

ROCK MASS CHARACTERISATION USING MWD

Constanza Paredes B.

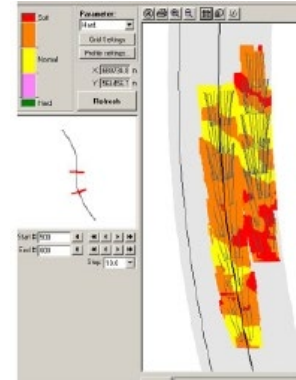
Advisory Team:

Prof. Sarma Kanchibotla

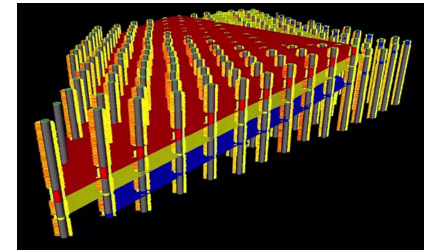
Dr. Vladimir Jokovic

STATE OF THE ART: MEASURING WHILE DRILLING

- Current Technology
 - Online machine measurements
 - Pull Down, Torque, RPM, ROP, Vibrations*
 - Online LWD
- MWD for Rock Mass Characterisation
 - Oil, Gas, Tunnelling and Coal mining
 - Rock Type and Hardness
 - Structures
 - Advanced LWD
 - Hard Rock Mining
 - Rock Type and Hardness
 - Blasting Optimisation
 - **Comminution Rock Properties**
 - **Prediction of Grinding Energy and Throughput**



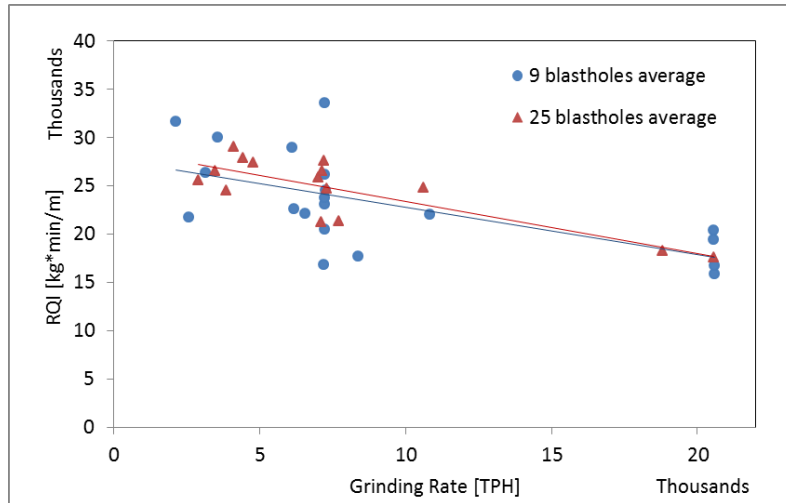
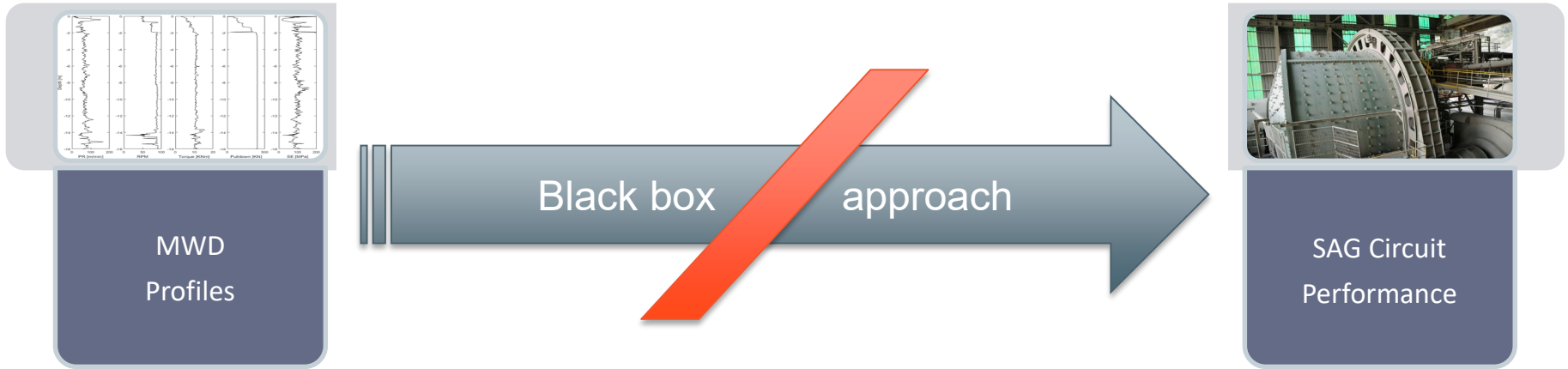
Tunnel Manager™, Atlas Copco



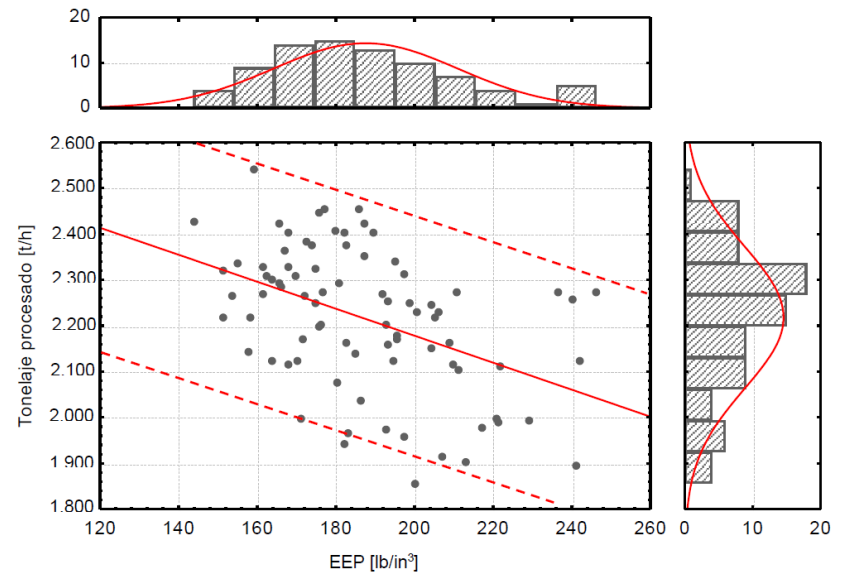
Eureka™, Maptek



STATE OF THE ART: MWD FOR COMMINUTION



MWD Index (RQI or W/ROP) versus Grinding Rate at Lornex Mine after Lebel (1984)



Throughput versus MWD Index (EPP or Specific Drilling Energy) at Carmen de Andacollo, Galvez (2017)



WHAT IS DIFFERENT IN OUR APPROACH?

Experimental Approach



Laboratory drilling

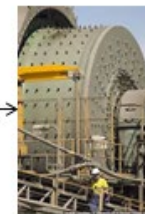
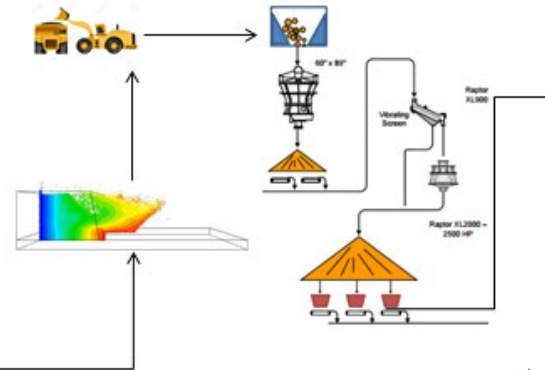
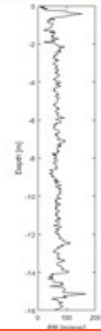


Direct Paired experiments



JK DWT and other Comminution Tests

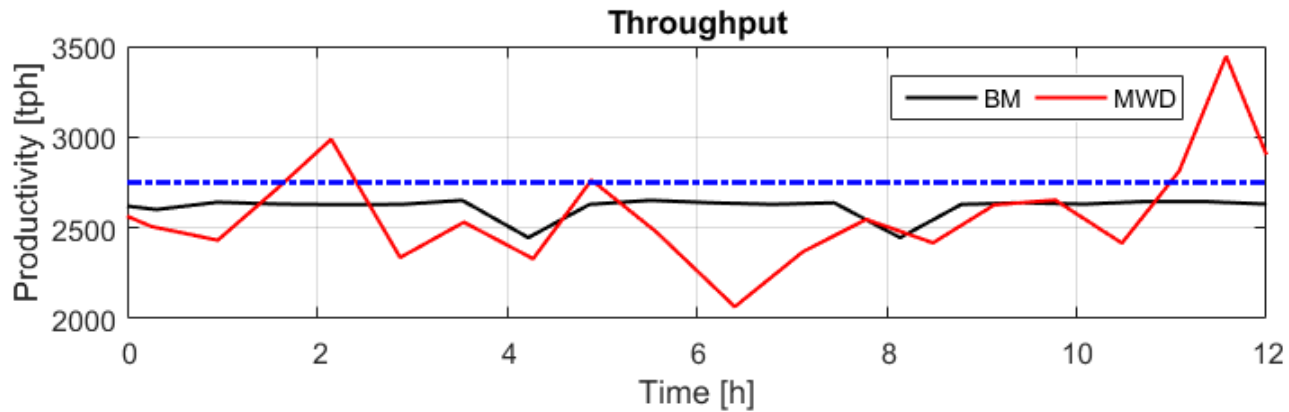
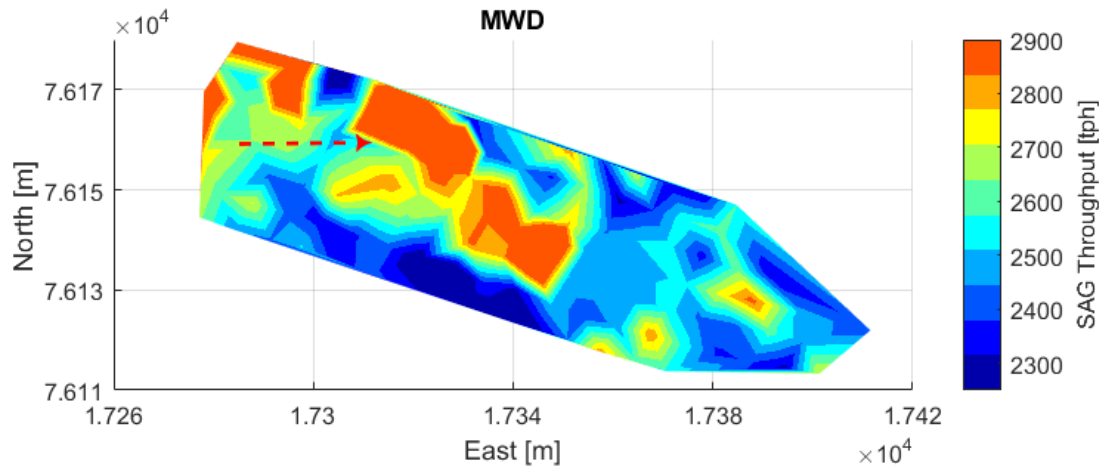
Operational Approach



Process knowledge
Effect of process on ore



POTENTIAL APPLICATION OF THIS APPROACH



FUTURE WORK

- Linking MWD to Comminution Feed Characteristics using Laboratory Approach
 - Hardness
 - Particle Size Distribution *
- Adapt results to an Operational Environment
 - Close the gap using
 - Laboratory results
 - Process knowledge



QUESTIONS