SEEQUENT

UNDERSTAND THE UNDERGROUND



GeoStudio

GeoStudio 2D Flow

Confidently analyze your environmental, groundwater, or ground freezing problems

Seequent, The Bentley Subsurface Company

GeoStudio 2D Flow is a multi-physics 2D finite element software for modelling environmental protection, groundwater flow, climate, and ground freezing problems. Simulate simple saturated only, steady-state scenarios through to complex coupling of water, heat, gas, and/or solute physics.

2D

SEEP/W TEMP/W CTRAN/W AIR/W

Environmental Protection

With GeoStudio 2D Flow, you can couple heat, gas, solute, and water processes to analyze your environmental projects. Address mining and municipal waste problems from pre-construction and construction stages, through to long term performance. Consider both steady-state and transient conditions in your geotechnical design, leading to more efficient management of waste during and after project closure.



Soil Cover Design

Consider climatic effects on soil cover performance using the Land-Climate Interaction and Surface Energy Balance boundary conditions. Monitor the influence of vegetation and evaporation on deep percolation and gas transport.

Transport and Consumption of Oxygen

When your geotechnical design uses a capillary barrier, you can use GeoStudio 2D Flow to analyze oxygen transport through an unsaturated cover system and explore the effectiveness of oxidation within the water retention layer.

Solute Adsorption and Decay

Analyze contaminant transport from your environmental project due to advection and dispersion. Consider the influence of adsorption and decay on mass transport to discharge areas of concern.

Groundwater

Understanding the hydrogeological behavior of a geotechnical or natural system is critical when managing groundwater resources. GeoStudio 2D Flow can be used to analyze a number of groundwater problems, including dewatering systems, flow through tailings dams and hydraulic earth fill dams, analysis of hydraulic barriers, and much more.



Relief Well Spacing

A plan view analysis in GeoStudio 2D Flow can be used to analyze the influence of relief wells on the downstream side of an earth dam. The relative spacing of these relief wells can be compared in multiple analyses within the same project file.

Seepage Through Dams

The saturated/unsaturated material formulation allows for the evaluation of seepage through embankments and dams. Review how drainage systems can influence the flow through the embankments in your project file or modify core materials to review their impact.

Varying Water Levels

Simulate increasing or decreasing water levels in reservoirs or within ponds using transient hydraulic boundary conditions. GeoStudio 2D Flow can also simulate the filling and draining of a pond in response to nearby varying water levels using the Head vs. Volume boundary condition.



Ground Freezing and Climate Change

Geotechnical projects, particularly those in northern climates, can include the added complexity of understanding the influence of ground temperatures and climate change on engineering designs. GeoStudio 2D Flow allows the integration of water and heat physics to analyze the influence of an engineering design or climate change on the degradation of permafrost, the performance of artificial ground freezing systems during construction activities, the effect of convective heat transfer on embankments or soil cover performance, and much more.



Artificial Ground Freezing

Analyze the effectiveness of artificial ground freezing systems on controlling groundwater flow and stabilizing the ground near your tunnelling, waste management, and civil engineering projects. Consider even the most challenging systems by including forced-convection heat transfer.

Permafrost Degradation

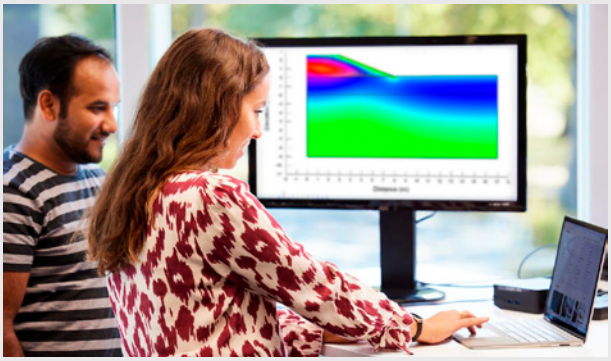
Harness freezing temperatures in your geotechnical design to improve performance and stability. GeoStudio 2D Flow includes both thermosyphon and convective surface boundary conditions, which can be used to analyze influence of embankments and infrastructure on permafrost degradation in northern climates.

Effect of Climate Change on Infrastructure

Analyze the effects of climate change on your geotechnical designs in northern climates. With the sophisticated Surface Energy Balance boundary condition, model the exchange of thermal energy at the ground surface to better understand the influence of freeze-thaw cycles on the performance of your waste cover systems.

Vadose Zone Hydrology

Complex processes in the vadose zone, including interaction between water in the porous media, climate, and vegetation, can make understanding water movement near the ground surface challenging. GeoStudio 2D Flow includes a multi-physics solver that can seamlessly couple water, heat, gas, and solute transport processes for geotechnical and environmental projects, including soil cover systems for mine or municipal waste.



Gas Particle Movement in Porous Media

Air movement through soil may be influenced by pore-air pressure, pore-water pressure, and soil temperature. Analyze potential gas migration through cover systems, in both single-phase air flow via air pressure gradients and dual-phase air flow within saturated/unsaturated materials.

Water Balance in Soil Cover Systems

Analyze the water balance of your soil cover systems using the Land-Climate-Interaction boundary condition. GeoStudio 2D Flow comes with 1D and 2D geometry types to analyze various ground surface conditions, including bare, snow-covered, and vegetated. Calculate net percolation, evaporation, runoff, and more.

Transpiration by Root Water Uptake

Water extraction via roots can have a significant impact on the near surface vadose zone. GeoStudio 2D Flow allows you to analyze the complex interaction between atmospheric climate conditions, vegetation, and the ground surface, including varying root depths and densities.



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A better understanding of the earth
creates a better world for all

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