Critical Overview of Water Consumption in the Pulp & Paper Industry

www.celso-foelkel.com.br

www.eucalyptus.com.br
For decades - no pressures at all...

Leading to high water consumption and effluent generation...

But now, a turning point has just arrived to our P&P industry...
Although improvements have been significant, there is still a long road to go ahead in terms of water use...

Past (1960’s)  
250 m³/adt

Future  
10 - 15 m³/adt  
Zero ?

Today ?  
25 - 40 ?
Water consumption shall not be considered as equal to effluent generation, do you agree?

*Effluent* is the *nickname* given to water after it has been polluted and wasted...
A substantial difference between water consumption and effluent generation... Why such? 10 to 20% ??

- Overflows
- Spills
- Evaporation
- Smokes
- Flue gases
- Cooling towers
- Moisture in residues
- Steam losses
- etc.; etc.
We need to speed up actions to fulfill commitments and to anticipate problems.
Restrictions are to become stricter

- Social and environmental responsibility from industry owners
- Environmental agencies restrictions
- Water utilization conflicts
- Pressures from Society
Water consumption is function of...

- Technological age of the mill
- Balanced design of inter-related mill areas
- Managerial commitments
- Operators responsibility
- Water resources availability
But, in general...

There are no specifications or restrictions to water utilization in the process sectors of a pulp or paper mill, only to final effluent to comply with legislated parameters.
Operators love to use water ...

Because of:

- technological concepts based on low consistency
- cleaning and elimination of contaminants that impair pulp quality and cause process equipment deposits
The concept to treat effluents till now is based on...

- Blend all effluent flows...
- treat them at a huge, expensive and dinosauric WWTP...
- at a high cost and with low ecoefficiency !!!
Water has till now been an inexpensive resource...

Treating effluent is a lot more expensive

- More water consumption ...
- More effluent to treat...
- More costs and impacts
- Higher heat losses in the water ($\sim 5$ GJ/adt)
A new world is just showing the face due to

- Water utilization conflicts
- Water footprint demands
- Payment of environmental taxes to use water
New concepts are required...

**Segregation** is the one of the most important...

It means to separate and to treat differently the different things

- Clean and low contaminated effluents;
- High SS but clean in terms of COD;
- Low SS but highly organic;
- etc.
New concepts are required...

Reuse water or effluent at the origin/effluent source is another of the most important...

This is the true and vital concept for closing water cycle

- and not just to send to someone else a dirty water, transferring the problem and creating unbalanced operations...
New concepts are required...

The water quality is another of the most important...

There is no need to use fresh water or clean industrial water to do every single job in the mill, even to wash the floors.
New concepts are required...

**The technological concepts** are to change soon

- moving pulp suspension flows at low consistency is becoming obsolete;
- paper and pulp sheet forming also;
- reducing pulp and paper brightness levels is a need, even by law;
- etc.
The eleven strategies...

1. Reduce water consumption at the origin or at process effluent source

2. Reuse as much as possible at the process area

3. Identify water and effluent quality at each sector of the mill, avoiding to contaminate the discharges to effluent
The eleven strategies...

4. Segregate different types of waters and effluents

5. Keep balanced operations and do not exceed the optimum sector and mill capacity

6. Remove or modify contaminants using kidney treatments (example - removal of chlorides and potassium from boiler ash, heat exchangers to recovery heat, etc.)
7. Treat different effluents by different methods, preferably at the process sites, with innovative methods

Ex.:
- woodyard waters (*wetlands*);
- pulp machine effluents (*save all screeners*);
- water purge from boilers (*direct utilization as such*);
- clean condensates and hot water (*direct utilization as such*);
- hydrociclones discharges (*removal of solids and reuse of water*);
- cooling towers wet gases (*condensation and reuse of water*)
The eleven strategies...

8. Close effluents lines at some specific areas possible to work without generating effluents

- digester room;
- pulp washing and screening;
- lime kiln and causticising;
- chemical plant;
- recovery boiler;
- etc.
9. Recycle a fraction of the final treated effluent to some areas where feasible

10. Use other sources of water, as rain water, wood chips moisture, water in purchased chemicals, etc.

11. Deal with environmental control agencies to restrict losses of pollutants in load (kg/adt) and not just in concentrations (ppm)
Water is a renewable resource but it is not to be aggressively used and wasted by Mankind

The Water Age...
P&P sector must act - SOON, do you agree?
Thanks for your attention

Good luck with your achievements