Trouble shooting, In Paper mill

Trouble shooting

- **Dale Carnegie, the famous author of 'how to stop worrying and start living', said that if the problem is known, it is half solved.**

- **At this juncture, we have to recall with pleasure, contribution of 'Fiction' literature. We are indebted to the likes of Sir Arthur Conan Doyle and Earl Stanley Gardiner, with such characters as Sherlock Holmes, and Perry Mason.**

Trouble shooting, A step forward

- Some simple ideas are presented. Nothing big. May have relevance to mid-scale and small mills.
- Again , idea is not to teach, but to share experiences.
- Experts know all this, so , requested to be kind and participate later in discussions, throwing more light on issues.

Trouble shooting:De-inking

- Deinked pulp is source of most medium scale mills,
- So a few observations connected with the operation of conventional deinking cells.(Cells in 1+5+2 formation).
- Problem plaguing mills is control of foam. Nowhere foam is fully killed by foam-killing nozzles. Since foam is not arrested, head acting on foam tank pump to secondary cells is negligible.
- Pump fails to lift; foam overflows and pulp is lost.
- To my knowledge, simple, cheap and effective foam breakers are not available.
- Importance of having as high foam level and foam tank as possible are highlighted .

Trouble shooting: Deinking

- **In some mills, overflow weirs of primary cells are found at staggered & zig zag levels—foam overflows more where it is not required; and less, where required. From each cell, foam and liquid overflow; but pumps have same capacity. How is this capacity met?**
- **By keeping overflow levels in reverse order, so that accepts back-flow is smooth from bottom ports (To be discussed by experts).**
- **It is necessary to catch the ink sludge separately; dry it and burn. Let this not be mixed with other effluent, since several mills are recycling effluent..**
- **Centrifuges are available, but are power oriented.**
- **Not practised by small mills.**

Trouble shooting: centricleaners

- **Operators Throttle the accepts, increase rejects, cleaning improves. That is the concept handed down by generations.**
- **The valves provided are for isolation, not control. As accepts throttled, accept flow is disturbed; central column rising is disturbed; and so the cleaning efficiency.**
- **It is physically difficult to maintain all accept-valves at the same opening level. With the result, pressure drops in cones vary; and flow happens into cone with the highest pressure drop; and direct discharge occurs.**

Trouble shooting: centricleaners

- Direct discharge is treated as a problem of the nozzle and nozzle is replaced. Now all nozzles do not have same diameter; problems get compounded.
- Operators have to appreciate that minor wear of nozzle is not a problem-if all nozzles are maintained same diameter.

Trouble shooting, Centri cleaners

- Older high cap coarse ss cones were made in several sections, with ceramic nozzles in the bottom.
- Pieces immediately preceding nozzles are made of cast steel of higher thickness.
- Once it happened that after commissioning of a new system, the intermediate section above the cast piece got cut; and total piece with nozzle fell out.
- This happened in a month. After another few days, more cone. There was panic all round!

Trouble shooting Centricleaners

- This happens when bottom most nozzle diameter is low.
- As per capacity of cone and pressure drop allowed, nozzle size has to be chosen. This was(there in the manual, given indirectly, as a range) not specifically suggested by manufacturer; but standard low opening nozzles were dispatched.
- This is similar to maximum diameter pump impeller despatch by manufacturer(sometimes) as standard-without trimming to the required diameter of duty point and range.
- After cutting nozzles to correct size, the disc like wearing portion of liquid having all contaminants descended into the cast piece; and problem has disappeared..
- Thankfully, with modern fine centri-cleaners in banks, these problems do not arise.

Trouble shooting:inlet valve throttling

- **Throttling of inlet valves of equipment-- to pumps; screens; cyclones...**
- **Example of a line feeding to a street of refiners: At pump, delivery valve is 75% open; at inlet to the first refiner, 75% open; at inlet to second refiner, 80% open...capacity falls to less than 50%.**
- **All valves must be open fully---- except final accepts valve, to get desired output level.**
- **Correct pump, ACVFD ., are other solutions.**

Trouble shooting

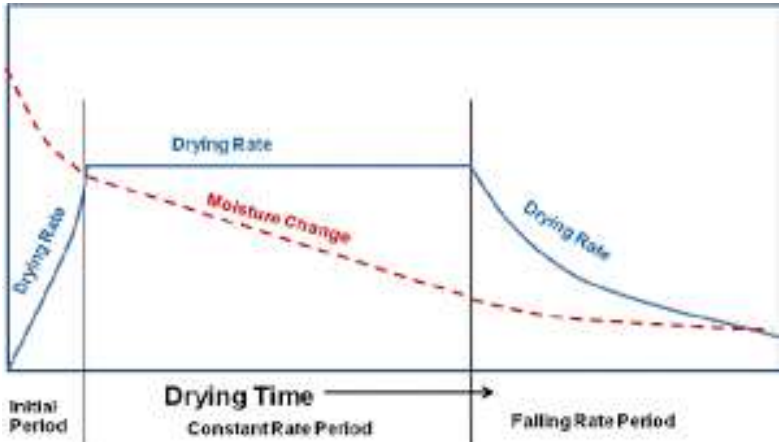
- Another so called valuable(!) advice passed on centri-cleaner launders.

- It is easy to overflow from primary reject launder to secondary launder; and from secondary, to tertiary by operators is level control in

- This passes on cleaning load from secondary cetri-cleaners down the line. In some cases, these rejects are directed into couch pit. These are practices to be avoided.

Trouble shooting, Paper drying area

- **Some misconceptions : Paper Drying**
- **Lack of understanding, and training.**
- **The drying-rate curve is convex.**



Drying fundamentals

- **Drying capacity not be lost by low valve opening in the end. Further, it is better that the end dryers be at highest temperature for good free rosin setting.**
- **With the advent of cascade steam and condensate systems, isolating valves have to be fully open. To be operated only for dryer isolation, for maintenance. Not for control purpose.**
- **Discuss last dryer : Cooler, Sweating**.... concepts

Solution - Drying

- **Coming to cascade systems, they are designed in such a way that minimum venting occurs sometimes.**
- **If operators are not alert to the situation, venting leads to heavy loss. Controllable, by correct settings of main group and differential pressures.**
- **I had experience of one machine in north India, where steam draw has been reduced from 25 to 17 tph; and from 17 tph to 12 tph in a south Indian mill.**

Trouble shooting - Approach

- The first step in the endeavour to problem solving is collection of data.
- Then comes evaluation of data. The famous CIA of the USA has a director and two deputy directors. One dy . collects the data and passes it on. A highly qualified specialist team under the second dy. director disseminates this information and draws conclusions.
- Idea is to be dispassionate. Fresh mind. No hang overs

Trouble shooting - Approach

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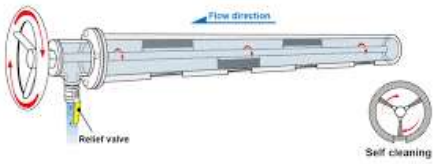
- Any information available must be duly respected and discussed. If information does not become data for analysis, precious clues may be lost.
- Observation of paper maker is that the consistency of discharge is rather high. Here, the paper maker, who has years of experience, must be respected.
- He may not have an immediate solution, but his observation is valuable!

Trouble shooting:HP showers

- **An overlook. Occasionally we find heavy flow from high pressure oscillating shower nozzles. Since shower is functioning, operators not bothered. Nozzle wear not suspected or attended to.**
- **As nozzles wear, flow increases by square of nozzle area ; pressure from pump drops. Operating point on H-Q curve shifts to right extreme-bad for cleaning and very bad for pump-since it will be operating in the low efficiency range.**
- **As water from nozzle/needle frays, water droplets are developed, detrimental to wire.**
- **Solution? Check nozzles and replace them.**



Trouble shooting

- **A mill in East India had problem with their yankee cylinder. Mill is still in operation. They reported that shell of the yankee is drawn in on tender side by 8 mm on the entire circumference; and since this is in the paper deckle, they had to give a cut of 8 mm and grind the cylinder.**
- **This happened a second time in another year's time, and I was called to study. The MS shell of 55 mm thick came down to around 40mm. The steam pressure is normal; MG press roll loading is in accepted limits. What can go wrong?**

Trouble shooting

- **This is not because of pressure.**
- **Some vacuum affair.**
- **Machine stopping procedure reviewed.. When the machine is stopped, the MG press roll is lowered; and after a few rounds, steam is closed; and machine stopped.**
- **Everything appears fine, but all is not well. When the cylinder cools, inside vapour condenses; and vacuum forms. Air could not enter cylinder.**
- **There is no provision for air entering.**
- **There is so much pressure from outside on shell, that tender side , straight opposite to condensate discharge spout is exposed; and metal caved in.**
- **After proper venting procedure,cylinder is safe , even after 10 years.**


Thank you!