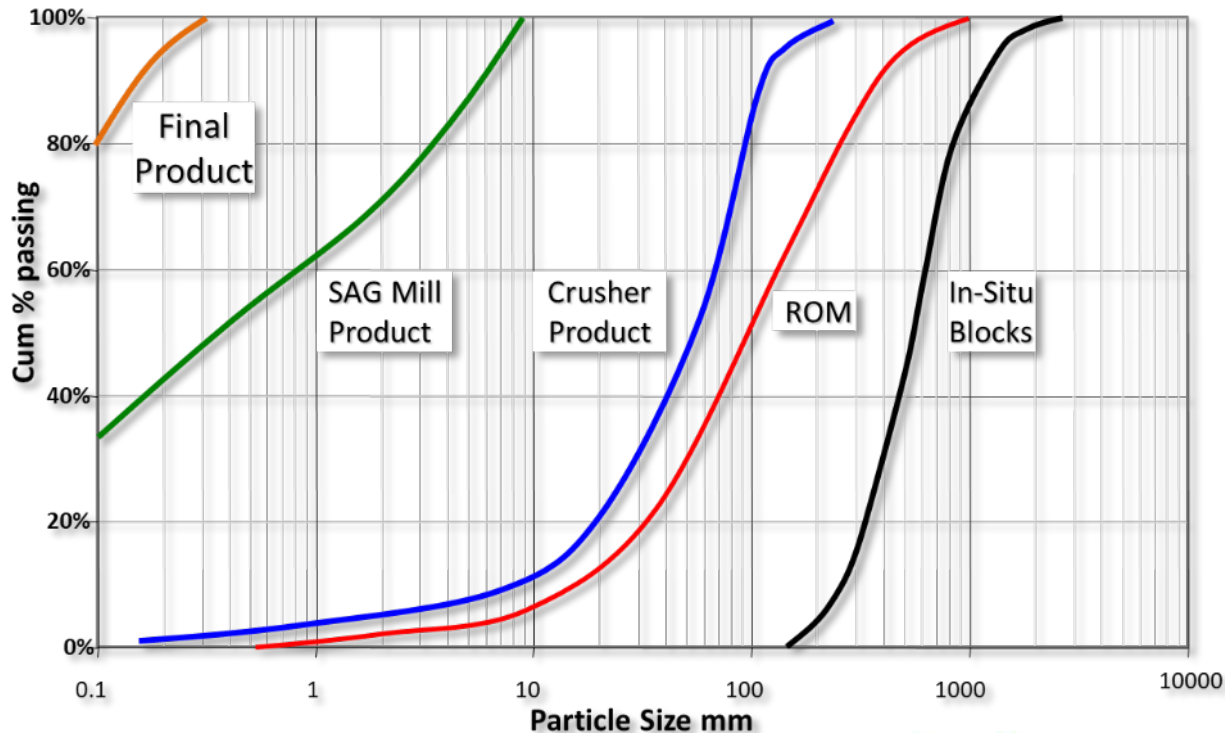


The Importance of Understanding Feed Size as well as Hardness in SAG Mill Performance

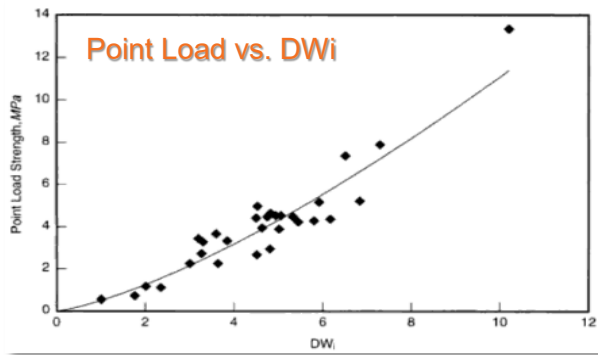
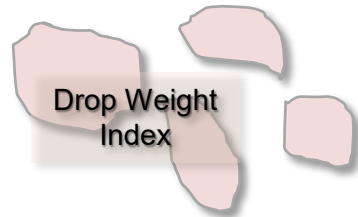
Adrian Dance

March 1st, 2022



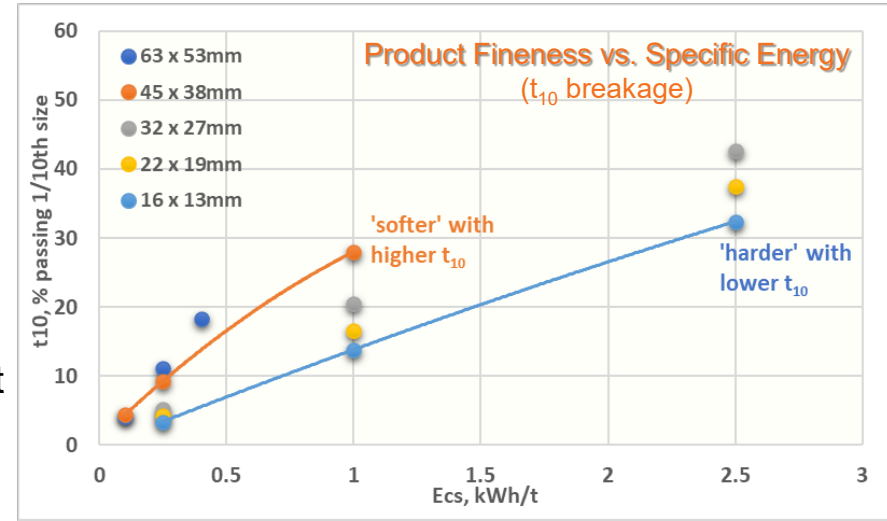
Emphasis on hardness

- What is measure of hardness?
- 'Hardness' varies with size
 - so if feed size is modified... does it affect hardness?
 - **hardness is not constant** – so measurements do not necessarily correlate



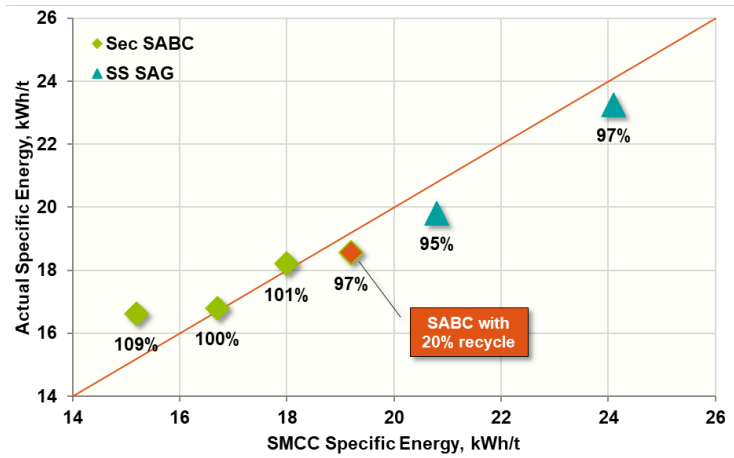
Drop weight test results

- **Apply specific energy to narrow size fractions**
 - larger particles produce more fines at same specific energy.... 'softer'
 - as measured in Point Load test, larger particles have more fractures/ weaknesses
- **So in fact,**
 - coarse, rock media is softer than particles that it needs to break

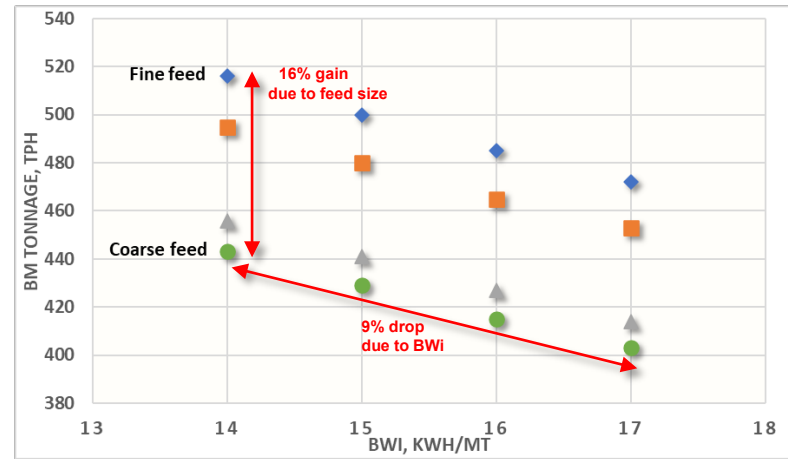


Examples of manipulating feed size

- **Secondary crush vs. single-stage**
 - compare with theoretical SMCC
 - *effect of hardness alone (no change in F_{80})*
 - 95% to 109% of expected kWh/t



- **Ball mill circuit (tertiary crush)**
 - throughput modelling of feed size vs. BWi
 - feed size has greater effect on tph
 - controllable by crusher operation



Final Comments

- **Focus on hardness only**
 - different methods, apply to different sizes
 - geometallurgical models
 - plant design
- **Extreme examples**
 - secondary crushed SAG feed
 - truncated AG feed
 - *reduce 10 to 100mm fraction*
- **What about feed size?**
 - in fact, manipulating feed size changes overall specific energy or 'hardness'
 - 'harder' ores can be "softened" with feed size changes
- **In plant design**
 - need to include how feed size **distribution** will impact kWh/t requirements
 - not just F_{80} (& poorly estimated)

Thank You



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