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Stress and Deformation Analysis



SIGMA/W is a powerful finite element software product for modeling deformation and stability in the civil and mining sectors. SIGMA/W analyses may range from simple linear elastic simulations to soil-structure interaction problems with nonlinear material models.

In Situ stresses can be established using gravity activation, field stresses, or the K0 procedure, which consider the volumetric water content function to determine effective stresses in the unsaturated zone. Pore-water pressures can be defined using a variety of sources.

The coupled stress and pore-water pressure formulation can handle complex analyses with saturated or unsaturated soils. This is useful for construction sequences invol



SIGMA/W offers simple but powerful analytical capabilities when used in combination with other GeoStudio products.

SIGMA/W models a full range of deformation problems

Staged fill or excavation design

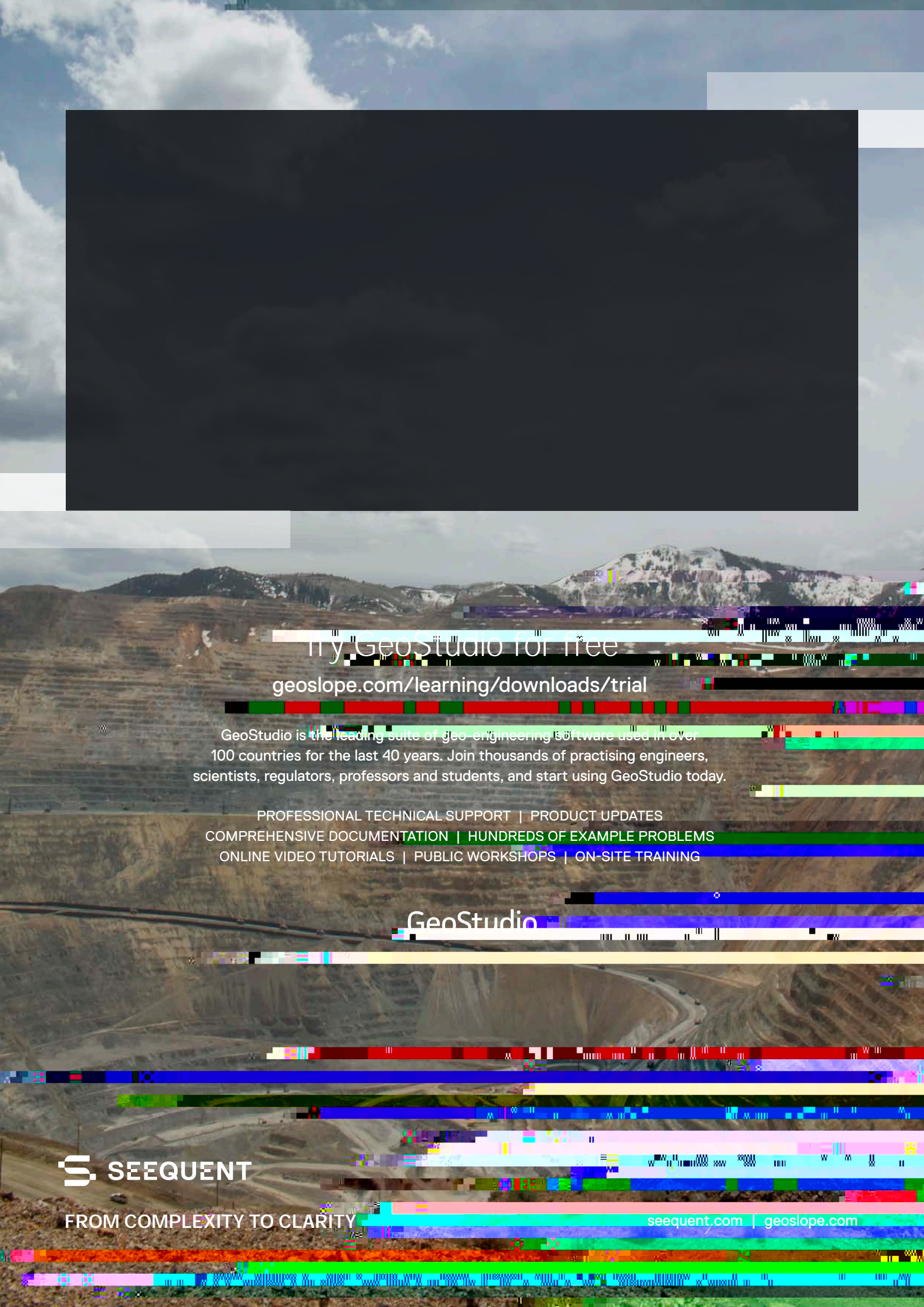
The rigorous stress-strain formulation of SIGMA/W, and the seamless workflow of GeoStudio, simplifies the analysis of complex staged construction problems involving cut slopes and fill placement. Simulations of this nature are required to simulate the construction of earth and rock fill embankments, tailings dams, railway and roadway cuts, and more. SIGMA/W's coupled stress-strain and water transfer formulation makes it possible to also analyze the simultaneous generation and dissipation of excess porewater pressures, allowing for the design of sub-surface drainage systems with the software.

Stability and deformation of slopes

SIGMA/W can be used to model the deformation of natural and cut slopes under a variety of loading conditions resulting from changes to the groundwater flow system, strength loss due to strain-softening, and construction activities. SIGMA/W's Strength Reduction Stability (SRS) technique can be used to calculate a safety factor against failure while simultaneously providing information about deformations resulting in strength loss.

Reinforcement and slope stabilization

Deep excavations for civil, geotechnical, and mining applications often involve complex soil-structure interaction. The rigorous structural element formulations, combined with a comprehensive material model library, make SIGMA/W the ideal tool for modeling struts, pile and sheet walls, anchorage, tunnel lining, and more. SIGMA/W's Stress Redistribution analysis also makes it possible to simulate load transfers and structural responses for projects involving slope stabilization by means of engineered structures (e.g. soldier pile wall). In all cases, SIGMA/W can be used to ensure that the structures are designed to safely carry the loads and to ensure that overall stability is established with an acceptable margin of safety.



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