

Efforts On Reducing Fresh Water Consumption And Closing Of Water Loop At EPML - Some Case Studies.

Nair M. B. S., Mohan V. & Sahu A. K.

ABSTRACT

Paper manufacturing is a highly capital, energy and water intensive industry. Water is imperative in all major stages of paper production, including pulp making, pulp processing, and paper manufacturing. Freshwater conservation is one of the major stewardship issues for the pulp and paper industry is trying to address. For sustainable management water conservation, recycling and reusing are the key principle to encounter the issues like cost, availability, environmental issues and productivity. Emami Paper Mills Ltd., Balasore, Orissa has taken various initiatives on fresh water minimization by identifying and segregating different waste water throughout the plant and further reused without any adverse impact. It is conducting a detailed study of water & waste water management practices in different processes and determining the opportunities for water savings by performance enhancement of existing and future facilities.

Keywords: Closed water loop; Reduce, Recycle, Reuse; Utilization of treated effluent; zero discharge from Power Plant.

Introduction

Water use is of increasing concern due to problems with fresh water scarcity in many parts of India. Moreover, the withdrawal and return of large amount of water to rivers and streams can have major ecological impacts which are made even worse at lean period of the year. Paper industry is third largest consumer of water. Fresh water consumption in paper industry is high due to poor water management practices and obsolete technology. The huge amount of water consumption by this sector leads to lowering of the ground water table. About 79% of the water consumed is discharged in to water bodies. By 2020, paper production is expected to be doubled resulting further increase in water consumption and there may be a severe shortage of fresh water. There is already growing conflict due to water scarcity and pollution. However in last decade significant reduction in specific water consumption has been observed as per the guideline given by CREP due to increasing awareness regarding water consumption and still our water consumption is high in comparison to global standards. Sustainable approach to water management is a must for paper industry for further

reduction of fresh water by almost 50%. Integrated approach towards zero discharge means segregation of waste water from various processes into clean waste water that can be separated and reused. The concept of zero discharge is based on the reduce, recycle and reuse and these are all taken care as the inbuilt part of the technology of the manufacturing process. Besides this in order to maintain the desired quality parameter for the product without disturbing machine run ability, some amount of process water has to be purged out.

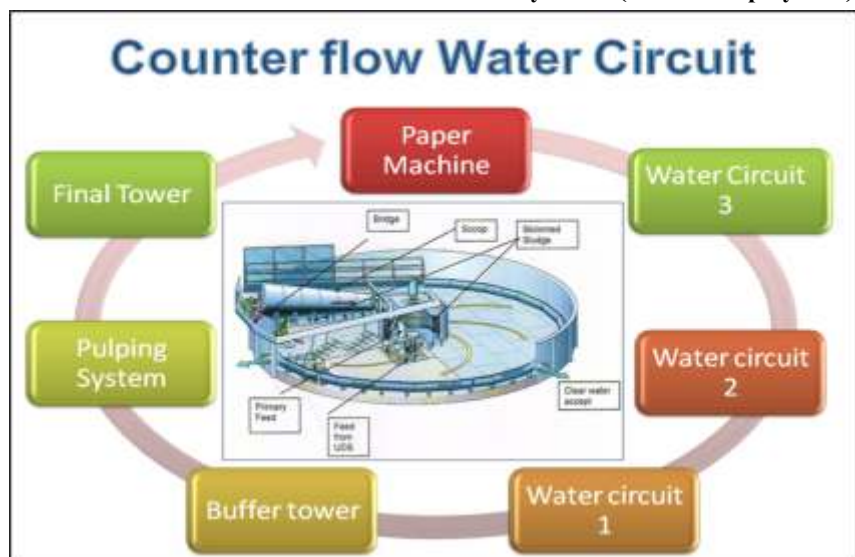
Closing of water system often leads to

increase in dissolved and suspended solids, an increase in temperature and reduction in dissolved oxygen. If these conditions are not addressed, the mill will suffer a loss in productivity and product quality. It is not possible to reduce water consumption considering without having capital investment.

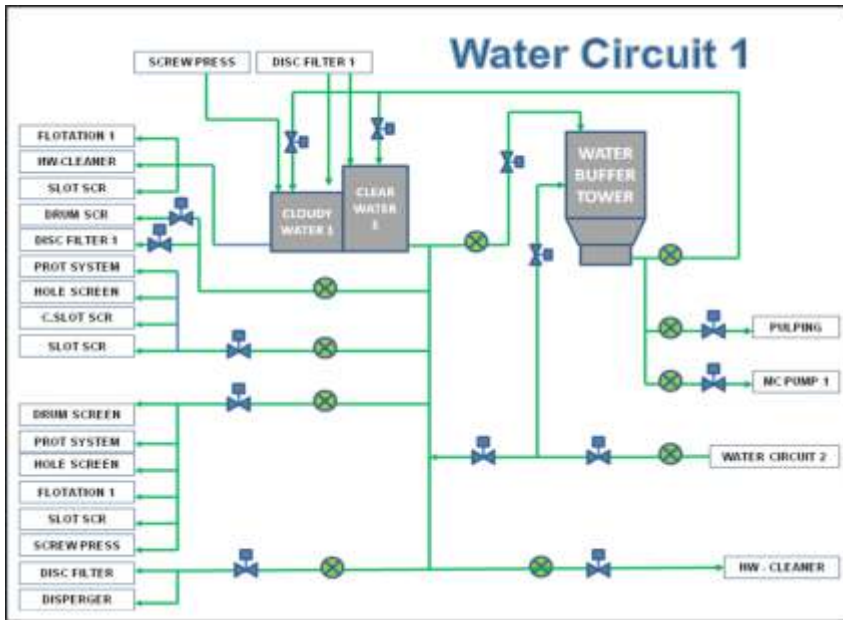
At Emami Paper Mills, some effective steps are taken towards closing the water circuit and the details are given below.

- All hydraulic system return water recycled in the same hydraulic system after passing through

Reuse of Machine Back water after fiber recovery units: (Closed Loop System)



Emami Paper Mills Ltd.,
Balgopalpur, P.O. Rasulpur,
Dist. Balasore-756 020 (Orissa)



A. In-built water circuit in various areas

Sl. No.	Area	Recovery System Available
1	DIP-1(W&P Grade)	Disc filter I and II & Potcher washing back water
2	DIP-3 (News Print Grade)	Disc filter I and II, and DAF
3	PM/C-3	Disc filter, condenser cooling water & Closed loop Hydraulic cooling system.
4	PM/C 1 & 2	Conical Bird Save al

Recovered water Vs Area of use

Sl. No.	Source of Recovered Water	Area of Use
DIP # 1	DF-1, Clear	Disc filter shower
DIP # 1	DF 1 Cloudy	Dilution of input -1 st loop
DIP # 1	DF-2, Clear	Disc filter shower
DIP # 1	DF 2 Cloudy	Dilution of input -2 nd loop
DIP # 3	DF-1, Clear	Disc filter shower
DIP # 3	DF 1 Cloudy	Dilution of input -1 st loop
DIP # 3	DF-2, Clear	Disc filter shower
DIP # 3	DF 2 Cloudy	Dilution of input -2 nd loop
PM # 3	Disc Filter, Clear	Sent to Clarified tower and then used in loop-II of DIP-3, final tower pulp consistency dilution of PM2 & PM3, wet end broke shower and dry end broke shower of PM3.
PM # 3	DF Cloudy	Sent to DAF and its clear water is used in deinking loop-II
PM # 3	Super Clear	Wire roll shower and knock off shower

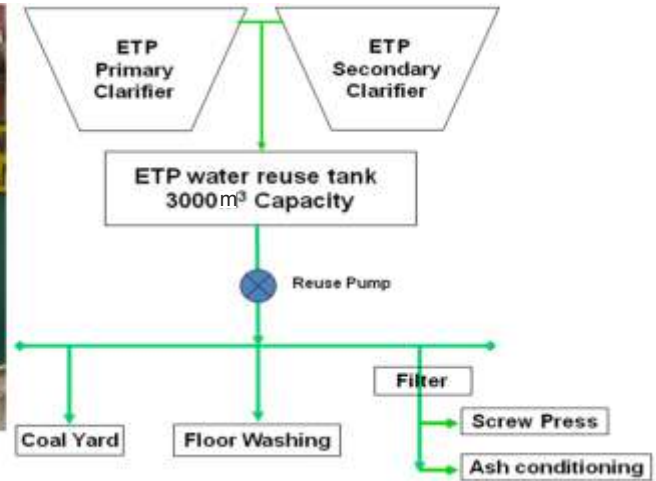
- cooling tower.
- Vacuum pump sealing water recycling with a cooling tower.
- Disc filter Super-clear water for LP
- showers in wire-part.
- Super clear water for the sheet knock-off shower.
- Disc filter clear water used for

consistency regulation of DIP final tower pulp, broke pulping system and the excess water to the DIP systems

- All showers for broke pulping with clear water.
- Disc-filter cloudy water from PM # 3 after clarification through DAF and save all clarified water from PM # 1 & 2 used as make up water in respective DIPs.
- Closed loop system so as to optimize the fresh water intake.
- Disc filter Super-clear water for LP showers in wire part.
- Super clear water for the sheet knock-off shower.
- DIP # 3 is in operation with a closed loop water circulation system. The makeup water requirement of DIP # 3 is fulfilled by the backwater from the paper machine. The backwater from the machine is clarified inside the plant with DAF system and utilized back in to the system. Hence, the fresh water requirement is practically nil in DIP # 3.
- The system water is reused as much as possible before being discarded as effluent.
- Apart from conveying the actual fibers, the process water transports chemical, disturbing components and heat energy.
- Due to less fresh water introduction into the system,
 1. Less energy is needed to maintain process temperature
 2. Less effluent discharge.
 3. Less chemicals required for the process
 4. Lower the fiber losses and improves yield
- Separation of water loops take place in two stages by the thickening process.
- The water loops are laid out on the counter flow washing principle.
- To achieve maximum yield, less power and steam, the water circuit should be in a closed loop.

Recycling and Reuse of treated Effluent:

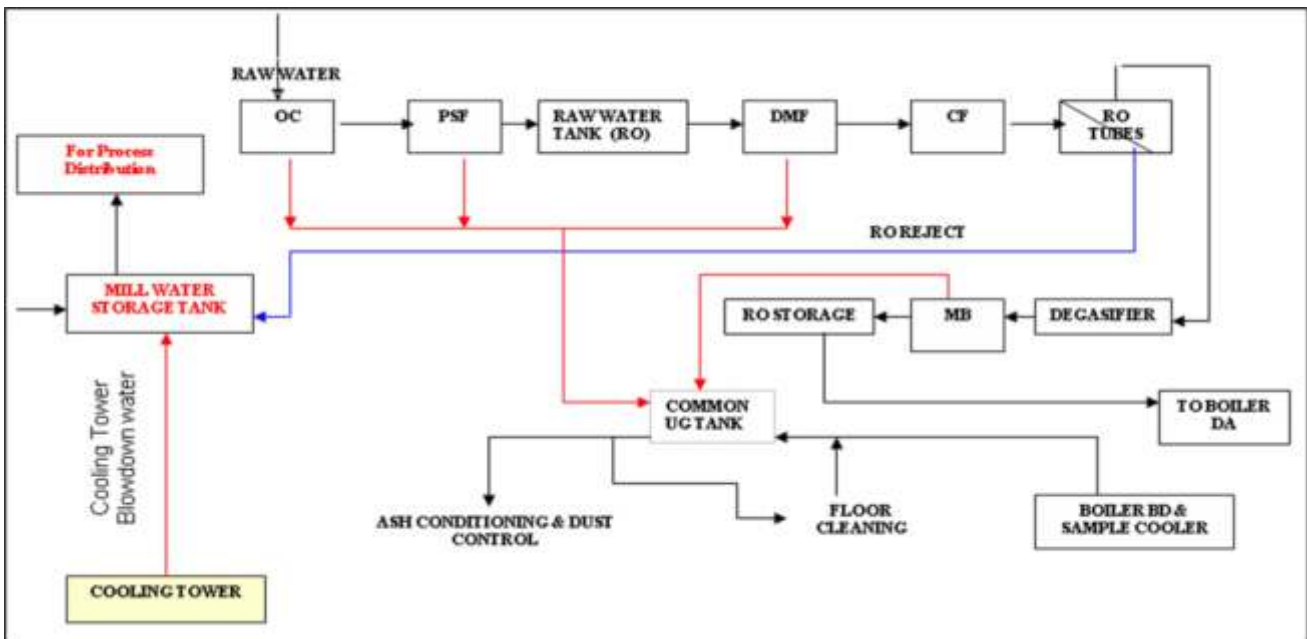
A Treated effluent is partly used by farmers for cultivation and partly recycled for use in areas like floor cleaning, sludge



B Zero Water Discharge from 20 MW Power Plant (15 + 5 MW):

Generally Power Plant Consumes fresh water for Steam & Power generation. Fresh water consumption in Power Plant mainly depends on the following:

- Evaporation & drift losses in the Cooling Towers.
- Condensate recovery from process & the makeup water requirement for Boilers
- Open steam utilization in the Process.



dewatering, coal yard (dust suppression), plantation and gardening.

1. The reuse in the plant area is made effective by installing an online filter of 100 micron in the treated effluent pipeline
2. Back Water generated in Potcher

3. Soap Stone Power slurry is being prepared with save all clarified water. No fresh water is used here.

- Blow down from Boiler & Cooling Towers and recycling.

Effective Utilization of fresh water & Zero Water Discharge at Emami:

- The condensate return from the process is almost 85 % (including the open steam used in DIPs)

