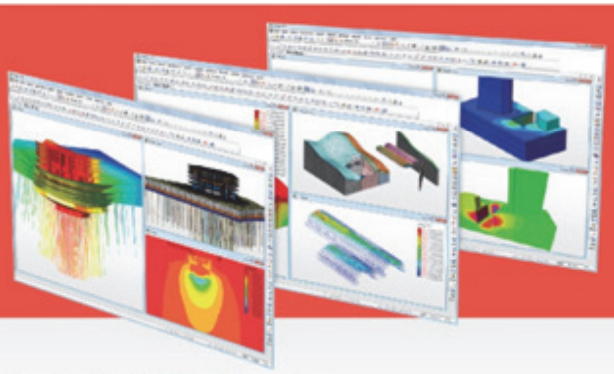
GTS NX
GeoTechnical analysis System

Integrated Solver Optimized for the next generation 64-bit platforms
Finite Element Solution for Geotechnical Engineering



Technical Specifications

Analysis Type Supported

Static Analysis

Linear static analysis

Non-linear static analysis (Non-linear elastic or Elasto-plastic analysis)

Construction Stage Analysis

Stress-Slope Analysis

Analysis of stress and slope stability during the construction process

Seepage Analysis

Stage by stage Steady state seepage analysis, Stage by stage Transient seepage analysis

Stress-Seepage-Slope coupled analysis

Sequential Seepage-stress analysis and Slope stability analysis during the construction process

Consolidation analysis

Consolidation analysis for environment change and construction process of embankment

Fully-coupled Stress-Seepage analysis

Stress analysis fully coupled with Transient seepage phenomenon

Analysis Type Supported

Seepage Analysis

Steady State Seepage Analysis

Transient Seepage Analysis

Coupled Seepage-Stress Analysis

Seepage-Stress Sequential Analysis

Consolidation Analysis

Fully-coupled Seepage-Stress Analysis

Dynamic Analysis

Eigenvalue Analysis

Response Spectrum Analysis

Linear Time History(Modal) Analysis

Linear Time History(Direct) Analysis

Nonlinear Time History Analysis

2D Equivalent Linear Analysis

Slope Stability Analysis

Slope Stability (Strength Reduction Method, SRM)

Slope Stability (Stress Analysis Method, SAM)

Dynamic-Slope Coupled Analysis

Analysis Options Supported

[Static]

Tab	Linear/Nonlinear Static analysis	Construction stage	*Consolidation analysis, *Fully coupled seepage stress	Seepage (Steady/ *Transient)	Slope stability (SRM/SAM)
General	Water pressure (Automatic)	Water pressure (Automatic)	Water pressure (Automatic)	Max. negative pore pressure	Water pressure (Automatic)
	In-situ analysis	Initial stage(ko) Restart option	In-situ analysis	-	Water level
	Initial temperature		Water level		Saturation Effects
	Water level		Saturation Effects		Max. negative pore pressure
	Saturation Effects		Max. negative pore pressure		Undrained Condition
	Max. negative pore pressure	Initial temperature	-		-
	Undrained Condition	Saturation Effects	-		-
		Max. negative pore pressure			
Nonlinear	Load steps	Load steps	Load steps	Load steps	Load steps
	Convergence Criteria	Convergence Criteria	Advanced nonlinear setting	Convergence Criteria	Convergence Criteria
	Use arc-length method	Advanced nonlinear setting	-	Advanced nonlinear setting	Use arc-length method
	Advanced nonlinear setting	-		-	Advanced nonlinear setting
Contact	-	Define analysis reflected contact	-	-	-
Seepage	-	-	-	Initial condition	-
Slope stability (SRM)	-	-	-	-	Nonlinear parameter
					Safety factor
					Advanced nonlinear setting (Use arc-length method)

[* : Time step setting analysis type]

Analysis Options Supported

[Dynamic]

Tab	Eigenvalue, Response spectrum	*Linear time history (Modal/Direct)	*Nonlinear time history, * Nonlinear time history +SRM	*2D equivalent linear
General	Initial temperature	Water pressure (Automatic)	Water pressure (Auto matic)	-
	Water level	In-situ analysis	In-situ analysis	
	15.Eigenvectors	Water level	Water level	
	Saturation effects	Eigenvectors	Saturation effects	
	Max negative pore pressure	Saturation effects	Max negative pore pressure	
	Undrained condition	Max negative pore pressure	Undrained condition	
	Mass parameters	Undrained condition	Mass parameter	
	-	Mass parameter	-	
	-	-	-	
Nonlinear	-	-	Converge standard	-
			Advanced nonlinear setting	
Dynamic analysis	Modal combination type	Damping definition	Damping definition	Effective shear strain
	Damping definition	-	-	Convergence
	Interpolation of spectral data			Interpolation control
	-			Mass parameters
Slope stability (SRM)	-	-	20.Difine time	-
			Nonlinear parameters	
			Convergence criteria	
			Safety factor	
			Advanced nonlinear Parameters (Use arc -length method)	

[* : Time step setting analysis type]

Constitutive Models

Type	Model type	Ground material	Structure material	Material behavior
Isotropic	Elastic	O	O	Linear elastic
	Tresca	O	O	Elasto-plastic
	von Mises	O	O	Elasto-plastic
	Mohr-Coulomb	O	O	Elasto-plastic
	Drucker Prager	O	O	Elasto-plastic
	Hoek Brown	O	O	Elasto-plastic
	Hyperbolic(Duncan-Chang)	O	X	Nonlinear elastic
	Strain Softening	O	X	Elasto-plastic
	Modified Cam Clay	O	X	Elasto-plastic
	Jardine	O	X	Nonlinear elastic
	D-min	O	X	Nonlinear elastic
	Modified Mohr-Coulomb	O	O	Elasto-plastic
	User defined model	O	O	Elasto-plastic
Orthotropic	Transversely Isotropic	O	O	Linear elastic
	Jointed Rock Mass	O	O	Elasto-plastic
2D Equivalent	2 Dimensional equivalent	O	O	(Equivalent) Linear elastic
Interface /Pile	Interface	X	O	Elasto-plastic
	Shell Interface	X	O	Elasto-plastic
	User supplied - Shell Interface	X	O	Elasto-plastic
	Pile	X	O	Nonlinear elastic

Element Library

Property type	Model type	Ground property	Structural property	Nonlinear property
1D	Geogrid(1D)	X	O	Tension Only
	Plot only(1D)	X	X	-
	Truss	X	O	From Material
				Tension Only/Hook
				Compression Only/Gap
				Nonlinear Elastic
	Embedded truss	X	O	From Material
				Tension Only/Hook
				Compression Only/Gap
				Nonlinear Elastic
	Beam	X	O	-
	Pile	X	O	-
2D	Geogrid(2D)	X	O	Tension Only
	Plot only(2D)	X	X	-
	Gauging shell	X	O	-
	Axisymmetric	O	X	-
	Shell	X	O	-
	Plane stress	X	O	Tension Only
	Plane strain	O	X	-
3D	Solid	O	X	-
Others	Rigid link	X	O	-
	Pile tip	X	O	-
	User specified behavior for Shell interface	X	O	-
	Point spring	X	O	Linear Elastic
				Tension Only
				Compression Only
				Hook
				Gap
				Nonlinear Elastic
	Matrix spring	X	O	-
	Interface	X	O	-
	Shell interface	X	O	-
	Elastic link	X	O	Linear Elastic
				Rigid Body
				Tension Only
				Compression Only
				Nonlinear Elastic

Load Conditions

Type of Static load	Description
Self weight	Input the self-weight of an element as a load
Force	Input the Force (as X, Y, Z axis direction component) on a desired model node
Moment	Input the moment (as X, Y, Z axis direction component) on a desired model node
Displacement	Input the displacement on a desired model node The displacement acts in the node coordinate system direction
Pressure	Input the pressure on a surface or line
Water pressure	Automatically input the water pressure load according to the position on the input water level line
Line beam load	When multiple beam elements are connected continuously, specify both ends of the beam element and input a distributed force
Element beam load	Input a distributed or force on a beam element
Temperature	Input the node temperature on an arbitrary node for thermal stress analysis. Input the initial temperature value used on a model node into the analysis condition
Prestress	Input the pre-loading on a Structure/Ground element
Initial equilibrium force	Input the initial in-situ stress
Combined load	Set the load combination using load sets and the factor for each set

Type of dynamic load	Description
Response spectrum	Input the spectrum data and load conditions needed for Response Spectrum Analysis
Ground acceleration	Input the ground acceleration in time load function form (DB can be used)
Time varying static	Multiply a time function by a static load to define a dynamic load
Dynamic nodal	Input the time load function (load component x time function) on an arbitrary node
Dynamic surface	Input the time load function(load component x time function) on a surface in pressure form
Load to Mass	Convert a static load to mass for application
Train Dynamic Load Table	Input or modify the train moving load using a table

Boundary Conditions

General

Supports /(Auto, Manual)

Change Material Property

Beam End Release

Shell End Release

Water Level [Line(2D), Surface(3D)]

Water Level for Mesh Set

Seepage / Fully Coupled Analysis

Nodal Head

Nodal Flux

Surface Flux

Review (Potential Seepage Review)

Slope Stability Analysis

Circular Slip Surface

Polygonal Slip Surface

Consolidation Analysis

Draining Condition

Non Consolidation

Dynamic Analysis

Transmitting Boundary

Elastic / Viscous Boundary