

EFFICIENT RESOURCES MANAGEMENT FOR REDUCED PRODUCTION COST IN PULP MILLS (PART 1)

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Vital Resources in a Paper Industry



Pulp Mills in India

Challenges and Opportunities

Raw Material Availability and Quality – A Challenging Task

Chip Quality Management – Improved Runnability, Output and Quality

Digester operations
Operational issues

Process Improvement Strategy – Enhanced Output and Quality

Comprehensive Process Audit
Process Optimization
Benchmark against Best Practices

Resources Management – Reduce Carbon Footprint and Production Cost

Raw material (Wood/Chips)
Water
Energy

Chip Quality Management

Improved Process at Lower Cost

Improve Pulping Operations

- **Measure the quality of chips** (as per SCAN and/or TAPPI Test methods) at least once per shift
- **Optimize chipping operations** for an optimum chip quality
 - Bark content (<0.5%),
 - Pins (chips <2 mm thick) <2%
 - Over thick chips (>8 mm thick) <10%
 - Overall Accept Chips (between 2-8 mm thickness band) >80%

Increase Pulp Yield

- **Accept chips quality >90%**
 - Pulp yield = +0.7%
 - **Increase in EBITDA = \$1.3 million per year**
 - (Pulp capacity = 1,000 TPD, Pulp price = \$550/ADT, Operations = 330 days/Y)

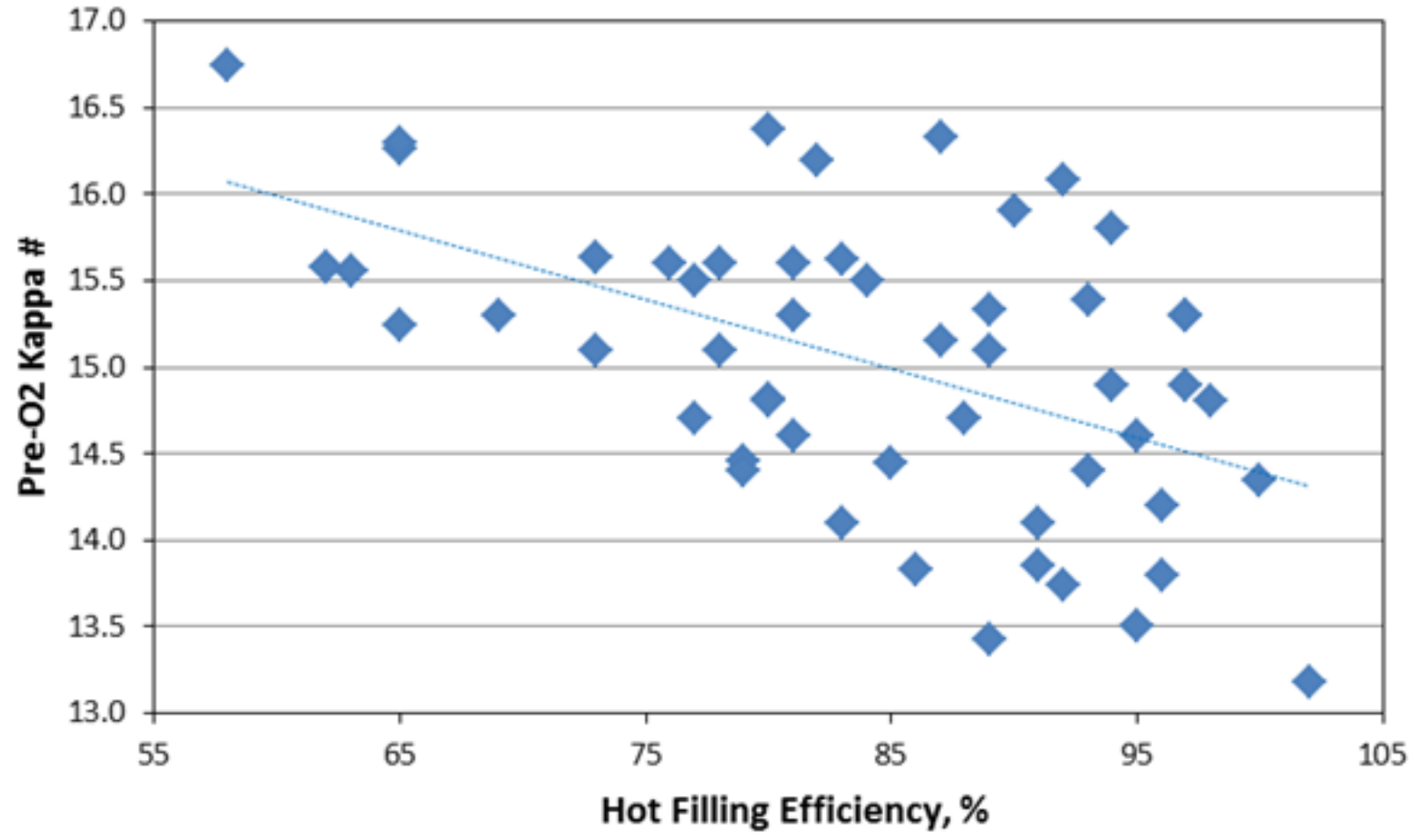
Chip Quality in Various Mills

An Example to Benchmark



Process Improvement

Effect of Hot Fill Efficiency on Kappa#



Improved Performance

Digester Additive Application

| Parameter | Units | Pre-trial | DA Results | Benefits |
|--------------------------------------|--------|-----------|------------|-----------------------------|
| Blown Kappa | # | 17.3 | 17.5 | |
| O ₂ Delignification Kappa | # | 9.2 | 9.3 | |
| White Liquor | Kg/ADT | 510.0 | 448.9 | Significantly Lower |
| Final Pulp Viscosity | CPS | 8.9 | 9.3 | Higher |
| ClO ₂ | kg/ADT | 16.3 | 16.1 | |
| Caustic usage (ODL + EOP) | kg/ADT | 23.0 | 20.7 | Significantly Lower! |
| Sulfuric Acid | kg/ADT | 24.3 | 23.3 | Lower |
| Oxygen in EOP | kg/ADT | 3.6 | 2.8 | Significantly Lower |
| H ₂ O ₂ | kg/ADT | 10.5 | 11.1 | Higher |
| Final Pulp Brightness | % | 87.2 | 87.2 | |

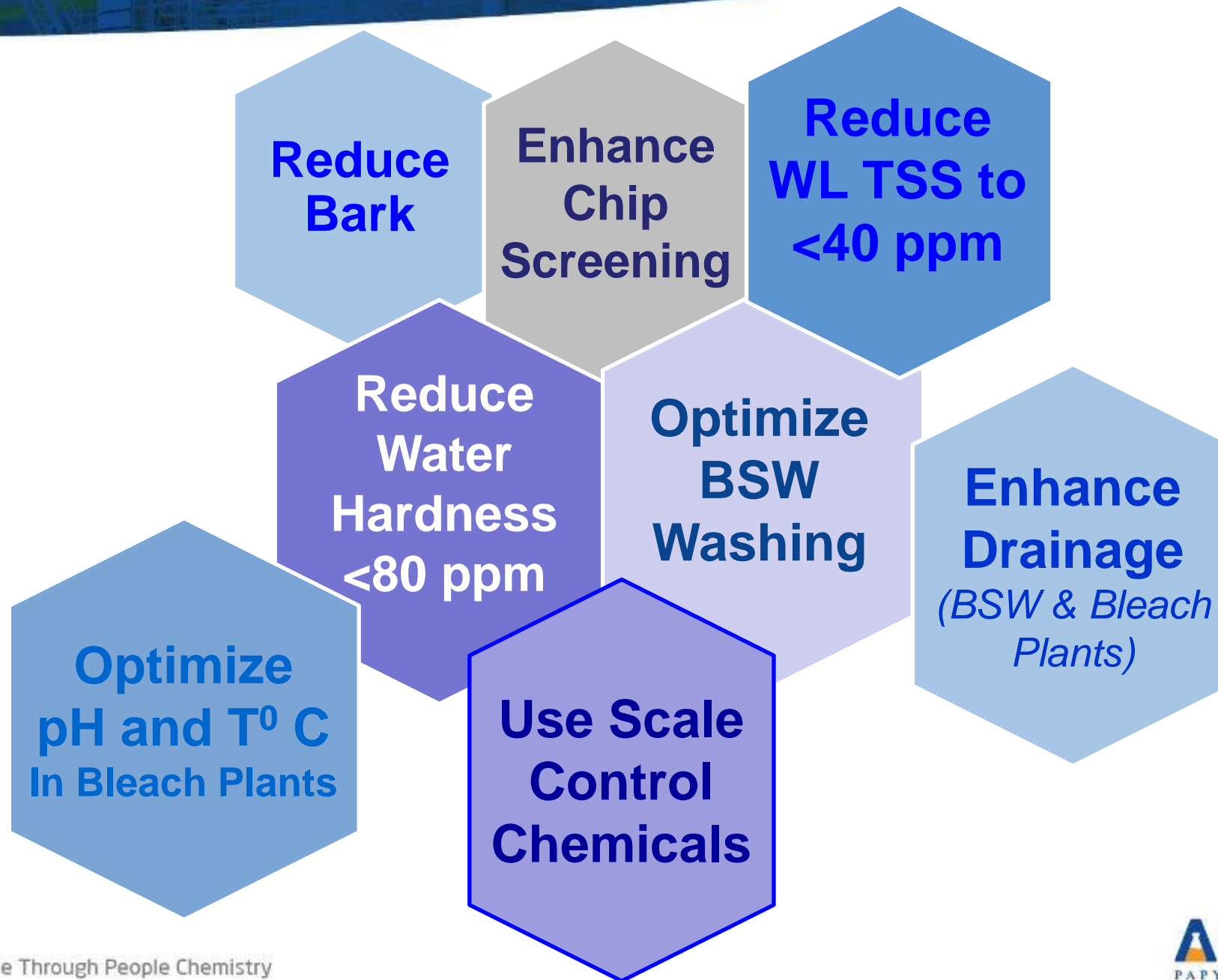
Ca⁺⁺ Input in the System

Impact on Scale

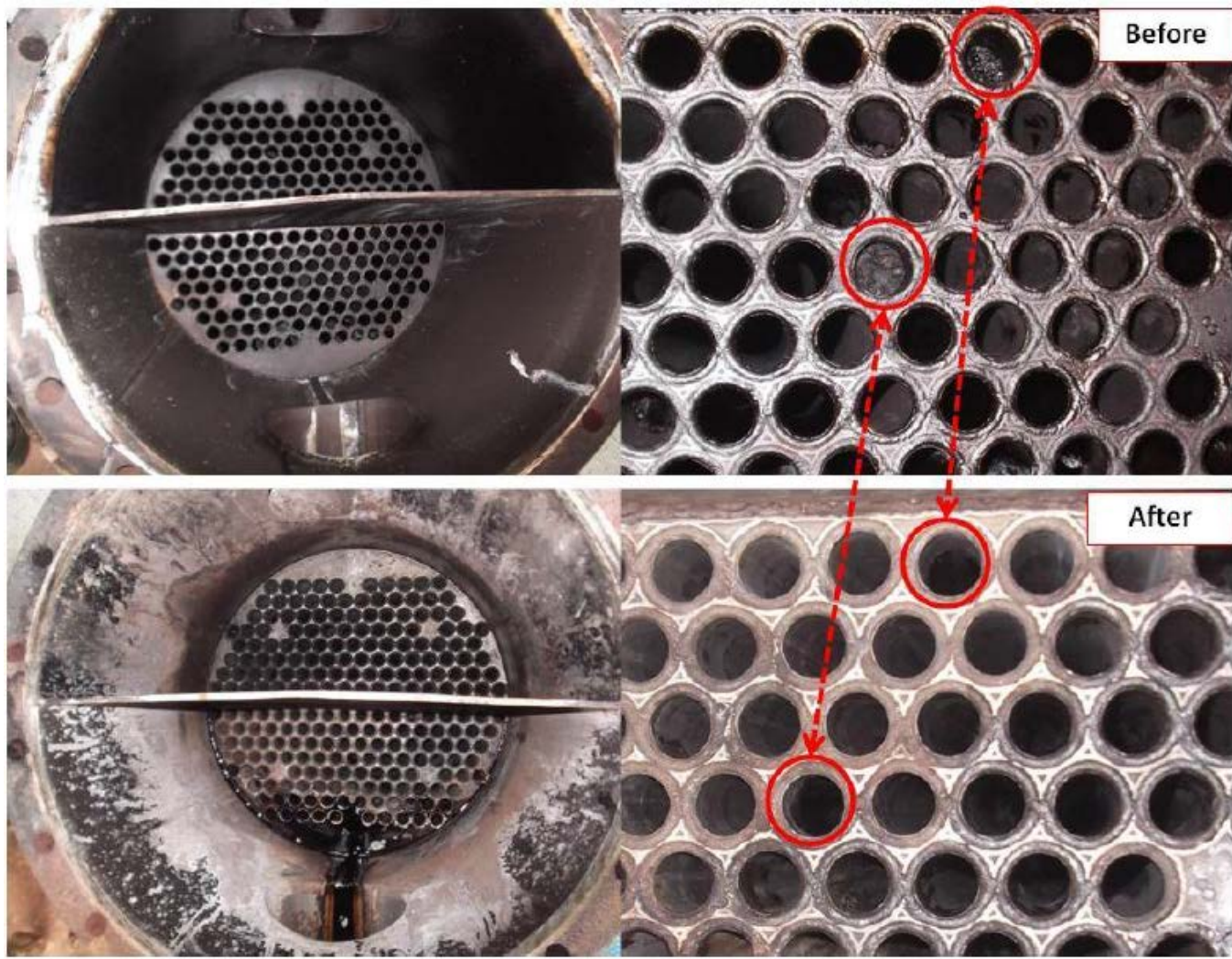
- Major source of Ca-Carbonate/Oxalate in Digester/Bleach Plant
 - *Chips*
 - *White liquor (WL)*
 - *Hot water*
- Oxalic Acid : *400 – 1,000 kg/day*
(1% bark content, 1,000 TPD mill)
- Ca-oxalate
 - *pH range of 2-9*
 - *D0/D1/D2 bleaching stages*
 - *Ozone bleaching*
 - *1/3rd Oxalic Acid generated*
 - *Absorbed on to the fibers*
 - *Possibility of severe Ca-Oxalate deposits in following bleaching stages*

Mitigate Calcium Related Scale Issues

Improve Plant Runnability and Output



Example of Scale Removal



Example of Scale Removal...#2



Left Window

Middle Window

Right Window

Conclusion

- **Improve Chip Quality = *Higher Output and Better Pulp Quality***
 - *Reduce bark (<0.5%)*
 - *Over-thick chips (<8%)*
 - *Fines (<2%)*
 - *Accept >80%*
- **Digester Additive = *Improve Resources Management***
 - *Maximize pulp yield*
 - *Reduce white liquor usage*
 - *Better pulp bleachability and viscosity*
- **Scale Related Issues = *Better Plant Runnability***
 - *Improved drainage on washers*
 - *Run scale control programs*
- **Reduced Production Cost = *Higher EBITDA***
 - ***\$1.5 to 2.0 million per year (Basis: 1,000 TPD)***

Acknowledgement

- Amazon Papyrus Chemicals Ltd
- IPPTA



THANKS

