RC Frame Design — User Guide

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What the app does

You describe a reinforced concrete building in two Excel forms: where the columns stand, the storeys, the loads, and the ground. The app then:

- analyses the frame for gravity, wind (EN 1991-1-4) and earthquake (EN 1998-1);
- designs the beams, columns, slabs, core walls and balconies to Eurocode 2 and Eurocode 8;
- audits its own design and re-designs until the frame passes;
- designs the foundations to Eurocode 7: pads, raft or piles;
- produces drawings, a design report, schedules and a quantity take-off.

Everything it produces is a **preliminary** design, to be checked and sealed by a chartered or licensed engineer.

Before you start: the two forms

Download both blank forms and their worked examples from the app's **Templates** tab. Open each example beside the blank form while you fill it in.

Form	What it holds	When it's needed
Building frame (.xlsx)	Columns, core, storeys, member sizes, material, loads, wind, seismic, balconies, plant and lifts	Always
Foundation / boreholes (.xlsx)	Founding choices, boreholes and soil layers	Before the foundation runs (C and D)

Four rules that prevent most mistakes:

1. **The columns are the geometry.** Enter each column's x and y. Beams are generated between neighbouring columns in X and Y. For an L, T or courtyard plan, simply leave the missing columns out. You need at least four columns.
2. **No blank rows inside a table.** Each sheet is read down to the first empty row, so a gap silently cuts off everything below it.
3. **Every storey needs a column size** on the Sections sheet.

4. **Fill in the ground properly.** Each borehole needs its water-table depth (type *none* if none was found) and an SPT N value on every layer. Every clay or silt layer below founding level needs its seven consolidation values. Mark exactly one borehole as representative.

The load categories (for example office B, roof H, plant E) set how much imposed load counts as seismic mass, so choose them carefully.

Step by step

1. **Sign in** with your Bespa licence email and key, and open RC Frame Design.
2. **Templates:** download the blank forms and the worked examples. Fill in a copy of each, starting with the Columns sheet.
3. **Upload:** choose the building form, and the foundation form if you're designing foundations, then press **Upload and validate**.
   - An **error** means nothing was saved. The message names the sheet and row. Fix it and upload again.
   - A **warning** lets you through and says what was assumed.
4. **Run** the four groups in order:

Group	What it does	Runs when
A · Analysis, design and audit	Analyses the frame, designs every member, audits, re-designs until it passes	Always first
B · Structural drawings and report	Drawings S00–S12, design report, schedules	A has passed
C · Foundation design and audit	Pads, raft or piles to EC7, then an independent audit	A has passed, and your foundation form is uploaded
D · Foundation drawings and report	Drawings F00–F04, foundation report	C has passed

Over-stressed members early in group A are normal, because the design loop resolves them. Read the verdict at the end of the group. If a group stops part-way, press it again: it carries on without repeating finished work.

5. **Results:** read the verdicts. Then press **Download everything (.zip)** before you close the tab, because jobs are deleted after **24 hours**.

What you download

The ZIP is arranged in labelled folders, with a READ ME FIRST file.

File	Contents
Structural_Drawings.pdf (+ SVG)	Thirteen sheets, S00–S12
Design_Report.docx	Design basis, loads, analysis, member design, the compliance audit, quantities, sign-off table
Design_Schedules.xlsx	Beams, columns, core walls, coupling beams, balconies, slabs, compliance checks, and the **quantity take-off** (concrete m³, reinforcement kg)
Foundation_Drawings.pdf (+ SVG)	Five sheets, F00–F04
Foundation_Design_Report.docx	The foundation design and its audit
Foundation_Design_Schedules.xlsx	Footings, pile groups, soil, consolidation, compliance
Your input	Your two forms as submitted

Common problems

You see	What to do
Nothing written. Fix the form and upload again	Read the error list. Each error names the sheet and the row
not a recognised input form, or *that is the foundation form*	A file is in the wrong box, or is an old form. Use the current templates
Columns: only 3 usable columns	A building needs at least four columns. Check for blank rows in the Columns sheet
column groups do not cover storey(s) …	Add a column size on the Sections sheet for those storeys
SOIL DATA INCOMPLETE	Fill in the water-table depth and SPT N for each layer named, then run group C again
missing consolidation values on a clay layer	Enter all seven oedometer values for that layer, or found on piles

You see	What to do
Groups B, C or D won't start	The audit hasn't passed yet. The message lists the first failures. Change the input, such as sizes or loads, and run A again
The building is smaller than you drew	A blank row inside the Columns sheet cut the list short. Remove it
The job has gone	Jobs are deleted 24 hours after the last run. Download the ZIP every time

Limits, and the engineer's sign-off

- **Upload your own foundation form before running C or D.** If none is uploaded, the app uses a sample soil profile that isn't your site, and the foundation results are meaningless. If you aren't designing foundations, don't run C or D.
- **Slabs** are slab-on-beams only: no flat slabs, no punching shear.
- **Earthquake analysis** is a preliminary approximation: the modes are combined into one equivalent static case per direction.
- **Foundations** use Eurocode 7 Design Approach 2 at the founding depth you give. A raft preference is designed as pads, merged where they overlap. There is no slope stability, retaining wall, basement wall or ground-improvement design.
- **Not modelled:** lift guide-rail and buffer loads (use the supplier's data), balcony thermal breaks, and chemical attack on buried concrete.

Every output says **PRELIMINARY** and must be checked and sealed by a chartered or licensed engineer before use. For detailed questions, contact Bespa Support at info@bespa.online.