RUNNING WITHOUT BREAKS

HOW PULP AND PAPER MILLS STABILIZE PAPER MACHINES AND REDUCE BREAKS

Braincube for Pulp and Paper

Breaks rarely happen without warning. They occur when sheet stability deteriorates as operating conditions shift beyond the machine's optimal range.

On a paper machine, conditions are constantly evolving. Fiber characteristics change, moisture responds to production speed, furnish composition varies, and equipment behavior drifts over time.

What keeps the sheet stable at one moment may **increase break risk in the next.**

Most mills manage this variability using fixed setpoints, control systems, performance monitoring tools, and operator experience. These tools provide visibility and control, but they rely on operating targets that do not adjust continuously as production conditions evolve.

As a result, adjustments often happen **after instability begins to develop.**

By the time drift becomes visible, the machine has already moved away from its optimal operating range.

Real-Time Process Optimization addresses this challenge by continuously recalculating the operating targets required to maintain sheet stability as conditions change. Instead of relying on static setpoints, the system adjusts speed, tension, moisture, and other controllable variables in real time so the machine remains aligned with its optimal operating window.

By keeping operating conditions aligned with the machine's current state, break risk declines and production runs become more stable.

WHY BREAK RISK PERSISTS DESPITE DATA AND EXPERIENCE

Mills already have tons of data. Historians, dashboards, alarms, and experienced teams. The issue is not visibility. It is the speed at which optimal conditions change.

On a paper machine, the best operating settings do not remain fixed for long. Fiber behavior shifts. Moisture responds. Equipment conditions evolve.

But setpoints are not recalculated continuously.

Adjustments are made after drift becomes visible. By then, the machine has already moved away from its optimal range.

Operators rely on what worked earlier in the shift or during a similar grade.

That experience is critical.

But no team can manually evaluate every combination of speed, tension, moisture, and furnish as conditions change minute by minute.

The constraint persists because recalculation does not happen at the same pace as production.

UNTIL OPERATING TARGETS ARE UPDATED CONTINUOUSLY, BREAK RISK NEVER FULLY DISAPPEARS.

HOW REAL-TIME PROCESS OPTIMIZATION PREVENTS BREAK CONDITIONS

Real-Time Process Optimization removes the delay between changing operating conditions and setpoint adjustment.

Instead of relying on static operating targets, the system continuously recalculates the setpoints required to maintain sheet stability as production conditions evolve.

As fiber behavior shifts, moisture responds, or machine dynamics change, controllable variables such as speed, tension, and moisture targets adjust to match the machine's current operating state.

This keeps the paper machine aligned with its stability range rather than allowing conditions to drift between manual adjustments.

OPERATIONAL IMPACT ON THE PAPER MACHINE

01

Break frequency declines because operating targets remain aligned with the machine's real-time behavior.

02

Grade changesstabilize faster because speed, tension, and moisture remain coordinated as operating conditions shift.

03

Throughput improves because the machine spends less time recovering from instability and more time running continuously.

The result is fewer interruptions, longer production runs, and more stable operation **without increasing risk.**

ENABLING CONSISTENT EXECUTION ACROSS PULP AND PAPER OPERATIONS

Braincube embeds optimization directly into live production, working alongside existing control and APC systems.

Control systems execute the process, while Braincube continuously recalculates the operating setpoints those systems should run toward as conditions change.

As fiber characteristics shift, moisture behavior evolves, and machine dynamics respond during production, operating targets adjust in step with the machine.

Because the system operates on real production behavior rather than static models, there is no need to rebuild optimization logic for each grade or condition change.

The same recalculation capability extends across shifts, grades, and similar machines.

This allows mills to operate more effectively while ensuring production continuously stays aligned with optimal performance.

As the capability expands across lines and sites, performance improvements hold.

EXPECTED OUTCOMES FOR PULP AND PAPER OPERATIONS

When real-time recalculation becomes part of daily production, the first impact appears where the constraint lives: break frequency.

Resulting impact: Higher throughput

On a typical paper machine, mills have leveraged Real-Time Process Optimization to achieve:

68%	1,850
Reduction in paper breaks	Breaks avoided per year

Breaks decline because instability is corrected before it escalates.

Fewer breaks mean fewer unplanned stops, fewer restarts, and fewer lost hours during transitions and grade changes.

Resulting impact: Higher throughput

As break frequency drops, machines stay up longer.

Using this approach, mills have achieved 5% higher throughput, driven by longer uninterrupted production runs and fewer recovery cycles.

5%

How this translates to business impact

- More reliable asset utilization
- Fewer downstream disruptions
- Faster recovery of lost production time
- Sustainable productivity gains

The improvement becomes a repeatable operating capability that keeps machines running closer to peak performance every day.

**Results vary by site; impacts shown are based on observed deployments and depend on machine configuration, grade mix, and operating variability.*

FROM BREAK REDUCTION TO SCALED PERFORMANCE ACROSS THE MILL

Sustained results begin by reducing paper breaks.

For most mills, the starting point is the paper machine. When break frequency declines and continuous run time increases, the impact is immediate and visible. From there, the same real-time recalculation capability extends beyond runnability.

Drying performance improves because moisture and speed remain aligned. Chemical usage stabilizes because the machine operates closer to its optimal condition.

The underlying system does not change. It simply extends across additional areas of the process. As the capability expands across lines and sites, improvements scale with it. Mills move from isolated gains to standardized execution.

Continuous setpoint recalculation becomes part of daily production rather than a one-time initiative.

Braincube for Pulp and Paper delivers Real-Time Process Optimization designed for this reality, enabling teams to achieve results quickly and scale performance across sites.

THE BREAK INSTABILITY CURVE

NORMAL PROCESS

STABLE SHEET
▼
PROCESS DRIFT
▼
INSTABILITY
▼
BREAK

RTPO INTERVENTION

STABLE SHEET
▼
PROCESS DRIFT
▼
RTPO CORRECTION
▼
STABLE SHEET

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