

PROJECT DESCRIPTION

KERNEOS Aluminate Technologies
France



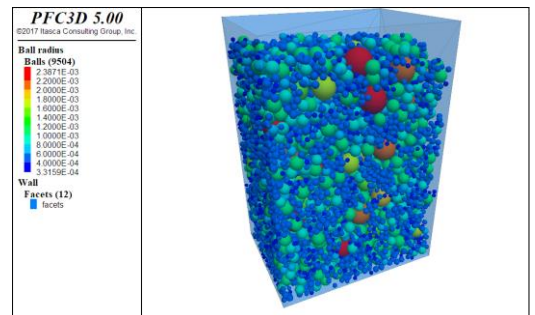
For aluminous cement manufacturers, the raw materials are becoming scarcer due to the depletion or loss of natural resources. The extraction of the raw material, its conditioning and transport generate dust, which is largely not reused at present.

KERNEOS Aluminate Technologies wishes to recycle these bauxite fines by compacting them with the ambition of creating a new recycling process for fine mineral particles. All the partners in the PARC project contributed to the development of a new compaction technology.

ITASCA'S ROLE

Develop the appropriate discrete numerical models (PFC3D) in order to:

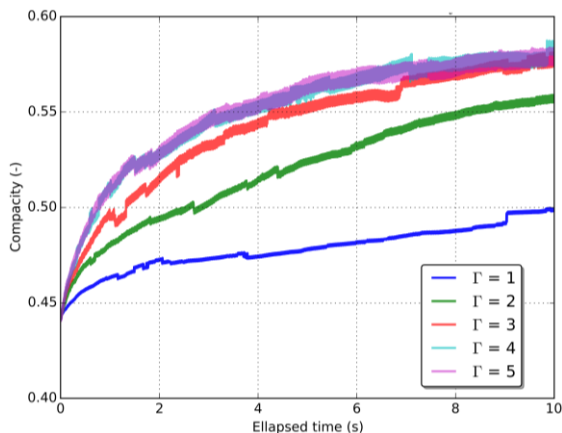
- Understand the physics of powder compression and compacted stacking.
- Improve powder compaction processes to achieve targeted density, porosity and compressive strength: loading/unloading cycles, addition and optimization of a vibration phase (frequency and maximum acceleration) to reduce compressive force.
- Reproduce the compaction/vibration tests carried out by the Ecole des Mines de Saint Etienne and extrapolate it to an industrial scale.



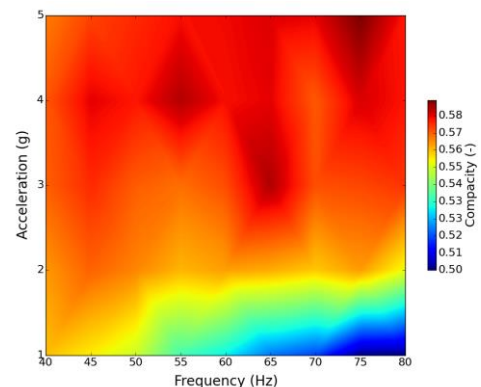
Example of PFC3D sample

PROJECT RESULTS

Experimentally observed trends are found: the effect of acceleration on compactness is qualitatively reproduced.



Evolution of the compactness during sinusoidal vibration as a function of maximum acceleration (for a given frequency)



Compactness after few sec. vibration, depending on frequency and maximum acceleration