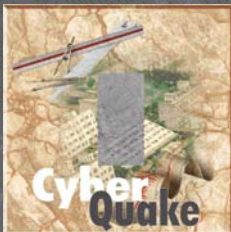




CyberQuake



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,...)

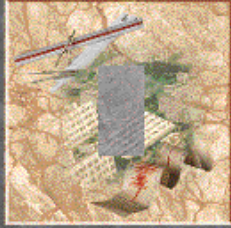
⇒ **before the seismic event**

- ✓ better design of structures

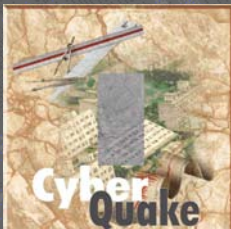


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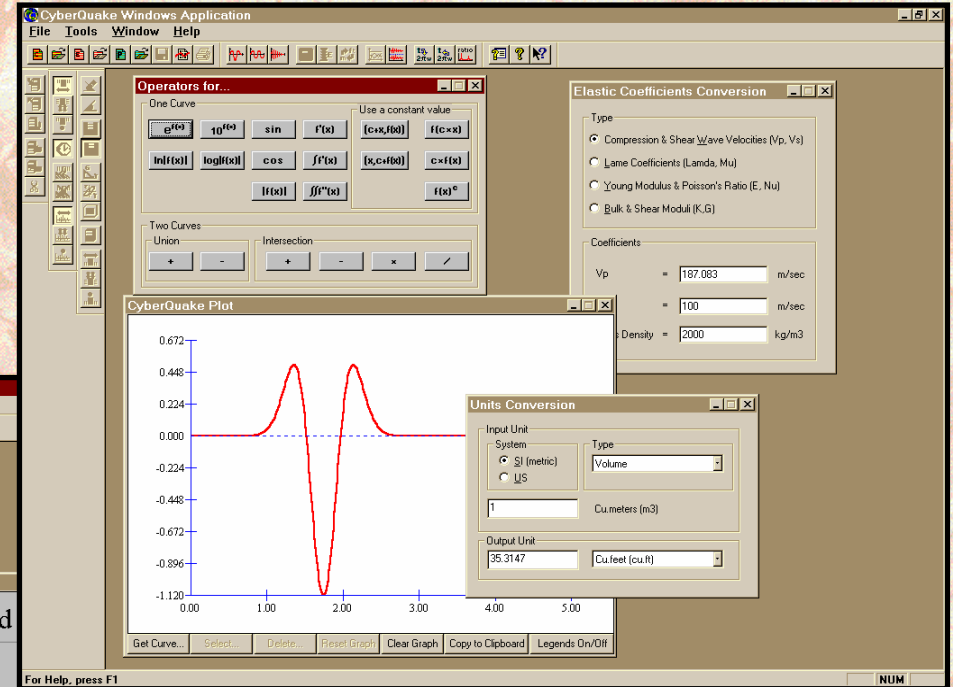
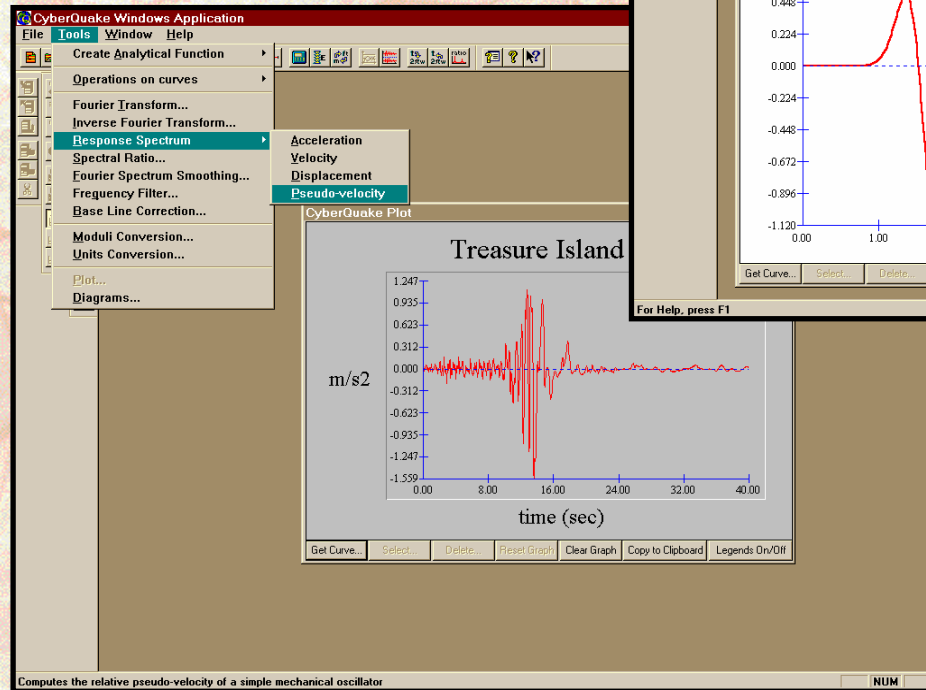
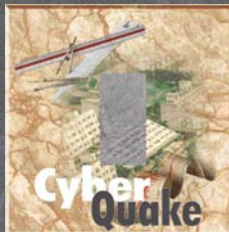


CyberQuake : A Software for Earthquake Engineers and Researchers

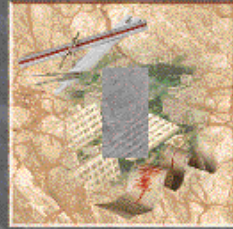
- ✓ **Multilayered soil profiles (1D geometry)**
- ✓ **Drained, totally or partially undrained conditions**
- ✓ **Rigid or deformable bedrock**
- ✓ **Two versions (2D or 3D kinematics)**
- ✓ **Linear elastic, equivalent linear and elastoplastic behaviour assumption**
- ✓ **Integrated Constitutive model 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

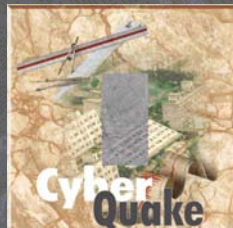
CyberQuake



An extensible accelerogram database



CyberQuake



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)

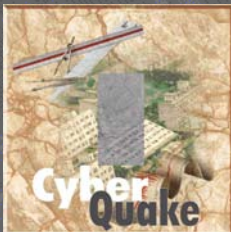
***Note!** It is a corrected accelerogram.

Imports Helena, Montana Earthquake (Oct. 31st, 1935) accelerograms

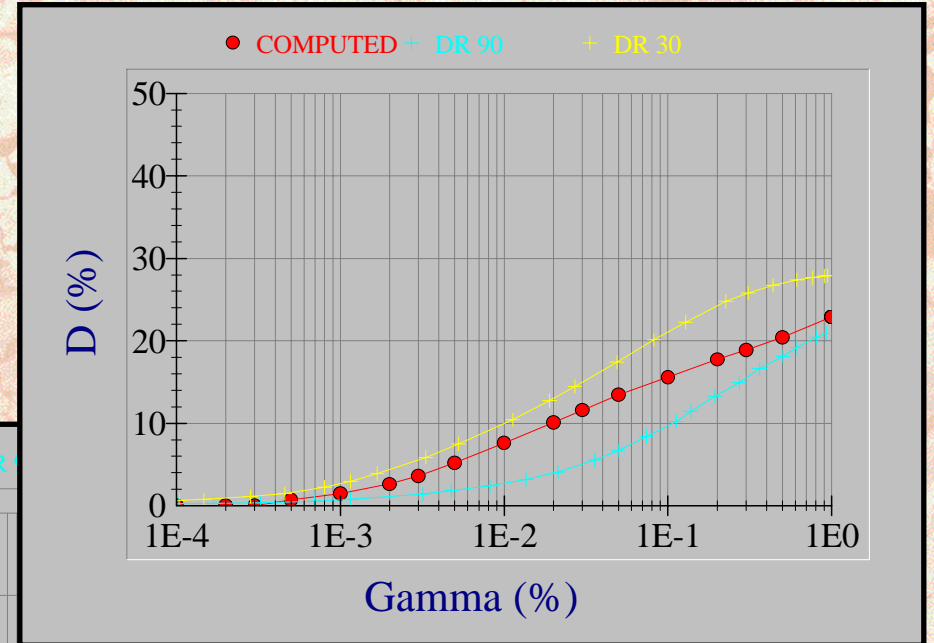
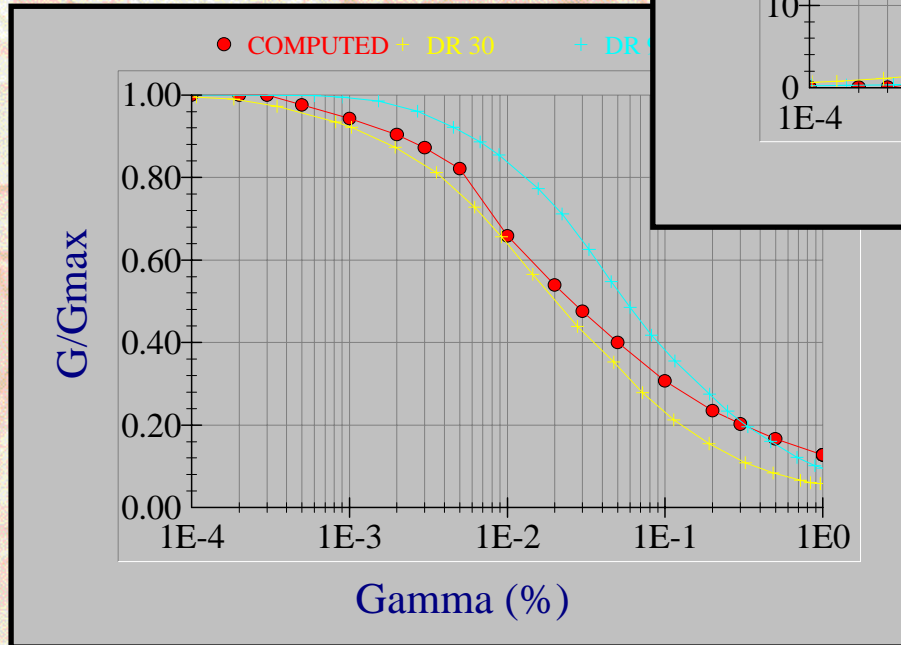
NUM



CyberQuake

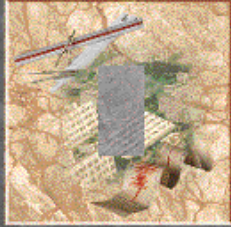


Variation of shear secant modulus and damping ratio with cyclic strain

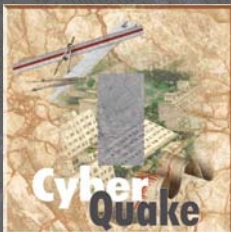


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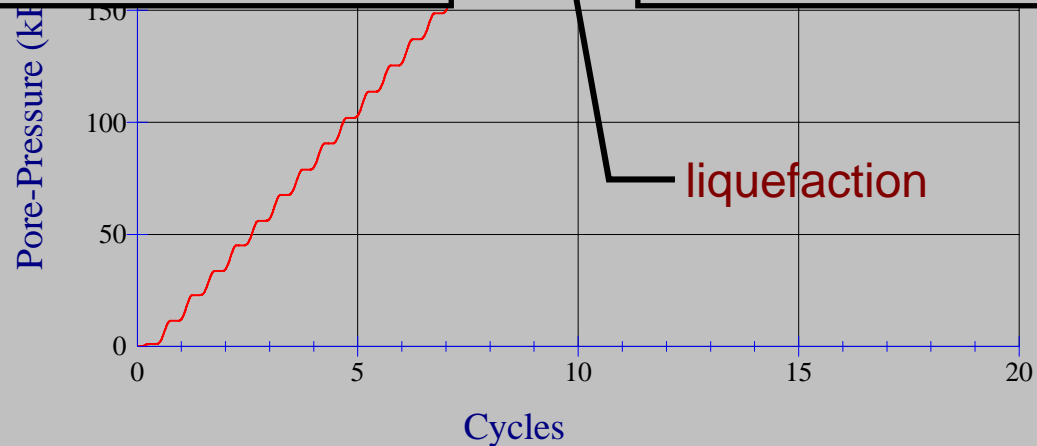
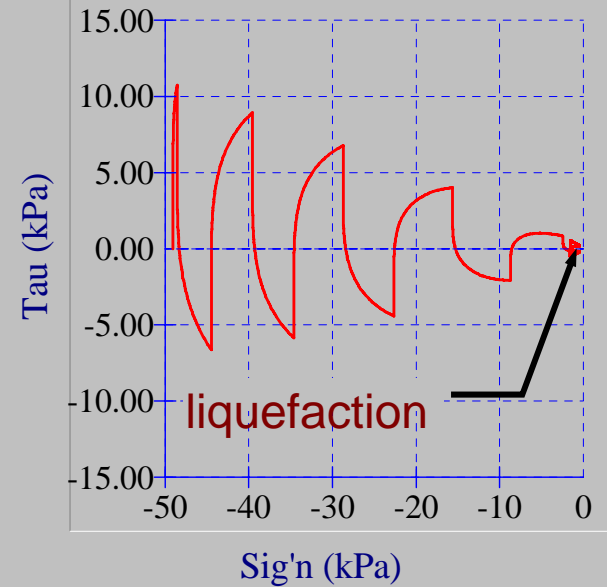
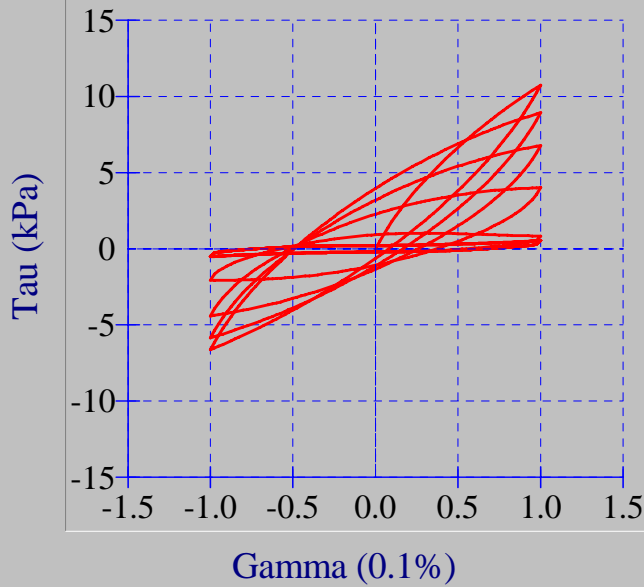
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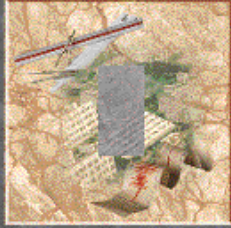


CyberQuake

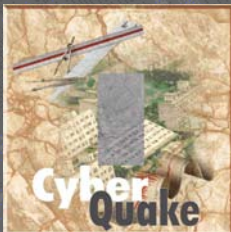


Elastoplastic Constitutive Model

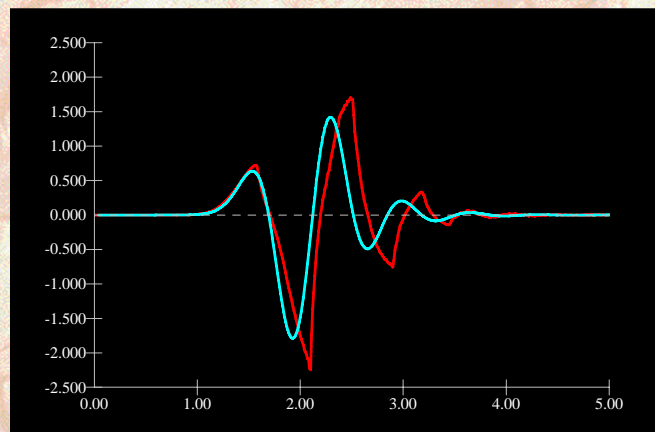
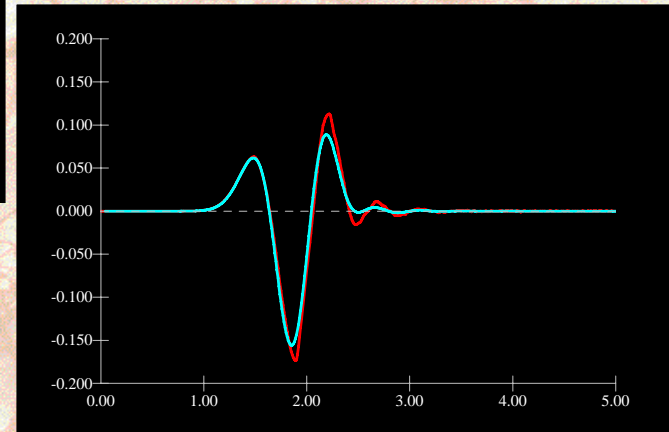
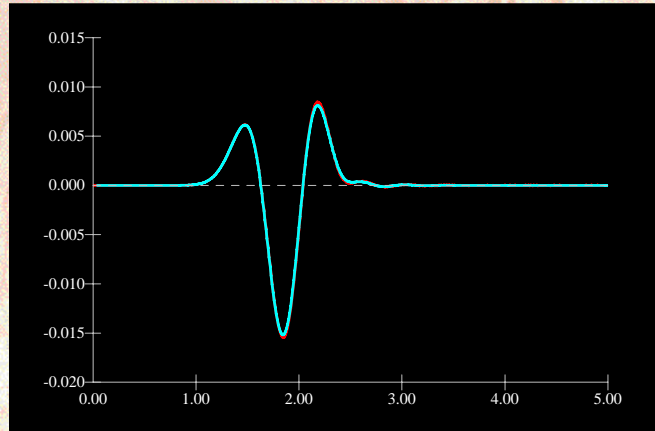




CyberQuake



Equivalent Linear vs. Elastoplastic Simulations



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