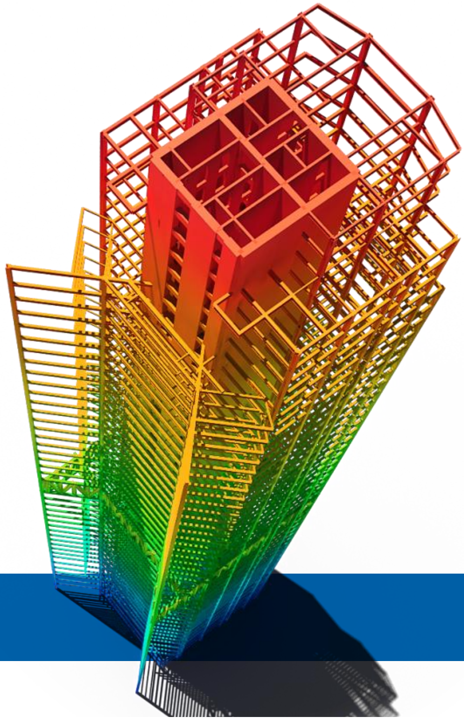
MIDAS

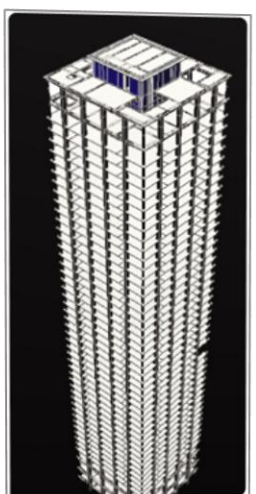


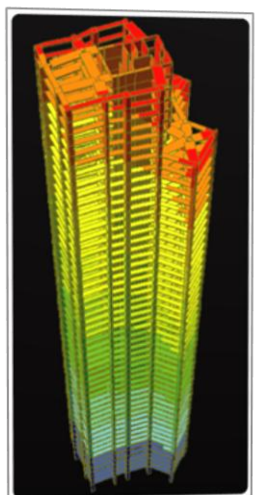
One Stop Solution for Building and General Structures

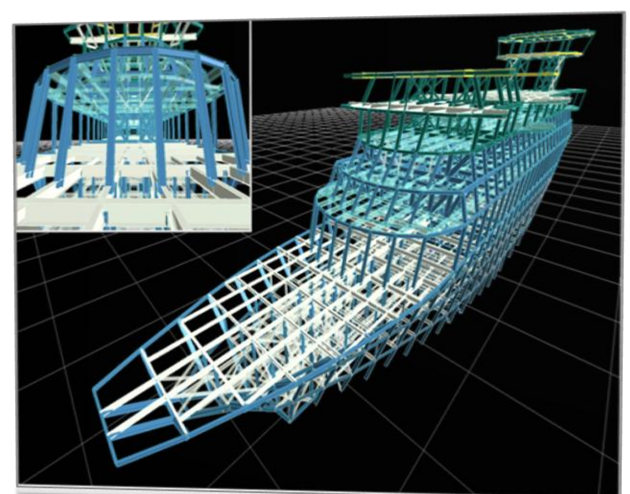
midas Gen

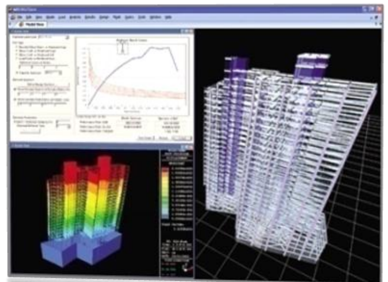
Product Overview

- **midas Gen** is a Windows-based, general-purpose **structural analysis** and optimal **design** system.
- The **intuitive User Interface**, contemporary Computer Graphics and substantially **fast solver** speed are some of the highlights of midas Gen.
- The user-oriented input/output features and significant analysis capabilities enable the **practicing engineers** and researchers to readily undertake structural analysis and design for even **complex and large structures**.

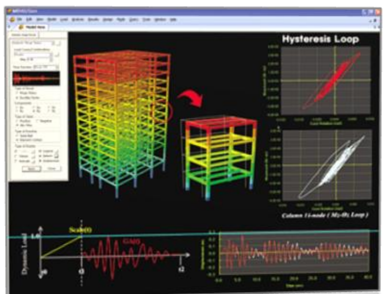




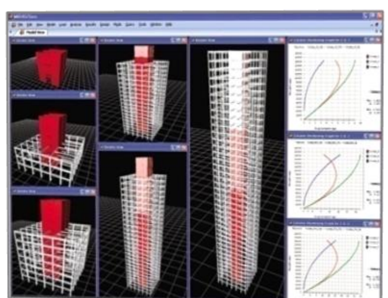




Pushover Analysis Result



Inelastic Time History Results



Column Shortening Results

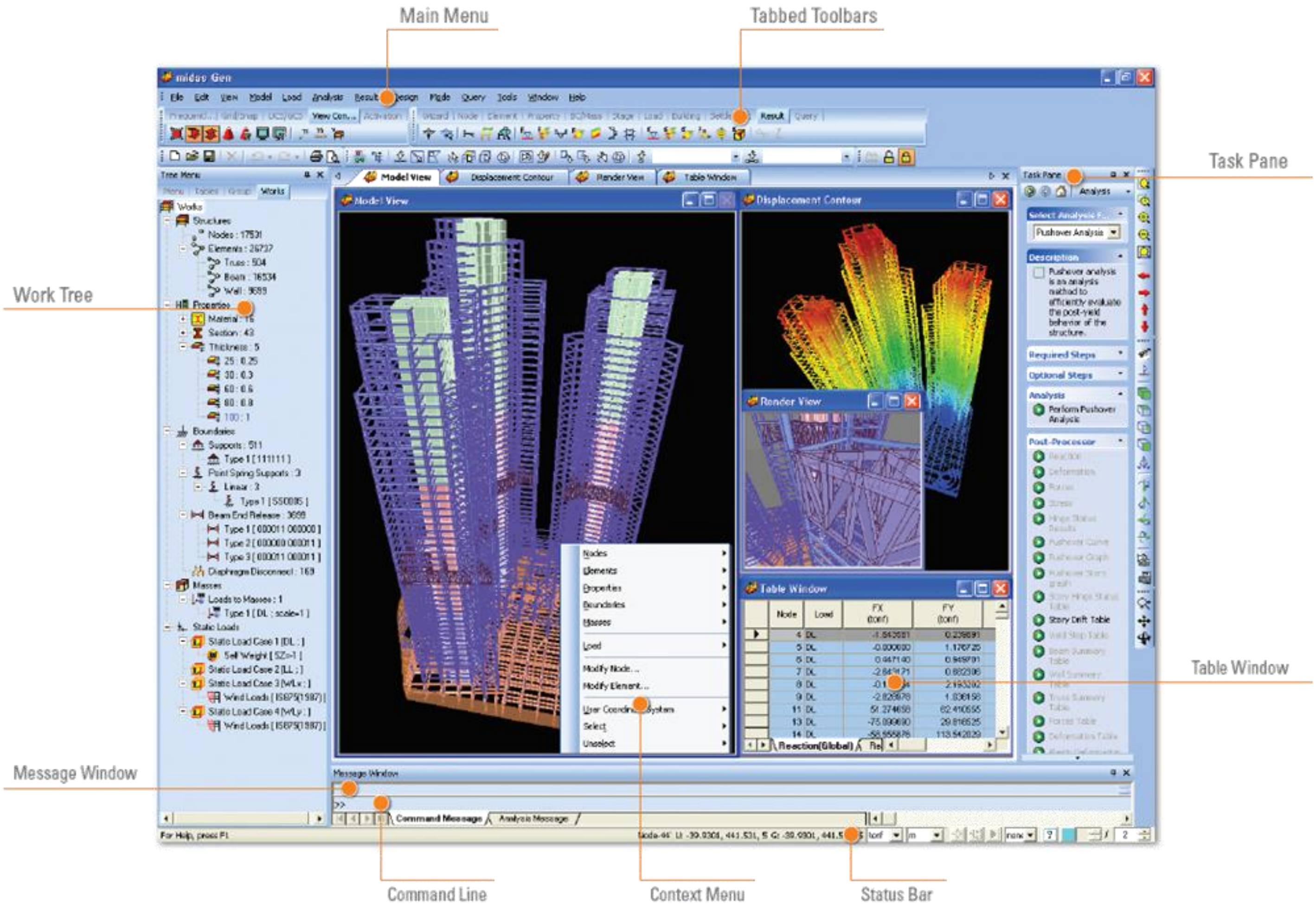
- Static Analysis
- Dynamic Analysis
- **Pushover** Analysis
- P-Delta Analysis
- Buckling Analysis
- Thermal Stress Analysis
- **Moving Load** Analysis
- **Construction Stage** Analysis (Time-dependent)
  - Creep, Shrinkage & Mod. of Elasticity
  - Tension losses in tendons
  - **Column Shortening**
  - Construction Stage Wizard
- Large Displacement Analysis (**Cable structures**)
- **Boundary Nonlinear** Dynamic Analysis
- Material Nonlinear Analysis
- Masonry Linear / Pushover Analysis
- Inelastic **Time History** Analysis (Fiber Elements)
- Heat of Hydration Analysis for mass concrete

Concrete	Reinforced Concrete Design Codes	Code Name
	Japanese Standard for Structural Calculation of Reinforced Concrete Structures	AIJ-WSD99
	American Building Code Requirements for Structural Concrete	ACI318-89 , 95, 99, 02
	British Design of Reinforced Concrete Buildings	BS8110-97
	Eurocode 2: Design of concrete structures	EuroCode 2
	Canadian Design of Concrete Structures	CSA-A23. 3-94
	Chinese Code for Design of Concrete structures	GB50010-2
	Korean Code for Design of Concrete structures – 1	AIK-USD94
	Korean Code for Design of Concrete structures – 2	KCI-USD99
	Korean Code for Civil Design of Concrete structures – 3	KSCE-USD96
	Korean Code for Design of Concrete structures – 4(WDS2000)	AIK-WSD2K
	Korean Code for Design of Concrete structures – 5	KCI-USD03
	Indian Code for Design of Concrete structures	IS456:2000
	Taiwanese Code for Design of Concrete structures	TWN-USD92

Steel	Steel Design Codes	Code Name
	Japanese Design Standard for Steel Structures	AIJ-ASD02
	British Structural use of steelwork in building	BS5950-90
	Eurocode 3: Design of steel structures (LSD)	Eurocode 3
	American Cold-formed Steel Design	AISI-CFSD86
	American Design of steel structures (ASD)	AISC-ASD89
	American Load and Resistance Factor Design Specification	AISC-LRFD93/2K
	Korean Cold-formed Steel Design	AIK-CFSD98
	Korean Load and Resistance Factor Design Specification	AIK-LSD97
	Korean Design of steel structures (ASD)	AIK-ASD83

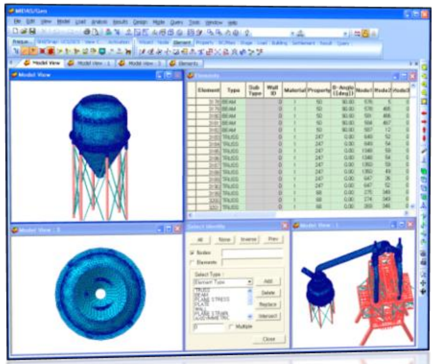
Graphic User Interface

Menus and Windows Layout

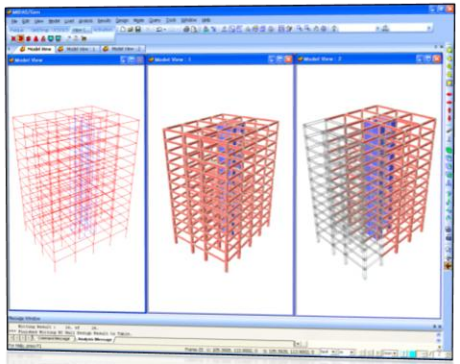


[midas Gen Framework]

Various Useful Functions and Windows



Multiple Viewpoints and Table



Different Display Modes (Frame, Hidden, Inactive Hidden)

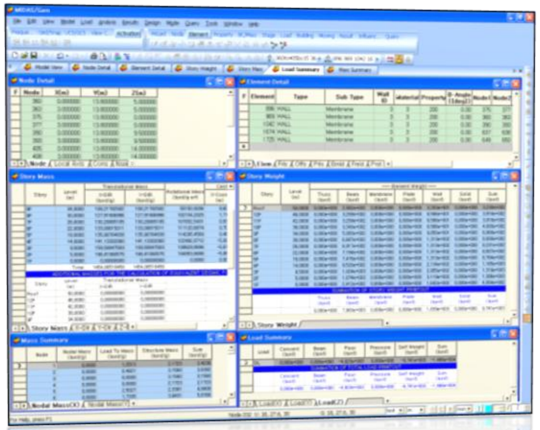
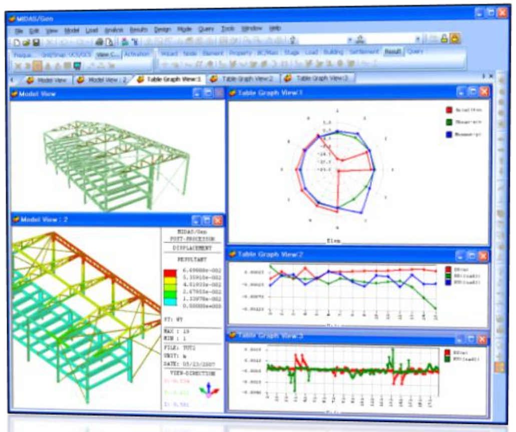
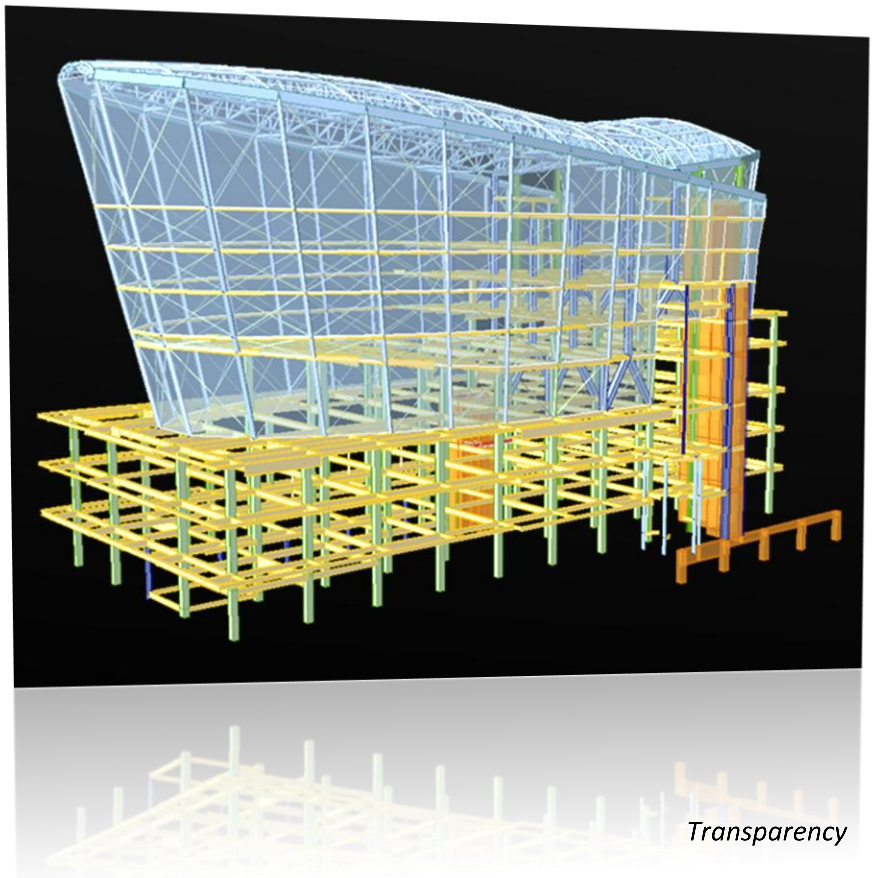


Table Windows

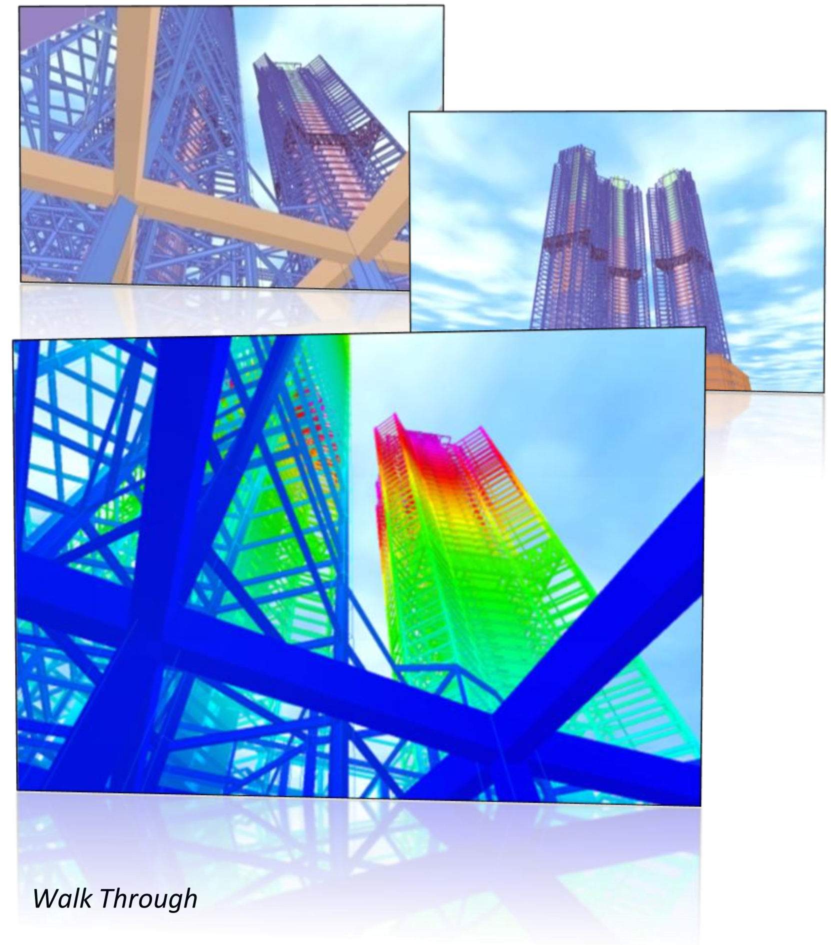


Various Types of Graphs

Special Visualization Features



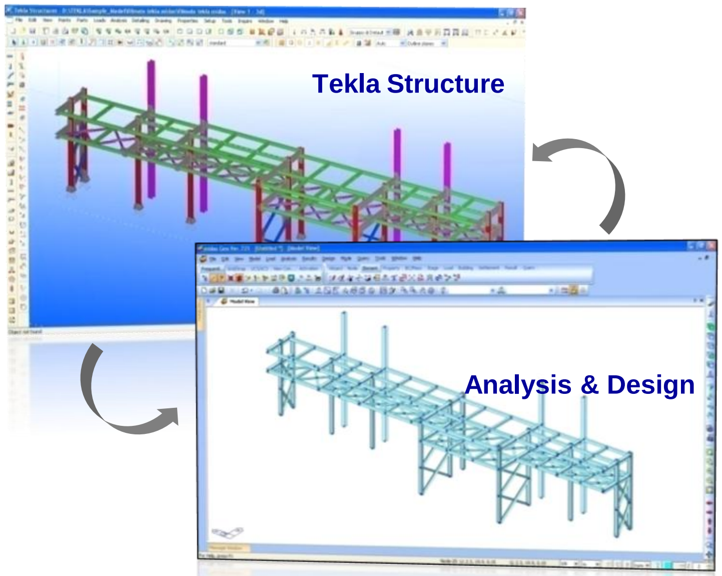
Transparency



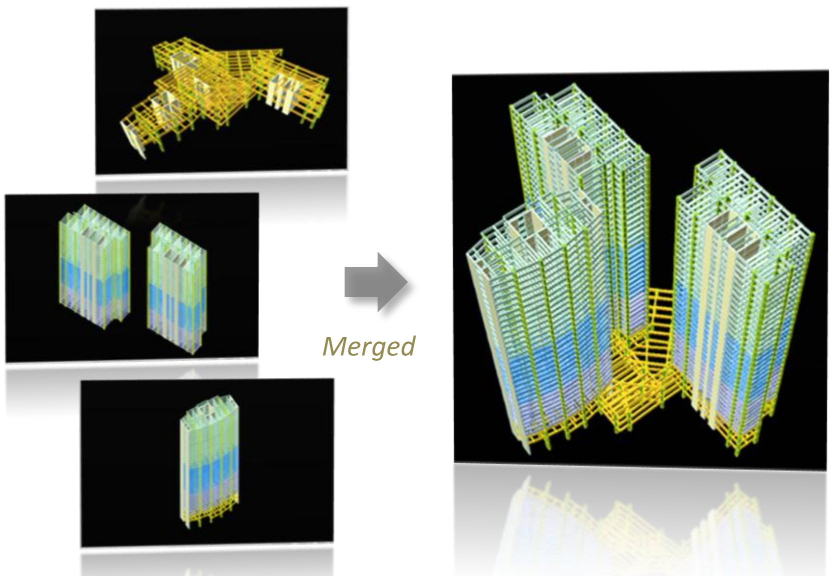
Walk Through

Data Exchange / Merge Data Files

- Direct Data Transfer with Tekla Structures, Revit Structure & STAAD
- Import/Export (AutoCAD DXF, MSC.Nastran, MGT, etc.)
- Merge Data Files
- Unlimited Undo/Redo & Step Return using History



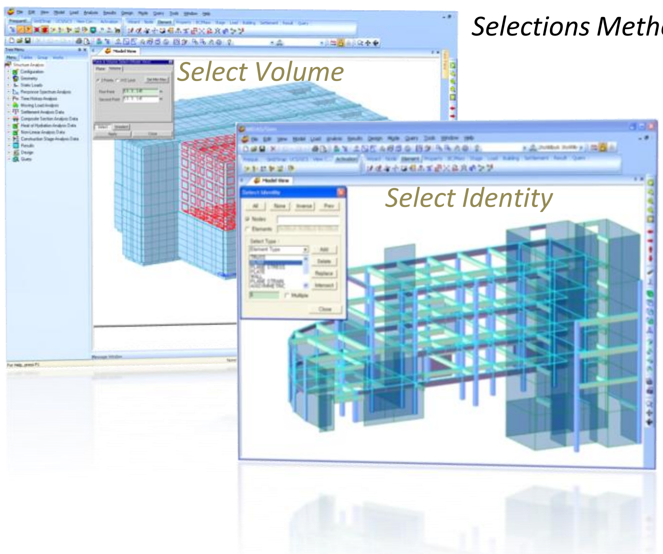
Direct Data Transfer



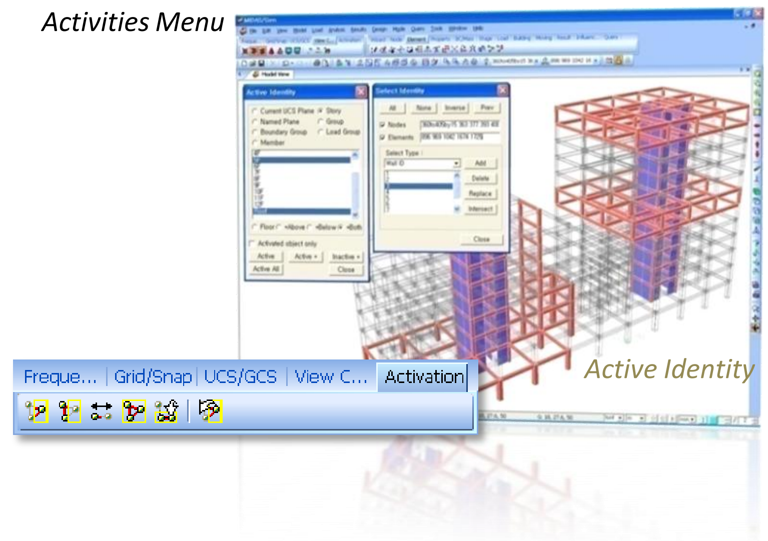
Merge Data Files

Quick and Easiness Features

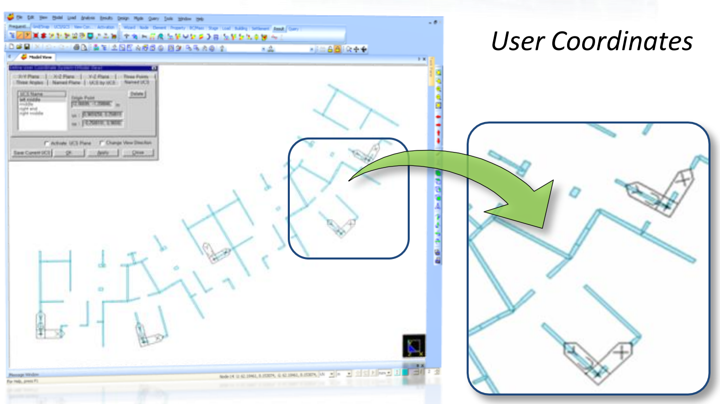
Selections Methods



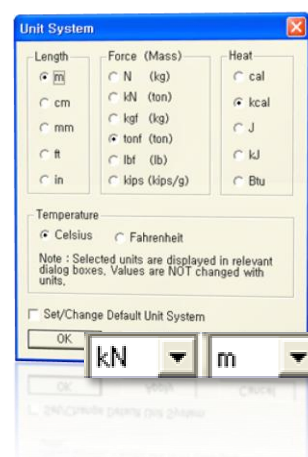
Activities Menu



User Coordinates



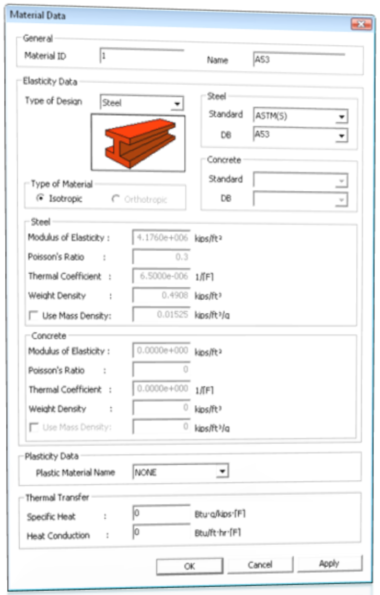
Unit Conversion



Unlimited Undo/Redo

Model Data Generation

Material Data Definition

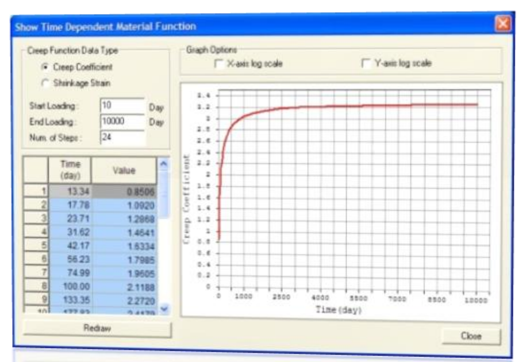


Database	Code Name
BS	British Standards
ASTM	American Society for Testing Materials
EN	European Code
DIN	Deutshes Institut Fur Normung e.v
CSA	Canadian Standards Association
IS	Indian Standards
JIS	Japanese Industrial Standards
KS	Korean Industrial Standards
GB	Chinese National Standard
JGJ	Chinese Engineering Standard
JTJ	Chinese Transportation Department Standard

**SRC and User Defined material properties can be defined*

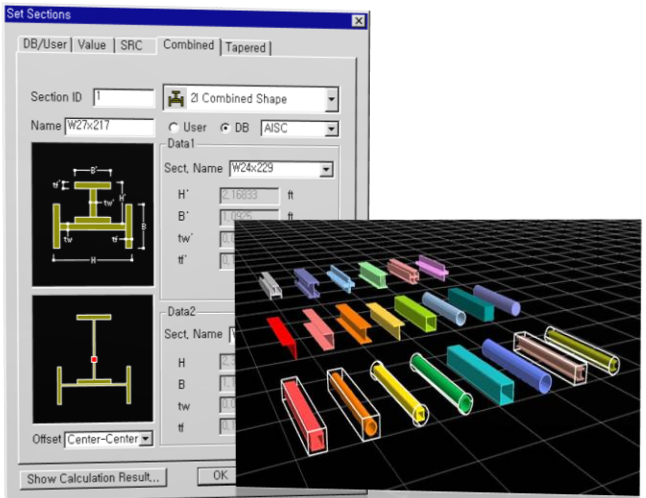
Steel & Concrete Material Database

- Creep/Shrinkage
  - ACI, CEB-FIP, PCA…
- Comp. Strength
  - ACI, CEB-FIP, Ohzagi…



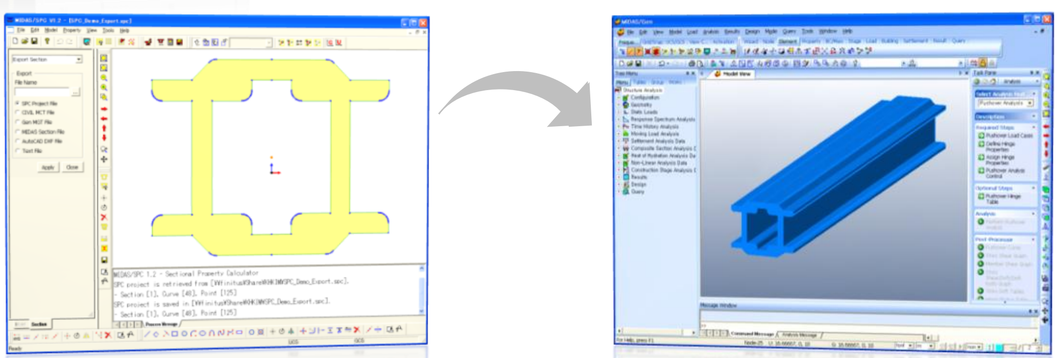
Time Dependent Materials

Section Data Definition



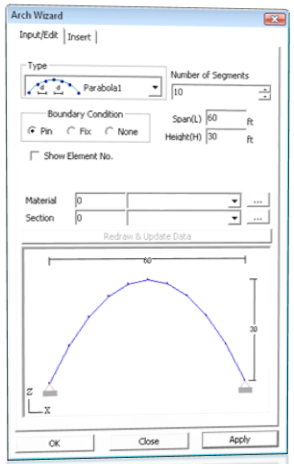
Section Database

- Section Database
- AISC2K(US), AISC2K(SI), AISC,
- CISC02(US), CISC02(SI), BS, DIN…
- Import data file already defined
- Input dimensions of typical sections
- Typical steel section (I, T, Channel, Angle, Pipe…)
- Steel – Concrete composite section (SRC)
- Tapered section
- Input section properties calculated

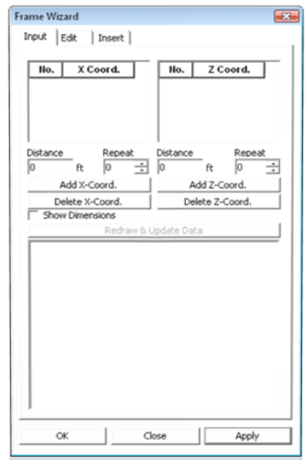


Arbitrary Section Definition

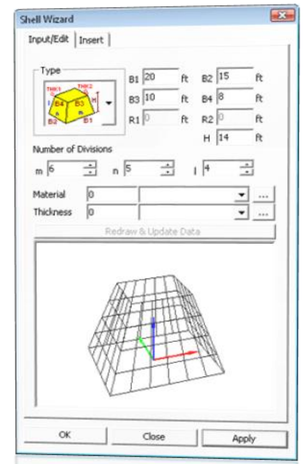
Quick Model Generation using Structural Wizards



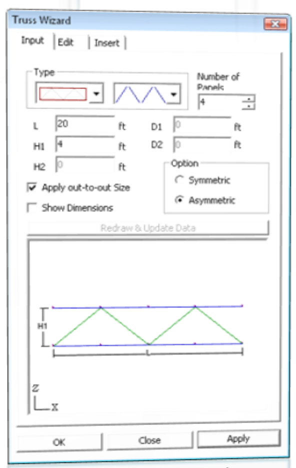
Arch Wizard



Frame Wizard



Shell Wizard



Truss Wizard

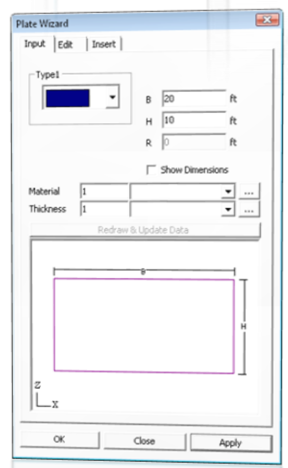
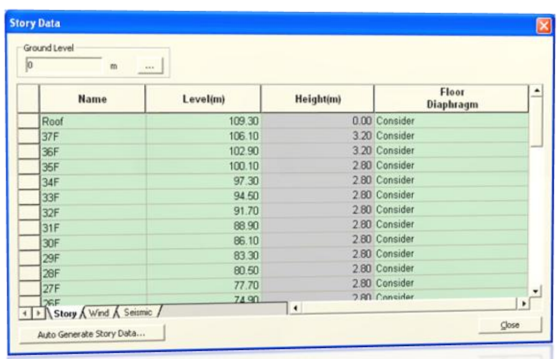


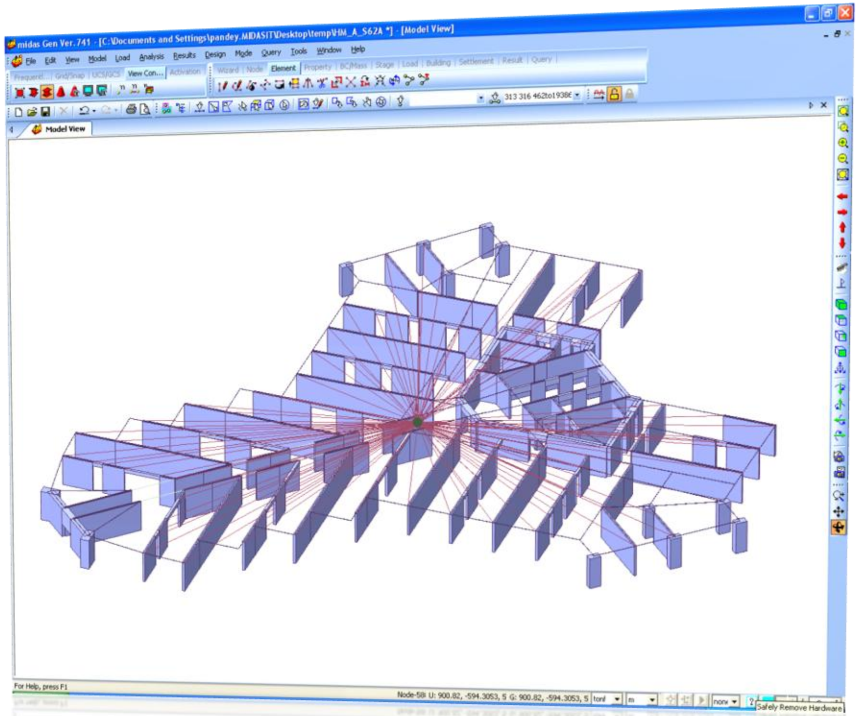
Plate Wizard

Automatic generation of stories and floor diaphragms

- Defining ground level for generating static seismic and wind loads
- Building Generation Wizard



Story Data

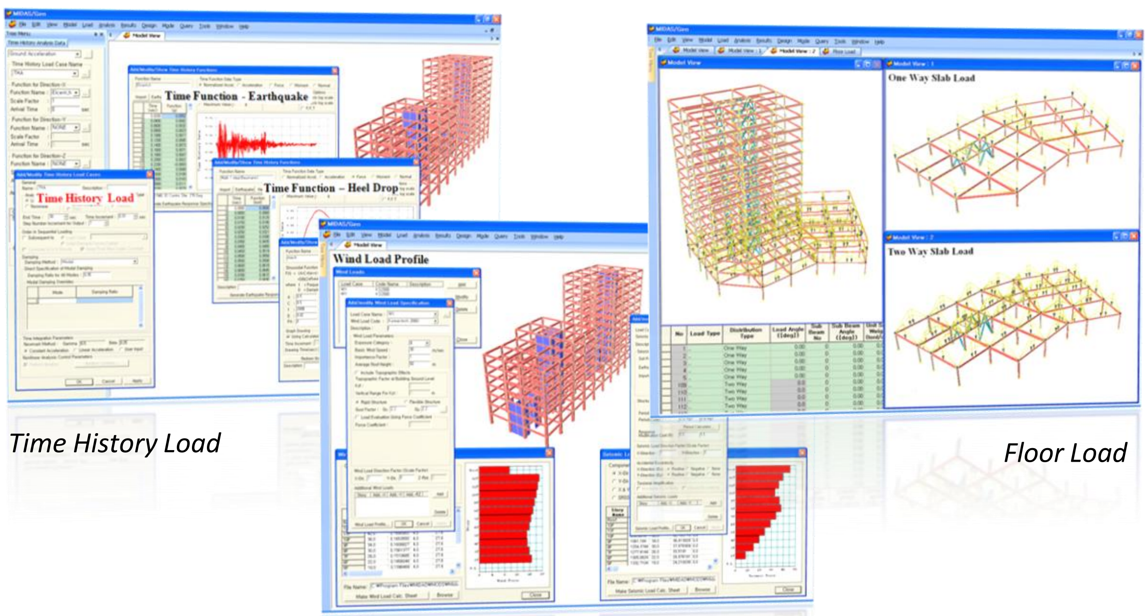


Automatic Diaphragm Control

Load & Boundary Conditions

Applicable Loads

- midas Gen enables us to specify all types of nodal, element, point, surface, dynamic, prestressing and thermal loads encountered in practice.
- Load combination based on the various design codes
- Load group generation of load case from load combinations



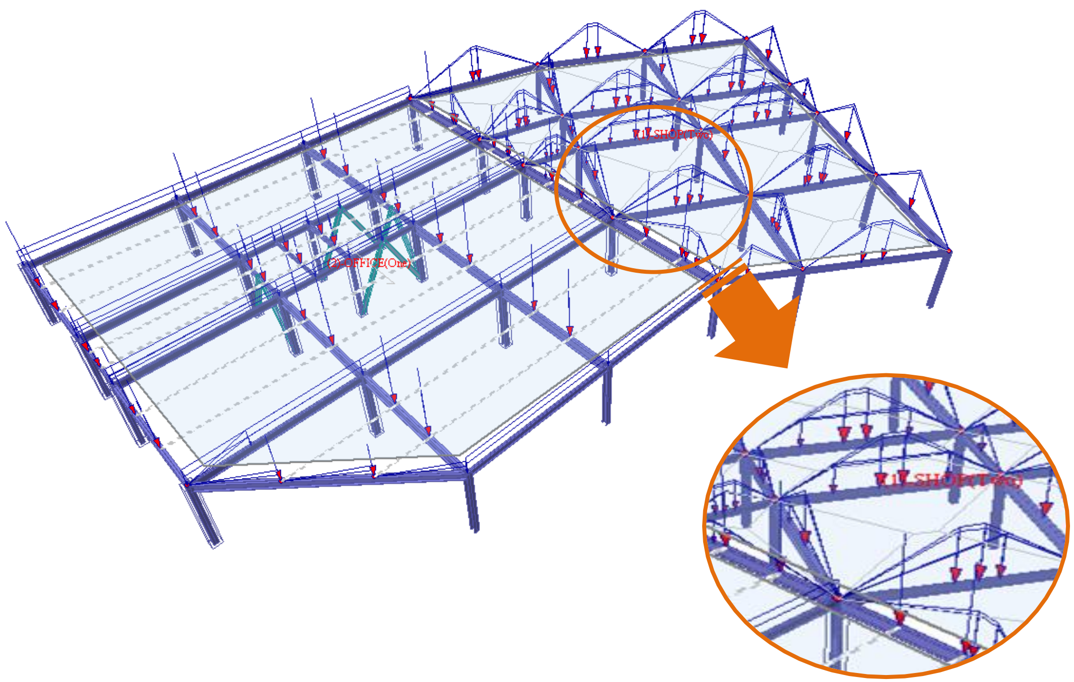
Time History Load

Floor Load

Wind and Seismic Load Generation

- Self Weight
- Nodal Load
- Prescribed Displacement
- Elements Beam Load
- Line Beam Load
- Floor Load
- Temperature Load
- Prestress Beam Load
- Pretension Load
- Tendon Prestress Load
- Hydrostatic Pressure Load
- Wind Load
- Static Seismic Load
- Construction Stage Load
- Initial Forces
- Time History Load
- Moving Load
- Pushover Loads
- Response Spectrum Function
- Ground Acceleration
- Dynamic Nodal Loads

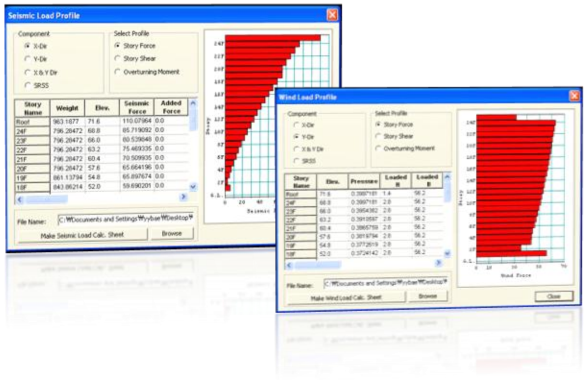
Floor Load



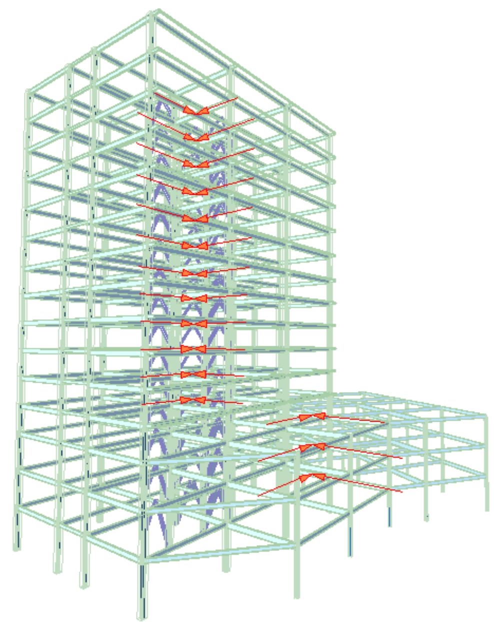
- Readily specify uniformly distributed dead and live loads on specific areas of a floor
- Automatically distributed and applied to the individual beams, girders and columns

Static Wind and Seismic Loads

- Static seismic loads and wind loads based on various international building codes

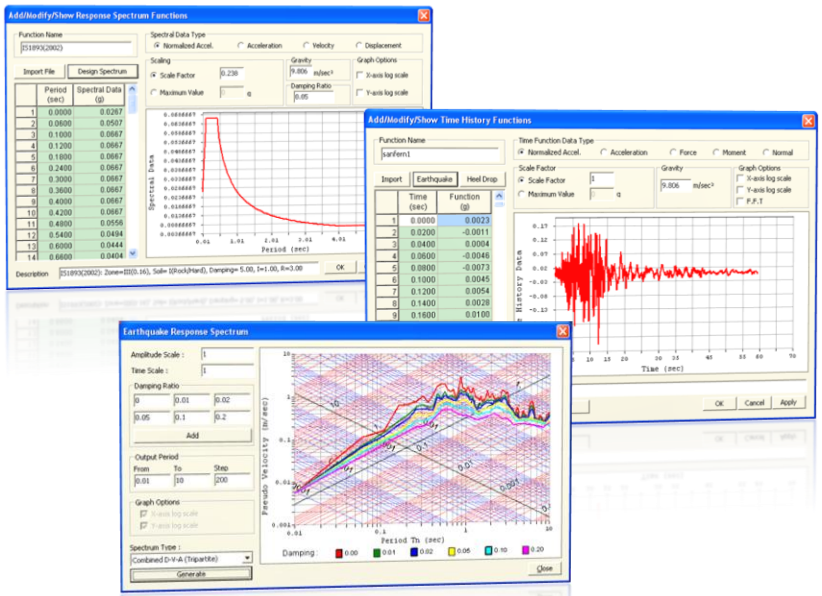


Wind Load Code	Seismic Load Code
IBC	IBC
UBC	UBC
ANSI	ATC
Eurocode	Eurocode
BS	-
IS	IS
NBC	NBC
GB	GB
Japan	Japan
Taiwan	Taiwan
Korea	Korea

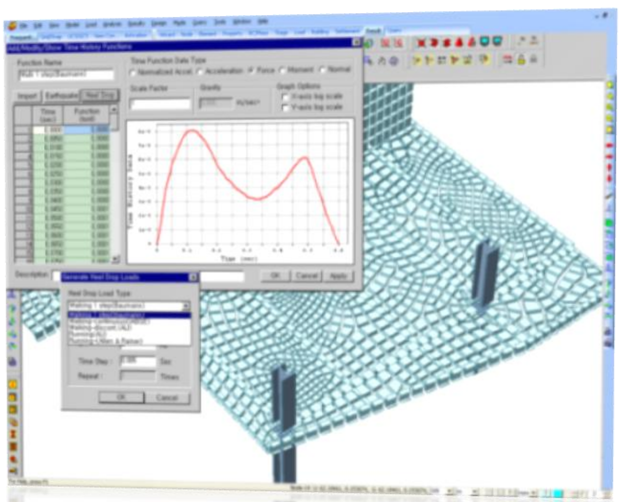


Dynamic Loads

- Response spectrum load
- time history load (earthquake records, Heel drop)

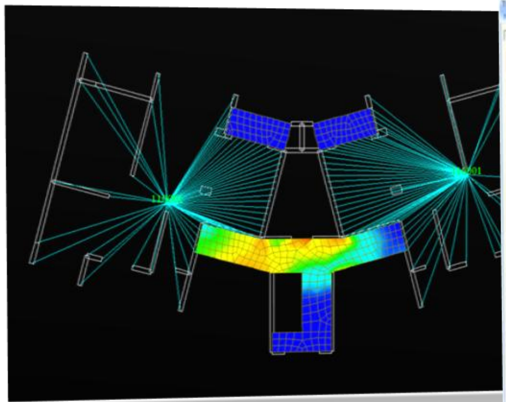


Earthquake Response spectrum

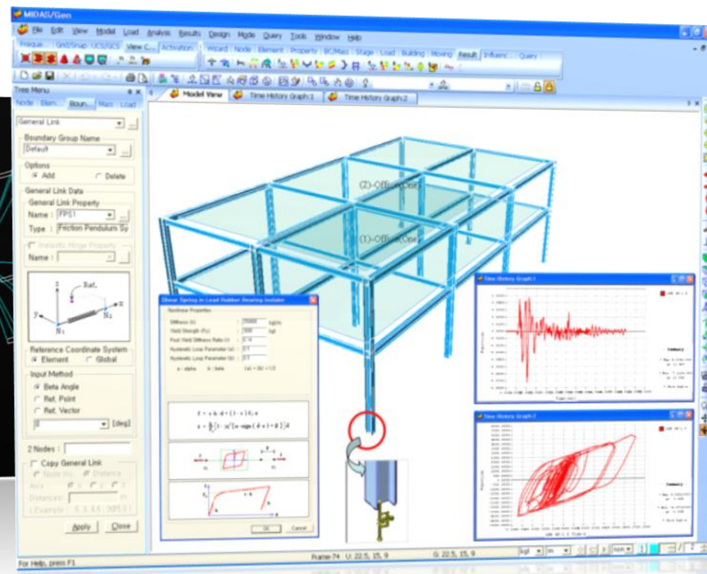


Time Varying Load: Heel Drop

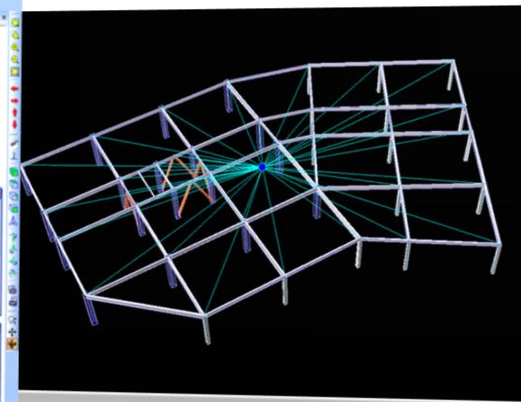
Applicable Boundary Conditions



Rigid Link



General Spring Supports

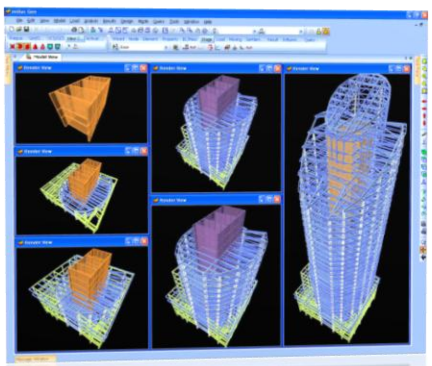


Floor Diaphragm

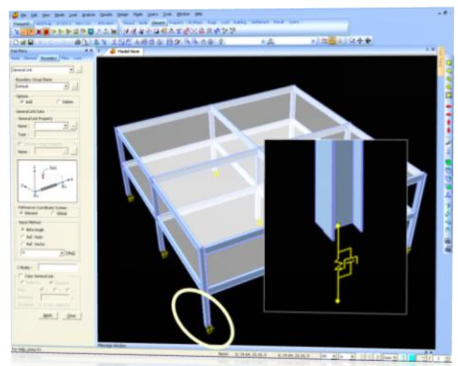
• Supports	• Elastic Link	• Plate End Release
• Point Spring Supports	• Nodal Coordinate System	• Rigid Link
• General Spring Supports	• Beam End Release (Semi-rigid connection)	• Diaphragm Disconnection
• Surface Spring Supports	• Beam End Offset	• Panel Zone Effects

Analysis Capabilities

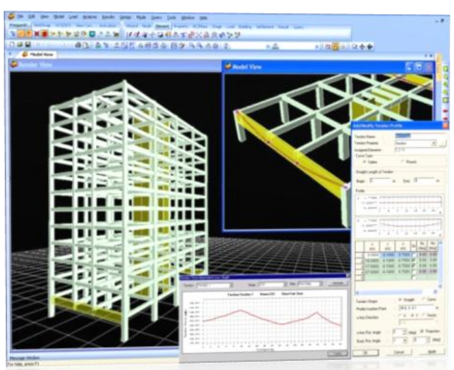
Available Analysis Types



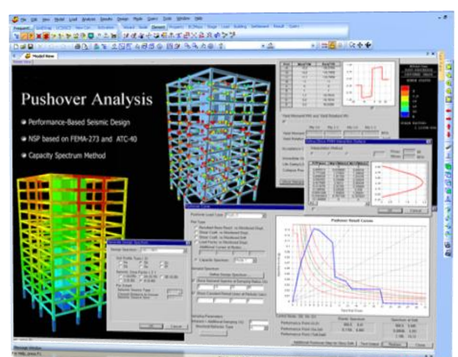
Construction Stage analysis



Dynamic Boundary Nonlinear



Post-tensioning girder analysis



Pushover analysis

Construction Sequence analysis

Moving Load Analysis
- > Influence Line & Influence Surface

Modal Analysis
- > Eigen Value & Ritz Vector

Dynamic Analysis
- > Static Seismic Analysis
- > Response Spectrum
- > Time History

Large Displacement Analysis

P - Delta Analysis

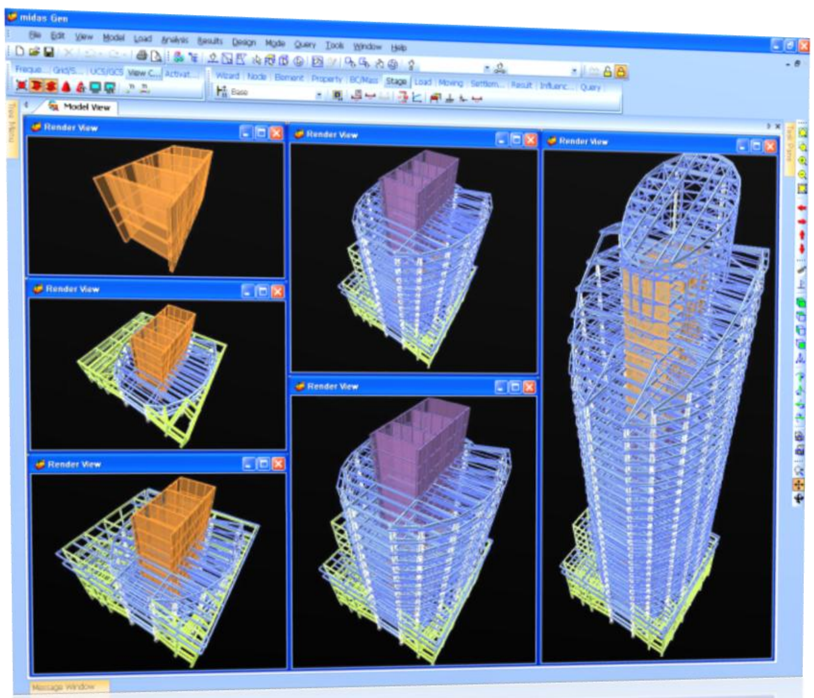
Buckling Analysis

Thermal Stress Analysis

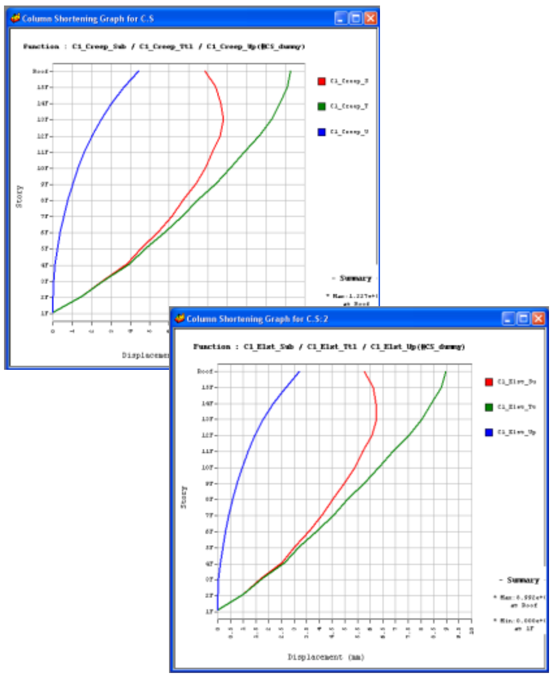
Heat of Hydration Analysis

Non Linear Analysis
- > Material & Geometric Nonlinearity
- > Pushover & Fibre Model Analysis
- > Inelastic Time History Analysis
- > Boundary Non-linear Analysis

- Construction Stage Analysis (Strength, Creep & Shrinkage)
- Column Shortening Analysis (Elastic/Creep & Shrinkage)

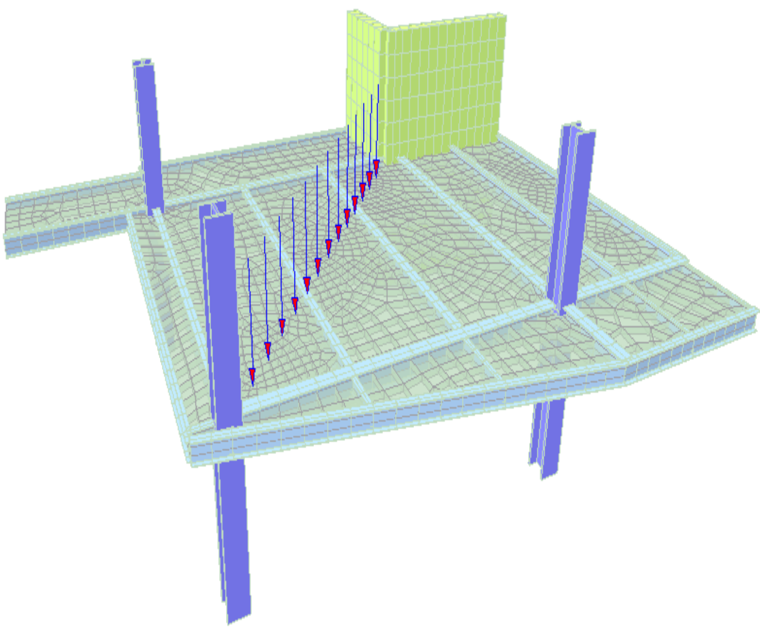


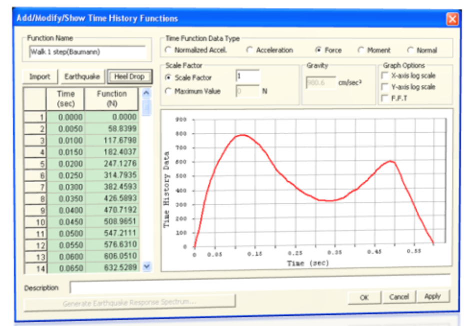
Stage Simulation



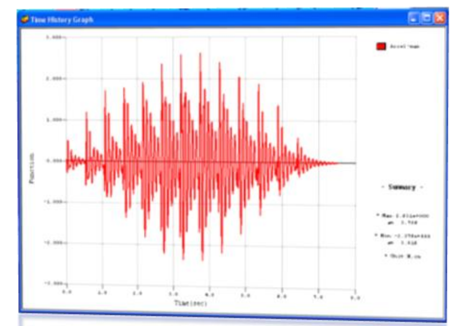
Column Shortening Results

- Time history forcing functions for walking loads for floor vibration.
  - Baumann, IABSE, AIJ, Allen & Rainer

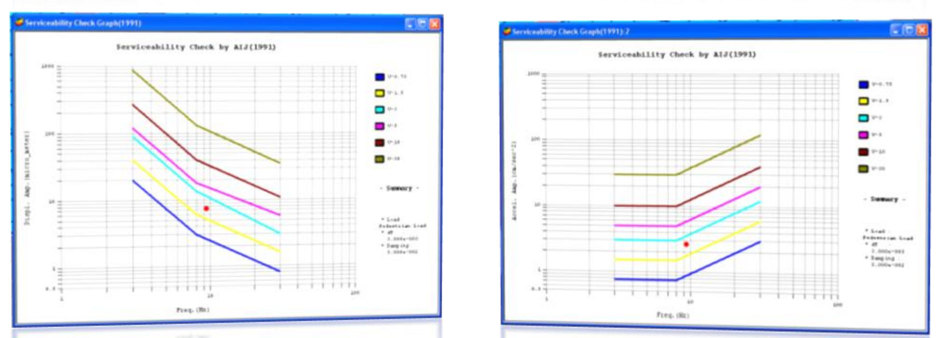




Walking Load

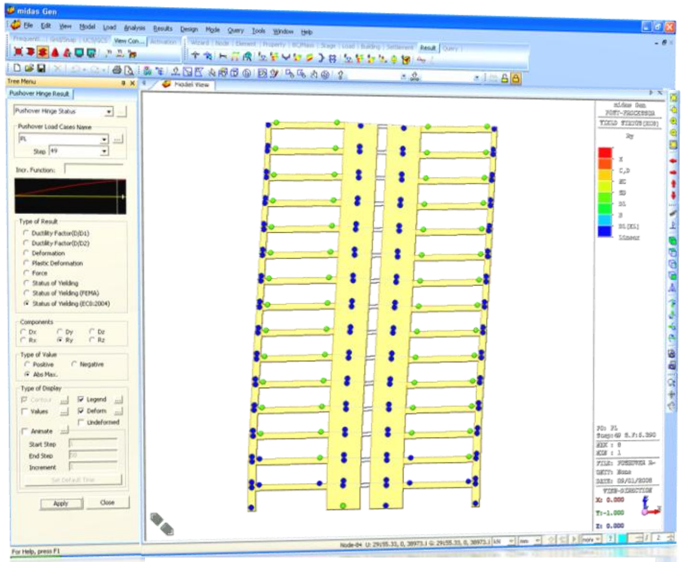


Vertical Acceleration Graph

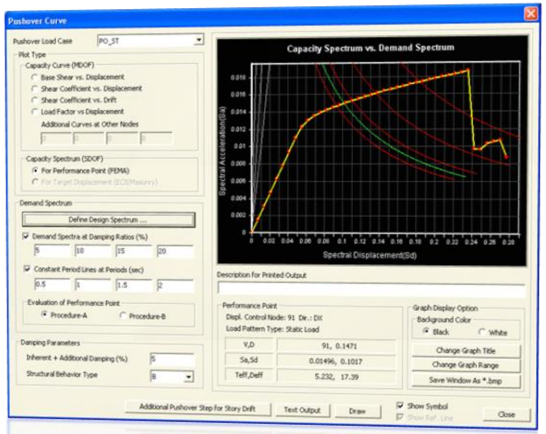


Serviceability Check Report

- FEMA 273, Eurocode 8, Multi-linear, Masonry & User-defined hinge type
- Displacement control & Force control
- Truss, Beam, Wall element & Spring
- Performance point & Target displacement
- Checking for acceptable performance (Drift limits & deformation/strength capacity)

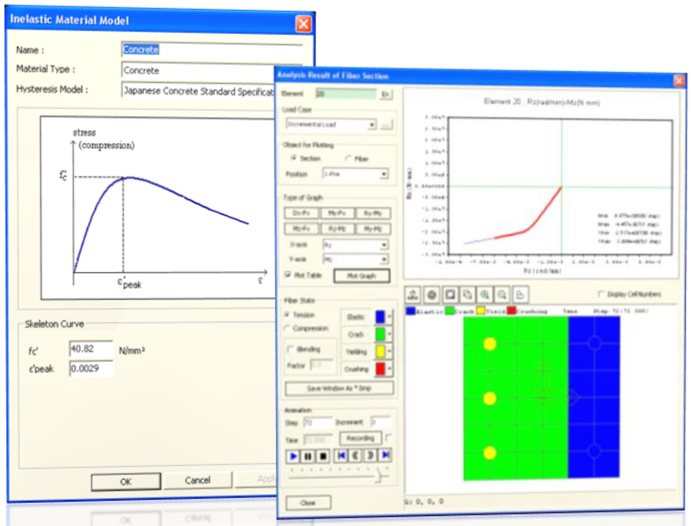


Pushover Hinge Status

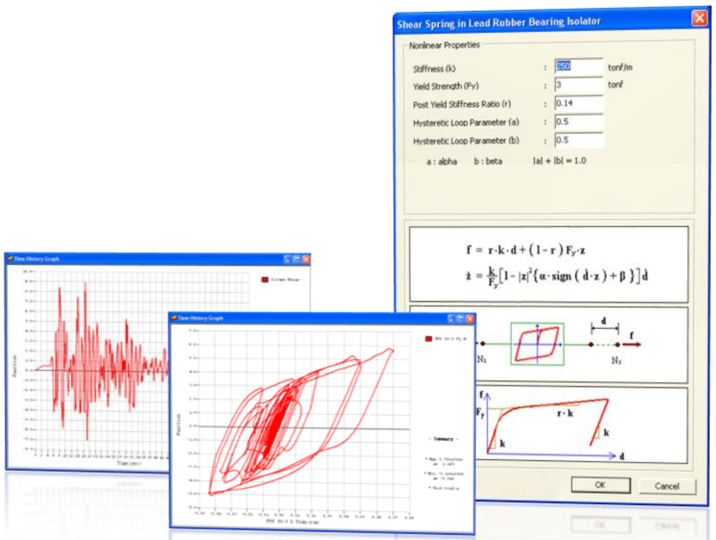


Demand Spectrum & Capacity

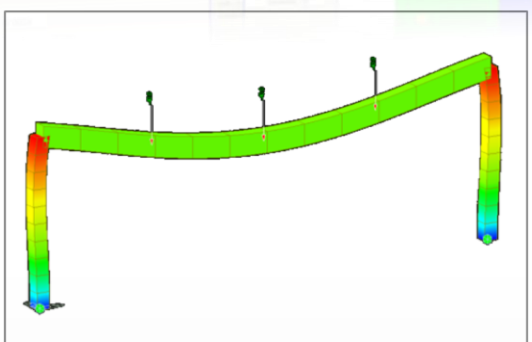
- Boundary Nonlinear Time History Analysis
- Inelastic Time History Analysis (Lumped/Distributed Hinges, Fiber Elements)

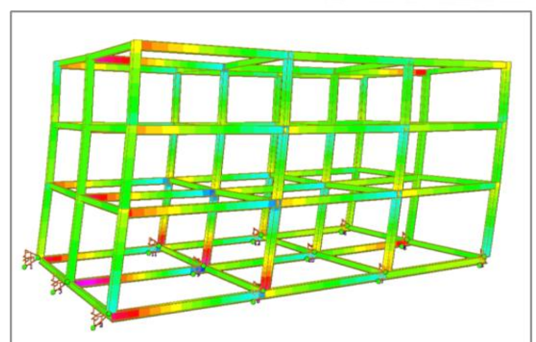


Inelastic Time History Analysis

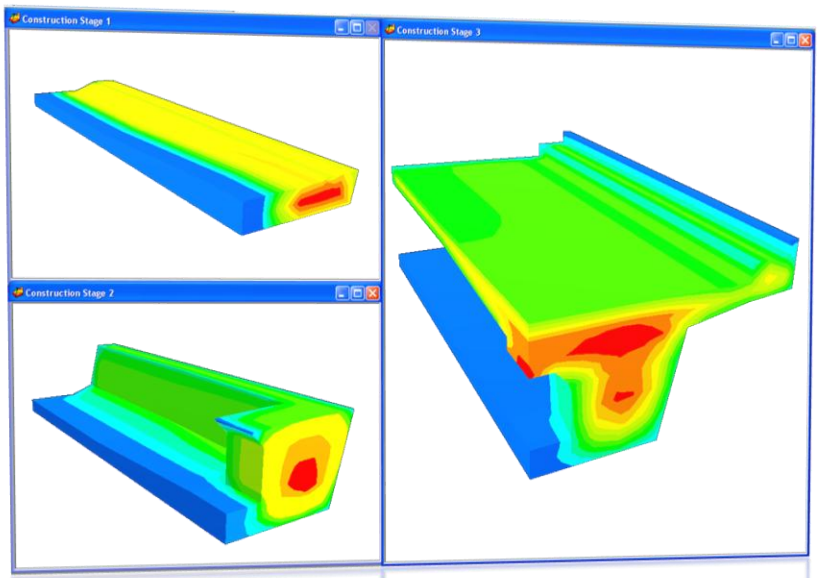


Boundary Nonlinear Time History Analysis

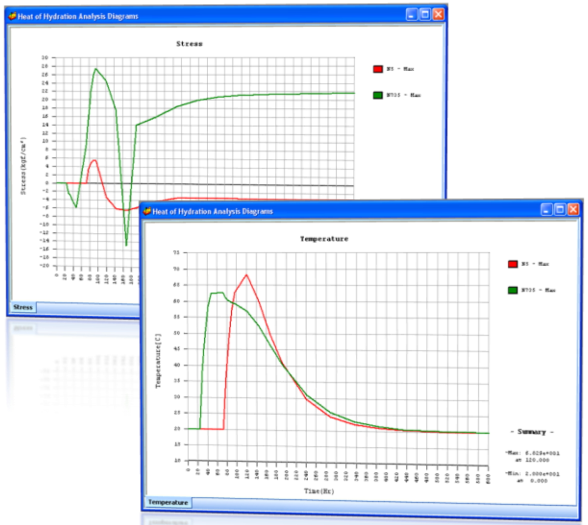




- Thermo-elastic
- Maturity
- Creep & Shrinkage
- Pipe Cooling

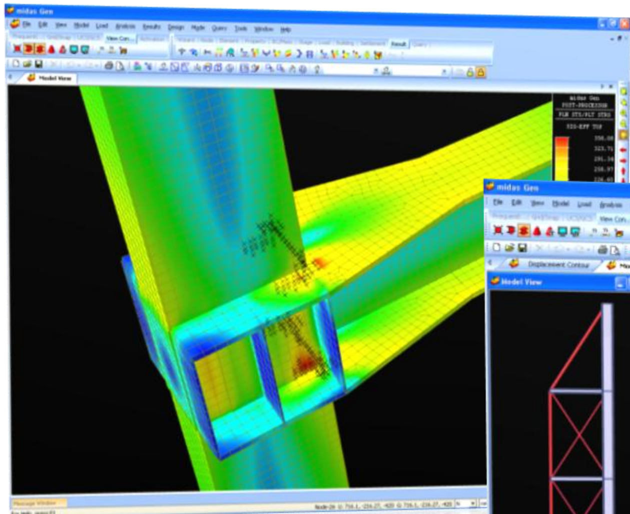


Heat of Hydration in Stage Analysis

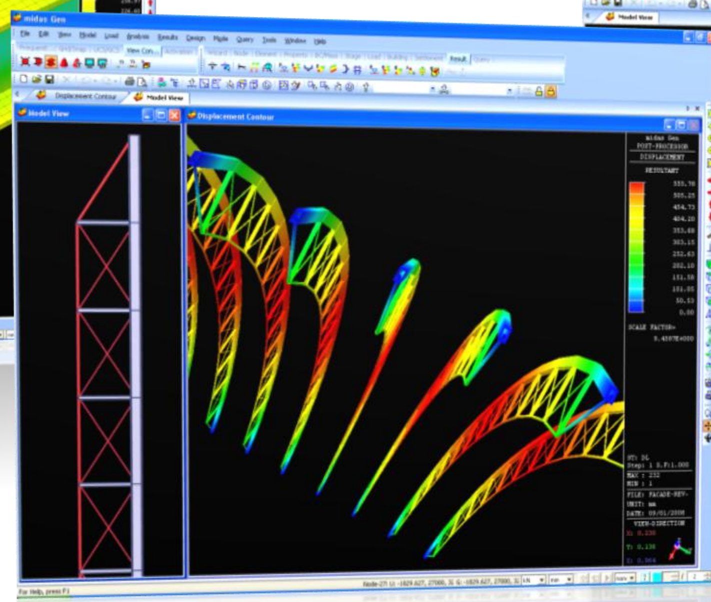


Time History Graphs for resulting stresses and temperatures

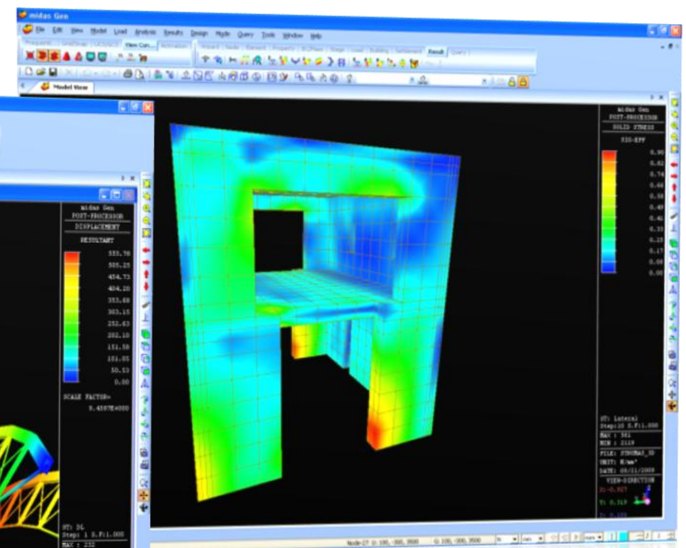
- Material Nonlinear Analysis (Von-Mises, Tresca, Mohr-Coulomb & Drucker-Prager)
- Structural Masonry Analysis
- Analysis for finding Unknown Forces by Optimization



Plastic Analysis



Geometric Nonlinear Analysis



Structural Masonry Analysis

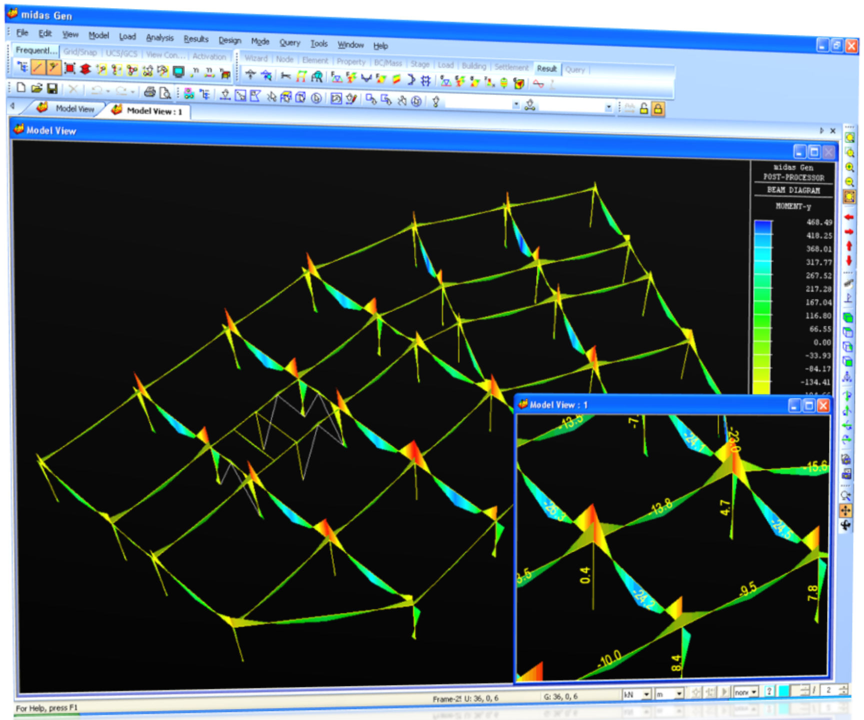
Available Element Types

- Compression only
- Tension only
- Gap
- Hook
- Viscoelastic Damper
- Hysteretic System
- Lead Rubber Bearing Isolator
- Friction Pendulum System Isolator
- Cable
- General Beam
- Tapered Beam
- Plane Stress
- Plane Strain
- Wall (In-plane, Out-of-plane Bending)
- Plate (Thick/Thin, In-plane/Out-of-plane Thickness, Orthotropic)
- Axisymmetric
- Solid Element (Hexagon, Wedge, Tetrahedron)

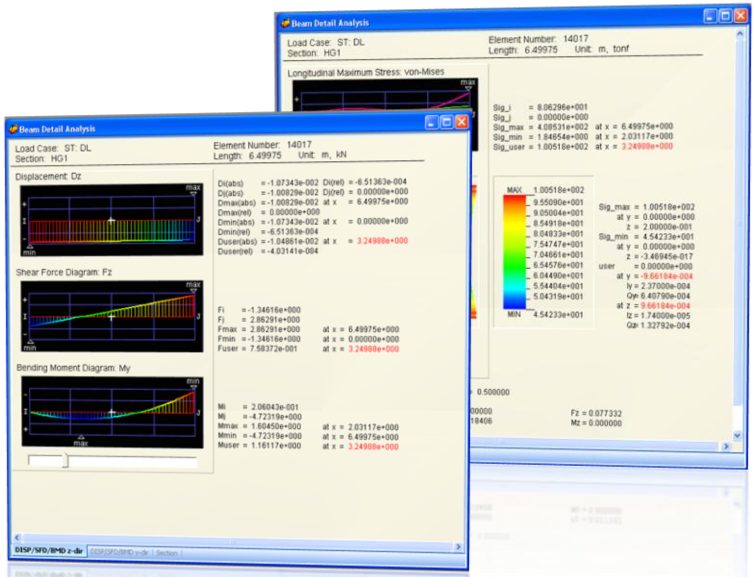
MIDAS

Post-processing

Beam Results

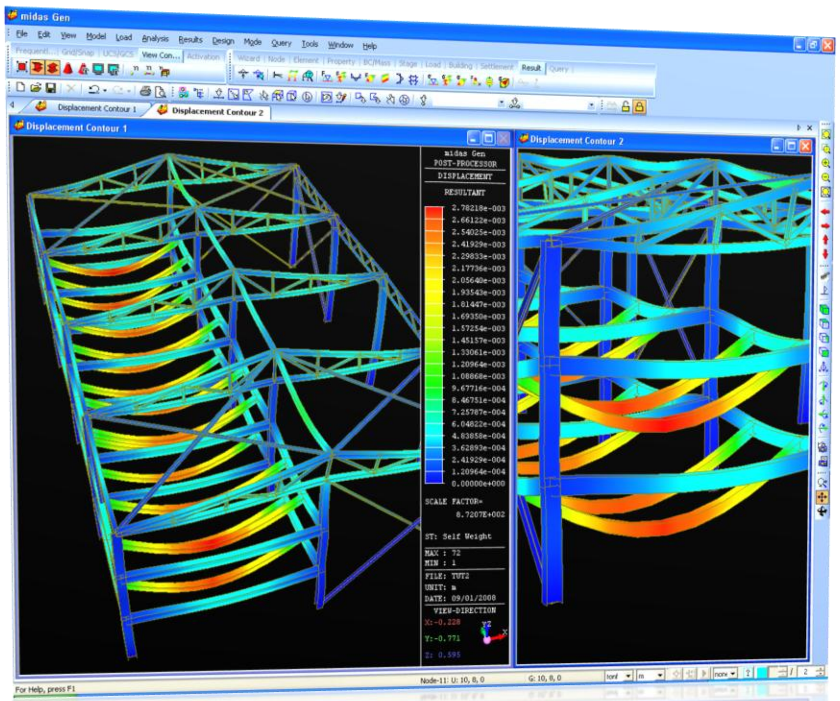


Beam Moment Diagram

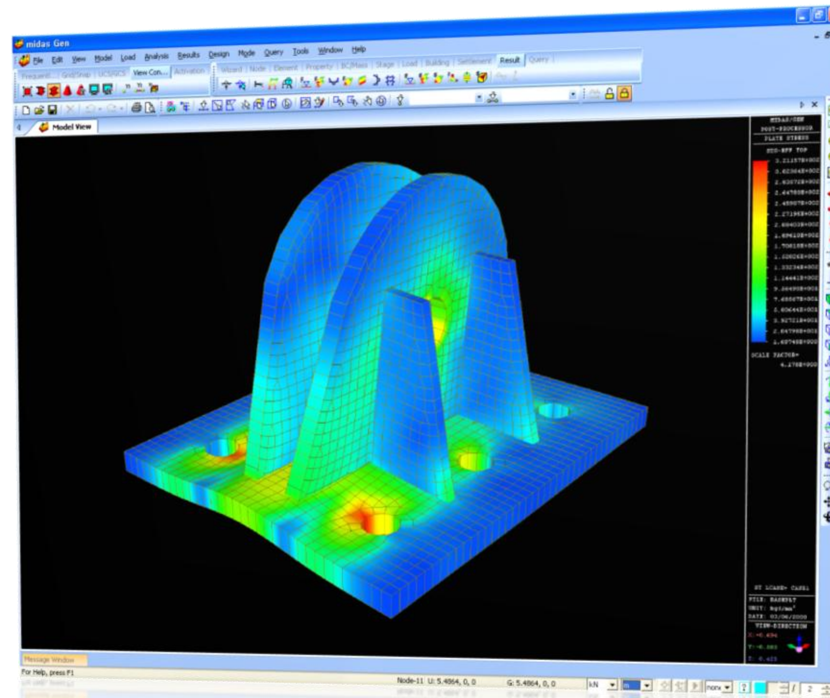


Beam Detail Analysis Results

Contours

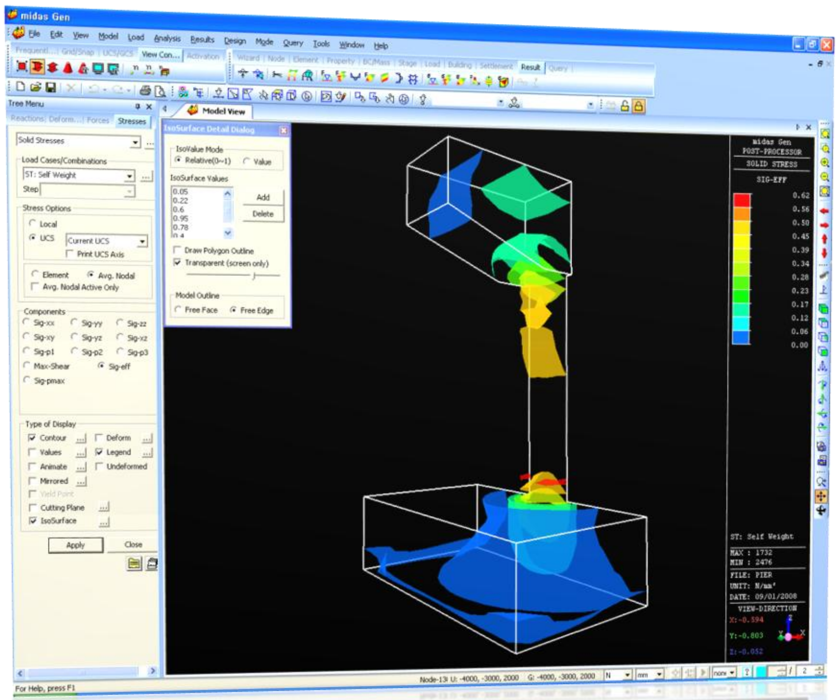


Displacement Contour

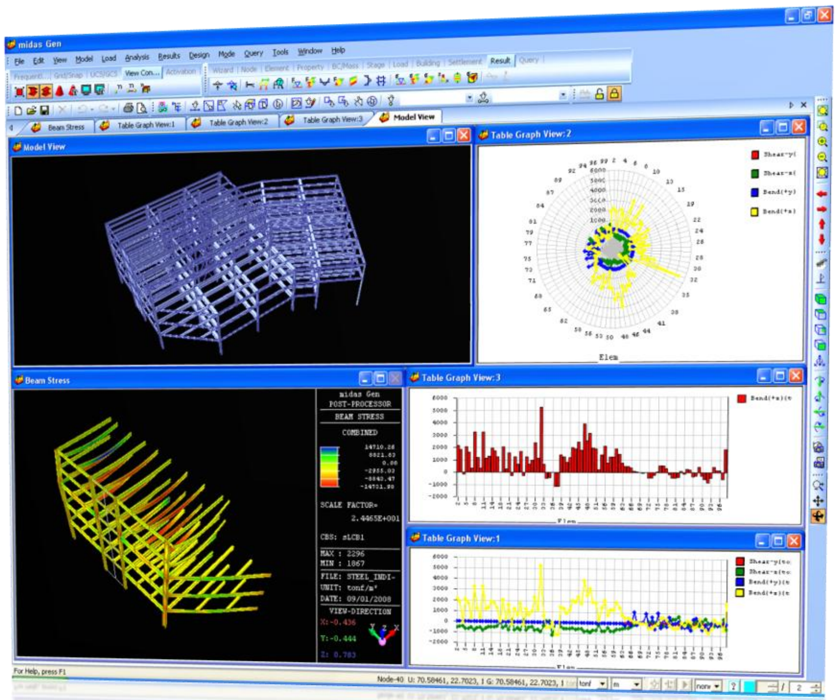


Von Mises Stresses Contour

Special Plots and Graphs

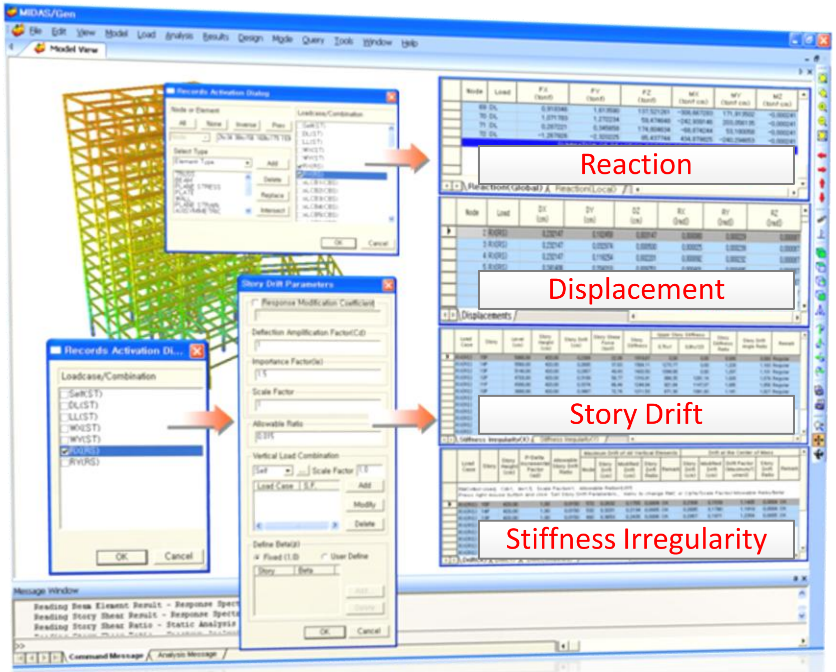


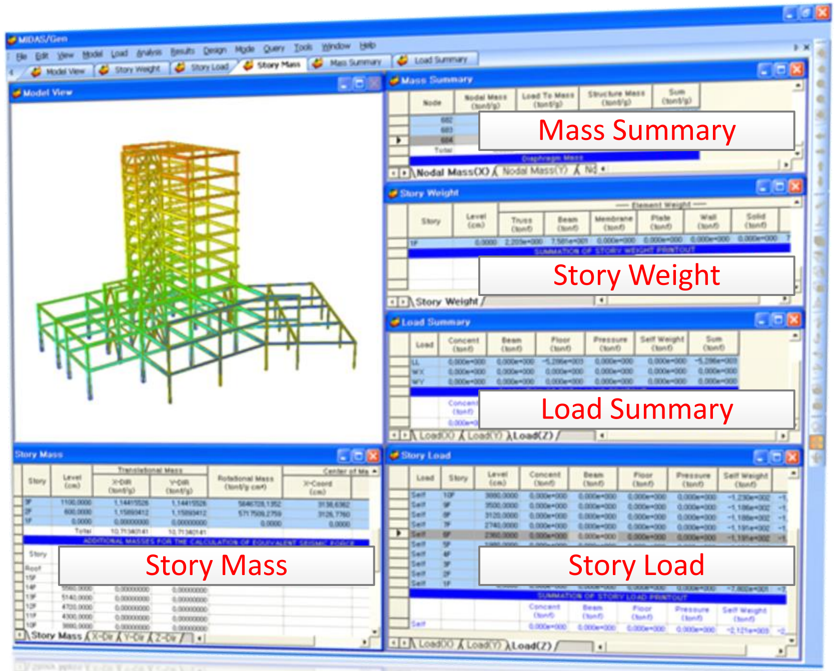
Solid Stresses (Iso-Surface)



Stress Results (Diagrams & Graphics

Table Output





Convenient features of checking results in table formats

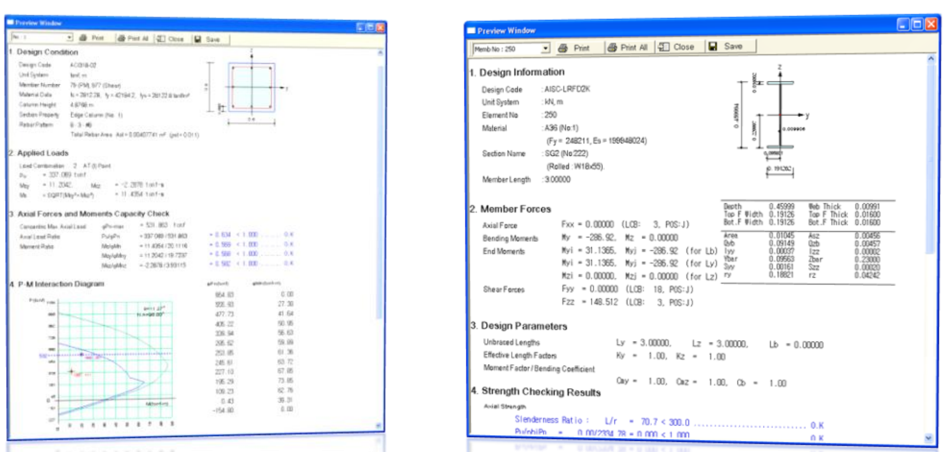
- Spread sheets provided for all analysis and design results
- Powerful filtering in conjunction with various selection functions
- Various sorting methods
- Various editing function (Add, Modify, Group Copy, Replace, Search, etc.)
- Copy & Paste using Clipboard
- Interface with other software such as MS-Excel, etc.

Design Capabilities

Available Design Code

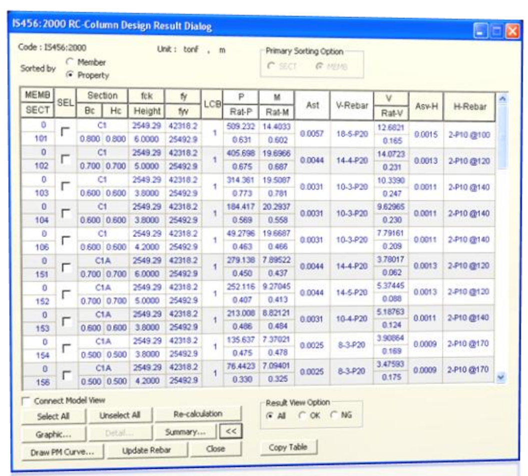
RC Design	Steel Design	SRC Design	Footing Design
ACI318-05	AISC-LRFD93, 2K	SSRC79	ACI318
Eurocode 2:2004	AISC-ASD89	JGJ138	BS8110
BS8110	AISI-CFSD86	CECS28	
IS:456 & IS:13920	Eurocode 3:2005	AIJ-SRC	
CSA-A23.3	BS5950-90	TWN-SRC92	
GB50010	IS:800-1982	AIK-SRC2K	
AIJ-WSD	CSA-S16-01	AIK-SRC	
TWN-USD92	GBJ17, GB50017	KSSC-CFT	
AIK-USD, WSD	AIJ-ASD		
KSCE-USD	TWN-ASD90		
KCI-USD	TWN-LSD90		
	AIK-ASD, LSD, CFSD		
	KSCE-ASD		
	KSSC-ASD		

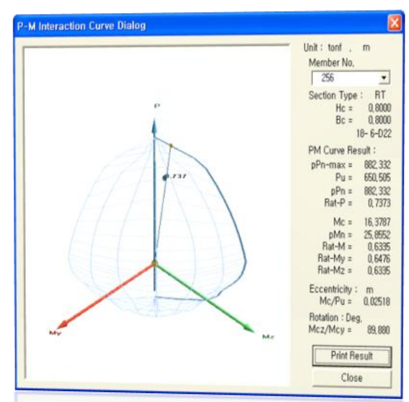
- Design check for structural steel members in accordance with various design codes
- Structural steel-reinforced concrete composite member design check
- Graphical analysis of design results (by members or section properties)
- Structural steel weight optimization through automatic design check iteration and auto-renewal of section properties
- Graphical representation of Structural steel design optimization process to identify the trend
- Graphs representing stress ratios, weight distribution and average safety ratios



Concrete and Steel Design Report

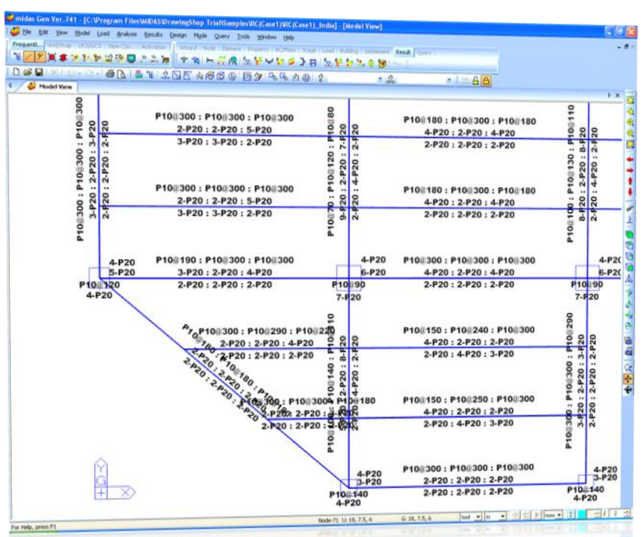
- Design check for variable (tapered) I-shape structural steel section
- Design check for reinforced concrete members in accordance with various design codes (producing rebar quantity)
- Strain-stress analysis and P-M interaction diagrams for Reinforced concrete members (beam, column, diagonal & shear wall) thereby producing required reinforcing steel
- Reinforcing steel size and spacing based on auto-calculated reinforcing steel
- Slender reinforced concrete column design reflecting moment magnification and slenderness producing required reinforcing steel



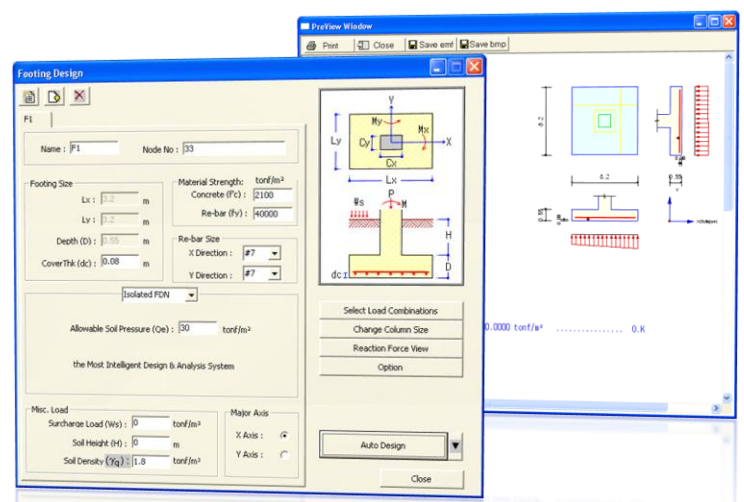


Design Result Table and P-M Interaction Surface

- Shear wall design reflecting the slenderness of weak axis
- Spread and pile footing design
- Structural systems independently designated in each direction, i.e., Laterally braced in X-dir and unbraced in Y-dir
- Auto-calculation of effective buckling length factor (K-Factor)
- Auto-generation of design check calculations and design summaries



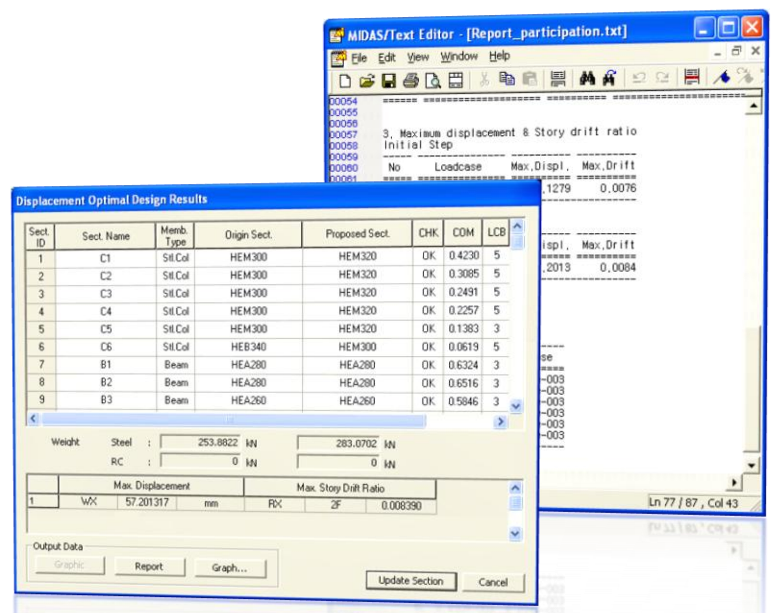
Graphical Display of Design Results



Footing Design

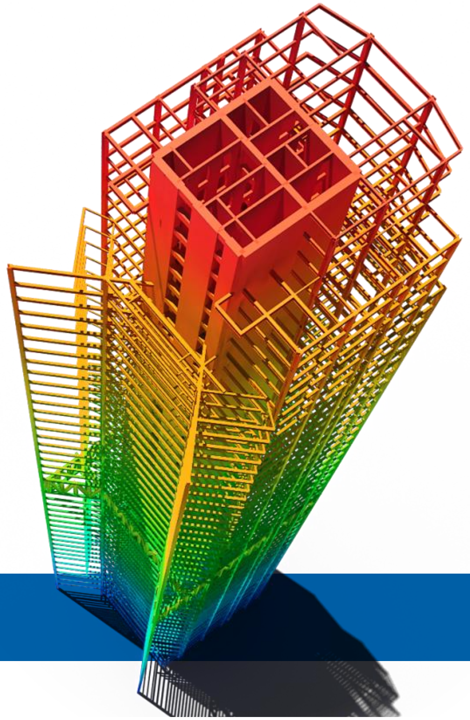
The optimal design feature of midas Gen optimizes the member sections, which determines the section dimensions automatically for the minimum sectional area (minimum weights) satisfying the specified design standard through verifying strength ratio (or stress ratio) in iterative analysis.

Steel Optimal Design



Displacement Optimal Design

Thank You!



One Stop Solution for Building and General Structures

midas Gen