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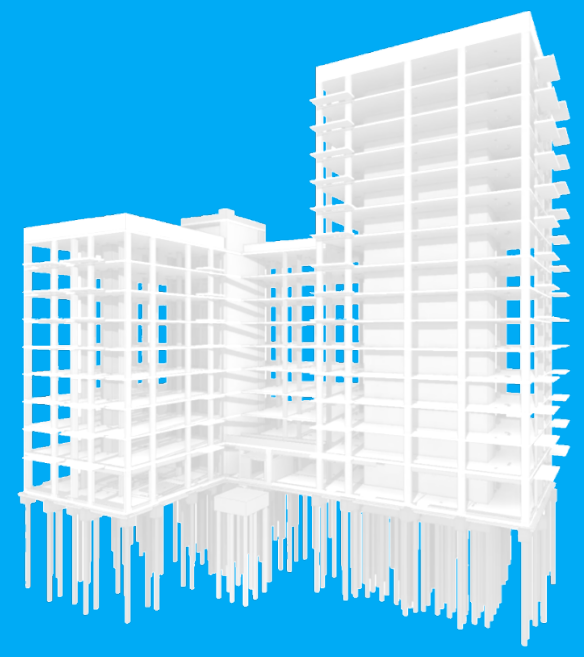
Introducing

BIM Integrated Design

A ‘Single Source Model’ Analysis + Design Solution
for Structural Engineers



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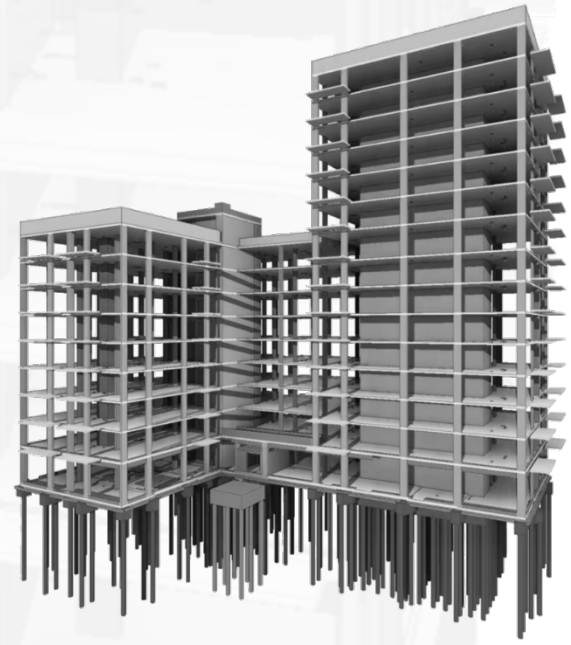

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Content

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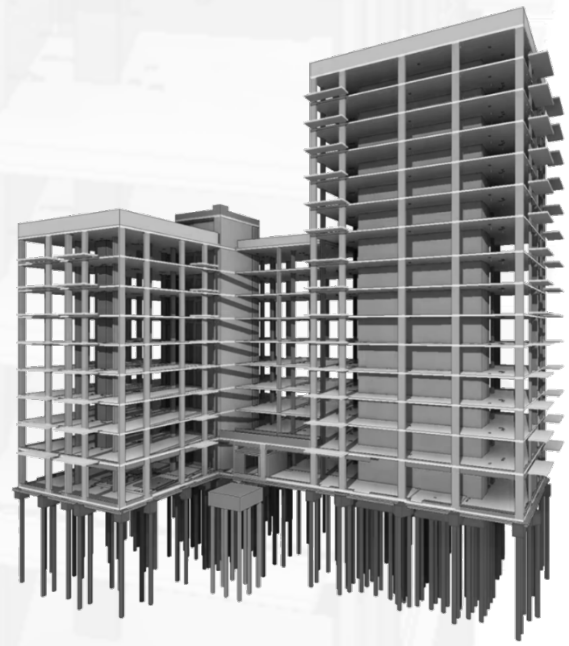

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Single Source Model Principle

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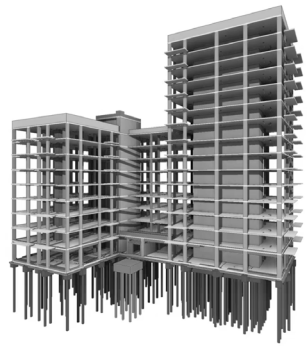
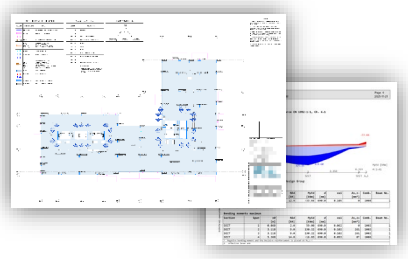
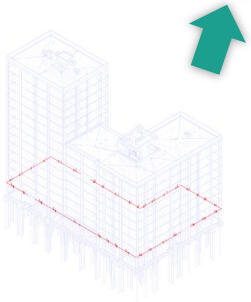


Physical Model

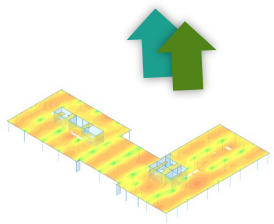
POSTPROCESSING



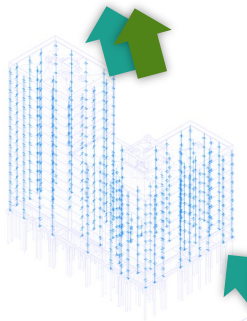
Documentation



Beams

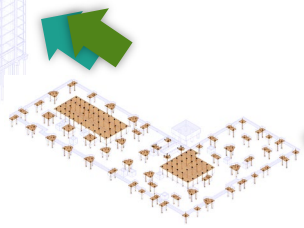


Slabs



Columns

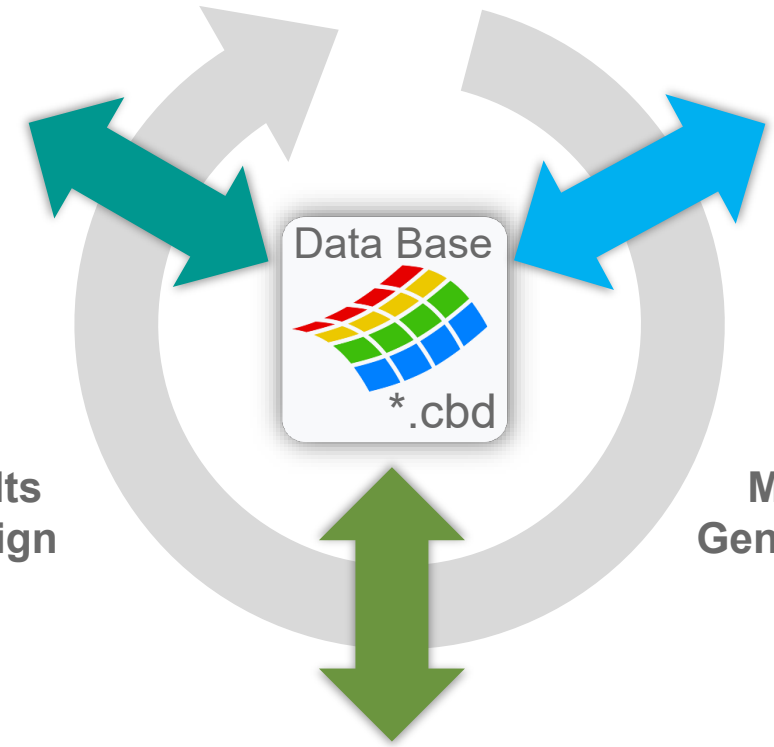
Core / Shear Walls



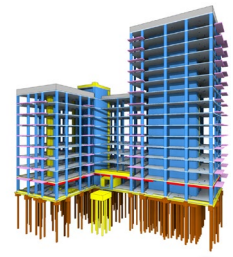
Foundation Results (Schedules)

Results & Design

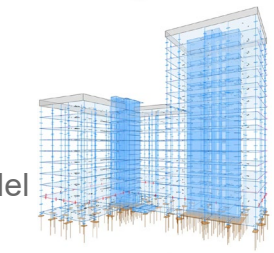
Start Here



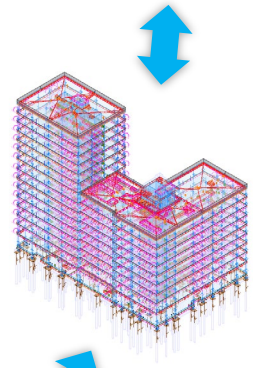
Model Generation



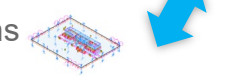
Prepared Physical Model



Generate Analytical Model

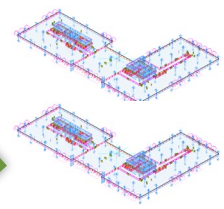


Apply Loads

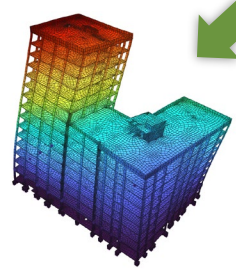


Generate Subsystems

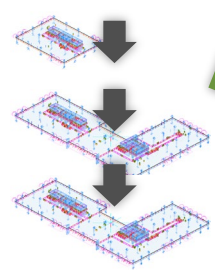
Analysis



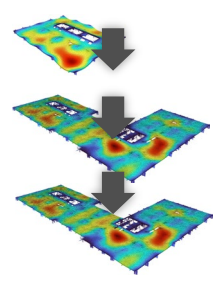
Analysis



Define Load Take Down (LTD)



Subsystems and LTD Analysis



PROCESSING

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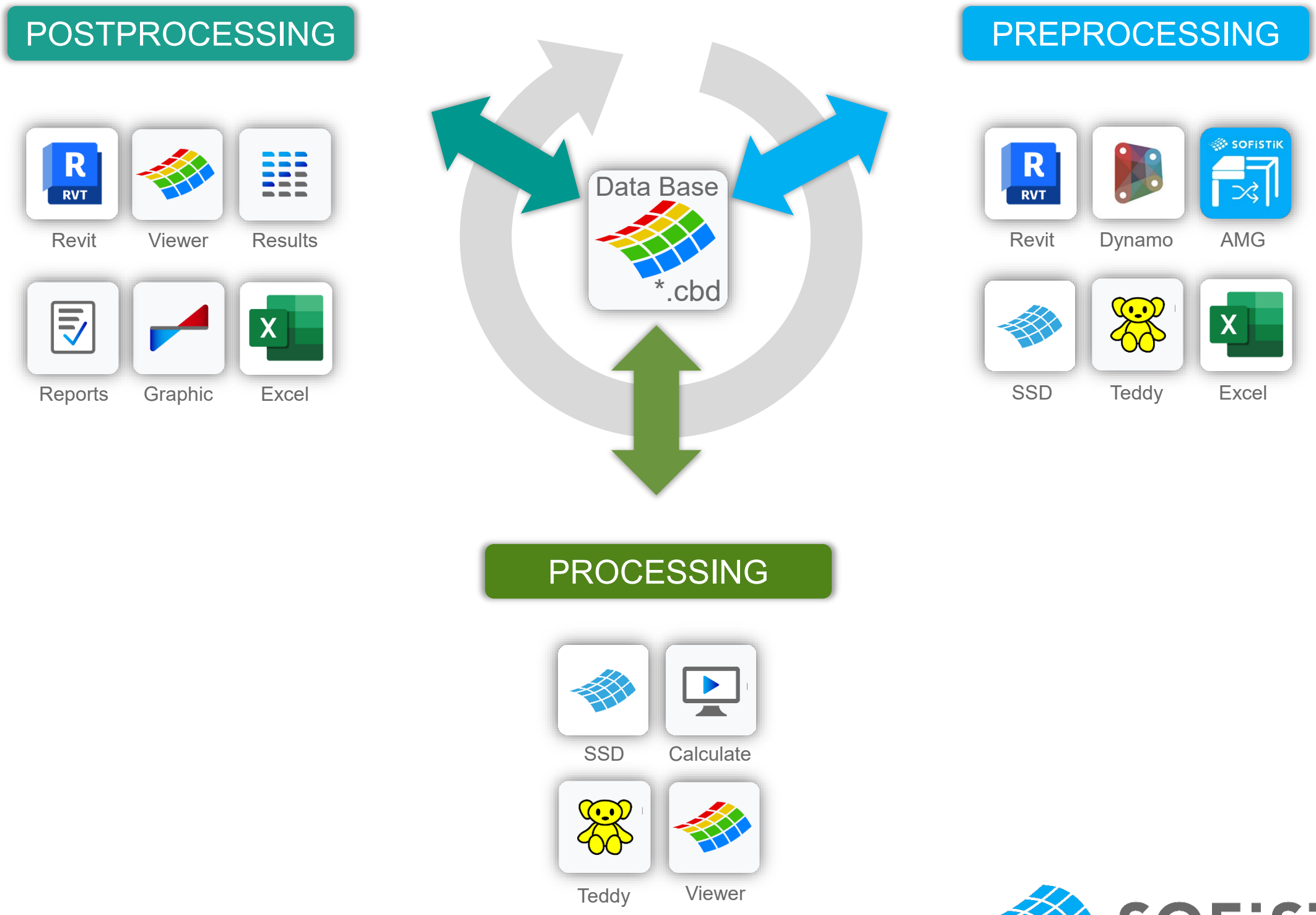
‘Access everything with a coordinated central data base’



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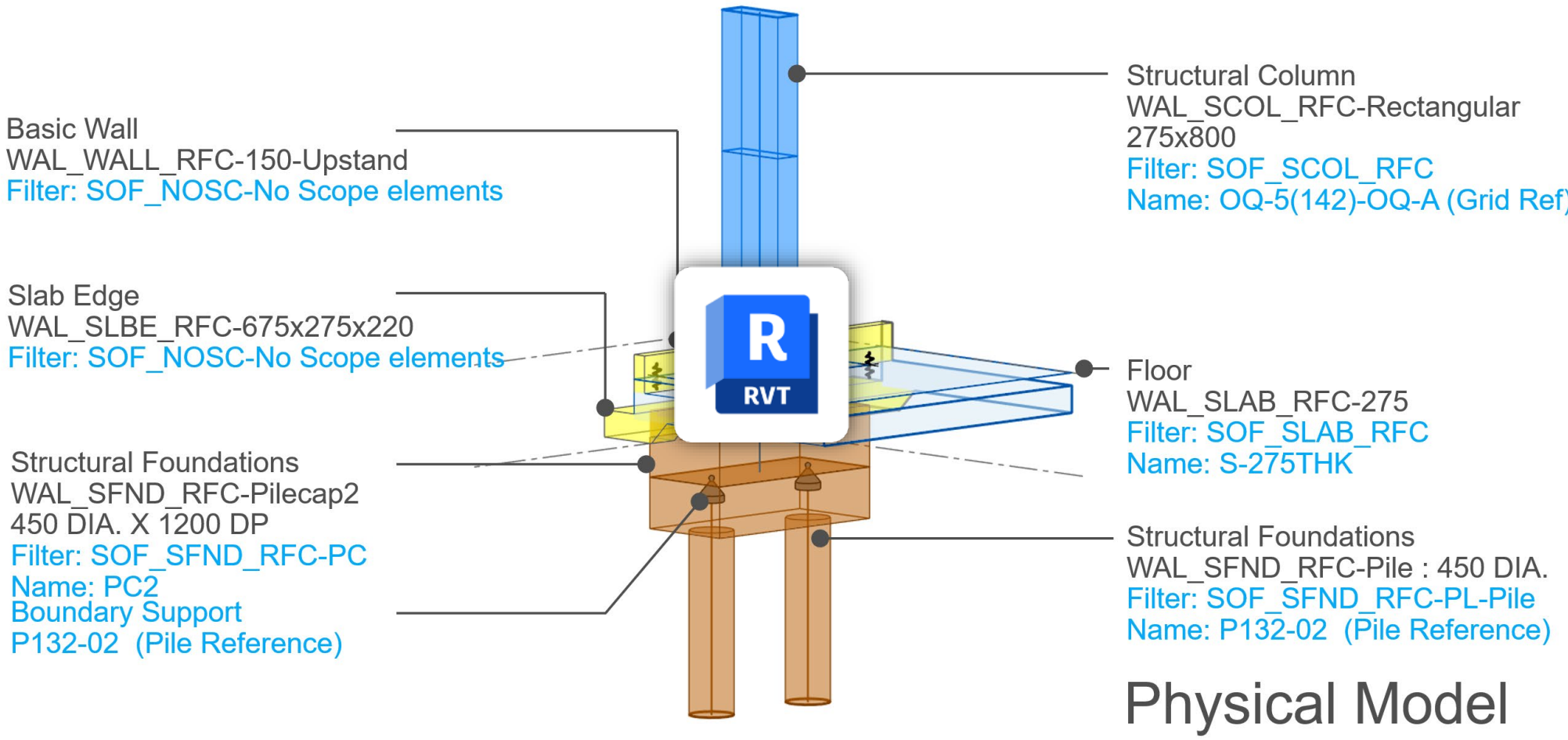
‘Deploy consistent naming between physical and analytical members’



Commentary

- Clear naming structure for Revit template views and rule-based view filters.
- Assisted automatic member naming and numbering following information from level and grid definition in the model.

Analytical Model Generation

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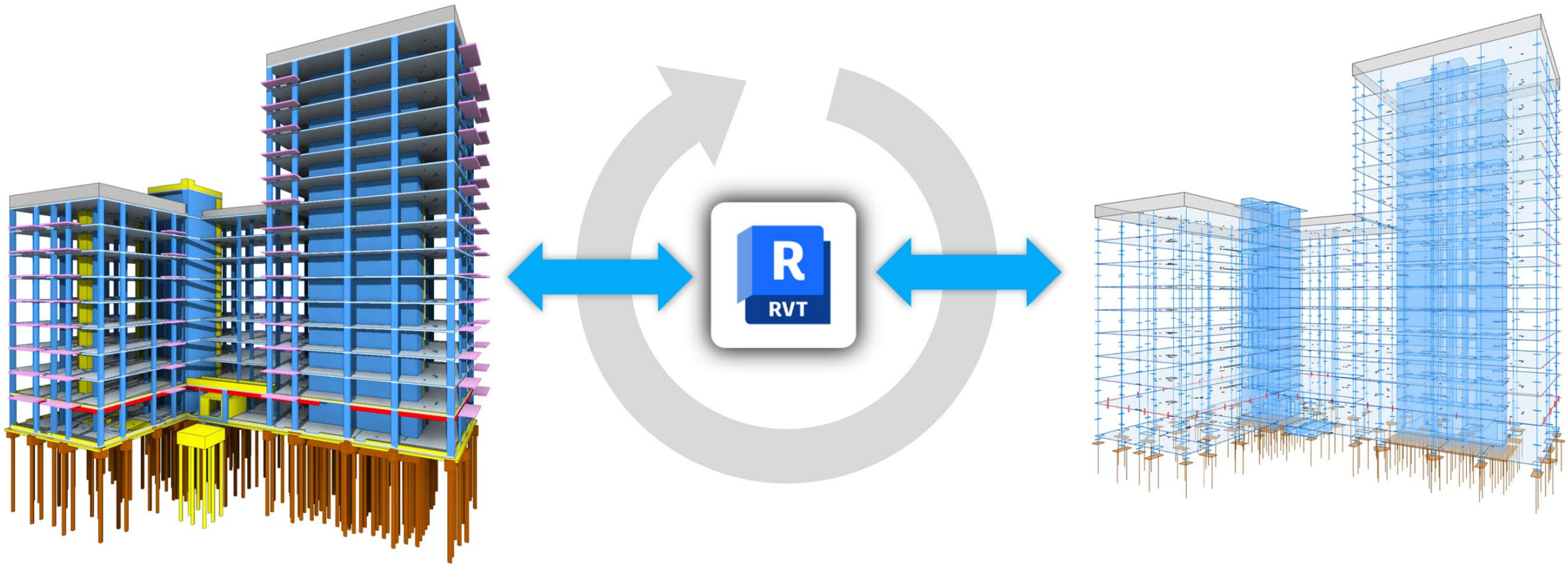
‘Generate analytical models fast’



Physical Model — PREPROCESSING — Analytical Model

Commentary

- Generate the analytical model from a prepared physical model.
- Coordinate changes, lock / unlock members to assist change control.
- Regenerate the whole, part or even single members of a model

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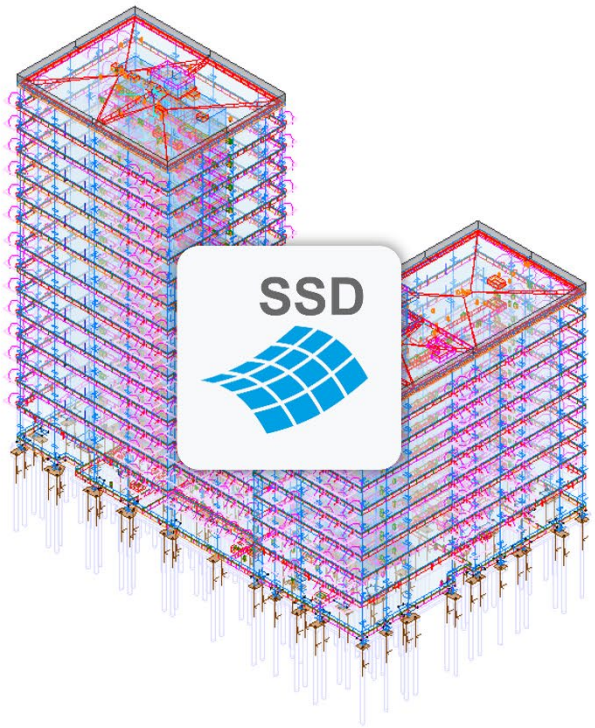
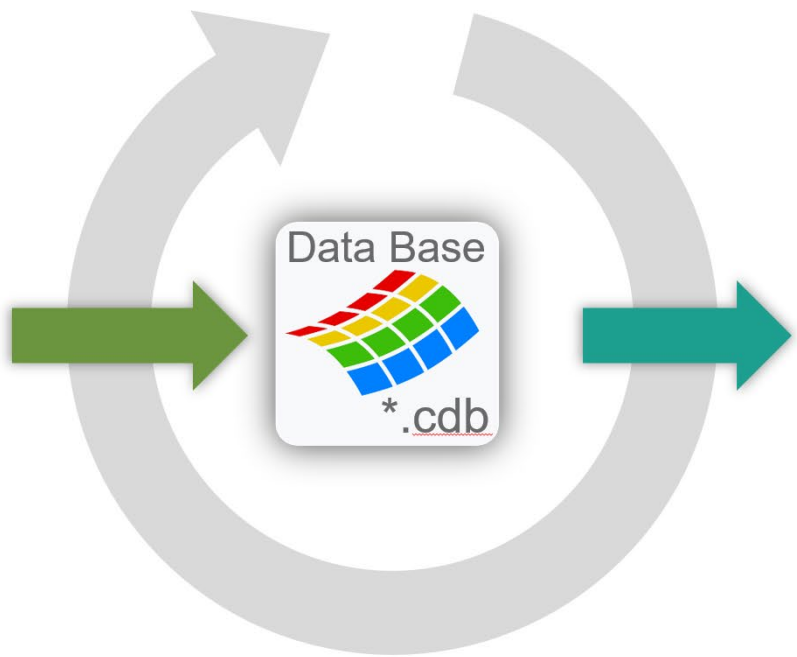
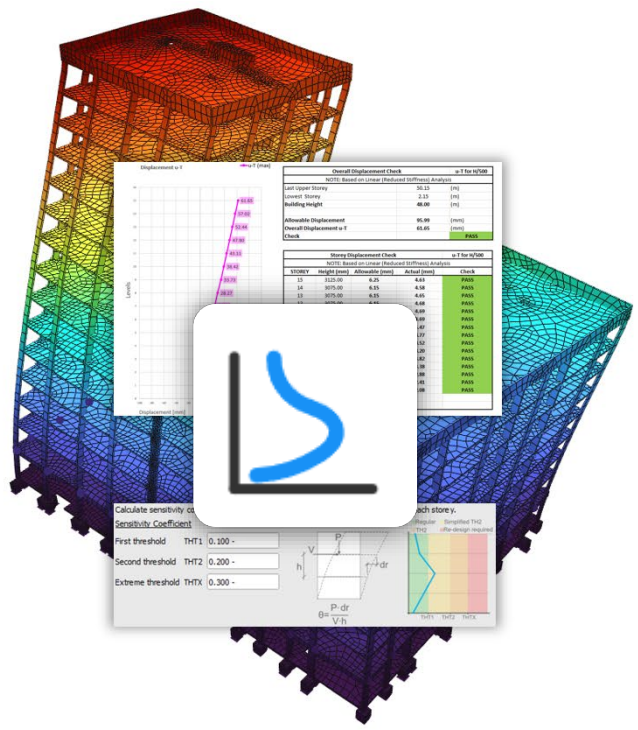
‘A single model is all that’s required for both lateral and gravity workflows’







PROCESSING

Linear Analysis calculation of Main System with Reduced Member Stiffness.

POSTPROCESSING

Checks carried out:
Rupture Stress
Displacement
Global P-Delta Check.

Commentary

- Dynamo script assistance to generate and apply lateral loads to a translated centre of mass at each floor, or the representing the centre of loaded width building for all directions
- Modified stiffness based linear analysis for lateral stability workflow.
- Global p-delta sensitivity check to second order effects

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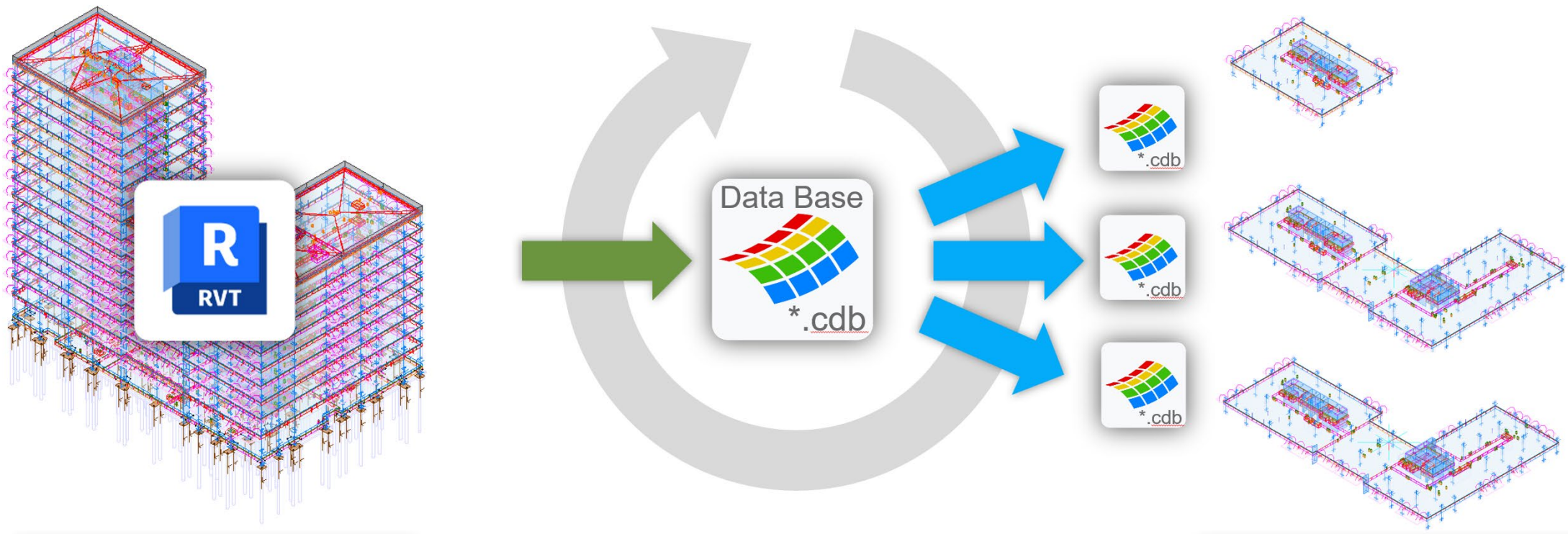
‘Quickly generate subsystems ‘by level’ and enhance both detail and mesh”



PROCESSING

Calculation of Main System

PREPROCESSING

Create Subsystems

Commentary

- Rapid generation of subsystems from the global system.
- Independently define subsystem supports in isolation of the global system.
- Keep the global model optimised and enhance the subsystem detail to include penetrations and adjust meshing parameters.

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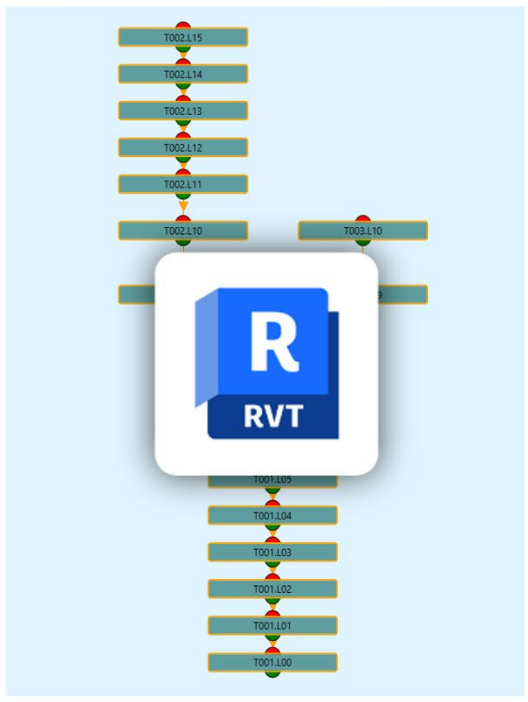
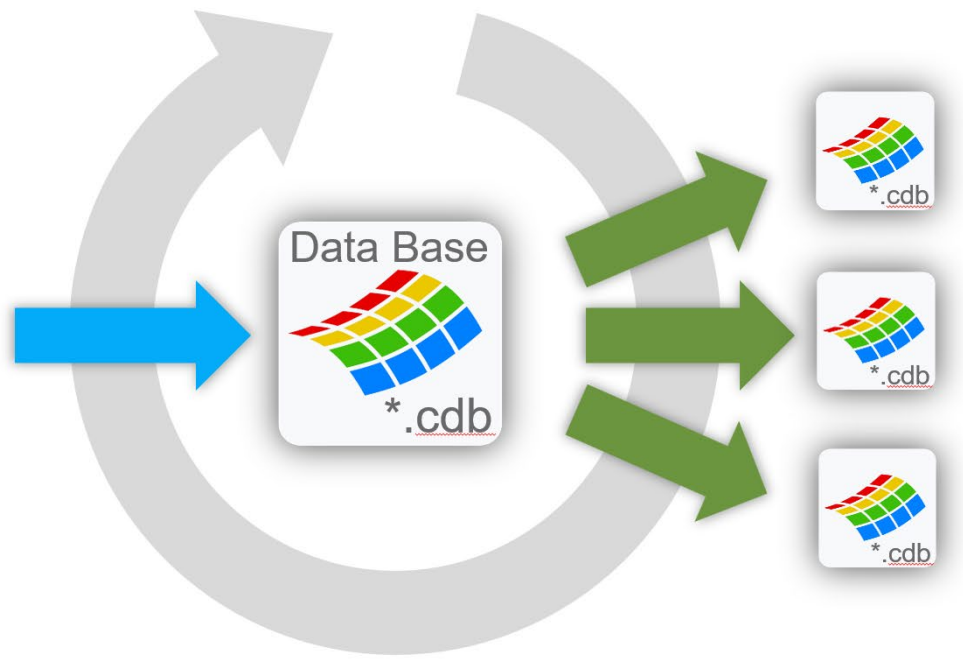
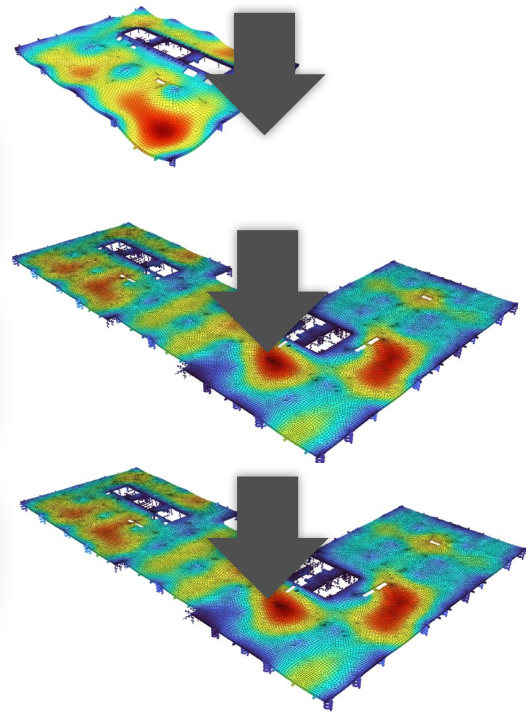
‘Define simple and complex LTD tasks quickly and execute’

Load Transfer Path.





Load Transfer



PREPROCESSING

LTD Task

PROCESSING

LTD of Subsystems

Commentary

- Quickly define complex load take down workflows with the ‘Load Take Down’ task.
- Self weight of structure automatically considered within the load take down calculation

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Results - Foundations

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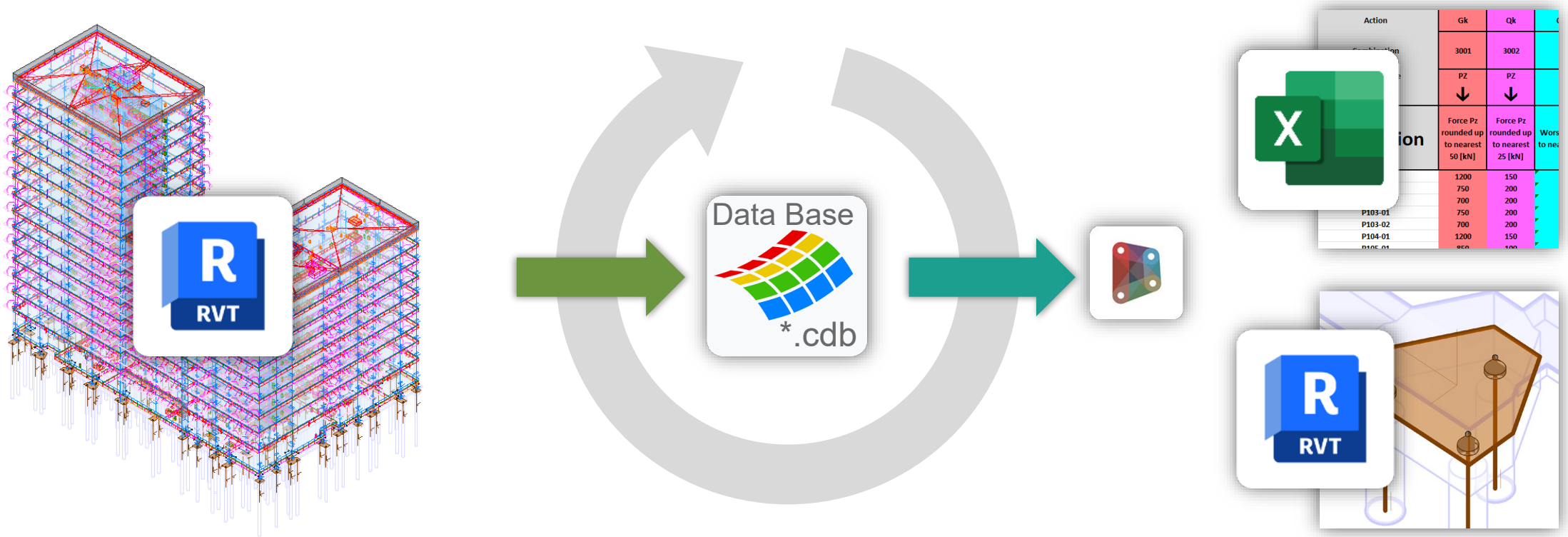
‘Dynamo scripts make light work of pile schedules and parameter field updates.’



PROCESSING

Calculation of Main System

POSTPROCESSING

Create Pile Schedule.
Update Physical Pile Load Parameter Fields

Commentary

- Export foundation results and quickly generate / update a pile schedule for issue to specialist pile designer.
- Update load parameter fields of the physical pile foundation member in the Revit model with Dynamo script assistance for a BIM coordinated documentation delivery

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Design – Core / Shear Walls

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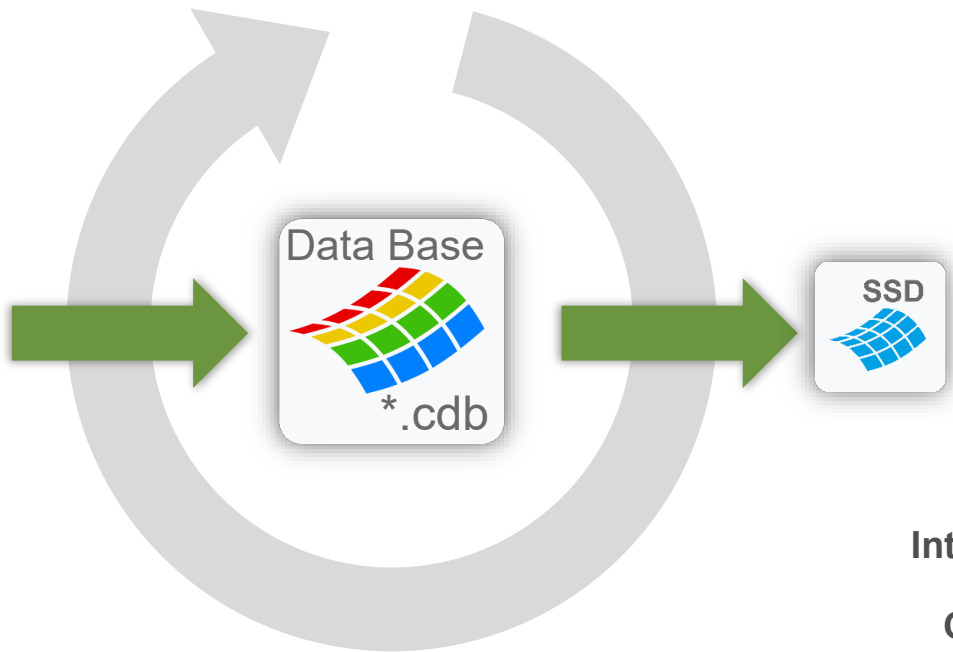
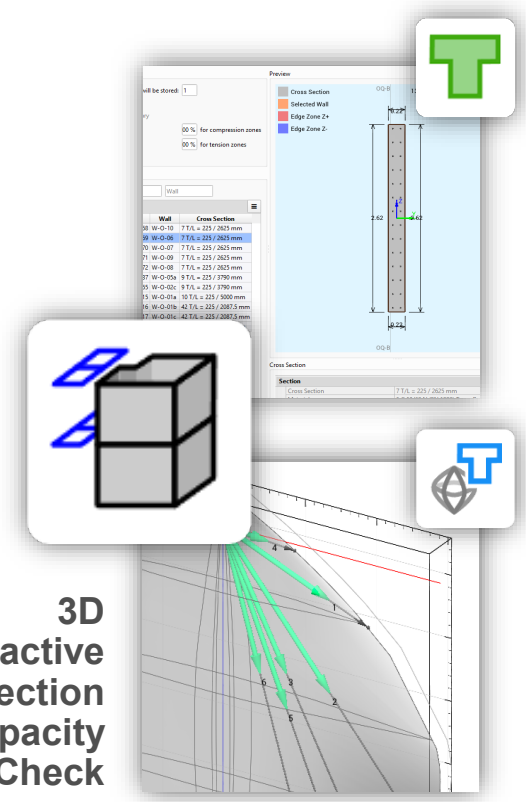
‘Quickly iterate and optimise wall and rebar design’





PROCESSING

Calculation of Main System

PROCESSING

Batch or Single Design. Section Capacity Check.

Commentary

- Execute batch design checks for all stability shear walls and iterate quickly to optimise the design.
- Optionally check multiple load sets with direct input of N,My,Mz values for individual walls with a 3D interactive section capacity check.

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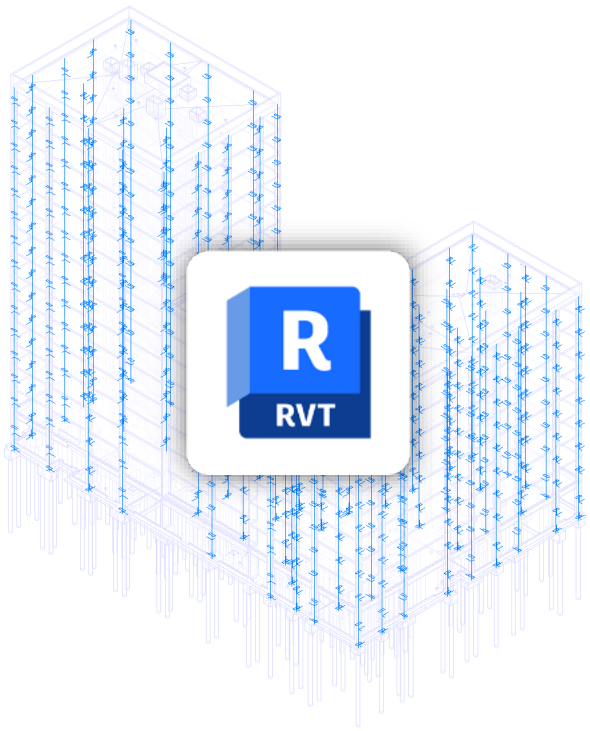
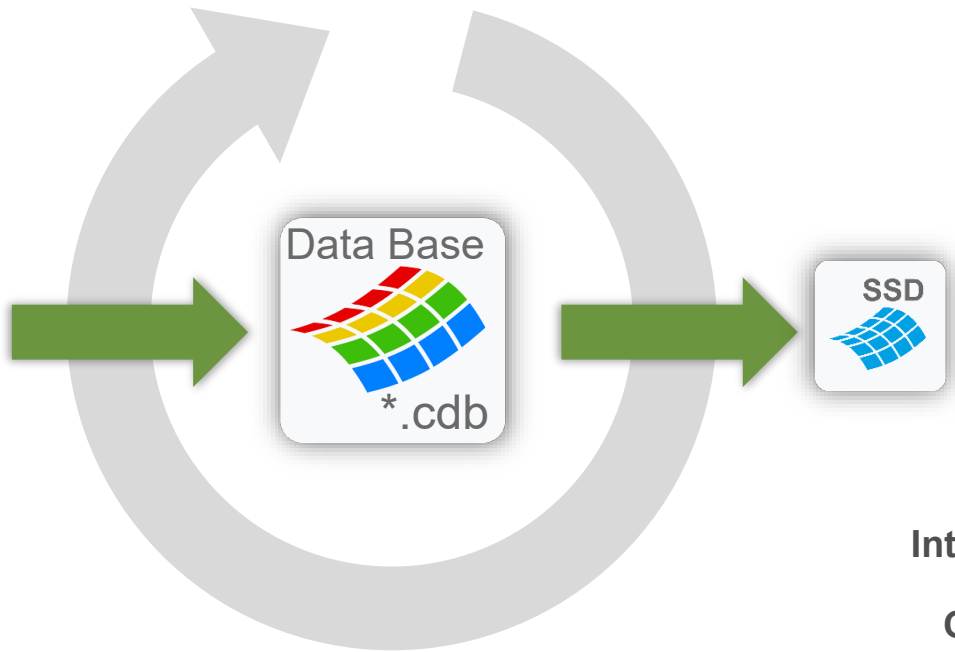
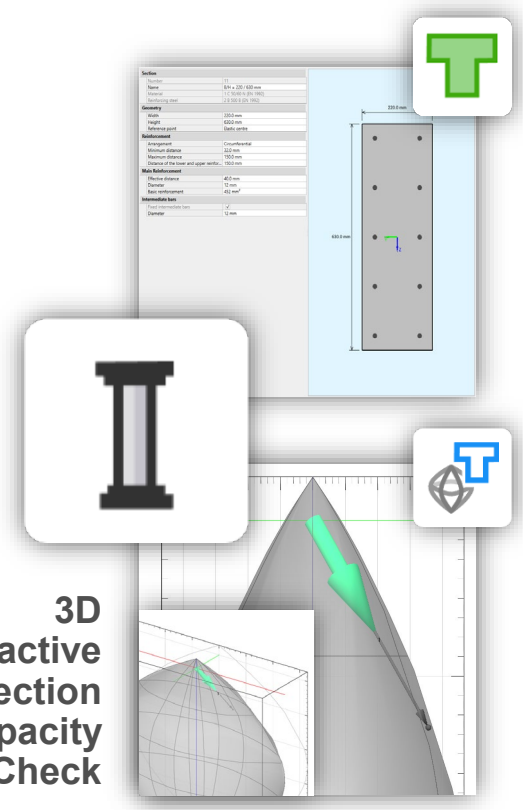
‘Quickly iterate and optimise column and rebar design’







PROCESSING

Calculation of Main System

PROCESSING

Batch or Single Design. Section Capacity Check.

Commentary

- Execute batch design checks for all columns and iterate quickly to optimise the design.
- Optionally check multiple load sets with direct input of N,My,Mz values for individual walls with a 3D interactive section capacity check.

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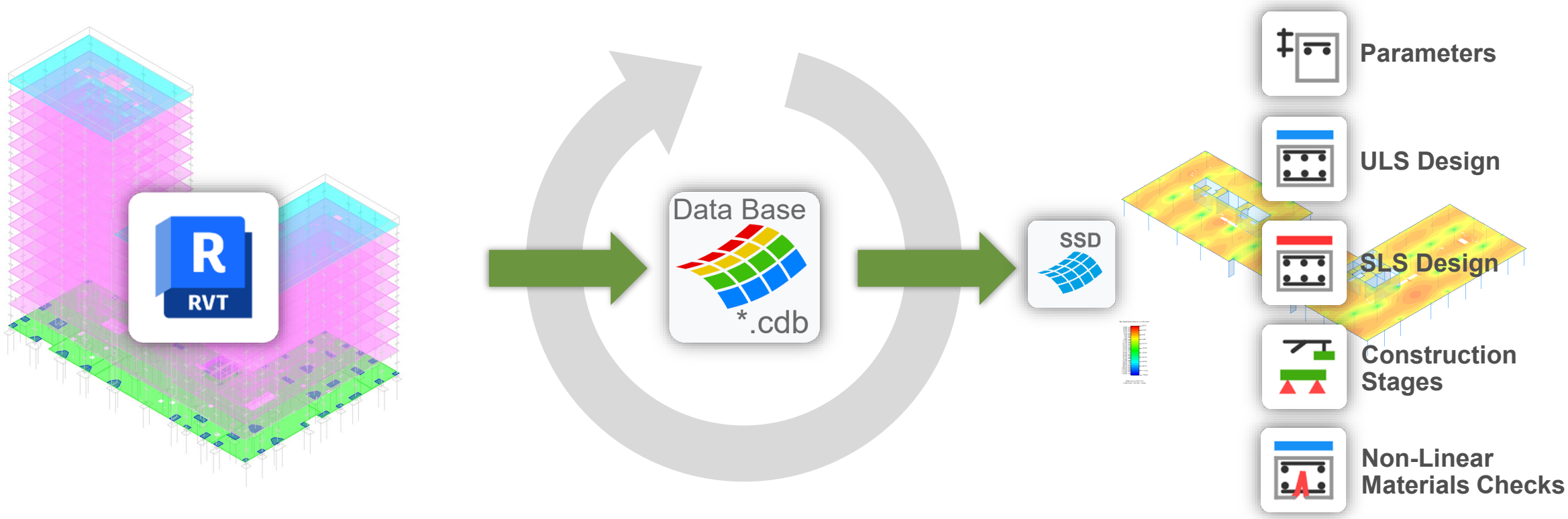
‘The ‘Gold Standard’ of slab analysis and design.’



PROCESSING

Calculation of Main System

PROCESSING

Calculation of Subsystem.

Commentary

- Execute linear analysis with ULS and SLS design for subsystems, including fully automated punching check and design for all 1D (column supports) and 2D planar elements i.e. blade wall ends, beam ends, wall corners etc.

- Execute advanced non-linear material construction stage analysis, includes automatic calculation of creep and shrinkage development over the full load history.

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Design - Beams

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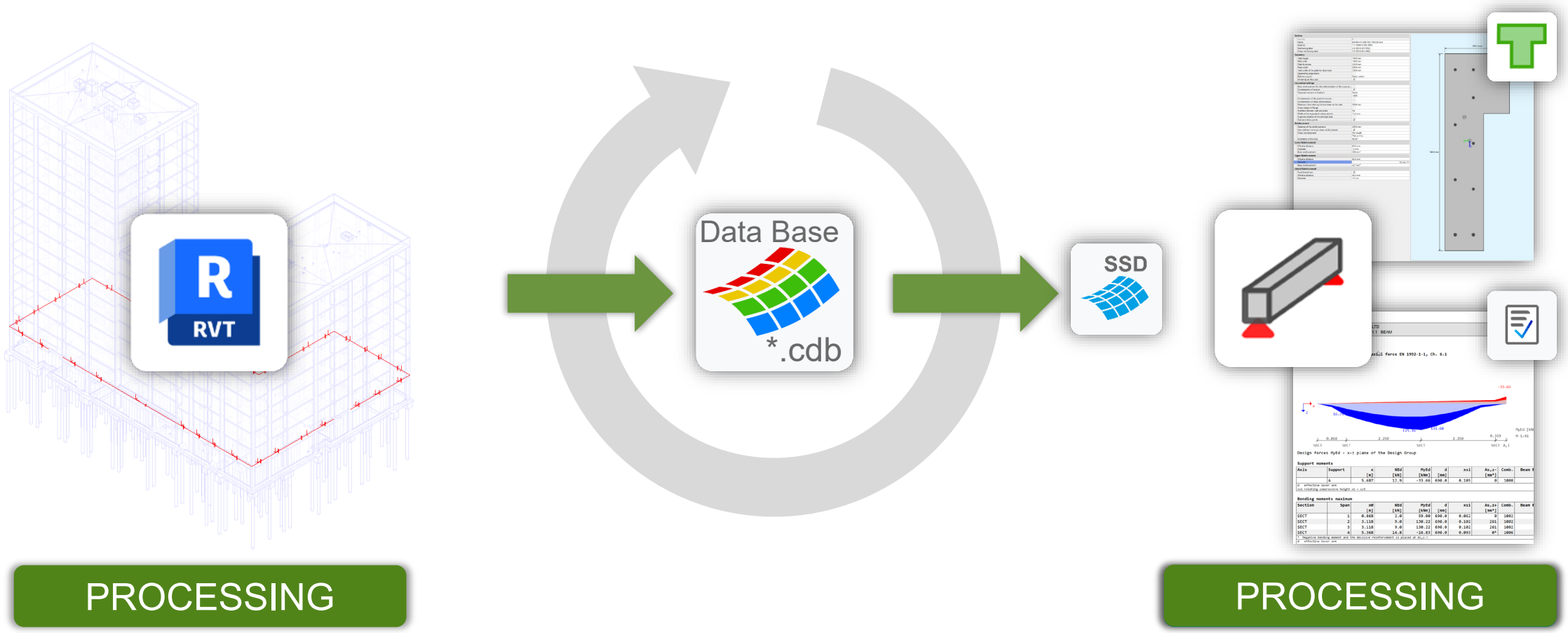
‘Quickly iterate and optimise beam and rebar design’



PROCESSING

Calculation of Main System

PROCESSING

Batch or Single Design. Capacity Check.

Commentary

- Execute batch design checks for all beams and iterate quickly to optimise the design.

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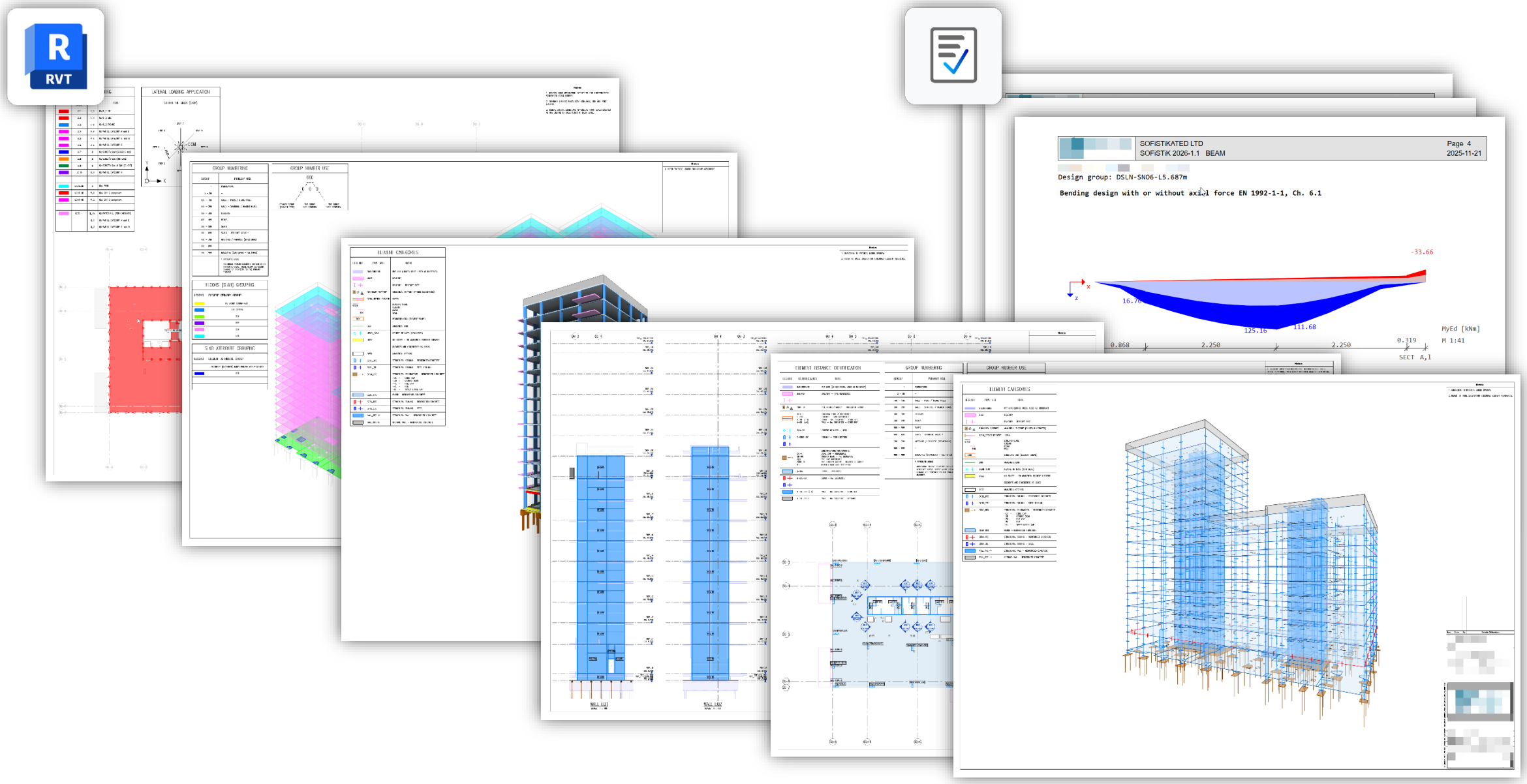
‘Create flexible and detailed curated documentation’



Commentary

- Complete your project with the creation and generation of sheets inside Revit providing a BIM level documentation of the physical and analytical model and relationship.
- Configure and export analysis and design output to Microsoft Word (for further post-processing) or PDF for a curated project deliverable.

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