



# CADS Hub 2020.4

## Release notes



GLOBAL CONSTRUCTION  
SOFTWARE AND SERVICES



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# Version 2020.4 (Build 120) November 2020

## Steel Member Designer

### Column

#### Calculation

- Software for verifying the design ultimate and serviceability criteria of a steel column;
- The internal forces (shear forces, bending moments and deflections) on the member are calculated for the given loading and support conditions;
- Effective length of the member is calculated according to NCCI SN009a-EN-EU;
- Non-dimensional slenderness for lateral-torsional buckling is calculated in accordance with SN002a-EN-EU and SN003a-EN-EU;
- The deflection of the column is verified against a value or limit;
- The overall slenderness of the member without considering the lateral restraints is also verified against the specified limit.

#### Input

- The cross-section of the member can be chosen from the steel section library;
- Allows entry of point loads, uniformly distributed loads and partial loads;
- Lateral restraints can be defined on the member.

#### Output

- 3D and 2D preview of the beam with loading details;
- Analysis results and utilisation diagrams with results graphs;
- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.

## Edge Beam

#### Calculation

- Software for verification of a single-span steel edge beam under eccentric wall loading;
- Calculations are based on the simplified method permitted by clause 6.2.7(7) of BS EN 1993-1-1, whereby for open sections, the effects of St. Venant torsion may be neglected with resistance to torque provided by torsional warping alone. For closed

sections, the effects of torsional warping may be neglected with resistance to torque provided by St. Venant torsion alone;

- Calculations may be required for two serviceability and two ultimate load cases:  
Case 1: Maximum vertical load - In this load case, all dead and imposed loads are applied unfactored for the serviceability limit state and factored for the ultimate limit state. These load cases will produce maximum major axis bending in the beam and corresponding deflections;  
Case 2: Maximum torsion effects - For the serviceability limit state, all dead loads are applied but only those imposed loads that have positive (leftward) eccentricities from the beam centre;
- For the ultimate limit state, all dead and imposed loads that have positive eccentricities are factored whilst dead loads with negative eccentricities are unfactored and imposed loads with negative eccentricity are not applied.

### Input

- The cross-section of the member can be chosen from the steel section library;
- Outer leaf, inner leaf wall details and slab details can be specified;
- The support details for beam and outer leaf support may be specified;
- Loading on outer leaf, inner leaf wall and slab can be specified.

### Output

- 3D and 2D preview of the beam with loading details;
- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.

## Steel Simple Connection Designer

### Column base plate connection

#### Calculation

- Performs checks on the connection of an axially loaded column to a concrete foundation;
- Design calculations guided by BS EN 1993-1-8:2005 and SCI P358.

#### Output

- 3D and 2D preview of the steel connections;
- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.

## New features / Corrections made

### Steel Simple Connection Designer

- Added torsion resistance check for full depth end plates;
- A few inputs are reorganised for better clarity.

### Structural Glass Designer

- For the glass floor plate and internal wall, the maximum width is now limited to the length.

### Retaining Wall Designer

- For Stem back vertical main bar, the label wasn't mapped correctly with the input. This issue is now fixed;
- Reinforcements of size 6 mm and 8 mm can now be specified in a reinforced retaining wall.

### Scaffolding

- The address search facility has been extended to include the Channel Islands and the Isles of Scilly;
- The calculation of the main platform's loaded area has been refined to omit the width of the toe boards.
- The calculation of the inner cantilever platform's loaded area has been refined to omit the gap between the main platform and the inner platform.

# Version 2020.3 (Build 110) July 2020

## Scaffolding

### Tied independent scaffold

#### Calculation

- Calculation of tube and fitting tied façade access scaffolds in accordance with TG20:13
- Compatible with sites in the UK and Ireland;
- Calculates the TG20:13 wind factor and the equivalent peak velocity pressure, compliant with BS EN 1991-1-4;
- Calculates the leg loads for scaffolds: the maximum support reactions for foundation design and the maximum axial forces in members. This includes the effect of wind and notional horizontal loads, compliant with BS EN 12811-1;
- Calculates the tie duty for scaffolds using grillage analysis;
- Calculates the adequacy of a scaffold bridge using a beam analysis, checking the moment and shear capacities, deflection and coupler slip. A library of standard beams is included, from Apollo, DESSA, Generation and TRAD, or it is possible to specify a TG20:13 compliant beam or a user-defined beam;
- Checks if a scaffold is TG20:13 compliant.

#### Input

- Site location can be selected on the map;
- Fully boarded or part boarded scaffolds;
- Cladding options (unclad, brick guards, debris netting or sheeting);
- Optional inner guard rails and toe boards;
- Structural transoms;
- TG20:13 tie patterns A – F;
- Impermeable or permeable facades;
- Load classes 1- 4 with optional fully-loaded inside boards;
- An optional TG20:13 compliant light-duty cantilever fan;
- An optional bridged opening, which may be supported by double standards.

#### Output

- Customisable output with 3 levels of output details;
- Separate leg load and tie duty report;
- MS Word and PDF export of output reports;
- 2D and 3D representation of the scaffold.

## TG20:13 wind factor

### Calculation

- Calculates the TG20:13 wind factor and the equivalent peak velocity pressure, compliant with BS EN 1991-1-4.
- Compatible with sites in the UK and Ireland.

### Input

- Site location can be selected on the map;
- Option to consider sheltering from nearby buildings for wind exposure.

### Output

- 3D topographic model of the site with satellite imagery;
- Results graph of wind factor by wind direction;
- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.

## Mass Concrete Base Design

### Calculation

- Calculations in accordance with BS EN 1992-1-1:2004+A1:2014 and BS EN 1997-1:2004+A1:2013 for UK National Annex;
- Performs design and checks the dimension for critical load combination;
- Axial load, horizontal load, moments are supported.

### Input

- Foundation details, soil property, loading.

### Output

- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports;
- 2D and 3D representation of foundation;
- 2D representation of bearing pressure graph.

## Engineering Toolbox

### Soakaway design

#### Calculation

- Calculations are in accordance with BS EN 752-4 *Drain and sewer systems outside buildings –Part 4: Hydraulic design and environmental considerations* and BRE DG365:2016;
- Calculates the size or adequacy of soakaway pit;
- Pit, trench, and perforated concrete ring type soakaways are supported;
- Includes a soil infiltration rate calculator for calculating infiltration rate from trial pit observations.

#### Input

- Site location, rainfall, soil and soakaway details.

#### Output

- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.

### Foundation depth for building near trees

#### Calculation

- Calculates the foundation depth required for building near trees;
- Calculations are in accordance with NHBC Standards 2020;
- Supports multiple trees.

#### Input

- Site location, soil and tree details.

#### Output

- 2D representation of foundation and tree.
- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.



## New features

### Steel Beam Designer

- Added a new feature to design beams with multiple spans;
- Single span cantilevers and beams with cantilever overhangs can be designed;
- Support fixities can be edited;
- Load combinations can now be generated.

### Steel Simple Connection Designer

- Added check for tying resistance for all connection types.

## Version 2020.2 (Build 100) April 2020

### Engineering Toolbox

#### Snow loading

##### Calculation

- Calculations are in accordance with BS EN 1993-1-3:2003+A1:2015 - *Eurocode 1 - Actions on structures - Part 1-3: General actions - Snow loads* for UK national annex;
- This software supports calculation of snow load intensity for flat, monopitch, duopitch, and cylindrical roofs;
- Features like parapet, canopy, obstructions and abutting building can be added.

##### Input

- Site location, roof shape, roof geometry and geometry of adjoining features.

##### Output

- 2D preview of the building with adjoining features drawn;
- Loading diagram;
- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.

#### Surface and foul water drainage design

##### Calculation

- Calculations are in accordance with BS EN 16933-2:2017 *Drain and sewer systems outside buildings – Design: Part 2 – Hydraulic design* and BS EN 12056-2:2000 *Gravity drainage systems inside buildings – Part 2: Sanitary pipework, layout and calculation* for UK National Annex;
- Calculates the size or capacity of surface and foul water drains.

##### Input

- Flow rate or diameter, rainfall intensity, pipe properties.

##### Output

- Relative velocity and flow rate graph;
- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.

## Roof drainage design

### Calculation

- Calculations are in accordance with BS EN 12056-3:2000 *Gravity drainage system inside buildings – Part 3: Roof drainage, layout and calculation* and *Manual for the Design of Roof Drainage Systems: A guide to the use of European Standards BS EN 12056-3:2000*, R. W. P. May, published by HR Wallingford;
- Calculates the capacity of various roof drainage elements such as gutter, outlets and rainwater pipe.

### Input

- Roof properties, gutter properties and outlet properties.

### Output

- 2D diagram of the roof drainage systems;
- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.

## Version 2020.1 (Build 90) March 2020

### Engineering Toolbox

#### Light steel section properties

##### Calculation

- Calculation of gross and effective section properties for lipped C-sections, un-lipped C-section (U) and Z-sections in accordance with BS EN 1993-1-3:2006.
- Gross properties are determined from the input dimensions.
- Effective properties in bending and compression are determined by considering the local buckling and the design strength of steel.

##### Input

- Section shape, dimensions and material.

##### Output

- Gross elastic and stability properties, effective dimensions and effective section properties;
- MS Word and PDF export of output reports.

#### Changes to the licensing module

- The licensing module has been updated.

# Version 2020.0 (Build 80) February 2020

## Steel Beam Designer

### Calculation

- Software for verifying the design ultimate and serviceability criteria of a simply supported steel beam;
- Calculations are in accordance with BS EN 1993-1-1:2005+A1:2014 - *Design of steel structures - Part 1-1 General rules and rules for buildings* for UK and Irish national annexes;
- The internal forces (shear forces, bending moments and deflections) on the member are calculated for the given loading and support conditions;
- Effective length of the member is calculated according to NCCI SN009a-EN-EU;
- Non-dimensional slenderness for lateral–torsional buckling is calculated in accordance with SN002a-EN-EU and SN003a-EN-EU;
- The deflection of the beam is verified against a value or limit;
- The overall slenderness of the member without considering the lateral restraints is also verified against the specified limit.

### Input

- The cross-section of the member can be chosen from the steel section library;
- Allows entry of point loads (single/dual), uniformly distributed loads and partial loads;
- Lateral restraint and torsional restraint can be defined separately for left and right supports;
- Additional lateral restraints can be defined at the top flange of the member.

### Output

- 3D and 2D preview of the beam with loading details;
- Analysis results and utilisation diagrams with results graphs;
- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.

## Corrections made

### Steel Simple Connection Designer

- The limiting values for the 'Top beam to plate distance' changed to accommodate larger fin plates.

# Version 2019.1 (Build 71) December 2019

## Concrete Ground Bearing Slabs

### Calculation

- Software for verifying the structural design of reinforced concrete industrial ground bearing slabs;
- Calculations in accordance with Technical Report 34 Concrete Industrial Ground Floors – A guide to design and construction – 4th edition;
- Punching shear resistance check at both the face of the loaded area and the offset perimeter;
- Load transfer capacity is calculated for dowelled joints considering the shear, bending, bearing and bursting capacity of the dowels.

### Input

- Allows for inputting point loads (single/dual), line loads applied at the internal or edge of the slab, and/or uniformly distributed loads;
- Allows for input of various reinforcement types: steel fabric or bar reinforcement, steel fibres, macro synthetic fibres or a combination of these;
- Dowels, steel fabric, or a proprietary system can be specified for load transfer at joints.

### Output

- 3D and 2D preview of the slab with loading details;
- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.

## Engineering Toolbox

### Crack Width

#### Calculation

- Calculation of Crack width for rectangular and T shaped cross-sections in accordance with BS EN 1992-1-1:2004.

## Output

- Crack width with detailed calculations;
- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.

## Creep Coefficient

### Calculation

- Calculation of Creep coefficient in accordance with BS EN 1992-1-1:2004.

### Output

- Creep coefficient graph;
- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.

## Corrections made

### Steel Simple Connection Designer

- The limiting values for the Top and bottom projection of the end plates is now changed to accommodate greater depth of end plates.

# Version 2019.0 (Build 53) October 2019

## Footfall Analysis

### Supported software

- CADS Footfall Analysis supports Dlubal RFEM and SCIA Engineer.

### Calculation methods

- Concrete Centre Method – CCIP-016 – A Design Guide for Footfall Induced Vibration of Structures;
- The Steel Construction Institute – SCI P354 – Design of Floors for Vibration: A New Approach.

### Footfall options

- Choice of excitation forces: CCIP-016, SCI P354, AISC DG11 for floors and stairs;
- Frequency weighting curves (BS 6841);
- Quick investigation for full model or specific areas;
- Vibration Dose Analysis (VDV);
- Adjust the minimum and maximum walking frequency as well as the walker's weight;
- Damping by user input values;
- Vary the number of footfalls for resonant response;
- Response limit.

### Output

- Overall maximum response factors and critical nodes;
- Resonant analysis (Maximum response factor, RMS acceleration, Critical node, Critical frequency);
- Impulsive (transient) analysis (Maximum response factor, peak acceleration/velocity, rms acceleration/velocity, Critical node, Critical frequency);
- Vibration Dose Values for both resonant and impulsive analyses.

### Charts

- Response factor vs walking frequency;
- Mass participation vs eigenmodes;
- Velocity time history.



## Punching Shear

### Calculations

- Software for rapid punching shear calculations for reinforced concrete flat slab structures;
- Calculations in accordance with BS EN 1992-1-1:2004+A1:2014 (*Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings*);
- Multiple column shapes (rectangular, circular, elliptical, T, L and cruciform);
- Internal, edge, external and re-entrant corner column positions;
- Rectangular openings in slabs;
- Radial stud layouts.

### Output

- Output reports as brief summary or detailed calculation;
- MS Word and PDF export of output reports.

## Retaining Wall Designer

### Calculation

- The software supports three types of free-standing retaining walls:
  - Reinforced concrete (RC) stem walls with RC bases.
  - Reinforced masonry (RM) stem walls of three sub types: RC cavity; RC hollow block; RC pocket. All with RC bases.
  - Gabion walls.
- Design calculations guided by BS EN 1997-1:2004+A1:2013, BS EN 1992-1-1:2004+A1:2014, BS EN 1996-1-1:2005+A1:2012, the UK National Annexes, BS 8002:2015, and other relevant publications;
- Checks for the geotechnical failures of a wall-soil system and structural adequacy of the wall components.

### Output

- 3D and 2D preview of the structure and reinforcement sketches;
- Customisable output with 3 levels of output details;
- Numerical and/or formulae output for easy checking and presentation;
- Clear output summary with Pass/Fail limit for each individual check performed;
- Easy sharing option by printing, exporting to file in MS Word or PDF format.

## Steel Simple Connection Designer

### Calculation

- The software supports three types of steel simple connections:
  - Beam-to-beam connection (end plate or fin plate);
  - Beam-to-column connection (end plate or fin plate);
  - Column splice (bearing or non-bearing);
- Design calculations guided by BS EN 1993-1-8:2005 and SCI P358;
- Checks for the resistance of each component of connection element and shows the critical component.

### Output

- 3D and 2D preview of the steel connections;
- Customisable output with 3 levels of output details;
- Numerical and/or formulae output for easy checking and presentation;
- Clear output summary with Pass/Fail limit for each individual check performed;
- Easy sharing option by printing, exporting to file in MS Word or PDF format;
- Possible to export as dxf format.

## Structural Glass Designer

### Calculation

- The checking is carried out based on the calculation framework presented in the *Structural use of glass in buildings (2<sup>nd</sup> edition)*, published by the IStructE;
- The strength of glass required is evaluated in accordance with the type of action applied to the glass element;
- The effective thickness of the element required is evaluated in accordance with the type and duration of the loading;
- Post-failure checks of the glass elements.

### Input

- Allows for laminated glass elements to be checked;
- Sacrificial layers with different thickness may be specified;
- Allows for inputting glass material properties;
- Interlayer properties from library or manufacturer test sheets may be specified;
- Input custom bending strength for glass based on the manufacturer's specification;
- Customisable ratio limits, depending on the type of element;
- Choice of different load types and support conditions for the elements.

### Output

- 3D and 2D preview of the glass elements;
- Customisable output with 3 levels of output details;
- Numerical and/or formulae output for easy checking and presentation;
- Clear output summary with Pass/Fail limit for each individual check performed;
- Easy sharing option by printing, exporting to file or individual calculation file sharing.