Capability Statement

delonix SOLUTIONS

Discrete Element Method (DEM)

Simulation for Operational Validation and Equipment Optimisation

Delonix Solutions specialises in leveraging Discrete Element Method (DEM) simulations to assist clients in operational validation and equipment optimisation for bulk material handling. Our expertise includes:

GEOMETRY AND CONFIGURATION OPTIMISATION

We quantify the appropriate geometry and configuration of equipment to optimise the flow, handling, and storage of bulk materials. By utilising DEM simulations in the early design stages, we ensure that equipment achieves the nominated nameplate capacity.

FLUID-SOLID INTERACTION SIMULATIONS

Delonix Solutions offers the additional benefit of coupling DEM with Ansys Mechanical and/or Ansys Fluent to simulate the interaction between fluids and granular solids on mechanical equipment. This capability enables a comprehensive analysis of complex systems involving both granular materials and fluid flow.

EQUIPMENT WEAR LIFE PREDICTION

Through DEM simulations, we can predict the long-term effects of bulk materials on equipment wear life. This information aids in proactive maintenance planning and optimising equipment performance.

COST-EFFECTIVE CONCEPT DEVELOPMENT

DEM simulations provide a more cost-effective alternative to physical prototype testing. We can simulate multiple “what-if” scenarios, including material property changes, particle interaction variances, surge loading, and plugging. This allows us to quantify material flow characteristics, identify initiation locations of problems, and develop effective solutions.

GRANULAR MATERIAL MOVEMENT SIMULATION

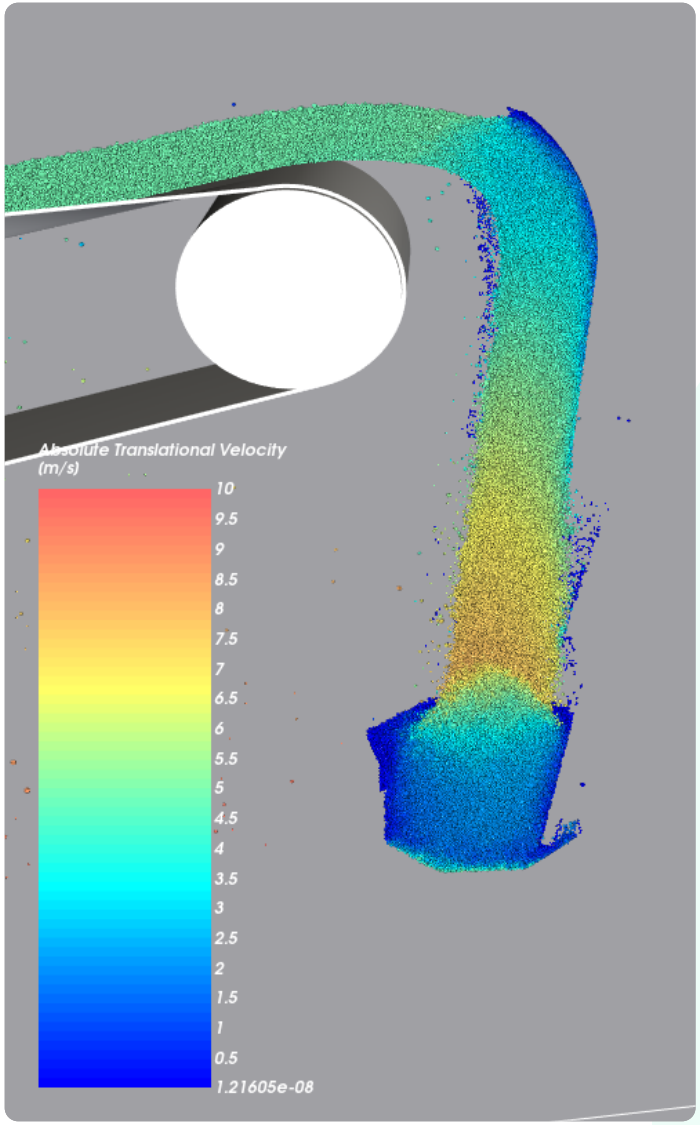
Our DEM simulations accurately model the movement of granular materials, tracing individual particles and their interactions with equipment such as transfer chutes and ship loaders. By simulating material behaviour, we identify and solve problems associated with incorrect geometry, ensuring efficient material flow.

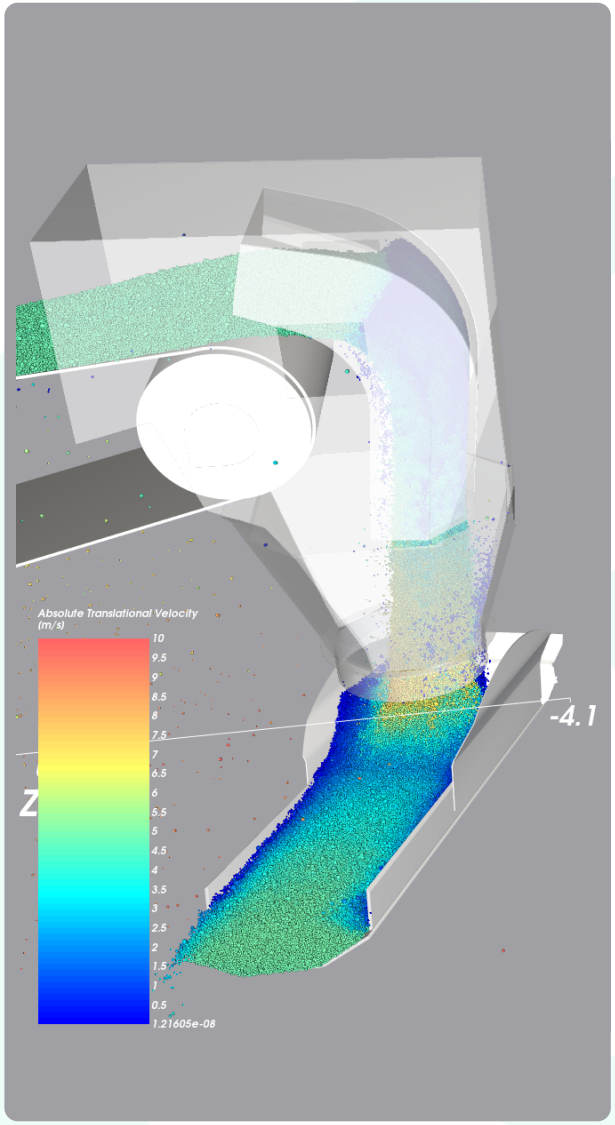
ON-SITE REPRODUCTION AND QUANTIFICATION

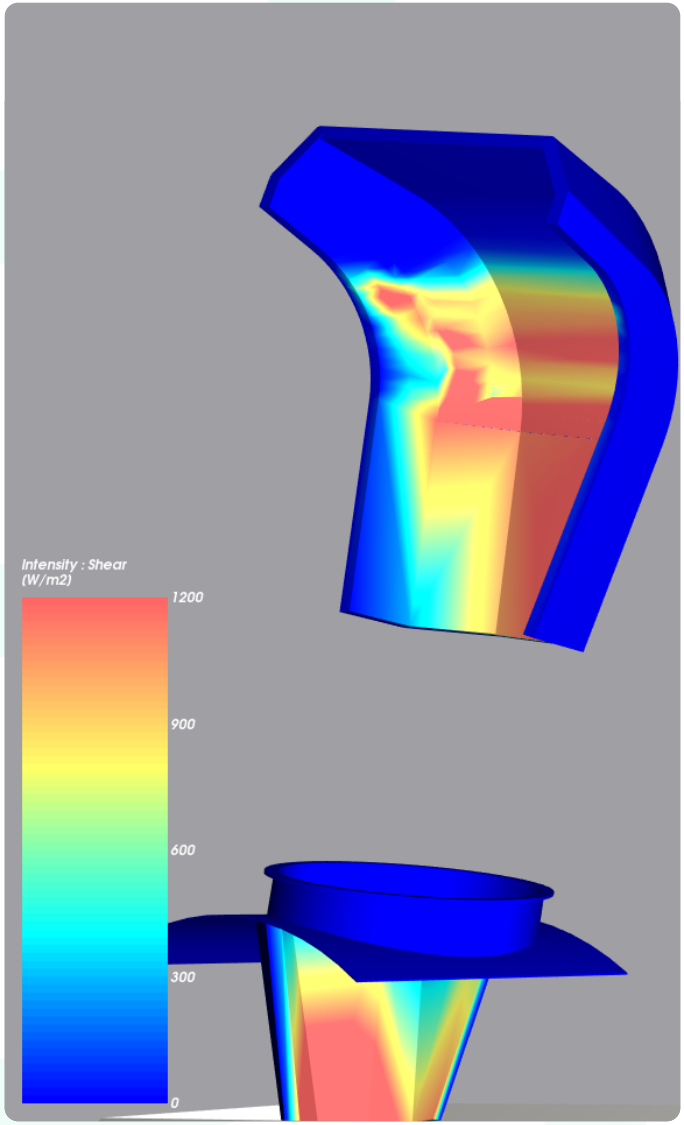
Our team can conduct DEM simulations to reproduce and quantify existing materials handling setups on-site. We can analyse parameters such as conveyor throughput, belt speed, belt loading profile, calculated bulk density, deflector position effect, and wear materials installed in chutes.

EXAMPLE OF QUANTIFICATION

We have successfully conducted simulations to quantify the above-mentioned parameters in materials handling setups, providing clients with accurate insights into system performance and optimisation opportunities.







DEM Software: ANSYS ROCKY

Rocky DEM is an advanced DEM software package for simulation and analysis of particulate solids handling and processing operations.

It has several distinct advantages over competitor codes that make it an engineering simulation tool that allows real world problems to be modelled and gives confidence to the engineers that the computational solutions have real value.

ROCKY'S BENEFITS:

- Fast and accurate with multi-GPU solver capabilities feature cutting-edge shared-parallel-memory technology.
- Realistically simulates discrete particles in a vast array of shapes and size distributions. Coupled with variable wet, dry, and dust-like properties.
- Flexible CAD import of geometries including XGL, STL and DXF to simulate any type of system. Ability to move boundaries and vibrate surfaces.
- Easy user interface, integrated help topics, and customisable parameters make ROCKY DEM simulations simple to set up.

Past Experience

FMG
Port Reclaimer Slide Chute Build Up Remediation Works

BHP
Car Dumper Flow Improvements
Port Headland Site Wide Chute Throughput Upgrades
Wear Improvement Modelling

BHP PORT
Stacker upgrade project

BHP OB 25
Portfolio of Chute Improvement Projects
Screen Deck Flow Balancing Assessment

GERALDTON PORT
Grizzly Flow Modelling

CBH
Geraldton Shiploader Chute Upgrade

CBH EXPERIENCE
Shiploader Chute Modification Project

ROY HILL
Port Hedland Chute Upgrades

RIO TINTO
Paraburdoo Chute Upgrade, Numerous Projects
MAC Rim Bin Improvement Project
Tom Price TLO Bin Modelling

SINO IRON
Magnetite Modelling

TRONOX
Mineral Sands Chute Improvements

NEWMONT
Chute Flow Modelling and Improvement Project

ALCOA PORT
Bauxite Out-loading Modelling

BUNBURY PORT
System Modelling for Spodumene, Mineral Sands, Silica Sand, Copper Concentrate; Testing, Calibration and Throughput Modelling and Chute Upgrades

GOT A PROJECT? CONTACT US.

Contact **Delonix Solutions** today to unlock the potential of DEM simulations and optimize your bulk material handling operations. Let us help you achieve enhanced efficiency, reduced costs, and improved equipment performance.

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