Building Leadership Excellence

Deposit Analysis –

Investigating Microbial Problems in a Paper Machine Environment

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Buckman

Commitment makes the best chemistry.

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RETHINK PAPER:
Lean and Green

Agenda

- Why are deposit analyses needed?
- On-site analyses
- Off-site analyses

Deposits

- Impact paper machine efficiency and runnability
- Are classified as organic, inorganic, or microbiological
- Most deposits will be a combination of these

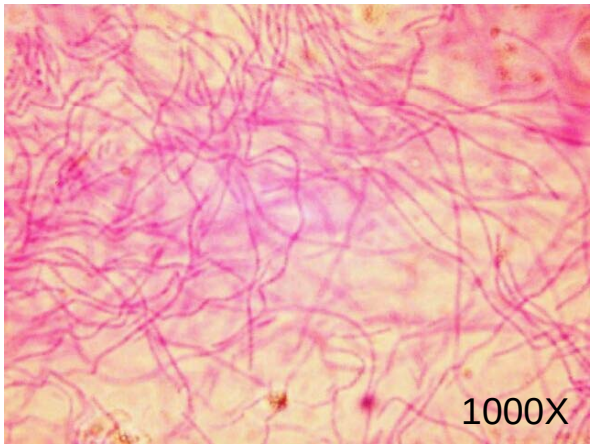
Types of Deposits

- Organic
  - Pitch
  - Stickies
  - Additives
  - White pitch
- Inorganic
  - Fillers
  - Scale
    - Calcium carbonate, barium sulfate, alumina, calcium oxalate

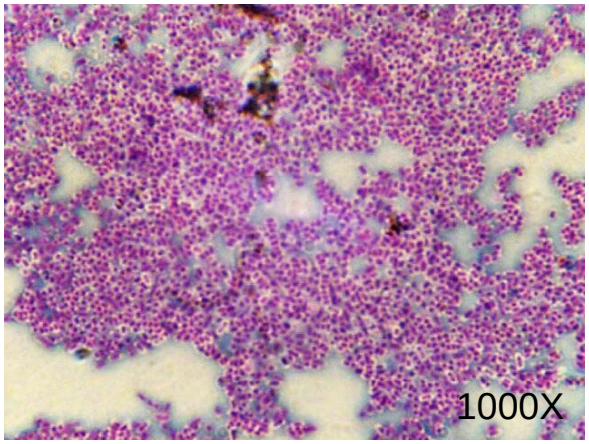
Types of Deposits

- **Microbiological**

Fungi



Filamentous Bacteria



Encapsulated Bacteria

On-Site Analyses

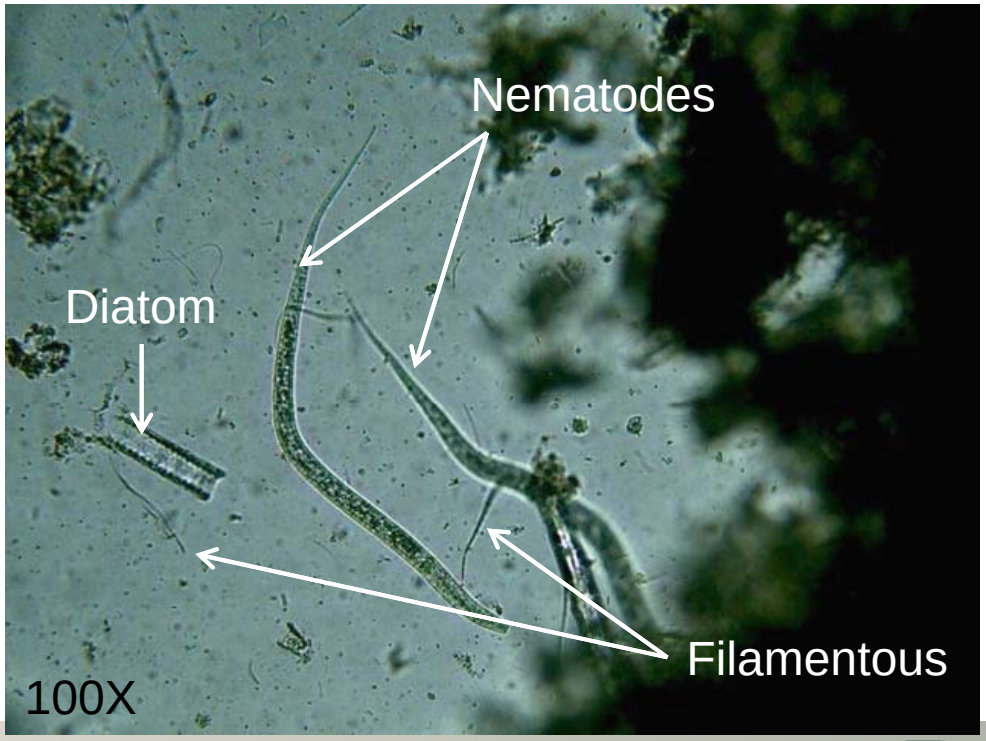
- Useful information to determine what additional testing will be required
- Tools
  - Dissecting scope, magnifying lens, light microscope
  - “Spot and speck” (qualitative) test procedures

On-Site Analyses

- Macro examination
  - Odor
  - Color
  - Consistency
  - Location of deposit

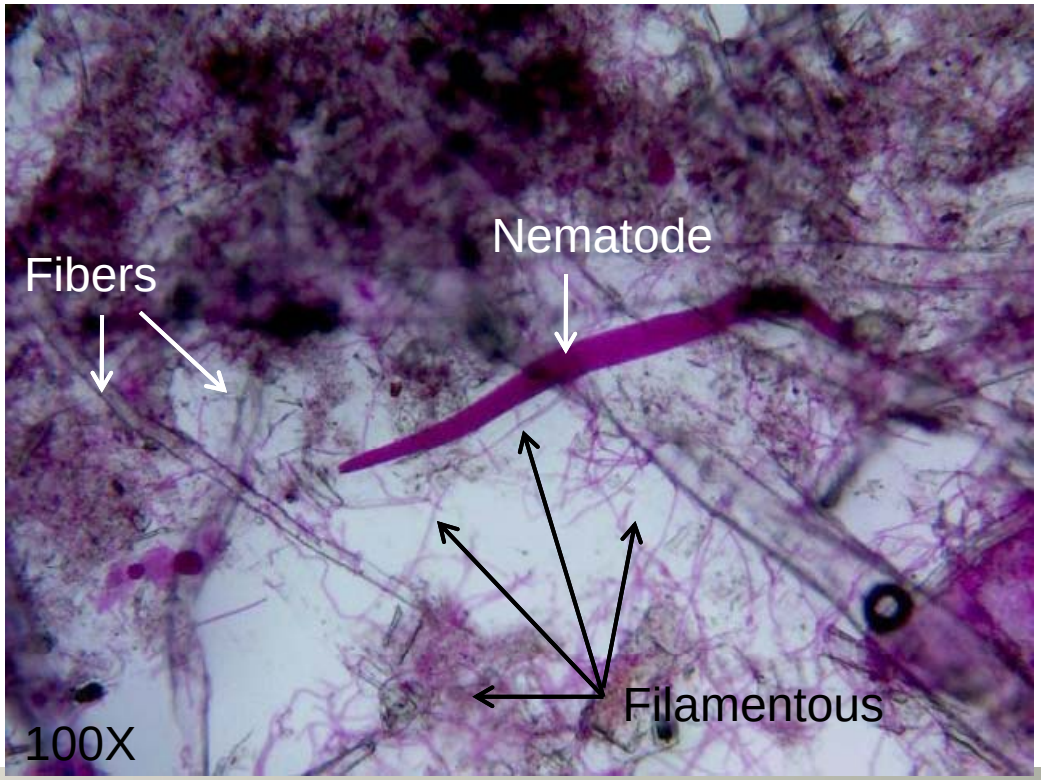
On-Site Analyses

- Microscopic examination
  - Unstained wet mount
    - Observe non-biological components (fines, fillers, starch) and higher life forms



On-Site Analyses

- Microscopic examination
  - Stained wet mount
    - Protein-specific stains to help visual microbes



On-Site Analyses

- Qualitative chemical tests
  - Microbio Ninhydrin
    - Stains protein in defects
  - “Spot” tests, including iron, starch, alum, various inorganic scales
  - References
    - Chemical supplier’s portable test kit
    - TAPPI Useful Method 589 (TAPPI PRESS 1991)
    - B.L. Browning’s *Analysis of Paper*, 2nd Edition (Marcel Dekker, Inc, 1977)

Off-Site Analyses

- Include semi-quantitative and quantitative analyses
- Sufficient quantity of deposit will be needed because:
  - Most techniques are destructive
  - No one procedure will provide a complete answer

Off-Site Analyses

- Techniques include:
  - Inductive Coupling Plasma Spectroscopy (ICP)
    - Inorganic determination
  - Fourier Transform Infrared Spectroscopy (FTIR)
    - Extractable organics such as lignin and pitch
  - FTIR-microscopy
    - Useful when defect is small
  - Gas Chromatography & High Performance Liquid Chromatography
    - Organic components

Deposit Analyses

- Data from both on-site (qualitative) and off-site (semi-quantitative/quantitative) analyses need to be compiled to provide compositional information on the deposit/defect
- This information along with system knowledge and proficiency of the chemical supplier will provide the correct solution(s) to the problem

Thank you.

Questions?