

Machine Clothing For Twin Wire Former An Experience at Mysore Paper Mills

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ABSTRACT

Forming fabrics development in general and selection process in particular with respect to Mysore Paper Mills is discussed in depth. It varies from mill to mill and conclusion is arrived on their experience and suitability to the Mills. Cleaning of Fabric is also addressed in this paper.

Introduction

Mysore Paper Mills (MPM) is the first to have true twin wire former Bel-Baie II supplied by Beloit in the year 1981 first of its kind in India at that time. The concept of twin wire former at that time was relatively less understood and problems encountered are really daunting. The twin wire former has many advantages over conventional fourdriner. Twin wire former has its own draw back also

- It is a vertical former – stock is pumped upwards between the wires
- More water mark on the paper
- Vacuum deflector gives rise to more water marks on the paper
- Less dwell time in the forming zone due to short former length
- Low first pass retention i.e 50 % given by the supplier
- Ceramic tiles in the forming zone water drainage
- Water drainage through centrifugal action, tension and drainage elements

- No outside roll in forming wire for better washing of fabric in return run.
- No mount hop roll in the forming fabric position

The choices of fabric at the time of installation of machine in 1981 were very limited and single layer fabric was the only option. With technological improvement in fabric sector some of the problems mentioned are effectively addressed and reduced. Machine clothing plays a vital roll in deciding the quality of paper produced and in this article experience of MPM by changing the Machine wire Fabric is discussed.

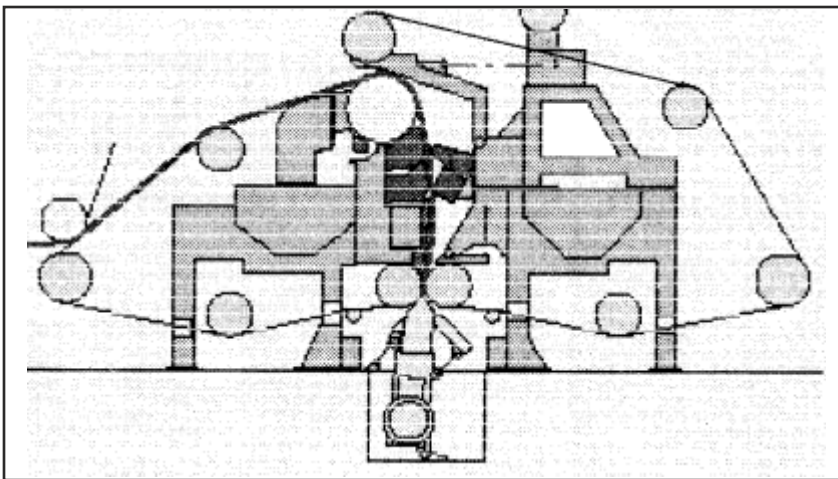
Impotence of Machine wire Fabric:

Wire fabrics are to perform tough task of dewatering 95 % of water in the stock coming from the head box. In the twin wire former the forming and backing wires have different function to perform for both dewatering and to give

dryer sections. A good fabric shall have the following characteristics for better performance.

1. Dimensional stability over its life time.
2. Good drainage index (DI)
3. Good fiber support index. (FSI)
4. Sheet forming top surface should be supporting the free water drainage at the same time good formation.
5. The fabric should easily help in releasing and transferring the formed sheet to the next section.
6. The fabric should allow in return run to clean properly by mechanical means like high pressure water shower.
7. The fabric shall not soil and clog in the wide furnishes mix.
8. Able to retain and give good first pass retention.
9. Machine side should be able to withstand wear and tear of stationary and rotating elements.
10. It should not leave mark on the paper.
11. Water spots and wire pick marks should be nil.
12. Drive load of the section should not increase drastically.
13. In twin wire former it should give characteristic double jet drainage in Bel- Baie II former
14. Able to withstand sudden machine trip and related problems.
15. It should maintain square run in wide range of operating speed.
16. Finally and most important should give targeted production.

A schematic diagram of Bel-Baie II is given below



Mysore Paper Mills Limited., P.O. Papertown, Bhadravathi-577 302 (Karnataka)

good formed sheet without any defects. In general cost involved in removing water in wire section is minimum compared to the subsequent press and

The above points are given due consideration while evaluating the fabrics and selection. The technological development in the design and pattern of fabrics is very fast changing and addressing many of shortcomings of the previous encountered problem. Each machine is unique in its own right, and

the fabric design suited for one machine may not be necessarily be good for another machine even though furnish mix may be the same.

The experience of MPM is highlighted in the next section showing the results of different fabric design on production on paper Machine-4

Mills's Experience :

MPM produces mainly Newsprint, the furnish mix being cold soda refined mechanical pulp 60 %, Chemical pulp 24 %, Softwood bleached chemical pulp 4 % and softwood mechanical pulp 12 %

In MPM over the period of time the experience is varied with different wire clothing of different suppliers and the experience gained is immense. Before going into details of each fabric, it is essential to separate both backing wire and forming wire in twin wire former.

In the initial period of machine start up in MPM both the forming and backing wires were single layer synthetic wire. The problems encountered were varied and changing to new design has taken considerable time in stabilizing the machine run.

In single layer backing wire, the wire used to have tendency of wavy in centre to back and sometime centre to front. This was causing streaky sheet formation in this area. Subsequently cleaning with needle shower also gives rise to marking if oscillation of shower fails in running. Many a times the wire used to run with shower jet marking bands which appeared on the sheet. With the single layer fabric the formation of sheet will be good but wire stability is not up to the mark. Cleaning of the single layer wire is relatively easier. The wire has the tendency to move in front or back and prone to creasing that is the main draw back of the single layer wire. In MPM backing wire comes in contact with only one stationary element namely water deflector. The wear and tear of the wire was relatively less compared to forming wire in this section. All the other wire rolls are well lubricated with low-pressure water shower. In the year 2008 the forming wire was changed to double layer wire, some of the problem of the single layer wire was totally eliminated and stability is quite satisfactory. In the initial trial in one wire the drag load of the wire went up by 40 Amp than normal when the cleaning shower was stopped

Backing wire used in Paper Machine 4 Single Layer Fabric in the period 1981 - 2006

SI No	Year	Imported	Indigenous	Total	Tonnage / Fabrics
1	1981 – 1986	40	0	40	6739
2	1987 – 1991	25	1	26	16713
3	1992 – 1996	18	6	24	19439
4	1997 – 2001	4	14	18	20526
5	2002 – 2006	1	15	16	24540

Backing Wire used in Paper Machine 4 Double layers Fabric from 2006

Year	Fabric		Tonnage		Tonnage / Fabric	
	S. L	D. L	S. L	D. L	S. L	D. L
2006-07	3	2	51117	69598	17039	34799
2007-08	0	2	0	61386	0	30693
2008-09	1	2	15030	61133	15030	30565

Forming wire used in Paper Machine 4 Single Layer Fabric in the period 1981 2001

SI No	Year	Imported	Indigenous	Total	Tonnage / Fabrics
1	1981 – 1986	44	0	44	5924
2	1987 – 1991	60	0	60	6831
3	1992 – 1996	49	9	58	8319
4	1997 – 2001	31	11	42	8220

Forming wire used in Paper Machine 4 Double layer fabrics from 2001

Year	Double Layer		Tonnage		Tonnage / Fabric	
	Imported	Indigenous	Imported	Indigenous	Imported	Indigenous
2001-02	8	1	123445	12556	15430	12556
2002-03	7	0	77102	0	11015	0
2003-04	3	5	32092	54659	10690	10930
2004-05	4	2	54379	27472	13595	13735
2005-06	2	4	28883	50215	14440	12555
2006-07	3	4	42699	48412	14235	12105
2007-08	1	7	18611	71009	18611	10145
2008-09	2	5	21032	66302	10516	13260

temporarily for cleaning jammed nozzles and for flushing the line. In another wire the wire used to move to back or front when the VHP shower is switched off. These two problems were informed to the supplier to take corrective measures. This problem was eliminated in the subsequent supply of fabric in this position.

Forming fabric selection in MPM, for

many years single layer fabric in this position was used as it gives many advantage like easy sheet release and easier to clean. However, with tremendous technological improvement in the fabric design, pattern, strand diameter and coarseness, the wire suppliers have more flexibility to imitate single layer fabric characteristic on multi-layer fabrics on the top surface that is sheet forming side

and at the same time imparting good dimensional stability to the fabric. In MPM the experience in this position is vast and mixed. New design particularly the multi-layer fabric in this position have given different type of problem, like guiding, wire picking, seam picking, more drive load, wire trim not clearly knocking off trying to go along with the pick up felt and so on. Till the year 2000 in MPM multi-layer fabric from imported sources were used in this position and many suppliers wire have given one or other problems, very few fabrics have less problem. After the year 2000 MPM has started using more of indigenous multi-layer fabric in this position and the results were mixed in the initial days. However the coordination of MPM along with wire supplier has given satisfactory results and many of the problems were effectively eliminated. MPM has increased the usage of indigenous fabric in this position.

The above tables gives a clear indication that MPM is successful in encouraging Indian wire manufacturers and using Indigenous wire without any quality problem.

Cleaning of Fabric

Cleaning of fabric is effected in two

ways, continuous mechanical cleaning and chemical cleaning

Very high pressure needle shower form the part of mechanical cleaning under this,

- a. Nozzle diameter 1 mm
- b. Shower angle against the fabric run for better cleaning and to avoid damage to fabrics.
- c. Distance between nozzle and fabric approximately 50 to 150 mm.
- d. Needle shower should not split before hitting the fabric for good cleaning.
- e. Shower oscillation complete coverage of fabric preferably overlapping of nozzle.
- f. Higher the fabrics tension lesser is the damage to fabric.
- g. Water pressure is around 35 to 40kgs/cm²

Chemical cleaning is done whenever the machine is stopped. 5 % of caustic solution is sufficient to give a good cleaning effect. Now a days sulfamic acid is used widely to clean the fabric.

The forming fabric is prone to damages since it comes in contact with stationary drainage elements and vacuum zones. The damages like holes on fabric happen during the machine start up and stoppage. The VHP showers water opening and closing is interlocked with

fan pump to avoid fabric damages.

Conclusion

It is imperative to use the new technological development to one's own advantage. Sometime the new technological teething problems are to be addressed effectively in co-operation between fabric manufactures and end user. The advantages of new technology should be mutually beneficial to fabric manufactures and end user.

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