2020-06 AGM feedback for Systems Approach to Grind Aids - Jarrod Hart / IMERYS

Summary of Status:

- New project started Oct 2019
- first months focus
    - Focus on materials choice (minerals, grind aids)
    - Set up of a grinder and rheology testing
- Establishment of baselines
    - Baseline effect of grind aids on theology at various sizes
    - Batch grinds with various grind aids
- Now we move on

Q&A:

1. Did the team approach manufacturers, for example of classifiers, for their modelling approach (for selection functions, classification functions etc)
    a. Reponse
    "we talked to two vendors of classifiers regarding their procedure to design the classifier and the relating process parameters. In general they use short cut models based on force equilibrium calculations as well known from the literature, but have their own empirical correction factors. Moreover, in the last years they started to increasingly use CFD simulation to understand the flow inside the classifiers and to design better classifier designs. The use of multiphase simulations, i.e. the combination of CFD and DEM simulations, will be the next step."
    Regarding the project the dispersion of the particles in front of and inside the classifier as a function of the grinding aid used is important. However, according to our inquiry there are now models or simulations used to predict this. There is some understanding based on products already tested."
2. Why two materials? SUrely more gound could be covered with only one?
    a. Good question, main reason is because IFPRI asked for two materials!!
    b. But why?
        i. JH: because we think grind aids are very material specific and using just one would lead to risky generalisations. Doing two would highlight differences in mechanisms. However, there is no law saying they can't narrow to one material for some aspects of the study.
        ii. Additionally the varying hardness tends to mean different breakage mechanisms which may expose the different ways grind aids work, they certainly work in multiple ways...
3. Why so little focus on surface physical effects, mechanisms?
    a. JH on behalf of team: Some reviewers were asking for more focus on the detail of what is happening at the surface, what is the mechanism? We have to remind these reviewer of the brief - this is a "Systems" project. We can, if we want to sponsor a project on this, or indeed revisit Prof Kwade's review if we want to learn more about this.
    While many intriguing academic questions remain Members were rather interested in the practicalities of how a grind aid might work in their plants, impact classification, PSD shape and other matters not just energy demand.

One further suggestions from the meeting chat:

1. Has the team spoken to Zoltan Nagy on his models? (JH comment: It seems to me the models may be more crystallization oriented, but still study populations and have to consider dispersion...so maybe of interest...)