# Multiframe 9.53 — 16th February 2007 Release Note

This release note describes the Windows version 9.53 of Multiframe, Steel Designer and Section Maker. This release will run on Windows 2000/ME/XP/2003 operating systems.

## Contents

# Multiframe

The following features have been modified or added to Multiframe in this release.

## Changes from v9.52 to v 9.53

- **Bug in the analysis of members with rigid offsets, introduced in 9.51, has been fixed.**
- **Selection Member Actions command now works correctly when selecting members by design efficiency.**
- **The Loadcase and Clipping toolbars are once again activated/deactivated via the menu items in the View->Toolbar submenu.**
- **Crash when printing a summary of the model has been removed.**
- **Ever increasing size of text that manifests the printing of member diagrams has been fixed.**
- **Overlayed columns in the Member Stress Table of the printed summary have been corrected.**
- **Pre-solve check for adequate restraint of the structure has been fixed to recognise the influence of prescribed displacements.**
- **Bug when copying data from the Report view has been fixed.**

## Changes from v9.51 to v 9.52

- **The results of a modal analysis were incorrect if a time history analysis was also conducted at the same time.**
- **The model can once again be sheared using the shear dialog.**
- **Correct units conversion is now used when adding a member loads via the automation interface**
- **Envelope load cases can now be deleted.**
- **Labelling of spring members is now draw is correct location.**
- **Crash when using the Disconnect Members command has been fixed.**
- **Problems with the time history analysis of models with more than one dynamic or seismic load case have been fixed.**
- **Corrected omission in AS4100 for calculating the value of kt for channel sections.**
- **Missing right button popup menus for Add Connected Members command have been reinstated.**
- **Fix to automation interface to allow access to results of nonlinear analysis.**
- **Seismic load case dialog has been fixed to correctly display all acceleration load series in load library.**
- **Possible problems with rendering of sections generated in Section Maker have been fixed.**

# Changes from v9.50 to v 9.51

- **Nonlinear analysis may be conducted using an incorrect value of torsion modulus**
- **Minor reporting fix in AIJ design report.**
- **Spring members can once again be selected.**
- **Correction to the application of loads on members with rigid member offsets.**

## Buckling Analysis

A rational buckling analysis of a model can now be performed within Multiframe to determine elastic critical loads and the associated buckling modes of the frame. The basis of this type of analysis is to linearly scale a set of predefined member forces to determine the load required to cause the frame to become unstable and buckle. In Multiframe, the buckling analysis uses the results of a user specified *reference load case* to provide the member actions to be scaled to cause buckling. It is important to recognise that the results of the buckling are dependent not only upon the elastic behaviour of the frame but also upon the distribution of member actions within the frame.

Member effective lengths and effective length factors are also determined during a buckling analysis. These effective lengths are based on the critical buckling load of the model and will tend to be larger than those based on the critical load of the individual member.

The buckling analysis in Multiframe is actually formulated as an Eigenvalue problem. Two methods for solving these types of problems are available to the user for performing a buckling analysis: Inverse Iteration method and the Jacobi method. The Inverse Iteration method is an iterative technique suitable for the analysis of very large models. However, it is limited to finding only the first buckling mode. The Jacobi solver on the other hand can find many buckling modes but is only suited to smaller models.

**Buckling analysis is only available in Multiframe 3D and Multiframe 4D.**

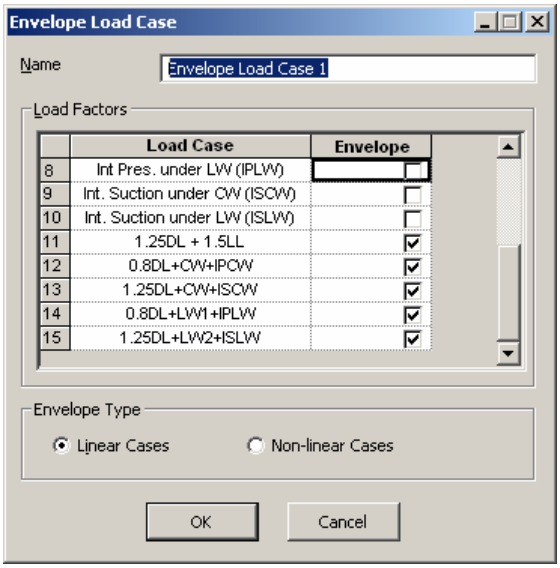
## Multiframe 3D Analysis

With the inclusion of buckling analysis, the commands and dialogs in Multiframe 3D related to analysis have been modified. Separate menu commands for linear and nonlinear analysis are no longer provided. Instead a single Analysis command is now used to invoke the Analyse dialog from where the user can specify which analyses are to be performed and for the settings associated with those analyses.

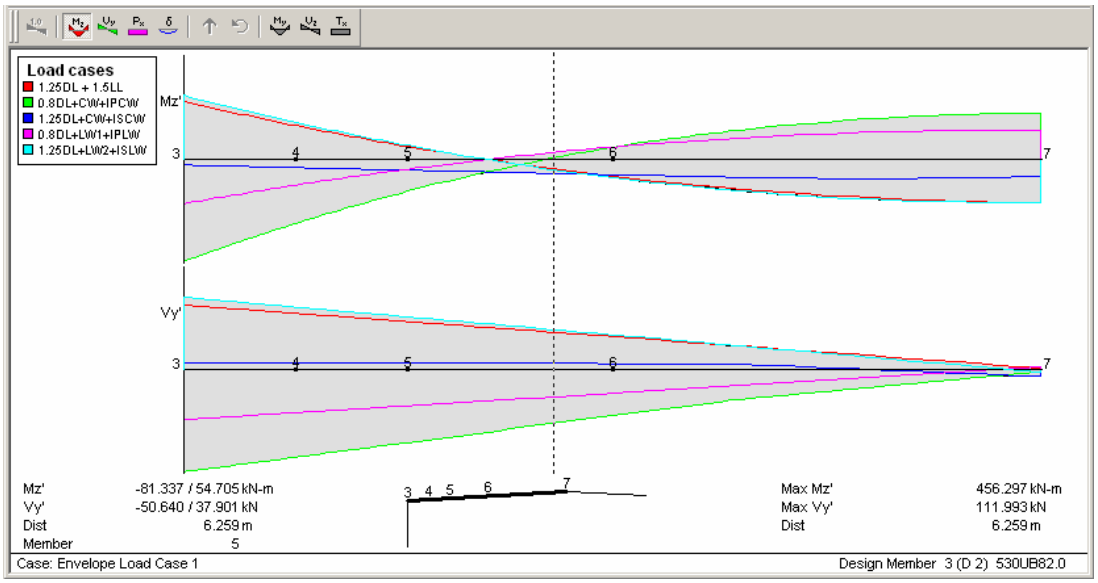
One advantage of this change is that the various reporting options at the bottom of this dialog will allow information about analyses to be output to the Report window. For a nonlinear analysis this information can be particularly useful when tracking down problems related to non-convergence of the analysis.

## Enveloping

Envelopes of static load cases are now supported within Multiframe via the inclusion of Envelope load cases into the software. An Envelope case can be added to a model via the Add Case submenu. When adding the new case the user specifies the load cases to be enveloped and can choose to envelope with either the linear or nonlinear results of the load cases.




The plotting of Envelope cases plots both the positive and negative envelope of actions along members. When preferences are set to draw filled plots, the action envelope is filled and the actions from each of the enveloped cases are overlayed as a solid line. The plots for the enveloped cases may be hidden by turning of the “Show Enveloped Cases” option in the Symbols dialog.



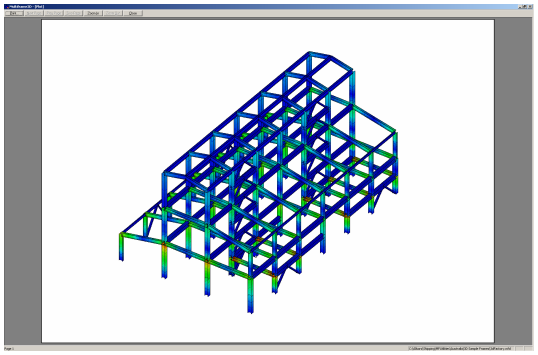

## Clipping Zones

Clipping regions can now be saved as a Clipping Zone within Multiframe. These zones can then be used later to restore the clipping to a desired region. This is particularly useful when working with 3D models as separate zones can be defined for various 2D frames that make up the model. Each of these frames can then be readily accessed by simply changing clipping zones.

The new clipping toolbar provides a drop down list of clipping zones that allow the user to quickly navigate through all the saved zones in a model. Commands for Saving, and Editing clipping zones are found in the Clipping submenu.

## OpenGL printing

Printing of graphical windows now supports the printing of OpenGL renderings of the model. Note that the image displayed in print preview may differ slightly from the final printed version.



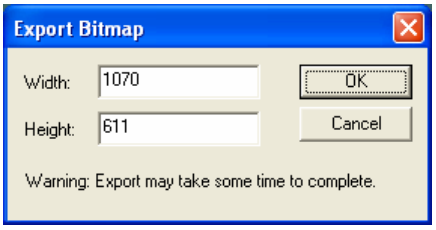
## Improved OpenGL rendering

Some extra options have been added to the Member Modelling dialog to give the user greater control of the automatic trimming of members used when rendering the frame. In addition, the user can now over ride the automatic trimming and directly specify the trimmed length at the end of the member.

## OpenGL Bitmap Export

Bitmap export gives you the ability to export rendered Frame, Plot and Load views to a bitmap file. This is similar to Edit | Copy (Copy to Clipboard) however, the File | Export | Bitmap Image allows you to specify the size of the image to be exported; the larger the size, the better the quality.

The aspect ratio of the current view is preserved when you change the width and height. These values are in pixels.




## Printed Report

A number of enhancements have been made to the formatting of the printed report. These include

- Background shading of alternate rows
- Distinct styling of titles
- Printing of header row at top of page when a table wraps onto a new page
- Improved horizontal rulings

Options for controlling these new features may be found in the Reporting tab of the Preferences dialog. The colour used for the shading of rows can me specified via the Colour dialog.

## Merging Members

Multiple collinear members can now be merged into a single member using the Merge Member command in the Geometry->Advanced submenu.

When using this command, Multiframe will take the current selection and search for all groups of members within the selection that can be merged together. These groups of members are selected on the basis that they all have the same section size, are collinear, are rigidly connected, and have the same member component type.

## Snap to origin

The cursor now snaps to the origin when the global axes are visible.

## Plot Window Legend

An option is now available within the Symbols dialog to turn on or off the display of the legend in the Plot Window.

## Program Performance

The general performance of the program has been enhanced. Drawing in the graphical windows is significantly faster and selection of items more responsive.

These optimisations have also produced a small reduction of the time taken to analyse a model.

## Time History Analysis

In addition to general improvements in program performance, the speed of the time history analysis has been improved via optimisation of the solver. Analysis times for large frames have been significantly reduced.

## Renumbering

The functionality of the renumbering command has been extended to give the user improved control over the renumbering process. The user can now specify the primary, secondary and tertiary sort directions used as the basis for renumbering. This includes the flexibility to specify an ascending or descending sort order in each direction.

## NavisWorks Export

Multiframe now supports export of 3D models to NavisWorks. NavisWorks provides real-time walk-through and inspection of large CAD models. This is particularly useful for presentations and for checking very large models. The model exported not only contains the correct geometry and colours from the Multiframe model, it also contains member attributes such as section name, length etc. More information on NavisWorks can be found at www.navisworks.com.

To export a NavisWorks model, choose File->Export->NavisWorks. You have two options in the file type to be exported. A NWC file requires only a NavisWorks Roamer licence and the resulting .nwc files can be read by NavisWorks Roamer on any machine. An NWD file export requires that you have a NavisWorks Publisher licence installed on your computer but the resulting .nwd file can be read by anyone who has the free NavisWorks Freedom viewer. This is a very good way to distribute a viewable model to any other person.

# Section Maker

The following features have been modified or added to Section Maker in this release.

## Conversion of Polygons

The Convert to Polygon command has been extended to include the conversion of open polygons to closed polygons.

## Library Window

The Groups and Sections windows have been replaced with a single window called the Library Window. The contents of the old windows are now separate tables within this window.

## Materials Table

A new Material Table has been included in the Library Window. This table lists properties of all the materials in the current library.

## Sections Tables

Two new columns have been added to the Sections table to describe the shape of the section and to indicate the presence of extra data used to graphically represent non-standard shapes.

## Sections Library

The format of the sections library has been updated to allow for future improvements to the software. Data within the library is now stored with double precision. This has resulted in a significant increase in the size of the library.

For compatibility with older version of the software options are available to export sections to libraries in older formats.

# Problems Fixed

This version fixes the following problems experienced with previous versions of Multiframe, Steel Designer or Section Maker.

- **Some missing strings have been reinstated within the program.**
- **Snapping to structural grid lines at non integer intervals**
- **An incorrect subscript in the AS4100 report has been corrected.**
- **Behaviour of tension and compression only buttons in Member Properties dialog.**
- **A crash when selecting members that occurs when the selection is sychronised between the graphical windows.**
- **Problems analysing frames with rigid joint links.**
- **A crash that can occur when duplicating parts of a model or when generating standard structures**
- **A potential crash or corruption of the model when deleting members with end springs.**
- **Labelling of the displacement diagram has been reinstated.**
- **Incorrect display of member end releases in Member Ends table**
- **The units used to display the dynamic Mass is Frequency table where incorrect.**
- **Zero magnitude prescribed displacements where not recognised at analysis.**
- **Graphical geometry commands have been fixed to interact better with associated dialogs.**
- **The graphical rotation command sometimes rotated about the origin rather than the specified point.**
- **Areas of sections in W1100+ group of the Canadians sections library were in the wrong units.**
- **The local member Plot view could not be copied.**
- **LRFD design code did not correctly recognise 2$^{nd}$ order analysis when checking the need for moment amplification.**
- **Incorrect nonlinear analysis of models with joint linking and tension only members which resulted in a reaction at the master node.**
- **Calculation of torsion constant for composite sections has been corrected.**

# Problem Reports

We greatly appreciate any bug reports or suggestions you may have. Please report any bugs or anomalies you find to:

Fax: +61 8 9335 1526
Email: support@formsys.com

When emailing reports, please attach the frame and sections library with your message.