NEW HORIZONS
FOR
SUGAR INDUSTRY OPTIMIZATION

SEQUENCE OF PRESENTATION

- Cane management
- Opportunities in maintenance cost reduction
- Soft starting for the machine’s safety
- Material protection against cavitation and wear
- Remarkable potential in boiler flue gases.

CANE MANAGEMENT BASED ON

- Minimum extraneous matters and binding materials
- Clean and fresh cane
- Uniform supply of cane to avoid reduced crushing situation.

EXTRANEOUS MATTERS, LOSSES AND THREATS

- Wear & tear of preparatory devices
- Increase of power consumption
- Extra milling load, milling losses & arcing cost.
- Increased mud volume and press cake losses.
- Increased molasses% cane and molasses losses.
- Increased chemical cost in processing.
- Fear of damage of pressure part of boiler due to sand and soil in bagasse.

QUANTIFIED EFFECT OF E.M

Average vehicle load in tons	= 18	
Extraneous matters %	= 0.03	
TPT/ton cane	= 300	(@ 12PKR/mund:)
Vehicle cost in PKR	= 5400	
Extraneous cost/vehicle in PKR	= 162	
Transportation weight loss in ton	= 0.54	
Process able cane delivered in tons	= 17.46	

QUANTIFIED EFFECT OF E.M

Mill capacity in TCD	= 10000
Loss in TCD	= 12.5
Milling time loss in minutes	= 1.8
Each vehicle contains E.M	= 0.54 Ton
Additional bagasse produced	= 1.08 ton
Assuming bagasse pol%	= 0.02
Sugar loss in tons/ vehicle	= 0.0216

PER UNIT TRASH IMPACT

(Triveni Engineering & Industries Ltd.)

Fiber % cane	0.57 % ↑
Bagasse % cane	1.17 % ↑
Sucrose loss in bagasse	0.03 % ↑
Molasses % cane	0.011 % ↑
Power at shredder	12 kwh/t ↑
Decrease recovery	0.23 % ↓

OPPORTUNITIES IN MAINTENANCE COST REDUCTION

- For maintenance cost optimizations, it is vital to think ‘‘out of-the-box,’’ and to use modern techniques.
- One approach to cost reduction is to re-design, to use less expensive materials or reduced quantities of higher priced materials.
- In some designs, the material used, is the correct choice but the physical dimensions of the component are overkill, resulting in the use of more material.
- Revise metallurgy, instead of over weighting the parts, resulting in high cost, break down hazard and additional power consumption.

OPPORTUNITIES IN MAINTENANCE COST REDUCTION

- Consolidation of Materials may offer an opportunity to use the same materials in the different components. This enables cost-reduction to carry less inventory of a particular material.
- It is beneficial to hold periodic design reviews to determine if there are opportunities to revisit materials selection decisions.

FACTORS OF IGNORANCE

Why companies do not look to re-designing of materials for cost reduction?

- Firstly, engineers often do not see materials as an aspect of the design for optimization. Typically, they look to modify the mechanical or electrical aspects of a machines.
- Secondly, engineers often believe that changing materials will turn into a big research project and could be risky.
- The final reason is that engineers may not know all of the options of materials to be considered, especially the performance, reliability, cost, and manufacturing requirements

SOFT STARTING- MACHINE'S SAFETY

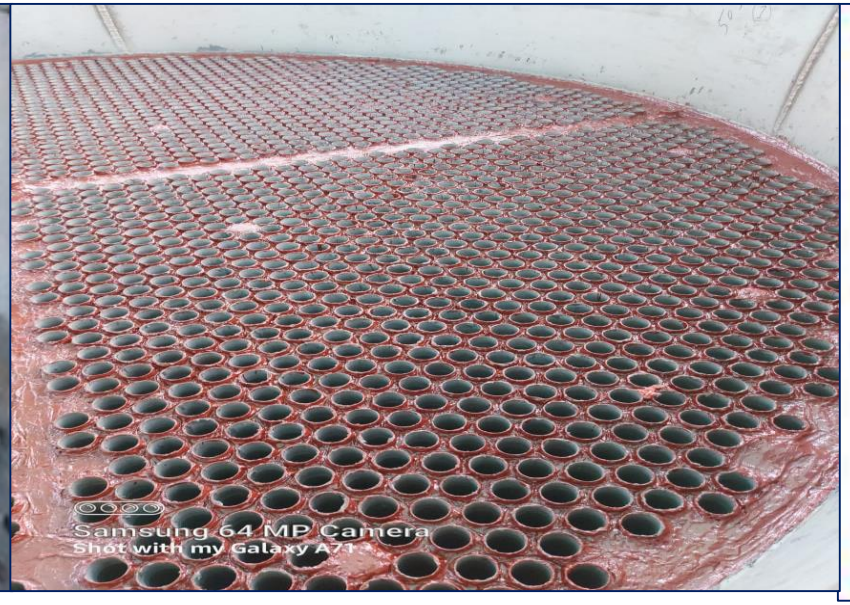
- A soft starter helps to limit transient voltages, while also protecting against sudden surges of power ensuring normal operation and power outages
- Their main applications include – pumps, compressors, fans and conveyors
- This extends the life of mechanical components and reduces their maintenance requirement by smooth and uniform starting through torque control for gradual acceleration.
- Soft starters also play significant roles in preventing mechanical, electrical, thermal weakening of the electrical equipment.

CAVITATION AND EROSION

The unprotected metal surface undergoes corrosion and the protective layer is reformed. Further, flow impacts more particles onto the same spot and destroys the newly formed surface layer. These processes repeat to remove more metal particles until failure occurs.

In the absence of protective surface layers, erosive forces can physically remove metallic particles at higher flow rates.

CAVITATION AND EROSION RESISTANCE COATING



NOTICEABLE AREAS

- Communication audit
- Consumables issuance on Quota basis
- Fix time and agenda in meetings

CHEMICAL COMPOSITION OF BAGASSE

C = 47 %

H = 6.5 %

O = 44 %

Є = 2.5 %

Moisture in the boiler flue gases

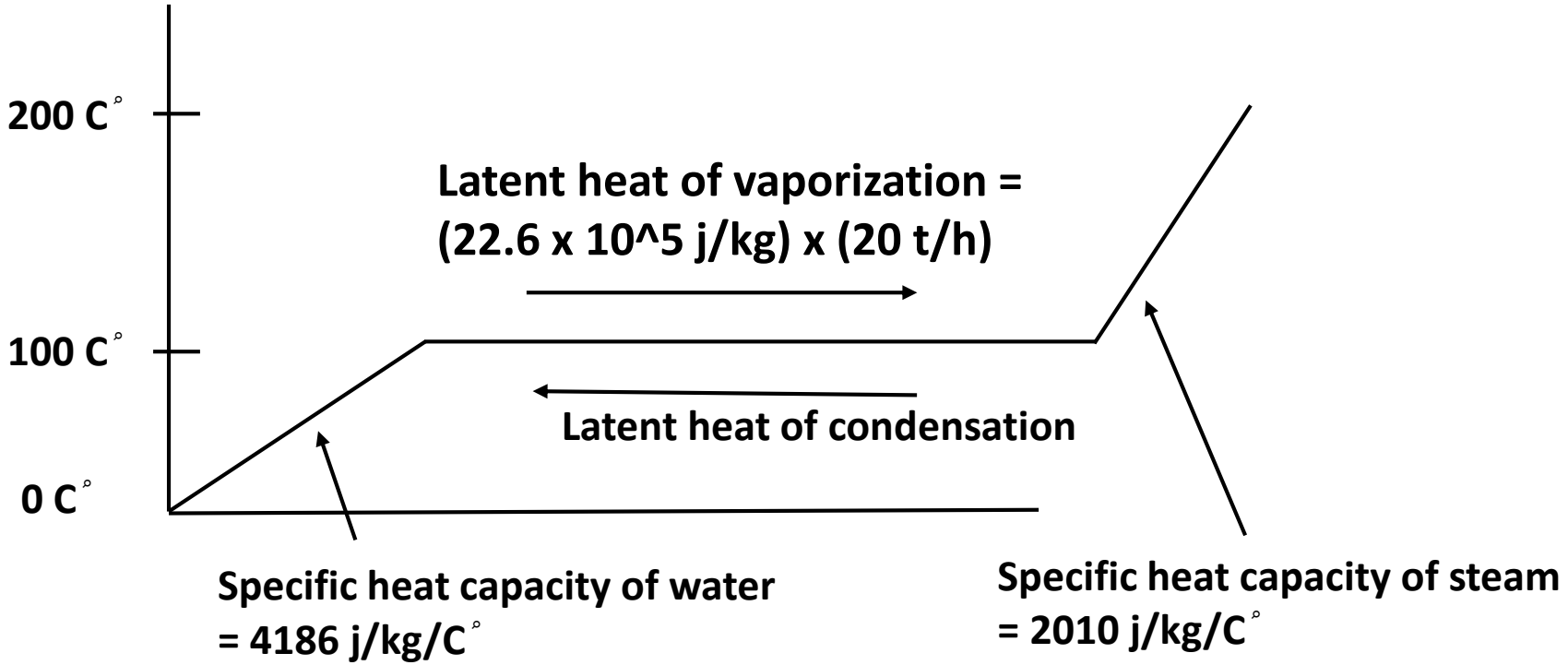
Two main sources of moisture entry in boiler furnace

1. Moisture of bagasse i-e 51 % app:
2. Water vapor formed in result of bagasse combustion i-e 0.796 kg/kg bagasse or 14.5 % of the flue gases.

REMEMBER THAT:

Specific heat capacity of steam	= 2010 j/kg/C°
Specific heat capacity of water	= 4186 j/kg/C°
Latent heat of vaporization/condensation of water	= 22.2 x 10^5 j/kg =(2220000 j/kg)

ENERGY CONSUMED BY 50 T/H BOILER



ENERGY CONSUMED BY 50 T/H BOILER

- Bagasse consumed by 50 t/h Boiler = 25 t/h (@ 1:2)
- water vapor generated in combustion = 20 t/h (@ 0.796)
- Latent heat of vaporization/condensation = 15,98,400 kcal
- Heat consumed by steam up to 200 C° = 1608 kcal
- Total energy released in condensation = 1600008
- Equivalent to Bagasse = 1.333 T/h

QUESTIONS?