

# ENVIRONMENTAL CONSERVATION IN PAPER INDUSTRY



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**Abstract:** Environmental protection is top priority and need of the hour of every individual and organisation. Almost all the industrial activities cannot be done without the utilisation of natural resources, however it needs to be used judiciously and processes needs to be made sustainable wherever possible. Water is one of the commonly used natural resource in paper industry for the manufacturing process. Usually industries do not show sufficient interest in conservation of water resources. Environmental practices derived out of implementation of ISO 14001 certification resulted in significant improvement in the environmental performance of Bank Note Paper Mill India Pvt. Ltd. Growth and development in harmony with environment has always been the approach of our company. The paper mill has already adopted best available practices and technologies in both Paper Making and Effluent Treatment. Recovery of sealing water of vacuum system, harvesting of rain water and seepage & run off water are the practices to name a few. Bank Note Paper Mill believes in adopting the principle of Reduce, Reuse, Recycle and Recover.

**Key words:** Sealing water recovery, Rain water harvesting, Seepage water recovery, Specific water consumption

## Introduction

### About us

Bank Note Paper Mill India Pvt. Ltd. (BNPM), located in Mysore, Karnataka is a Joint Venture Company of Security Printing & Minting Corporation of India Limited (SPMCIL- A wholly owned Public Sector Undertaking of Government of India under Ministry of Finance) and Bharatiya Reserve Bank Note Mudran Private Limited (BRBNMPL - A wholly owned subsidiary of Reserve Bank of India, RBI) is engaged in production of Bank note papers with a capacity of 16000 TPA.

The company has installed state of art machinery imported from Germany and other European countries. BNPM has established ETP supplied and installed by M/s Voltas Ltd. The state of the art ETP has zero discharge concept consisting of primary, secondary and tertiary treatment with ultra-filtration, RO & MEE (Multi effect evaporator) has been established to treat trade effluent and re-cycle the water in the process and gardening.

### Innovative approaches/ improvements implemented to conserve water & energy

#### 1. Sealing Water recovery used in the vacuum system

As per the Original design from Machine supplier's, only fresh water was proposed for use in the process for level make up of vacuum system, there by the back water collected from the vacuum seal pits were sent to effluent treatment plant (ETP) as effluent, as this is the practice at all the banknote paper manufacturing plants across the world. After brainstorming and detailed analysis of the process requirements, the process has been modified such that the back water generated from the vacuum seal pit is collected and pumped back into the system for reuse of level make-up.

This has drastically reduced the effluent generation there by reducing the fresh water consumption by 700 m<sup>3</sup>/day. Before the modification, the back water was sent to ETP, the water used to contain cotton fibres and various chemicals used in paper manufacturing process. The modification resulted in cascading effect by not only reducing the water consumption, but also brought down the load on the effluent treatment plant while reduced cost of paper manufacturing to the company in terms of recovery of useful cotton fibers, reduced chemical consumption and security materials, which in turn also resulted in water conservation.

#### Project - 01 (Vacuum System Back Water Recovery)

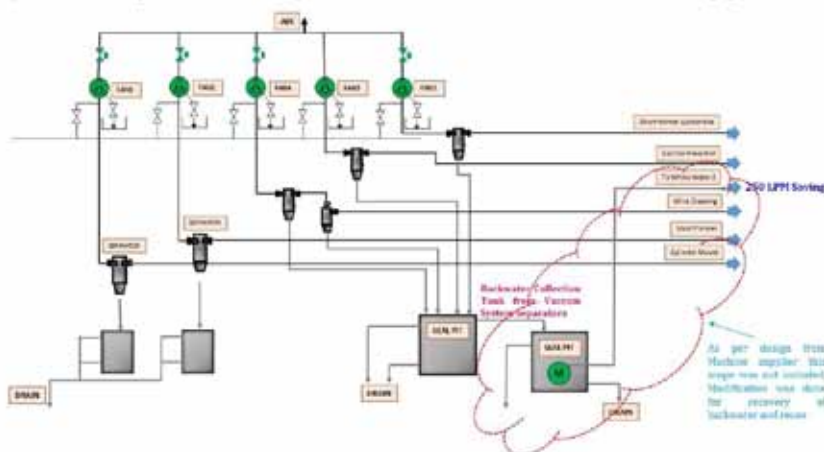




Figure 2: Photograph of the seepage/run off water recovery system a) lagoon b) culvert with pumping arrangement



Figure 3: Photograph of the filters of rain water harvesting system

**2. Rain water harvesting and seepage/run off water recovery**

BNPM has a topographical advantage of having a height difference of over 60 ft in terrain. Taking advantage of the topography BNPM has constructed a garland storm water drainage system and connected the same to the culvert which is situated at the lowest point of the BNPM premises. The culvert has been converted into a storage area of 150 m<sup>3</sup> capacity by construction of cross wall and submersible pumps are installed in the storage area. Whenever it rains, the rain water, runoff water & seepage water from entire premises are collected in culvert pit through storm water drainage and transferred to lagoon having 3600 m<sup>3</sup> capacity. ETP (effluent treatment plant) load is reduced considerably due to initiative of the above project. Additional capacity of about 600 m<sup>3</sup> - 700 m<sup>3</sup> has been created at ETP due to reduced load. As ETP is having capacity to take additional load, the collected water is subjected to treatment at ETP. The treated water is meeting all the parameters required for process water in the plant.

Prior to implementation of the project, entire water during rainy season was going out of the premises through culvert. Mysore city witnesses about 70 - 75 rainy days a year and hence it is possible to harvest on an average 500 m<sup>3</sup> of water during every rain fall from the above arrangement. BNPM

has already harvested about 34,400 m<sup>3</sup> of water from December 2020 to till date (covered one rainy season) which is equivalent to 36 days of entire requirement of the plant. Apart from this Rain Water Harvesting is done for Raw Material Godown with a roof area of about 5000 m<sup>2</sup>.

**Discussion**

- Fresh water consumption reduced by 40 % in paper machine plant with sealing water recovery in vacuum system.
- Further fresh water consumption has reduced by 8.9 - 9% through rain water harvesting
- The reduction in the fresh water consumption in the plant over the years is shown in Figure 4.
- Though BNPM is a young organisation with only 5 - 6 years of paper making experience, we have achieved one of the lowest specific water consumption per Metric Ton of paper produced among all the Currency paper mill in the world. Right now total water consumption per MT of Paper produced stands at 53 m<sup>3</sup>/MT and specific fresh water consumption is 18 m<sup>3</sup>/MT of paper produced.

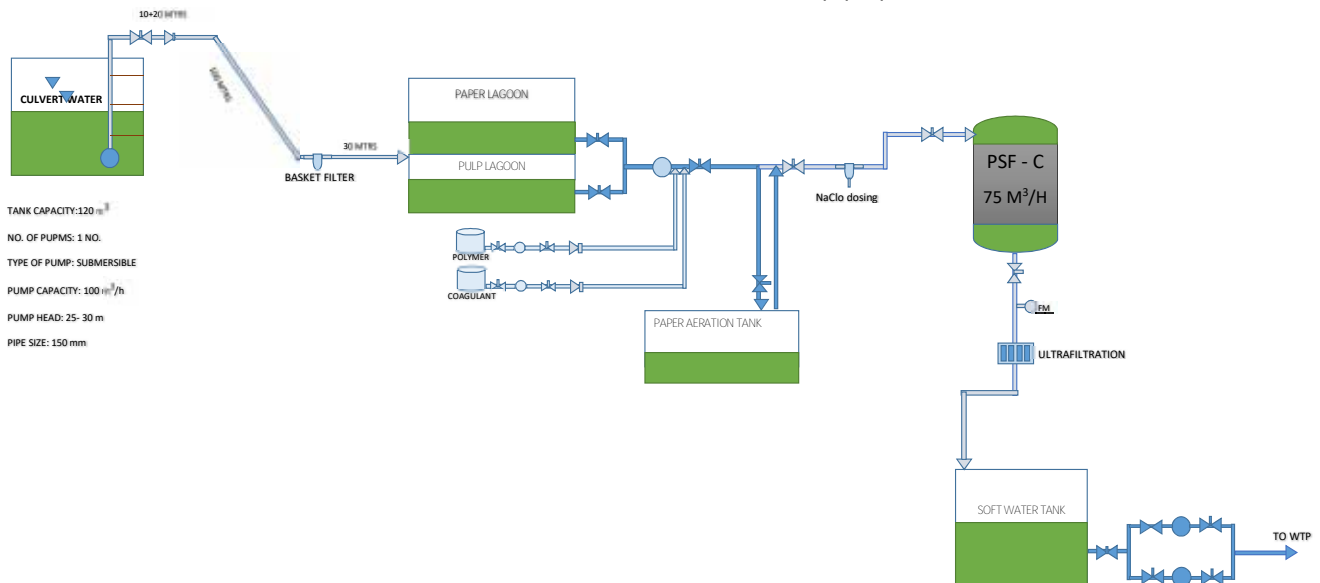


Figure 1: Schematic of collection of Rain, Run off and seepage water and treatment process

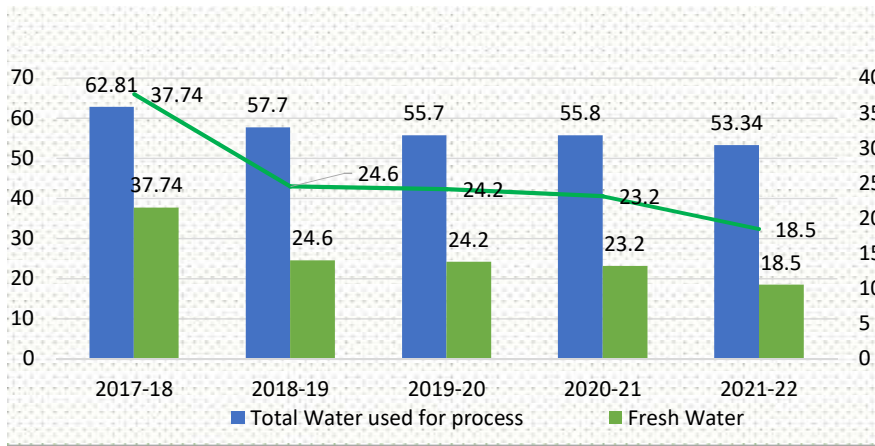


Figure 4: specific water consumption (m3/MT)

**Conclusion**

BNPM is committed for conservation and up-gradations of Environmental aspects. In this endeavour BNPM has achieved milestone in water conservation by open approach and its preparedness for accepting change management. Recognising our effort towards conservation of water, BNPM has received “Best Jury Special Award in National Level Competition - 2021 Organized by CII for Excellence in Water Management”.



**Acknowledgement**

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