



CADS Hub 2024.2

Release notes



GLOBAL CONSTRUCTION
SOFTWARE AND SERVICES



Microsoft
Partner

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CADS Hub 2024.2

Thank you for upgrading to the latest CADS Hub

These release notes summarise the enhancements and corrections made across all software.

CADS Hub 2024 can be installed on 64-bit versions Windows 10 and Windows 11.

Version 2024.2 (Build 290) September 2024

Pile Cap Designer

Calculation

- Calculations are in accordance with *BS EN 1992-1-1:2004+A1:2014 - Design of concrete structures - Part 1-1 General rules and rules for buildings* for UK National Annex;
- Pile load analysis for different pile configuration types;
- Provides an analytical and design tool to calculate the appropriate size and reinforcement for a pile cap.

Input

- The application supports different types of pile configurations, from two piles to nine piles group;
- Option to calculate using Beam theory or Strut and tie model are supported;
- Pile properties such as diameter, spacing factor and its ultimate capacity can be defined;
- Supports axial loads and moments from two directions from a column.

Output

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

Wind Speed

Calculation

- Calculates peak wind velocity and wind pressure;
- Supports design standards for the following countries: UK, Ireland and USA;
- Calculations are done for 4, 8 or 12 sectors and at various heights.

Input

- Allows picking the site location on the map or use the search bar by entering the location, postcode or partial address;

- Site wind velocity and distance to the shoreline are also automatically calculated;
- Wind sector, orography and terrain information can be defined;
- Option to view the wind velocity contours over the map for supported regions;
- Allows to configure the height bands at which pressure is calculated.

Output

- 3D and 2D preview of the map;
- Display pressure results graphs for all wind directions;
- Customisable output with 2 levels of output details;
- MS Word and PDF export of output reports.

Version 2024.1 (Build 280) May 2024

Pad Base Designer

Corrections made

- A warning has been provided for bearing stress failure at the bend of the bar.

Version 2024.0 (Build 272) April 2024

Framework

Enhancements

- The CADS Hub installer has been updated to provide improved user experience.
- The Install updates option now allows the software to be updated from within CADS Hub, rather than from the CADS website.

Scaffolding

Tied tower scaffolding

CADS Scaffolding has been updated to include a new tied tower module, which calculates leg loads and tie duties, and designs the tower in accordance with BS EN 12811-1 and TG20:21.

Tied independent scaffolding

Enhancements

- An option has been provided to define the design life greater than 2 years, so that a probability factor of 1.0 can be used in the wind load calculation.
- An option has been provided to define the scaffold base level, to allow the vertical distance between the ground level and the base of the scaffold to be defined when the scaffold is standing on a building or another structure.
- An option to stack up to 3 bridge beam assemblies has been provided if a single beam assembly is not adequate.
- An option to define the over-sail length of bridge beams has been provided.

TG20:21 wind factor

Enhancements

- An option has been provided to overlay the wind velocity contours over the map in the TG20:21 Wind Factor app. The overlay displayed corresponds to Figure 4.1 of the TG20:21 Design Guide, which displays the basic wind speed (m/s) before the altitude, orography and exposure coefficients are applied to calculate the site wind factor.
- An option has been provided to define the design life greater than 2 years, so that a probability factor of 1.0 can be used in the wind load calculation.
- An option has been provided to define the scaffold base level, to allow the vertical distance between the ground level and the base of the scaffold to be defined when the scaffold is standing on a building or another structure.

Punching Shear Designer

Enhancements

- The punching shear designer app is now extended to support traditional shear link reinforcement.
- The generated shear reinforcement layout can now be exported to DXF format.

Corrections made

- In some specific instances, the U0 and U1 perimeters are not calculated correctly. This is now fixed.

Concrete Ground Bearing Slabs

Enhancements

- A new dowel type Plate dowels has been added for transferring the point loads.
- The app has now been extended to support Fatigue check when material handling equipment (MHE) loads are present.

Corrections made

- The diagram was not correctly updated to represent the position of dowels. This has now been fixed.

Footfall Analysis

Enhancements

- CADS Footfall Analysis has now been extended to support SCIA Engineer 24.0.

Corrections made

- While importing the model from RFEM, if the model did not contain any 1D members, the import process would not succeed. This issue has now been fixed.

Version 2023.2 (Build 260) March 2024

Light steel section properties

Corrections made

- A bug in the calculation of the warping constant has been fixed.

Version 2023.1 (Build 250) June 2023

Pad Base Designer

Enhancements

- The Pad Base Designer app has been extended to support strip and combined footings in addition to isolated footings.

Corrections made

- Minor corrections to punching shear and effective depth calculations;
- Minor corrections to minimum cover for anchorage calculation;
- For bases with uniaxial uplift, the calculation of moments was incorrect in some cases. This is now fixed.

Retaining Wall Designer

Corrections made

- Corrected stem back and front vertical bar caps position if they have staggered bar spacing;
- Corrected label for permanent and variable area loads;
- Corrected moments from line loads applied above wall not accounted for moment resistance;
- Considered area of steel required in deflection check.

RC Slab Designer

Corrections made

- There was a bug in the values of support reactions with spring supports. This issue is now fixed;
- When the design reinforcements are exported to CADS SMART Slab Detailer, the openings on the slab were not exported. This issue is now fixed;
- Corrected the incorrect reporting of min and max labels in the results table.

Soakaway design

Corrections made

- Increased maximum input limit for climatic effect upto 40 % and storm duration upto 2880 minutes.

Framework

Enhancements

- Updates have been made to the CADS Hub Framework and dependent libraries.

Version 2023.0 (Build 243) January 2023

RC Slab Designer

Calculation

This software performs structural analysis and design of an RC slab using Finite Element (FE) analysis. The FE analysis is carried out using the NASTRAN solver and the design calculations are performed in accordance with EN 1992-1-1.

Input

- A slab may be modelled using the modelling tools in the app or by importing the DXF file;
- Material, thickness, openings and reinforcement regions of the slab can be defined;
- Allows entry of point loads, line loads, patch loads and area loads on the slab;
- Load combinations can be generated automatically as per the Eurocode.

Output

- 3D and 2D view of the slab with loading details;
- Graphical representation of the analysis and design results for load cases and combinations;
- Option to export the input data and results to MS Excel;
- Option to export the design reinforcement to CADS SMART Slab Detailer for detailing;
- Easy sharing option by printing or exporting to a calculation report in MS Word or PDF format.

Steel Member Designer

Corrections made

- There was a bug in the calculation for interaction factor. This has now been fixed.
- The buckling parameter for hollow sections was incorrect. This has now been fixed.
- There were a few bugs in the effective length factor calculation which are now fixed.

Framework

Enhancements

- Updates have been made to the CADS Hub framework libraries, licensing modules and the installer.

Version 2022.2 (Build 232) October 2022

- Updates to the application framework libraries, licensing modules and installer;
- There was a bug in opening the help pages for beam to beam connection and beam to column connection apps. This has now been fixed.

Version 2022.1 (Build 223) September 2022

Two Way Slab Designer

Calculation

This software performs structural design of rectangular slab panels that are essentially two-way spanning between a system of supporting beams or walls:

- Calculations are based on Johansen's Yield Line theory published by the Cement and Concrete Association in 1962 and BS EN 1992-1-1: 2004;
- The serviceability deflection check is carried out using the span/effective depth limits given in EN 1992-1-1 and the UK NA.

Output

- 2D view of the two-way slab in a planar view showing the dimensions, loadings and, where applicable, reinforcement arrangements;
- Customisable output with 3 levels of output details;
- Numerical and/or formulae output for easy checking and presentation;
- Easy sharing option by printing, exporting to file in MS Word or PDF format.

Timber Connection Designer

Calculation

- Calculations are in accordance with BS EN 1995-1-1:2004+A2:2014 - Design of timber structures - Part 1-1 General Common rules and rules for buildings for UK National Annex;
- Verifies the capacity of the connection, connected members, gusset plates and fasteners.

Input

- Software supports different types of connections splice, apex/corner, and intermediate (with and without gusset plates);
- Different types of fasteners are supported based on connection types;
- Member properties such as material, cross-section and its orientation can be defined;

- Allows entry of factored axial, shear and moment loading along with the load duration.

Output

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

Concrete Ground Bearing Slabs

Corrections made

- There was a bug in the calculation of shear capacity with fabric reinforcement. This is fixed now.

Version 2022.0 (Build 212) February 2022

Structural Glass Designer

Insulated glass units

- Calculations are based on the framework presented in *BS-EN 16612:2019*. The software takes into account the consequences arising from the presence of a fixed and hermetically sealed quantity of gas within the cavity (or cavities) of the insulated glass units;
- Performs the structural strength and deflection checks of insulated glass units (double and triple glazed).

Footfall Analysis

Enhancements

- CADS Footfall Analysis is now extended to support RFEM 5.27 and RFEM 6;
- Improved calculation performance.

Retaining Wall Designer

Corrections made

- For some models, where the loads on soil is added far from the wall, there was an exception while exporting the report into PDF/ Word. This issue is now fixed.

Version 2021.3 (Build 200) December 2021

Embodied Carbon

Calculation

- Calculations are based on the guidance published by the Institution of Structural Engineers, How to Calculate Embodied Carbon (IStructE, 2020);
- The application estimates and compares the embodied carbon quantities at different stages of the design process for different configurations.

Input

- Bill of materials and scheme properties.

Output

- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports;
- Bill of materials and carbon estimates can be exported to Excel.

Retaining Wall Designer

Enhancements

- Unreinforced masonry stem type added in the masonry retaining wall module;
- Mass concrete stem type added in the concrete retaining wall module;
- Provided an option to choose either mass concrete or reinforced concrete foundation type irrespective of wall type in the concrete and masonry retaining wall module;
- Improved results graph tab and other minor updates to the input user interface;
- Included a new option for the restoring effect of surcharge in design parameters tab to consider or ignore the beneficial effect of surcharge loads;
- Included a new option to design the stem using the 'at rest' earth pressure.

Corrections made

- A correction was made in the lever arm calculation of moment due to horizontal line load on the wall;
- Shear force calculation when the heel side is under lift-off condition was corrected;
- The PSF for overturning moment in the calculation of linear bearing pressure for section design were corrected;
- A correction was made in the lever arm calculation for stability check at each gabion layer.

Scaffolding

Tied independent scaffold

The Tied Independent Scaffold and TG20 Wind Factor apps have been significantly updated to match the wind factors, leg loads, tie duties and maximum safe heights reported by the NASC TG20:21 eGuide.

- The terminology in the TG20 wind factor report has been updated for TG20:21. This wind factor calculation is the basis for the calculation in the TG20:21 eGuide and can be used to justify the wind factor reported by a TG20:21 compliance sheet;
- The TG20 check has been updated for TG20:21, which was itself developed using SMART Calculations, matching the results from the TG20:21 eGuide;
- Support has been added for tied or rakered independent scaffolds with 3 inside boards;
- An option has been provided to allow the top lift to be untied for clad scaffolding. This will fail the TG20 check but it allows the temporary condition where the top lift is not yet tied to be considered, in which the tie duty will include the cantilever effect of the untied top lift. This is the tie duty reported by the TG20:21 eGuide. Note that, to model this condition for scaffolding with ties at alternate lifts, it may be necessary to reduce the scaffold height by one lift such that the top lift is untied;
- An option has been provided to connect the tie tubes to the inner and outer faces of the scaffold or to the inner face only. If the option is selected to connect to the inner face only, a greater proportion of the horizontal loading is transferred to the foundations at the outer face of the scaffold. The TG20 check reports whether the tie tubes need to be connected to the inner and outer faces or whether they may be connected to the inner face only and will fail if the required condition is not met. A new option has also been provided to automatically select the tie tube connections based on the TG20 check, automatically connecting to the inner and outer faces if required;
- An option has been provided to consider the effect of additional sway resistance provided to the scaffold as described in section 7.9 of the TG20:21 Operational Guide. If so, the proportion of the horizontal loading that is transferred to the foundation at the outer face of the scaffold is reduced. An option has been provided to automatically determine the requirement for additional sway resistance from the TG20 check and the TG20 check now fails if additional sway resistance is required but not provided;
- An option has been provided to allow the façade bracing below the first lift to become ineffective, if applicable, as described in section 5.7.3.4 of the TG20:21 Design Guide. If this option is selected and the slip capacity of the couplers connecting the façade bracing below

the first lift is exceeded, the frame is reanalysed with the bracing considered ineffective. This results in a reduction to the maximum leg load at the outer face as the horizontal forces are redistributed within the frame;

- The TG20 check has been improved where inner edge protection is present. It now checks the inner leg loads against the axial load capacities of the inner standards, rather than conservatively failing in some cases as in the previous version of the software;
- The TG20 check has also been improved to check the inner leg loads where the inside boards are fully loaded to the main platform load class. This can be used to check a scaffold with fully loaded inside boards, which is not possible with the NASC TG20:21 eGuide;
- The guidance for single-lift independent scaffolds that are not tied or supported with rakers has been implemented as described in section 6.23 of the TG20:21 Operational Guide. The requirement for structural transoms connected to the standards is checked in the TG20 check and, if the option for automatic structural transoms has been selected, they are automatically added to a single-lift scaffold if the scaffold is not supported by ties or rakers;

Version 2021.2 (Build 190) July 2021

Retaining Wall Designer

Enhancements

- Extended the inputs to allow adding line load and strip load on the soil for all types of retaining walls;
- Option to choose either PD 6694-1: 2011 method or Boussinesq's method to derive pressure from line and strip load on soil;
- Added separate pressure graphs for different load types in the Results graph tab;
- Improved user interface for the Loads input tab and other minor updates;
- The key position can now be changed for reinforced concrete and reinforced masonry retaining walls.

Corrections made

- The retained height was incorrect with sloping soil and inclined virtual plane option. This has now been fixed;
- The weight of soil mass was incorrect when there is a water table. This has now been fixed.

Steel Member Designer

Enhancements

- The Steel Member Designer module has been extended to support inclined members;

- A new mode for the quick design of columns in simple construction had been introduced;
- The previously separate applications for Beam and Column Steel Designers have been merged into one Steel member designer application with the above new features;
- Unsymmetrical sections (angles and channels) can now be used for the Inclined member design and check;
- New load types have been introduced.

Version 2021.1 (Build 170) May 2021

Pad Base Designer

The Mass Concrete Base Designer module has been extended to support reinforced concrete base design and renamed as Pad Base Designer.

Calculation

- Calculations are in accordance with *BS EN 1992-1-1:2004+A1:2014* and *BS EN 19971:2004+A1:2013* for UK National Annex;
- Performs design, and checks the dimension and reinforcements for critical load combinations;
- Axial loads, horizontal loads and moments are supported.

Engineering Toolbox

RC Corbel Designer

Calculation

- Calculations are in accordance with Annex J.3 of *BS EN 1992-1-1:2004+A1:2014* and the UK National Annex;
- Performs the verification of corbels using the Strut-and-tie model.

Input

- Corbel details, loading and reinforcement.

Output

- 3D and 2D preview of the corbel with loading details;
- 2D representation of the Strut-and-tie model;
- Customisable output with 3 levels of output details;
- MS Word and PDF export of output reports.

Version 2021.0 (Build 150) March 2021

Timber Member Designer

Beam

Calculation

- Calculations are in accordance with BS EN 1995-1-1:2004+A2:2014 - Design of timber structures - Part 1-1 General Common rules and rules for buildings for UK National Annex;
- Verifies the design ultimate and serviceability criteria of a timber beam;
- Software supports different types of beams (simple beam, floor joist, rafter & flitch beam);
- The internal forces (shear forces, bending moments and deflections) on the member are calculated for the given loading and support conditions;
- The instantaneous and creep deflection of the beams are verified.

Input

- The material, cross-section, bearing and notch details of the member can be defined;
- Allows entry of point loads (single/multi point), uniformly distributed loads, moments and partial loads;
- Lateral restraint can be defined for the member;
- Load duration can be defined for each load case;
- Creep deformation calculation can be enabled.

Output

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

Column in Simple Construction

Calculation

- Calculations are in accordance with BS EN 1995-1-1:2004+A2:2014 - Design of timber structures - Part 1-1 General Common rules and rules for buildings for UK National Annex;
- Verifies the strength and stability criteria of a timber column in simple construction;
- The nominal moments are calculated from the eccentric beam reactions;

Input

- The material and cross-section details of the member can be defined;
- Option to apply nominal moments from eccentric beam reactions;
- Effective length factor can be defined for the member;

Output

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

Version 2020.5 (Build 130) January 2021

Framework

- Internal maintenance was performed on the method of retrieving wind and snow load information.

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 19971:2004+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 (2nd 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;