

ACE (Advanced Control Expert)

Optimization solutions for brown stock washing



The challenge: To fully optimize brown stock washing operations



The solution:
Brown Stock Washing ACE
ACE (Advanced Control Expert) is an advanced control solution for brown stock washing lines. ACE manages all aspects of washing, screening and thickening, while communicating its actions to the operator. ACE ensures that production goals are met and that operating costs are kept at their lowest possible level.

Brown stock washing lines are notoriously difficult for human operators to manage efficiently. Numerous filtrate tank inventories must be managed along with wash water flow rates and dilution factors in order to try and balance the process. The optimal targets vary with the costs of energy, bleaching chemicals and raw materials. Operators, however, tend to choose operational targets that provide the greatest runnability to ensure the uptime of the system. Unfortunately, these targets are rarely economically ideal. The result is inconsistency and suboptimal efficiency, leading to higher than necessary operating costs. Operating with a dilution factor that is too high

causes lower solids at the evaporation plant and drives up energy costs, whereas operating with a dilution factor that is too low leads to higher soda losses and higher bleach plant chemical usage. This type of suboptimal control results in higher than necessary operational costs and can ultimately limit the production capacity of the fiberline.

ACE addresses all of these issues. It calculates the optimal targets for soda loss or COD, as well as solids based on the mill's actual costs (such as wash water, soda make up, bleach chemical costs, and evaporation costs) and then works diligently to minimize the overall operational costs by keeping all of the processes on target.

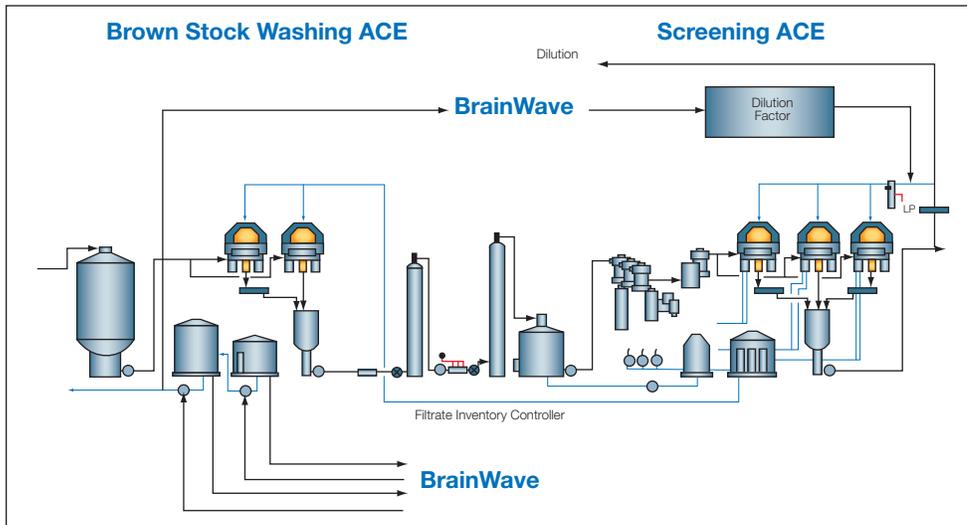
ACE continuously monitors differential pressures across screens and thickeners and, should they begin to plug, takes corrective action so that further plugging doesn't occur. The operator is informed of the "event," but by this point ACE has typically already averted the potential mishap. ACE continuously controls conductivity and solids to the

evaporation plant by adjusting the total dilution factor of the brown stock washing line. Filtrate balance is controlled based on the filtrate tank levels, ensuring washer operation is consistent and stable.

There is a special self-optimizer function in ACE that maximizes washing efficiency or production throughput, depending on the preferences and production targets entered by the operator. ACE has proven solutions for all types of washers, including diffusion washers, DD washers, drum washers, and wash presses.

Screening and thickener optimizers within ACE automatically select the best targets based on wood species, kappa number, and production rate. Virtual analyzers predict when online instruments need attention and allow the system to continue operating until serviced.

During challenging times, such as when there are differences in digester and brown stock washing production rates, ACE maintains a calm, forward-looking view, steadily adjusting



▲ Control schematic showing the implementation of BrainWave and ACE

production without violating any of the process limits established for the system. ACE will work tirelessly to keep the bypass lines closed and the washing efficiency as high as possible.

The new, greatly increased stability realized through ACE provides many benefits for the mill, including reduced operating costs, increased production stability, improved wash line efficiency, improved bleach plant operation, increased production rates, fewer disturbances and shutdowns, and reduced operator workload.

Our technology

BrainWave is our patented predictive multi-variable technology that controls all filtrate levels and wash flows simultaneously, while considering the effects that each actuator move will have on various process parameters. Large penalties are applied to bypass openings so that they are opened only when necessary and for a short duration. By tightly holding all the targets, BrainWave can provide dramatically improved stability to the washing process.

ACE is our virtual expert operator that manages a process area with the goal of keeping costs as low as possible while continuously delivering a product that meets all necessary specifications. ACE manages all of the operational constraints and limits, reconciles lab test data with operational goals while validating instrument accuracy, and further provides shift-to-shift stability. ACE advises the operator what is occurring and why, while sending all operational targets to BrainWave.

Success story

Customer: Metsa-Botnia Oy

Control objective:

- Optimize operation to achieve raw material and energy savings

ANDRITZ AUTOMATION implemented the ACE solution at Metsa-Botnia's mill in Joutseno, Finland, which produces 600,000 t/y of bleached softwood kraft pulp. In 2001, the mill installed a new, state-of-the-art fiberline. The mill was looking to gain further efficiencies in their operation and so turned to the capabilities of ACE. Brown Stock Washing ACE was

Benefits

- Stabilizes pulp washing, screening and thickening
- Online controls of weak black liquor solids and carryover manage important process metrics
- Unification of all shifts to “best practices,” reducing operator workload
- Integrates uniform control with pressure thickeners, washers, and wash presses
- Reduces costs of operation



installed in 2009, reducing conductivity variability by 79.5%, carryover by 20% and water consumption by 450,000 m³/y.

The mill is now achieving significant reductions in energy consumption, bleach plant chemical consumption, soda loss, organic fuel usage, and urea in the waste water treatment facilities. Due to the optimizations achieved by ACE, the mill is now saving 1.3 MEUR to 1.6 MEUR per year.

Automation solutions

Release your full potential



We offer a full range of advanced control and optimization solutions for pulp operations, including:

- Bleaching ACE
- Brown Stock Washing ACE
- Digester ACE
- Evaporator ACE
- Kiln ACE
- O₂ Delignification ACE
- Pulp Dryer ACE
- Recaust ACE
- Recovery Boiler Combustion ACE
- Screening ACE
- Washing ACE

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