

ADVANTAGES OF SCREENING IMBIBITION JUICES

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ABSTRACT

Traditionally, all imbibition juices were screened through perforated sheets and cushion was conveyed by scraper conveyor cum elevator ahead of mill # 2 in the tandem. With the introduction of DSM screens for the screening of mixed juice, the screening of imbibition juices was also discontinued and these juices were pumped directly along with cushion through chokeless pumps. At Shahtaj, we started screening of imbibition juices which proved to be a great success. In this case study, the advantages / benefits of new adopted system shall be discussed.

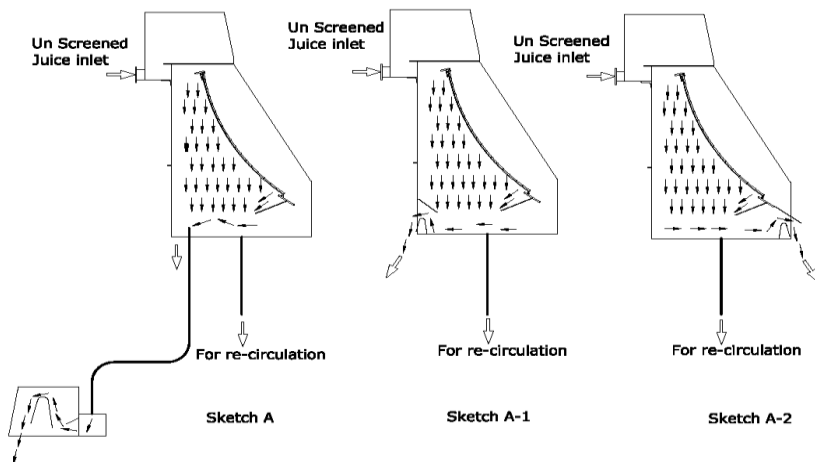
INTRODUCTION

Traditionally all the imbibitions juices were screened. It was common to have a single cushion screen, also referred as cushion conveyor, consisting of a long drag type slat carrier on top of a horizontally fixed perforated screen deck running along side the mills. The juice from each mill passed through the screen and was collected in the respective receivers of mills installed under the screen and all the strained cushion was returned ahead of mill # 2 through cushion conveying and elevating system. The screened juice was free of cushion and hence was applied smoothly and regularly. The mill juice trays were washed by re-circulating screened juice back to same mill juice tray. On the other hand, due to wet and corrosive nature of the cushion, the conveying equipment was difficult to maintain and the breakdowns/ stoppages were high and because of difficult approach

under the screens and pockets in the chain, it was a safe heaven for bacterial growth. Further due to conveying of all cushion ahead of mill # 2, the fiber loading of the whole tandem except mill # 1 increased substantially. With the introduction of chokeless pumps, the use of cushion conveyors has nearly eliminated. Now, the unscreened mixed juice is pumped to DSM Screen and cushion is dropped on Inter Carrier # 1 either directly or through a screw conveyor and all imbibition juices are pumped with chokeless pumps directly before the preceding mill and re-milling of cushion present in the juice is being done only by one mill. Presently, the use of DSM Screen for mixed juice screening is being replaced with rotary screen day by day. Where there are many advantages of direct pumping of imbibition juices, some disadvantages were also found which are discussed hereunder; At Shahtaj, we were using Cush Conveyor

on one tandem till season 2002-03, which was replaced with choke less pumps (without screening), on the other tandem the same choke less pumps were already in use. Following problems were faced due to direct pumping. The chokeless pumps usually run under "Snore" conditions, drawing in air with the liquid to prevent fiber agglomeration by maintaining a low level in the suction tank. Due to this pumping condition, the flow of imbibition juice remained gushy; resulting in over imbibition, owing to this phenomenon, sometimes the feed ability of mills was badly affected, causing choking of the Donnelly chutes or even the pressure chutes. We all know, regular and well spread imbibition is basic requirement of good milling, hence, when there was no imbibition or very poor imbibition, dry bagasse passes into the mill which can be a dangerous phenomenon for the pressure chutes. In both cases excessive / less imbibition is experienced. Due to this irregularity, results are

affected to quite an extent, which are not easy to quantify.



The overflow weirs of imbibition gutters remained choked regularly with cush cush and small channels were formed in the imbibition juice gutter discharge, resulting in very poor spreading of imbibition juice over the entire width of the bagasse belt. To ensure uniform spreading, one worker was engaged all the time for the cleaning of imbibition gutters.

With the introduction of arcing/beading on mill rollers, phenomenon of Cush Cush / bagasse falling in mill juice trays further aggravated, causing increased choking of

pumps & piping.

Water hoses were regularly used for washing down the accumulated bagasse in the juice trays, adding unnecessary water into the system, thus increasing the steam requirement.

To overcome the problems, we started screening of all imbibition juices with DSM screens.

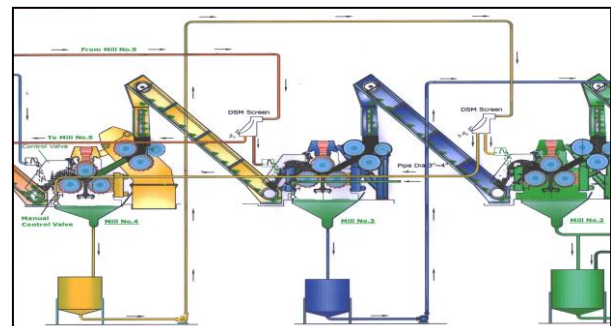
Methodology

The imbibition juice of each mill i.e. 3, 4 & 5 is pumped with choke less pump to DSM screen installed over intermediate carrier of preceding imbibition mill. The

screened juice is transferred to imbibition gutter through a pipe as shown in sketch 'A'. (If there is any space constraint, the bottom of DSM screen trough can also be used as imbibition gutter as shown in sketch 'A-1' & 'A-2'). From the DSM screen juice trough a portion of juice (as primary consumer) about 25~30 tons/hrs. for 42"x84" Mill is transferred back to the same mill juice tray through a pipe 3 ~ 4 Ø which sprays the juice at the mill delivery side of the juice tray through a perforated pipe installed over the entire width of tray, as shown in Photograph Picture-1 below.



Sketch 1)



(Sketch 2)

This juice washes down all the accumulated bagasse/cush cush dropped in the juice receiving tray of

that mill. Due to addition of juice into the mill tray, the proportion of cush cush is decreased in the imbibition

juice and smoothens the pumping. This system is illustrated in sketch 'B' schematically and also shown

in photograph P-2.



Picture-2 (Imbibition juice screens installed at Shahtaj)

Advantages

The chokeless pumps worked smoothly and no gushes are observed. The flow of imbibition juices remained very smooth and regular, the imbibition gutters remain clean and the imbibition juice is spread all over the width of Bagasse as shown in Photograph P-3.

Picture-3

Regular and evenly distributed imbibition juice/water is a basic requirement for good milling, which we achieved by adopting this system.

We never faced choking problem of mill juice trays, pumps or piping.

The use of water hoses to wash the bagasse accumulated in the juice trays was eliminated.

The labour requirement for attending the mill trays and imbibitions gutters was reduced substantially.

Installation Cost

Rs.140, 000 to Rs.150, 000 are needed to install whole new system for one mill only. With the installation of Rotary screens many mills may have surplus DSM screens which can be used for this purpose and then the cost for remaining parts may be reduced to Rs.30, 000 ~ 40, 000 only. Care should be taken that DSM screen used for this purpose should not be less than 0.78 mm aperture, one may go up to 1.25 mm comfortably.

CONCLUSION

At the end, I shall say that this is a very low-cost job but plays a vital roll in milling efficiency and working. By the grace of Allah, during season 2015-16, under mentioned Mill extraction results were achieved by SHAHTAJ:

	Plain	Reduced	Whole Reduced
Max. Mill Extraction	97.19	97.42	97.51
Average Mill Extraction	96.74	96.99	97.13

No doubt, we can not quantify the actual share of the system discussed above; however, we all know that imbibition system plays an important role in milling.

REFERENCES

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