

# CADS A3D MAX

## ENGINEERING SOFTWARE

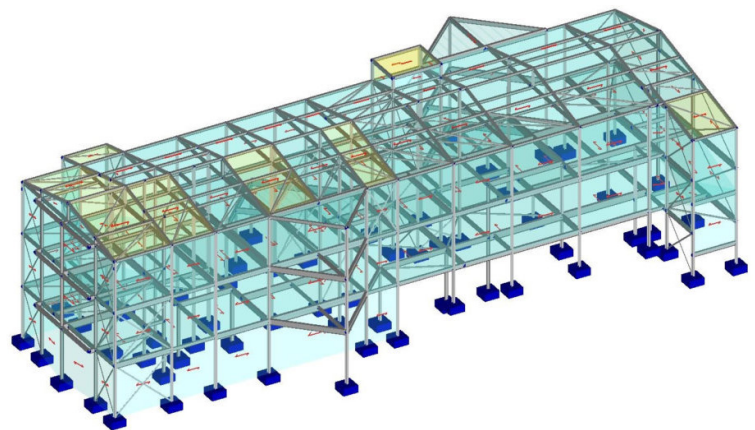


## Overview

**CADS A3D MAX provides a powerful and flexible frame analysis package for 2D or 3D, elastic/plastic/P-delta and stability analysis and can solve any size job with no limit on the number of members or load combinations. Links to CADS design and detailing software as well as Revit compatibility via an IFC export.**

## Summary

- Intuitive user interface makes learning easy
- Import from AutoCAD and spreadsheets
- Rapid 2D & 3D building modelling
- No limit on the number of members per frame
- Fast automatic frame generator macros
- Use for simple beams or complex frames
- Area load application ( $\text{kN/m}^2$ )
- Elastic/plastic/P-delta and stability analysis
- Flexible graphical display of forces, moments and deflections
- BS5950/EC3 Steelwork design
- BS8110/EC2 Reinforced Concrete design
- Integrated with CADS Design and Detailing software
- Export IFC format to link to Revit

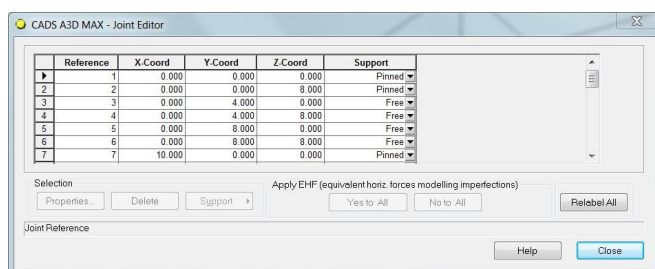


Load panels to distribute load to frame (one and two-way)

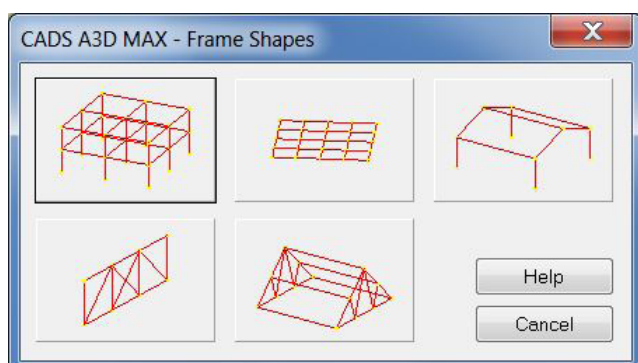
## Input Features

### Frame Geometry Input

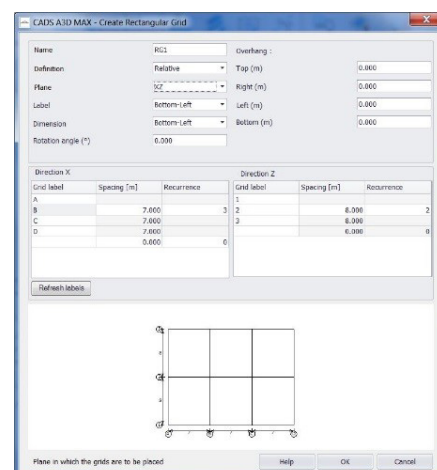
Select from a variety of methods including 2D or 3D DXF file import or frame generators wizards for trusses, girders, portal and multi-storey frames. For simpler projects just enter the coordinates (see table below), and draw the members in with the mouse. Also use rectangular or circular grid generators (below) to set out the members with user defined grid spacing and optional labelling.



Joint editor



Frame shapes

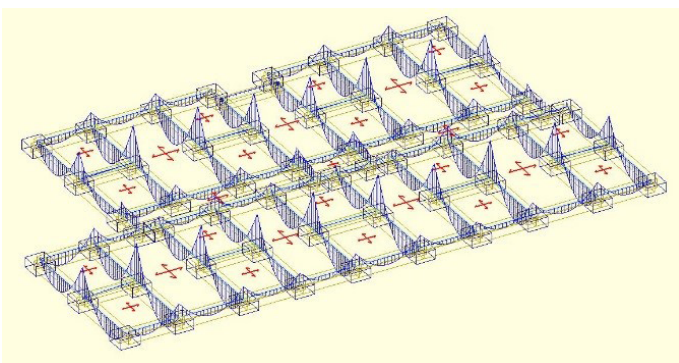


Create rectangular grid

### Panel loading and rigidity

The A3D MAX panel feature is a productivity aid which allows single panels or whole floors or walls to be loaded with uniform, patch, point and line loads which the program automatically applies to the supporting beams or columns, thus saving the user huge amounts of time and all without the need for FE plate analysis.

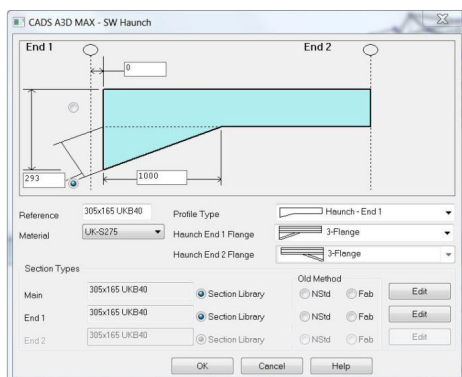
Floors and groups of panels may be defined as rigid or semi-rigid plates to model the diaphragm action of most concrete floor systems, see below



Modelling the diaphragm action

### Member Types

- Standard libraries of British, European, Indian and American steel sections.
- Timber sections and user defined concrete beam and column sections also available.
- User defined sections and direct input of section properties are also available.
- Tapered and haunched member types.



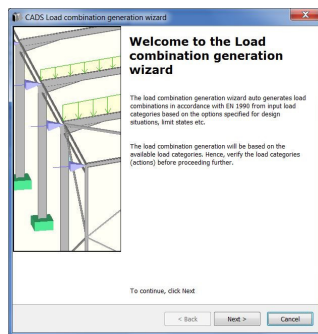
SW haunch

Materials include various grades of steel, concrete and timber. Users can also enter their own material types such as aluminium.

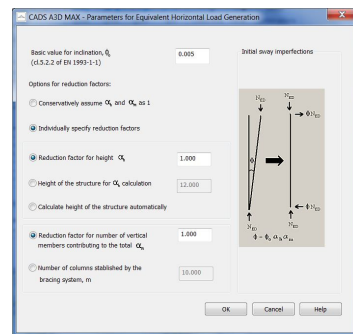
## Analytical Features

### Loads and combinations

An automatic combination generator is provided as well as an equivalent horizontal load generator for stability checks to the Eurocode standard.



Load combination generation wizard



Parameters for equivalent horizontal load generation

### Supports

Choose from a variety of drag and drop standard support types or create your own including spring supports.



### Tension / compression-only members

Define members as tension / compression only elements in structural models, so that they can be designed and checked accordingly.

### 'Lift-off' supports

Define supports as 'lift-off' in structural models, enabling the condition to be detected and designed more easily and safely. This is especially valuable in more complex structures where 'lift-off' may not be anticipated by simple inspection.

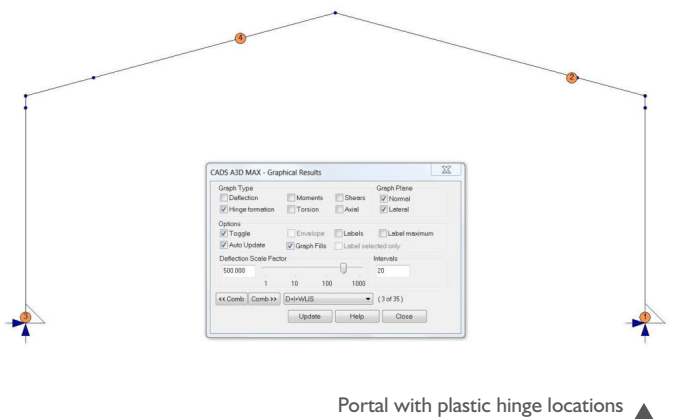
### Partial fixity

Model the rigidity of practical steelwork connections enabling the benefits of semi-rigid connections to be exploited as well as the usual rigid and pinned options.

### Plastic analysis

The plastic analysis features provide the following results for steelwork and other structures:

- Load factor at which the first plastic hinge forms for each load combination
- Full history of plastic hinge formation up to collapse for selected combinations
- Bending moment and other results for any member at any stage up to collapse



### P-Delta analysis

User friendly access to the full elastic-plastic second order P-Delta analysis functionality previously only available in much more cumbersome and expensive software. Users may elect to include or ignore P-Delta effects in elastic or plastic analysis.

### Elastic critical load factor ( $\lambda_{cr}$ ) determination

In recent years the 'elastic critical load factor' has become an important parameter for determining the sensitivity of frames to second order buckling effects. A3D MAX

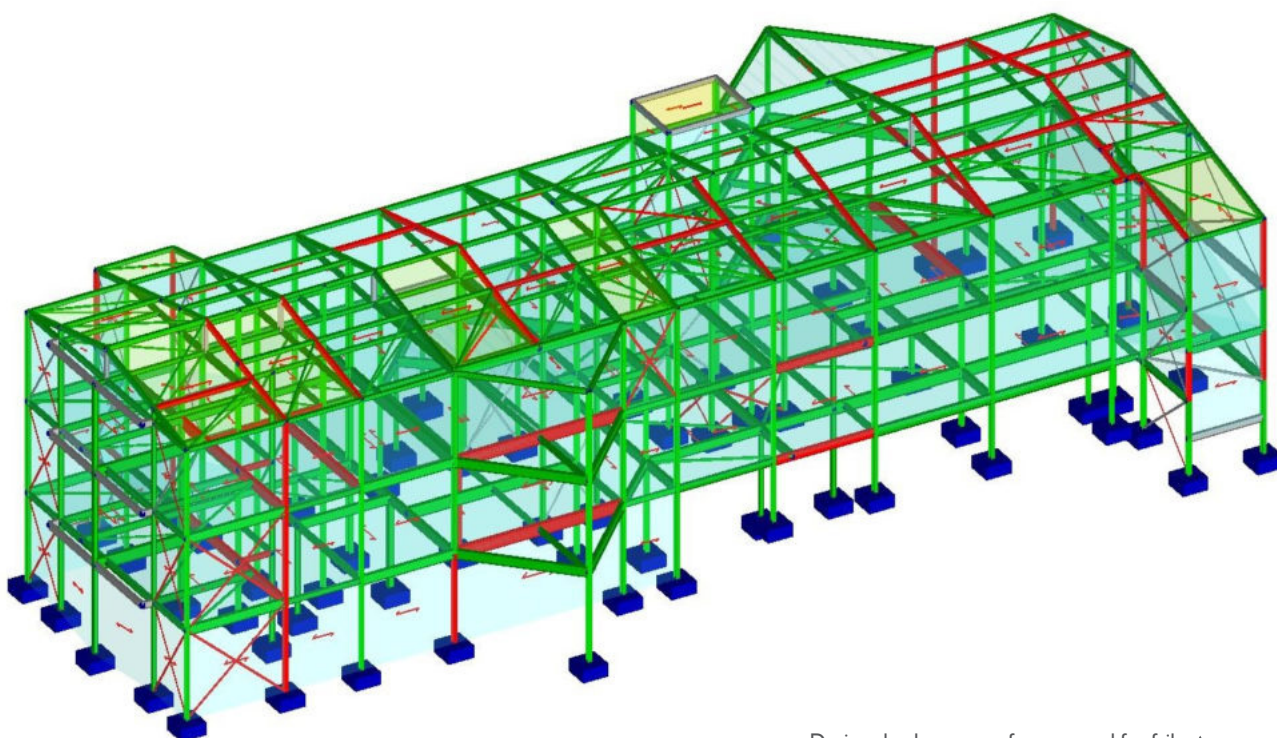
provides an independent analysis feature to automatically determine  $\lambda_{cr}$  for selected load combinations by incremental second order elastic analysis. The load factor of the lowest buckling mode is detected. For unbraced frames this will be a sway mode and for braced frames a non-sway failure of the frame or a critical member will govern.

### Torsionless design

The software provides designers with an option to ignore the torsional stiffness of the frame members where torsion is not a primary load path. The removal of torsional moments from the frame is balanced by an increase in some of the bending moments. This simplified analysis is permitted by BS 8110 Part 2 Clause 2.4.1 and is mainly useful in reinforced concrete frames to avoid designing for torsion.

### Combined features

When necessary, A3D MAX is able to carry out incremental elastic-plastic analysis of structures containing tension-only members and lift-off supports. Similarly, elastic critical load determination can take account of directional members and lift-off supports.



Design checks – green for pass, red for fail ▲

## Design Features

Design checks for steel and concrete members to BS or Eurocode standards. Pass and fail are shown as green and red members on the project frame for easy visual reference.

### Integrated design

The CADS Design Wizard allows members and supports to be grouped for common design and batch processing of steel members and concrete members.

### Links to design and AutoCAD

A3D MAX can also be integrated with other engineering software from CADS. Links with the CADS RC Design modules for RC beams, columns, bases and pile caps, through to CADS RC detailing and automatic bar scheduling with AutoCAD.

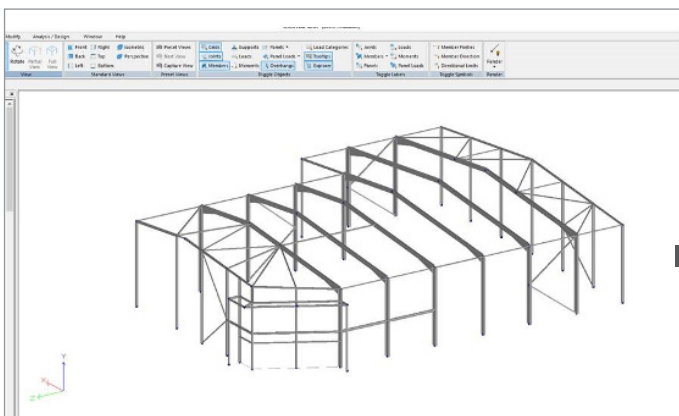
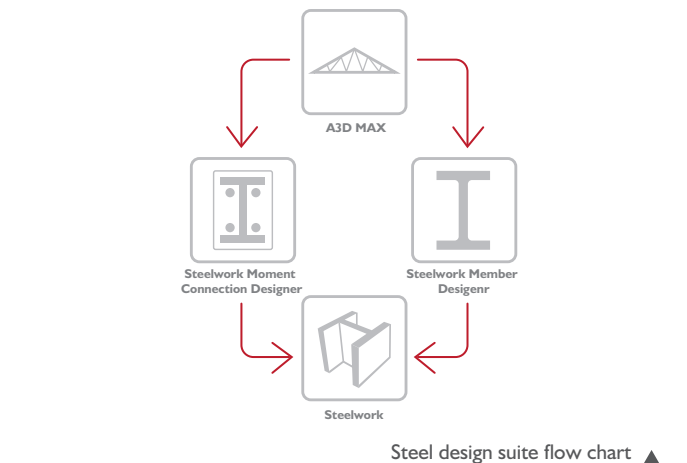
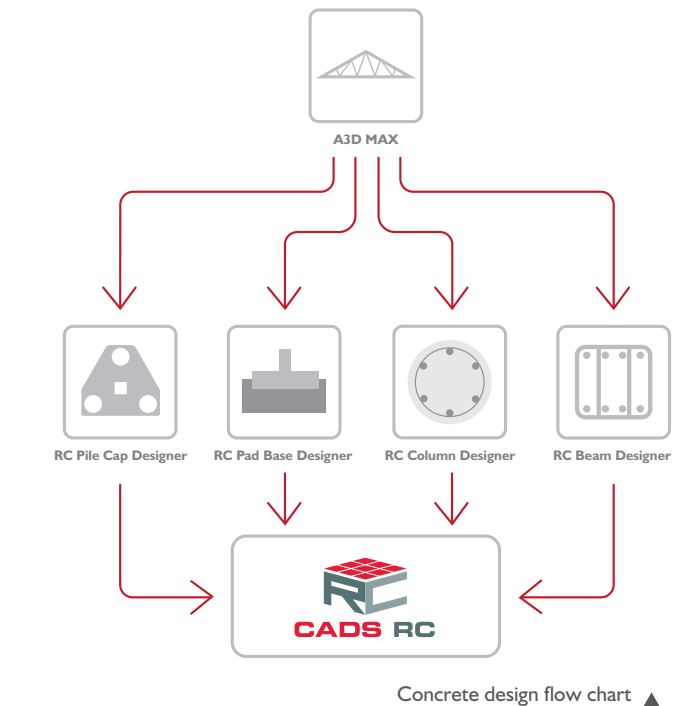
A3D MAX also integrates with CADS Steel Design solutions, offering links to steel member and connection design, and to CADS Steelwork detailing and scheduling, popular with consulting engineers and steel fabricators.

### Export as an IFC file to link to Revit

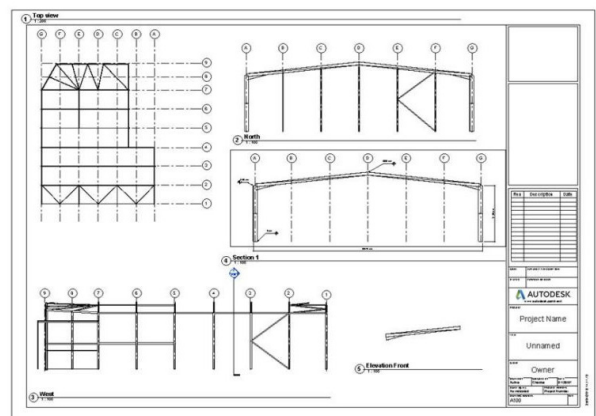
The latest update now allows the export of IFC files. Simply export your model as an IFC file to import into Revit and other IFC compatible software to benefit from their extended capabilities when creating drawings and reports. The exported file could also be viewed on a tablet on site or as a 3D pdf in Bluebeam.

### Excellent printing facilities

A3D MAX provides engineers with the flexibility to print either a concise or a detailed report.



A3D MAX model ▲



Use Revit's drawing capabilities to enhance the A3D MAX model ▲