



## SOLVING ONE OF THE BIGGEST ISSUES IN PULP MILLS



2016  
Best Energy  
Startup



2017  
Slush100  
winner

# THE ISSUE = FOULING IN EVAPORATORS

## REQUIRES

Production stoppages  
for cleaning

## DECREASES

Evaporators energy  
efficiency

## SHORTENS

Evaporators lifetime

## AFFECTS

End product quality

## IMPACTS

Our environment negatively

**COMPANIES LOSE MORE THAN 202 BILLION DOLLARS ANNUALLY  
BECAUSE THEIR PRODUCTION EQUIPMENT GETS DIRTY**

# ALTUM SOLUTION

*USING SOFTWARE-GUIDED  
POWER ULTRASOUND TO  
REMOVE AND PREVENT  
FOULING FROM INDUSTRIAL  
EQUIPMENT WITHOUT  
STOPPING THE PRODUCTION  
PROCESS*



5. Modular

6. Easy to install

# ALTUM SOLUTION IN PRACTICE

## REFERENCE CASE No.1: FINNISH FLUTING MILL, FOULING PREVENTION IN BLACK LIQUOR EVAPORATORS

### SUMMARY OF THE CUSTOMER'S ISSUE

The customer has seven tubular evaporators in series, that use steam to evaporate water from process liquid, to increase dry material content in liquid. As the temperature gets higher, the dry material content and the viscosity of the black liquor increases. The first two evaporators in series gets fouled by calcium-based material. Fouling decreases the efficiency of the evaporation process, which causes problems in other parts of the production process.

### ALTUM SOLUTION IMPLEMENTATION

Ultrasonic transducers were attached externally to the inlet pipe of evaporators 1A and 1B with Altum's clamp-on device (COD). The goal was to sonicate and treat the process liquid flowing from the pipeline to the evaporators and prevent fouling to happen in the tubes of evaporators.

### PREVENTION EFFECT

Fouling prevention mechanism mainly relies on affecting the calcium-based fouling crystal structure to avoid fouling attaching into the tubular structure of evaporators.

### RESULTS

During sonication period of one-year, the customer has reported that their need to clean evaporators has decreased from 24 to once per year. During the whole year no mechanical cleaning has been needed as Altum Solution alone has kept the evaporators clean.



# ALTUM SOLUTION IN PRACTICE

## REFERENCE CASE No.2: SOUTH AFRICAN PULP MILL, INCREASING EVAPORATORS ENERGY EFFICIENCY

### SUMMARY OF THE CUSTOMER'S ISSUE

The customer has three effect evaporators in series. The evaporators use steam to evaporate water from the process liquid to increase dry solid content over 50%. The steam circulates from the first effect to second and fourth, and finally in the condenser. The evaporators get fouled by the red liquor, and the issues occur mainly in the evaporator's tubes.

### ALTUM SOLUTION IMPLEMENTATION

Similar to the previous case, the ultrasonic transducers were attached externally to the inlet pipe of the first effect to prevent the fouling from accumulating to the evaporator's tubes. The goal was to sonicate and treat the process liquid flowing from the pipeline to the evaporators and prevent fouling to happen in the evaporators.

### PREVENTION EFFECT

Fouling prevention mechanism mainly relies on affecting the calcium-based fouling crystal structure to avoid fouling attaching into the tubular structure of evaporators.

### RESULTS

During a month and a half, the ultrasound has increased the operational time of the evaporators by 18 days, and the evaporation rate was increased by 3 T/h. Besides, the energy efficiency of the first effect increased by 57%, and the second by 39%.



## BENEFITS OF USING ALTUM'S SYSTEM IN EVAPORATORS\*

- Energy efficiency improvement in evaporators by more than 50%
- Evaporators lifetime and capacity improvement
  - Fouling prevention solution prevents corrosion and erosion inside the evaporator when the fouling does not accumulate inside the tubes
- Evaporation Ton per hour rate increase by more than 6%
- Operational time of the evaporators increase 25%
- Mechanical and chemical cleaning reduction and savings
  - Number of mechanical cleanings was reduced more than 70%
- Pumping efficiency increase by more than 10%, ultimately proving that the evaporators are kept clean from fouling
- Improvement in controlling evaporators process
  - Less fouling issues decreases need for mechanical washes improving entire evaporation process control

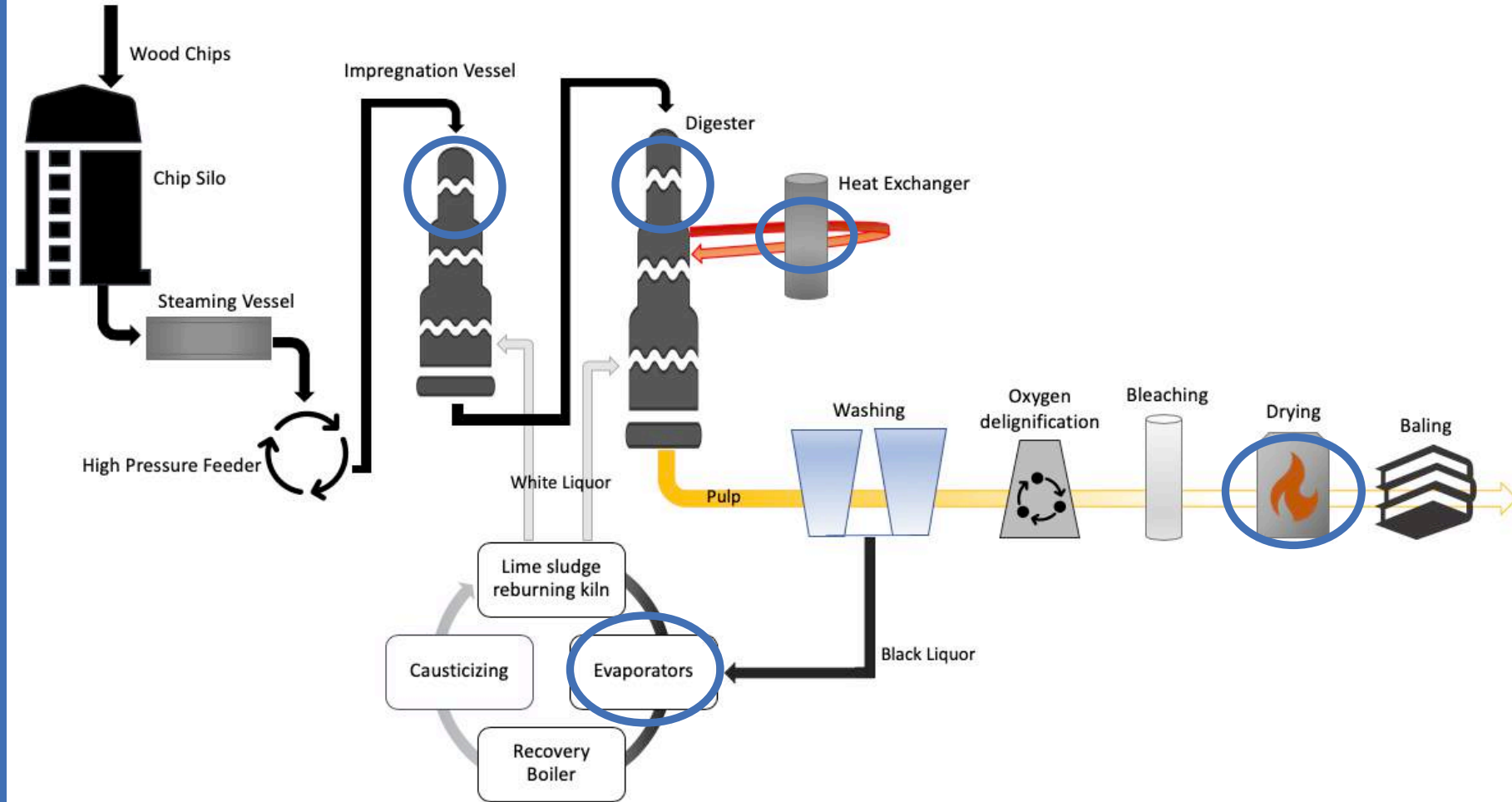
*\*Results from actual cases, benefits may vary depending on evaporator type and product*

○ = potential locations where Altum's system can be installed to get rid of fouling

## OTHER POTENTIAL APPLICATIONS

for using Altum solution to increase process flow and efficiency in pulp mills

- Prevent fouling in heat exchangers
- Prevent fouling in top screens at impregnation vessel and digester
- Enhance water removal in pulp drying





**Altum**  
TECHNOLOGIES

Sound into Performance

**LET'S FIND THE SOLUTION FOR YOUR NEEDS TOGETHER!**

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