

# Meshfree Method for the Simulation of Soil Motion During Excavation

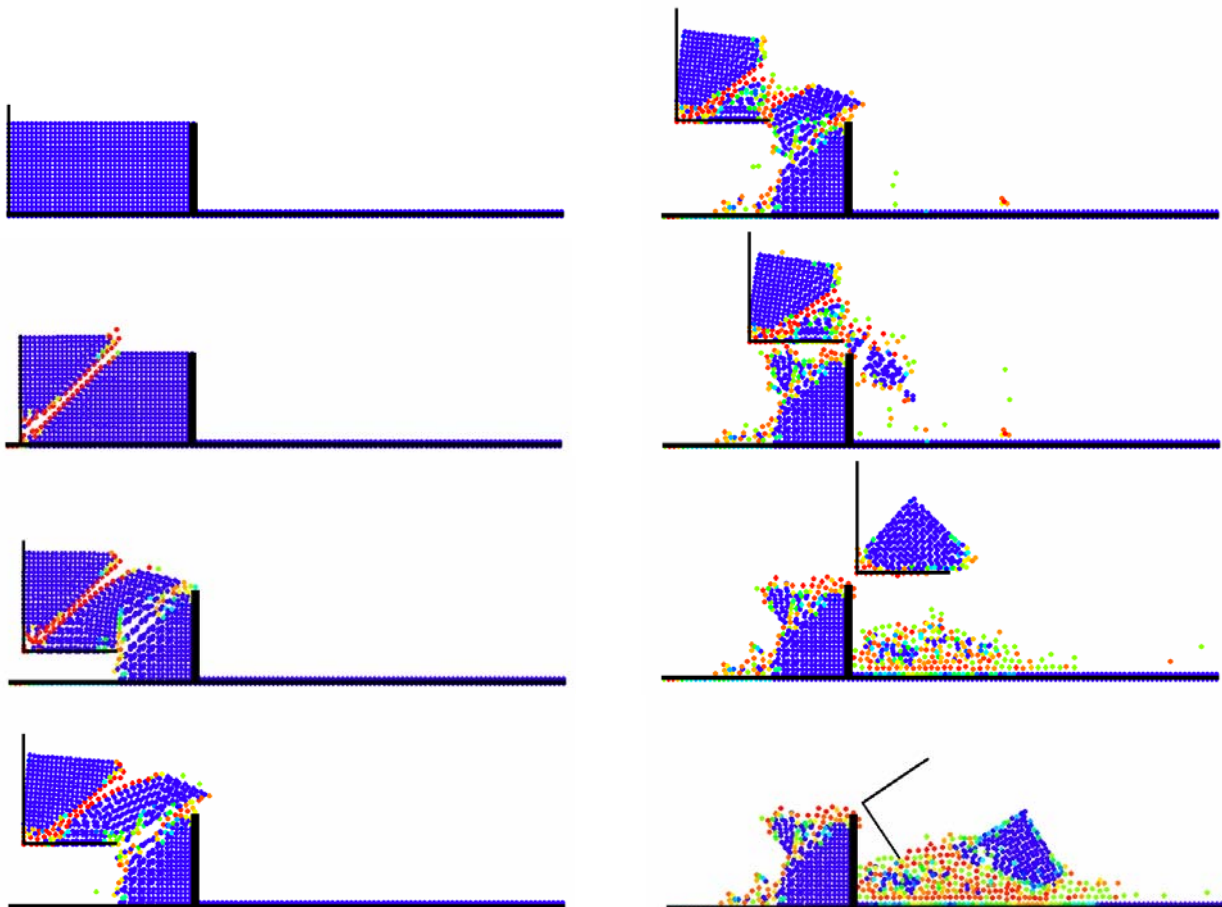
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## Abstract

Soil motion during excavation and push-loading operations exhibits excessive plastic deformation and complex contact conditions, along with failure mechanisms. The major difficulty in using a finite element approach to this problem is due to the severe mesh distortion resulting from large soil deformation, and the burden of creating cracks on an existing mesh to simulate progression of shear failures in the soil. The simulation of an excavation requires capabilities well beyond what the current finite element methods can offer.

The objective of this proposal is to develop the meshfree method as a computational and modeling technique, in conjunction with the development of a soil/structure contact algorithm and implementation of soil constitutive equations and failure criteria, for the simulation of soil motion and deformation during excavation. The ultimate goal is to be able to accurately calculate the actuator forces under various earth-moving operations for design improvement.

## Earth Excavation Simulation



# Bulldozing Simulation

