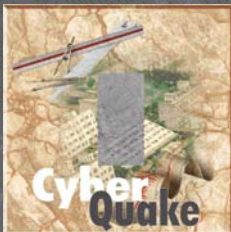




CyberQuake



CyberQuake : a computer-aided design tool for evaluating seismic soil response

Non linear behaviour of soil deposits **should** be included in analysis of strong motion earthquakes

Numerical modelling of seismic soil response is **possible** and permits:

⇒ **after the seismic event**

- ✓ better understanding of phenomenon
- ✓ access to distribution of motion with depth
- ✓ evaluating unrecorded quantities (pore-pressure, irreversible displacement,...)

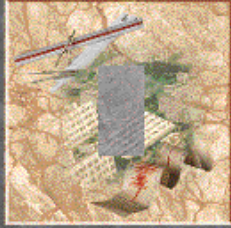
⇒ **before the seismic event**

- ✓ better design of structures

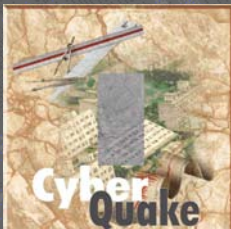


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brgm



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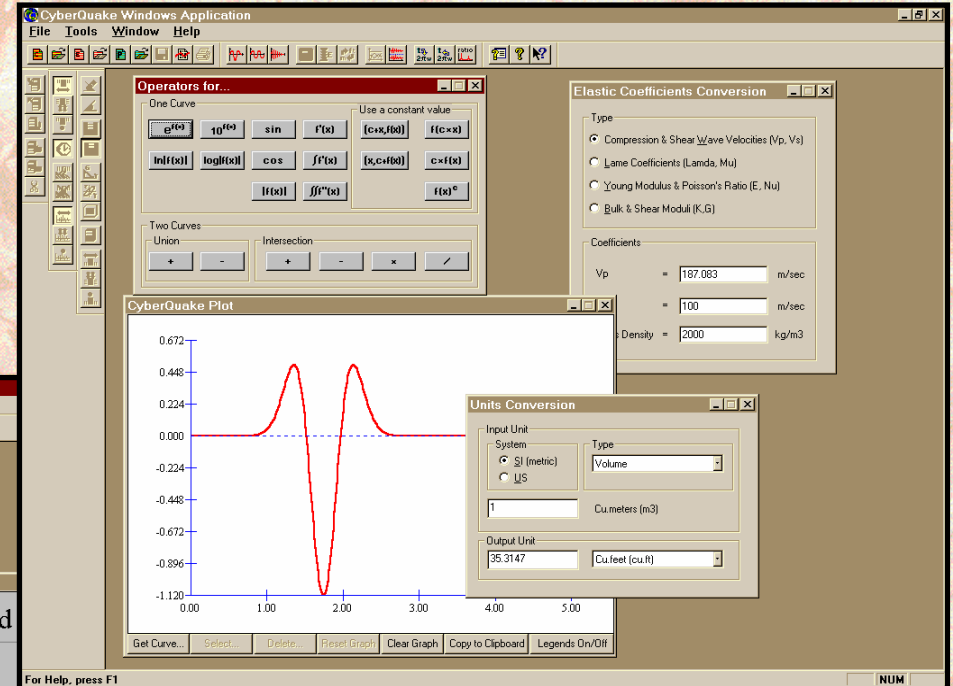
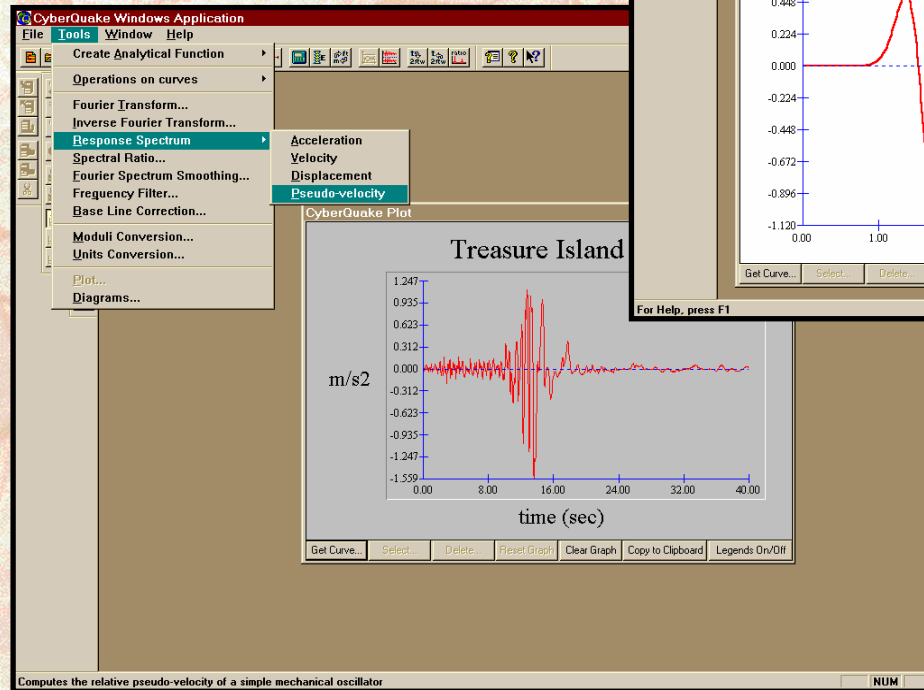
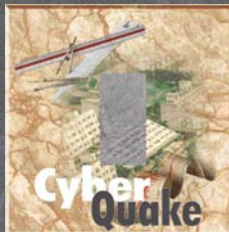


CyberQuake : A Software for Earthquake Engineers and Researchers

- ✓ **Multilayered soil profiles (1D geometry)**
- ✓ **Drained, totally or partially undrained conditions**
- ✓ **Rigid or deformable bedrock**
- ✓ **Two versions (2D or 3D kinematics)**
- ✓ **Linear elastic, equivalent linear and elastoplastic behaviour assumption**
- ✓ **Integrated Constitutive model driver**
- ✓ **Deconvolution of input motion from Control Point**
- ✓ **External load at the ground surface**
- ✓ **Extensible accelerogram Data Base**
- ✓ **Tools for accelerogram treatment**
- ✓ **Integrated graphics and on-line Help**
- ✓ **Interactive user-friendly software in Windows' environment (Win95/98,NT)**

A complete set of professional tools

CyberQuake



An extensible accelerogram database

CyberQuake

The screenshot displays the CyberQuake Windows Application interface. The main window is titled "CyberQuake Windows Application" and shows a menu with options like "New Column For", "Open Column For", "Import Accelerogram", and "Export Cyber Curve...". The "Import Accelerogram" menu is open, showing a list of databases including "Cyber Database" and "Other...". The "Cyber Database" is selected, and a list of locations is shown, with "Montana" highlighted. Below the menu is a "CyberQuake Plot" window showing three accelerogram traces for the Helena, Montana Earthquake. The traces are labeled "ew.cyb", "ns.cyb", and "up.cyb". The x-axis represents time in seconds, ranging from 0.00 to 50.88. The y-axis represents acceleration. The plot shows a significant seismic event around 10 seconds. Below the plot are buttons for "Get Curve...", "Select...", "Delete...", "Reset Graph", "Clear Graph", "Copy to Clipboard", and "Legends On/Off".

The right-hand panel, titled "CyberQuake", displays detailed information for the "Helena, Montana Earthquake 1935" at "Carroll College, Helena, Montana".

Earthquake

Date :	30 October 1935	18h37m49s	
Location:	46.50° N	112.00°W	(California)
Magnitude:	Ms = 6 (ISC)		
Depth:			
Mechanism:			

Site

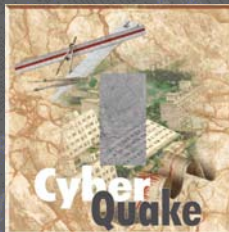
Name	Carroll College, Helena, Montana (station No. 323)		
Location	46.583°N	112.033°W	
Altitude:			
Geology			
Structure			
Instrument:			

Recording

Epicentral distance	10 km		
Hypocentral distance	17 km		
Duration	10 sec		
Sampling step size	0.02 sec		
P.G.A.*	0.15 g (NS)	0.15 g (EW)	0.09 g (UP)

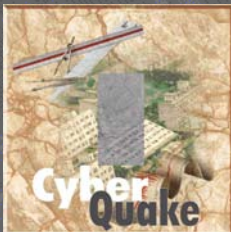
***Note!** It is a corrected accelerogram.

Imports Helena, Montana Earthquake [Oct. 31st, 1935] accelerograms NUM

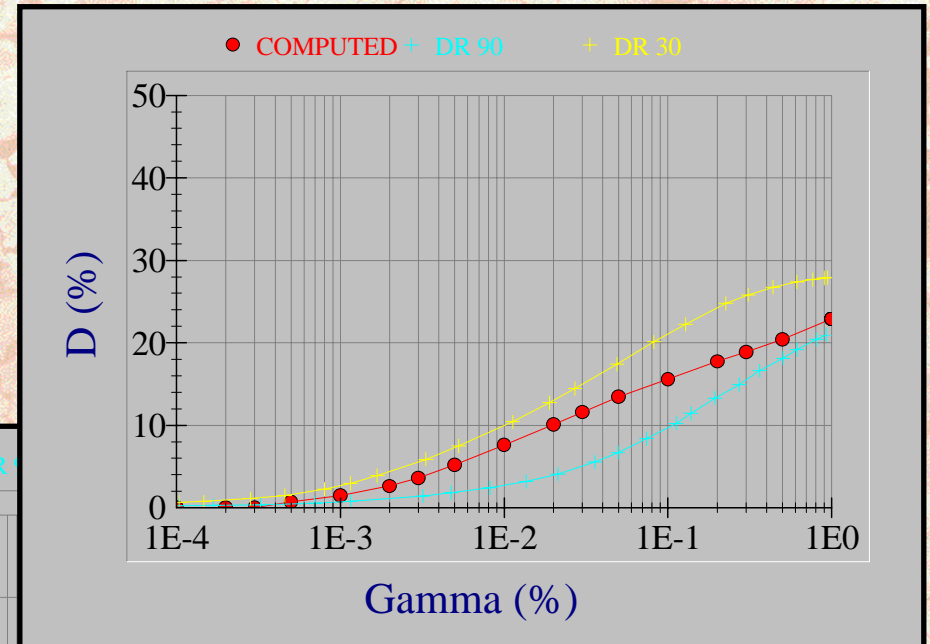
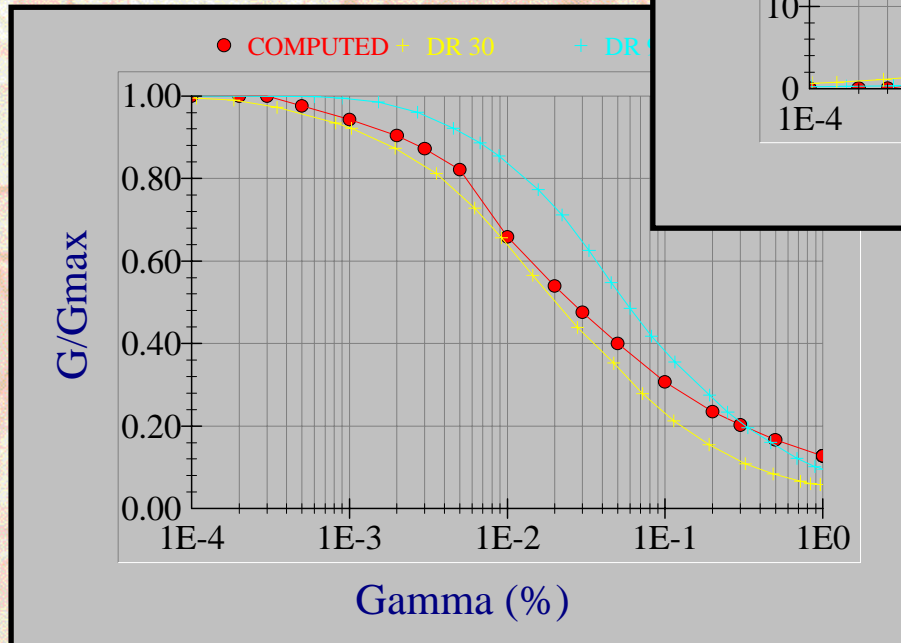




CyberQuake

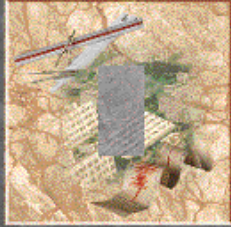


Variation of shear secant modulus and damping ratio with cyclic strain

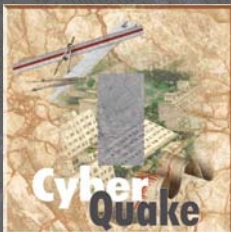


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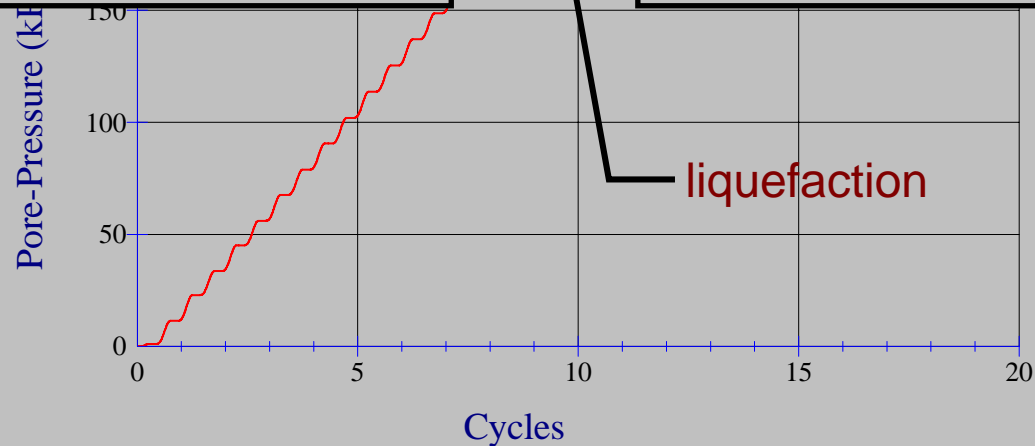
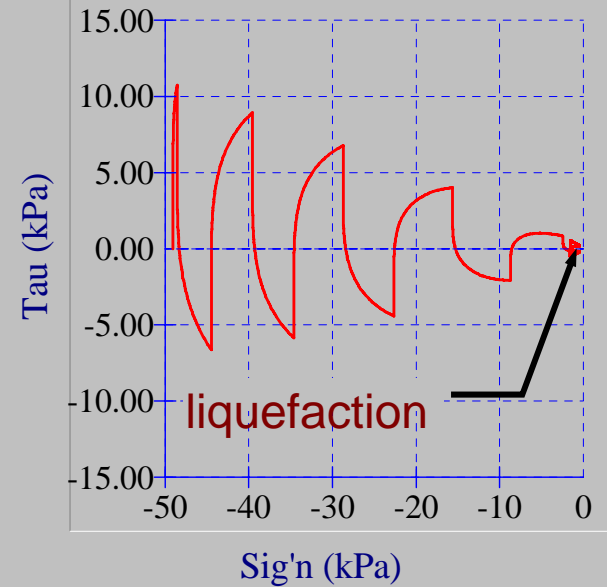
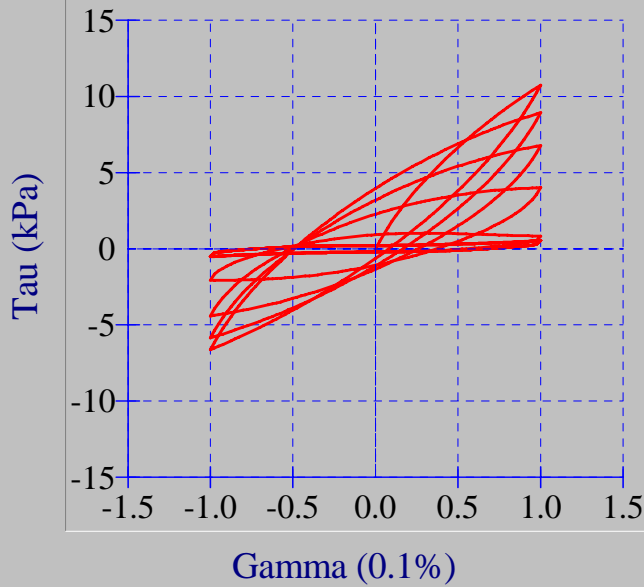
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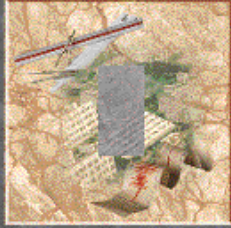


CyberQuake

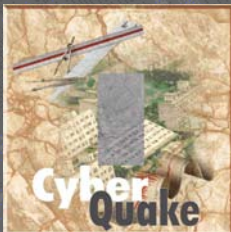


Elastoplastic Constitutive Model

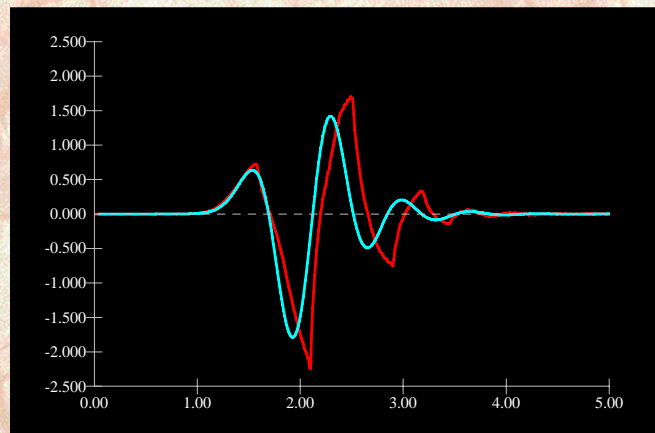
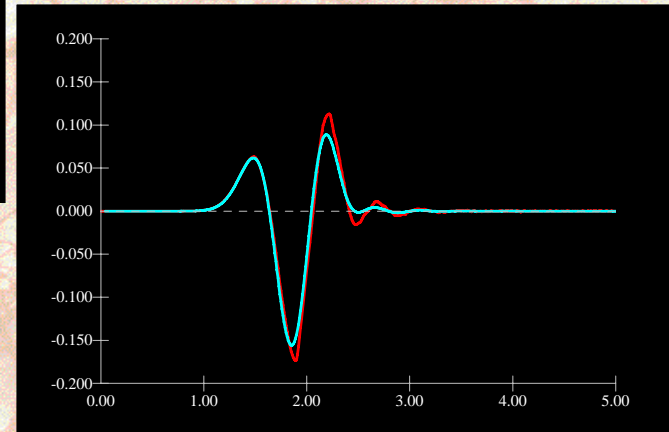
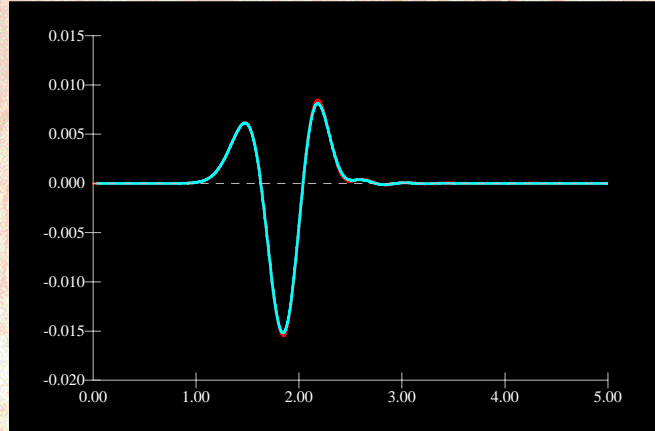




CyberQuake



Equivalent Linear vs. Elastoplastic Simulations



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