

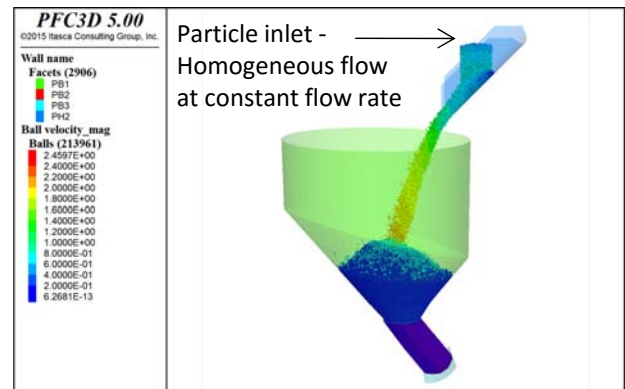
## PROJECT DESCRIPTION

ArcelorMittal

France



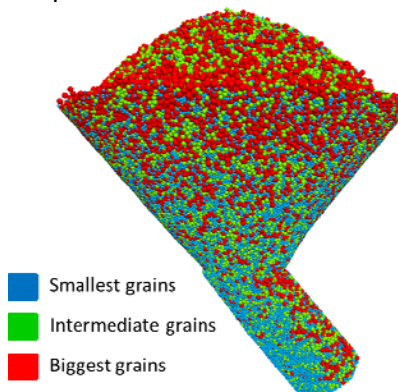
- Evaluate the feasibility of using the distinct- element modeling to study the flow and segregation of frictional particles without cohesion.
- Simulate an experimental test corresponding to the charge/discharge of a scale model batch hopper.
- Analyze the segregation observed in the hopper after its charge.



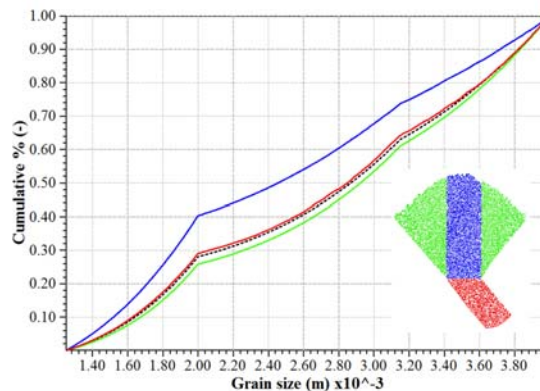
**Ball velocity contour during the charge**

## ITASCA'S ROLE

- Charge of a hopper with a geometry and parameters specified by ArcelorMittal.
- Import from a CAD design the real geometry of the hopper.
- Develop a new rolling resistance contact law to apply on spherical particles instead of using the real grain shapes.



**Visualization of the segregation in the final steady state (427,878 grains)**



**Analyse of the grain size distribution in the three coloured zones**

## PROJECT RESULTS

- Rolling resistance model allows the repose angle of the real material to be simulated.
- Observation of segregation mechanisms during the charge of the hopper:
  - smaller particles tend to concentrate in the inner cylinder, while bigger particles concentrate nearby the hopper walls.
  - the bottom part of the hopper is filled by a homogeneous material.
- Simulations give insight on segregation mechanisms that explain the results observed later on (during the discharge).