporating high percentages of groundwood furnish. The groundwood furnish has a final bleaching stage of hydrosulfite and carries a sulfite residual to the machine. The sulfite residual consumes some of the biocide chemistry.

When changing to a groundwood-containing furnish, the biocide dosage had to be increased. When changing to higher kraft pulp-containing furnish, the dosage had to be lowered to avoid high chlorine residuals which could contribute to corrosion. These constant grade changes required frequent communication with the Buckman account manager and high potential for under or over feeding of the biocide chemistry. This problem was alleviated by installing a MicroBio Advisor (MBA). The MBA unit measures the total chlorine in the clarified whitewater loop and



Fig. 3 – Buckman MicroBio Quotient



Fig. 4 - Dashboard example

activates a feed point to open and feed Busan 1215 until the residual measures 1.2 parts per million total chlorine.

At this level, it deactivates the feed point until the clarified whitewater loop decreases to 0.6 parts per million total chlorine, and then restarts the cycle. The MBA measures the total chlorine in the clarified whitewater loop and feedback controls to the Busan 1215 generator to ensure the machine never encounters a low or high biocide residual during furnish mix changes. This ensures the papermaker that the system is always in microbiological control (Fig. 2).

The MicroBio Advisor was further tested in this same mill, as the mill challenged the Buckman Account Manager to turn off the biocide prior to a scheduled shutdown. The biocide was turned off four hours before the outage, and the MBQ measurement portion of the MBA was monitored. The results are displayed in Fig. 3.

The MicroBio Advisor also measures oxidation/ reduction potential (ORP); some mills prefer this to the total chlorine monitor or as an additional measurement device. The total chlorine probe does require some calibration, so it is good to have another independent method to verify the ORP data.

The MBA can also measure pH, and manage pH data from other sources. For example, one customer wants the pH of their coated broke managed and a rescue program available to prevent spoilage of broke. A lower trending pH is normally the result of broke being stored for extended periods, and escalating microorganisms producing acids in a broke or stock system as part of their respiration process. The MBA can recognize the pH of the system trending downward and once below a pH set point, trigger the MBA to signal the Busan 1215 generator to feed the broke recirculation line.

Some mills have witnessed that pH trending lower can aggravate pitch outbreaks. Most mills do not know this is happening until long after the fact. This again proves the MBA is a great insurance program to any mill.

The MBA can also be used to control the fresh water disinfection program. Use of Oxamine® products, Buckman's biocide chemistries for water treatment, combined with the MBA will decrease corrosion potential throughout the mill and set the program up to manage a consistent total chlorine residual to the farthest point in your plant. Most mills' fresh water programs are out of sight and out of mind. With the MBA, the papermaker will have daily access to the data through Buckman OnSite®. The effects of over feeding traditional halogens on functional chemistries will be reduced and potential felt damage in the press section can also be decreased.

The MicroBio Advisor can be located in a mill where it can sample two different sample points. This allows the unit to sample up to two paper machines. The data is managed internally by a multiple I/O controller. This data can be sent by cell phone connection, LAN line, or traditional phone line to the Buckman corporate office as a CSV file.

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Customer: Paper Customer Location: Midwest United States Process: Micro Bio Advisor Controller: 112134343 Date Range: 9/3/2013 9:38:22 AM - 9/4/2013 9:38:22 AM 24hr Avg Measurement Unit Min Max ast Read Avg MBQ 8.11 9/17/2013 Units 14.24 7.31 0.07 16.38 100.00 🖌 8:57:40 AM ORP 776.55 9/17/2013 761.82 677.82 588.68 777.64 600.00 850.00 🗸 mV 8:57:40 AM 4.57 9/17/2013 8:57:40 AM pН 5.50 🖌 pН 4.56 4.67 4.54 4.80 4.50 Total Chlorine 1.46 9/17/2013 8:57:40 AM 0.69 1.03 0.19 1.70 0.90 3.00 🖌 ppm



Fig. 5- Daily report example.

Data management is another exciting feature of the MBA; this data is managed through the Buckman OnSite customer data portal. This portal allows the customer access to this data at any time. Once the data is uploaded to Buckman OnSite, the customer can access or have the data sent directly to the mill data management process. Most customers prefer access to Buckman OnSite so they can view live data, plot graphs, and compare historical data. The data is presented in a dashboard format. The customer can click on the gauges to see trends and further access the data. (Fig. 4)

One of the best features of Buckman OnSite is the customized daily report which is emailed every morning to the Buckman Account Manager or directly to a customer distribution list. Most customers prefer only alerts or alarms, and to have the daily reports compiled by the Buckman Account Manager into a weekly report.

In Fig. 5, notice the yellow highlighted 0.99 for chlorine is below the lower limit for this machine. A 24-hr graph for total chlorine is included, as well as a low consistency MBQ reading, and the 12-month rolling average of the MBQ.

In today's challenging environment of manufacturing, Buckman's MicroBio Advisor provides assurance that the mill's microbiological program is in total control. Even when Murphy's Law shows up, the MBA will send an alert via text message or DCS alarm. The MBA can be customized to fit each mill's needs and biggest concerns.

Paul Quinn is sales director, Paper Technologies, Buckman

Buckman

Complete control over microbiological control. Measure, monitor and manage with advanced tools from Buckman.

The more control you have over your biocide program, the better you can control plant efficiency, productivity and costs. That's why Buckman offers powerful tools that keep you informed and your water systems in perfect balance.

MicroBio Advisor™

The MicroBio Advisor precisely measures key microbiological control parameters, including total chlorine residual, dissolved oxygen, pH, and ORP, and delivers the

data to you in real time. It also provides feedback directly to your automated biocide feed unit so it can adjust dosage. Text alarms keep you aware of potential problems. And data can be sent to your DCS, accessed by computer and smart phone, or integrated with Buckman OnSite[®].



Buckman OnSite®

With Buckman's web-based portal and data dashboard, you and your Buckman representative can access vital system data, including automated controller data, manually entered updates, material safety data sheets and more. Buckman OnSite enables users to efficiently manage documents and quickly create comprehensive reports, complete with graphical interpretations. All of your systems all in one place!



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