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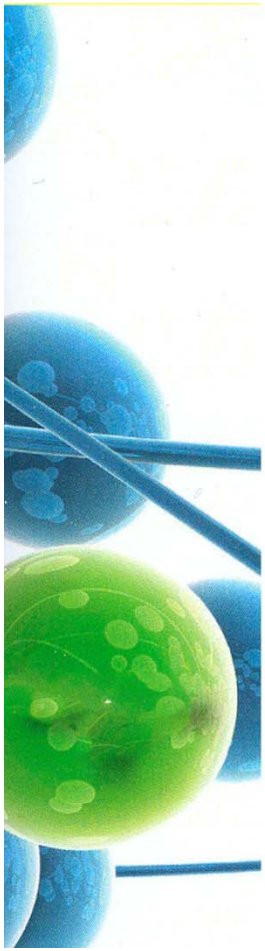
Tomorrow's Answers Today



Removing the Unknown of Lap Pulp Colloidal Stickies to Improve Paper Machine Runnability

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Introduction of Recycle Lap Pulp

- Printing and Writing grades are seeking to increase usage of recycle fiber.
- A critical barrier to the use of recycle fiber is the inclusion of stickies
- Stickies lead to deposition issues and runnability problems such as scratching at the coater
- Most recycle fiber comes in as lap pulp
- Quality Criteria can include
  - Brightness
  - Macrostickies
  - Fiber Properties
  - Ash Content

Stickies - The Unknown of Recycle Lap Pulp

- Even with a macrostickies count paper machine can have deposit/stickies issues
- Papermakers want to know if a given lot of lap pulp will run well or have issues.
- The perception is that it is by chance, a roll of the dice, that a given run of lap pulp will go well.
- This mindset limits the desire to use recycle fiber.

What is Unknown about the Stickies in Recycle Lap Pulp

Macrostickies - 150 μm
- how many/can be seen/counted

Macrostickies - 100 μm
-33% of Fine Screens in Lap Pulp Plants

Macrostickies - 75 μm
-Behavior same as larger macrostickies

Suspended stickies – 20 to 75 μm

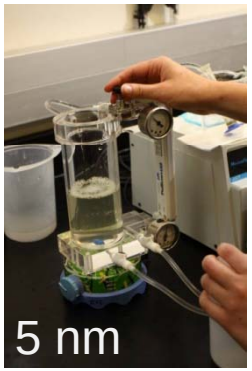
Dispersed stickies – 1 to 25 μm

Colloidal stickies – 0.5 to 5 μm

Dissolved stickies – less than 5 nm

Testing for Invisible and Visible Impact

Fractionate

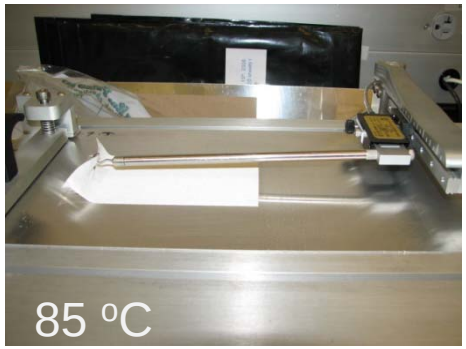


Total Organic Carbon

Invisible = Colloidal Stickies

Fractionate

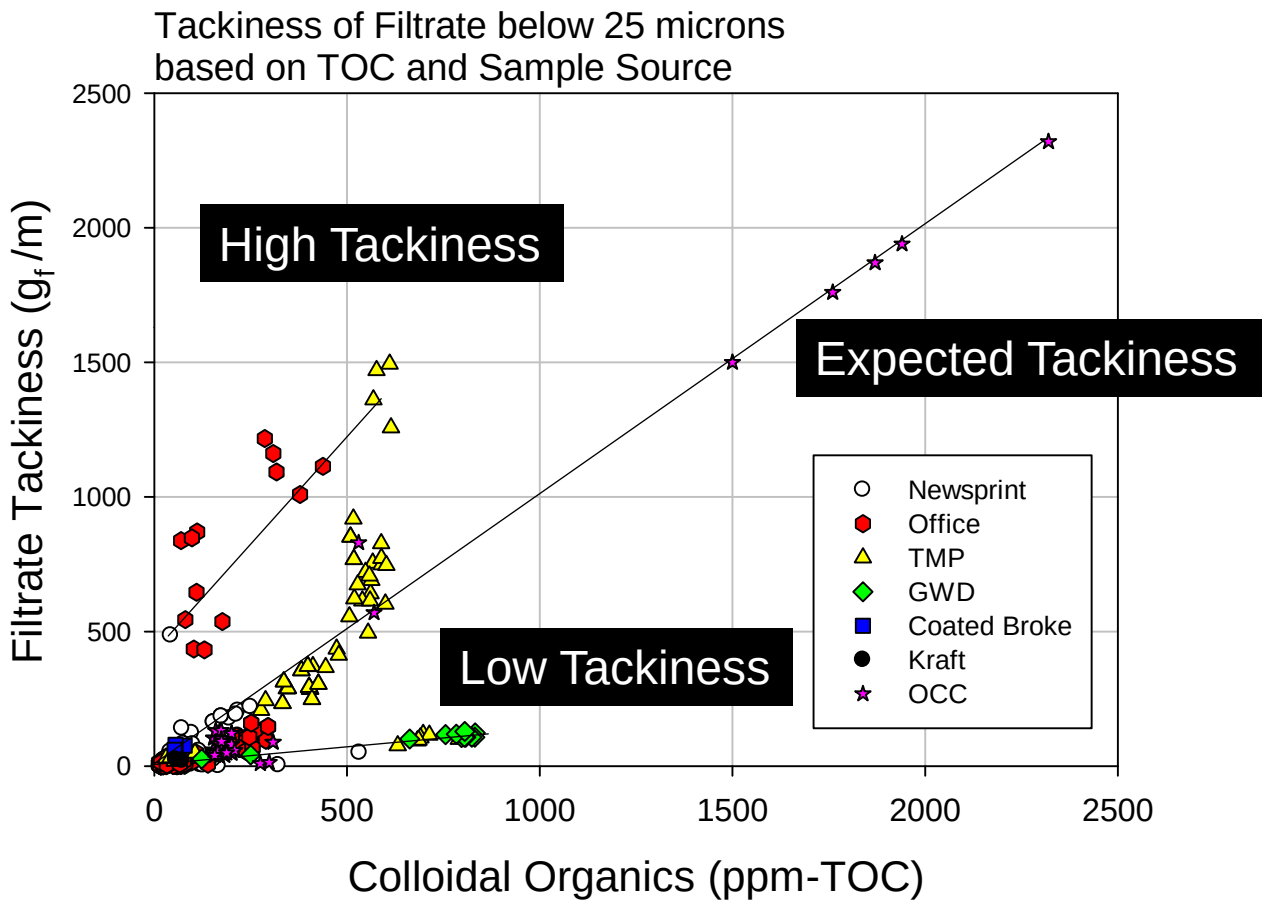
Soak and Measure Tackiness



Visible = Tackiness

Relationship Between Colloidal Organics & Tackiness

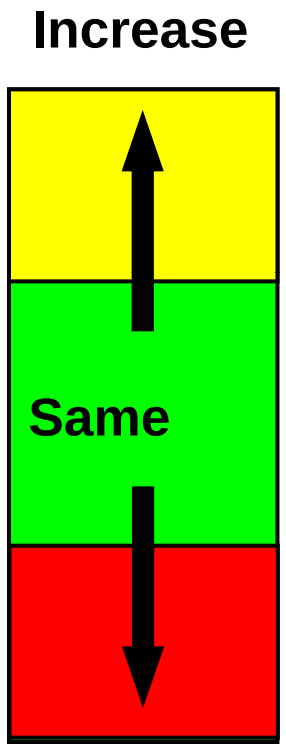
High Tackiness typically seen at operations having deposit/stickies issues



Shear Stress Test Analysis

- Does the amount of colloidal organics (the invisible stuff) change?

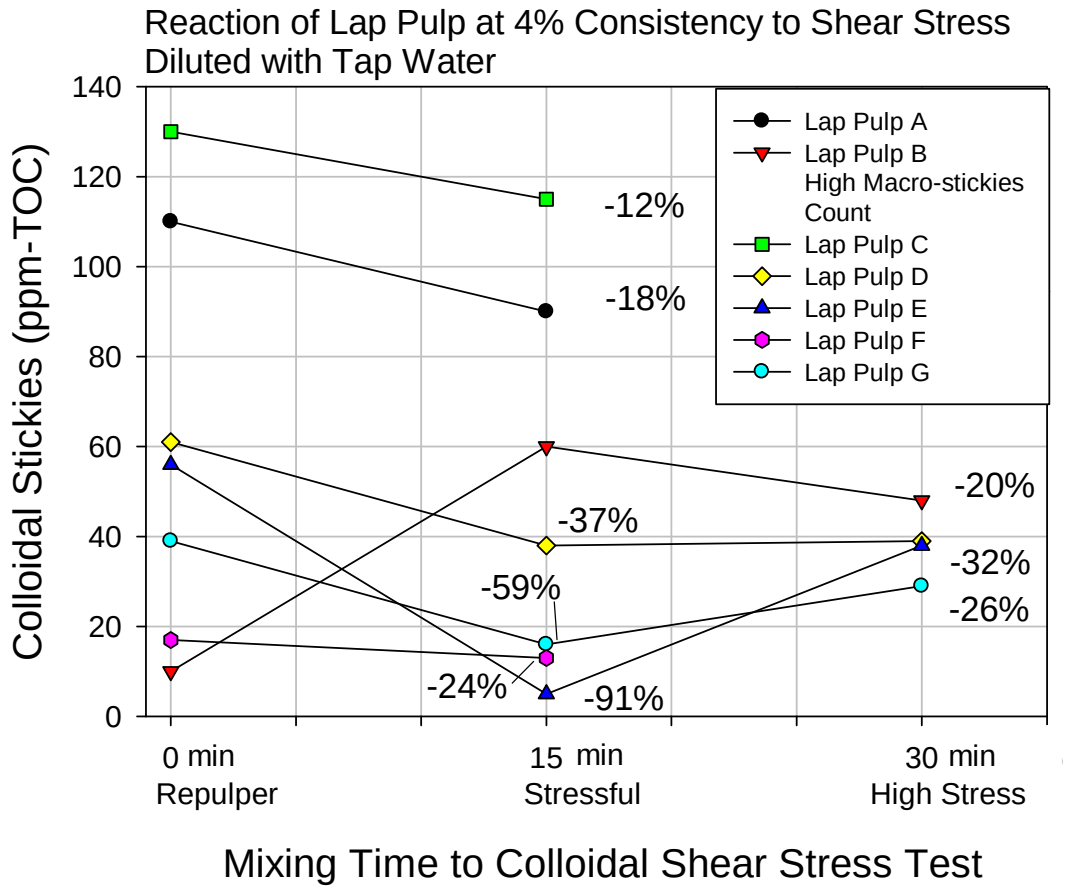
- **Increase** – shearing broke into pieces generating more
  - Caution potential to over whelm/over load the process
  - Increasing means no agglomeration
- **Same** – stable/equilibrium
- **Decrease** – where did it go? It deposited out onto fiber, fines, filler & surfaces



Shear Stress Response for Problem Lap Pulp

Lap Pulp that had been identified to cause issues saw a decrease in colloidal organics under stress

Agglomeration of colloidal seen to result in runnability issues due to recycle pulp



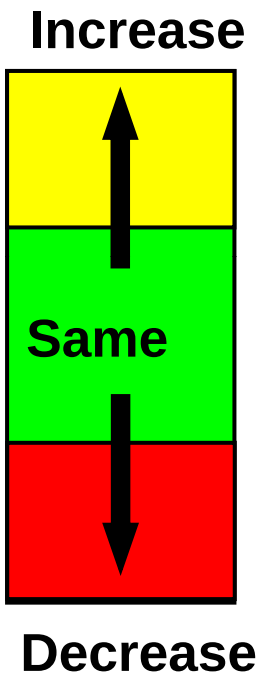
Measuring the Unknown / Unseen Stickies

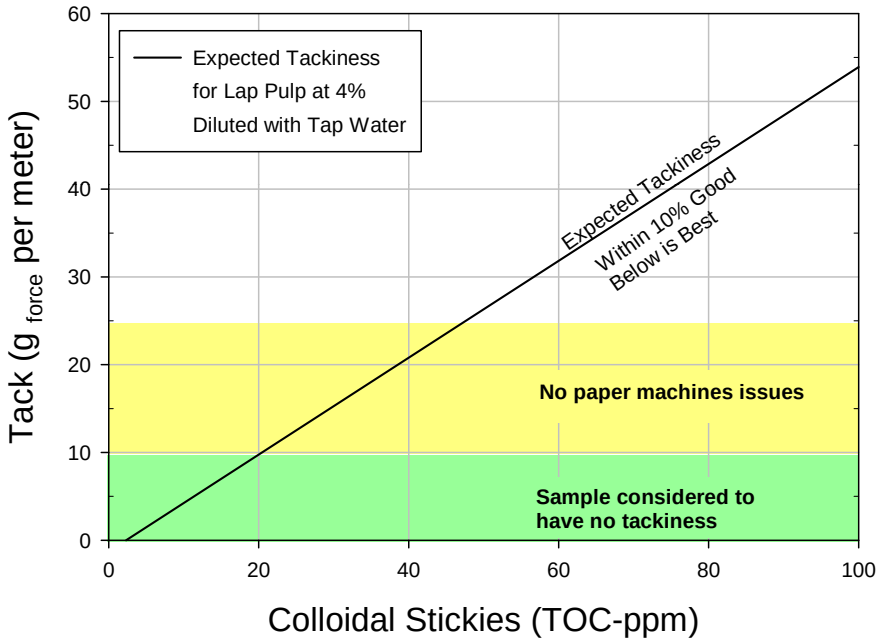
Lap Pulp that is stable

- **Seen to increase or remain the same under stress**

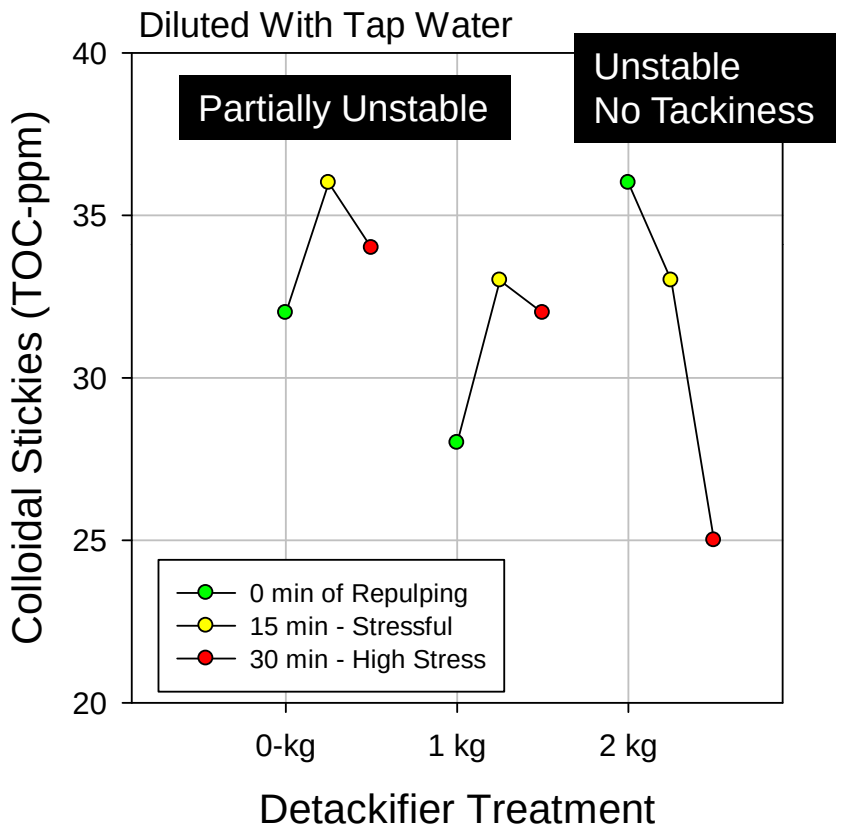
Lap Pulp that has low or expected tackiness

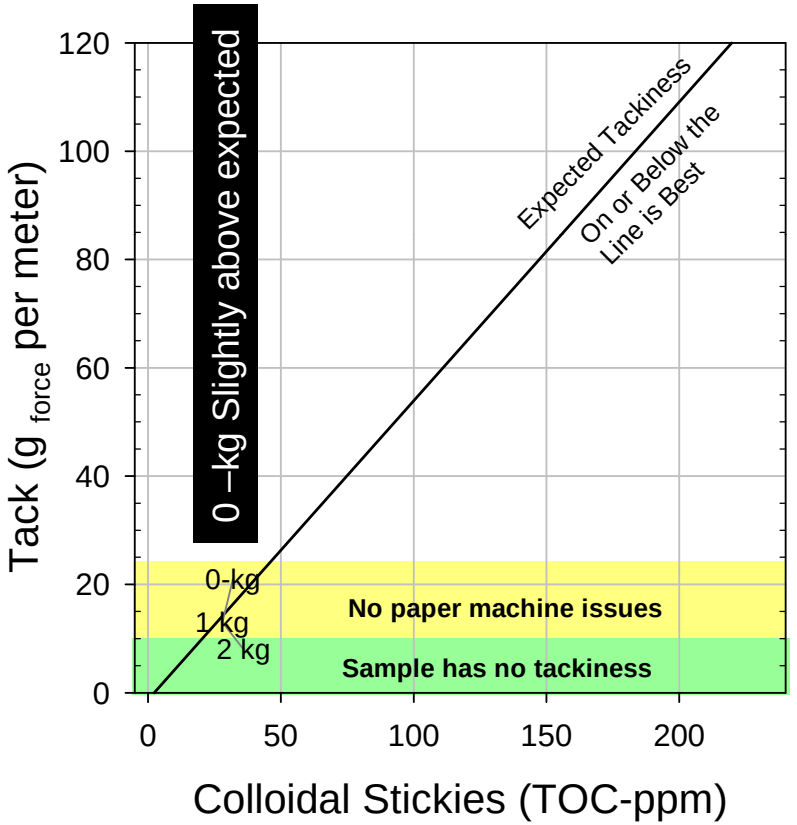
- **That has a no tackiness or low tackiness**
- **Tackiness on or below expected tackiness**



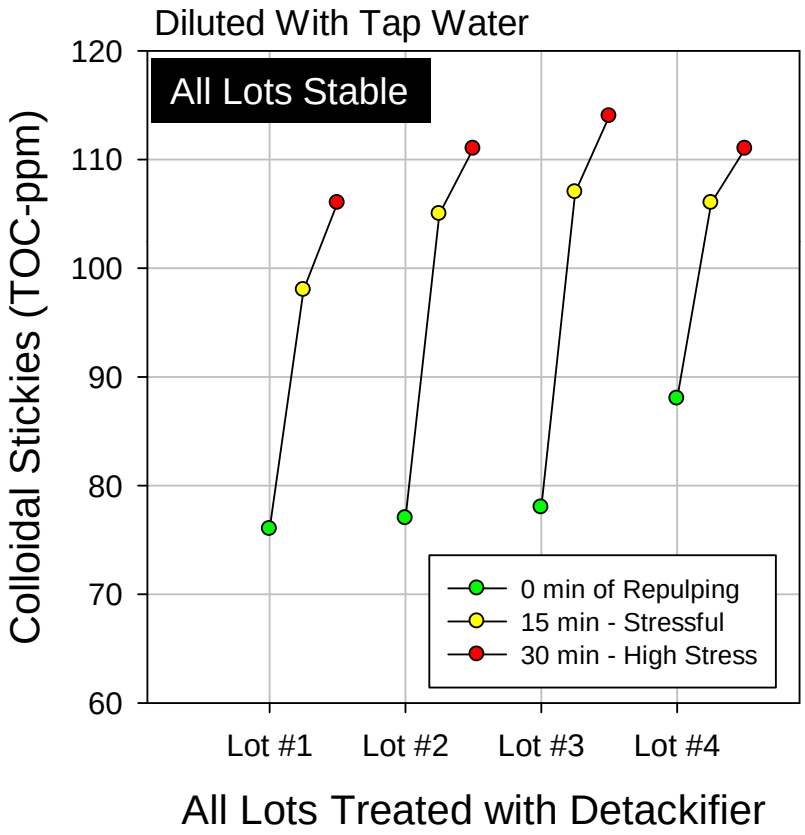


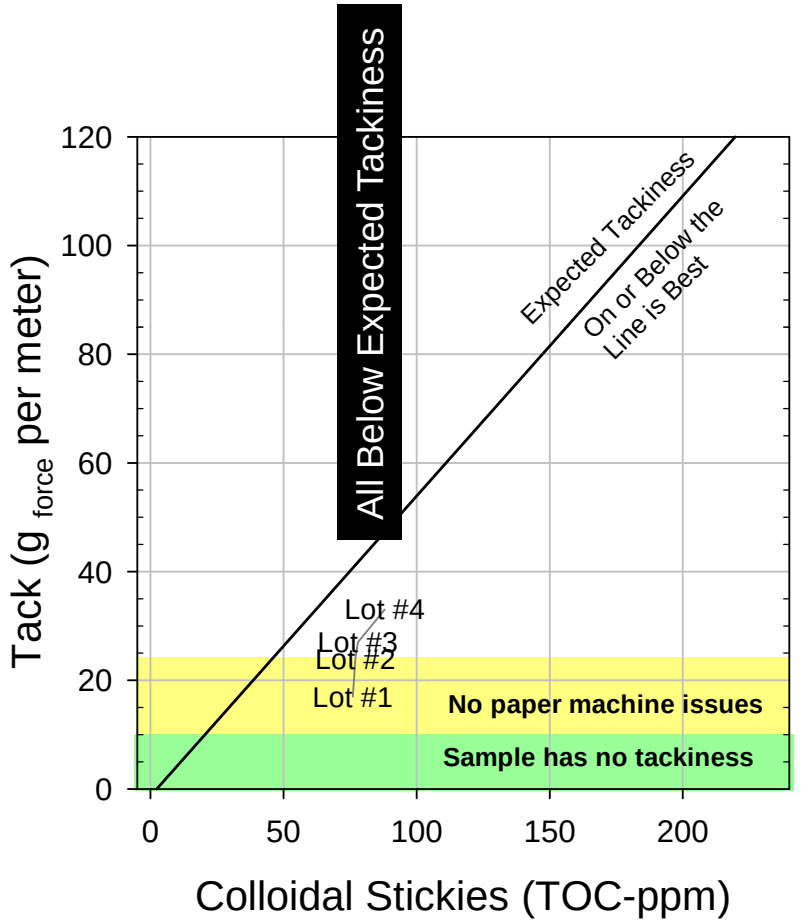
Example 1 – Unstable & No Tackiness
No Issues on Paper Machine



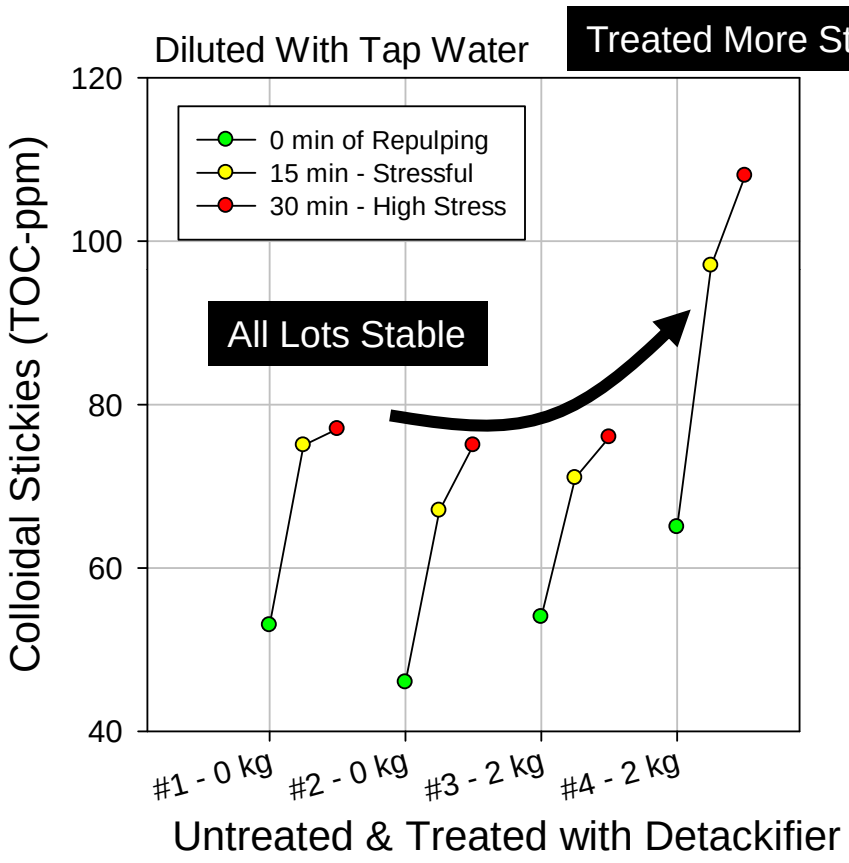


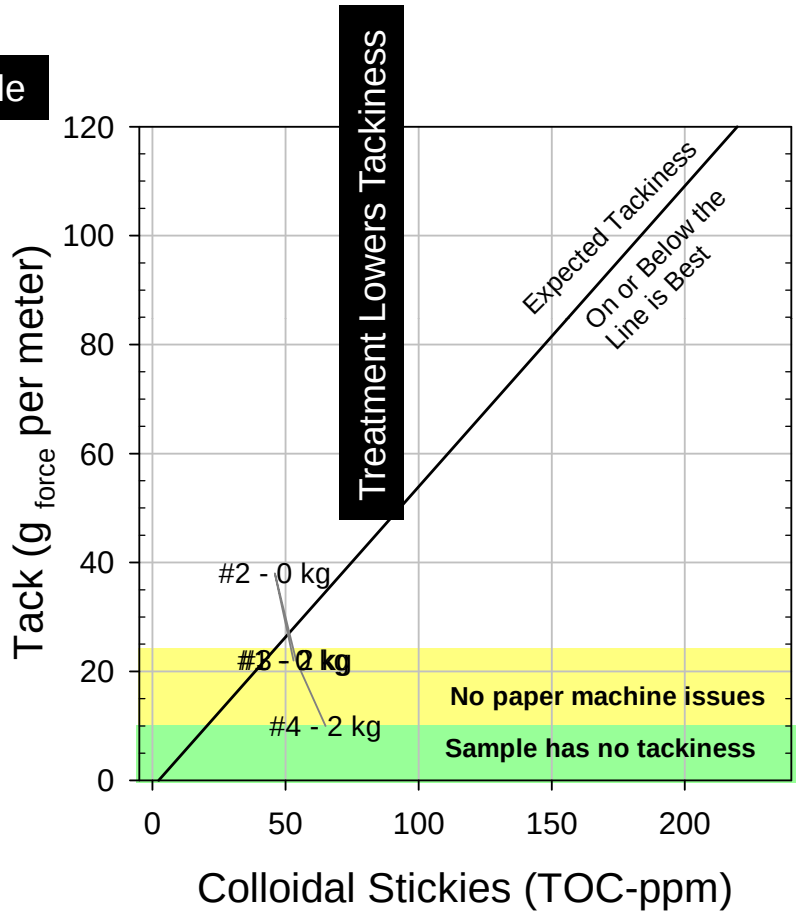
Example 2 – Stable &Tackiness Below Expected – No Issues





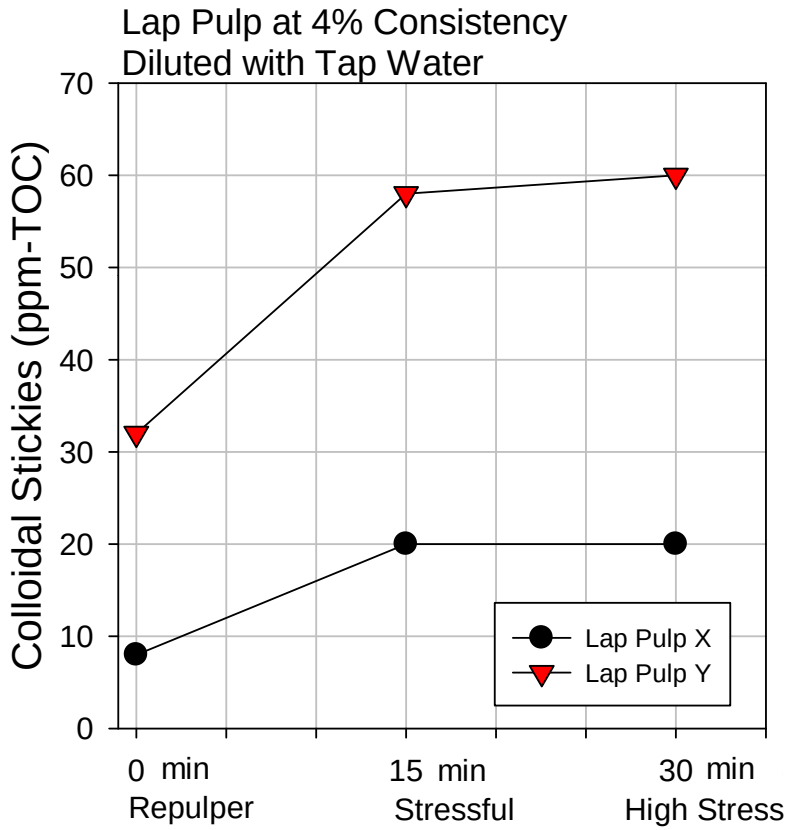
Example 3 – Stable & Treatment Moves Tackiness Below Expected – No Issues



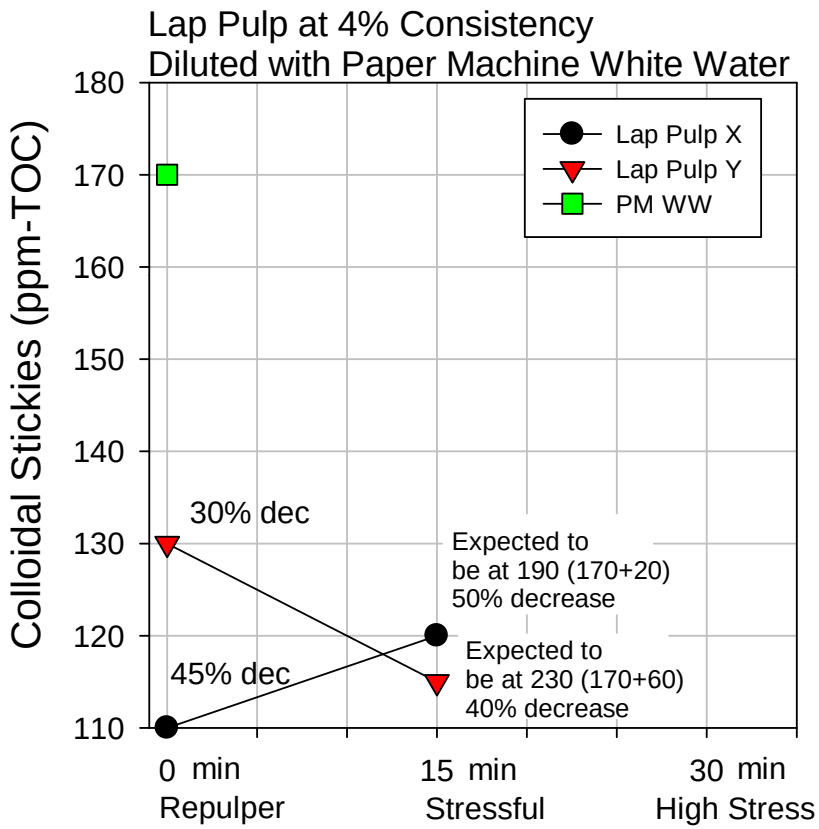


Lap Pulp is Not Always the Problem

Two Lap Pulps
Stable with Tap Water



Two Lap Pulps
Unstable with Paper Machine White Water



Mixing Time to Colloidal Shear Stress Test

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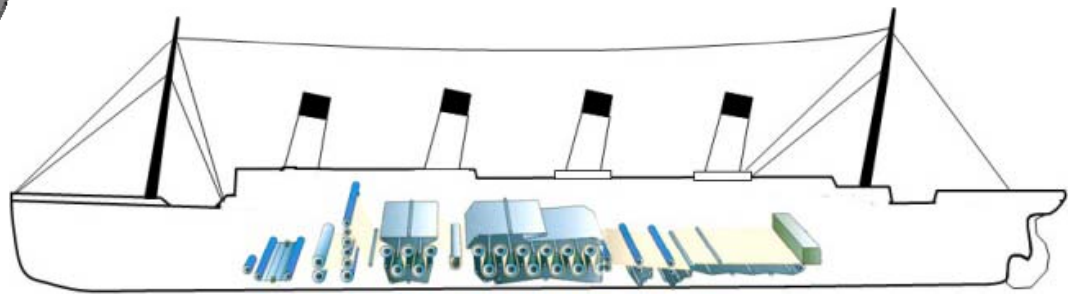
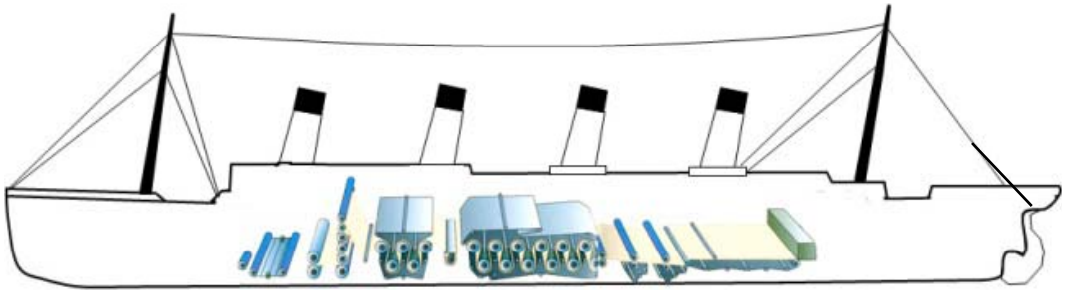
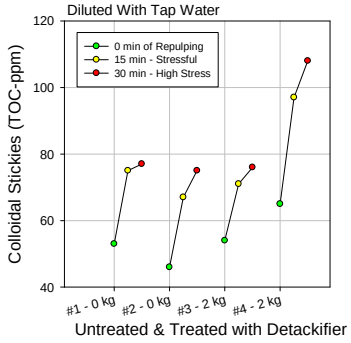
Colloidal Stability & Tackiness

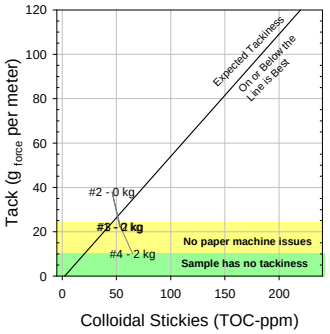
If Colloidal Stickies are Unknown It can be a Roll of the Dice with Recycle Lap Pulp



Remove the Unknown about the Stickies in Recycle Lap Pulp by Knowing Colloidal Behavior







Colloidal Stability & Tackiness

Thank You for your attention.
Questions?