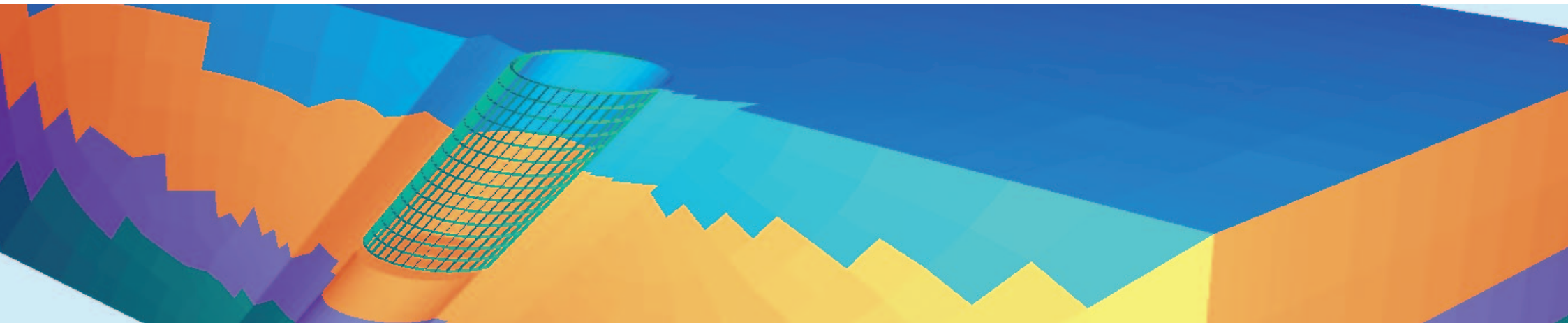SOFiSTiK

Geotechnical Engineering Software

Pre-Processing

CADiNP

SOFiSTiK offers a very powerful text-editor and script language to control the behaviour of all programs. Using the SOFiSTiK editor TEDDY the engineer can create parametric data-sets for any SOFiSTiK module.

- Input and control of all SOFiSTiK modules
- Local and global variables
- Arithmetic functions (LOG, EXP, SIN, COS)
- Loops and Jumps (LOOP)
- Logic queries (IF, ENDIF, ELSE)
- Direct access to the SOFiSTiK database (@key)
- Simple sketches
- Free comments
- User defined macros
- Line or Column-Input
- Archieve-Wizard
- All commans in English
- Full-Text-Search
- Contextsensitive help as PDF-file
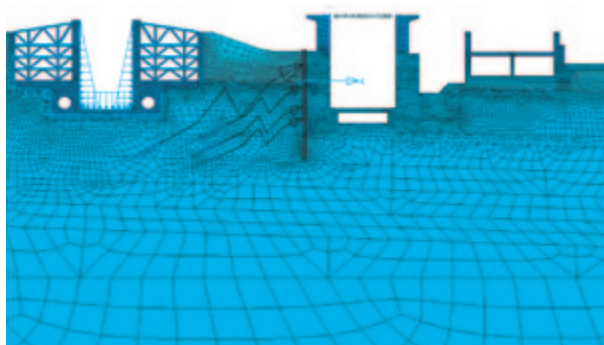
WinTUBE

WinTUBE, developed by our partner company FIDES, is a professional and interactive CAD preprocessor especially designed for tunnel- and geotechnical systems. WinTUBE is being used as a very powerful tool for the system, mesh and load generation, as well as for the management of construction stages.

- CAD-functionality
- Automatic intersection of structural volumes or structural surfaces,
- Extensive control of visibilities, named views
- Intelligent selection of objects
- Windows standard like: undo / redo, copy & paste, context sensitive menu, …
- DXF-import, import of structures from an existing SOFiSTiK-database
- Numerous wizards f.e. for: tunnel-cross-sections, tunnel-junctions, construction stages, loading, file check …
- Automatic mesh generation
- Structured grids and unstructured meshes may be mixed up, automatic detection of structural surfaces
- Functions for mesh enhancement of selected mesh regions, refinement- and compulsory points, …
- Generation of excavation- or construction phases and loading
- Data generation for the SOFiSTiK program HYDRA for seepage or thermal analysis
- Generation of non-linear 2D- und 3D-Interface elements, …
- Generation of 3D-Models by extrusion of any plain system or using the unstructured mesh generator for 3D-meshes with tetrahedral elements
- Simulation of tension- and tubbing-hinges
- Powerful generation of pile and pilecap systems in combination with volume elements
- FIDES-WinTUBE generates pure ASCII-files, simultaneous editing with FIDES-WinTUBE and TEDDY is possible
- Merging of multiple files, saving of subsystems,multiple copying
- Cut-and-Cover, Shotcrete
- TBM Systems
- Tubbings, Emergency shafts, portals
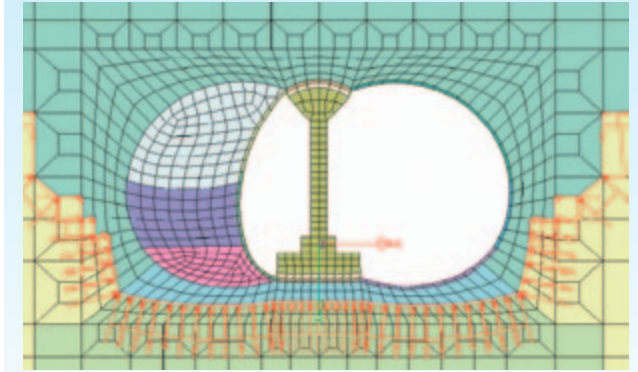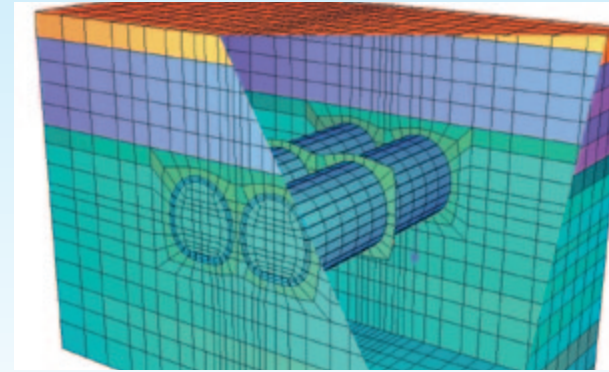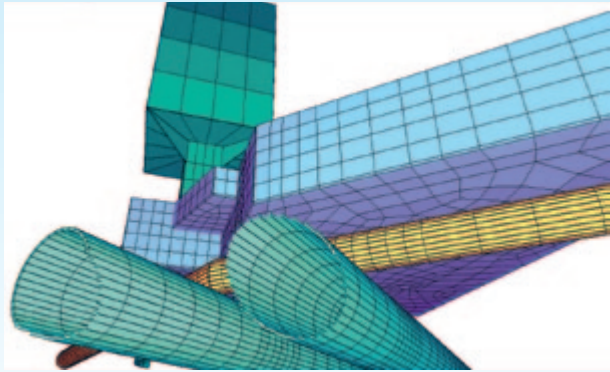
Material and Soil Models

- Orthotropic material
- General elastoplastic models with associative/ non-associative flow and various failure conditions, e.g.
  – von Mise
  – Drucker-Prager
  – Mohr-Coulomb
  – Lade
  – Gudehus
- General viscoplastic laws for modeling time dependent effects, such as
  – Creep
  – Short/long term strength
- Oriented shear planes for jointed materials
  – Oriented shear planes
  – Scalar damage model for tensile failure

- GRAN - advanced soil model
  – (Double-)hardening plasticity
  – Automatic calibration for
    - Realistic simulation of compressive loading states
    - Realistic simulation of deviatoric hardening response
      (Kondner Hyperbola)
  – Stress dependent stiffness formulation
  – Automatic consideration of loading direction
    (different stiffness response for primary and
    un-/reloading stress paths)
  – Failure condition according to Mohr-Coulomb
  – Loading state dependent dilatancy effects
- Swelling soil/squeezing rock
  – Time and stress dependent strain evolution
- Hypoplastic material model
  – according to v. Wolffersdorff
- Interface for user supplied material models
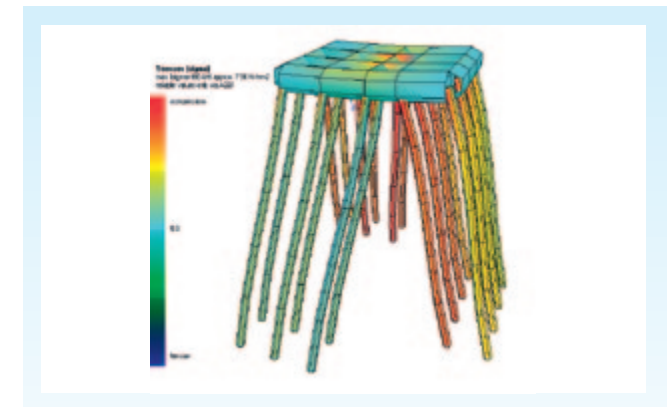
Processing

- 2D-Beam system (planar beam) - not any more state of the art of the analysis technique
- 2D-Finite element disc systems (plane strain)
- Non-linear bedded 3D shell element systems
- Non-linear 3D volume element systems
- Iterative 3D models
- Combinable elements:
  - Beam / disc / shell / volume / spring / cable / truss / pile
  - Compound elements: e.g. anchor analysis, contact elements, plastic hinges, etc …
- Construction stages
  - Integrated Constuction Stage Manager for Geotechnics in TALPA
  - Step-by-step method with group simulation
  - Iterative (β) method with fixed mesh for stress transition during the iteration
- Time step analysis for viscose material
- Dynamic analysis
- Seepage Analyis with HYDRA
- Analytical Halfspace Analysis

Post-Processing

- RC Design of Shells and Beams (EC, DIN, ÖNORM, ACI, SNIP …)
- Automatic superpositioning of results
- Powerful graphical / numerical result evaluation with WinGRAF / DBView
- Direct database access through FORTRAN, C++, VBA Interface

SOFiSTiK