

# Water Circuit Closure

## Simulation Tools

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# Background

- Small mill, 60 MT/day
- Production: White Top Liner (WTL)

		WTL# 130
Production	ton/day	60
Bleached Fibers	%	50
Brown Fibers	%	50

- Open water circuit
- Low investment
- Cylinder Vat (5) Machine
- Two pulp lines

# Base Simulation

## Assumptions

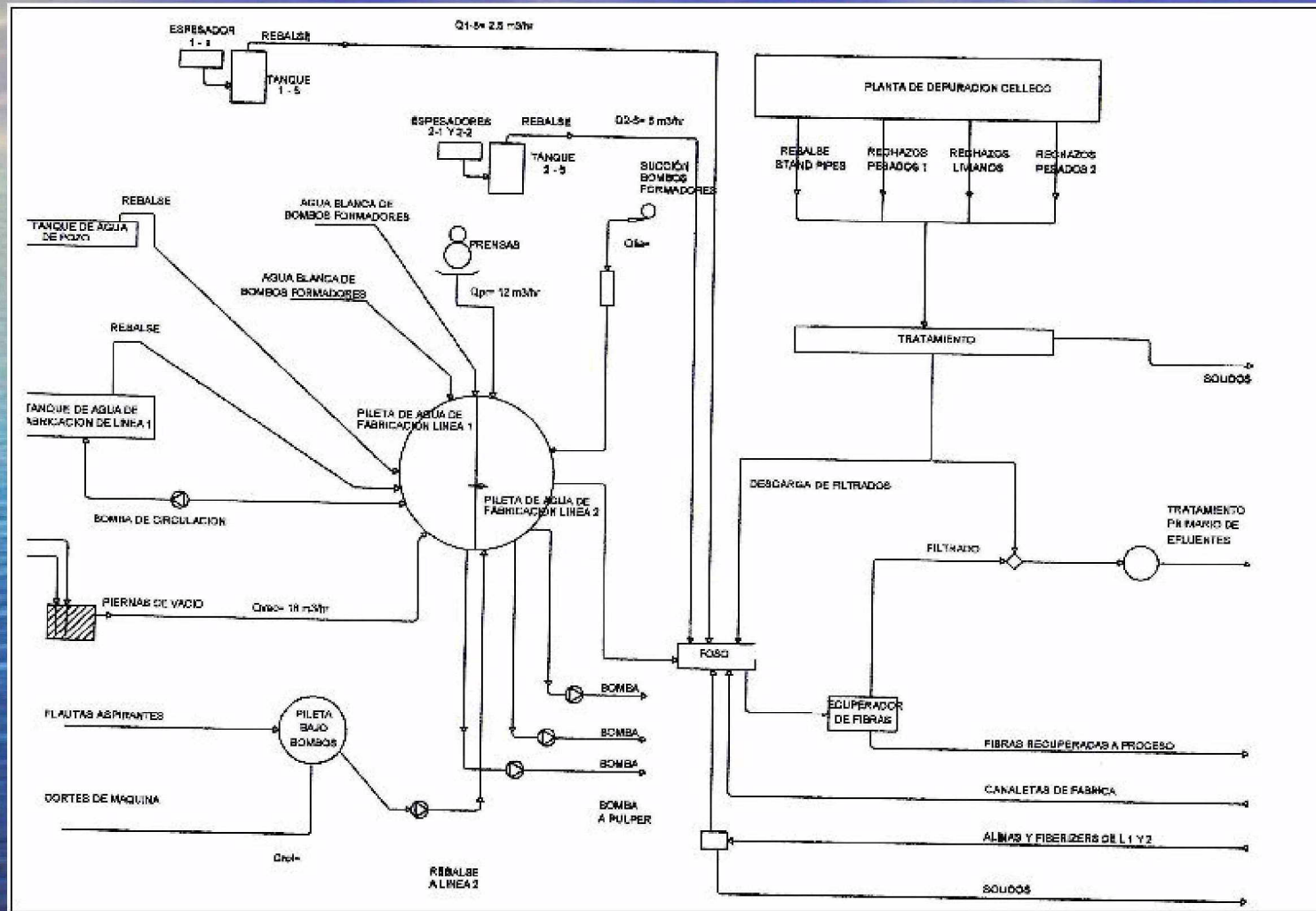
- The vats for each type of pulp are considered as one vat
- Fresh water is added in a regulated form (it was overflowing constantly)
- Cleaners rejects were used as regulation tools
- Pulpers work in a continuous process (they were working under batch conditions)

# Base Simulation

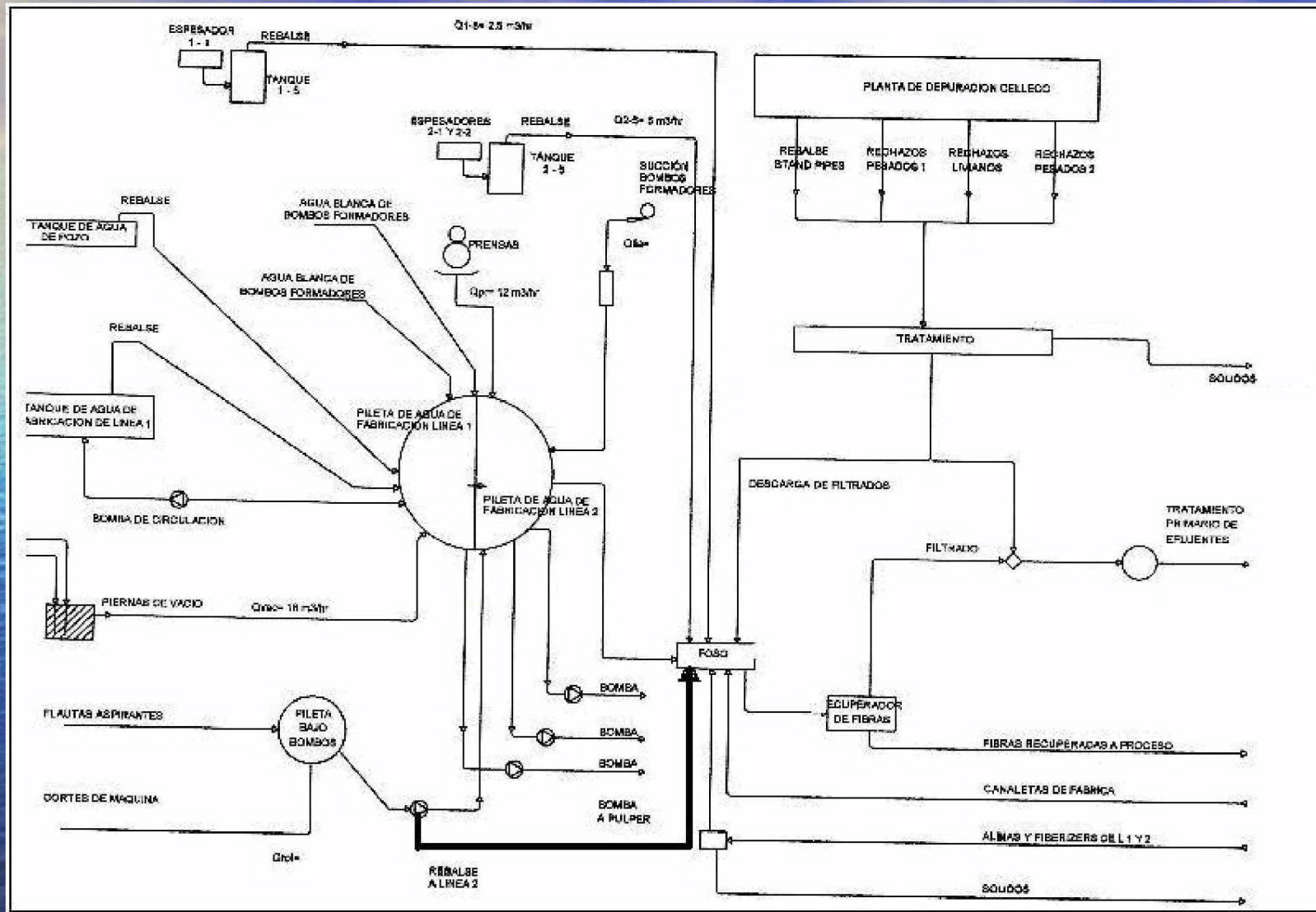
## Parameters

		Line 1 Bleached Pulp	Line 2 Brown pulp
Pulper Consistencies	%	2.3	2.6
Fiberizer rejects	%	15	15
Cleaners consistencies 1° stage	%	0.6	0.6
Cleaners rejects 1° stage	%	28	28
Cleaners consistencies 2° stage	%	0.35	0.35
Cleaners rejects 2° stage	%	35	35
Cleaners consistencies 3° stage	%	0.26	0.26
Cleaners rejects 3° stage	%	35	25
Decker, output consistencies	%	7.5	7.5
Decker, fiber loss	%	15	15
Decker, cleaning shower flow	m <sup>3</sup> /h	3	3
Refiner, input consistencies	%	3.5	4.5
Stuff box consistencies	%	2.8	3.5
Vat consistencies	%	0.5	0.5
Vat retention	%	80	80
Vat, cleaning shower flow	m <sup>3</sup> /h	6	9
Wet web consistencies (Vat output)	%	5	5
Consistency, entering 1° press	%	----	13
Consistency, leaving 1° press	%	----	33
Vacuum pump, sealing water flow	m <sup>3</sup> /h	----	19.8
Fiber rotary filter, efficiency	%	----	72

# Base Simulation



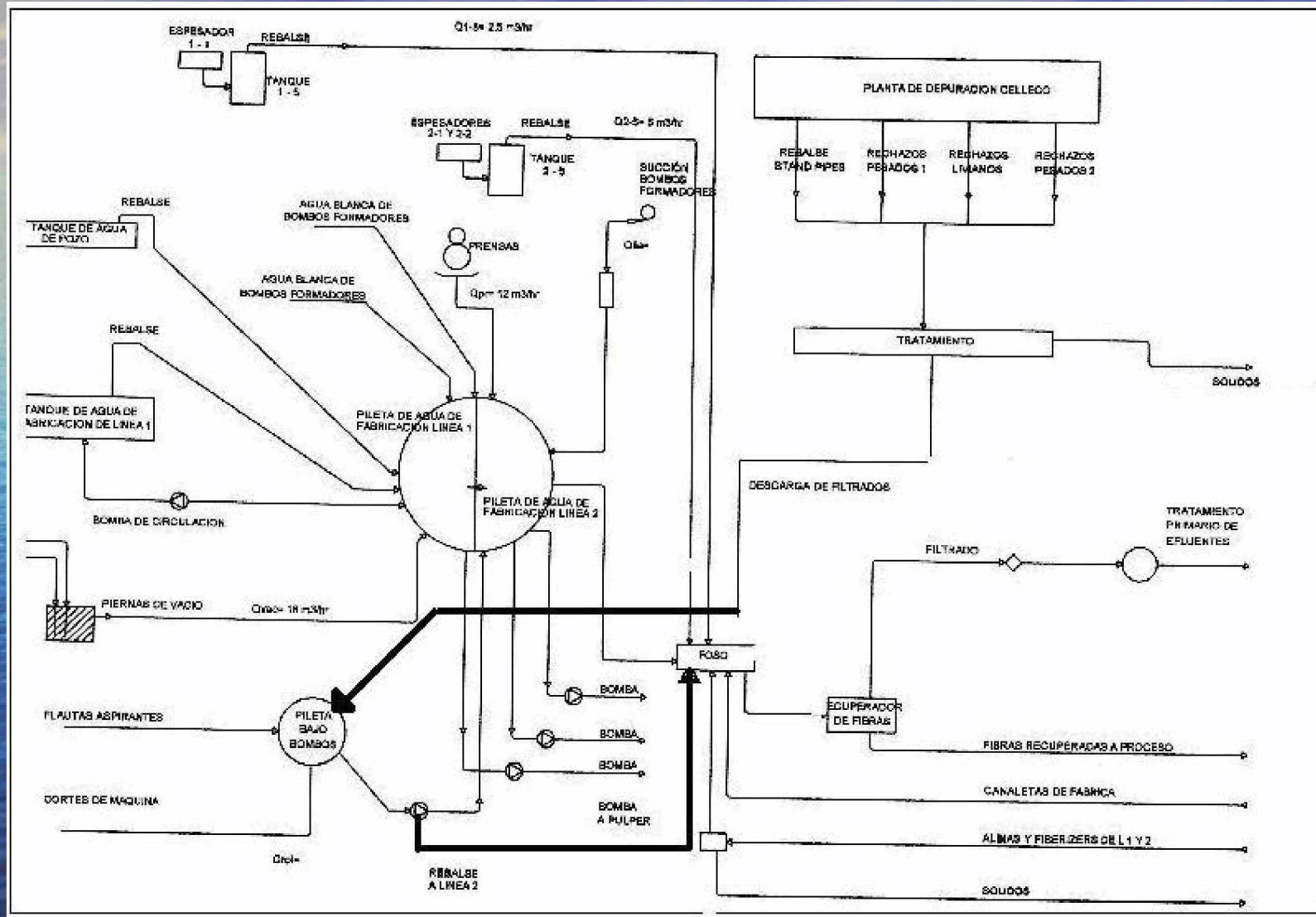
# Alternative 1



# Alternative 1

		Base	Alter. 1
Water consumption	m3/h	98,6	98,4
Water consumption	m3/tn	38,9	38,8
Fiber to effluent	kg/h (tn/día)	68,8 (1,65)	64,4 (1,55)
Fiber to effluent (% on production rate)	%	2,7	2,5
Total material loss	kg/h	131,1	126,7
Total material loss (% on production rate)	%	5,17	4,99
Bleached pulp consumption	%	52,7	52,8
Brown pulp consumption	%	47,3	47,2

# Alternative 2

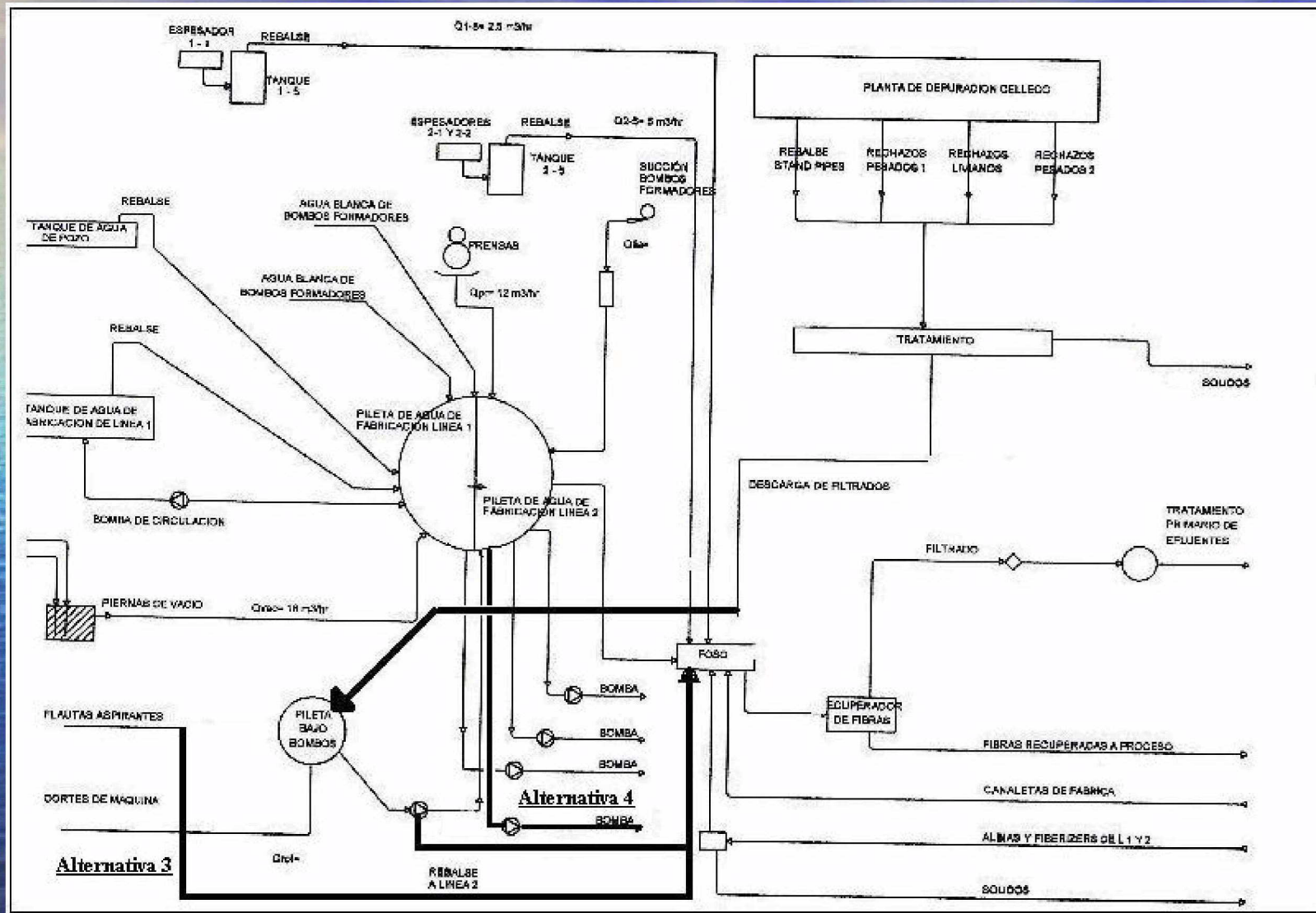




# Alternative 2

		Base	Alter. 1	Alter. 2
Water consumption	m3/h	98,6	98,4	98,2
Water consumption	m3/tn	38,9	38,8	38,7
Fiber to effluent	kg/h (tn/día)	68,8 (1,65)	64,4 (1,55)	41,3 (0,99)
Fiber to effluent (% on production rate)	%	2,7	2,5	1,63
Total material loss	kg/h	131,1	126,7	103,7
Total material loss (% on production rate)	%	5,17	4,99	4,09
Bleached pulp consumption	%	52,7	52,8	53,3
Brown pulp consumption	%	47,3	47,2	46,7

# Alternative 3 & 4



# Alternative 3, 4 & 5

		Base	Alter. 1	Alter. 2	Alter. 3	Alter. 4	Alter. 5
Water consumption	m3/h	98,6	98,4	98,2	78,55	67,35	37,25
Water consumption	m3/tn	38,9	38,8	38,7	30,9	26,5	14,6
Fiber to effluent	kg/h (tn/día)	68,8 (1,65)	64,4 (1,55)	41,3 (0,99)	7,9 (0,19)	5,0 (0,12)	4,8 (0,12)
Fiber to effluent (% on production rate)	%	2,7	2,5	1,63	0,31	0,20	0,19
Total material loss	kg/h	131,1	126,7	103,7	70,3	67,4	67,2
Total material loss (% on production rate)	%	5,17	4,99	4,09	2,77	2,65	2,65
Bleached pulp consumption	%	52,7	52,8	53,3	53,9	53,6	49,4
Brown pulp consumption	%	47,3	47,2	46,7	46,1	46,4	50,6

# Conclusions

- The simulations showed that with low investment was possible to reduce fiber and fresh water consumption. It was corroborated in the practice
- Also, they showed the possibility to reduce total fiber cost by modifying the water recirculation system.
- Even not all the BAT recommendations were applied this type of work should be the first step to achieve closed systems
- The use of available software can be a good help also to small mills. Very valuable information can be obtained.