

Generating 2D models from 3D cross-sections and 3D models from 2D

Background

Plaxis 2D is the first software system developed by Plaxis and is now widely respected for its robustness. Plaxis 3D is under rapid development and will be released in 2009. Both are used for creating, calculating and evaluating models of soil and structures, such as tunnels, dikes and skyscraper foundations. They each consist of an input module (CAD-like modeller), a calculation module (using the Finite Element Method), and an output module (visualisation of results).

Problem definition

Plaxis 2D models are easy to define and quick to calculate. They are, however, limited in their capability to handle complex situations, where the third dimension plays a crucial role. Plaxis 3D models are slightly more difficult to create, and their calculation can take many hours or even days.

Converting a 2D model to 3D offers a straightforward and gentle upgrade path for users who are familiar with 2D, but are new to 3D. A customisable extrusion-based utility would be needed in order to generate true 3D models. For example a tunnel may be extruded over the entire depth of the model, but also follow a curve upwards; a building pit on the other hand would not be extruded over the entire depth, but would have finite dimensions and a certain position in the third dimension.

Converting a 3D model to 2D allows advanced users to generate accurate 3D models, but use 2D calculations to quickly explore particular subsets of the problem. The 2D model can be generated using a cross-section of the 3D situation, with additional filtering options to remove irrelevant parts.

Project goals

This internship comprises the development of the modules required to convert 2D to 3D and 3D to 2D, including the user interface with which users can customise the outcome of the operation.

How to apply

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