

User reference manual

Use this manual when you need the exact sequence, the meaning of a setting, or help recovering a job.

Task instructions and control reference for everyday use.

Click a section below to go straight to it. Every page has a Contents link; PDF bookmarks provide the same navigation.

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Assembly image supplied by the user. The reference manual also includes the RAM visibility screenshot. Other diagrams are simplified illustrations.

Welcome and first launch

CADEO Slab Automation Suite turns a RAM Concept reactions export or model into punching shear calculations, reinforcement drawings and, when selected, bar bending schedules (BBS). It is a Windows desktop application for engineers who will check the model, choose the design settings and review the resulting details. You work in the application window; no programming is needed.

THE MAIN WINDOW

Header and project information	
Choose the code and units, then confirm project number and level.	
Pipeline Start a job and run phases	Reo Parameters Set reinforcement options
BBS Re-link Update schedules after edits	Delimiter Editor Edit bars and annotations
Change / Merge Carry reinforcement into new geometry	Bar Areas Look up reinforcement areas
Guide Read the built-in overview	Settings Set office and output preferences

The main controls and tabs

Open the application

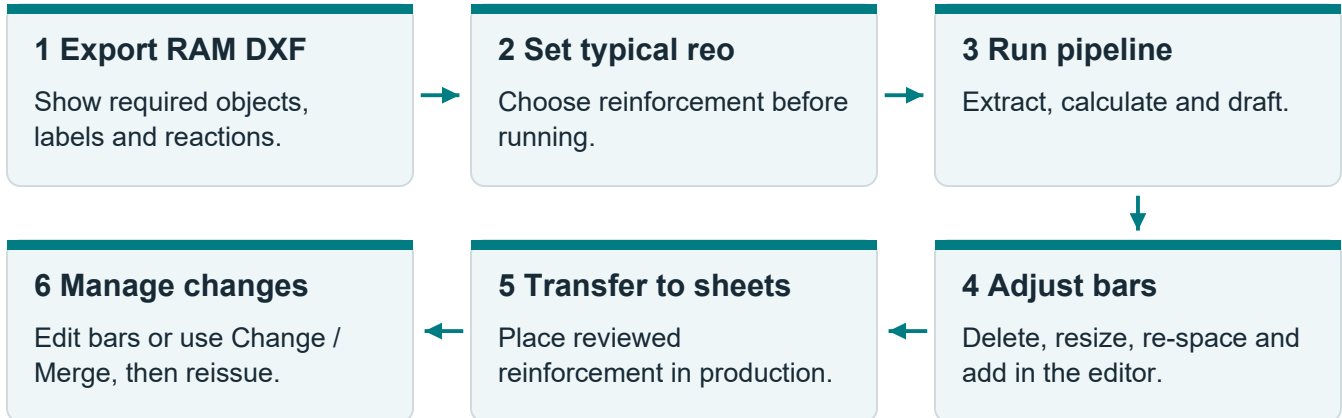
Double-click the installed **Slab Automation** desktop shortcut, or select it from the Windows Start menu. The licence check runs before the main window becomes available. If activation is requested, enter the supplied licence key and click **Activate**, or contact your licence administrator. The **License** button in the top right opens the same area later for status or deactivation. A release installation may also show an update button beside it; that button checks for an available application update.

The first tab is **Pipeline**. The project name, number, level and client fields sit above the tabs and remain visible as you move around the application. The header also contains **METRIC (UK/EU)** and **US / IMPERIAL**. These choices affect more than the labels on dimensions: metric runs use the EC2 calculation route and US/imperial runs use ACI 318. Check the selected route before entering project values or running calculations. When you select a reactions file, the application attempts to identify its units and may switch the header automatically. If the detection is inconclusive, it leaves your choice unchanged and says so below the input file. The engineer remains responsible for confirming the code and units against the model and design brief.

The tabs are **Pipeline**, **Reo Parameters**, **BBS Re-link**, **Delimiter Editor**, **Change / Merge**, **Bar Areas**, **Guide** and **Settings**. Pipeline is where a new model becomes calculations and drawings. Reo Parameters holds the detailing choices for that run. BBS Re-link refreshes schedules after drawing edits; Change / Merge helps when slab geometry changes between runs. The built-in Guide offers a quick reminder, while Settings holds office and installation details. You can start a normal DXF run without configuring every Settings item.

Follow the working sequence

The normal workflow has six steps: **export the RAM reactions DXF**, **specify typical reinforcement**, **run the pipeline**, **adjust the generated reinforcement in Delimiter Editor**, **transfer it to production sheets**, then **manage later changes**. In the editor, delete incorrect pipeline bars, adjust bar sizes and spacings to suit the design, and add any manual bars required. Update the BBS to match the edited drawing.

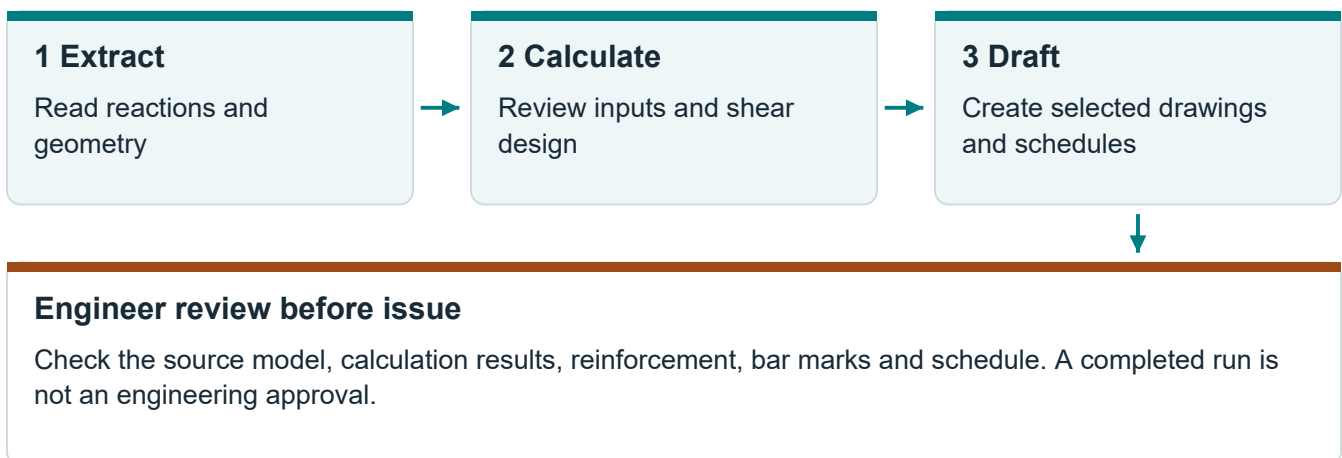


The complete workflow, including reinforcement adjustments before transfer and changes after the first issue.

Transfer can also be enabled as part of the pipeline using **Auto-transfer after Phase 3**. If the pipeline drawing is edited afterwards, transfer the updated result again. Later reinforcement-only edits use Delimiter Editor and BBS Re-link; changed slab geometry uses Change / Merge. Check the resulting production drawing and schedule together.

Understand the three phases

Use a single left mouse click unless an instruction says otherwise. Click a box to type a value; click a checkbox to turn an option on or off. A dropdown shows a list when clicked. **Browse** opens a Windows file picker: find the file, select it and click **Open**. Scroll within a tab to see the controls below the visible area. A greyed control is unavailable in the current mode or until an earlier step is complete. **Ctrl+S** means hold Ctrl and press S; it is a keyboard shortcut, not text to type.



The route from a source model to checked deliverables

Phase 1 - Reactions Extraction reads the reactions and slab information, identifies columns and openings, and creates the shear summary. **Phase 2 - Punching Shear Calculations** calculates the punching checks and groups details. **Phase 3 - Drafting Outputs** produces whichever shear, top reinforcement and bottom reinforcement outputs you select. Each phase has its own run control and live log; **RUN ALL PHASES** starts the normal sequence at Phase 1. If the model genuinely has no column reactions, a separate drafting-only option runs Phase 3 without the first two phases.

The application can calculate punching shear with its default **Python calc engine (PDF proofs, no Excel)** option. “Python” describes the calculation engine inside the application. Ticking the box does **not** ask you to write or run code. It produces PDF calculation proofs. Unticking it selects the Excel workbook calculation route; **Lock existing shear details** forces that Excel route. The header chooses the design code, while this checkbox chooses how the calculation proofs are produced.

Before a first project

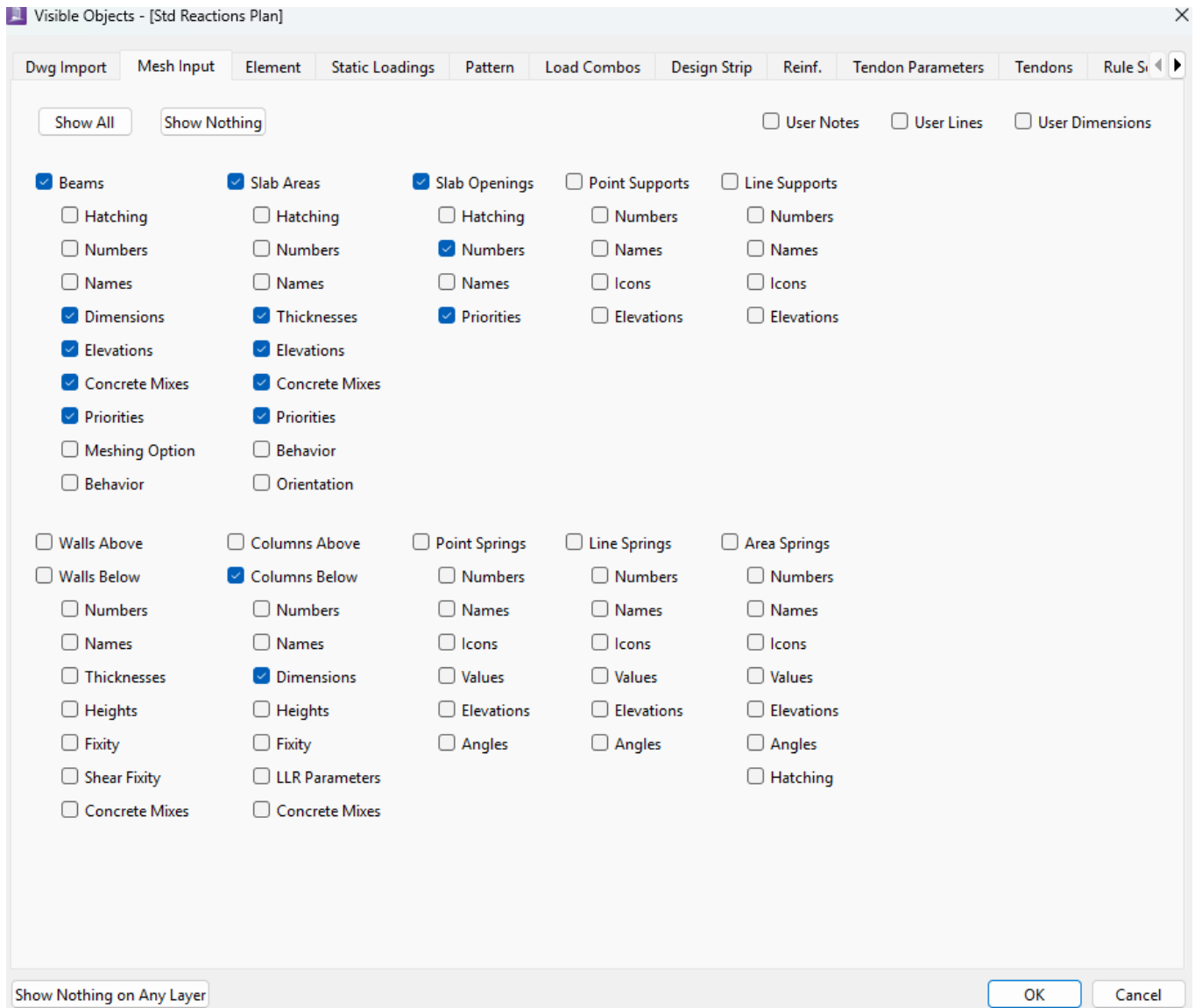
Keep the selected reactions file in the intended project folder. The application creates or updates outputs alongside it and places drawing deliverables in a **Drawings** subfolder. Have the project number and level ready: the interface calls them out as required for drawing notes and BBS naming. If you plan to provide a **DWG** export, the installation also needs ODA File Converter. Its status and path are in **Settings**; a DXF-only run does not need this conversion step. A **.cpt** input uses an installed and licensed RAM Concept application to read the model.

Start with [Prepare the RAM Concept export](#) and [Prepare a project](#), then [Set reinforcement parameters](#) before [Run extraction, calculations and drafting](#). Continue with [Edit reinforcement drawings](#), [Transfer to production drawings](#) and [Manage design changes](#).

Prepare the RAM Concept export

Use this chapter when exporting a DXF or DWG yourself. RAM exports the information visible in the **active plan**. Turning objects on in a different plan does not prepare the reactions plan. Selecting a **.cpt** directly in Slab Automation uses its model-extraction route instead; follow [Prepare a project](#) and check the chosen load case and extracted results.

Open the required load combination's **Std Reactions Plan** or **Reactions Plan**. For punching shear, use the engineer's intended ULS/strength case. With that plan active, open **View > Visible Objects**, then select **Mesh Input**. Use the screenshot and the checklist on the next page to show the geometry and its property labels.



User-supplied RAM Concept screenshot: Visible Objects for the Std Reactions Plan, Mesh Input tab. The selections show the slab, beam and opening properties and below-column dimensions.

This screenshot shows Mesh Input only. It does not show the Element or reaction-plot settings. Walls are unticked here; their actual footprints must still be included on **Element**. Include the relevant above/below members for your model rather than assuming the shown column selection suits every job.

Layers and labels to include

Where to look	Show these items	Purpose
Mesh Input: Slab Areas	Slab Areas, Thicknesses, Elevations, Concrete Mixes, Priorities	Slab boundary and zones, depth, top-of-concrete level, grade and governing overlapping region.
Mesh Input: Beams, if present	Beams, Dimensions, Elevations, Concrete Mixes, Priorities	Beam footprint and size; retain its centreline as well.
Mesh Input: Slab Openings, if present	Slab Openings, Numbers, Priorities	Opening boundaries and identifiers, including openings near columns.
Mesh Input: Columns	Relevant Columns Below and/or Columns Above , plus Dimensions	Size labels attached to the correct column footprint.
Element	Column and wall footprints for the relevant above/below members	Support geometry; later opening checks need Element-layer column outlines. A mesh of slab triangles alone is insufficient.
Reaction plot	Vertical reactions Fz , moments Mr and Ms where applicable, centre symbols and local R/S axes	Loads, column centres and reaction orientation for the chosen case.
User Lines: construction joints (CJs) and pour strips	Dashed User Lines modelled on the Reactions layer in RAM , visible on the active reactions plan	Enables the software to pick up CJs and pour strips. Turn User Lines on; they are off in the supplied screenshot.

For slab regions, check that the plan shows thickness (**t=**), elevation (**TOC=**), concrete grade and priority. Include elevations for every region on a stepped slab, including regions whose true elevation is zero. Missing elevations can prevent correct step and soffit geometry. A missing grade may prompt for manual entry; a single replacement value is not a substitute for different grades in different zones.

Use **View > Plot** to review the reaction display. Check that needed force and moment values are not hidden by component choices or filtering. **A missing Mr or Ms label can be read as zero by the importer.** Do not omit a nonzero moment to simplify the picture. Retain the reaction signs, local axes and original label positions.

Export and check the file

1. Confirm the plan's load-case name and that the model results represent the current design. Check a column, an opening and each depth change on screen. Check that all **CJs and pour strips are modelled as dashed lines on RAM's Reactions layer** and visible in the export; lines drawn only on another layer will not be picked up by the software.
2. Choose **File > Export Drawing**, select **DXF**, and save a clearly identified export. Choose file units deliberately: use **millimetres** for a metric export, with reaction values in **kN** and moments in **kNm**. For a US export, keep its imperial geometry and result units consistent; the app converts its working copy. Do not scale or relabel it by hand.
3. Keep RAM's normal object colours, layers and text. Do not flatten the export to an image, move property labels, explode text or recolour it to make a presentation drawing. The importer uses the original geometry and labels.
4. Retain the original and load a working copy into Slab Automation. After Phase 1, compare the extracted columns, reactions, dimensions, slab depths and openings with the RAM model. Investigate unexpected zeros and missing members before calculating or drafting.

The exported drawing should contain **RAM_Concept_Mesh_Input**, **RAM_Concept_Element** and **RAM_Concept_Plot_Overlay** with actual geometry and labels. These are DXF layer names, not extra checkboxes in RAM. An empty layer, or passing the app's Mesh Input check, does not prove the export is complete. A deliberate no-column-reaction job uses the separate drafting-only route.

Exported layer reference

Use this table when checking an incomplete export with the person preparing the RAM model. Colour numbers are CAD colour indices used by the importer. Preserve the native export instead of manually redrawing or recolouring missing items.

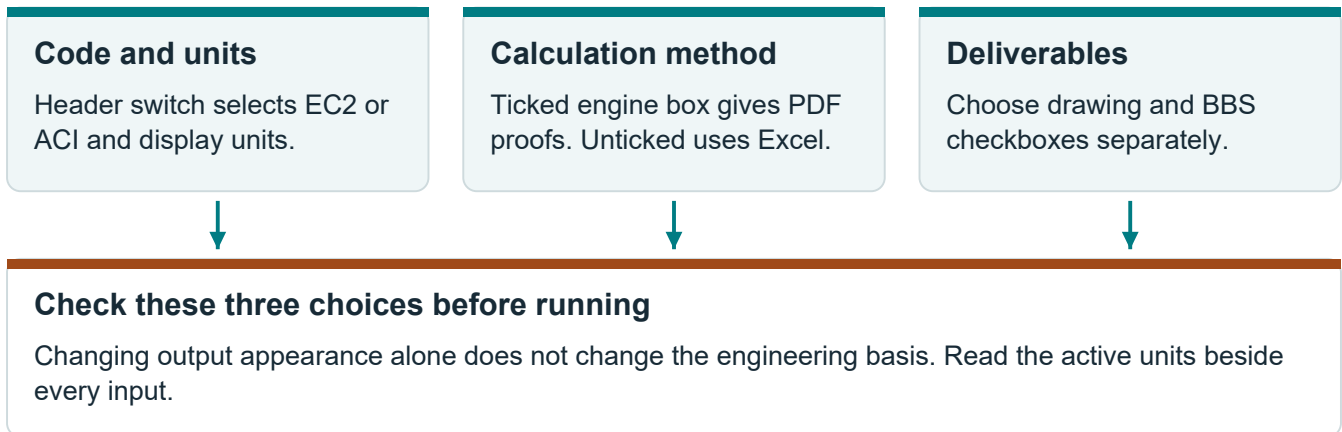
DXF layer name	Expected content in the native export
RAM_Concept_Mesh_Input	Slab-region outlines and property labels: colour 150 . Column dimension labels: 3 . Opening outlines: 9 , with their identifiers. Beam outlines, centrelines and width/depth labels: 81 , where beams exist.
RAM_Concept_Element	Column and wall outlines: colour 3 . Include circular outlines for round columns.
RAM_Concept_Plot_Overlay	Reaction text and column-centre circles: colour 1 . Keep the related R/S axis information.

For example, a metric slab-region label might show **t=250**, **TOC=0**, **C32/40**, **Priority=1** on separate lines. Column dimensions appear as **b=** and **d=**, or a diameter; beam dimensions appear as width by depth. These examples explain the expected labels, not design values to copy into a job.

Prepare a project

Use the RAM Concept reactions export for the correct project, level, slab and load case, with mesh input included. **Before browsing, put a working copy in the project folder and retain the supplied original separately.** Selection can rename the working file and convert its coordinates in place, before a phase runs. The selected folder becomes the project folder for outputs.

For a manually exported drawing, first follow [Prepare the RAM Concept export](#). That chapter shows the RAM screenshot and the required layers, property labels and reaction values.



Choose the source and the correct route

Choose the source file

In **Pipeline**, use **Browse** beside **REACTIONS DXF / RAM MODEL**. You can choose a reactions **.dxf**, a RAM export **.dwg**, or a RAM Concept **.cpt** model. A DXF is ready for the phase preflight after selection. A DWG is converted to DXF; wait for conversion and confirm that the path field now points to the generated **Reactions.dxf**. For a **.cpt** model, the application opens RAM Concept to list its load combinations and loadings. Choose the load case intended for the punching design, let extraction finish, and confirm the generated **Reactions.dxf** in the path field. The load-case dialog says ULS/strength combinations are the usual punching shear choice, but the project design basis governs your selection. After either conversion, start the run once the generated DXF has been adopted.

The application uses **Reactions.dxf** as its standard project input. It may rename the selected DXF to that name, so the old filename disappears. An imperial input is converted to metric working coordinates in place, with the original retained under **_original_imperial**. Use the main project **Reactions.dxf** for the pipeline, not that backup. If competing reaction inputs cause a conflict, resolve it before continuing. Browse also checks units and fills project information where possible; verify every suggested value.

If a **.cpt** cannot be read, confirm that RAM Concept is installed, licensed and able to open that model. If a DWG conversion fails, open **Settings** and check the **ODA File Converter** status and configured path, or use a sound DXF export. Do not start Phase 1 with a guessed or partial conversion. A warning about missing **Mesh Input** means the export lacks geometry needed by extraction and drafting; re-export it from RAM Concept with mesh input included.

Complete the project setup

Enter **PROJECT NAME**, **PROJECT NUMBER**, **LEVEL** and **CLIENT** in the top bar. Project Number and Level are required for drawing notes and BBS file names; make them match the issue records. Select **Suspended** or **Ground** under **SLAB TYPE**. This choice changes the drafting route, so set it from the actual structural system.

Check **TOP COVER**, **BTM COVER** and **SIDE COVER**; their metric starting value of 30 is not a design recommendation. Read the displayed units before entering values. **DEAD LOAD** is the superimposed dead area load, excluding slab self-weight; **LIVE LOAD** is the live area load. The units are kN/m² in metric mode and psf in US mode. For the EC2 slab-load deduction, enter unfactored surcharges: the calculation adds self-weight and applies combination factors. Check these in the proof. The entries are not column reactions. They start blank but a .cpt extraction may fill them; verify the values before Phase 2.

The project folder may already contain a **Shear Summary Sheet.xlsx** or completed calculation package. In that case, the application can offer to skip completed phases. Accept only after confirming those files belong to this model, design code and level. Then use the **Run** button on the newly enabled Phase 2 or Phase 3 panel. **RUN ALL PHASES starts again from Phase 1** in an ordinary reaction-based job, even after you accepted a skip. Reusing another job's outputs would give later phases the wrong basis. If you change the source after a previous run, begin again from the earliest affected phase.

Choose the calculation and drawing scope

Under **PHASE 1: EXTRACTION**, **Lock existing shear details** is for retaining an existing detail set and brings its own selection step. It forces the Excel calculation route. **Force $\beta = 1$** changes the punching shear factor used by the calculation; use it only when that assumption is justified for the job. Leave both off unless the project calls for them.

Under **PHASE 2: SHEAR CALCS**, **Appendix B** requests that additional output. **Python calc engine (PDF proofs, no Excel)** is selected by default. Untick it for Excel calculation workbooks.

The deduction selector applies to the **Python EC2 route**. **Deduct slab loads inside u2..u,out** is its starting basis. **Deduct ground reaction (raft, cl. 6.4.4(2))** enables the net ground pressure entry. Enter the engineer's net ULS upward pressure in the displayed units; the implementation applies no further factor to it and subtracts factored raft self-weight separately. Check the deduction in the proof. Do not assume this selector changes Excel or ACI calculations. **MAX LINK ZONE** is an **EC2** cap measured from the column face to the last permitted link ring; **0** switches it off.

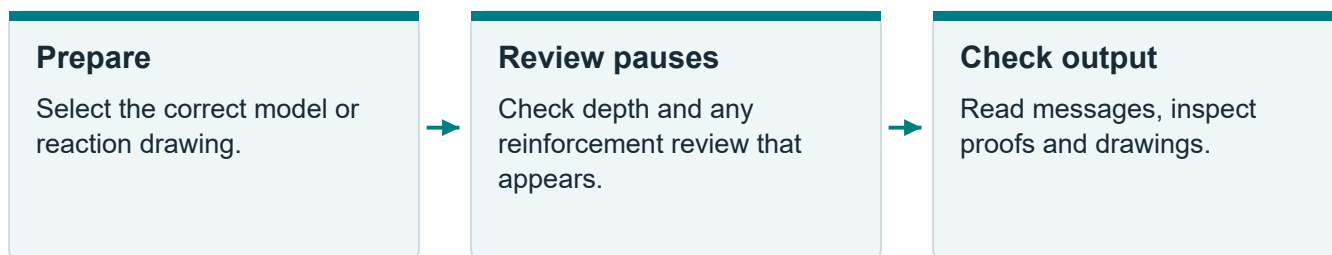
Under **PHASE 3: DRAFTING OUTPUTS**, choose **Shear Drafting**, **Top Reo Drafting** and **Bottom Reo Drafting** as needed. The adjacent **Shear BBS**, **Top Reo BBS** and **Bottom Reo BBS** boxes are separate: selecting a drawing alone does not request its schedule. **BBS Format** offers **Image Based** and **BS 8666**. **Prepared by** is the initials used in the schedule metadata. **BBS Scope** offers **Single schedule (flat)** or **Per-pour schedules**; the latter opens a pour-region review during Phase 3. In US mode, an additional **US bend-type table (ACI 315)** choice appears. Choose the outputs to be reviewed and issued, then check the reinforcing settings in [Reo Parameters](#).

Drafting with no column reactions: Select **No column reactions (drafting only)** only where the model is expected to carry slab geometry but no column reactions, such as the example of a precast structure over an RC slab. It skips Phases 1 and 2 and disables Shear Drafting. If reactions should exist but are absent, correct the RAM export instead.

Run extraction calculations and drafting

Run the phases after the source, project details, calculation basis and required outputs have been checked.

RUN ALL PHASES validates the setup and runs Phase 1, then Phase 2, then Phase 3. Alternatively, use the **Run** button in each phase panel to inspect its result before starting the next phase. Each panel shows live progress and a log. A successful phase unlocks the next one.



A pause requests your input. It is not a frozen application.

Read the dialog, complete the review, then use its continue or save control.

Review the engineering decision points between phases

Phase 1: extract reactions and geometry

1. Confirm that the source field points to the intended **Reactions.dxf**, then start **Phase 1 - Reactions Extraction** or **RUN ALL PHASES**.
2. Respond to any upstand review or missing-input prompts. If asked for concrete strength, enter the specified grade (for example, C32/40); enter slab thickness in the unit stated by the dialog. A missing answer can leave later calculations inaccurate.
3. Read the log for the column count, openings, warnings and completed outputs. Inspect **Shear Summary Sheet.xlsx** and the annotated reactions PDF in the project folder. Confirm that column positions, classifications, openings, depths and reaction values make sense against the RAM model.

The phase stages a working copy, finds the slab and columns, detects openings, then copies its outputs back to the project folder. If it reports no reactions, the dialog asks whether that absence is expected. Accept drafting-only mode only for a genuine no-column-reaction job. Otherwise, re-export the reactions plot from RAM Concept and run extraction again. If the log says mesh input is missing, include **Mesh Input** in the export before retrying.

Phase 2: calculate punching shear

1. Start **Phase 2 - Shear Calcs** after Phase 1 succeeds, or let **RUN ALL PHASES** continue. Check that the header still shows the required code/unit route and that the Phase 2 options reflect the job basis.

2. Follow any **Punching shear depth review** window if it appears. It is conditional: the run may flag averaged or stepped depths, high reinforcement demand or a failed face check. Examine the named columns and their depth and reinforcement status against the model. The window permits changes to **P/A**, **New Punching Shear Depth (mm)** and their application to selected columns or all high-reinforcement columns. Choose **Re-run calculations with new parameters** only after deciding that the revised inputs are justified; **Continue without changes** retains the current values. A face-check failure cannot be repaired by merely adding reinforcement.
3. After completion, review the updated shear summary and the calculation proofs. Check governing columns, demand and capacity, reinforcement requirements and whether equivalent details were grouped appropriately. The run also refreshes the annotated reactions plan. The exact calculation package differs between EC2 and ACI modes.

The default Python engine writes PDF proofs; the alternative Excel engine uses calculation workbooks. For completed Python results, use **Manual Punching Shear Editor**. Its EC2 and ACI controls differ: follow [Review and amend punching shear calculations](#). **Rebuild Appendix B (starts Excel)** is a separate action. There is no routine manual-reinforcement pause in Phase 2.

A complete run is not a design sign-off. Keep the input model, selected code, covers and load basis with the calculation package so another checker can reproduce the decisions.

Phase 3: draft the chosen outputs

1. Check the **Shear Drafting**, **Top Reo Drafting** and **Bottom Reo Drafting** selections and the separate BBS boxes. Confirm schedule format and scope before starting **Phase 3 - Drafting**.
2. Complete the reviews requested for the selected outputs. Check lift-pit compartment divisions, upstand and beam-intersection treatment, loose-bar zone boundaries and assignments, or pour regions as applicable. A per-pour schedule invokes the pour-region review. Before choosing **Skip**, read that dialog's description of the stored regions or defaults it will use; do not treat Skip as approval of unchecked geometry. **Cancel** can abort drafting. Reo Parameters explains zone choices; the schedule chapter explains per-pour review.
3. Wait for the selected drafting paths to finish and read the Phase 3 log. Several outputs can be drafted at the same time. A failure in one path does not prove that the other paths were discarded: check the log and **Drawings** folder before retrying.
4. Open the finished DXFs and schedules in the project **Drawings** folder. Check slab boundaries, openings, levels, bars, shear details, marks, notes and cover-related geometry. Reconcile BBS quantities and shapes with the drawings. The application runs a final DXF audit, but the engineering and issue checks remain yours.

Phase 3 normally expects Phase 2 results. If those results are absent, it asks whether to continue; that prompt exists because empty bar groups or shear details could otherwise pass unnoticed. For a genuine no-reaction job, use the **No column reactions (drafting only)** setup option: it runs Phase 3 alone and keeps shear drafting off. Where reactions and checks were expected, finish the earlier phases instead.

Recover a stopped run

Read the failing phase's log, correct the named cause and rerun that phase. Follow [Troubleshooting and file reference](#) for missing inputs, conversion and locked files. After a partial run, a file's presence alone does not prove success: match its modification time and contents to the completed steps in the log.

Review and amend punching shear calculations

The punching shear calculation is an engineering result to review, even when the run reports completion. Check the reaction plan, the summary workbook and the calculation proofs together. In particular, confirm that each column is in the right position, has the intended reaction and slab depth, and is classified correctly at edges and openings. A finished calculation can still contain an engineering failure or an input that needs correction.

Review during Phase 2

Phase 2 uses **Shear Summary Sheet.xlsx** to calculate column checks. It may stop at **Punching shear depth review** for averaged or stepped depths, high reinforcement or a face check failure. The window identifies the columns and their present depth and reinforcement status. **P/A** means prestress force divided by concrete area: the compressive stress input in each direction. Check the values and units before editing. The window also offers **New Punching Shear Depth (mm)**. Apply changes to selected columns or, where offered, all high-reinforcement columns.

1. Read why each column was flagged. Compare the proposed depth with the actual slab geometry and check the source reaction and opening arrangement.
2. Make only the changes supported by the design information for the job. A face check failure needs separate attention; increasing reinforcement does not resolve it.
3. Choose **Re-run calculations with new parameters** if you changed inputs, or **Continue without changes** if the present inputs are correct. Then read the Phase 2 result and any warnings.

The separate **Manual Punching Shear Editor** described below is available after the Python calculation run. It is not the conditional Phase 2 review window. The older manual reinforcement review described in some historical project notes is not a current Pipeline step.

Open a finished calculation

On **Pipeline**, click **Manual Punching Shear Editor** for the current job. To work on another completed job, click **Open finished folder...** and select its project folder. That folder needs its Reactions DXF, **Shear Summary Sheet.xlsx**, and Python calculation records. Finish running phases first. The header's code selection determines which editor opens: EC2 input review or **Manual ACI Load and Moment Editor**. The Excel route uses the calculation workbook as its edit surface.

Edit EC2 calculation inputs

The left plan shows columns. Click one, or type a column or shear detail reference such as C13 or SD.4 in **Search** and press Enter. The **All**, **Overridden**, **Stale**, **Not-valid**, **Face-fail**, and **High-REO** filters help narrow the plan. Read the selected column's inputs, verdict, drawing and proof before changing a value. The plot and displayed result respond as you type, but a live preview is not a saved or regenerated proof.

Inputs include concrete grade, link bar size, prestress **P/A** in two directions and its factor, beta, column reaction, superimposed dead and live area loads, slab thickness, cover, and flexural bar. Ring deduction controls include load factors, the slab-load or ground-reaction basis, and net ultimate ground pressure. **More inputs** exposes less common material, link, angle and post-tensioning entries. Column geometry and openings appear for reference and cannot be edited here. Read each field's units. These controls belong to the EC2 editor; the ACI editor below has different inputs.

Top steel has **Auto** and **Manual** modes. Auto shows the calculated top steel and associated bar value as unavailable for entry. Manual enables the top steel values in the two directions and the flexural bar. Change the mode deliberately; a manual value is an engineering override. **Note (prints in the calc proof)** lets you record the reason for the change where a reviewer will see it.

Save and regenerate EC2 results

1. Select the column and amend its inputs. Use **Undo (Ctrl+Z)** or **Redo (Ctrl+Y)** for a completed field edit. **Esc** reverts unsaved edits on the current column.
2. Click **Save column (Ctrl+S)** if you want to store the override before calculation. The column becomes **Stale**. Its current PDF and calculation still show the previous result.
3. Click **Regenerate changed (n)** to recalculate saved stale columns. If the current column still has pending edits, click **Apply & regenerate (n)** to save them and perform the regeneration in one action. The number shows how many stale columns are queued.
4. Read the status message, reopen the affected proofs, and check the verdict, reinforcement, detail grouping and notes against the revised input. Inspect the updated **Shear Summary Sheet.xlsx** and annotated plan as part of the same review.
5. Update the affected Phase 3 drawings and schedules before issue. Regeneration can update calculation records and individual details while leaving packed drawing sheets, top reinforcement or a BBS out of date, even if detail numbers stay the same. If regrouping changes detail numbers, rerun **Shear Drafting** and **Top Reo** in particular.

The **also apply to the other columns of this SD** box extends the current edit to sibling columns in the same shear detail when you Save or Apply & regenerate. Check those columns before using it. **Clear overrides** removes saved overrides for the selected target column or columns; regenerate afterwards if the proofs need to reflect the restored values. When you change columns or close with unsaved edits, **Yes** saves, **No** discards and **Cancel** keeps you in the editor. **Ctrl+F** focuses Search, **Ctrl+Left/Right** steps between visible columns, **Ctrl+M** toggles top steel mode and **Ctrl+Enter** applies and regenerates.

REACTIONS STALE means the Reactions DXF beside the workbook no longer agrees with the reactions on which the calculations were run. This is different from a column marked Stale because of a saved override. Investigate the drawing and workbook before confirming workbook values or issuing results; a changed source may require rerunning earlier phases.

Edit ACI loads and moments

On a Python ACI job, **Manual Punching Shear Editor** opens **Manual ACI Load and Moment Editor**. It checks source loads for one original column. It does not provide the EC2 material, top-steel or multi-column controls described above.

1. Click the intended original column on the plan. Read the **Original** and **Current check** columns in the input panel.
2. Amend **Factored reaction V_u / F_z** , **Signed M_r at column centre** and/or **Signed M_s at column centre** as justified. Use the displayed units: kip and ft-kip for inch-pound sheets, or kN and kNm for metric sheets. Moments are signed in RAM's column r/s axes at the column centre. The app applies ACI orientation and centroid transfer; do not pre-transform them a second time.
3. Enter **Reason for manual check**. A changed load check requires a reason. If the signed column orientation is unavailable, the app refuses a moment override; resolve the source information instead of guessing a sign.
4. Click **Save and Recalculate**, wait for the result and inspect the proof and status. A preview is not a published check. **CHECK FAILED** or **Saved override needs recalculation** means the result still needs attention.
5. To remove that column's override, click **Reset to Original**. It clears the override and recalculates the original inputs through the normal app route. Check completion again.

Complete or deliberately discard the current work before selecting another column. If the summary or reactions file changes while this window is open, close and reopen it as instructed. After recalculation, review dependent drawings, schedules and any generated appendix before issue; use the result message to identify work still needing regeneration.

For the complete source-to-output sequence, see [Prepare a project](#) and [Run extraction calculations and drafting](#). For a drawing or BBS changed after a calculation edit, see [Update and issue bar bending schedules](#).

Set reinforcement parameters

The **Reo Parameters** tab holds drawing and scheduling choices used by Phase 3, plus some calculation properties. Review them against the current design. A **mat** is a reinforcement layer; **loose bars** are individual scheduled bars rather than welded mesh; a **zone** is an area with its own reinforcement choice. Orange sections concern bottom reinforcement, teal concern top reinforcement. Displayed defaults are starting values, not automatically suitable for the slab.

The header's **METRIC (UK/EU)** or **US / IMPERIAL** choice changes the displayed sizes and dimensions here as well as the calculation code. Enter values in the units printed on the controls. A combined entry such as **H12.200** denotes a 12 mm bar at 200 mm spacing in the metric display; a loose-bar combination box accepts a listed option or a custom size and spacing in the same form. Check both parts rather than interpreting it as a single length.

Slab design and mat form

RC slab (no post-tensioning) marks the job as reinforced concrete, selects RC tendon type, and initially selects scheduled loose bars for both mats. It also zeroes precompression in the punching calculations. The mat selections remain editable, so verify them after ticking RC. In metric mode, **Add top mesh (metric only)** can retain welded top mesh alongside loose top bars; this option is hidden in US mode.

Slab Tendon Type offers unbonded PT, bonded PT and RC. On the US/ACI route it changes how far the drafted support bars extend into the span; the metric bar-group route is unaffected. In the US-only **ACI Punching Shear** section, **Link Type** selects single-leg or open double-leg links for drawing and schedule presentation. **Opening Rule** defaults to measured openings, using actual opening polygons and the slab boundary; the template option follows the idealised workbook model. Measured mode needs the Python engine and currently applies to axis-aligned column frames. **Metric (SI) calc sheets** changes the issued ACI sheet units; unticked uses inch-pound sheets. Check the resulting calculations and details.

Under **BOTTOM MAT MODE**, the loose-bar box replaces the welded mesh symbol with scheduled discrete bars. **B1** and **B2** set X-running and Y-running size/spacing. Under **TOP MAT MODE**, scheduled loose top bars replace the top mesh symbol; **T1** and **T2** are slab-wide overrides when saved top zones are not supplying the layout. **min reo** leaves the top-bar choice to the per-zone minimum reinforcement calculation. Each face has a **Zones...** button for a polygon-based review of areas needing different bars or spacing. Blank bottom-zone assignments use the general B1/B2 values. Where saved top zones are used, blank top-zone assignments use the calculated per-zone minimum, rather than the general T1/T2 override. Enter explicit values in those top zones when a fixed size and spacing is required. Check zone boundaries against the actual slab and openings before Phase 3.

Edges, beams and local details

Zones... needs the relevant loose-bar mode to be enabled and slab geometry to be available for this project. If it is greyed, complete the earlier extraction/setup and use the zone review offered during drafting.

The **BOTTOM EDGE BARS** selector chooses **U** or **L** bars. The column and typical rows distinguish bar diameters and leg dimensions. If you choose bottom **L**, the **TOP EDGE BARS (L-BARS)** section becomes available; top edge bars are L-bars only. Its through-slab cog is calculated from slab depth and covers, while the horizontal leg and diameters are editable. **Stepped edge bars** have their own size and spacing and can be drawn where the slab has a stepped edge independently of ordinary top edge bars. Review these against the section detail, not just the plan outline.

BOTTOM BEAM LINKS defines link diameter, spacing and leg counts by beam-width band. The shipped metric entries begin at H12 at 200 mm, with 2, 4, 6 and 8 legs in successively wider bands; those values need project review. **BOTTOM BEAM BARS** and **TOP BEAM BARS** each have bar size and spacing. A size of **0** means the application selects the size from beam depth; enter a size when the design calls for an explicit one. **TOP BEAM TRANSVERSE BARS** controls their size, spacing and L-bar horizontal leg. Compare all beam settings with the beam widths and depths in the model and the reinforcement design.

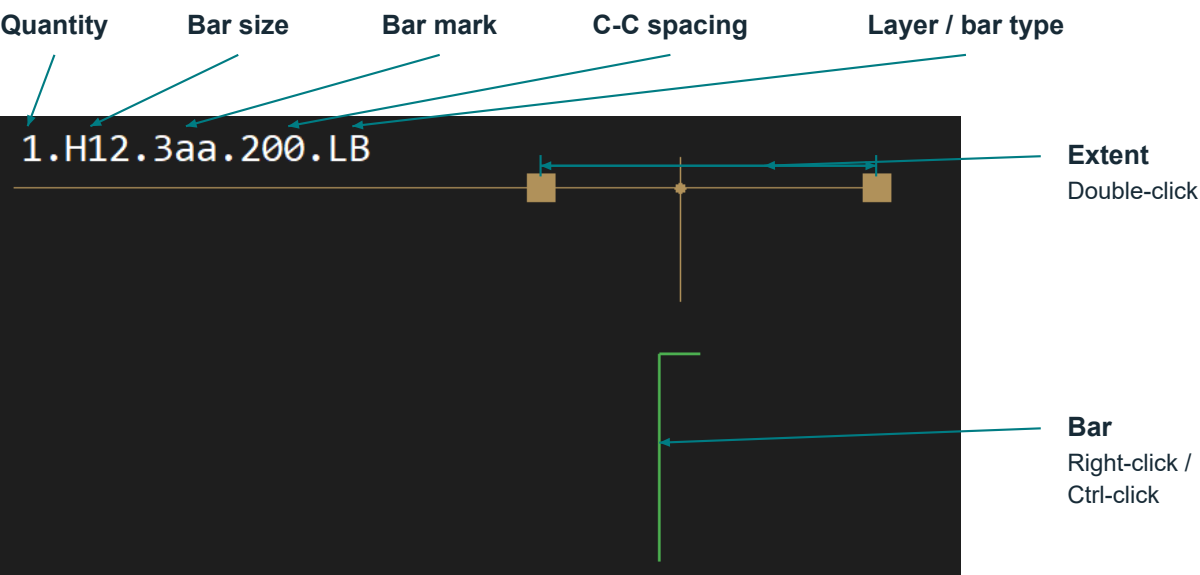
The local-feature group includes **TOP STEP-BAR LACERS** and **BOTTOM STEP-BAR LACERS**, each with an enable control, diameter and spacing. The application derives the number of rows from the step-bar long leg and the spacing. **PULL-OUT BARS AT CORES** is off initially; enabling it exposes size/spacing for pull-outs and the associated top core-wall L-bar and long leg. **LIFT PIT PERIMETER BARS** controls bars at the pit wall top and the bottom U/L form. The **UPSTAND BARS** section controls vertical and lacer sizes, spacing and dimension thresholds for alternative upstand arrangements. Review these local details wherever the model has steps, cores, pits or upstands.

Apply and retain choices

The live values on this tab are used when you run the phases; you do not need to press **Set as defaults** for the current job. That button saves the displayed Reo Parameters values as starting values for future jobs on this installation. **Restore factory defaults** returns the shipped starting set. Neither button certifies that the resulting reinforcement is adequate. After changing parameters, run the affected drafting phase and review both the DXF and BBS. If a run was already issued and you subsequently alter the drawing in CAD, use the drawing-edit and BBS Re-link workflow so the schedule follows the final geometry.

Edit reinforcement drawings

Use **Delimiter Editor** after drafting to remove incorrect bars, adjust reinforcement and add required bars. An *assembly* comprises a bar, its callout, extent, delimiters and connecting lines. Saving changes the drawing; **BBS Re-link** updates its separate schedule.



User-supplied assembly with labelled callout fields, extent and bar. C-C = centre-to-centre.

Open and navigate the drawing

1. Keep the previous issued drawing and matching BBS as your recovery baseline.
2. In **Delimiter Editor**, **Browse** to the finished top or bottom DXF/DWG and click **LAUNCH EDITOR**.
3. Scroll to zoom; middle-button drag to pan. Click an assembly and confirm its highlight before editing. Click empty space to deselect.

Make common edits

Task	Action
Move annotation	Select the assembly and drag the intended element.
Change size or spacing	Use BAR SIZE / SPACING , or enter a custom value and click Apply .
Delete	Select the assembly; click Delete Selected .
Add	Click ADD BAR , choose the matching shape template, then click to place. Tab rotates; Shift-click repeats; Esc cancels.
Copy within Delimiter Editor only	Select, Ctrl+C , Ctrl+V , then click to place. Some details offer Copy entire bar group detail by right-click.

Check geometry, callout and extent after editing. **Undo/Redo** operates since the last save. **Reset Selected** restores the selected assembly to its opening state and clears the entire Undo history.

Do not copy assemblies in AutoCAD. Duplicate them in Delimiter Editor; move them to production drawings using the software's Transfer to Production Drawing workflow.

Save the drawing, then re-link its schedule

1. Review changed areas and click **SAVE**. Choose **Yes** for revision clouds, **No** without clouds, or **Cancel** to stop saving.
2. **Save As...** creates a separate DXF; **it does not retarget SAVE**. Close and reopen that DXF before editing the new copy.
3. Run **BBS Re-link** using the saved drawing and its **matching existing workbook**. Check changed, added and removed marks before issue.

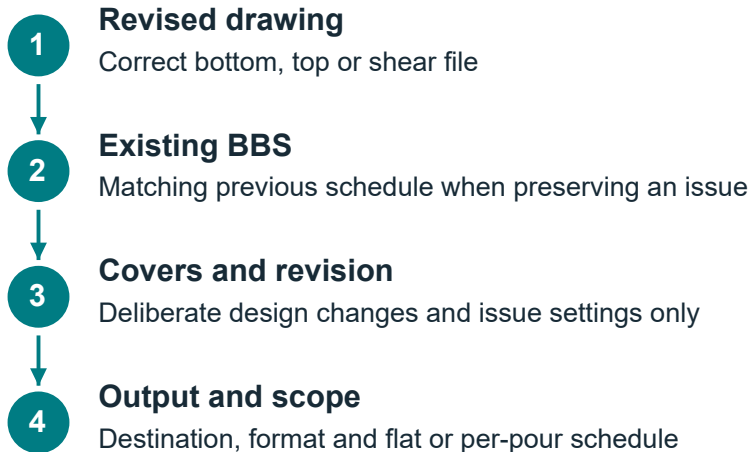
SAVE overwrites the loaded DXF; for a loaded DWG, it converts the edited temporary DXF back over that original DWG. **Save As...** creates no DWG. Successful saves clear Undo history. A partial-save warning requires checking the saved drawing because some assemblies may already have saved.

Editor clouds cover this session's modified/deleted assemblies. BBS revision stamps and Change / Merge clouds are separate; see [Manage design changes](#).

Update and issue bar bending schedules

Use **BBS Re-link** after drawing edits to update the corresponding bar bending schedule (BBS). Select drawings and workbooks for the same face and level; bottom, top and shear inputs can be processed together. **Do not copy assemblies in AutoCAD or use copy/paste to transfer them to production.** Duplicate in Delimiter Editor and use the software's production transfer controls.

BBS RE-LINK / INPUT CHECK



RUN BBS RE-LINK > read saved paths > check drawing and schedule

Drawing, existing schedule and output choices for BBS Re-link.

Prepare the inputs

1. Preserve the previously issued drawing and workbook in the job's issue record. An existing workbook selected here is updated at that path; ordinary BBS Re-link does **not** create an automatic before-copy.
2. Open **BBS Re-link**. Browse to the revised bottom drawing, top drawing or shear detail sheets you need to update. Leave unused rows blank. You can select several files together; the app routes recognisable bottom, top and shear names to their inputs. Verify each populated row before running.
3. Set **OUTPUT FOLDER** for fresh schedules and accompanying output. The suggested location is a neighbouring **BBS** folder if one exists, otherwise the drawing's folder. The selected existing workbook path controls where an existing schedule is updated.
4. For an existing bottom or top schedule, choose **EXISTING BOTTOM BBS EXCEL** or **EXISTING TOP BBS EXCEL** as appropriate. Leave the field blank to make a fresh workbook. If a filled path does not exist, the app stops and asks you to correct or clear it.
5. Check the optional shear BBS field if shear details are included. When left blank, the shear route looks for a schedule beside the supplied shear drawing. Verify the workbook the run actually reports.

The bottom and top fields are independent: a top drawing should never be paired with a bottom workbook just because both are in the same folder. A blank existing bottom/top workbook field still allows the drawing's existing marks to be retained, but the output is a new BBS rather than a comparison with a prior workbook. Keep the old workbook available if you need to see which rows changed.

Choose format, scope, covers and revision

Select **Image Based** or **BS 8666** for the schedule presentation required by the job. Under scope, **Auto (match existing BBS)** follows the selected workbook's arrangement for each face. With no existing workbook, Auto makes a single flat schedule. **Single schedule (flat)** puts the items in one schedule; **Per-pour schedules** separates the workbook by pour. If an explicit choice conflicts with the selected workbook, the app asks before changing its arrangement. Read the proposed conversion and use **Cancel** if it is not the intended issue format.

Per-pour scheduling needs pour regions in the drawing's stored slab geometry. If they are missing, the app opens a region review before processing either selected face. Draw or adjust the regions and use **Save & Continue** when the division is correct. **Skip (use stored regions)** works only when regions already exist; **Cancel run** stops the update. Check bars spanning construction joints or pour strips in the finished worksheets, because the schedule allocates their quantities by the defined regions.

The covers card can load values from the drawing. **Adjust covers and bent bar depths** changes the selected drawing cover data and through-depth dimensions on relevant bent bars before the BBS is written. Leave it unticked when the intention is only to refresh marks or quantities. If covers have changed, confirm bottom, top and side values against the detail, tick the adjustment deliberately, then review the affected shapes and dimensions in both drawing and schedule.

Tick **Revision mode** and enter the intended revision, such as **P02**, for a formal reissue. A blank revision field stops a revision-mode run. This tab preserves existing marks where possible, stamps changed BBS rows in column T and can retain placeholders for removed marks when it has an existing workbook to compare. It is an ordinary re-link with a revision stamp; it does not produce the geometry comparison or red/green clouds of **Change / Merge**. If the slab outline, openings or other geometry changed, follow that workflow instead.

Run and inspect the result

1. Close the workbook and drawing in programs that may lock them. Check the input paths, output format, schedule scope, cover option and revision entry.
2. Click **RUN BBS RE-LINK**. Complete any scope or pour-region review that opens. Watch the run log until it reports completion or a clear failure.
3. Read the actual saved paths in the log. A DXF input produces a new drawing beside the input: a numbered **Btm step** advances to the next step, while other bottom or top names commonly receive **_Updated**. A DWG input is converted for processing and written back over the selected DWG.
4. Open the resulting drawing and BBS together. Check marks, shapes, dimensions, quantities, units, revision and any removed-item rows. Verify the changed drawing is the one you intend to issue.

If the selected existing workbook is open or locked, the save guard offers a retry. If it cannot publish to that path, it may write a timestamped workbook beside the target. The log tells you the actual filename; do not assume the original workbook was updated. For a fresh bottom or top BBS, look in **OUTPUT FOLDER** for the reported workbook. Shear schedule handling is separate, so check its reported path as well.

PRINT BBS TO PDF (A4) is a separate action. It uses the workbook paths currently in the existing bottom/top BBS fields, or opens a workbook picker if neither is set, and writes a same-name PDF beside each selected workbook. After a new BBS is created, select that new workbook for PDF printing. The ordinary re-link button does not itself guarantee a PDF. Check the printed pages for cropping, legibility, totals and revision before sending them for issue.

Read the Image Based schedule

In the Image Based workbook layout, data normally begins on row 5. Read the row as a complete bar record; changing a visible cell alone does not change the drawing geometry.

Column	Meaning
B	Bar mark that identifies the scheduled bar.
D to I	Shape dimensions L1 to L6, read with the shape illustration.
K	Bar size.
N	Number of repeated items or arrangements.
O	Bars per item. Read N and O together when checking the total.
T	Revision string applied to changed rows.

Use the headings and units in the issued workbook, especially after changing format or converting to US units. Check the schedule's shape sketch against the actual bar, then compare the mark, dimensions and quantities to the drawing.

Transfer to production drawings

Use the software for transfer: assemblies must not be copied in AutoCAD into production drawings. Transfer aligns reinforcement and preserves scheduling links. **It overwrites the destination DWG**; retain the previous issued DWG and matching BBS.

Normally, edit and re-link the pipeline result first. **Auto-transfer after Phase 3** can transfer immediately; transfer again after subsequent source edits.

Source drawing



Production drawing



The red reference cross and stored geometry locate the reinforcement after transfer.

Source reinforcement is aligned to the destination slab using the drawing reference.

Select the source and destination

In the **Pipeline** tab's **TRANSFER TO PRODUCTION DRAWING** card:

1. Tick **Auto-transfer after Phase 3** and supply production top/bottom DWGs, or tick **Transfer to Production DWG (from pipeline or a similar floor)** for on-demand buttons.
2. Set **production DWG** to this level's destination. Confirm each face; a combined picker routes recognised filenames automatically. Resolve any level/sheet mismatch banner.
3. Confirm **Source drawing**. Automatic lookup finds the latest pipeline drawing; **Browse** overrides it and **Reset** restores lookup. Sources need this app's stored slab geometry; redraft older sources lacking it.
4. Click **TRANSFER TOP NOW / TRANSFER BOTTOM NOW** for on-demand work. Follow alignment dialogs and check each face's logged result.
5. Inspect alignment, bars, details, titles and notes in the production DWG. Run **BBS Re-link** on that drawing with its matching existing BBS.

Keep the red **_SHADOW_GEO** cross on **Defpoints**, normally at the top-left slab vertex. It locates the transferred slab for later scheduling. Keep it with the reinforcement; never move or delete it separately. Transfer reads the source and changes the destination.

If the destination already contains reinforcement

The comparison dialog offers:

Choice	Effect
Cancel transfer	Stops this transfer.
Clear existing & proceed	Removes recognised reinforcement, including tagged manual additions and edits , then imports the source.
Keep & proceed (merge)	Keeps existing reinforcement and adds incoming work and geometry.

Before clearing, put every required production edit into the incoming source. A strong same-face match defaults to Clear; a weak/opposite-face match defaults to Cancel. Small existing sets may not trigger a prompt. Inspect for duplicates and omissions after transfer.

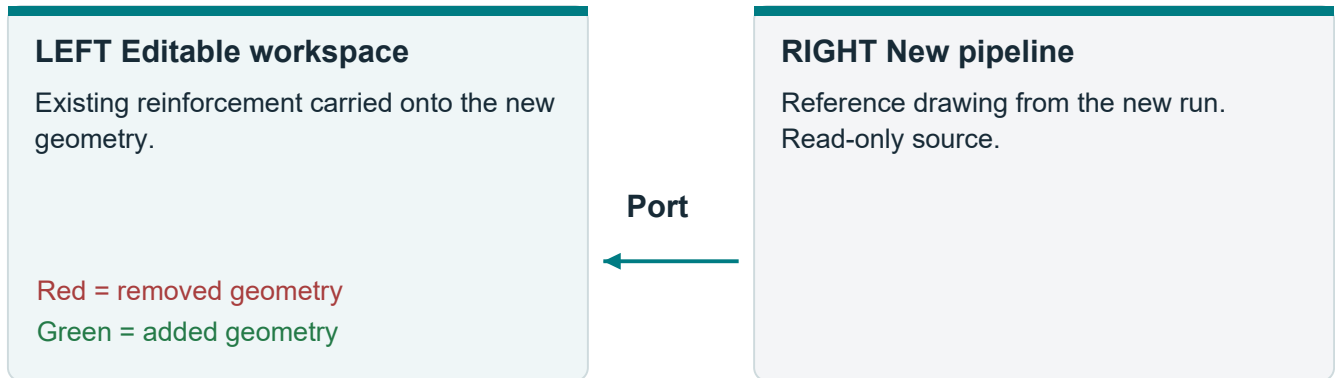
Reuse a finished similar floor

Choose the finished production DWG as **Source drawing** and this level's DWG as destination. Reinforcement, stored geometry and covers transfer; notes transfer only when the destination has none. The source's general arrangement reference, title block, sheet and revision clouds stay behind.

For this level's **new schedule**, run BBS Re-link with **existing BBS blank**; the source floor's workbook is not its baseline. Reuse requires equivalent layouts that can align, excluding mirrored/handed floors. Changed edges, openings, steps, columns or reinforcement require this level's Pipeline and **Change / Merge**. Review against this level's design.

Manage design changes

Use **Change / Merge** when the slab geometry has changed and you need to carry suitable reinforcement from an existing design into a new one. The new reactions and geometry must first pass through **Pipeline** Phases 1-3, producing fresh bottom and/or top reinforcement drawings. The workspace then shows the previous reinforcement against the new slab on the left and the new pipeline result on the right. You decide what existing work remains and which new bars to bring across.



Inspect changes > port selected bars > tidy > Finalise

Existing marks are retained; imported bars receive fresh final marks.

The editable old reinforcement and the new pipeline drawing sit side by side.

Prepare both design states

1. Preserve the previous issued drawing and schedule. Work from controlled copies: **Save Workspace** replaces the old DXF, while a DWG receives the saved result on Finalise or when a saved workspace is closed. **Finalise** also updates the automatically found BBS.
2. Run the new reaction drawing or model through **Pipeline** Phases 1-3 with the reviewed design settings. Inspect the new calculations and drafting before using the new drawing as a source.
3. Open **Change / Merge**. For bottom reinforcement, supply both **OLD PIPELINE DXF** and **NEW PIPELINE DXF**. For top reinforcement, supply both **OLD TOP DXF** and **NEW TOP DXF**. You may do bottom only, top only, or both; a lone old or new file for a face is rejected.
4. Check the automatically filled drawing paths. Browsing one old or new file can fill other fields from that folder, choosing the latest numbered drawing. Confirm face, level and design state for every row. This tab has no existing-BBS picker; prepare the old working folders as described below before proceeding.
5. Enter the intended **REVISION NUMBER**, such as **P02** or **C03**, then click **OPEN WORKSPACE**.

Slab geometry comes from each drawing or its matching saved geometry. If the new drawing has neither, rerun Phase 3 or restore its matching geometry. The comparison and BBS need the correct design state. The old side may be a production drawing; check that each field still identifies the intended reinforcement face.

At Finalise, the app searches beside the old drawing for an **.xlsx** workbook whose name contains **BOTTOM REO** or **TOP REO** for that face, or **BBS**. A generic BBS name can match either face. It can take the first matching workbook, without a picker; if none has a recognised filename, it creates a fresh schedule. Use a separate controlled old working folder for each face, containing its drawing, required companion data and **one intended matching schedule**. Keep archived schedules and other-face workbooks elsewhere. Verify the actual workbook path after Finalise.

Review and edit the workspace

The **left pane** is the editable old reinforcement placed over the new geometry. Red geometry indicates a removed portion and green geometry an added portion. The **right pane** is the new pipeline drawing and is read-only. Use it as a source of bars, not as the drawing to issue. When both faces are supplied, use the bottom/top selector and review each face separately.

Inspect the full plan, especially changed slab edges, openings, columns, steps and any reinforcement crossing a changed region. Select bars in the left pane to move or remove them; **Delete Selected** removes the selected workspace item. **Undo** and **Redo** are available for changes made since the last save. Right-click an appropriate bar in the right pane and choose **Port to workspace** to bring it into the editable drawing. For a complete grouped detail, use **Port entire bar group detail** when that action is shown. Check the new placement and its related annotation in the left pane after every port. A green bar does not by itself mean the engineering decision is correct; compare it to the calculation and new slab arrangement.

Change / Merge treats carried-forward and imported bars differently for scheduling: existing bars should keep their established marks, while ported bars receive new marks when finalised. Review near-identical old and new bars carefully so the workspace does not contain both. The schedule update is part of **Finalise**; saving the workspace drawing alone does not finish the revision.

Save and finalise each active face

1. Set or confirm **Revision** in the workspace toolbar. Inspect the active face and the changed locations one final time.
2. Click **Save Workspace** to retain the active left drawing and clear that face's Undo history. With a DXF input it writes over the old DXF; with a DWG it saves the temporary editing DXF. Finalise, or closing a saved workspace, then writes back over the original DWG. Deleted-bar locations last only for the current session, so finalise in that same session if automatic red deletion clouds are required.
3. Click **Finalise (Save + BBS)** for the active face when ready. It saves that workspace, runs the full BBS update, preserves existing marks where possible and assigns new marks to imported bars. It stamps changed workbook rows with the revision and records removed marks as placeholder rows when a previous schedule is available.
4. Read the result path and warnings. Finalise draws red clouds for deleted bars whose locations are still held in the session and green clouds for imported bars. Check the actual cloud coverage; reopening saved work does not recover the deleted-bar locations. If the old input was a DWG, the completed drawing is written back over that DWG.
5. If both faces are present, switch to the other face, review it and **Finalise** it separately. Then open each completed drawing and BBS and check marks, quantities, clouds and revision before issue.

Finalise uses the automatically found old BBS as its revision baseline; verify the workbook actually updated. The **BBS Re-link** revision option stamps schedules without comparing geometry or importing bars.

Closing with unsaved changes prompts you to save. **No** discards those edits. Keep your prior issued copies for recovery; saving clears Undo history.

Sections and three dimensional views

The app offers two three-dimensional tools with different results. The **3D Editor** under **Delimiter Editor** changes the inferred reinforcement model used for drafted sections. The **3D RENDER** card under **BBS Re-link** produces an interactive browser view for inspection. Identify which task you need before opening a drawing.

Browser 3D render

BBS Re-link tab
CREATE 3D RENDER
Inspect the generated model in a browser.

3D section editor

Delimiter Editor tab
3D EDITOR
Edit section information through the section workflow.

Two tools with different purposes

Follow the import and rebuild steps for section edits; a render does not update the BBS.

Choose between an editable section model and a browser inspection render.

Open and inspect the editable section model

1. On **Delimiter Editor**, browse to a finished bottom or top reinforcement drawing in **DXF DRAWING**. A DXF or DWG is accepted. Click **3D EDITOR**. If requested, select the drawing for the opposite face; the app remembers it for the project. You may also open the 2D **LAUNCH EDITOR** first and then click **3D Editor** in its **SECTIONS** card.
2. Allow the initial model to build. In the left controls, choose the useful face and side visibility and show or hide concrete, walls, openings and cut lines. Reduce concrete opacity to reveal bars inside the slab. **Z exaggeration** makes the thickness and steps easier to see; it changes the view, not the entered dimensions.
3. Drag on empty space with the left mouse button to orbit. Right-drag, or Shift-drag on empty space, to pan. Roll the wheel to zoom towards the pointer. Double-click to move the orbit centre. **Iso**, **Top**, **Front (X)** and **Side (Y)** provide set views; **Fit** frames everything and **Focus (F)** frames the selection.
4. Click a bar to select its complete arrangement. Click again at an overlap, or Shift-click, to cycle candidates. Ctrl-click changes between an arrangement and one bar; further Ctrl-clicks can select more bars from that same arrangement. Use Search for a bar mark, callout fragment, face or side. Press Esc or **Clear selection** to start again.

The **Selection** panel, right-click menu and on-screen hint line show available actions for the selected arrangement, including move, rotate, snap and small arrow-key adjustments. Work on one clearly identified arrangement at a time. Inspect the result from more than one view and use **Undo** or **Redo** before saving if a change is wrong. For operation-specific mouse and keyboard gestures, use the editor's on-screen hints. The section previews reflect the last model build; save to rebuild them after an edit.

For a simple position correction, select the intended arrangement or individual bar, move the pointer out of any text box and press **G** to begin moving it. Inspect the moving preview; **Enter** accepts the move and **Esc** cancels it. **I** isolates the selection; press **I** again to show everything. Recheck the selected face and local cover before saving. These edits affect the section model, as explained below.

Save sections and carry edits forward

Click **Save** in the 3D editor after reviewing the change. The app saves corrections in **section_model_edits.json** beside the drawing and attempts to rebuild the section output. Read the result: edits can be saved while **Sections.dxf** is **NOT saved**, for example when a section build cannot complete; with no section cuts, no section DXF is produced. In those cases the old section drawing may remain unchanged. Correct the reported cause and rebuild before issue. A successful save starts a new undo history. If the underlying drawing changed, review the stale-edit message before confirming reuse; **Reload** reads the drawing again.

This Save changes the section model and section output. It does not write the changed bars into the bottom or top plan drawing, update bar marks there, or recalculate a BBS. If the plan reinforcement or schedule also needs correction, make and check those changes through [Edit reinforcement drawings](#) and [Update and issue bar bending schedules](#). A 3D view helps inspect geometry; it does not establish reinforcement adequacy or schedule accuracy.

For drafted sections, return to the 2D Delimiter Editor's **SECTIONS** card. Use **Add Section**, click the first point on the plan, then click the second point to establish the cut direction. **Tab** flips the viewing direction and **R** toggles an orthogonal cut. Check the markers and labels, then **Build Sections** to generate the section drawing. Read the reported output path and confirm the DXF was written. **Ignore saved 3D edits** builds a comparison from the original inference while retaining the correction file; turn it off to use the corrected model again.

After saving, **Export shareable HTML...** writes **Section Model (view only).html** beside the drawing for a colleague to inspect. The export uses the saved model, so save first to include your latest edits. This viewing copy does not replace the edit file or drafted DXF. Check section cut locations and labels in the final DXF against the reinforcement plans.

If the editor opens in a browser

If the desktop view host is unavailable, the app opens the editor page in a browser. Editing controls are similar, but the browser cannot save directly to the job. Click **Export edits** and keep the downloaded edit file. Return to the 2D Delimiter Editor and click **Import edits...** in **SECTIONS**. Select the export and respond to the offer to rebuild sections. Check **Sections.dxf** after import. If you close the browser without exporting, its changes are not transferred to the drawing folder.

Create an inspection render

On **BBS Re-link**, find **3D RENDER** and choose the finished bottom and/or top reinforcement drawings. You can include shear detail sheets; the file picker permits multiple sheets with Ctrl or Shift. Select **US rebar sizes (#3, #4, #5, ...)** if that display is wanted. Click **CREATE 3D RENDER**. The app makes an interactive `<project>_3D_render.html` and opens it in a browser.

Orbit and zoom in the browser to examine the arrangement. Hover over a bar for its readout; a stationary click holds that readout and a double-click clears it. Camera movement, hidden items and readouts affect only this view. The render does not create a section drawing or alter the reinforcement file. For corrections to bar marks or extents in the 2D drawing, see [Edit reinforcement drawings](#); for schedule changes afterwards, see [Update and issue bar bending schedules](#).

Office settings and reference tools

The **Settings** tab holds values shared across jobs on this installation. Set them for the office before relying on generated drawing numbers, issue fields or production drawing transfer. Job-specific values on **Pipeline** and **Reo Parameters** still need checking for every project. Fields left blank use the displayed shipped value or remain optional as explained beneath each entry.

Start, licence and units

Open the installed **Slab Automation** shortcut. If **LICENSE ACTIVATION** appears, enter the key from the confirmation email and click **Activate**. **Check now** checks an already stored key; **Deactivate this machine** removes its activation when your office intends to move the licence. The main window opens only when licensing permits it. Once inside, the header **License** button reopens the status and activation controls. The header update button checks for a release when available in an installed build. If activation or update fails, record the exact message and ask the person who manages the office installation to resolve it.

The header selector reads **METRIC (UK/EU)** or **US / IMPERIAL**. It changes displayed entry units and the design code used for punching shear: metric selects the EC2 path; US / IMPERIAL selects the ACI path. Check the selector before running calculations, even when a project field or cover value looks familiar. The **Python calc engine (PDF proofs, no Excel)** choice in Phase 2 is a separate choice about the calculation route. Switching the header display after making an engineering selection is not a substitute for rerunning a calculation or converting an already issued drawing.

Set the office identity and output paths

Open **Settings** and scroll through the groups. Enter only values your office uses, then click **SAVE SETTINGS** and read the status below it. **Restore defaults** clears the stored office choices. The setting page shows the stored value; an empty box may still have a shipped default shown as placeholder text.

Setting group	What it controls
Drawing numbers	Originator code appears in generated drawing numbers and filenames.
Sheet issue	Designed by , Drawn by and Checked by initials are stamped in nominated title-block fields.
Sheet	Company/designer name, replacement title-block DXF, company logo image and CTB plot style.
Staging / working folder	Temporary work location used before finished files are copied to the job.
Drawing registration	Names of slab outline and column layers in the office's production drawings.
Project auto-fill	Job-folder names used to help recognise project details.
Bar bending schedules	Automatic A4 PDF export after runs.
Production drawings	Optional AutoCAD refresh after reinforcement transfer.

The staging folder should be a local folder that does not sync with OneDrive, Dropbox, Google Drive or SharePoint. Syncing can lock working files during a run. If your office drawing uses a different title block, click **Set up my title block...** and follow the wizard using one of your own drawings. It captures the block and asks you to confirm where fields belong. The **Company logo (image)** accepts PNG or JPG; saving places it in the supplied Excel calculation and schedule templates. Check the resulting sheet before issue.

Drawing registration layer entries are comma-separated names from your production drawing. The slab-outline list helps align transferred reinforcement with slab geometry; the column list provides a column-matching fallback. Leave them empty if standard names work. **Job folder anchors** is usually empty because the app recognises common layouts and can learn an office pattern after a project number is entered. Confirm any automatically populated project name and number in the header.

Export BBS to PDF after each run controls automatic A4 schedule export after Phase 3 and uses Excel. Ordinary BBS Re-link uses the separate **PRINT BBS TO PDF (A4)** button. A PDF export failure can leave the underlying drawing and workbook run complete; resolve Excel or file access, then print and check the PDF. **Refresh production drawings in AutoCAD after transfer** asks an installed AutoCAD to refresh the drawing; if unavailable, that refresh is skipped. Inspect the transferred result in CAD before issue.

Set up DWG conversion

The **EXTERNAL TOOLS** area reports whether **ODA File Converter** is found. It is needed for DWG conversion. DXF-only work can proceed without it. If the status says **NOT FOUND - DWG conversion will fail**, install the converter and use the app's **Download ODA File Converter...** link if needed. Then find the installed shortcut, right-click it, choose **Properties**, and copy its **Target** into the ODA field, or click **Browse** to select the executable. Click the adjacent **Save** and verify the status turns green. **Clear** removes a stored path so the app can try automatic detection again. This path has its own Save button; **SAVE SETTINGS** above does not store it.

Use the reference and support tools

The **Guide** tab provides task prompts within the application. **Bar Areas** is a read-only steel-area reference: the header metric mode shows metric bar and spacing areas and standard mesh data; US / IMPERIAL shows US areas with metric equivalents. It does not change the current project or select reinforcement for you.

On **Pipeline**, **Single Shear Detail** runs one selected shear-detail calculation workbook, not a whole slab. The lower **Convert UK ↔ US** control accepts bottom and/or top DXF or DWG drawings and detects each drawing's conversion direction. That action changes bar-mark units in its drawing; it is different from changing the header display. Review the reported output file before using it with a schedule.

At the bottom of **Settings**, **Send diagnostics to Cadeo** is a user-initiated support action. The confirmation states that recent pipeline logs, app version, licence key, machine ID, Windows version and your note are sent. Drawings, models and project files are not attached by that action. Include the operation and error message in the note if you choose to send diagnostics.

Troubleshooting and file reference

Start with the message in the active phase panel. A review dialog may be waiting for your decision; a failure displays **FAILED** or **CRITICAL ERROR** and a reason in the log. Record the input file and operation before retrying. Correct the named cause and rerun the affected phase. When several Phase 3 outputs run together, one may have finished before another failed, so check the **Drawings** folder and log before deciding what to rerun.

Common interruptions

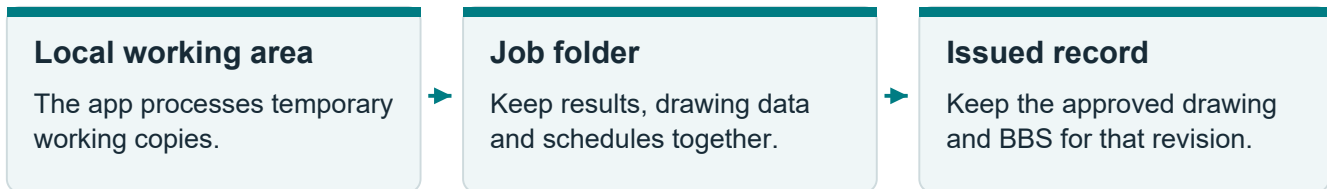
What you see	What to check and do
Input missing or not found	Select the intended reactions file again on Pipeline and confirm the path exists.
A CPT or DWG was converted	Let conversion finish, verify the field now points to a Reactions DXF, then run again.
No mesh input	Export the RAM Concept drawing with Mesh Input and select that export.
No reactions found	If reactions were expected, re-export with the reactions plot. Use drafting-only mode only if the job intentionally has no column reactions.
Existing Outputs Found	Confirm the job before accepting a skip, then use the enabled Phase 2 or 3 Run button. Run All starts again at Phase 1.
Phase 3 says calculation results are missing	Check that Phase 2 completed for this project; return to its results if shear details or top reinforcement depend on them.
DWG conversion fails	Open Settings and check the ODA File Converter status and saved executable path.
Save says the file is locked	Close the drawing or workbook in CAD or Excel, then use the retry offered by the app.

The Phase 1 extraction needs slab geometry. The no-reactions option skips shear calculation and its drafting when no column reactions are intended; it is not a remedy for an incomplete RAM export. If Phase 1 asks for missing concrete strength or slab thickness, enter the project values and check that they carried into the summary. A missing response can leave later calculations unreliable. If Phase 2 pauses at **Punching shear depth review**, work through the flagged columns as described in [Review and amend punching shear calculations](#).

If an editor does not appear to update, check which operation saves its outputs. EC2 **Save column** stores inputs but leaves proofs Stale until **Regenerate changed**; ACI uses **Save and Recalculate**. Calculation regeneration can leave packed drawing sheets or schedules needing a separate update even if detail numbers are unchanged. For 3D edits, confirm **Sections.dxf written**: the edit file may save even when the section DXF fails to rebuild. Browser fallback needs **Export edits** and **Import edits....** The 2D Delimiter Editor saves to the drawing; **BBS Re-link** then updates its schedule. Browser **3D RENDER** is for viewing only.

If **REACTIONS STALE** appears in the calculation editor, the source reactions drawing and the workbook calculation basis differ. Identify which is authoritative before confirming workbook values. If slab geometry changed between issued and new work, use **Change / Merge** after running the new design; simply editing the old output does not reanalyse the geometry. See [Manage design changes](#) for that workflow.

Know where results belong



Do not move only the drawing and discard its companion files.

Select the intended level and face every time you reopen, re-link or transfer.

Working files, checked results and the issue record.

Keep the reaction input, its calculated results and the issued drawing and schedule pair together for each project and level. The project folder normally receives **Shear Summary Sheet.xlsx**, an annotated reaction plan named from the input with **_annotated.pdf**, and Phase 2 proof PDFs. Phase 3 places final reinforcement and shear drawings under **Drawings**. Drawing names include project and level numbering and vary with selected face, drawing type, schedule scope and code mode. Use the exact output paths reported in the phase log rather than assuming one fixed sheet filename.

File or folder	Purpose
Reactions DXF	Extracted source geometry and column reactions for the run.
Shear Summary Sheet.xlsx	Column summary and Phase 2 calculation data.
*_annotated.pdf	Annotated reaction plan for checking extracted locations.
Drawings/	Final shear, top and bottom drawing and schedule deliverables.
BBS .xlsx and optional .pdf	Editable schedule and an A4 print copy when requested or enabled.
section_model_edits.json	Saved corrections for the editable 3D section model.
Sections.dxf	Drafted sections rebuilt from the model and section markers.

Some tasks write companion data beside a drawing, including embedded or saved geometry and scheduling information. Keep such files with the working drawing when continuing a BBS Re-link, 3D edit or production transfer. A DWG can be converted to DXF for the app's work; check which file the final operation reports as its output. A .cpt is a RAM Concept model input, .dxf is an exchange drawing, .dwg is a CAD drawing, .xlsx is an Excel workbook, .pdf is a print document and .html is a browser view. A browser render file and a view-only section HTML are inspection copies, not issue drawings.

After a correction

1. Confirm the source input, code and header units, project identity, slab type, covers and relevant options.
2. Rerun the earliest phase affected by the correction. A changed reaction or slab geometry may require extraction and calculation again; a calculation override needs regeneration; a drawing annotation edit generally needs the BBS refreshed.
3. Read the completion log and open the new files from its reported paths. Check that the expected drawing face and schedule were actually selected.
4. Compare the revised calculation, drawing, schedule and revision with each other before issue. Retain the previous issued pair as the office record.

For an unresolved failure, use the error text and the Settings diagnostics control when your office support process calls for it. The app's **Guide** tab also gives short task-specific directions.

Terms used in this manual

- **BBS**: bar bending schedule, the workbook of bar marks, shapes, dimensions and quantities.
- **Reo**: reinforcement bars or arrangements shown in the drawing.
- **Shear detail (SD)**: a grouped punching shear detail shared by one or more columns.
- **Stale**: a saved input or source changed after its current calculation or drawing was built; regenerate the dependent output.
- **Phase**: one of the three Pipeline stages: reactions, calculations or drafting.
- **Cover**: specified distance from concrete face to reinforcement, entered in the displayed units.
- **Section marker**: a cut location on the 2D drawing used to draft a section from the 3D model.
- **Production drawing**: the office's final CAD sheet into which generated reinforcement may be transferred.