WHY SOFTWARE??

"What's the opposite of 'Eureka!'?"

CIVIL ENGINEERING SOFTWARE

PLANNING SOFTWARE

- ✓ *AUTOCAD*

MODELING SOFTWARE

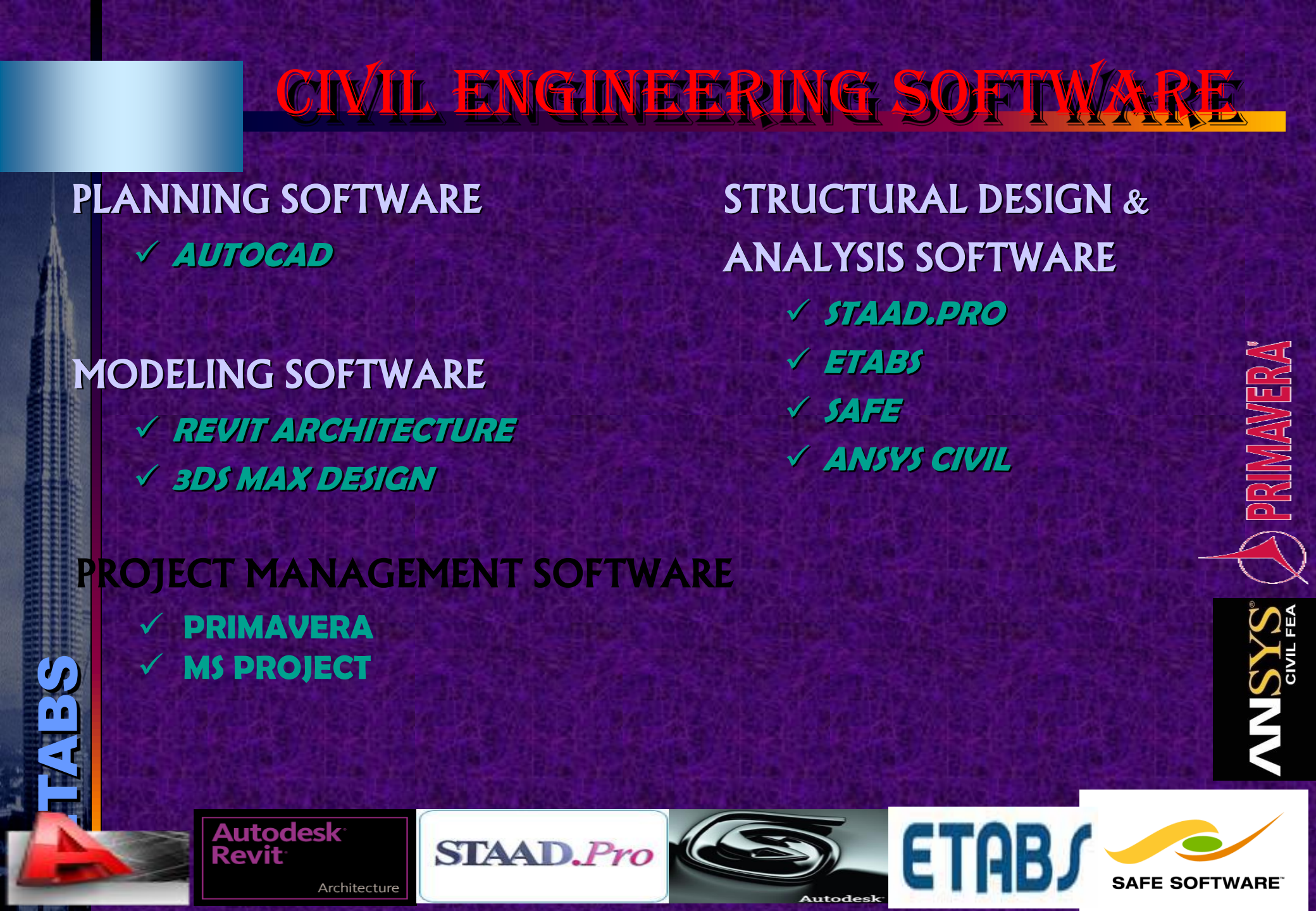
- ✓ *REVIT ARCHITECTURE*
- ✓ *3DS MAX DESIGN*

PROJECT MANAGEMENT SOFTWARE

- ✓ **PRIMAVERA**
- ✓ **MS PROJECT**

STRUCTURAL DESIGN & ANALYSIS SOFTWARE

- ✓ *STAAD.PRO*
- ✓ *ETABS*
- ✓ *SAFE*
- ✓ *ANSYS CIVIL*



ETABS

3D Modeling, Analysis, Design & Detailing Software

by

Sekhar Babu

20+ Years Experienced
Structural Consultant

SPACE CADD

Tambaram, Velachery , Guduvanchery

Key Features

Key Features

- Fully integrated interface within Windows XP/2000/7/8
- Optimized for modeling of multistory buildings
- 3D perspective, plan, elevation, developed elevation, and custom views
- 3D model generation using plans and elevations
- CAD drawing/editing for fast, intuitive framing layout

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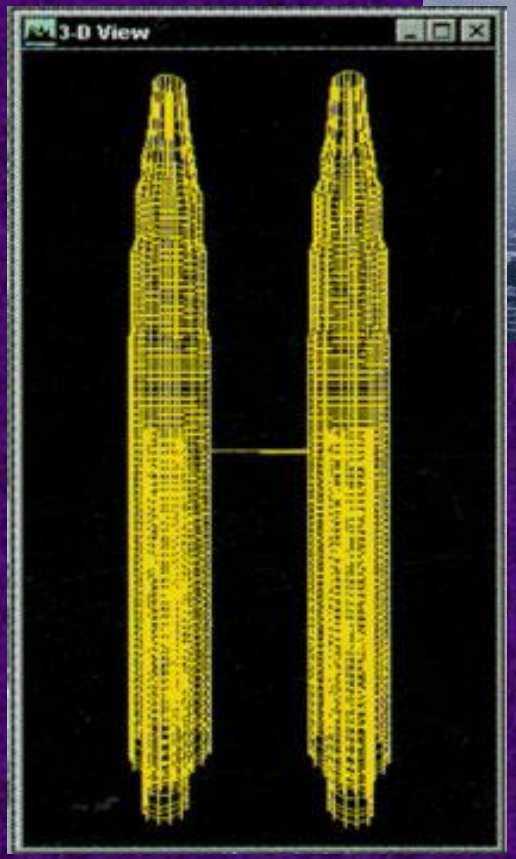
Key Features

- **Extensive Analysis Capabilities**
  - *Linear Static Analysis*
  - *Linear Dynamic Analysis*
  - *Static and Dynamic P-Delta Analysis*
  - *Static Non-Linear Analysis*
  - *Dynamic Non-Linear Analysis*
  - *Pushover Analysis*
  - *Response Spectrum Analysis*
  - *Time History Analysis*
  - *Construction sequence loading analysis*

Key Features

Key Features

- Fast generation of model using the concept of similar stories
- Automated templates for typical structures
- Easy editing with move, merge, mirror and replicate



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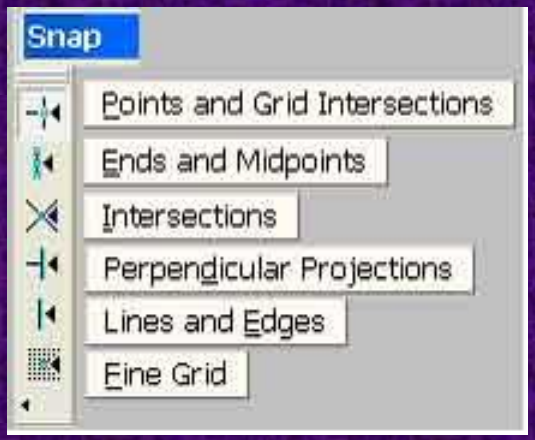
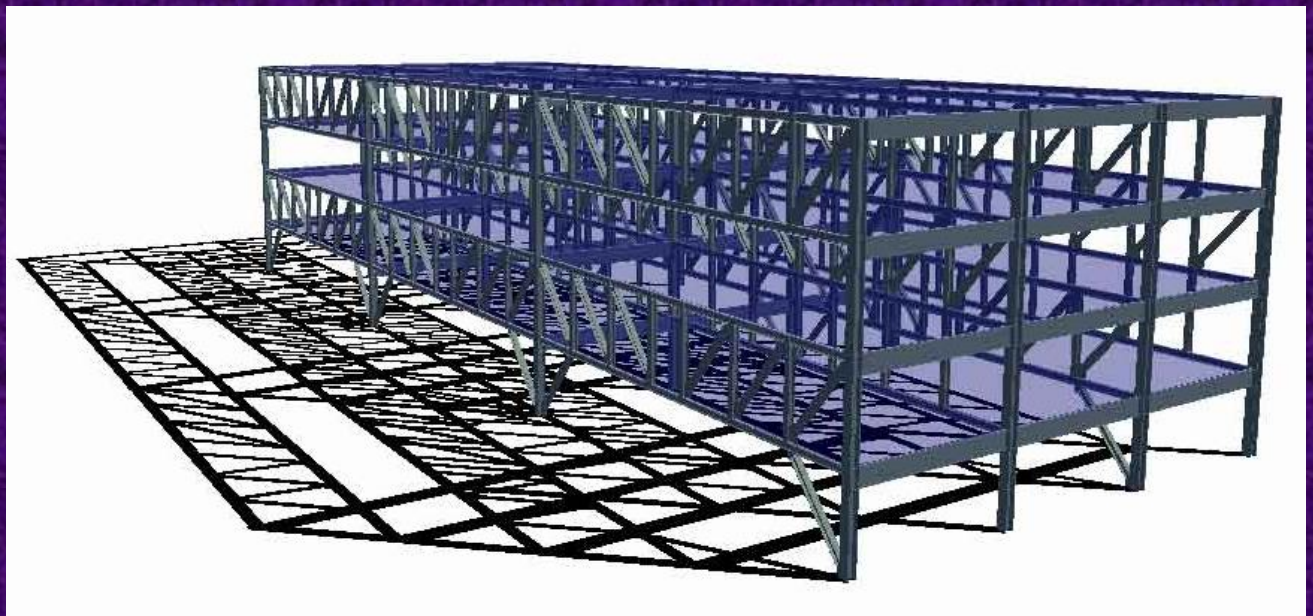
Key Features

Key Features

- Multiple views in 3D perspective with zooming and snapping
- Onscreen assignment of properties, loading and supports
- Powerful grouping, selection and Display options
- Cut, copy and paste options





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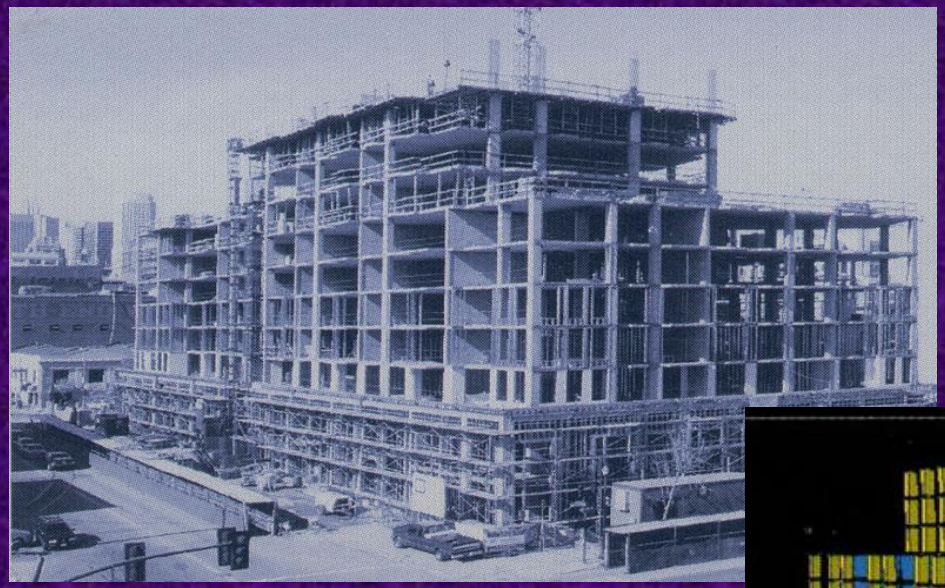
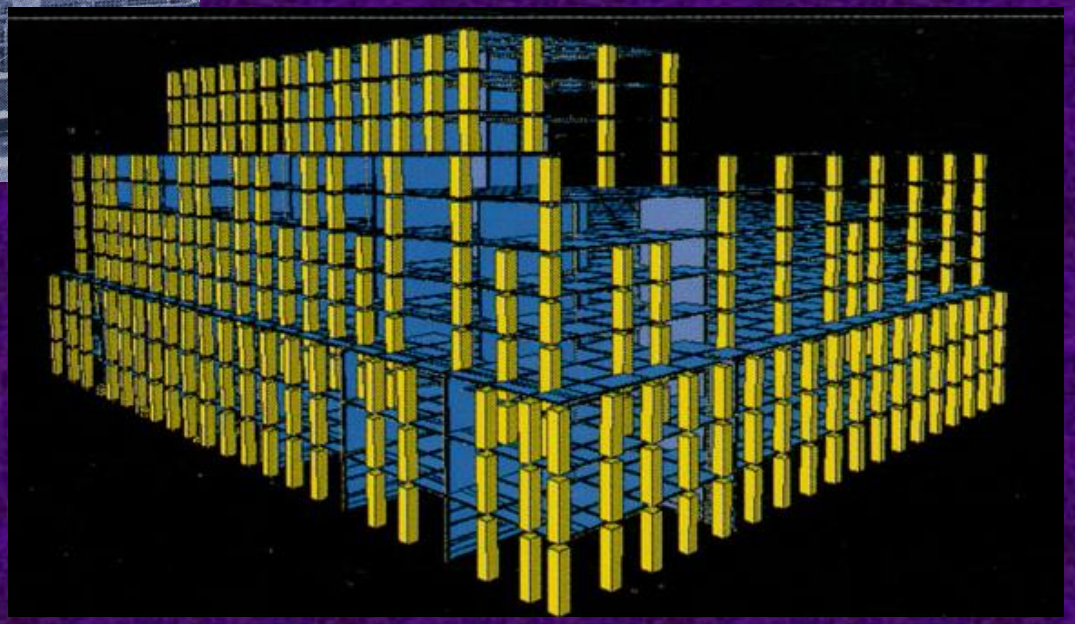
Interactive Model Creation
Fully Graphical Interface

Interactive Modeling

Realistic Modeling





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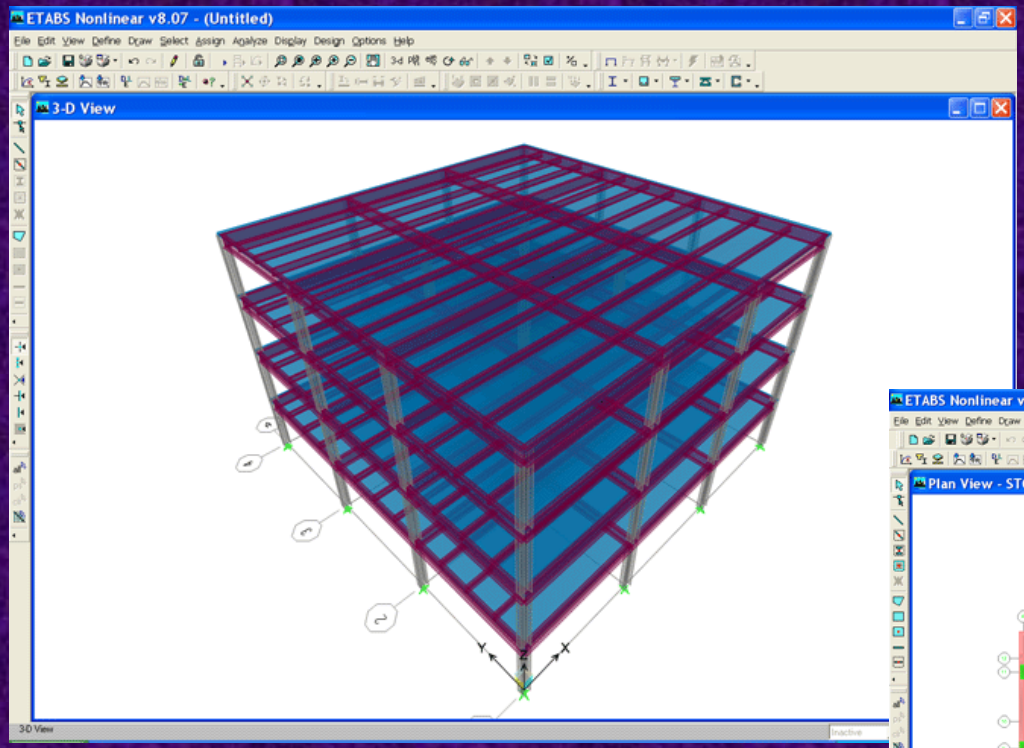
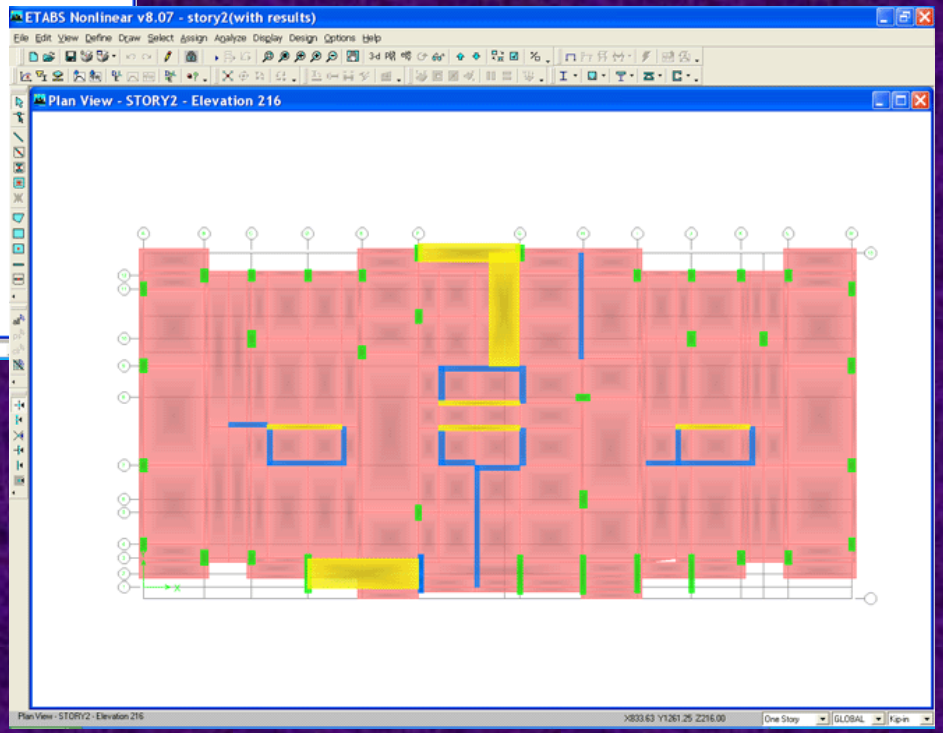
Interactive Modeling

Powerful Viewing Options





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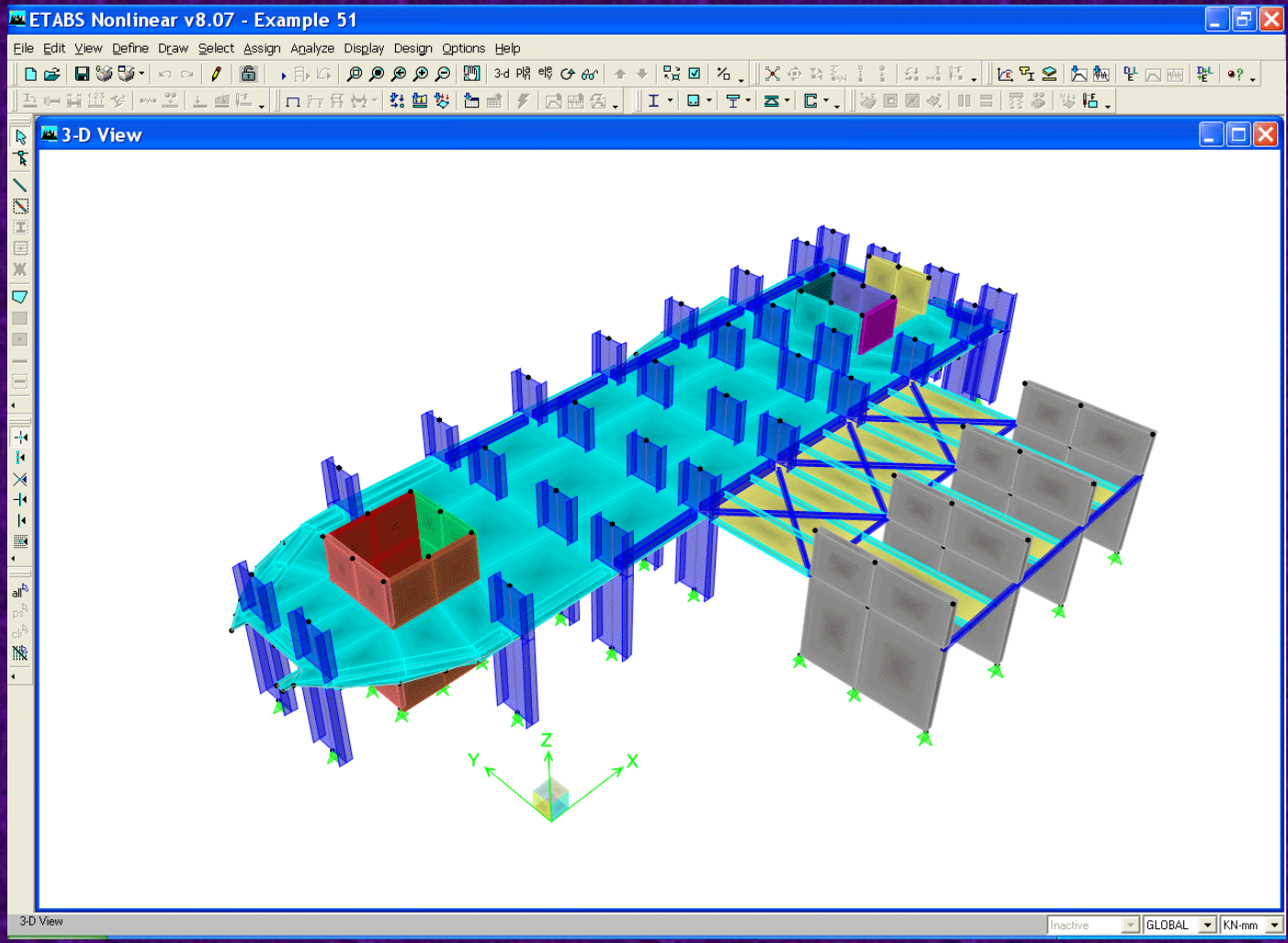
Interactive Modeling

Powerful Viewing Options



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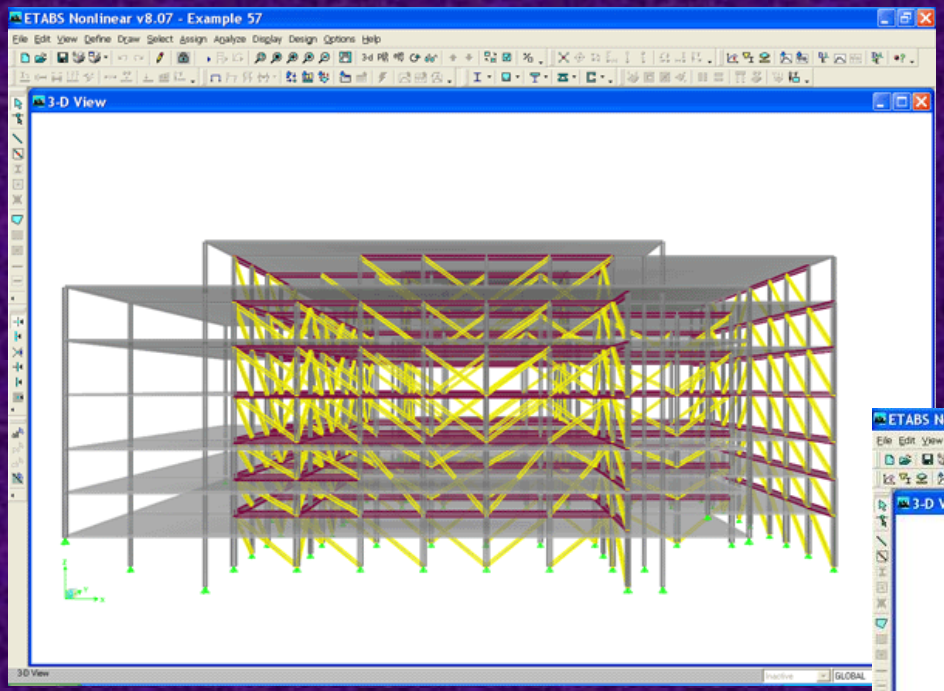
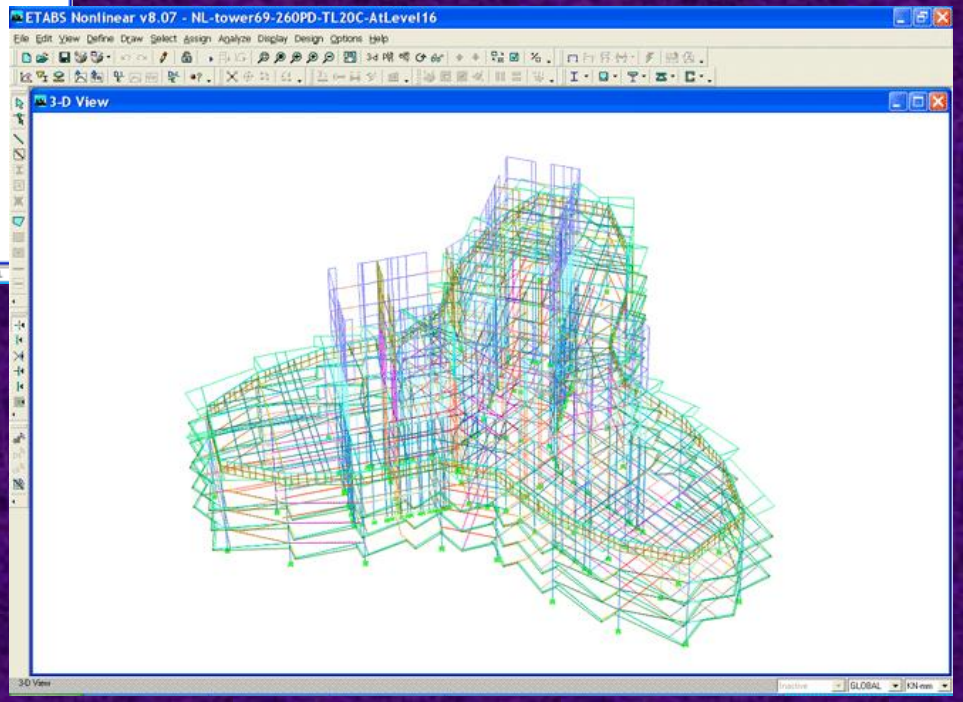
Interactive Modeling

Powerful Viewing Options





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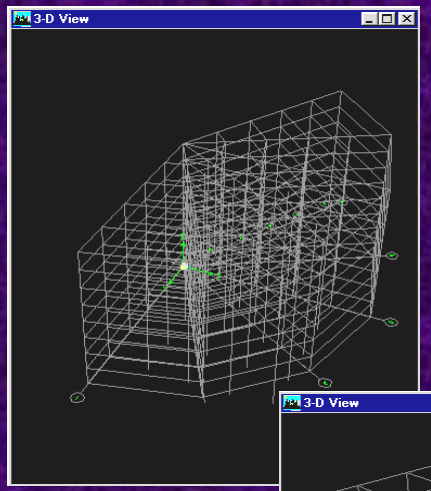
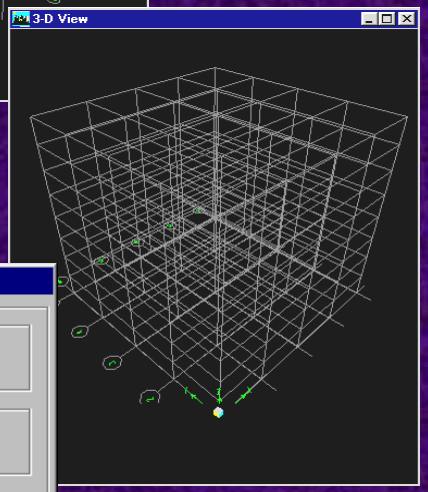
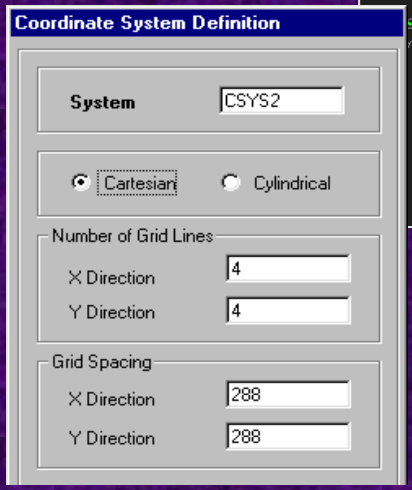
Interactive Modeling

Flexible Grid Systems

- Convenient dividing and meshing of design objects
- Multiple simultaneous rectangular and cylindrical grid systems
- Accurate dimensioning with guidelines and snapping
- Quick-draw options to create objects with one mouse click







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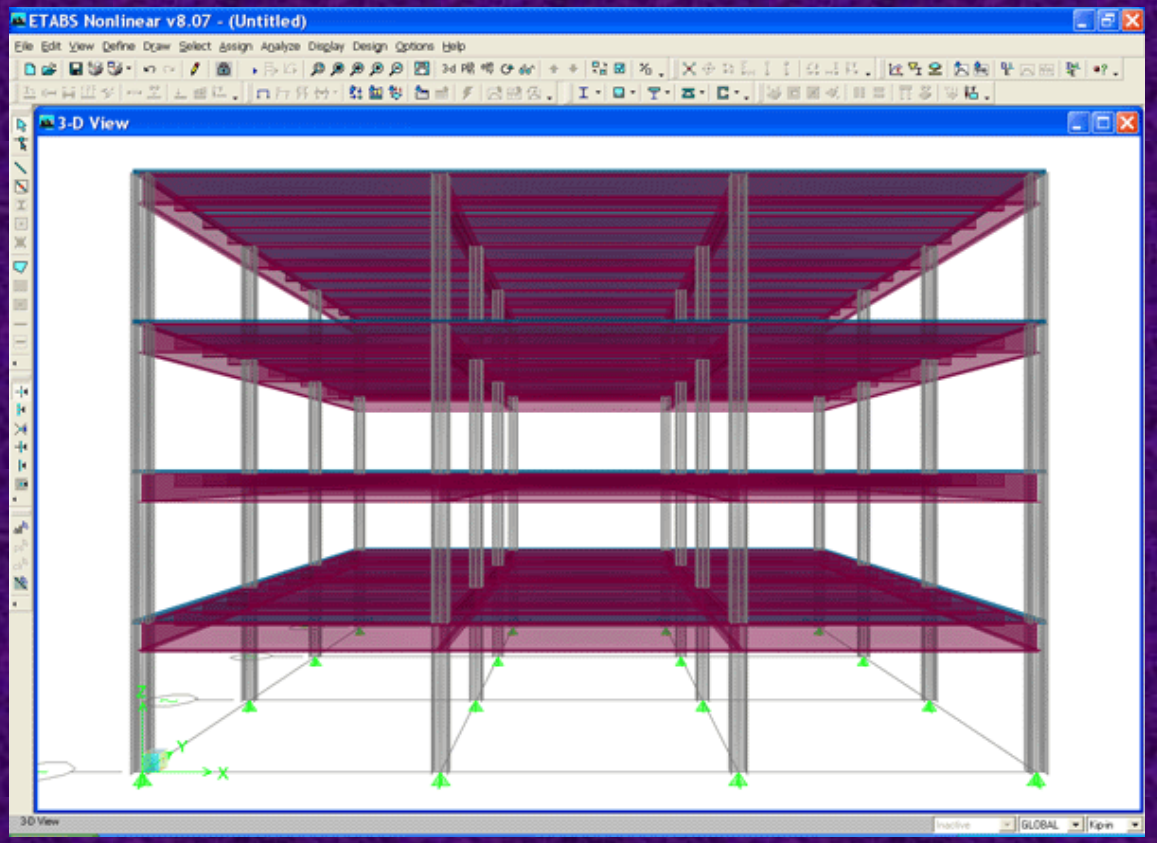
Interactive Modeling

Parametric Templates

- Automated model generation for typical structures using powerful templates
  - *Steel Deck*
  - *Flat Slab*
  - *Two-way Slab*
  - *Waffle Slab*
  - *Ribbed Slab*



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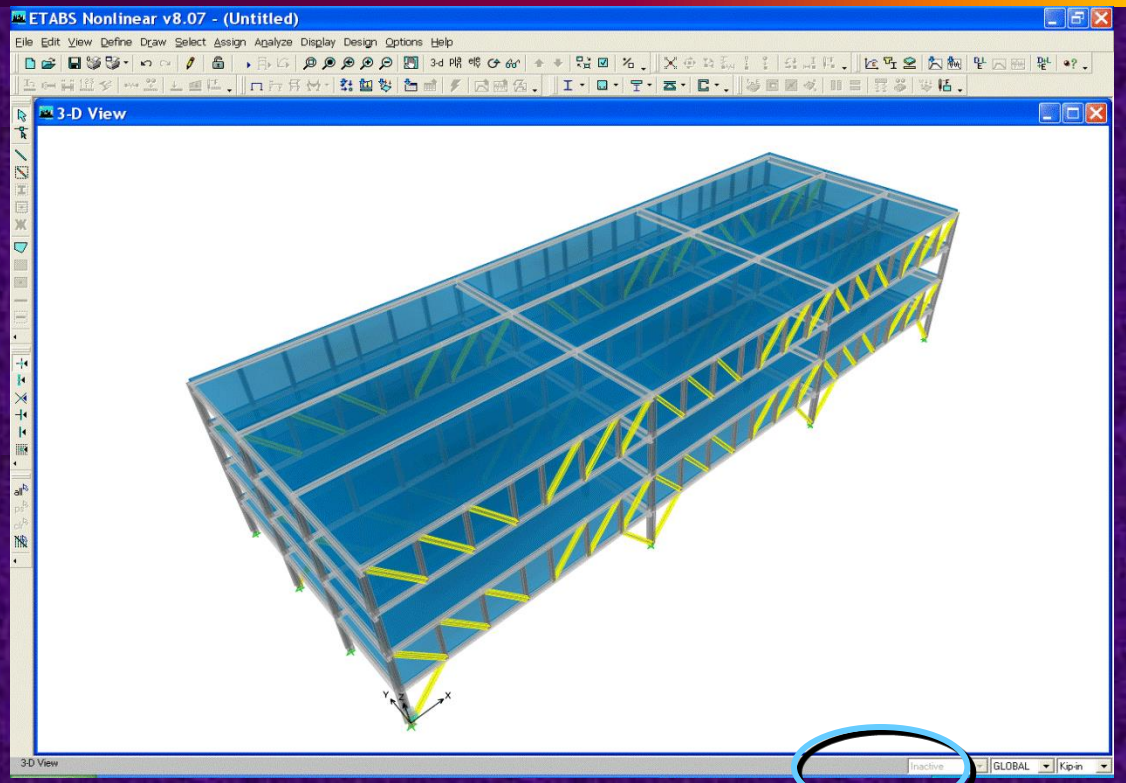
Interactive Modeling

"Similar " Story Concept

- Time saving Story definitions using the concept of similar Stories
- Common labeling of Objects between similar Stories



Story Data

	Label	Height	Elevation	Similar To
9	STORY8	144.	1152.	NONE
8	STORY7	144.	1008.	STORY8
7	STORY6	144.	864.	STORY8
6	STORY5	144.	720.	STORY8

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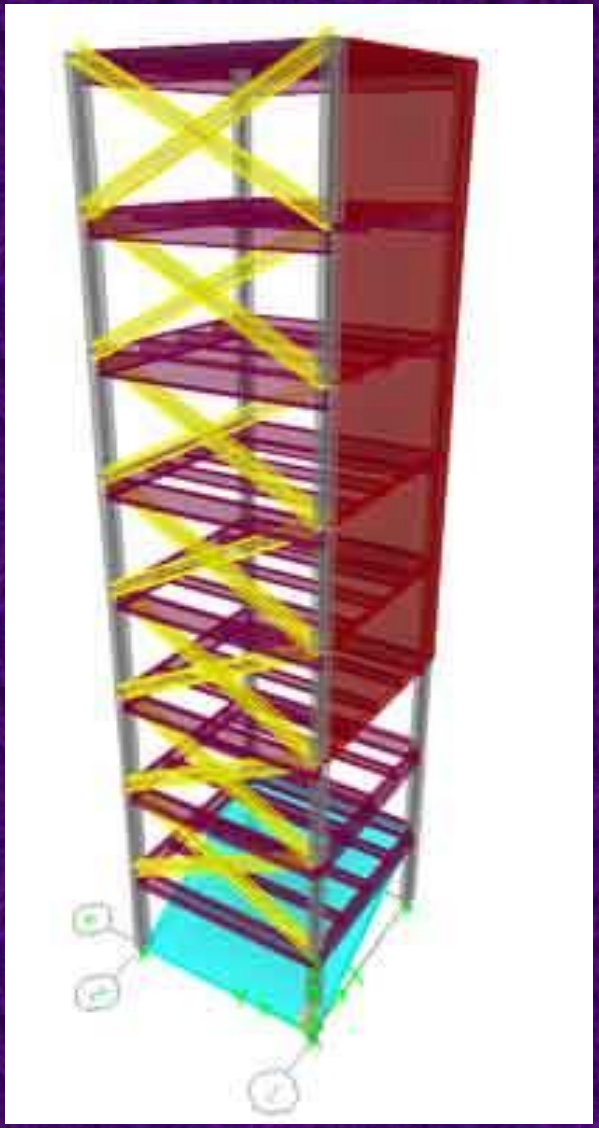
Interactive Modeling

Object Based Modeling

- Area objects for
  - *Walls, Slabs/Decks, Opening, Springs, Mass, Loads*
- Line objects for
  - *Columns, Beams, Braces, Links, Springs, Mass, Loads*
- Point objects for
  - *Supports, Springs, Mass, Loads*



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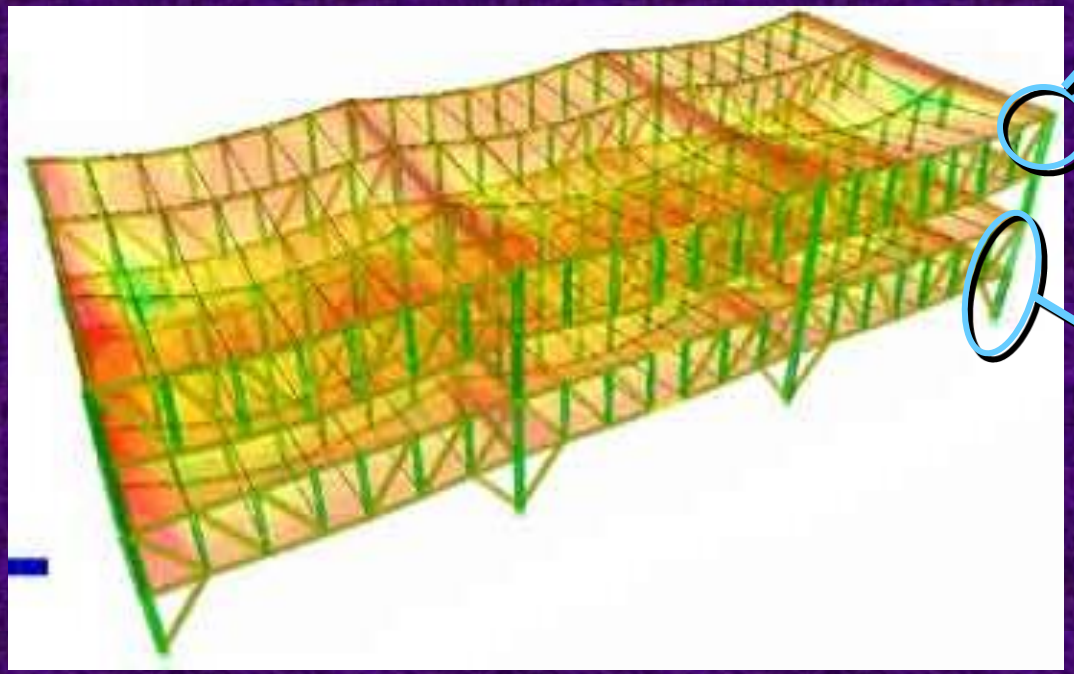
Interactive Modeling

Feedback and Information

- Right button click for element or design information
- Customized display of parameters and attributes



Point Information

Location | Assignments | Loads

Identification

Label: 19

Story: STORY8

X	816.
Y	-6.
Delta Z	0.
Connectivity	
Area	F18
Area	F19

Line Information

Location | Assignments | Loads

Identification

Label: C4 Line Type:

Story: STORY8 Design Procedure:

Section Property	CSEC1
Releases	None
Partial Fixity Springs	None
End Length Offsets	Automatic
End I Length Offset	0.
End J Length Offset	0.
Rigid Zone Factor	0.
Joint Offsets	None
Min. Number Stations	3
Local axis 2 Angle	Default
Property Modifiers	None
Link Properties	None
Nonlinear Hinges	None
Pier	No
Spandrel	No
Line Springs	None
Line Mass	None

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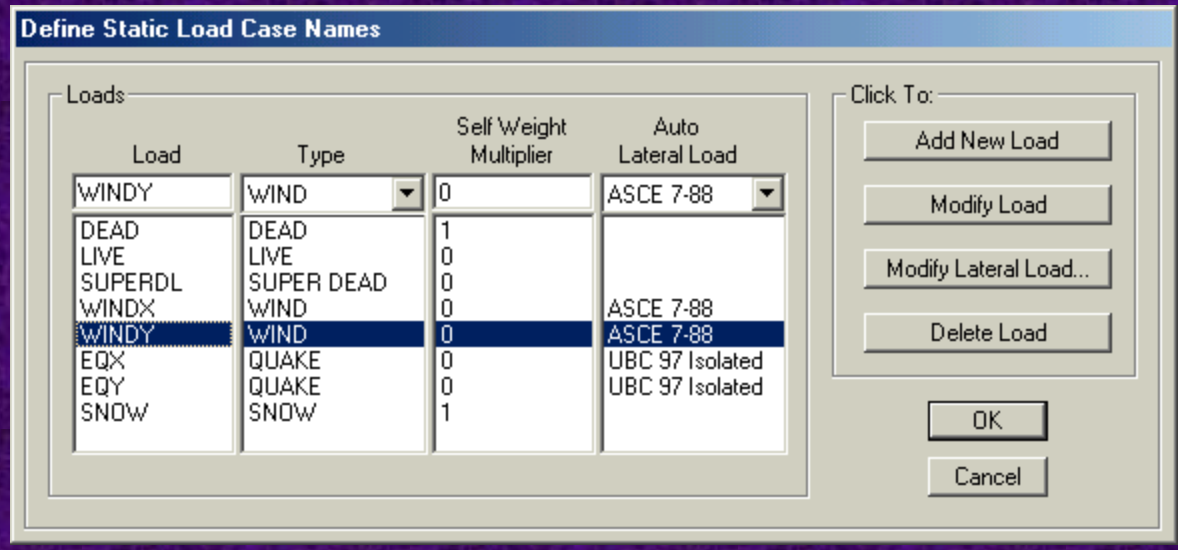
Interactive Modeling

Building Loads

- No limit on number of independent load cases
- Gravity loads specified as point, line or area loads
- Wind and Seismic Load Generator for several codes



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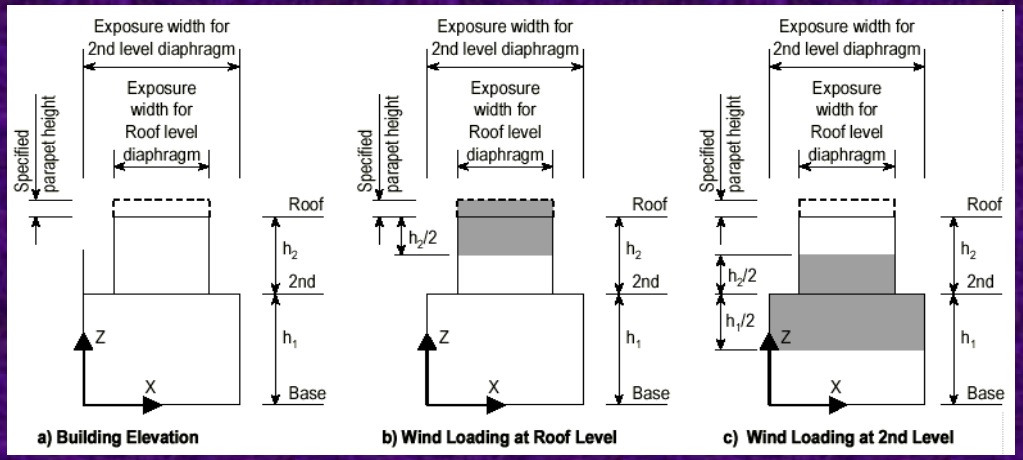
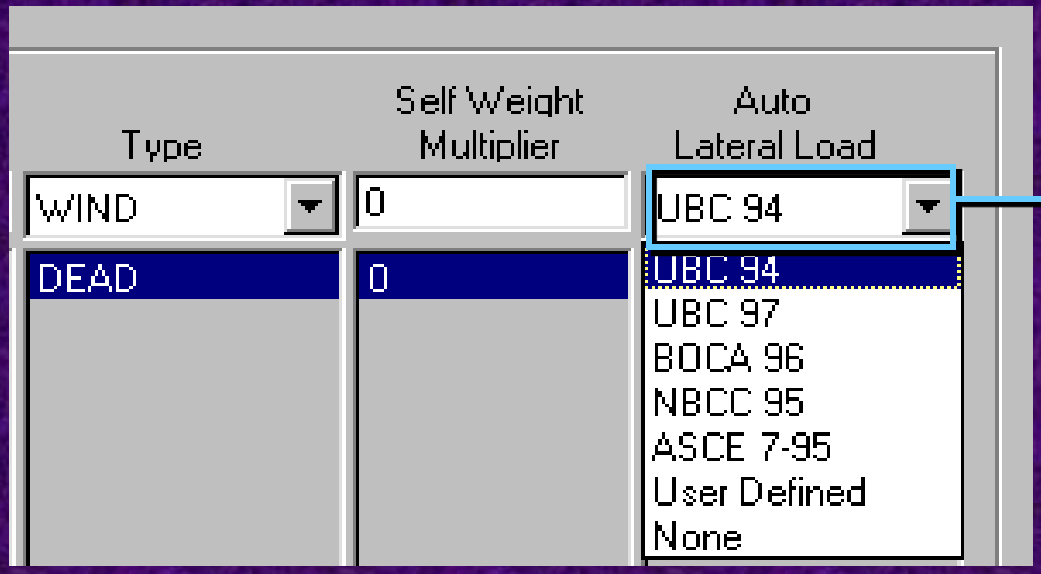
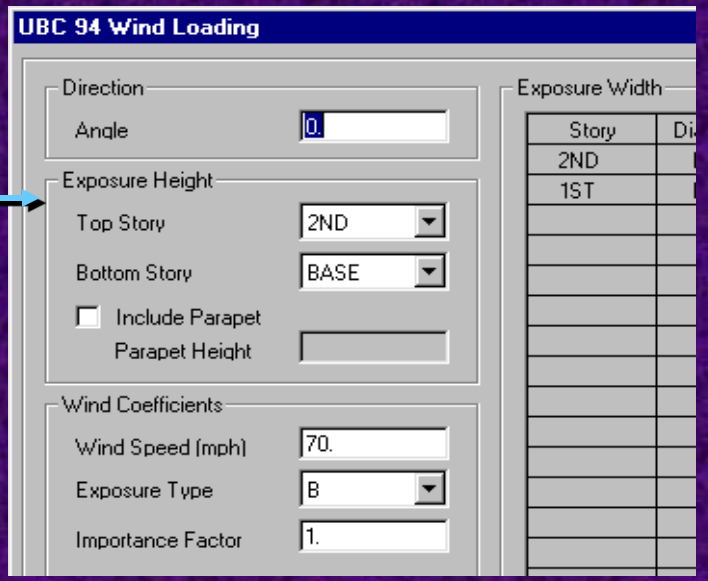
Interactive Modeling

Building Loads

- Automatic wind load generation
  - *Indian IS 875*







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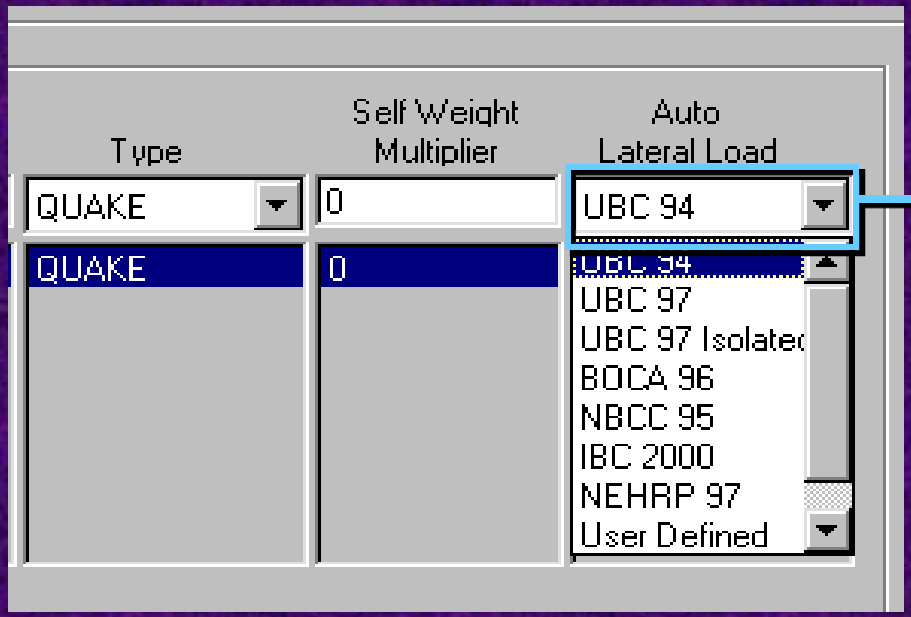
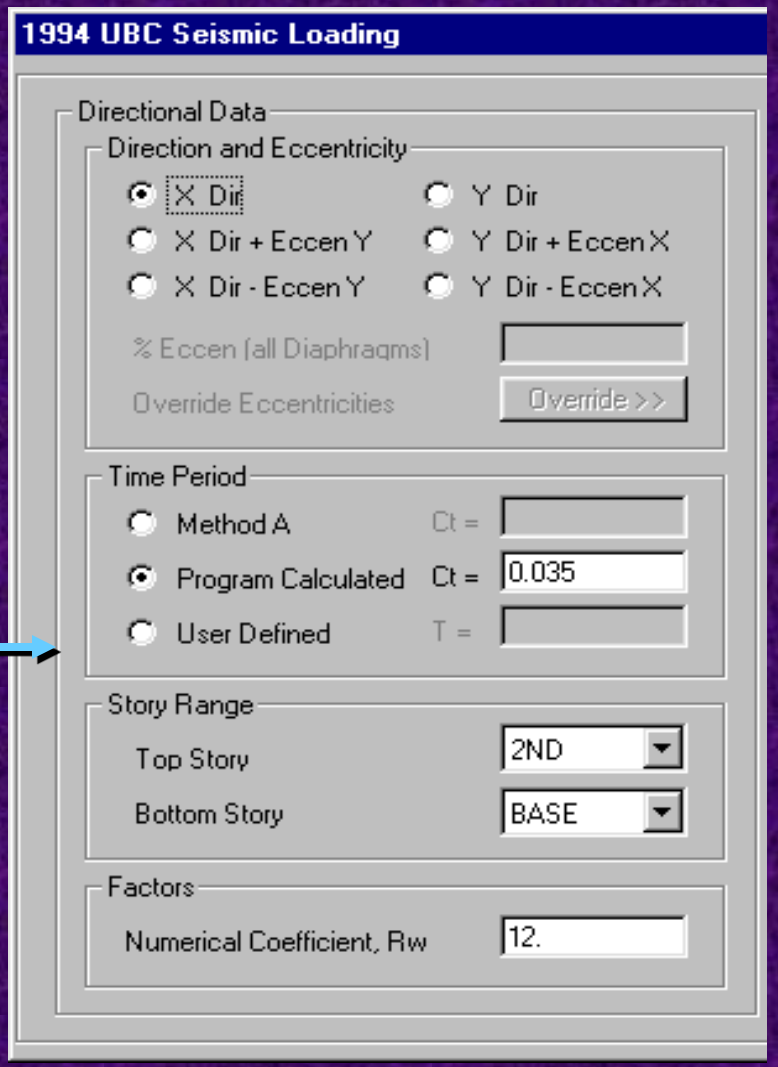
Interactive Modeling

Building Loads

- Automatic Seismic Load Generation
  - *Indian IS 1893*





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Modeling Elements

Beams, Columns, Walls, Slabs ...

Modeling Elements

Powerful Object Based Elements

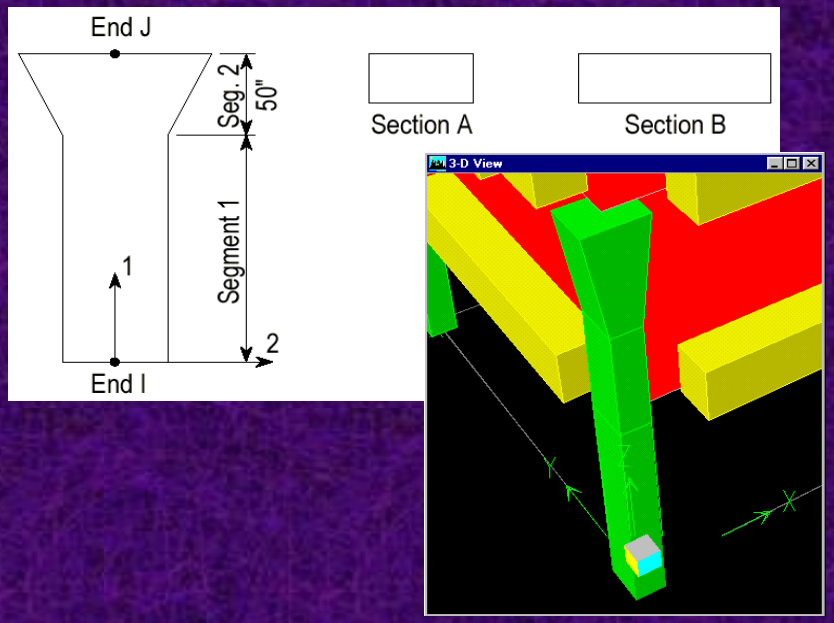
- Area objects
  - *Walls*
  - *Slabs/Decks*
  - *Opening*
  - *Mass*
  - *Loads*
- Lines objects
  - *Columns*
  - *Beams*
  - *Braces*
  - *Links*
  - *Springs*
  - *Mass*
  - *Loads*
  - *Plastic Hinge*
  - *Non-linear Link*
- Point objects
  - *Supports*
  - *Springs*
  - *Mass*
  - *Loads*

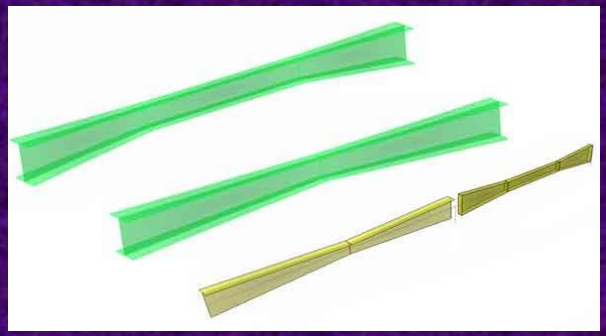
ETABS

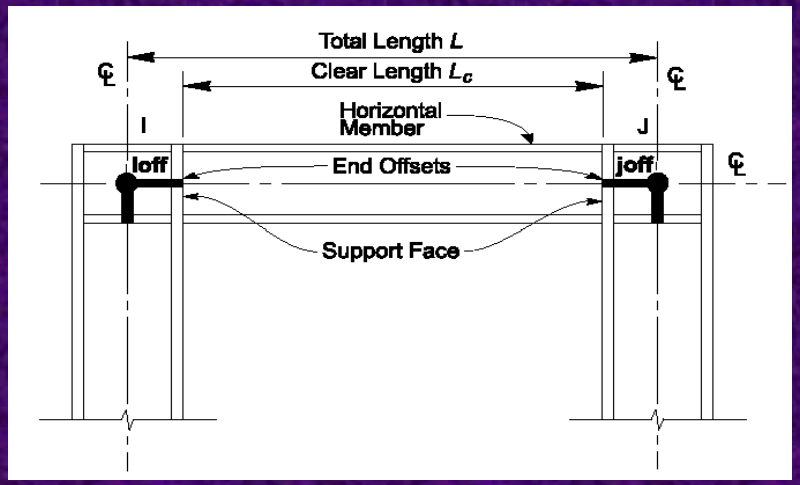
Modeling Elements

Beam, Column and Brace Elements

- Axial, bending, torsional and shear deformations
- Multiple non-prismatic segments over element length
- Ends offset from reference nodes in any direction
- Automated evaluation of offsets for joint size







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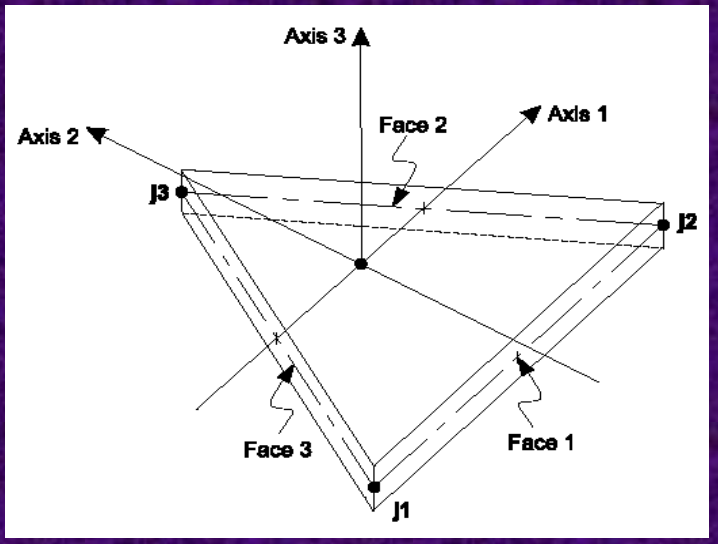
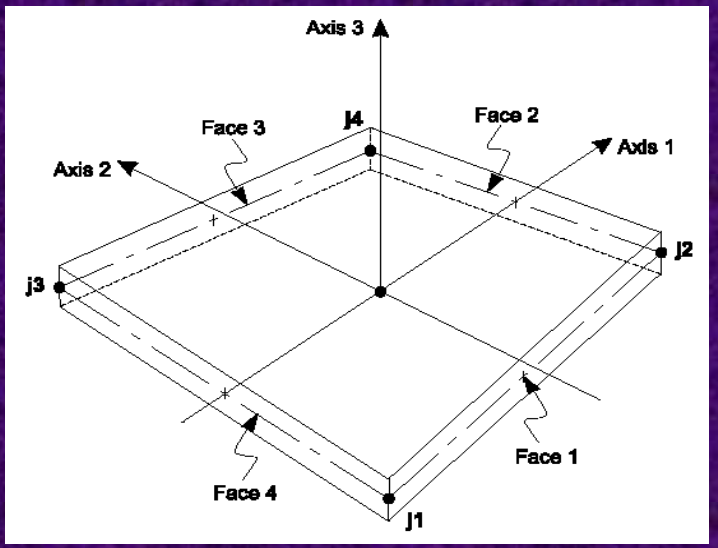
Modeling Elements

Wall, Slab, Deck Elements

- Shell, plate or membrane action
- General quadrilateral or triangular element
- Six degree of freedom per joint
- Uniform load in any direction
- Temperature and thermal-gradient loading





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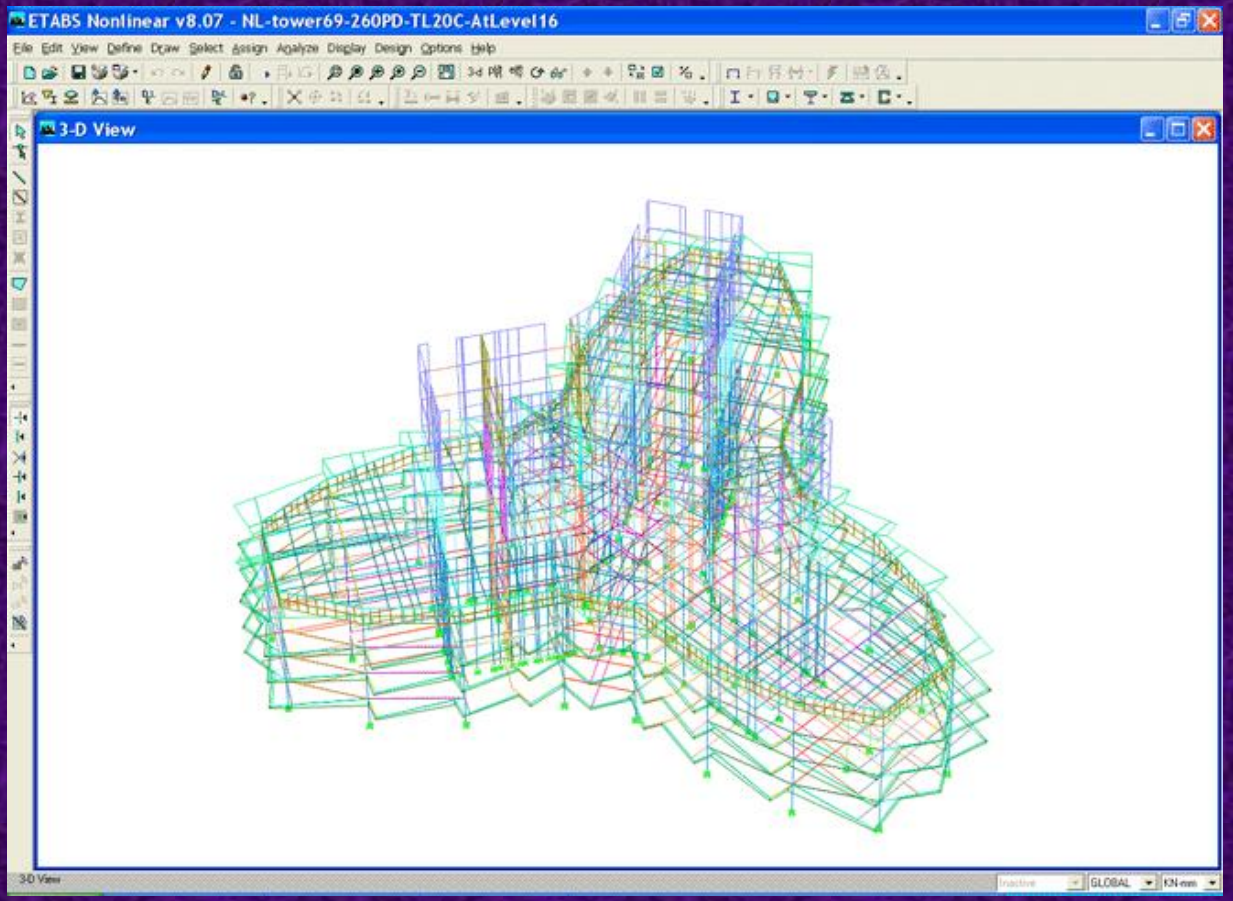
Modeling Elements

Wall, Slab and Deck Elements

- Use these Elements to Model
  - *Shear Walls*
  - *Bearing Walls*
  - *Wall Panels*
  - *Concrete Slabs*
  - *Diaphragms*
  - *Metal Decks*



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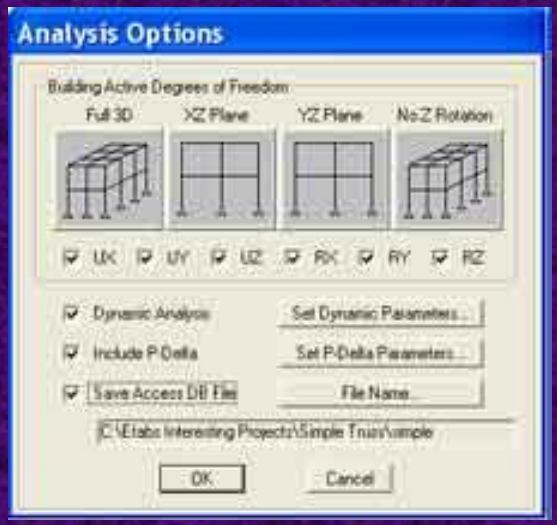
$$[K - \Omega^2 M]\Phi = 0$$

$$Ku(t) + M\ddot{u}(t) = r(t) = p\cos(\varpi\ t)$$

Analysis Options

Main Analysis Options

- Linear Static Analysis
- Linear Dynamic Analysis
- Static and Dynamic P-Delta Analysis
- Static Non-Linear Analysis



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Main Analysis Options

- Dynamic Non-Linear Analysis
- Pushover Analysis
- Multiple Response Spectrum Analysis
- Multiple Time History Analysis
- Construction sequence loading analysis

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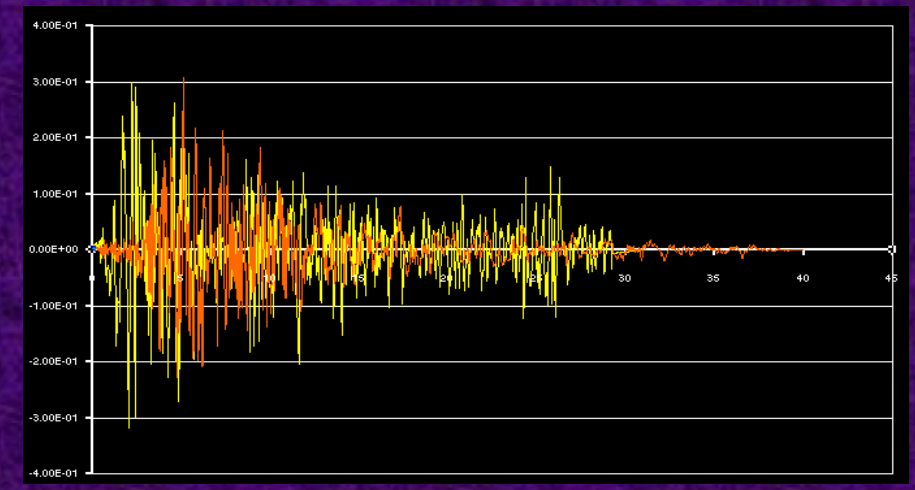
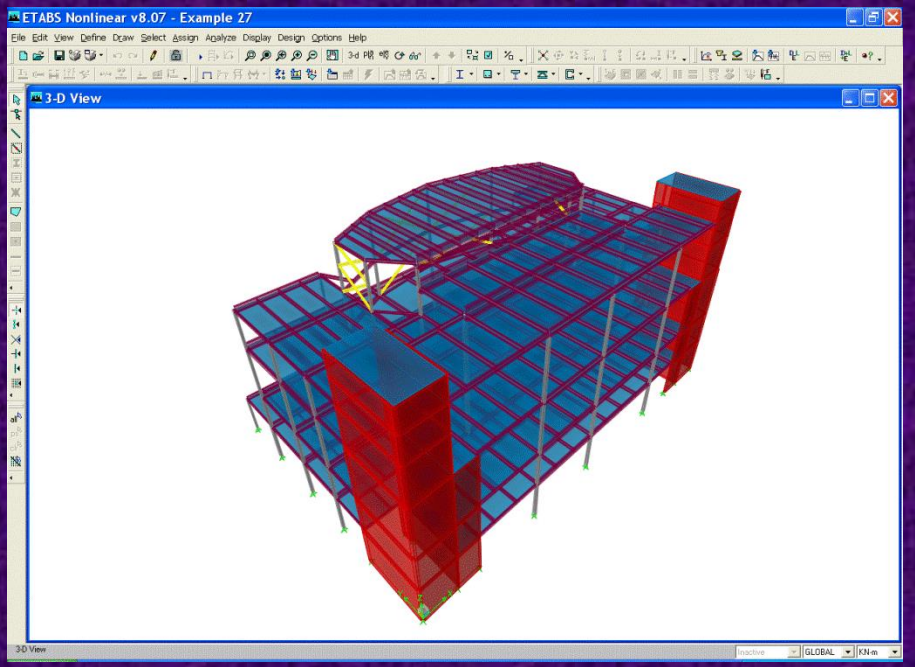
Analysis Options

Dynamic Analysis Options

- Static and dynamic response combinations by ABS or SRSS method
- Eigen and load-dependent Ritz vector determination





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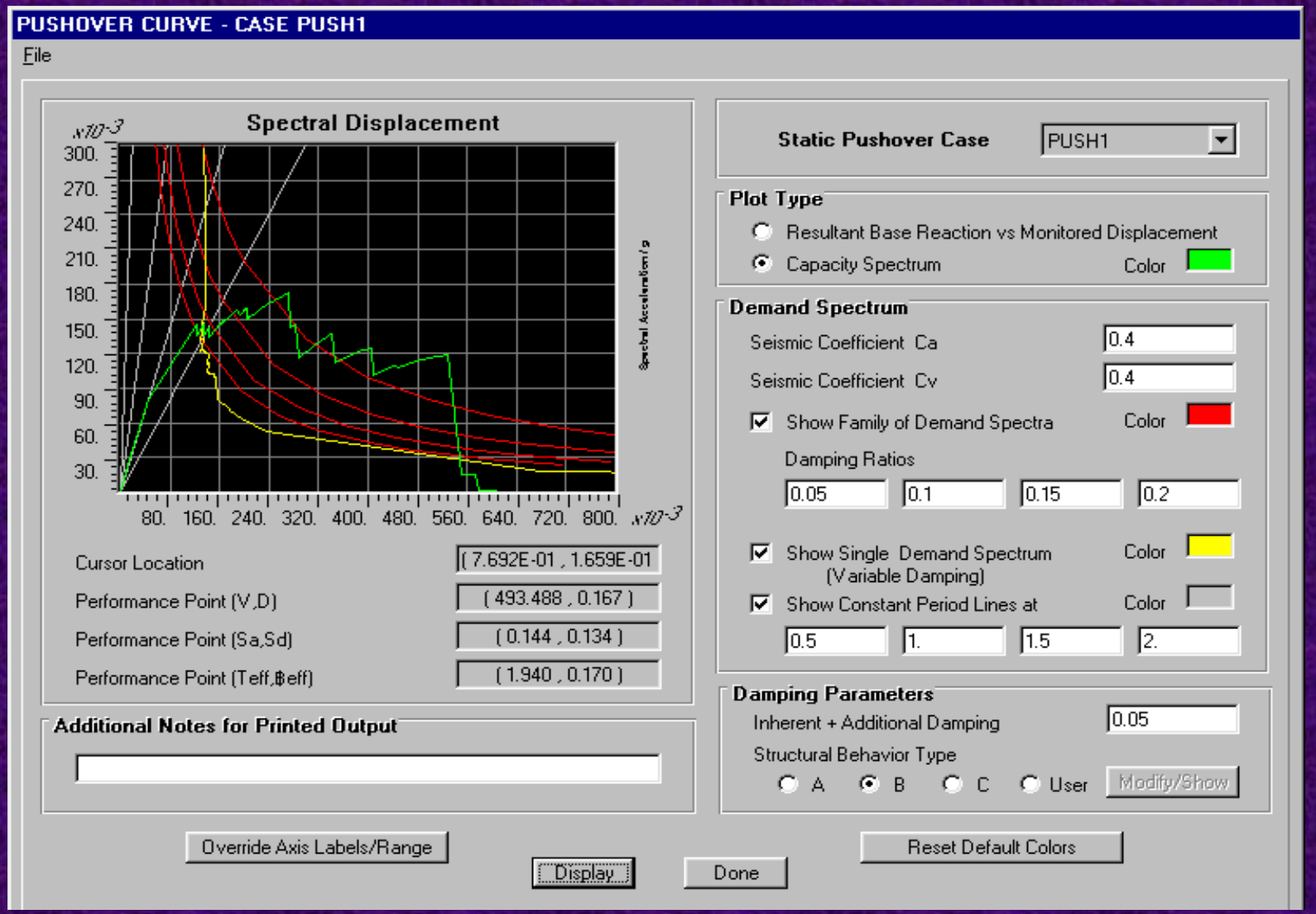
Pushover Analysis

Analysis Options



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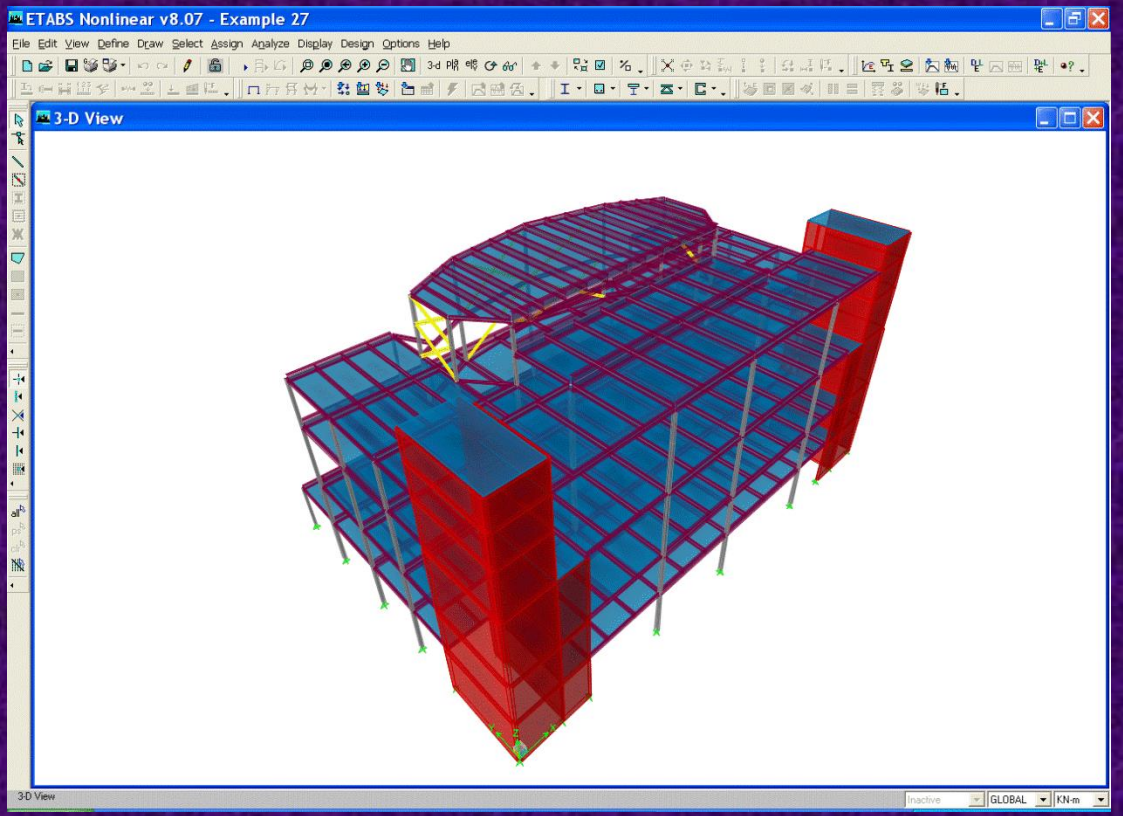
Viewing Results

Analysis Results

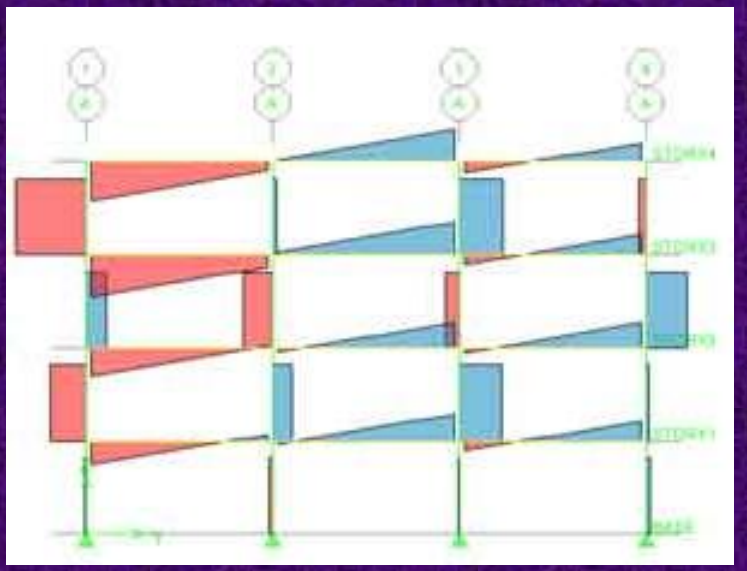
- Deformed and Un-deformed geometry in 3D perspective
- Animation of deformed shapes

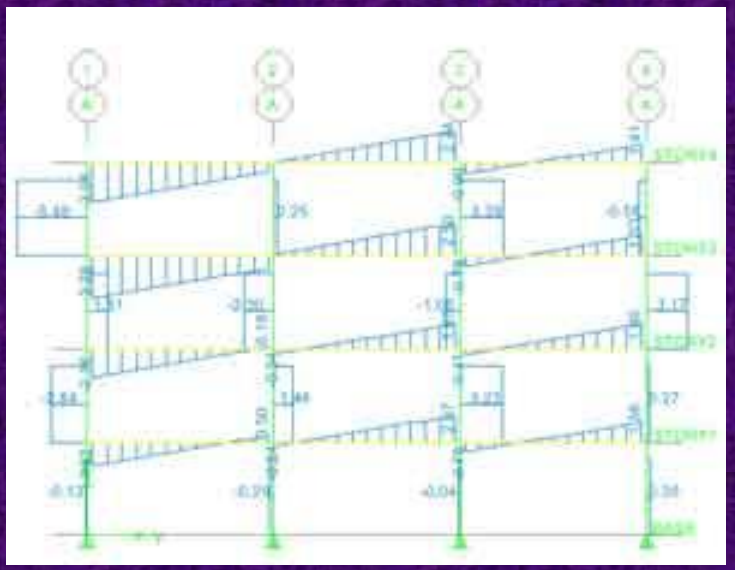


Analysis Results

Analysis Results

- Bending-Moment and Shear-Force diagrams for Frames
- Instantaneous on-screen results output with right-button click on element
- Integrated-force diagrams for Wall Piers and Spandrels





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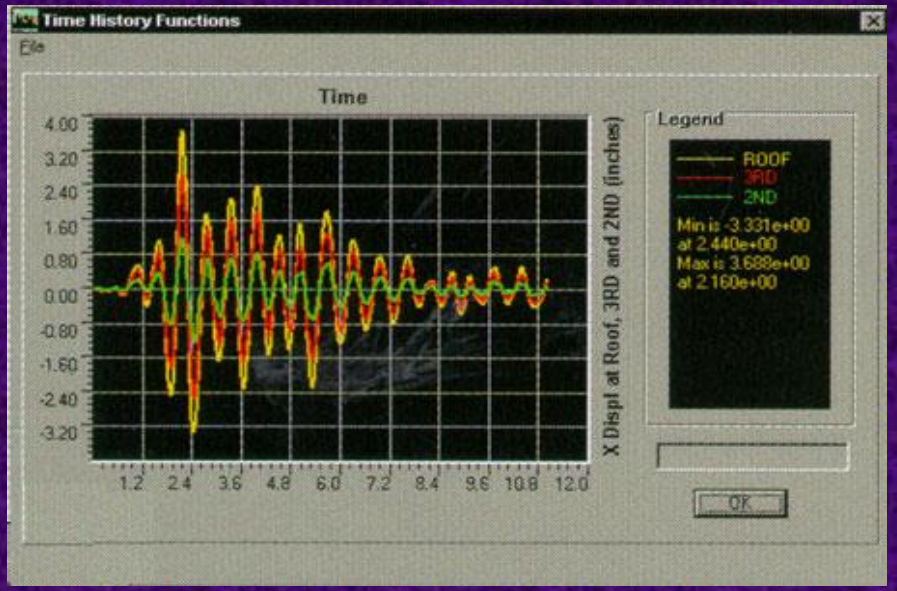
Analysis Results

Dynamic Analysis Results

- Time-History deformed shapes as real time AVI file
- Displays of nodal and element time-history records
- Time History displays of function vs. time or function vs. function
- Response spectrum curves for any joint from Time History response



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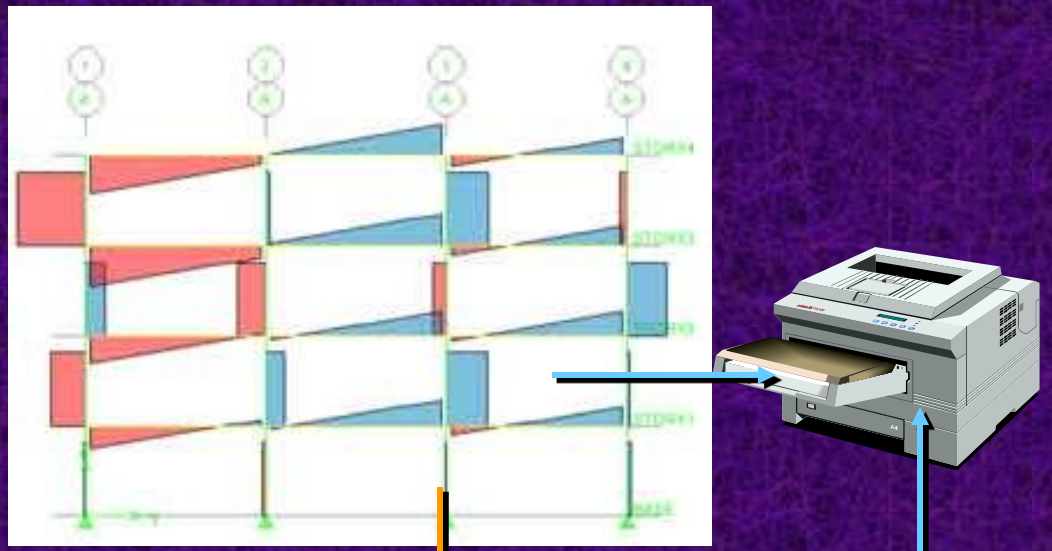
Analysis Results

Analysis Output

- Selective or complete tabulated output for all output quantities
- Graphics output to screen, printer, DXF file, or Windows Metafile
- Tabulated output to screen, printer, or Access Database



Beam Forces

Edit View

	Story	Beam	Load	Loc	P	V2
▶	STORY4	B1	DEAD	12	0	-9.919177
	STORY4	B1	DEAD	30	0	-9.469206
	STORY4	B1	DEAD	48	0	-9.019235
	STORY4	B1	DEAD	48	0	-5.107079
	STORY4	B1	DEAD	72	0	-4.507117
	STORY4	B1	DEAD	96	0	-3.907155
	STORY4	B1	DEAD	96	0	-1.694391

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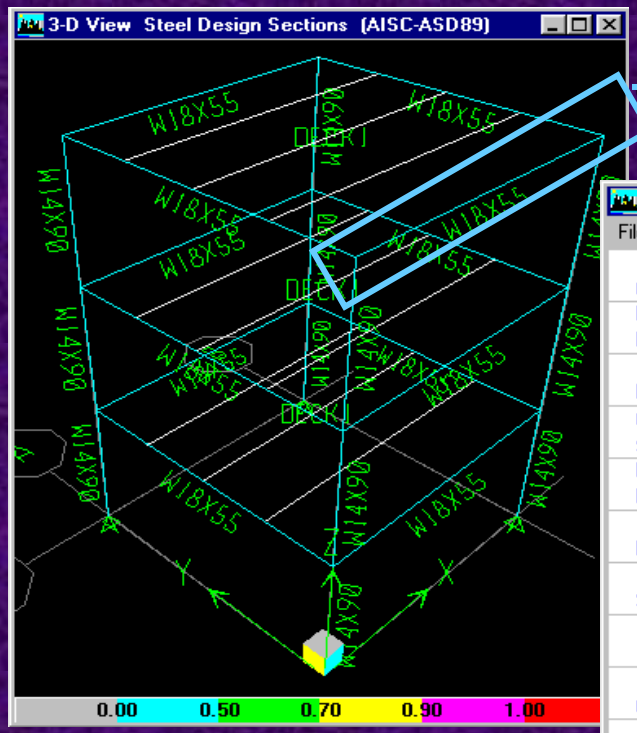
Member Design

Steel Frame Design

Member Design



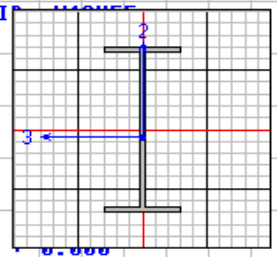
Analysis Model

Design Output

Steel Stress Check Information AISC-ASD89

File

```
AISC-ASD89 STEEL SECTION CHECK     Units: Kip-in
Level: STORY3  Element: B3  Station Loc: 144.000  Section ID: W14X90
Element Type:  Moment Resisting    Classification:  Compact

L=288.000
A=16.200  i22=44.900  i33=890.000
s22=11.926  s33=98.288  r22=1.665  r33=7.412
E=29000.000  fy=36.000
RLLF=0.947  EQF=1.000

P-M33-M22 Demand/Capacity Ratio is    0.302 = 0.000 + 0.302 + 0.000

STRESS CHECK FORCES & MOMENTS
                        P          M33          M22          V2          V3
    Combo   DSTL2     0.000      706.294      0.000      -3.209      0.000

AXIAL FORCE & BIAXIAL MOMENT DESIGN   (BENDING)
                        fa           Fa           Ft
                    Stress    Allowable    Allowable
    Axial            0.000       18.926       21.600

                        fb           Fb           Fe          Cm           K           L
                    Stress    Allowable    Allowable      Factor      Factor      Factor   Fact
    Major Bending    7.186       23.760      110.726       1.000       1.000       0.945    1.0
    Minor Bending    0.000       27.000       79.839       1.000       1.000       0.250

SHEAR DESIGN
                        fv           FV       Stress
```



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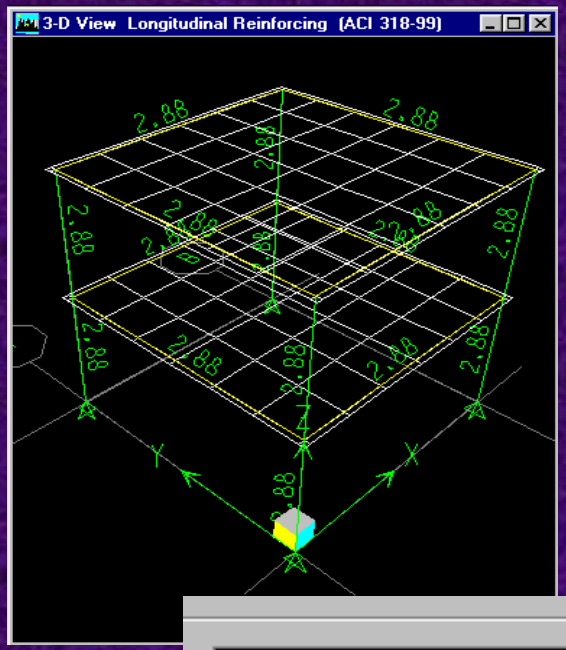
Concrete Frame Design

Member Design



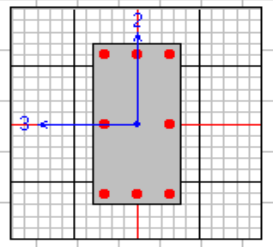
Concrete Design Information ACI 318-99

File

ACI 318-99 COLUMN SECTION DESIGN Type: Sway Special Units: Kip-in

Level: STORY2 Element: C2
Station Loc 120.000
Section ID CSEC1
Combo ID DCON2

L=144.000
B=12.000 D=24.000 dc=1.500
E=3600.000 fy=60.000 fc=4.000 Light Wt. Shr. Fac.=1.000
RLLF=0.995 EQF=1.000



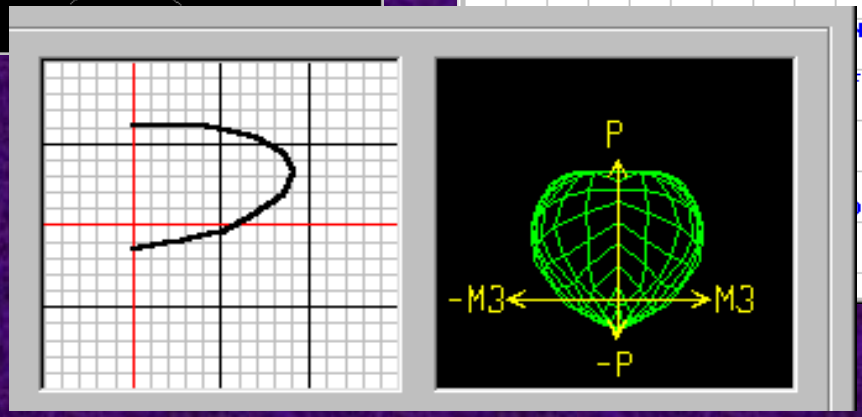
AXIAL FORCE & BIAXIAL MOMENT DESIGN FOR PU, M2, M3

Rebar Area	Design Pu	Design M2	Design M3	Minimum M2	Minimum M3
2.880	43.730	369.087	-667.306	41.981	57.723

NT FACTORS

Cm	Delta_ns	Delta_s	K	L
Factor	Factor	Factor	Factor	Length
0.400	1.000	1.000	1.000	120.000
0.400	1.000	1.000	1.000	120.000

Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
0.032	36.452	0.000	36.452	36.452
0.068	36.445	0.000	36.445	36.445

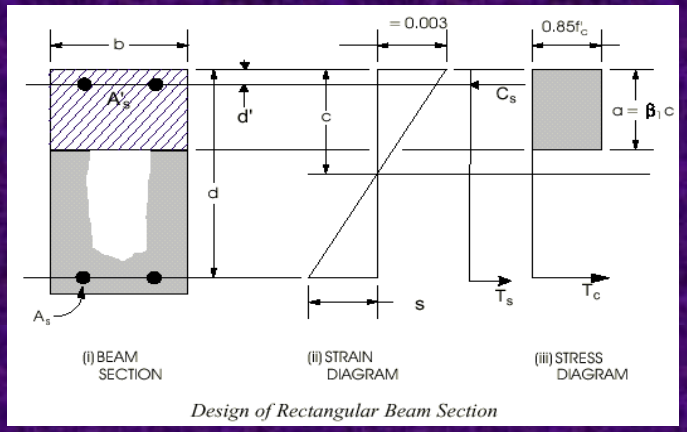


ETABS

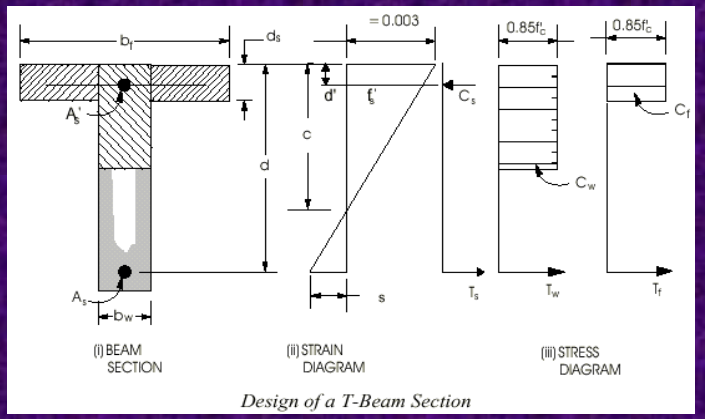
Member Design

Concrete Frame Design

- Fully integrated concrete frame design
- Indian, ACI, UBC, Canadian and Euro codes
- Design for static and dynamic loads
- Seismic design of intermediate/ special moment-resisting frames
- Seismic design of beam/ column joints
- Seismic check for strong-column/ weak-beam design



Design of Rectangular Beam Section



Design of a T-Beam Section

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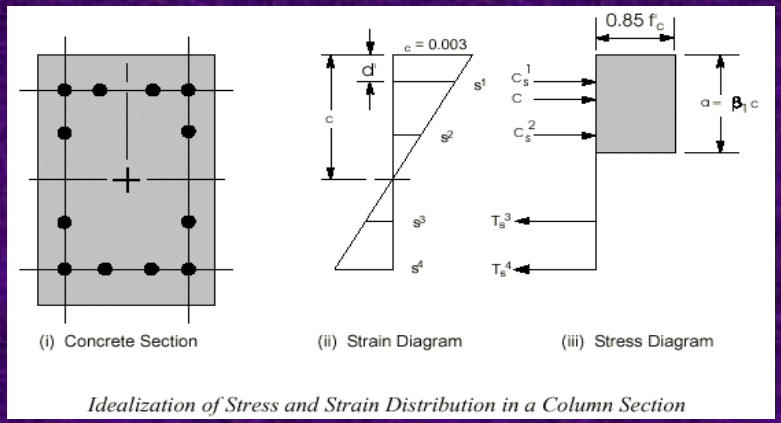
Member Design

Concrete Frame Design

- Graphical Section Designer for concrete rebar location
- Biaxial-moment/ axial-load interaction diagrams
- Graphical display of reinforcement and stress ratios
- Interactive design and review
- Summary and detail reports including database formats



Idealization of Stress and Strain Distribution in a Column Section

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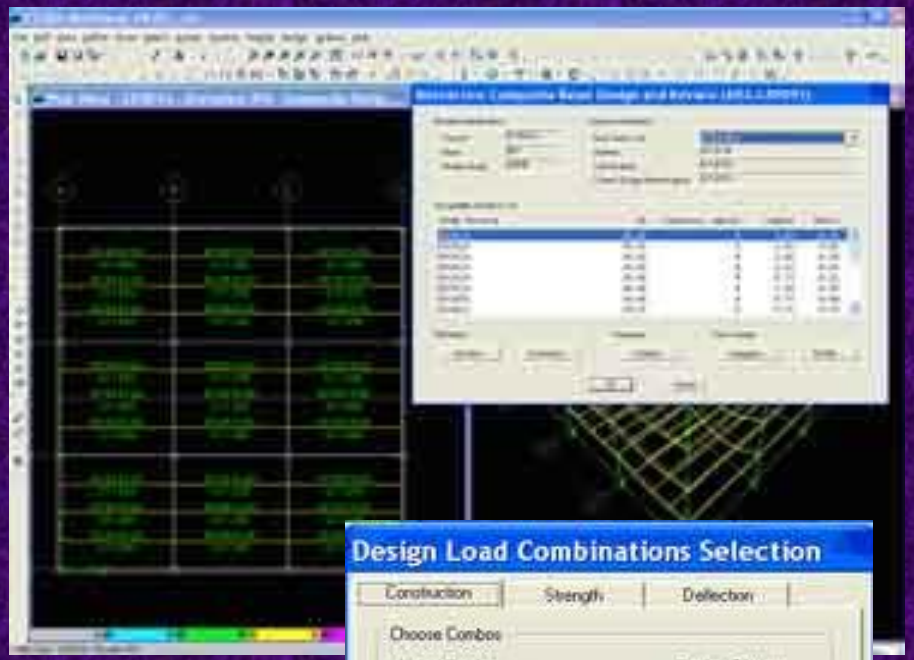
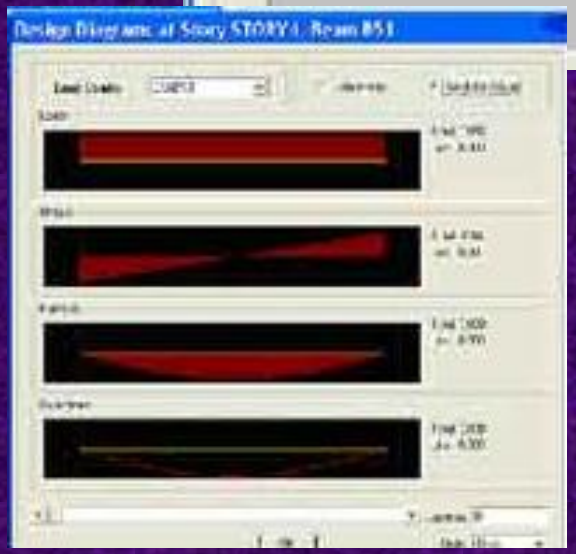
Member Design

Composite Beam Design





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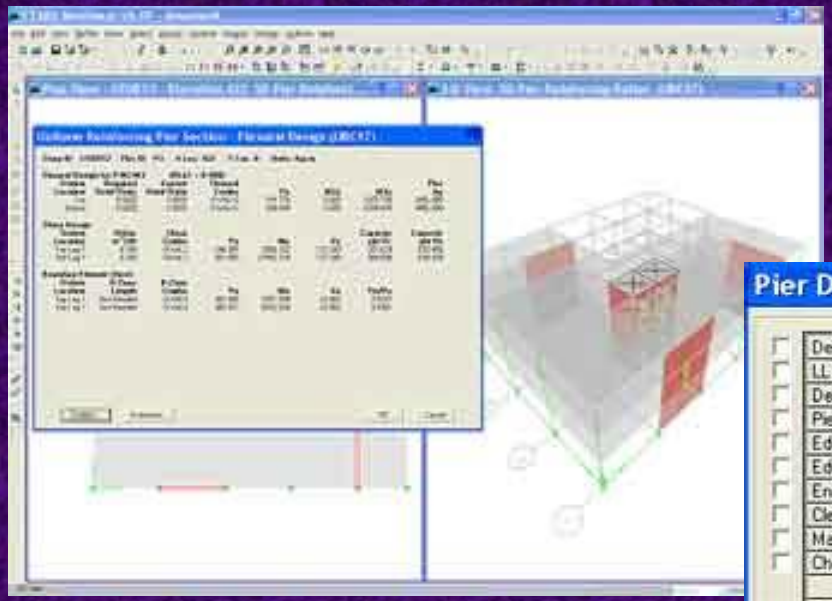
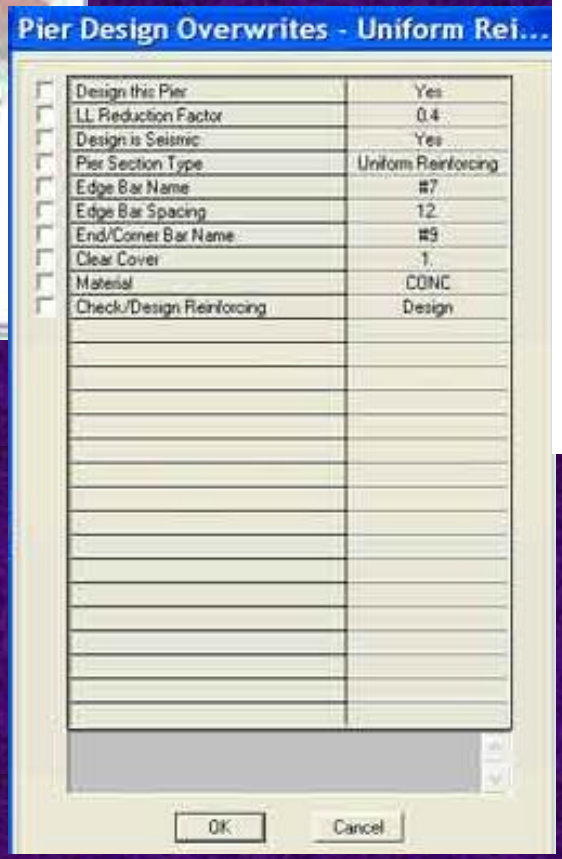
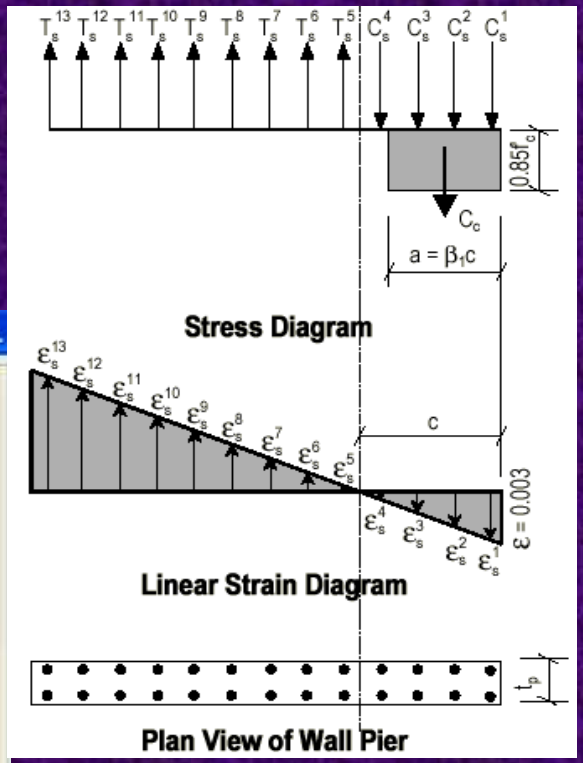
Shear Wall Design







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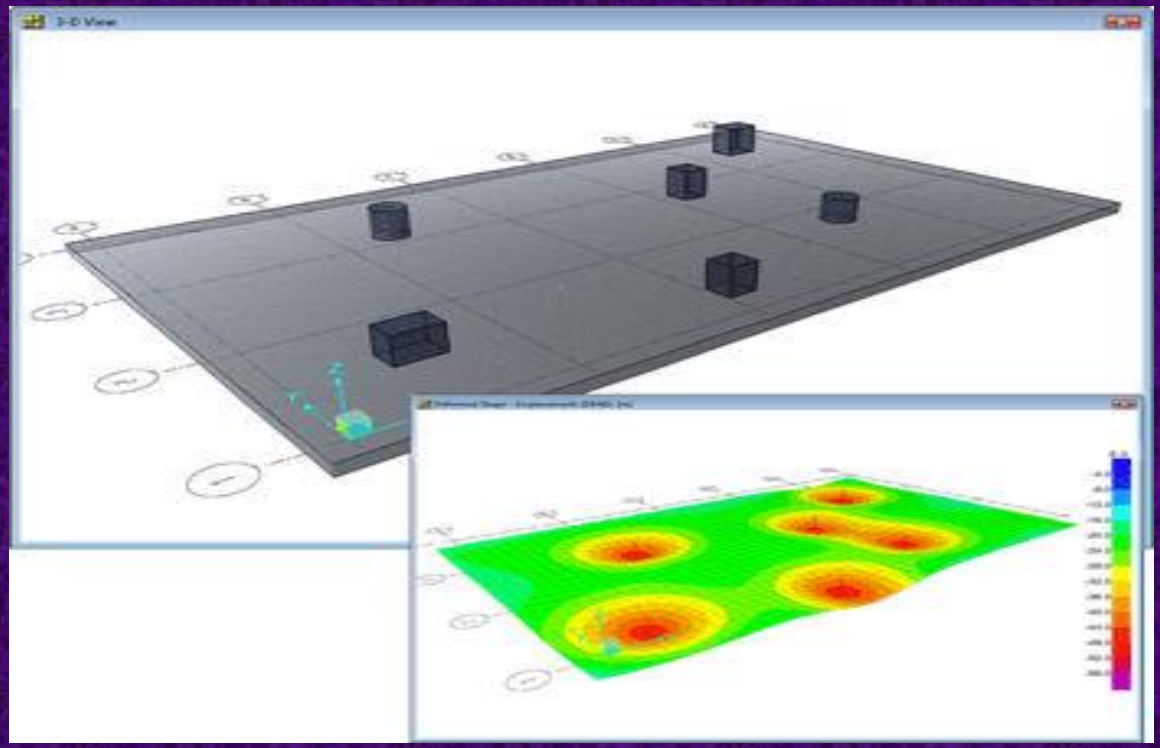
SAFE

- ✓ Ultimate tool for designing Concrete floor and Foundation System
- ✓ Comprehensive & Customizable
- ✓ Detailed Plan, Section, Elevation, Schedule & table may generate and export to Cad Packages

Only tool for:

Designing & Detailing of Concrete slab system & Foundation



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Detailing & Reports

- Detailing can be done and drawings can be exported to AutoCAD
- Reports can be viewed in MS-word

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Other Courses

- SAFE
- SAP2000
- Staad.Pro
- Revit Architecture
- 3ds Max
- RCC Manual Designs
- Steel Manual Designs
- Quantity Surveying…etc

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Any Questions..?

- Subscribe to our Newsletter for Information about
- Internships/ Placements
- Free Workshops on Site Execution with Site visits, Vasthu, Building Planning..etc

Thankyou…

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Thank you..!

For Registration & More information

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- Velachery
- Guduvanchery