In-Line Polymer Dose and Tailings Index Properties

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Overview

It started with a phone call…

- Applications for in-line polymer addition
- The ‘optimum’ dose
- Optimum dose varies by:
  - Solids content
  - Particle size distribution
  - Atterberg limits
  - Methylene blue index
  - Other index properties
- Some limitations
Applications

June 17, 2004
3 Month Post-Flocculation

June 20, 2002
No Flocculation
Establishing the ‘optimum’ dose
Depositional Solids Content

![Graph showing the relationship between polymer dose (g/t) and solids content by mass for different types of minerals: Oil Sands, Iron Ore, Mineral Sands, and Other (Gold, Copper, Coal, Alumina, Laterite Nickel). The correlation coefficient, $R^2 = 0.52$, indicates the strength of the linear relationship.]
Particle Size Distribution (<75 µm)

$R^2 = 0.46$

Polymer Dose g/t

% passing 75 µm
Methylene Blue Index

R² = 0.94

Polymer Dose g/t

MBI
Poor Predictors

Poor correlation with:

- Commodity
- Application
- Specific gravity
- Particle diameter passing 80%, 50% or 10% (P80, D50 or D10)
- Fines over fines plus water (FOFW)

Insufficient data for pH, water chemistry, zeta potential
Limitations

- Polymers differ
- Solids content, and silt and clay fractions ≠ clay activity
- Clay activity ≠ all minerals
- Limited data relative to range of variation in tailings
Conclusions

- Optimum dose varies for a single commodity
- Polymer dose correlates well with index properties representative of the fine particle fraction and clay activity
- Strongest relationship with MBI, liquid limit and the % passing 44 µm
- Tailings index properties have limited ability to predict dose
- For a single tailings, dose varies significantly between polymers

Do testing!
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