

NEES collaborative project

OpenSees User Workshop 2004

Getting ready to build the model:
Introduction to the user manual and
input-file format

Silvia Mazzoni

University of California, Berkeley

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Sponsored by the National Science Foundation
through the Pacific Earthquake Engineering Research Center



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Part I – the user manual



download documentation

OpenSees Open System for Earthquake Engineering Simulation
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Welcome to the website for OpenSees, a software framework for developing applications to simulate the performance of structural and geotechnical systems subjected to earthquakes.

The goal of the OpenSees development is to improve the modeling and computational simulation in earthquake engineering through open-source development.

OpenSees is in under continual development, so users and developers should expect changes and updates on a regular basis. In this sense, all users are developers so it is important to [register](#). More information on [Open Source](#) is available.

The development and application of OpenSees is sponsored by the [Pacific Earthquake Engineering Research Center](#) through the [National Science Foundation](#) engineering and education centers program.

[More info...](#)

Register!
For information about new releases we encourage you to register with us at the [OpenSees Registration Center](#).

Need Support?
If you need assistance or have any bugs to report, send an e-mail to [technical support](#)

Latest News
August 25th, 2003
A [User's Workshop](#) was held August 21-22, 2003. The [Workshop Presentations](#) can be found here.

May 15th, 2003
Version 1.5 [binaries](#) and [source code](#) distributions are now available.

Silvia Mazzoni, UC Berkeley
OpenSees User Workshop 2004

documentation

<http://opensees.berkeley.edu/OpenSees/user.html>

OpenSees

Open System for Earthquake Engineering Simulation
Pacific Earthquake Engineering Research Center

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Welcome! This page contains some useful information for people who wish to use the OpenSees interpreter.

[Documentation](#)
Before you begin and for when you get stuck there is always the documentation. For new users to OpenSees, have a look at the primers to get yourselves more familiar with the overall design.

[Download](#)
Download a precompiled binary from the latest build.

[Examples](#)
Here are some simple and some not-so-simple examples to get you started.

[Accessories](#)
Download accessory programs which are available for OpenSees.

[Message Board](#)
To talk to other users who may be able to assist you with problems leave a message on our users message board. We encourage all users to visit the message board often to see what others are working on and to assist others who may be having problems.

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<http://opensees.berkeley.edu/OpenSees/primer.html>

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Welcome! This page contains links to existing primers on how to use both Tcl/Tk and OpenSees.

- [Tcl/Tk Primer](#) is a html document providing a quick introduction to programming in Tcl/Tk.
- [OpenSees Users Manual](#). This is a html document providing the syntax and description of OpenSees commands. ([MS Word](#), [Offline Windows](#)).
- [OpenSees Examples Manual](#). This is a html document providing descriptive examples of basic OpenSees script files. ([MS Word](#), [Offline Windows](#)).

[OpenSees Users Manual](#). This is a html document providing the syntax and description of OpenSees commands. ([MS Word](#), [Offline Windows](#)).

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3 manual formats

[OpenSees Users Manual](#). *This is a html document providing the syntax and description of OpenSees commands. ([MS Word](#), [Offline Windows](#)).*

1. **OpenSees Users Manual** – on-line HTML document, residing on OpenSees server. Always going to be the most current.
2. **MS Word** – downloadable Word document
3. **Offline Windows** – downloadable .chm file. it is similar to the HTML format, but the file resides on your computer. You may not have downloaded the latest version of manual

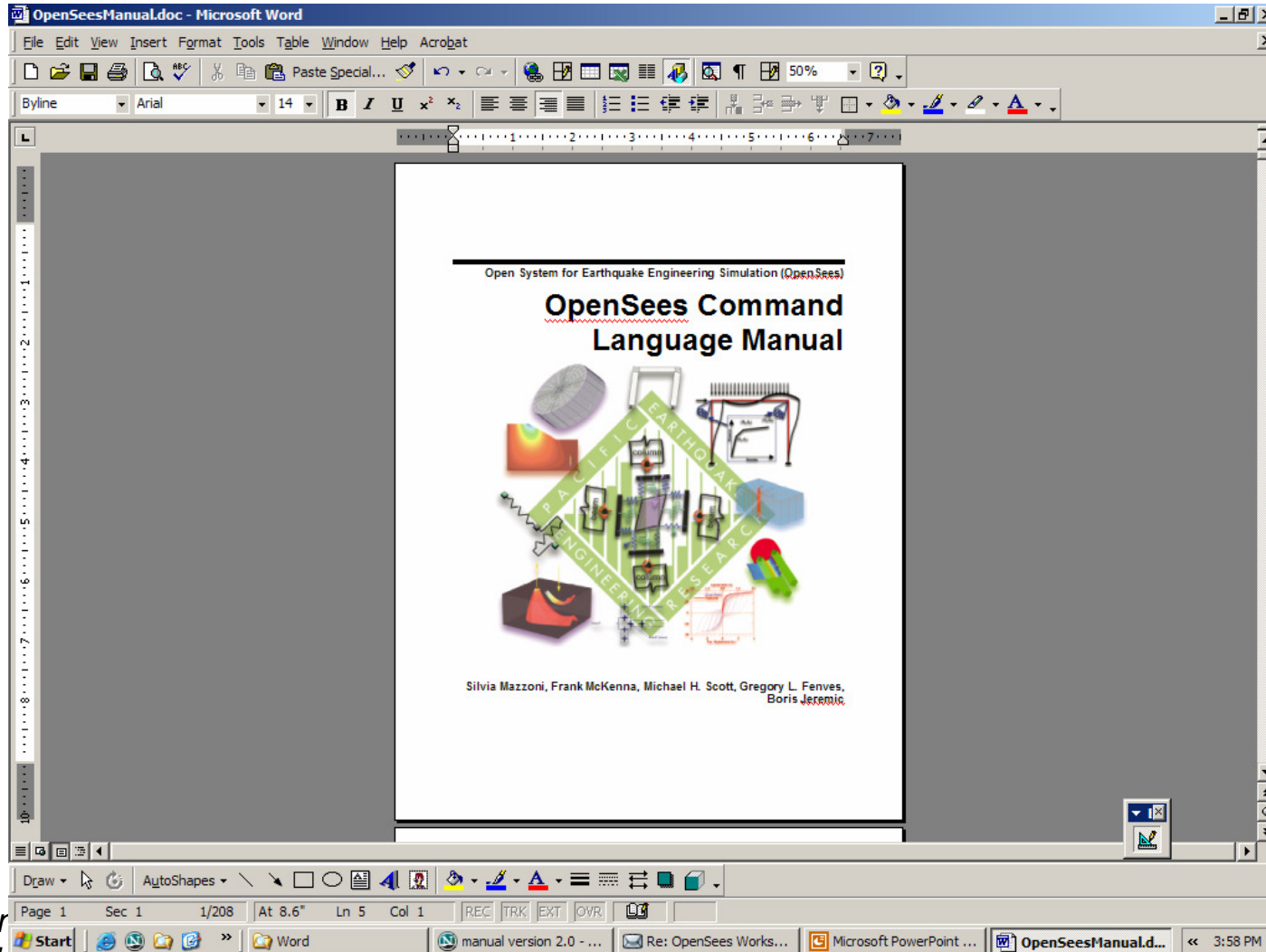
1. HTML on-line format

<http://peer.berkeley.edu/~silvia/OpenSees/manual/html/>

The screenshot shows a Netscape browser window titled "manual version 2.0 - Netscape". The address bar contains the URL <http://peer.berkeley.edu/~silvia/OpenSees/manual/html/>. The browser interface includes a menu bar (File, Edit, View, Go, Bookmarks, Tools, Window, Help), navigation buttons, and a search field. The main content area displays the "opening page" of the OpenSees manual. The page features a header with the "OpenSees" logo and the text "Open System for Earthquake Engineering Simulation" and "Pacific Earthquake Engineering Research Center". A left sidebar contains a "Contents" menu with links to "opening page", "Introduction", "OpenSees", "ModelBuilder Objects", "Analysis Objects", "Recorder Objects", "Miscellaneous Commands", "How To...", "References", and "Index". The main content area includes the text "opening page", "Open System for Earthquake Engineering Simulation", the authors' names "Silvia Mazzoni, Frank McKenna, Michael H. Scott, Gregory L. Fenves, Boris Jeremic", "Pacific Earthquake Engineering Research Center", "University of California, Berkeley", "version 2.0", and a contact email "please send questions and comments about the manual to: silvia@peer.berkeley.edu". The browser's status bar at the bottom shows the taskbar with the Start button, several open windows (MyPresentation, manual version 2.0..., Re: OpenSees Works..., Microsoft PowerPoint ...), and the system clock showing 3:56 PM.

Silvia Mazzoni
OpenSees User Workshop 2004

2. MS Word document OpenSeesManual.doc



3. Offline Windows

OpenSeesManual.chm

silvia@peer.berkeley.edu'. The PowerPoint interface shows a table of contents on the left and a taskbar at the bottom with various open applications."/>

Microsoft PowerPoint - [SilviaMazzoni_GetReady.ppt]

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opening page

Open System for Earthquake Engineering Simulation

**Silvia Mazzoni, Frank McKenna, Michael H. Scott,
Gregory L. Fenves**

Pacific Earthquake Engineering Research Center

University of California, Berkeley

version 2.0

please send questions and comments about the manual to: silvia@peer.berkeley.edu

Slide 8 of 34 peer English (U.S.)

Start Word manual version 2.0 - ... Re: OpenSees Works... Microsoft PowerPoint ... manual 4:01 PM

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OpenSees

- OpenSees
 - ModelBuilder Object is responsible for building the following objects in the model and adding them to the domain
 - Domain Object is responsible for storing the objects created by the ModelBuilder object and for providing the Analysis and Recorder objects access to these objects
 - Analysis Object is responsible for performing the analysis
 - Recorder Object monitors user-defined parameters in the model during the analysis

ModelBuilder Objects

- model Command
- node Command
- mass Command
- Constraints objects
- uniaxialMaterial Command
- nDMaterial Command
- section Command
- element Command
- block Command
- region Command
- Geometric Transformation Command
- Time Series
- pattern Command

Analysis Objects

- constraints Command
- numberer Command
- analysis Command
- algorithm Command
- integrator Command
- system Command
- test Command
- analyze Command
- rayleigh command
- eigen Command
- dataBase Commands



Recorder Objects

- Node Recorder
- EnvelopeNode Recorder
- MaxNodeDisp Recorder
- Drift Recorder
- Element Recorder
- EnvelopeElement Recorder
- Display Recorder
- Plot Recorder
- playback Command

Miscellaneous Commands

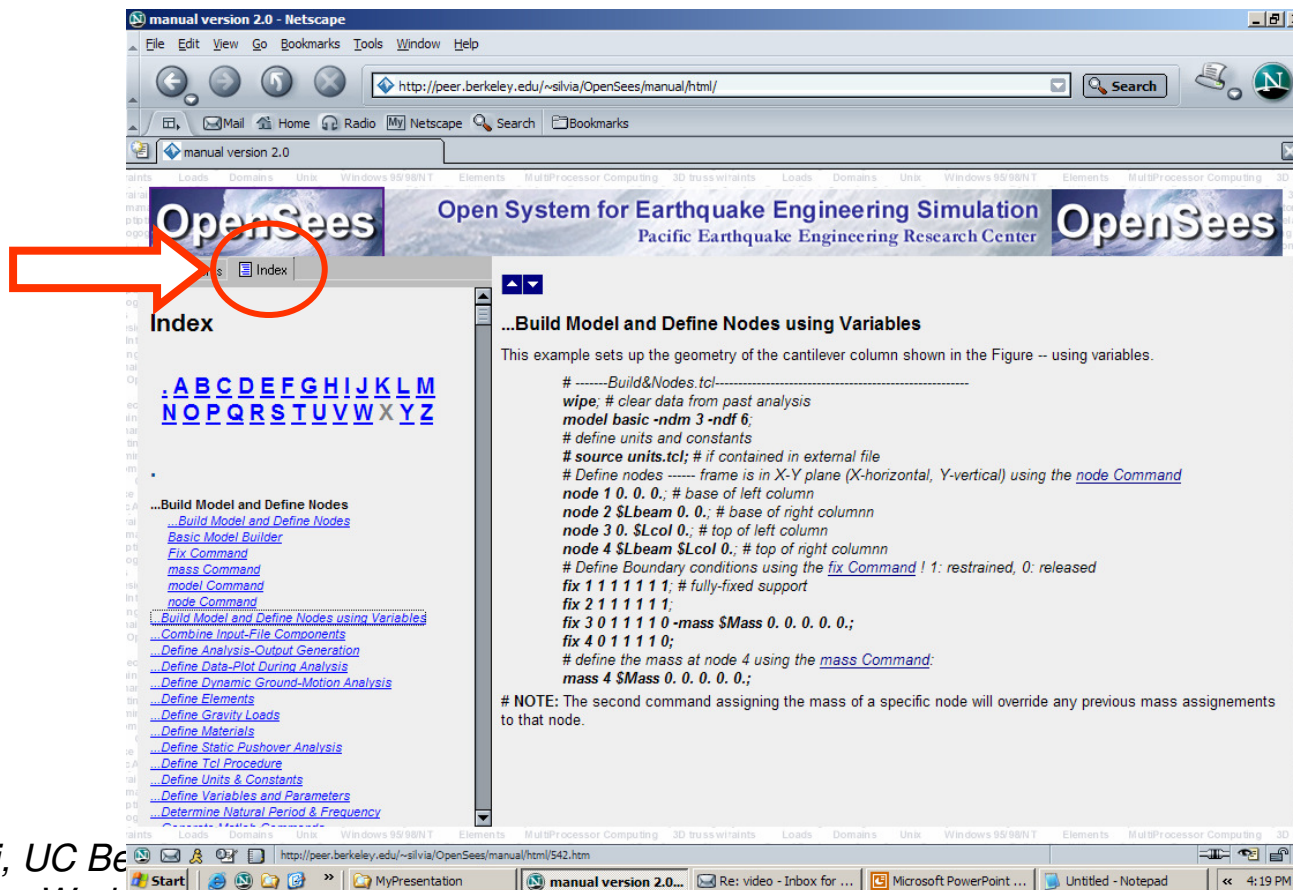
- print Command
- reset Command
- wipe Command
- wipeAnalysis Command
- loadConst Command
- getTime Command
- nodeDisp Command
- video Command

How To....

- ...Run OpenSees
- ...Define Units & Constants
- ...Generate Matlab Commands
- ...Define Tcl Procedure
- ...Read External files
- Building The Model
- Defining Output
- Gravity Loads
- Static Analysis
- Dynamic Analysis
- ...Combine Input-File Components
- ...Run Parameter Study
- ...Run Moment-Curvature Analysis on Fiber Section
- ...Determine Natural Period & Frequency

note

- you can also use the index tab to search specific commands



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Part II – input-file format



Tcl Scripting language

- ability to “source-in” files
 - break-down input file into component files
- variables
 - unit and constant definition
 - parameter definition
- simplifies error check
- generate new-analysis input by using component files of previously-generated and tested input

input-file architecture

