

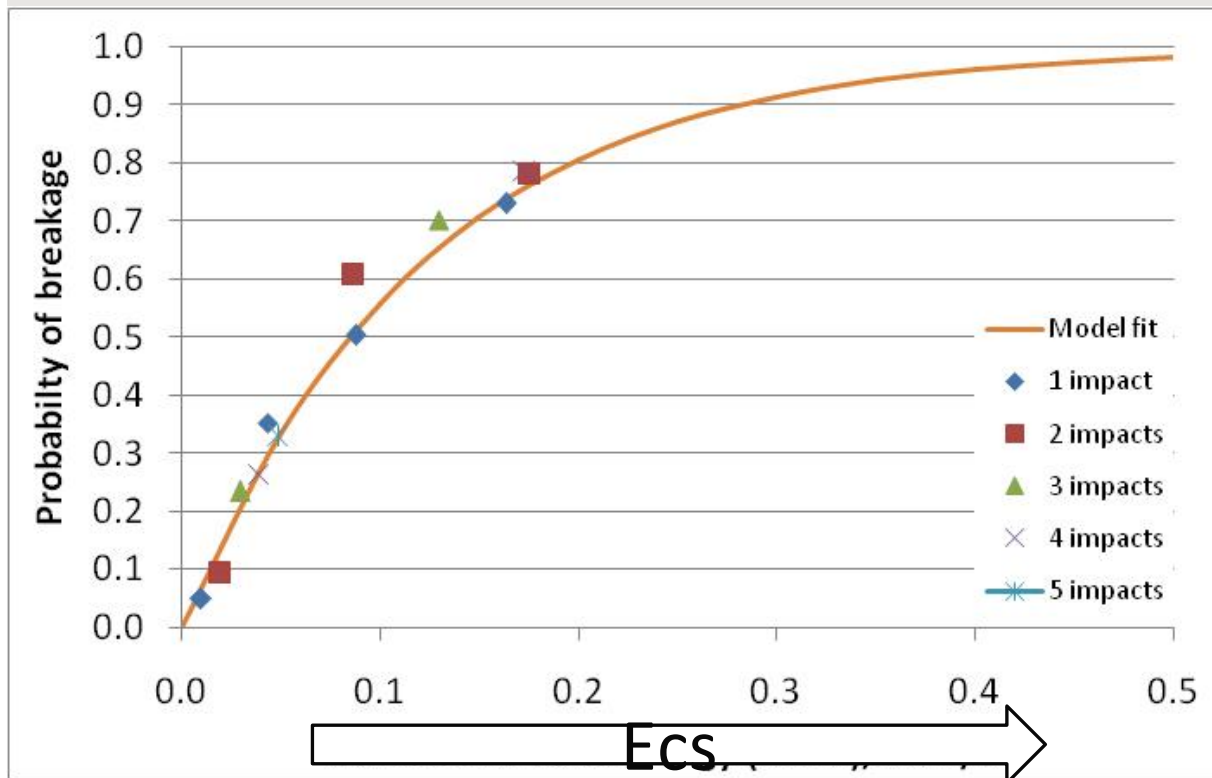
Development of a Rapid Particle Breakage Characterisation Device – The JKRB

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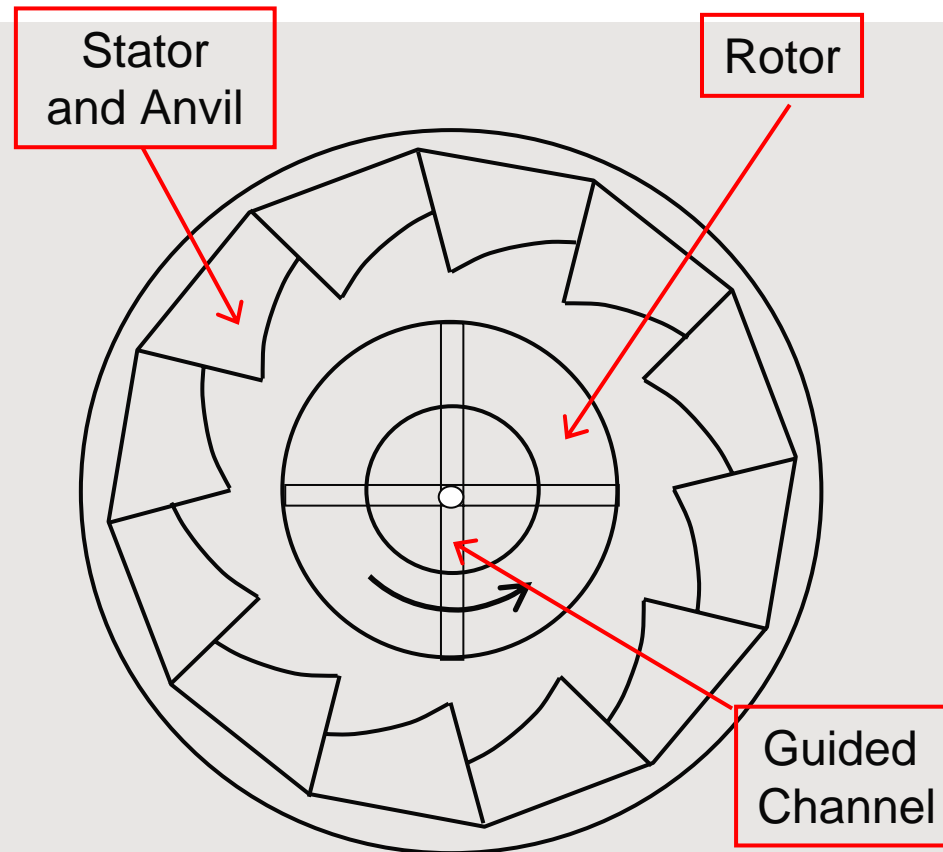
Ore Breakage Characterization

- Relationship between specific energy (kWh/t) and resultant product
- Underlies all comminution process models



$$E = mgh$$

Kinetic Energy



$$E_{CS} = \frac{1}{2} v^2$$

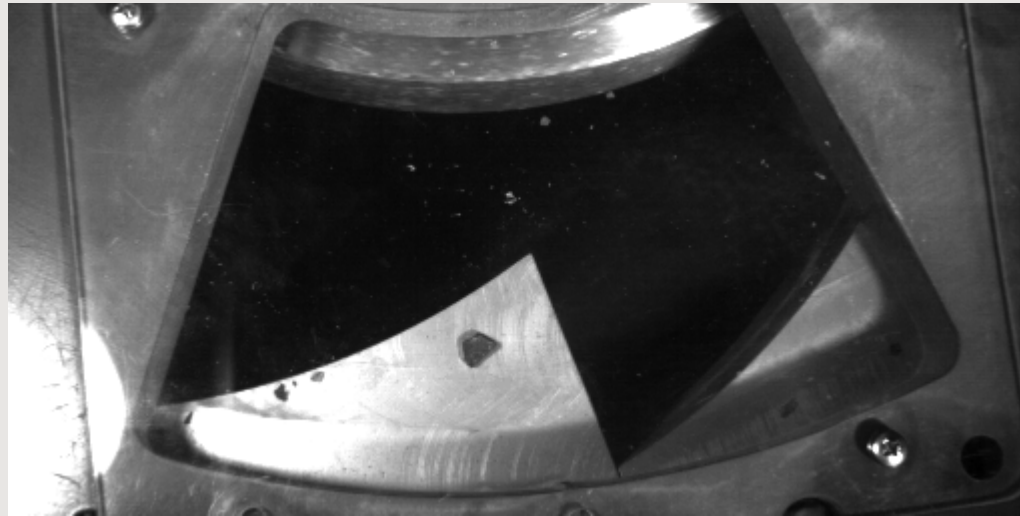
JK Rotary Breakage Tester (JKRBT) - Prototype



High speed video camera



$V = 48.3 \text{ m/s}$
 $E_{cs} = 0.32 \text{ kWh/t}$



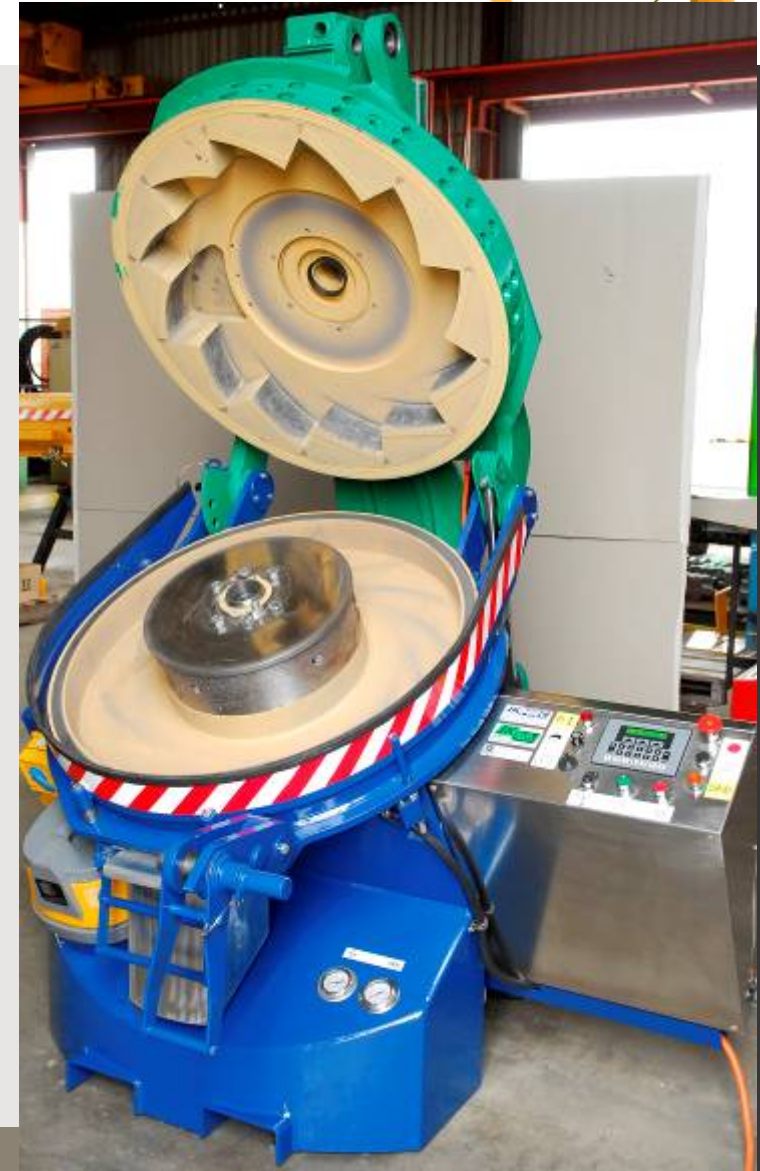
$V = 120.8 \text{ m/s}$
 $E_{cs} = 2.03 \text{ kWh/t}$



Fast Tracked to Commercialisation



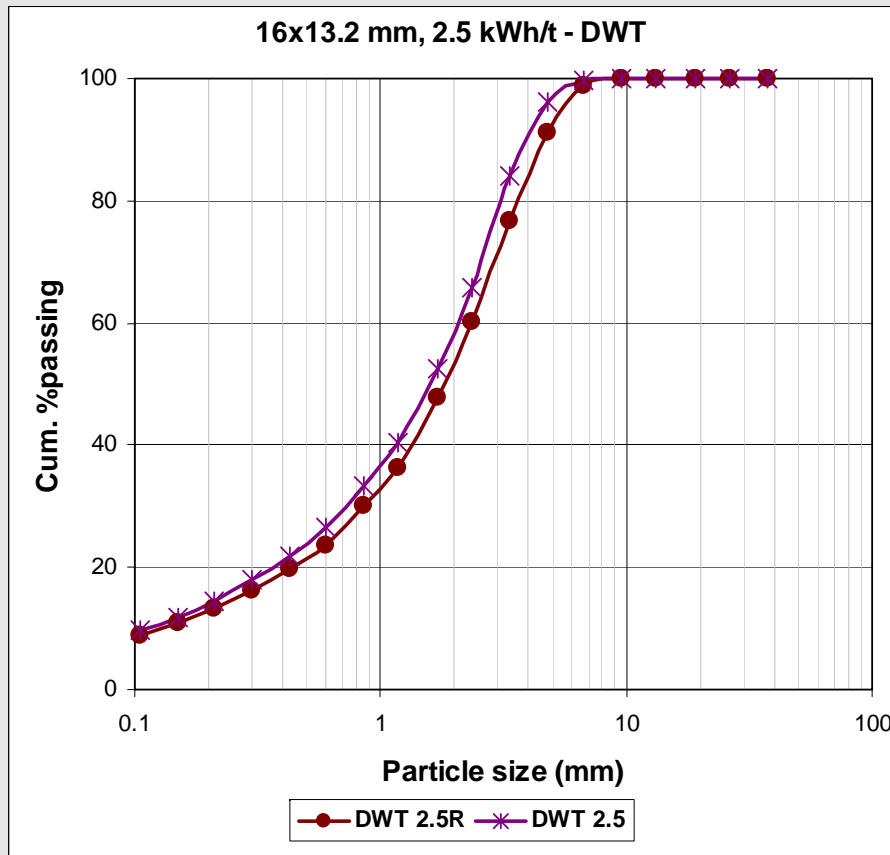
- Prototype - Jul 05
- Industrial unit
Russel Mineral Equipment
- Anglo Research Mar 07
- 2nd generation design Mar 08
- 6 units worldwide
 - Anglo Research x 2
 - Barrick Gold
 - BHP-Billiton
 - Rio Tinto (Kennecott, USA)
 - Teck Cominco (Trail, Canada)
 - JKMRC



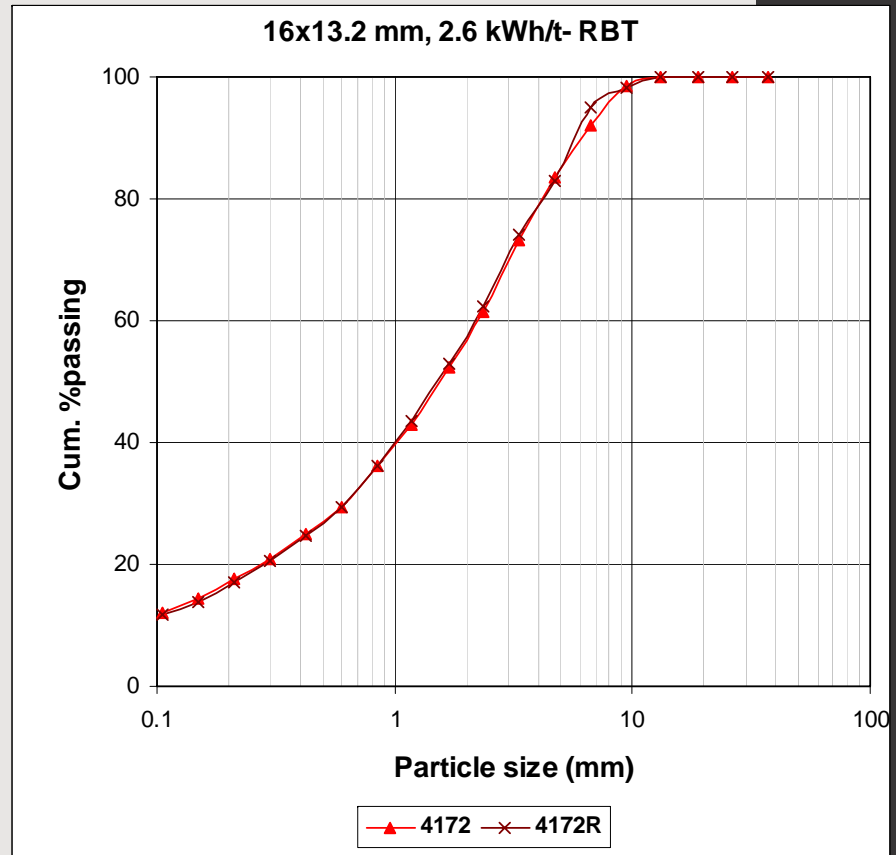
JKRBT at Anglo Research



Reproducibility



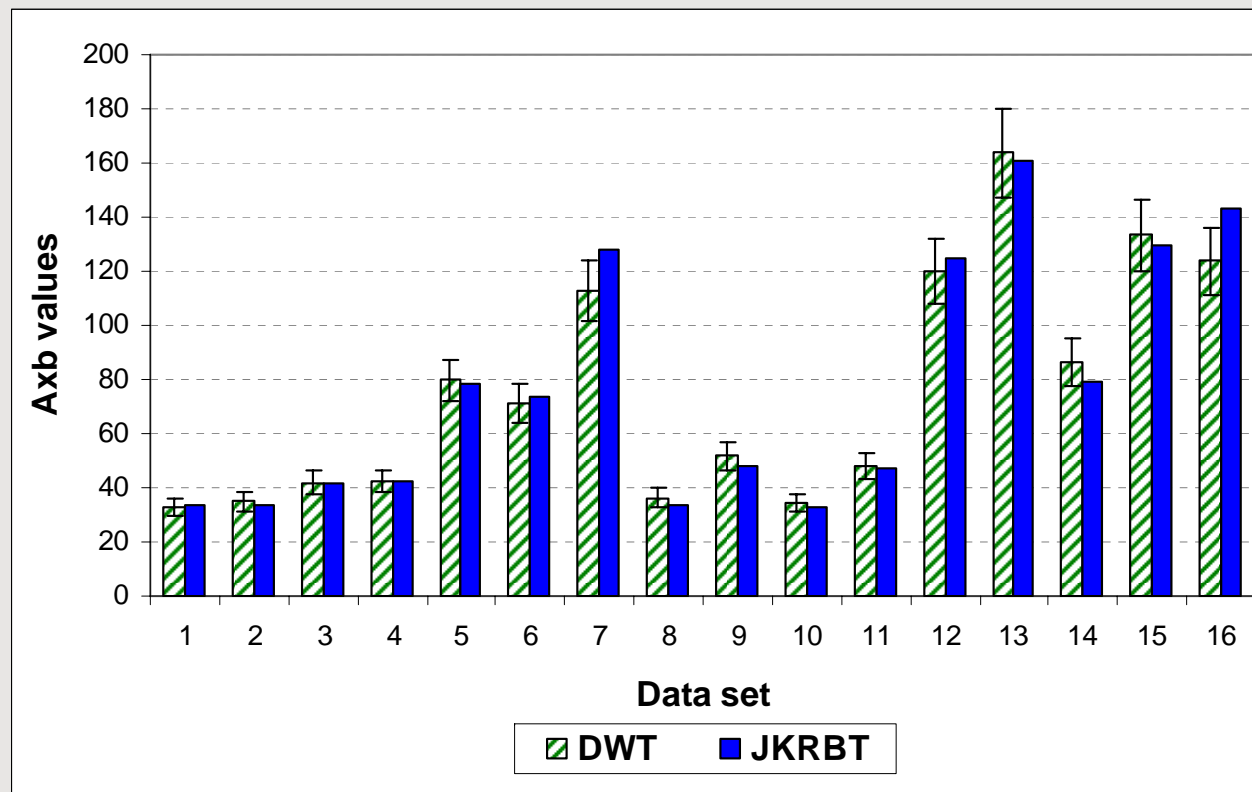
DWT



JKRBT

Breakage Parameter Comparison

- JKRBT and DWT A*b parameters are statistically consistent.



95% confidence intervals shown

Features of the JKRBT

Feature	Benefit
more particles	Statistical validity
wide range size & energy	3 – 45 mm 0.001 - 3.9 kWh/t
Rapid	Rate & cost
Accurate & precise Ecs	Reduces scatter mass variation in size fraction
Drill core	Ore body mapping
Drill chips	Process check

