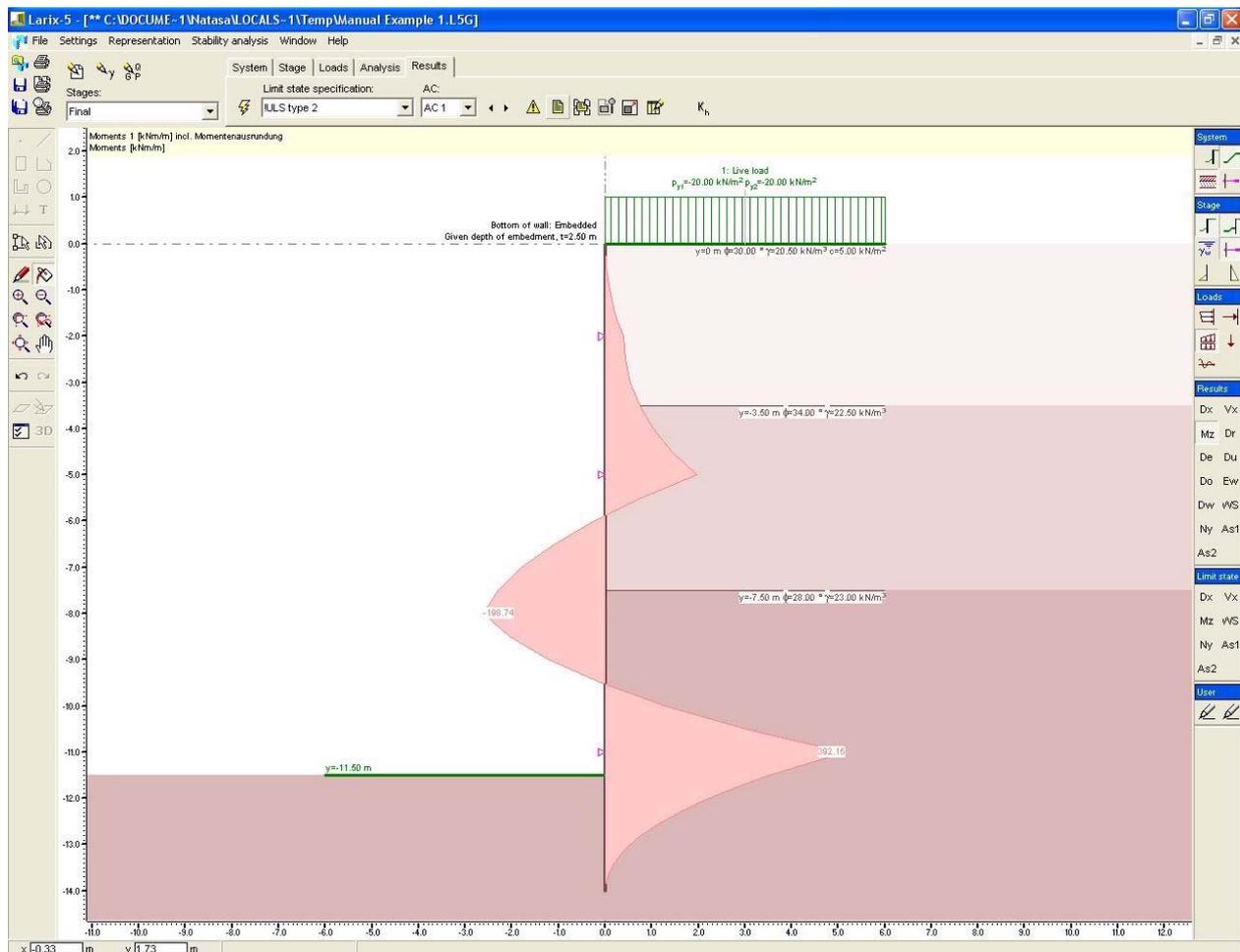# LARIX-5G

Geotechnical Engineering

Excavation walls
New Codes
Windows Environment

With the module LARIX-5G anchored and unanchored excavation walls such as sheetpile walls, diaphragm walls, bored pile walls and soldier pile walls can be analyzed. In this way the stepwise construction process can be simulated realistically.

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Geotechnical model

- Horizontal soil layers can have different cohesion values on the active and passive sides
- Ground surface is horizontal, sloping or broken (non-straight, stepped)
- Base of excavation is horizontal, sloping or with berms
- Horizontal water table on both sides of the excavation walls, with hydrostatic and hydrodynamic water conditions

Walls

- Closed and open wall systems with arbitrary boundary conditions at the top of the wall
- Vertical or inclined wall with variable bending stiffness

Construction stages

- Simulation of a stepwise construction process
- Automatic building of limit state values over all construction stages

Methods of analysis

- Well known general methods of analysis to determine the depth of embedment, the sectional forces (internal forces and moments) in the wall and wall displacements for stage construction

Supports (anchors, props etc.)

- Rigid or elastic boundary conditions for the supports
- State 'active' or 'inactive' in the construction stages can be changed (installation and removal of the supports)
- Import of wall displacements on installation of the supports or direct specification
- The effects of support displacements can be investigated

Earth pressure

- Earth pressure analysis according to Coulomb
- Analysis of passive resistance according to Coulomb, Caquot-Kırisel or Weissenbach
- Redistribution of earth pressure from the excavation level down to the point of zero earth pressure or down to the bottom of the wall
- Shape of redistribution: rectangular or arbitrary polygon
- Portion of earth pressure at rest can be chosen freely

Loading

- Constant surcharge on the active and passive sides of the excavation (e.g. for dismantling states)
- Uniformly distributed area and line loads on the active excavation side
- Earth pressure components due to the loads can be considered, if desired, in any earth pressure redistribution
- Concentrated und distributed loads on the wall
- Horizontal and vertical earthquake loading

Results

- Required depth of embedment, if not prescribed
- Forces in the supports (anchors and/or the struts and braces)
- Graphical and tabular presentation of results: wall pressures, shear forces, bending moments, displacements

Stability of excavations

- The determination of the overall stability and of the required anchor lengths of anchored excavation walls can be carried out with the module LARIX-5S
- All input data of the module LARIX-5G and the calculated support forces are automatically imported into the stability analysis

Safety concept

- Dimensioning according to the ultimate limit states for structural safety and serviceability (compatible with the Eurocodes)
- Uncertainties in the actions, the soil and material properties, the geometrical properties and the analytical model are taken into account by means of partial safety factors
- Tabular management of all - partly limit state-dependent – safety factors
- Automatic building of all necessary action combinations for the required limit states
- User-defined action combination
- Dimensioning according to the old safety concept with a global safety factor is possible

Results and limit states

- Dimensioning and verifications are carried out in the prescribed limit states
- Results for each limit state and each action combination
- Limit values over all action combinations

User interface

- User-friendly graphics input of all geometrically-defined data for the geotechnical model and loading using the object-oriented Graphics Editor with the usual CAD construction possibilities
- Multi-step Undo-/Redo function
- Very simple modification possibilities for all input data, both for individual objects and for object groups
- Search for objects with specific properties
- Management of all input objects according to type in individual management layers, whose visibility can be activated or deactivated as required
- Import of any type of input object from one analysis to another using copy/paste
- CAD drawing functions to complete figures (dimensions, labelling, line and area objects)
- Possibility of configuring working environment (colours of individual objects, symbol sizes, font sizes, dimension units and number of decimal places for all quantities, default values for dialogues)
- Detailed, context-sensitive help system and hints directly on the cursor itself; the manual can also be consulted on-line and with search for technical terms
- Operating systems Windows NT, 2000, XP

Interfaces

- Import und export in DXF format
- Export of graphics and texts to other applications (Word, Excel, etc.) via the clipboard
- Input data from LARIX-2, LARIX-3 and LARIX-4

Printing (CubusViewer)

- Page preview of the documents queued for printing with the possibility of changing dimensions, moving documents, pasting and deleting via the clipboard
- User-defined document template (free design of page header and footer) with firm's logo, etc.

Project management (CubusExplorer)

- Clear overview of project management in the style of the Windows Explorer
- Functions like archieving, file compression, moving, deleting, etc., for individual analyses or whole folders
- Graphical preview for user-friendly searching of an analysis

More LARIX-5 programs

- Overall stability
- Retaining walls