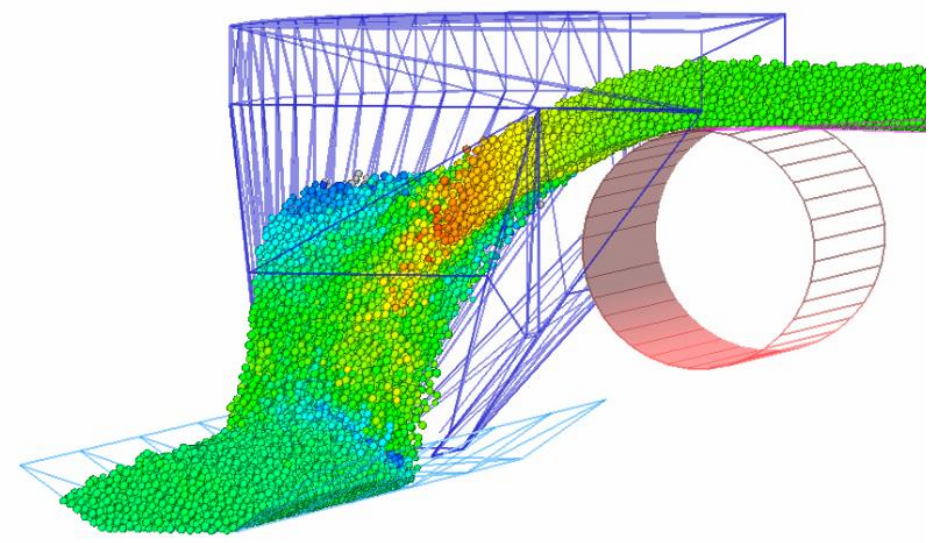
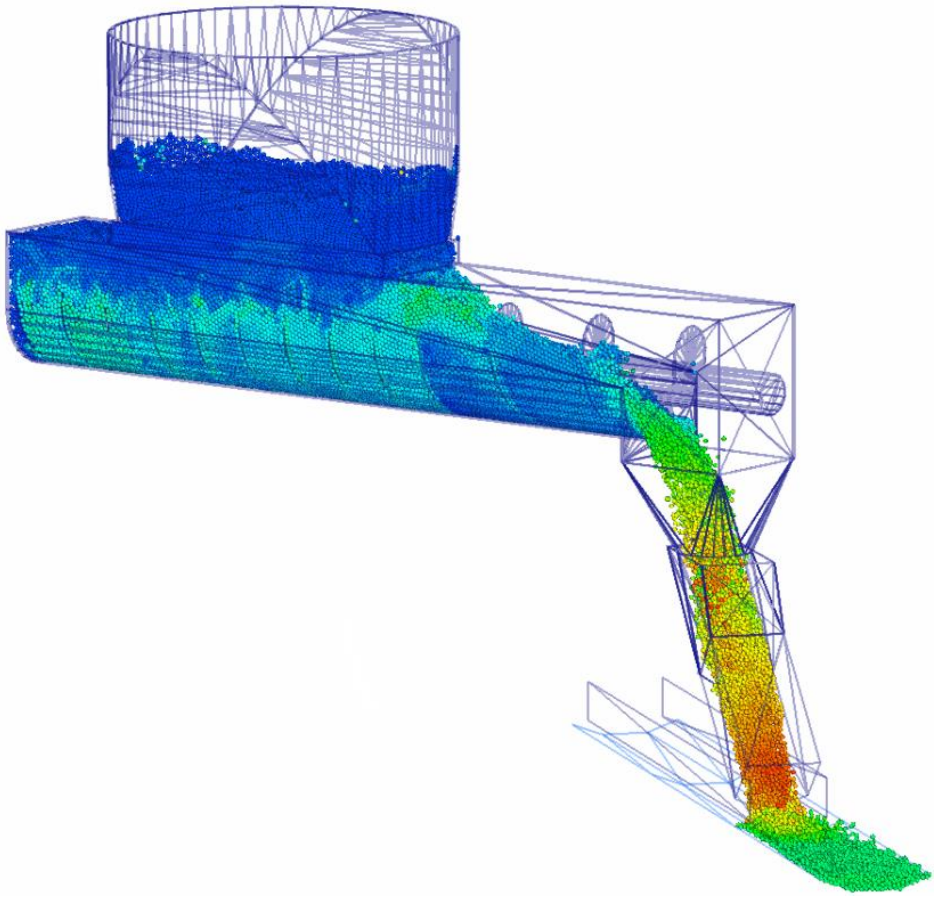
Discrete **E**lement **M**odelling is used to approximate the motion and mechanical interactions within a system. This is achieved by simulation of the bulk material as a discontinuous system of particles within the physical constraints of interest. The simulation then provides a detailed description of the velocities, positions, and forces acting in the system throughout the entire analysis.

Why DEM?

DEM allows for designs to avoid typical problems such as plugging, dust creation, material degradation, premature belt and chute wear, and off-center belt loading.

DEM is a tool used to allow visualization of a variety of loading scenarios, such as upset conditions and various flow rates prior to fabrication. This approach is used to eliminate the traditional approach of trial-and-error testing, saving on fabrication costs while provided improved system operation.



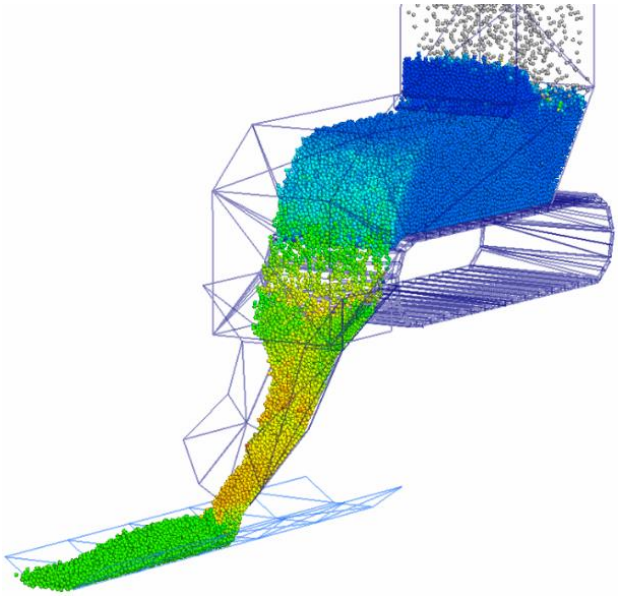


Applications

Discrete **E**lement **M**odelling can be applied to **any** system containing bulk materials. This includes but is not limited to:

- Transfer points: inline, angled, flop-gates, soft drop, low headroom, rock boxes, cascading
- Screw conveyors
- Drag conveyors
- Loading point types: Bin apron feeders, screw feeders, feeder breakers, etc.
- Product mixing
- Skip loading and unloading systems
- Trippers
- Rotary plows
- Grizzlies
- Bucket elevators

PROJECT EXPERIENCE

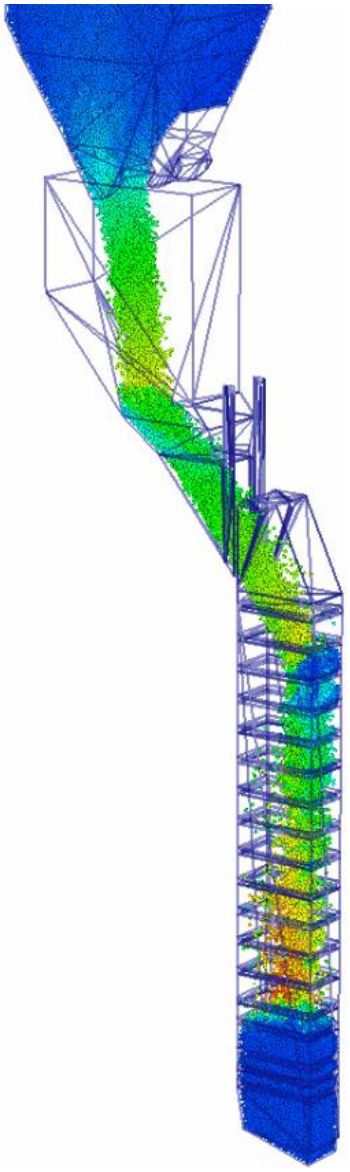


Loadout Chute

- Transfer chute between conveyors in loadout facility to minimize dust and decrease product degradation. Our newly designed chute minimized product impact thereby keeping product intact and reducing dust
- System Details: 36 inch belt width, 350 fpm, 500 stph

Transfer Point

- Transfer point between feed screw and belt conveyor. Very fine, dusty material. New chute design fed the product onto the center line of the belt while keeping the product flowing at approximately the same speed during transfer
- System Details: 30 inch belt width, 300 stph



Underground Potash Rotating Transfer Point System

- Development of a typical underground transfer point system to be used in a potash mine. Solution was one chute design capable of transfer angles from 45° to 135°.
- System Details: 48 inch belt width, 600 fpm, 1000-3000 stph

Raw Ore 90° Underground Chute

- Transfer chute used for mine development and eventual mainline use. Solution is to modify an existing chute to accommodate new belt widths and headroom constraints at a variety of operating tonnages. Dust generation will be minimized.
- System Details: 48 inch belt width, 700 fpm, 1000-3000 mtph

Underground Bin Apron Feeder Transfer Point

- Vendor-supplied transfer points on five new bin apron feeders were generating excessive dust and material spillage. Transfer points were redesigned to eliminate these issues.
- System Details: 48 inch belt, up to 2600 mtph

Fine Product Transfer Point

- Transfer point with large vertical drop between two inclined belts. Dust creation and product backflow issues are mitigated through a new chute design.
- System Details: 24 inch belt width, 150 stph, 425 fpm

Skip Loading Study

- Skip loading is producing considerable dust and spillage. A study was performed to understand the cause of the problem and identify solutions to reduce dust, spillage, and loading time. Loading times were reviewed in order to maximize product loading resulting in increased ore transfer.

Raw Ore Apron Feeder Transfer Point

- Raw ore is loaded onto an inclined belt on surface facilities. Dust, caking, plugging, and off-centered loading have been consistent issues in the past. Our new chute has improved performance in all aspects.