



frontline focus

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Pins And Fines: a Small Cause of Big Losses

By Gregory R. True, "Chip Doc" Biomass Resources

The chipping process at most chip mills and saw mills in North America is carefully analyzed and setup for optimal chip thickness production and testing. This provides feedback to suppliers so they can minimize pins and fines and maximize fiber yield. Pins and fines are very small particles of fiber that are dealt with in the chipping and pulping process. But what is their impact on the bottom line? Read on and find out...

Chipping – the tip of the iceberg

The first step to increase fiber yield is to understand the pulp mill's digesters and develop an ideal chip specification and thickness target. This leads to proper chipping equipment setups, the best chip handling procedures, and good screening operations that will minimize fiber losses. The reduced variability and tightened chip distribution lets the pulp mill concentrate on operations that improve fiber yields and reduce chemical and process costs at the digesters. The chipping process is just the tip of the iceberg, but it is the most important part of developing ideal chip quality for fiber use.

Your mission – reducing pins and fines

The objective is to reduce pins and fines that are typically screened out and sent for boiler fuel. Also you want to reduce the amount that makes it to the digesters due to their low yielding fiber values (graph 1).

Many mills have pins extraction programs, however the relative amounts that are

P.No.: or Kappa: Target Mill Yield:

	Fines	Pins	2-4 mm	4-8 mm	8mm-10mm	>10mm
Chip Specs (Max)	0.5%	1.5%	15.0%	unlimited	10.0%	10.0%
Pulp Yield	10.46	20.92	35.56	41.83	39.32	38.49
Default rel. yield values for thick-ness fractions	0.25	0.50	0.85	1.00	0.94	0.92
Loss/gain Through CTS	80%	70%	10%	2%	5%	5%
Value of chips in excess of specs	83%	83%	83%		100%	100%

Graph 1 - Fiber yield improves as chip thickness increases.

being used are small compared with what is being produced or purchased. The yield at these mills is higher, but there is still a lot of fiber yield variance based upon chip purchase price.

Monitoring quality = monitoring thickness

To accurately monitor chip quality you must focus on targeting chip thickness. Thickness testing allows you to more accurately determine what the ideal chip quality is for the mill's digesters. Thickness is now a standard test. Typically a 4-6mm mean thickness target is ideal for the pulping process, however this can change based on a mill's specific operations.

Targeting chip size

Now it's time for an example. Let's assume a chip mean of 4-6mm has been determined to be ideal for a particular mill, and we're using this chip specification:

Fines = 0.05	4-8mm = 63.00
Pins = 1.50	8-10mm = 10.00
2-4mm = 15.00	>10mm = 10.00

Within chippers (not canters) there is a direct correlation between chip thickness and chip length. A 4-6mm mean target

would mean to a 7/8" -15/16" chip size. Typically a 7/8" chip size would be selected for summer months (wood is not frozen) and in the winter months (months where wood is frozen or drier) knife widths would be extended or knife pockets shimmed to produce a 15/16" chip size. Although the width of the chipper knives is extended in the winter to make a 15/16" chip, the frozen or drier environmental factors ensure a 7/8" size and a 4-6mm nominal thickness throughout these months.

Optimizing chip quality

Now that a chip size has been targeted, the chipper must be setup and maintained to ensure that this chip quality is being produced. Chippers are fairly simple machines; however, it is this simplicity that creates a problem. All wear points and tolerances must be accurately analyzed and fixed to get the best operating conditions within a chipper. These tolerances can be hard to achieve and even harder to sustain. In addition, people and conditions can inadvertently affect tolerances before the chipper even runs, for example the knife grinder, millwrights, and maintenance technician. However, with proper setup, knife grinding techniques/tolerances, maintenance, and communication between employees - optimal chip quality can be achieved and maintained.

Assuming you have reached this point it's time to study how much fiber is lost in the production of excessive pins and fines. Here are some real-life examples that show how excessive pins and fines result in significantly lower pulp yield.



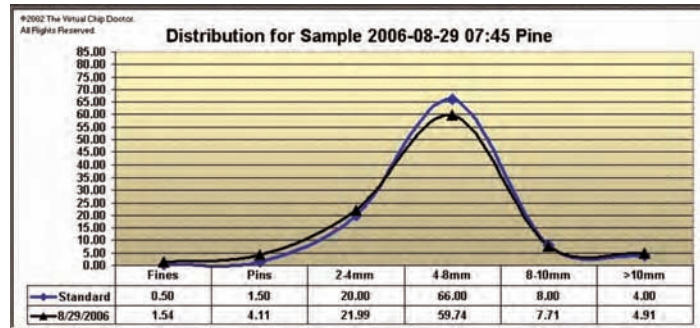
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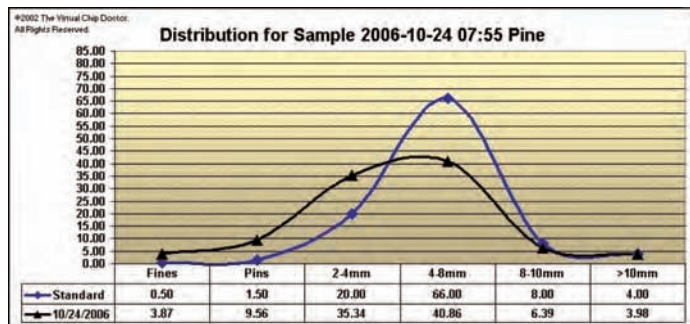
Real-life example

In the following two graphs, the black line shows the current distribution of chip thickness. The blue line represents the standard to achieve, with a desired peak in the 4-8mm range. Graph 2 shows a pulp manufacturer who is properly setup and getting optimal chip quality after the chipper (unscreened).



Graph 2 - Proper setup minimizes pins and fines.

In graph 3 the same supplier is using the same setup as before, but has just reached winter chipping conditions and has not yet increased his knife width. The result is increased pins and fines.



Graph 3 - Improper setup increases pins and fines.

We know how much money this supplier was paying for raw material, the production level they are running at, and what they are selling chips for. So we can now figure out how much fiber they are losing through the increased production of pins and fines. Based on 800,000 tons and a specific Kappa, the screen losses and digester losses on an annualized basis shown in graph 4 are significant.

Pins & fines cost money!

The increased production of pins and fines dramatically influenced the ratio of raw material to usable fiber. The influence was so significant that if this particular supplier had run at their current conditions and not extended their knives to offset the winter wood conditions (from Nov. – Mar.) they would lose \$8,795,768 in fiber alone.

Although this example is particular to one supplier, experience with major paper corporations and their pulp suppliers shows this represents most mills in North America. Pins and fines tend to increase dramatically through the winter months due to improper or no preparation for frozen and drier wood conditions. This increase in pins and fines tends to stay somewhat consistent through the winter months and typically causes significant monetary loss in fiber.

Per Ton Values Relative to Baseline						Delivered \$ Values Relative to Baseline					Supplier Effective Chip Price
Fuel Value Loss from Change in Screened Out Fiber	Fiber Value Gain from Change in Screened Out Fiber	Delivered Screened Out Fiber \$0.00/ton	Digester Pulp Yield Fiber Gain \$0.00/ton	Delivered Fiber Value Gain from Chip Quality Change	Delivered Monthly Chip Deliveries to Mill (Green Tons)	Delivered Monthly Screened Out Fiber	Digester Monthly Pulp Yield Fiber Gain	Delivered Monthly Fiber Value Gain	Cumulative Fiber Savings	Period Ending	
										Baseline	
\$0.99	\$6.83	\$5.84	\$8.01	\$11.85	742,500	\$4,336,154	\$4,459,614	\$8,795,768	\$8,795,768	Annualized	
										Target	\$66.85

Graph 4 - Increased pins and fines result in significant losses.



Gene Canavan

Traffic Lights

The other evening I was driving to our minister's house for a meeting. About 50 yards from a traffic light another vehicle buzzed by me about the time the light turned yellow. I couldn't make the light but the other car blew through it. It was red before he entered the intersection. Luckily, the green light delay held up traffic long enough for him to clear the intersection. After the

same light went though its cycle and turned green for us again, a Suburban ran the light from the other direction. Two dangerous incidents within two minutes! This got me thinking about the things I've learned about risks from safety meetings and bad experiences at work and home. People like you and me take risks and get away with it time and time again. Then one day we take a risk again and WHAM – we get hurt or worse. A man reaches into a nip point to remove some trash and loses his arm. Two men enter a limekiln without a lookout and die from carbon monoxide. Workers take a shortcut in a lockout and get injured. A young driver reaches to get something from the passenger side, swerves into the oncoming lane, hits a vehicle head on and causes the death of a good friend. These are all true incidents from my sad memories of others taking risk. Every one of them could have been avoided. Every single one. As we enter into the holiday season, we get preoccupied with many things both at work and at home. These make it more "convenient" to take short cuts. To keep me on track, I have tried to live by a couple of rules and I recommend them to you.

First, I will never knowingly run a red light. Never. In our town it makes no sense since the next light will just be red anyway. Hurrying needlessly gains nothing.

Second, if I'm first or second in line at a red light, I look both ways when the light turns green. Every time. Make it a habit so you do it automatically.

Third, know the safety rules at work and follow them every time. If you can prevent a piece of machinery from shutting down by violating a safety rule and taking a risk, let the machine shut down – period.

We cannot eliminate risks from our lives but we can do things that reduce our risks. Being especially careful behind the wheel and at work are two such things. I wish you all a safe and happy holiday.

Many mills don't understand what is causing the increase of pins and fines. As a result, they make incorrect alterations to their chipper and make the problem worse. Increased pins and fines negatively affect everyone - from the supplier through the pulp mill.

All information is from real suppliers utilizing the patented CHIP MACS™ software program, a joint venture between Biomass Resources, Inc. "Home of the Chip Doctors" and Fiber-M Technologies. **FF**

For more information, contact Erik True at etrue@thechipdoctor.com.



Uptime

Improving Uptime with a Wellness Fair

By Paula Lamey, Smurfit-Stone Container Corp

Normally, this area of the newsletter deals with ways to improve the uptime of machinery and processes. This month, our emphasis is on improving "your" uptime. Read on and see what one paper mill is doing to build employee wellness.

Smurfit-Stone Container Corporation's Missoula Mill holds a wellness fair every year, organized by a committee of mill employees. The Missoula pulp and paper mill currently has about 500 employees. The health fair started out very modestly in 1996 with only a handful of people attending. It has grown to be a very popular event, having more than 350 people in attendance.



Timing is important

The fair is typically held in the fall, shortly after the mill's annual maintenance outage and before hunting season begins so the majority of the employees, their families and mill retirees can participate. The fair is scheduled from 5:00 AM – 8:30 AM on a Thursday and a Friday to accommodate twelve-hour shift workers, giving most employees the opportunity to participate.

Current employees and former employees typically begin calling the mill in August to find out the dates for the next Wellness Fair.

Uncovering unknown problems

One of the biggest attractions of the fair is the blood screening. The company subsidizes a portion of the cost for its employees. Many serious illnesses have been identified from these screenings, saving lives of several people who were not aware of their medical conditions. Cancer, diabetes, thyroid problems, kidney and liver diseases are examples of issues identified through the blood screening process.



Bone density is also offered free of charge at the wellness fair. The beginnings of osteoporosis have been identified for several people.

Although the fair does not provide a comprehensive medical analysis, it gives employees, their families and the retirees who take advantage of these screenings the opportunity to check their overall health and to seek proper medical care, if needed. Since blood screening can take place only after a ten-hour fast, a healthy and hearty breakfast is served to all who attend. The employees who have worked all night without eating really appreciate the breakfast!



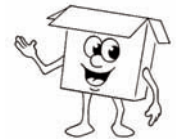
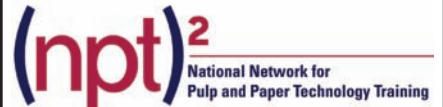
Something for everyone

The wellness fair truly has something for everyone. Several professionals offer their services during this event. The company doctor, physician's assistant and nurse are on hand for blood pressure checks, skin cancer checks, flu shots and answering questions. A chiropractor is present, while a physical therapist and message therapist give table and chair massages. Other professionals include: a nutritionist who counsels both employee and family members; an acupuncturist who performs on site treatments; vision screenings; fitness screenings by personal trainers; herbal, vitamin and supplement booths; smoking cessation information; health club discounts; and a stress management and sleep disturbances booth.

Many of the vendors supply samples and/or demonstrations of their products and services.

The event is fun filled as well as educational, with everyone who attends receiving a wellness-related gift. **FF**

For more information on the Missoula health fair, Paula Lamey can be reached at plamey@smurfit.com.

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Finding My Place

By Daniel S. Blevins, Norcross, GA

In June 2003 I attended a Church Mission conference in downtown Atlanta. There were three days of programming with a ministry track I was particularly interested in. The last session was called, "Finding your place in Ministry – Your Skills are Needed". The instructor began his presentation stating that regardless of what your skills were there was a ministry somewhere that could use you. He said, "I'm going to go around the room and have you tell me what you do or want to do and I will suggest to you a ministry that would fit your situation." He started around the room and told teachers, electricians, nurses, etc ministries and places in the world where they could be involved. My turn was coming. I began to wonder what I would say. My degree is in chemistry but for the past twenty-five years I had specialized in the technology of making paper.



The instructor motioned toward me. "And what do you do, sir?" "I'm a paper chemist," I answered. The instructor's jaw dropped and the room erupted in laughter. "Well, you stumped me with that one," he admitted. "I don't know of a place for a paper chemist." Suddenly, from the back of the room a voice called out, "I know a ministry that needs a paper chemist." We all spun around to see who had said that. It was a fellow named Norman Malwitz, sitting at the back of the room. And that was the beginning of my calling with a group called Finishers that Norman Malwitz founded.

Norman led the way to a booth for Action International where I met Marvin and Sarah Graves, mission mobilizers based in Seattle. They were displaying some wrapping papers, and guest books made from handmade paper. The paper was made from Manila hemp, a non-wood material. By an amazing coincidence, I happen to have a specialization in making paper from non-wood materials such as cotton, flax, straw, and, oh yes, hemp too. As I looked at a picture from the paper mill, I was stunned to see they were doing exactly the type of processing that corresponds with my expertise.

Village Handcrafters – the place for me

I learned from Marvin that the ministry is Village Handcrafters, located outside of Manila in the Philippines. They do livelihood development among the poor squatter people around Manila and use the profits to fund pastors who plant churches among the squatters. Action missionary Ed Landry who had the vision to create useful products out of local materials started Village Handcrafters in 1995. He struck upon the idea of handmade paper from hemp and began learning how to make the paper and turn it into commercial products. The Village now employs about 40 people and funds three church plants.

I then contacted Ed Landry directly. After a few discussions about their paper process Ed told me, "We are self-taught amateurs. We really need you to come to the Philippines and help us." That was enough for me. I took early retirement in 2004 at the age of 51. Consequently, I am available to travel at any time.

Putting a lifetime of work to use

I made my first trip to the Philippines in October of 2003. They put me to work applying my knowledge to their process. During my ten-day visit, we were able to cut their processing time for a batch of hemp pulp from nine hours to three and to cut their chemical costs for a batch by about 90%.

I returned to the Philippines in March of 2004. It turns out another major need at the Village Handcrafters paper mill is to develop and implement a wastewater treatment process. Surprisingly, I also have some experience in wastewater treatment! During my second trip I was able to run a set of experiments to determine how to best process the mill's effluent so it can be released without harm to the environment.

I plan to return to the Philippines as soon as the timing is right for the installation of the wastewater process. The project has been delayed until the Village has the capital to conduct the project. In the meantime I stay in touch with Ed and the Village by e-mail. Often I am asked to give advice on technical questions. I am part of Village team and look forward to seeing them again soon.

Finding your own place

What's my message to you? Whoever you are, whatever you do, there is a place for you to serve. If you take the first step you will be amazed at the journey you will take. I would never have found my place with Village Handcrafters if I had not followed the call to attend the ministry track at that Church conference. My faith has been strengthened by this experience. I am certain that I am following a higher agenda in working with Village Handcrafters. Blessings have rained down upon me because of the connection that was made there! In the spirit of this holiday season – I urge you to find your own place. Use your skills and experience for a higher purpose. It's a wonderful feeling! **FF**



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To receive *Frontline Focus* at your mill each month for FREE, contact Mary Beth Cornell at 770 209-7210; mcornell@tappi.org

Doctor Blade Load Tubes

Probably the most frequent cause of doctoring problems is a failed load tube. With heat and age, tubes become brittle and will fail. Tubes are relatively simple to replace. However, check with your doctor supplier for the latest material for your application.

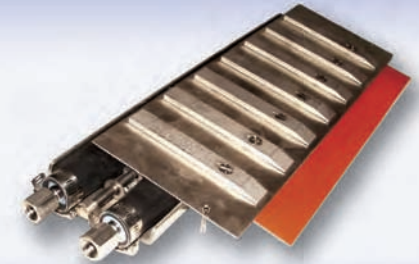
When applying a new tube, be sure to massage all the kinks out of the material before it is installed. The lining in some of the tubes has been known to stick together, totally blocking a tube.

After a new tube is installed, it may grow in length for a couple of weeks before it stabilizes. After this period, the tube should be checked, and the extra length cut off. This stretched length can present a problem, depending on how the tube is clamped. If the clamp is attached to the mounting plate, the tube has nowhere to go end-wise so it moves sideways, trying to extrude through the gap between the fingers and the retainer flange. If the retainer is cap-screwed on, it may shear the cap-

screws and bulge out. If the retainer is part of the mounting (or tube tray), it may bend the flange to free itself. This problem will show up as a wide worn area on the blade. A couple of weeks after a new tube is installed, the excess (grown) length should be trimmed off the "dead" end of the tube.

A few years ago, one supplier provided tubing that was too small as a replacement for load tubes. If there is any of this tubing in the mill, discard it and order the proper size tubing. We have also found that industrial supply houses have been supplying "fire hose" for replacement DST tubing. The size of the tubing determines the effective loading area of the blade holder and is critical to its performance.

Doctor suppliers furnish replacement tubes of various diameters and "firmness" - all for the same application. "Firmness" becomes a real factor when used in the unload tube. Pressure in the load tube may have to be increased to overcome the



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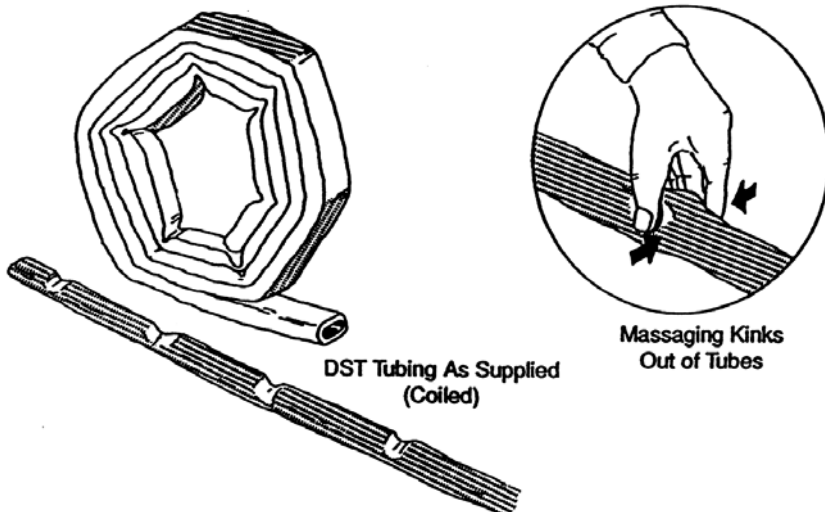
residual "firmness" and collapse the unload tube.

Superior quality doctor blade loading tubes

Metso Paper offers superior quality doctor blade air loading tubes for all of your doctor blade holders. Switching from the tubes you are presently using to the new and improved Metso low or high temperature doctor blade load tubes is easy.



For starters, it's as easy as calling to request more information. Metso loading tubes fit any blade holder, have a high temperature rating, and are provided by Metso's one-stop source. The Metso tubes will provide you with flexible coverage for all your doctors and performance at a price you can afford. Making the switch to Metso doctor blade loading tubes is easy, just pick up the nearest phone and call your Metso representative for more information.



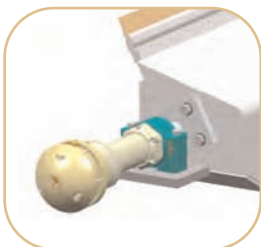
OsciPro Pneumatic Doctor Oscillator

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The Ultimate in doctor oscillation

Dependable doctoring is an essential part of managing the papermaking process. With reliable doctoring, the efficiency of the entire production line can be improved.

Metso Paper's OsciPro pneumatic doctor oscillator is a wise choice when replacing dry and wet end doctor oscillator units that are difficult or impossible to keep functioning properly. They are particularly well suited for the typical dryer section application with up to 300°F ambient air temperatures. OsciPro is also the perfect fit, literally, to replace existing Beloit forming and press section oscillator units that are difficult or impossible to keep functioning properly.



Easy to upgrade

It's easy to upgrade to the Metso OsciPro doctor oscillator. The OsciPro with its adapter/connector parts is a uniquely compact assembly that takes minimal physical space. This makes it easy to replace malfunctioning or inefficient oscillators. Modern doctor oscillator bearings simplify mounting of the OsciPro doctor oscillator assembly.

Contact your Metso representative about this and other Doctoring Process Solutions, a special brochure and informative CD are waiting for you!

