

Real-Time Deformable Terrain Simulation

with Vortex Studio

overview /

The Vortex Studio provides integrated simulation and visualisation deformable terrain and earthmoving machinery. It simulates machine-soil interactions in real-time, unlocking the ability to create interactive simulations of earthmoving equipment.

benefits /

Predicting the behavior of ground interacting with soil-cutting tools usually requires the use of offline simulation solutions, limiting its use and making operator-in-the-loop applications impossible. Vortex Studio allows you to enhance scenes and mechanisms and enabling the simulation of new types of equipment.

KEY FEATURES /

1. Validated hybrid discrete element method particle simulation model
2. Realistic simulation of earthmoving interactions in real time
3. Add buckets, blades, containers and other earthmoving tools
4. Built-in visualisation of soil piles and particles
5. Library of pre-defined soil types, including clay, sand, loam and gravel
6. Fully integrated with the Vortex Editor's scene creation tools

Real-Time Soil Dynamics Simulation.

Vortex Studio accurately simulates deformable terrain in real-time, enabling interactive simulation of earthmoving equipment for both operator training and product testing applications.

Immersive Visualization. Vortex Studio lets you visualise interactions between terrain and earthmoving in full motion. Each soil state is rendered in rich visuals, enabling the creation of engaging simulations.

Off-the-Shelf Editing Tools.

The Vortex Studio Editor, makes it easy to add and configure deformable terrain zones and earthmoving tools to your scenes and equipment, with an intuitive graphical user interface.



Key features

1

Validated Soil Simulation

Vortex Studio combines accurate simulation of interactions between earthmoving equipment and soil with the interactivity of real-time simulation, enabling the simulation of complex machines and soil materials based on engineering specifications.

- Calculate terrain deformation using a hybrid particle- and mesh-based method
- Define interactive terrain zones with varying density and compaction levels
- Dynamically update terrain height field based on excavated volume
- Simulate buckets, blades and soil containers
- Measure soil cutting forces and torques using validated models
- Simulate soil-like materials emitted from artificial sources such as concrete pump or hopper

2

Immersive Visualisation of Soil in Motion

Vortex Studio provides integrated rendering of soil in motion, allowing you to create rich scenes with deformable terrain, trenches, soil containers, soil particles and construction equipment to immerse operators in.

- Immersive rendering of soil states, from static to pouring and settling
- Apply custom soil and particle textures to recreate specific scenes
- Define particle emission rate, size and duration
- Automatically adjust terrain height field based on displaced soil volume

3

Create a Wide Range of Scenarios

From excavating to leveling and soil handling, Vortex Studio module allows you to create a wide range of scenarios involving deformable terrain and earthmoving equipment.

- Excavating and trenching equipment, such as excavators, backhoe loaders, trenchers and draglines
- Ground grading and contouring machines and bulldozers
- Transformation equipment, such as concrete pumps and hoppers
- Soil containers, including dump trucks, ship holds and dump zones

