

## **GentleBarking – a log debarking method for higher yield "From innovation to reality"**

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### **Summarize:**

Metso Paper has developed a new log debarking method, called GentleBarking, which effectively separates tough, stringy bark, typical to wood species like eucalyptus and acacia. The gentle method minimizes wood losses and breakage, which improves chip quality and gives higher yield.

### **Key Words:**

Debarking, bark, logs, chips, eucalyptus

*In 2002 Metso Paper developed and brought to the market a revolutionary process, GentleBarking, to eliminate new challenges to the debarking process, i.e. how to get rid of tough, stringy bark in the chips and how to reduce the wood losses due to fragile wood species when handling expensive pulp mill raw materials, especially fresh eucalyptus and acacia from plantations. Since this new process came on the market, it has been evaluated as the best available technology on the market and has been selected by 9 companies worldwide for 12 lines. This paper focuses on the basis of this process and reports on the latest experiences.*

### **Conventional debarking process**

In the conventional debarking process, which has been in use in the pulp and paper mills over a century, the pile of logs fed into the drum is put in a crosswise tumbling or rolling motion by rotating the drum, which is fitted with log lifters mounted on the inside of the drum shell. While tumbling and rolling inside the drum, the logs rub and hit against each other and bark loosens from the log surface. The drum shell has an essential amount of longitudinal holes (bark slots) through which the loose bark should come out of the drum. In other words, the barking drum is a combination of a debarker and a bark separation unit.

As a natural development this method has evolved from a batch debarking to a continuous debarking process. In batch debarking, the debarking drum is filled to a high degree while keeping the discharge gate closed and rotating the drum. The batch tumbles in the drum until the logs are debarked, the gate is opened and the logs are discharged gradually from the drum. This method is still used by some mills where the prime target is not to minimize wood loss or to focus on the quality of the end product but rather log cleanliness. This debarking method may cause more than 10 % wood loss and a very high percentage of broken logs and broomed log ends.

During the last 20 years, while the required debarking line capacities have risen to up to 300-400 solid m<sup>3</sup>/h, drum debarking has been developed into a process where logs are fed continuously into the drum and also discharged continuously from the drum by adjusting the discharge gate position. The aim of this method is to maintain an even discharge rate from the drum by weighing the log flow on the drum discharge conveyor via what is known as feedback control. The correct retention time in the drum is achieved by measuring the drum weight and by adjusting the discharge gate position. In the event of an operational disturbance in the process line after the debarking drum, for instance a chipper blockage or a switch-off by the metal detector, the discharge gate is closed and the drum continues running. This method also generates plenty of wood loss due to movements of the discharge gate and may result in an uneven log flow to the chipper infeed, thus making the chipper line susceptible to further disruption.

In the two methods mentioned above the aim is to remove the bark from the drum through the bark slots onto a bark conveyor situated below the drum. To debark wood species with stringy, tough bark which is also difficult to crush into small pieces, separation of the loose bark requires a long barking drum, although a much shorter drum length would be adequate to debark the logs. In spite of the length of the barking drum and the number of bark slots, a large amount of loose eucalyptus or acacia bark, for instance, still exits with the logs from the discharge end of the drum onto the chipper line. On the other hand, if the bark slots were larger, the wood losses would be even higher due to the tendency of small wood to go through the bark slots as well. In the chips, this bark is regarded as a serious contaminant unless it can be separated from the log flow.

## History

One stimulus for the innovation was the observation that although the drum of one woodyard was about 35 m long, the bark was clearly removed from the log surface in the first 10 m of the drum length. This gave Metso the impetus to carry out mill-scale studies with various wood species on how the debarking process progresses inside the drum.

In all cases where eucalyptus is debarked in a debarking drum, the bark is removed from the log surface in the first 8-12 m of the drum length. These studies clearly show that, as far as the pure debarking process is concerned, the remainder of the drum length, the final 15-25 m, are unnecessary and cause wood breakage and unreasonably high wood losses.

When observing the bark flow that passed through the bark slots of the drum onto the belt conveyor, it confirmed the conclusion of ineffective bark separation. This bark flow contained only small fractions of bark and pieces of wood caused by the over-long debarking time.

## GentleBarking method

All good innovations are simple ones, and so is GentleBarking. The debarking takes place in the drum, but the drum is essentially shorter than those made earlier by the major suppliers in the industry. There are no bark slots in the drum, because the bark is separated in a special roll conveyor after the drum. In addition to a shorter barking drum, there is less equipment and less civil and electrical work needed with this new method. (Figure 1 shows the artist's view of the GentleBarking process after the innovation.)

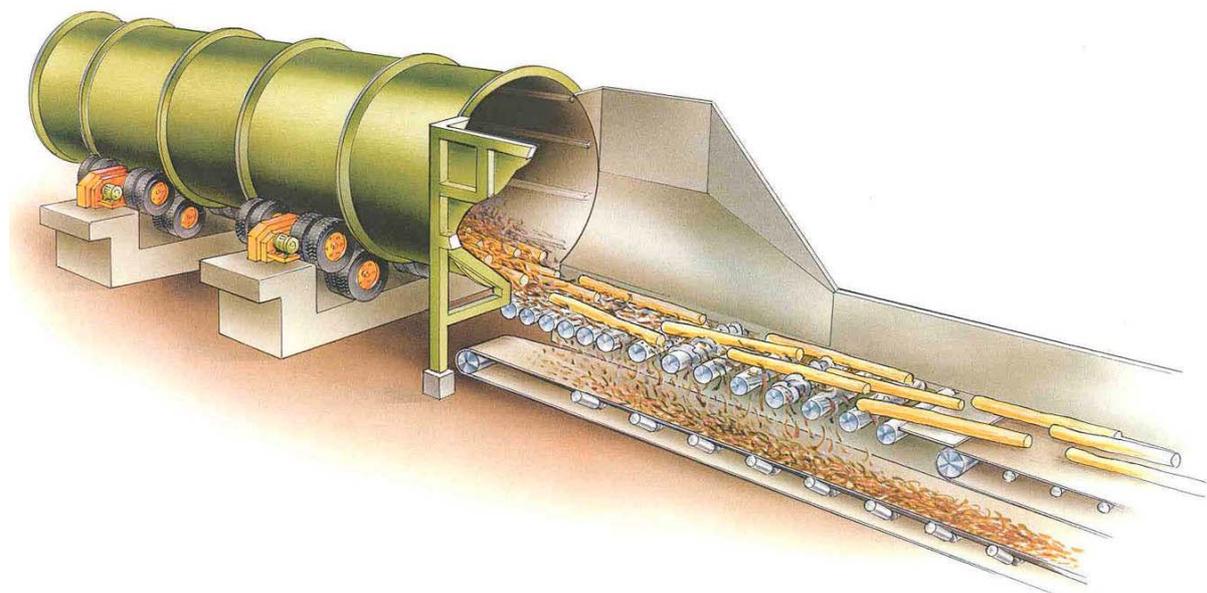


Figure 1.

## Benefits

The significant advantage of the new method is a shorter debarking drum allowing a shorter retention time, which means less wood losses and less wood breakage. Another improvement is the even discharge rate from the debarking drum achieved with a fundamental change in the discharge gate operating principle. In the new method, the discharge gate does not function as a slide-gate at all but instead has been replaced with a regulator device, causing minimal interference to the smoothness of the log flow. This means that one substantial source of log breakage and wood loss has been eliminated from the process. The function of the regulator device is merely to set the drum filling degree to a level which corresponds to the prevailing debarking conditions.

Because the loose bark is not separated from the log flow in the barking drum, the drum shell has no bark slots. This means that the bark chutes and bark conveyor under the drum are no longer needed and the elevation height of the entire debarking line can be reduced by several meters. This brings substantial savings in construction costs and space requirements, which improves and facilitates the utilization of space in the area.

In short, the new debarking method results in less wood loss, better chip quality, lower operating and maintenance costs and higher uptime. Furthermore, the total investment cost of the system is much lower than that of the present conventional methods.

## Experiences

Veracel Celulose finalized the erection of its two GentleBarking lines in February 2005. While waiting for the rest of the mill to be completed, the GentleBarking lines were fine tuned and trimmed to top shape during this test period. (Picture 1 shows the lines right after the erection.)



Picture 1.

It was clear from the very beginning that the GentleBarking process with short drums will result in extremely high capacities with clean logs. In Veracel, logs are forest-debarked and GentleBarking is customized to remove the rest of the bark at high capacities. (Picture 2 shows the infeed of logs to the GentleBarking drum.)



Picture 2.