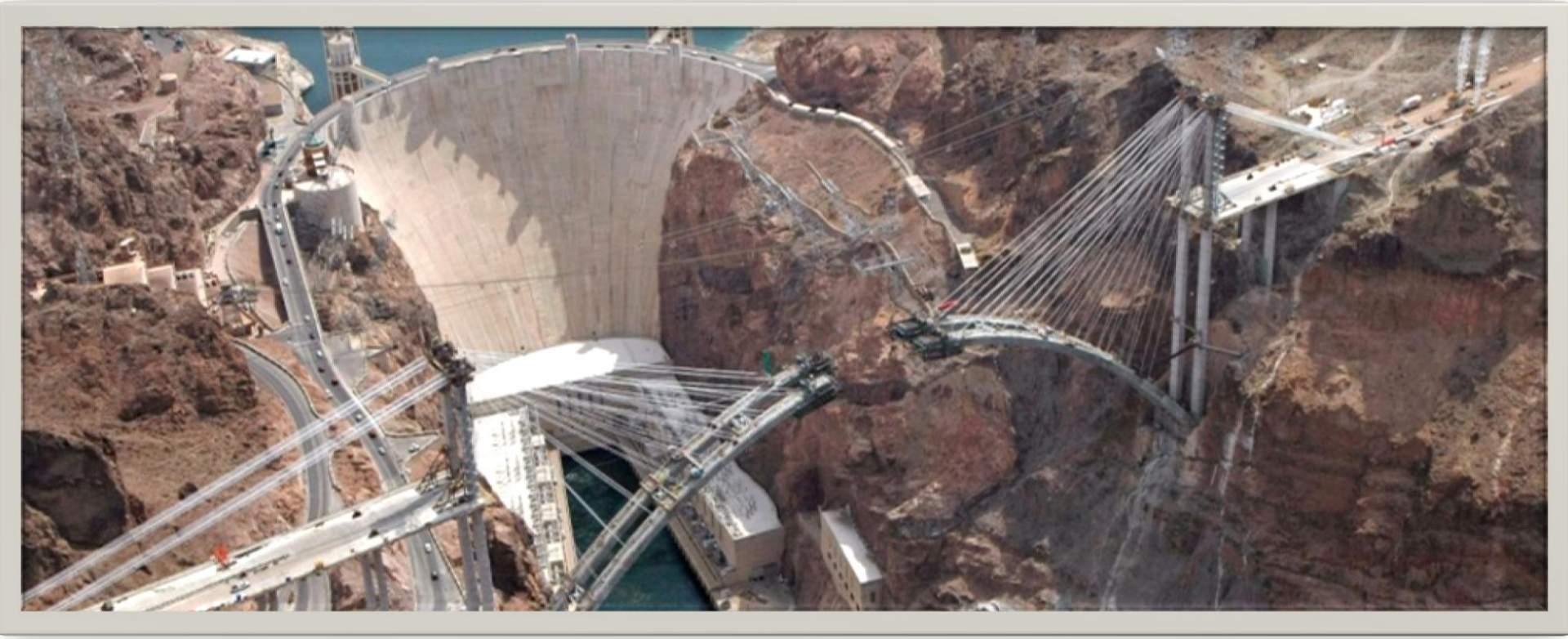


Soil Liquefaction Analysis Software

NovoLiq

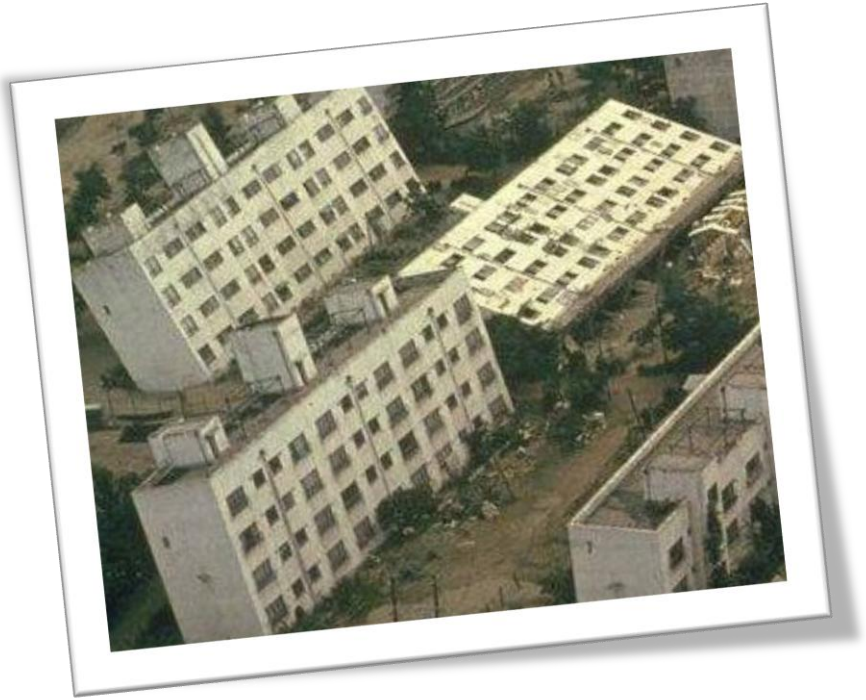
NovoTech software

www.Novotechsoftware.com

Soil liquefaction is a phenomenon in which the strength and stiffness of soil is reduced during earthquake shaking. The main reason for loss of shear strength of soil is pore pressure build up.

Susceptibility of a site to liquefaction depends on a series of parameters including but not limited to:

- Soil void ratio
- Soil density
- Soil permeability
- Geological history of site
- Ground water level
- Nature of the earthquake shaking



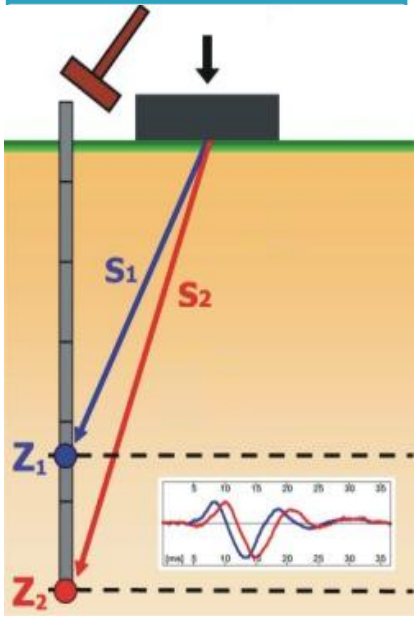
Many different methodologies have been developed during last few decades for soil liquefaction assessment. Most of them use in-situ test results in conjunction with site stratigraphy to estimate the potential of soil layers to liquefaction.

Following is the list of the most common tests:

SPT

CPT

Shear Wave Velocity



Liquefaction-induced movements and residual shear strength of the soil are very critical in liquefaction analysis. Following pictures show the disastrous lateral spreading during earthquake:

Before

After


CHIGUAYANTE
HUALPEN
A 200 MTS

What is your tools for liquefaction analysis?

- Excel spreadsheets?
- Design charts?
- Flac?
- …

- **How much does it cost for you?**
- **Are the results reliable?**
- **How long does it take?**
- **How many methods are incorporated into your analysis?**

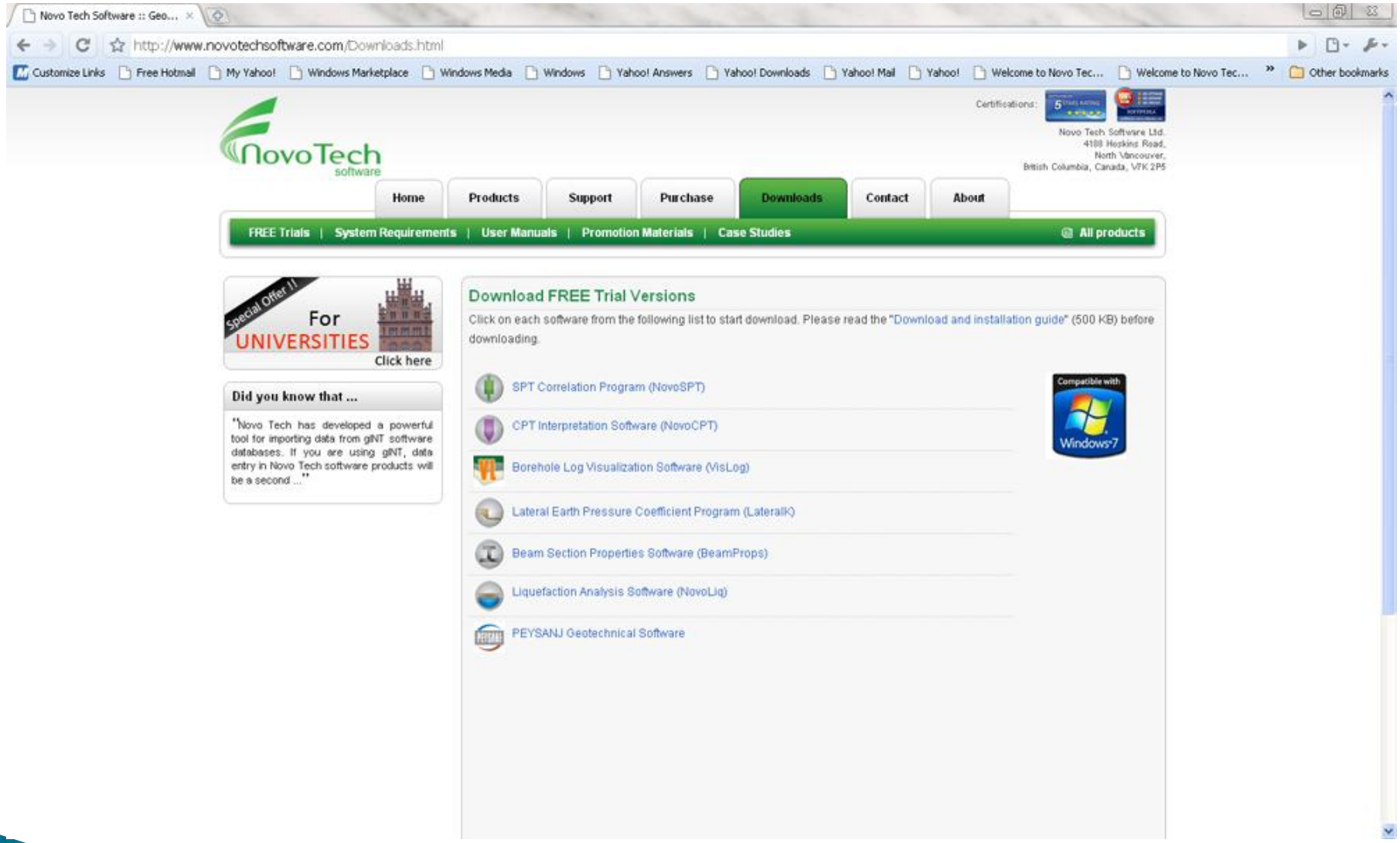
Introducing:

Liquefaction Analysis Software

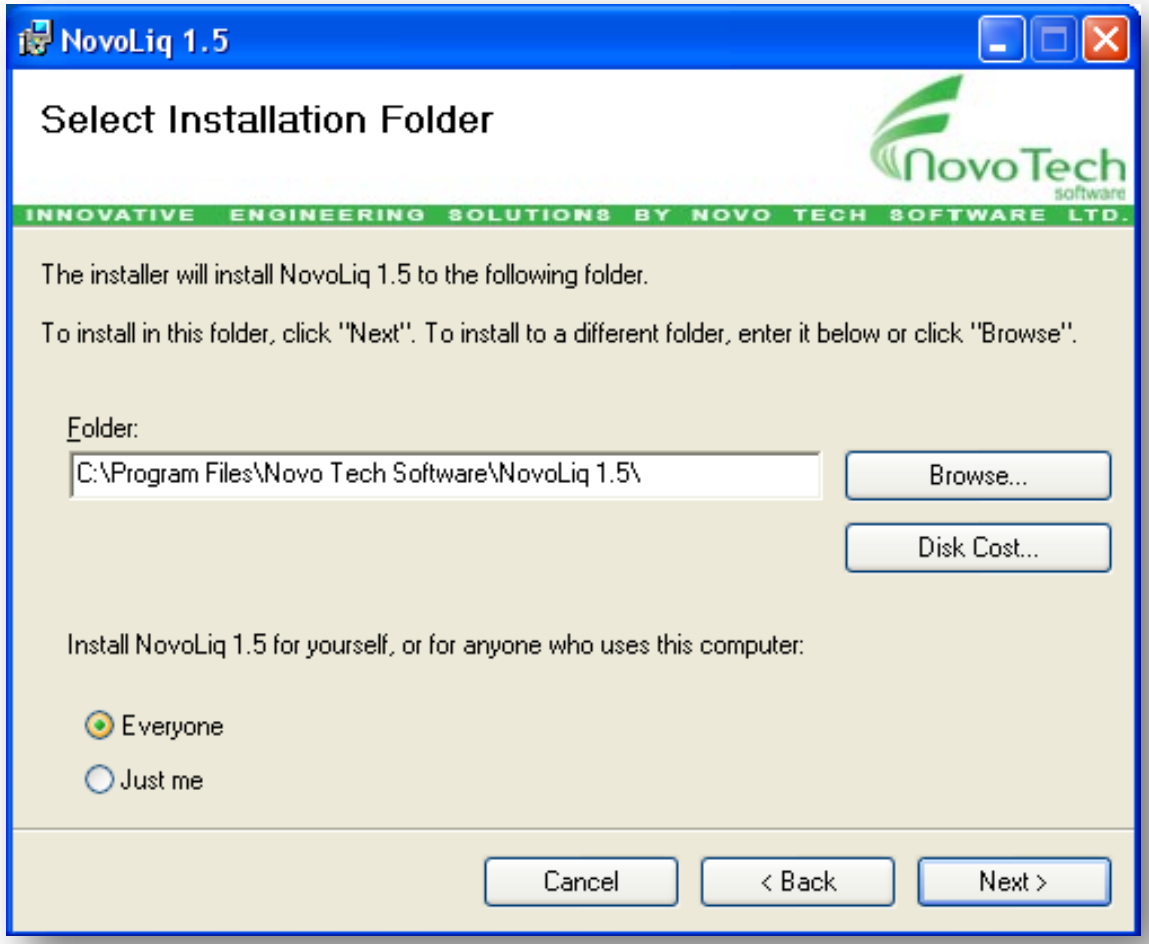
NovoLiq

Developed by:
Novo Tech Software Ltd.
Vancouver, Canada

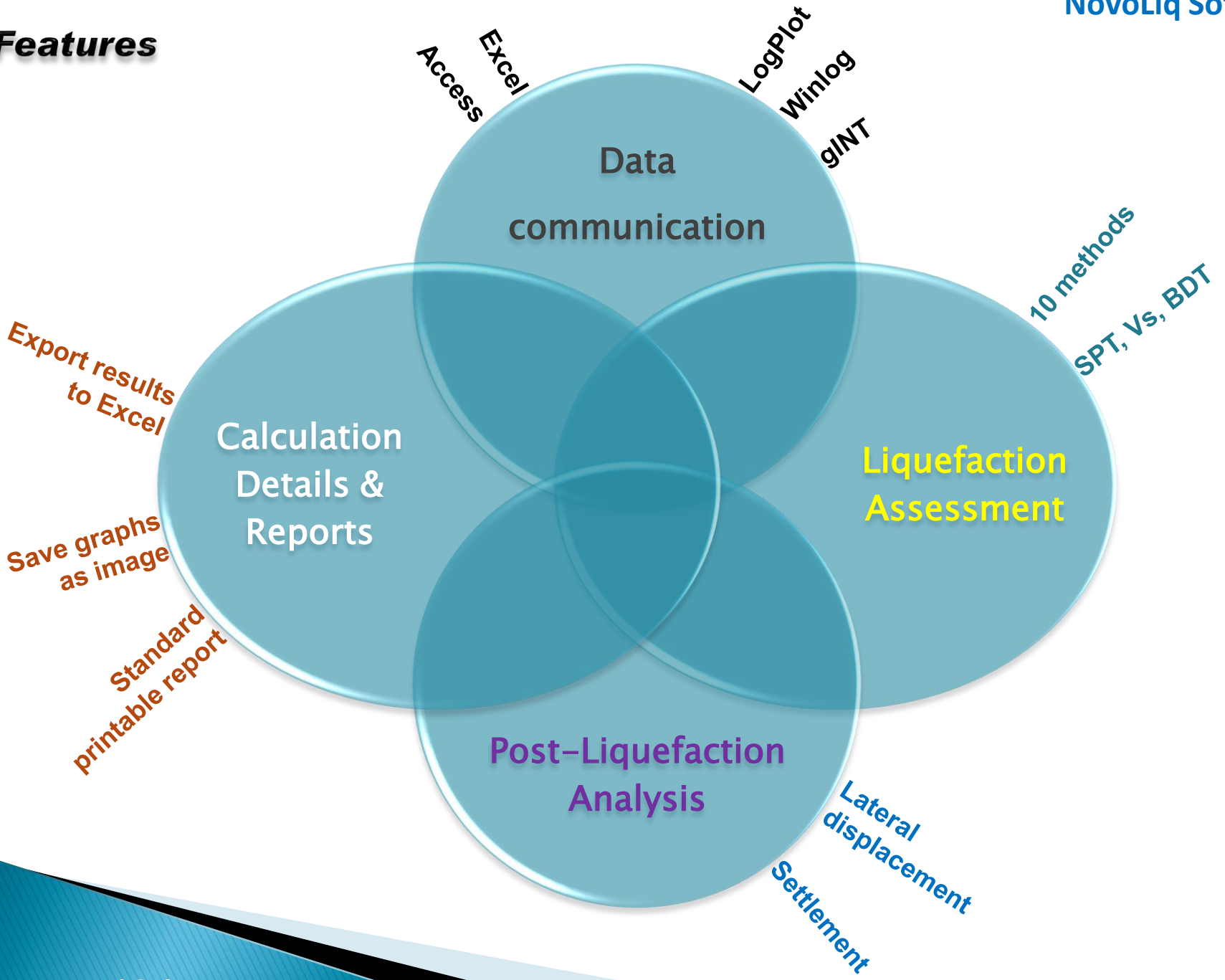
Easily download the software from our website



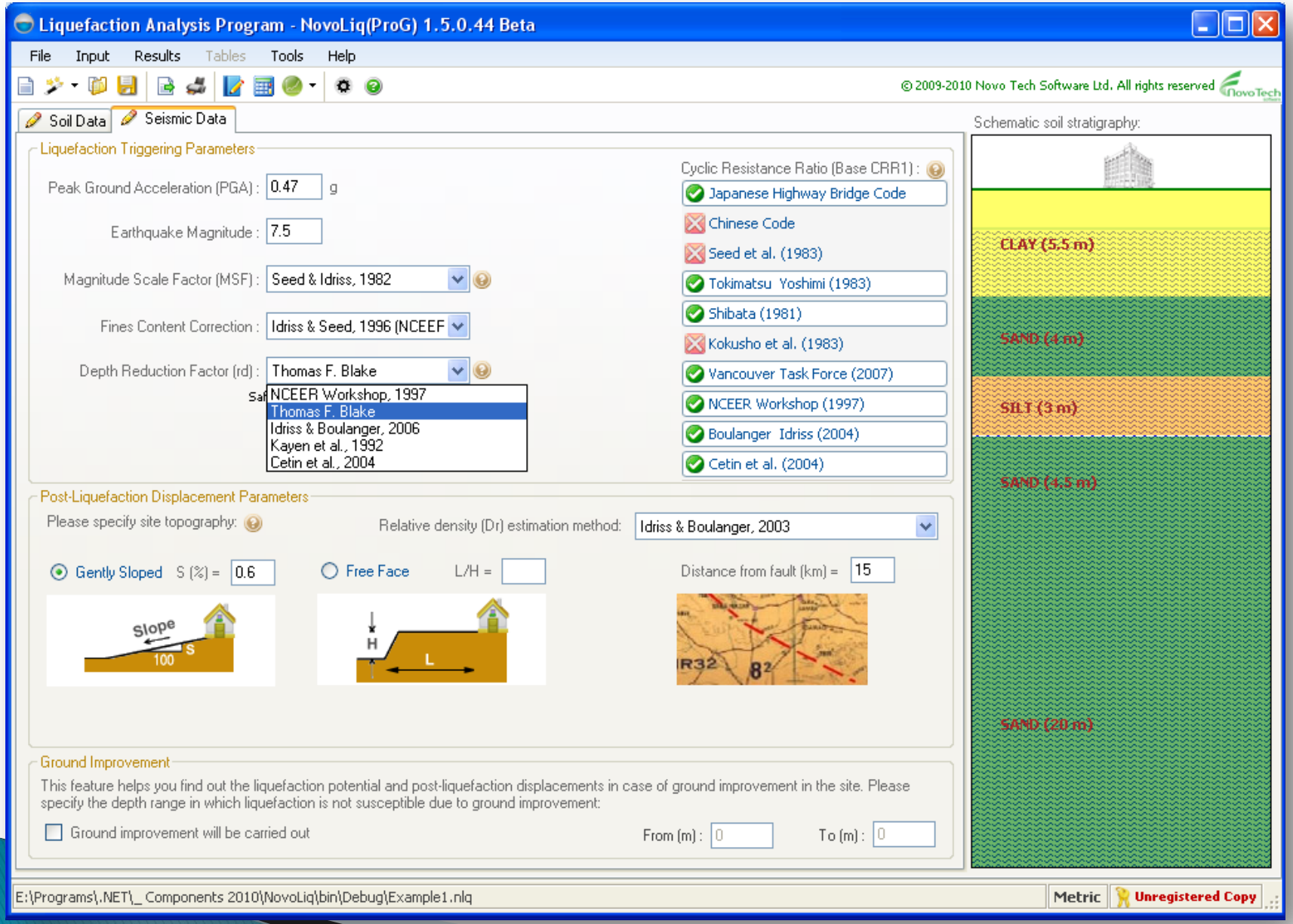
Quick and easy installation



Features


Access
Excel
LogPlot
Winlog
gINT
Data communication
10 methods
SPT, Vs, BDT
Export results to Excel
Calculation Details & Reports
Liquefaction Assessment
Save graphs as image
Standard printable report
Post-Liquefaction Analysis
Lateral displacement
Settlement

Input data for soil liquefaction analysis



NovoLiq, provides you with several options:

Field Tests

- Standard Penetration Test (SPT)
- Becker Penetration Test (BPT)
- Shear Wave Velocity (Vs)

Overburden Correction Methods

- Gibbs and Holtz, 1957
- Peck and Bazaraa, 1969
- Peck, Hanson and Thornburn, 1974
- Seed, 1976
- Tokimatsu and Yoshimi, 1983
- Liao and Whitman, 1986
- Skempton, 1986
- Samson, 1986
- Canadian Foundation Engineering Manual, 2006

SPT Corrections

- Depth (Overburden) Corrections
- Hammer Energy Correction
- Borehole Diameter Correction
- Rod Length Correction
- Sampling Method Correction
- Water Level Correction

Becker Conversion

- Harder & Seed
- Alex Sy & Campanella

NovoLiq, provides you with several options:

Liquefaction Analysis Methods (CRR)

- NCEER Workshop (1997)
- Vancouver Task Force (2007)
- Boulanger and Idriss (2004)
- Cetin et al. (2004)
- Japanese Bridge Code
- Chinese Code
- Seed et al. (1983)
- Tokimatsu-Yoshimi (1983)
- Shibata (1981)
- Kokusho et al. (1983)

Silt Content Correction

- Idriss & Seed, 1997 (NCEER Workshop)
- Robertson & Wride, 1997 (NCEER Workshop)
- Idriss & Boulanger, 2004
- Cetin et al., 2004

Depth Reduction Factor (rd)

- NCEER Workshop, 1997 recommended
- Thomas F. Blake
- Idriss & Boulanger, 2006
- Kayen et al., 1992
- Cetin et al., 2004

Magnitude Scaling Factor

- Seed & Idriss, 1982
- Idriss
- Ambraseys, 1988
- Andrus & Stokoe
- Arango, 1996
- Youd & Noble, 1996Ohba and Toriumi, 1970
- Tokimatsu and Seed, 1987

NovoLiq, provides you with several options:

Liq. Lateral Displacement

- Zhang, Robertson & Brachman, 2004
- Youd et. al., 2002
- Barlett and Youd, 1992
- Hamada et. al., 1986
- Youd and Perkins, 1987

Liq. Settlement

- Ishihara & Yoshimi, 1992

Residual Strength

- Idriss & Boulanger, 2009

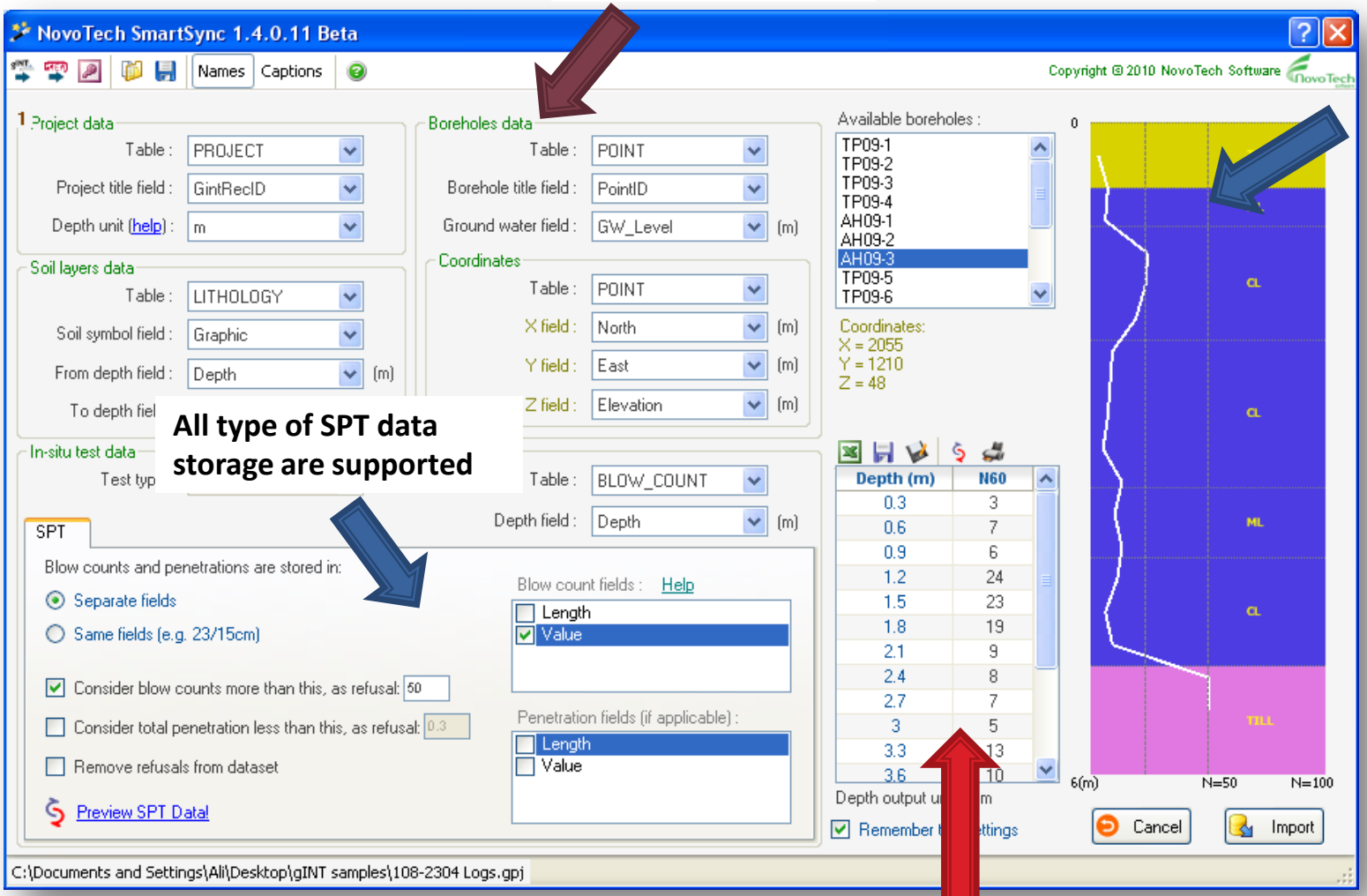
Probability of Liquefaction

- Youd and Noble, 2001
- Cetin et al., 2004

Please see more options in our website ...

Import your borehole log/ SPT data from gINT files

Database structure

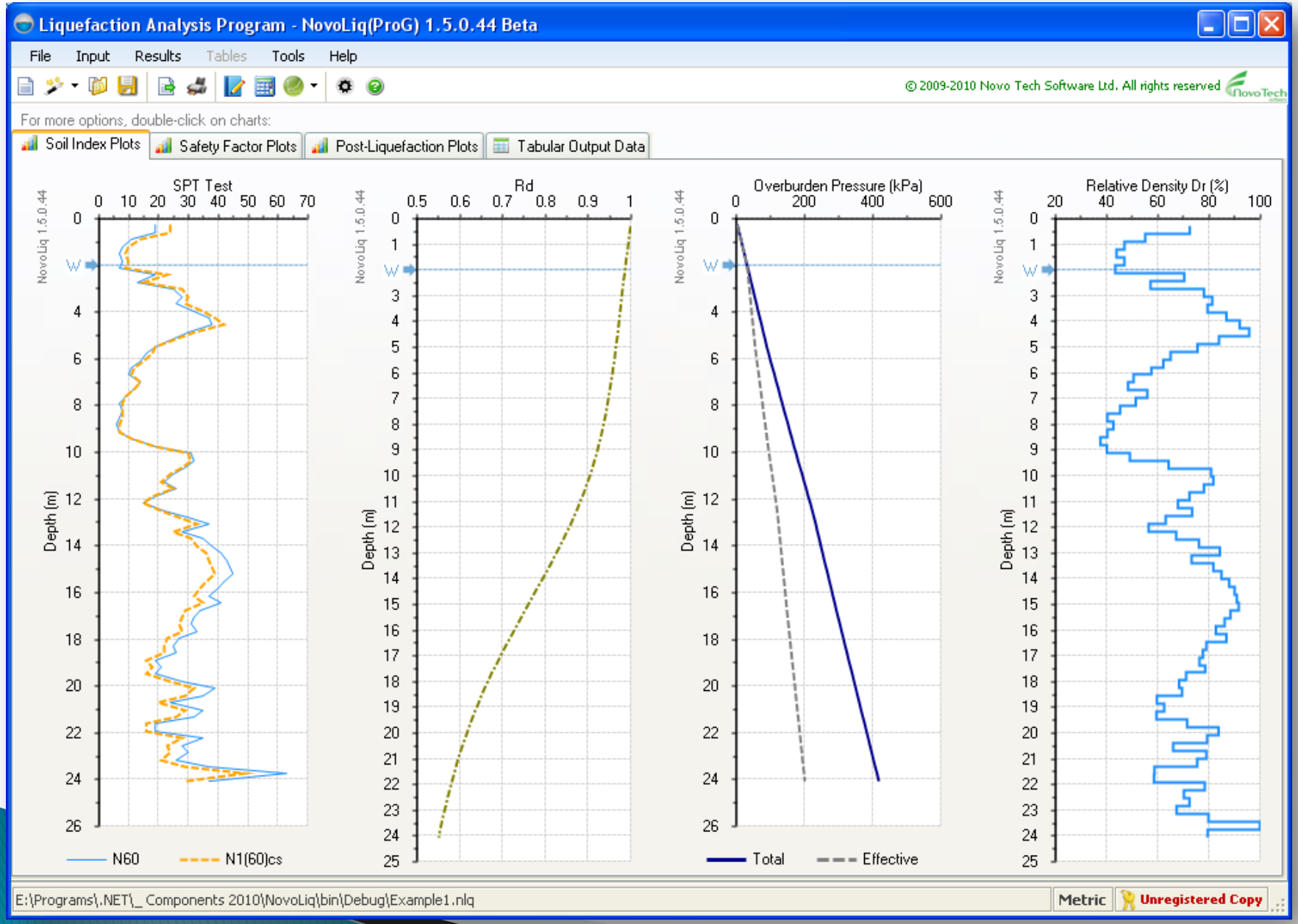


All type of SPT data storage are supported

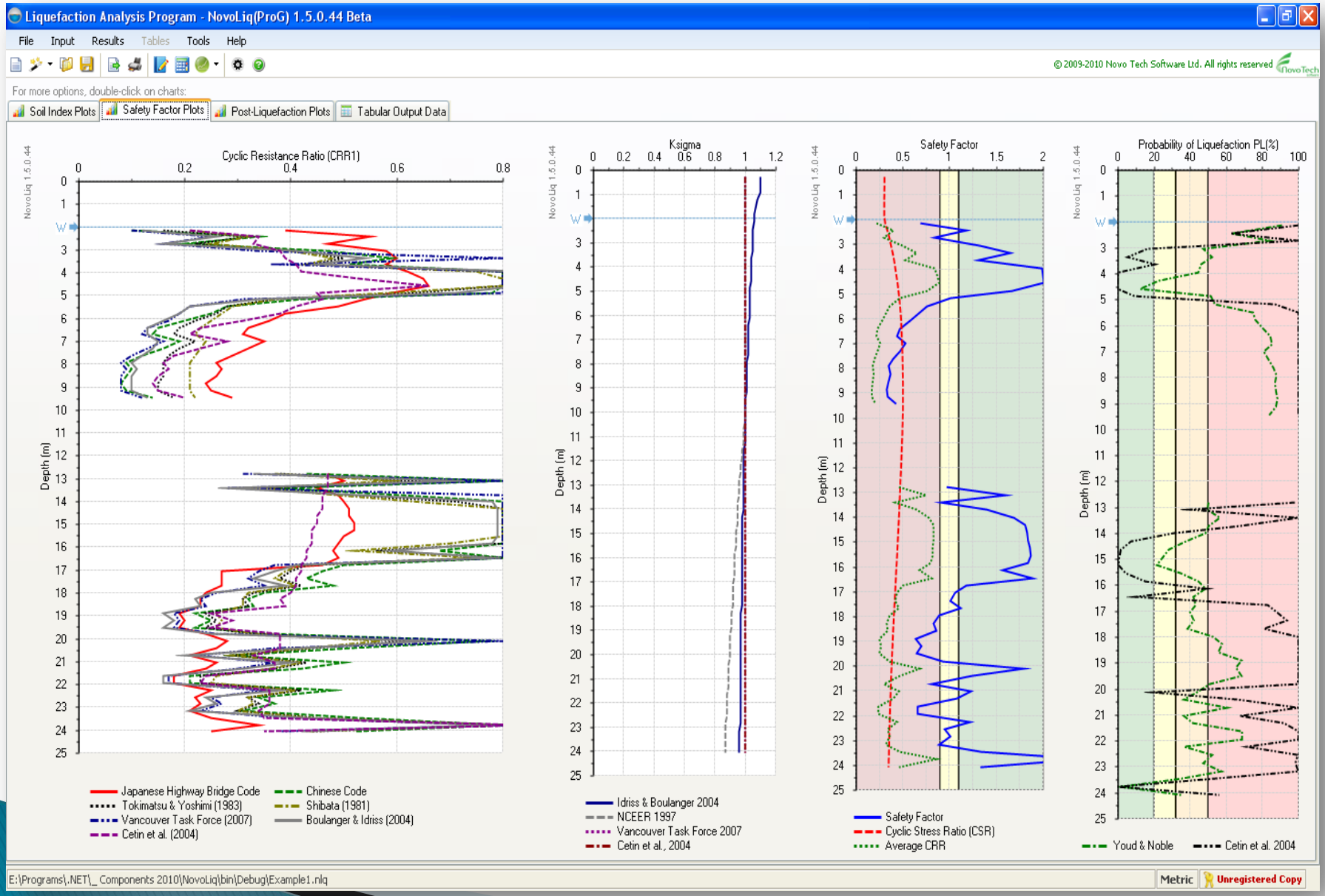
Schematic soil layers and SPT plot

SPT blow counts for selected borehole

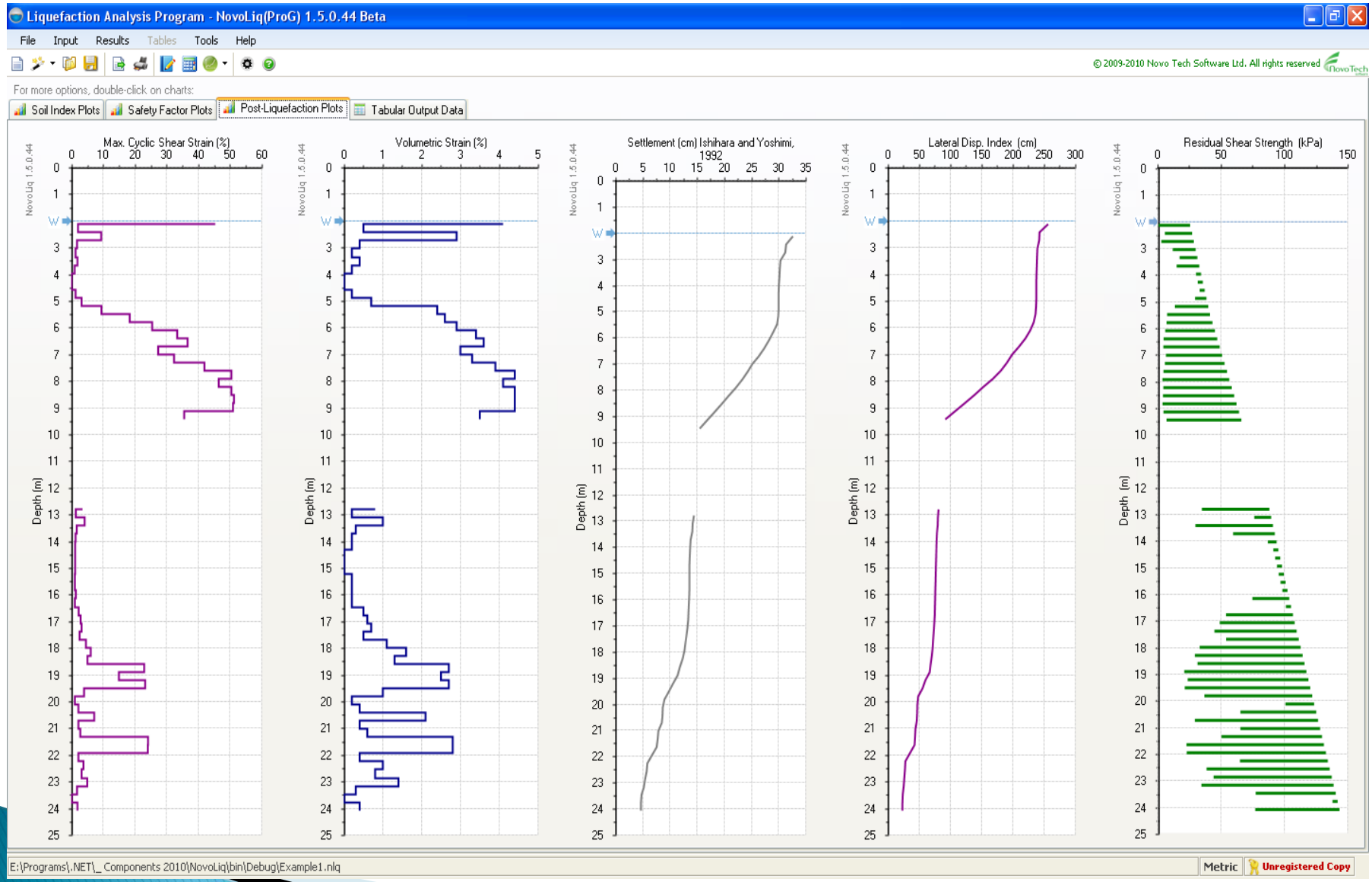
Analysis results include:



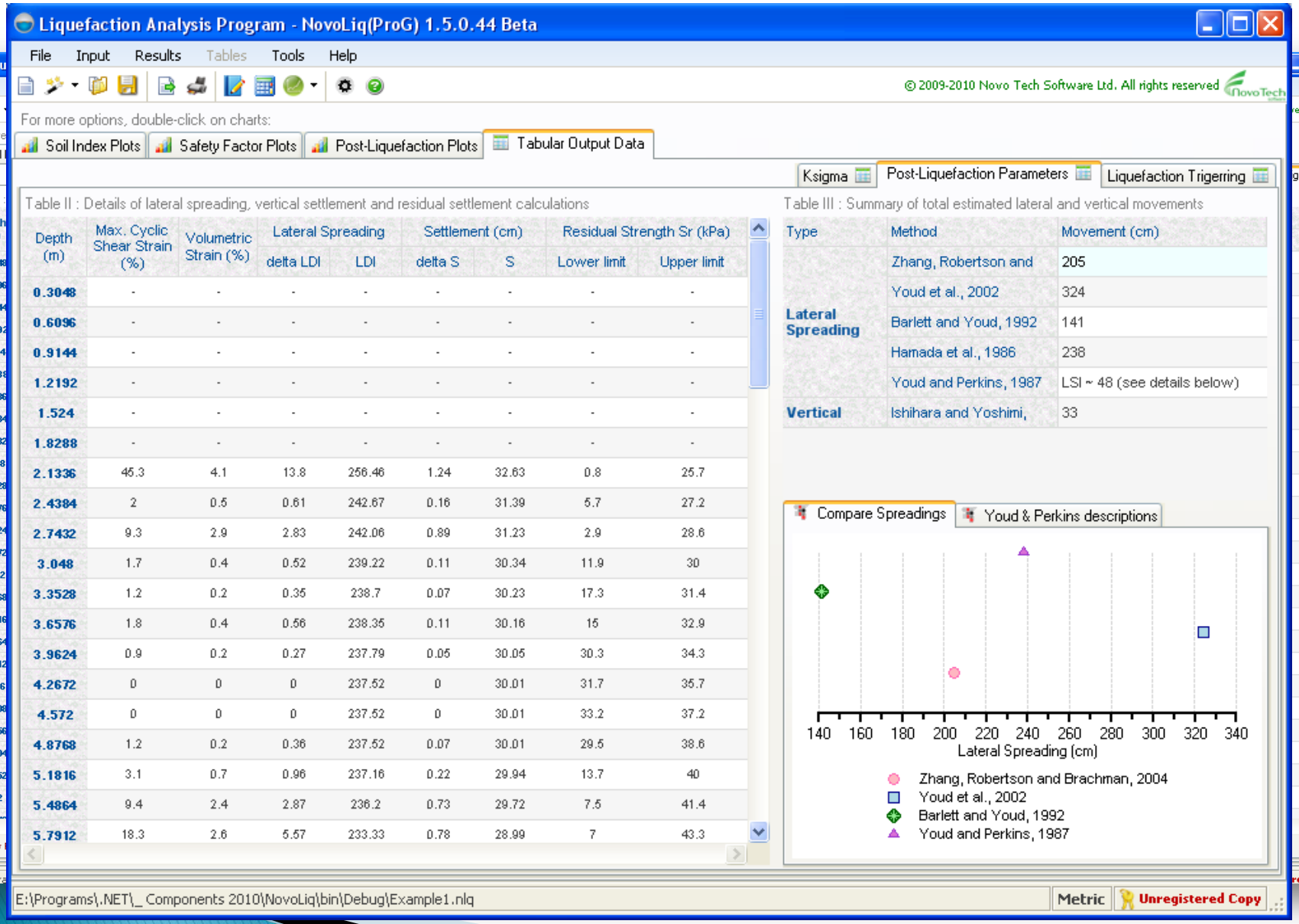
Analysis results include:



Analysis results include:



All calculation details are presented as tabular data:



Help file for using program features as well as theory manual:

NovoLiq User Manual

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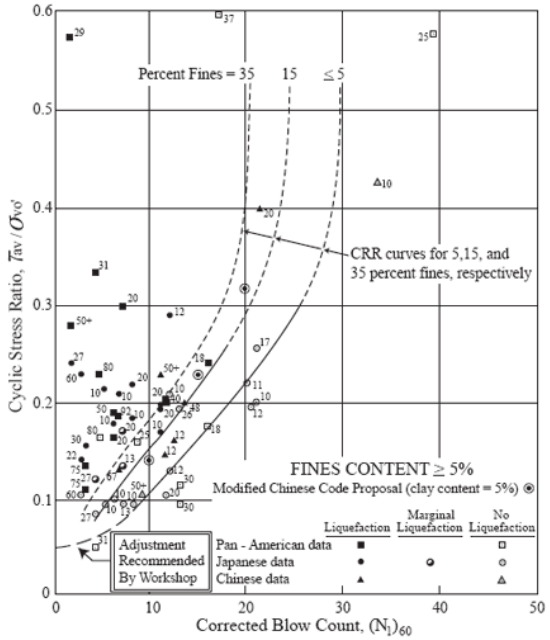
Liquefaction Assessment Theory - Standard Penetration Test (SPT)

All CRR_1 calculation methods utilized in NovoLiq are described below:

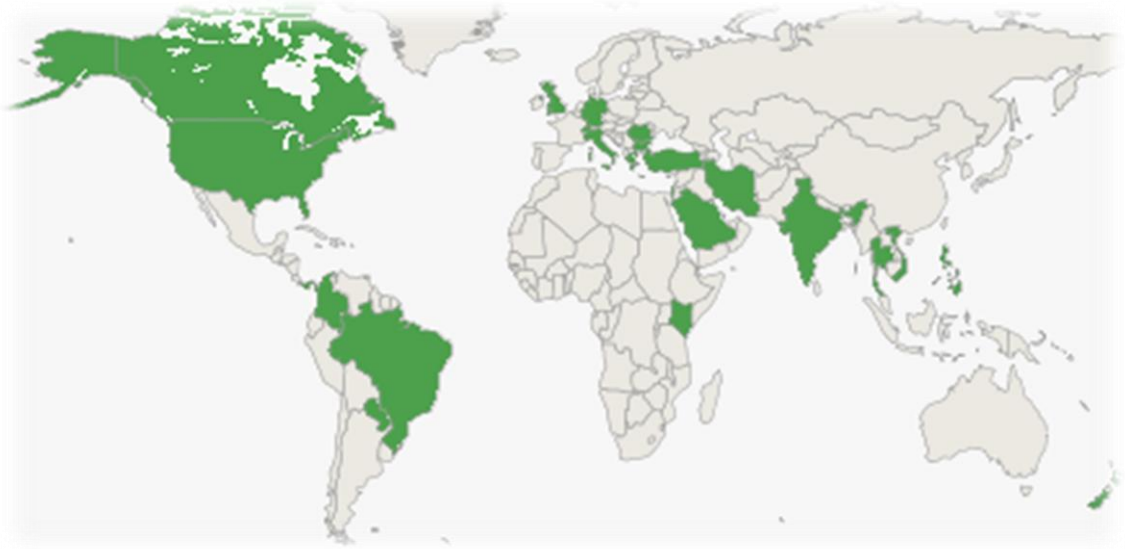
NCEER (1997) and Vancouver Task Force Report (2007)

These two methods are very similar expect that in "Vancouver Task Force Report (2007)" a K_σ parameter is multiplied in CRR_1. In these methodologies, CRR_1 is a function of depth corrected SPT blow counts $N1_{(60)}$ for clean sand (fines content less than 5 percent). For sands containing more fines content, more corrections will be applied on $N1_{(60)}$. The CRR_1 curve proposed by these methodologies based on $N1_{(60)}$ is shown below:



In **NovoLiq**, the equation proposed by Thomas F. Blake (Fugro West Inc., Ventura, California) recommended by NCEER Workshop (1997) for clean sand curve, is used. The factor K_σ is calculated from the following formula:

$$K_\sigma = (\sigma' / P)^{f-1}$$



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