SOFiSTiK

SOFiSTiK | 2020

New Features

Image: Queensferry Crossing Photo: Bastian Kratzke © 2019 SOFiSTiK AG

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SOFiSTiK | 2020 – An open data hub for reliable structural engineering

In the attached brochure, you can learn about all the new features included with the 2020 versions of our products. The new advances in our latest software releases make it easier for users to accomplish their daily work—whether they rely on our SOFiSTiK | 2020 FEM software, our growing family of BIM apps including Analysis + Design and the Bridge Modeler, both released in late 2018, or the 2020 version of our proven SOFiCAD suite.

Building information modeling (BIM) is everywhere you look these days. The professional community knows that BIM means new methods for collaborative planning, not just a new type of software. Our aim is to help you deliver reliable structural engineering across a range of scenarios by providing new interfaces and improved workflows, breathing life and purpose into the concept of BIM.
We're particularly excited to be opening the doors to a completely new world of parametric modeling and project-based data analysis in the form of the visual programming provided by Dynamo for Autodesk® Revit® and Grasshopper for Rhinoceros.
And just as important, we want to remain on the path we've chosen with the new Analysis + Design application by continuing to offer newcomers to the world of SOFiSTiK a single-app option for construction design and analysis right in Revit.

The Bridge Modeler has gained more unique features for BIM-compliant infrastructure planning with its ability to model prefabricated bridges and generate the corresponding plans. Additional features for railway bridges are in the pipeline.

Your SOFiSTiK team

Product	Version	Licence year	Revit			AutoCAD			OEM Kernel		OS (64bit)		
			2018	2019	2020	2018	2019	2020	2018	2020	Win 7 Pro	Win 8.1 Pro	Win 10
Analysis + Design	2018	2018	x								x	x	x
	2019	2019		x							x	x	x
	2020	2020			x							x	x
SOFiPLUS	2018 (AutoCAD 2018)	2018				x					x	x	x
	2018 (AutoCAD 2019)	2019					x				x	x	x
	2020 (AutoCAD 2020)	2020						x				x	x
SOFiPLUS-X	2018	2018							x		x	x	x
	2018 (≥ 2018-4)	2019							x		x	x	x
	2020	2020								x		x	x
SOFiCAD	2018 (AutoCAD 2018)	2018				x					x	x	x
	2018 (AutoCAD 2019)	2019					x				x	x	x
	2020 (AutoCAD 2020)	2020						x				x	x
SOFiCAD-OEM	2018	2018							x		x	x	x
	2018 (≥ 2018-4)	2019							x		x	x	x
	2020	2020								x		x	x

SOFiSTiK Product Line Overview

SOFiSTiK | 2020

This product line contains all structural analysis, dynamics and finite element modules of SOFiSTiK.
Graphical pre-processing based on Autodesk AutoCAD and Revit as well as McNeel Rhinoceros are parts of this family. A core component is the SOFiSTiK Structural Desktop (SSD), the central control and input program for all structural computations.

BIM Apps | 2020

From the Revit BIM model with 3D reinforcement from design results towards structural drafting and R/C detailing in 2D, the BIM-Apps support your BIM workflow.
Furthermore, there is an innovative app for Bridge Design and Detailing.

SOFiCAD | 2020

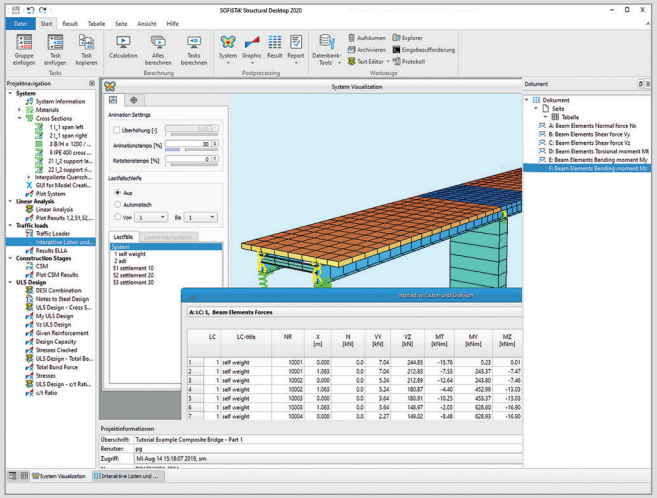
Reliable 2D drafting and R/C detailing on an AutoCAD platform or using integrated Autodesk Technology as SOFiCAD-OEM (German only).

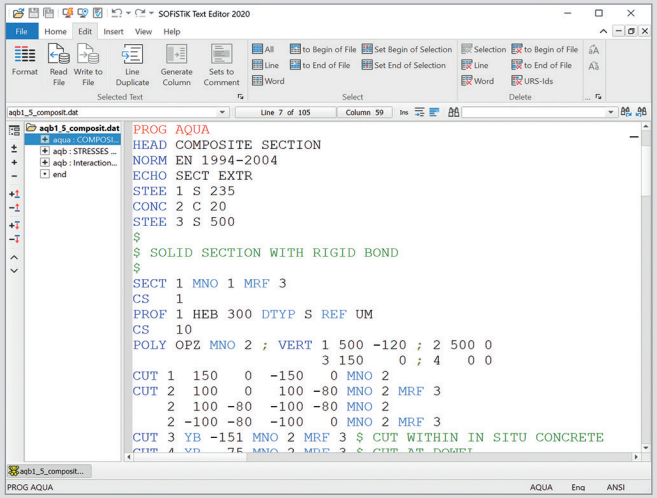
Starting with Version 2020, all SOFiSTiK products can be downloaded via the SOFiSTiK Application Manager. Additionally, the SOFiSTiK BIM Apps are available in the Autodesk App Store. If you have any questions regarding our products, please send an email to info@sofistik.com.

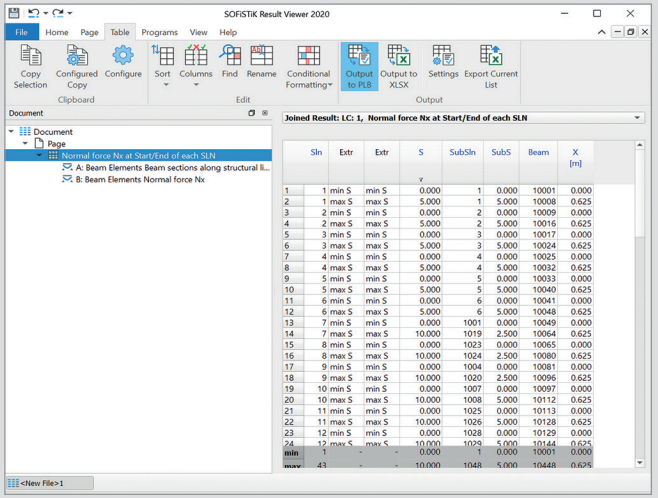
New User Interface

A completely new designed Graphical User Interface increases the usability considerably. New Ribbon Bars for SSD and Teddy workflows improve the clarity and support efficient working.

+ Intuitive design based on Ribbon Bars and icons with a clear visual message
+ Better organisation of control elements
+ Clear user guidance through larger icons
+ Better support of Windows display scaling (e.g. for 4K displays)
+ Simplified, document-orientated user guidance within the Result Viewer
+ Selected results will now be shown and managed as subelements of a table
+ Interactive search for results, cross sections, loadcases and designcases



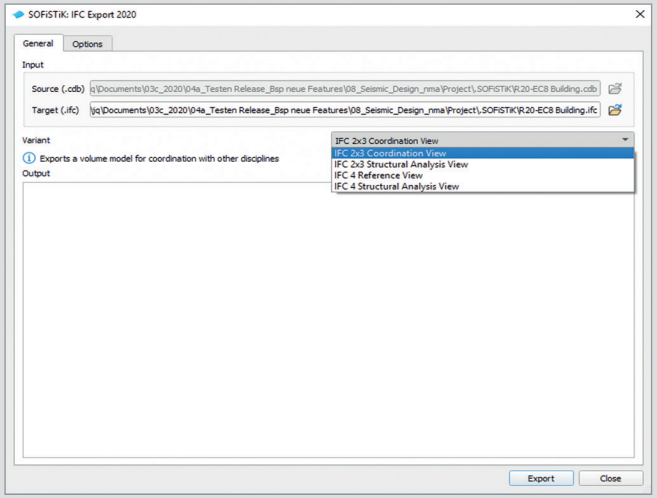


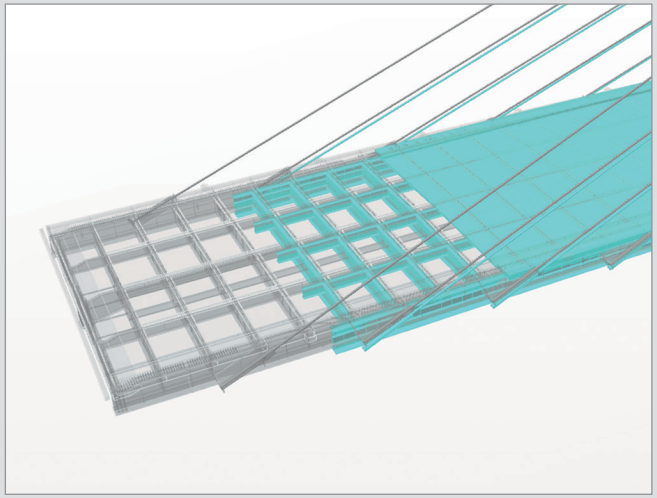


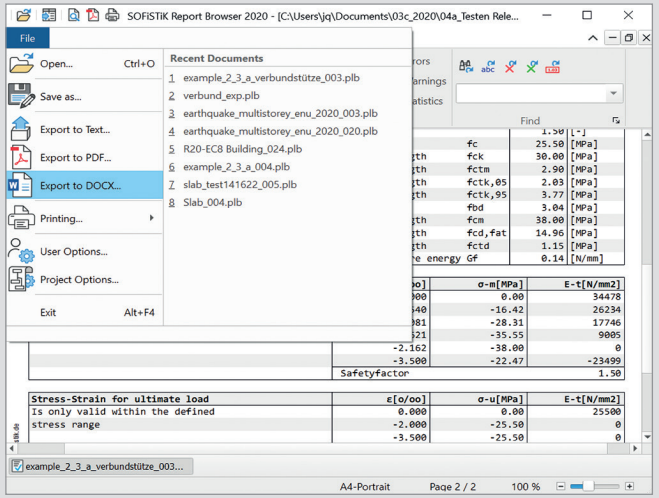
Interfaces for IFC and DOCX Export

For collaborative work on BIM models the version 2020 allows, without need for an additional license, the export of models into the IFC format. Additionally, the DOCX Export of result files has been further developed. SOFiSTiK results can be edited more flexibly and can easily be combined with other results.

+ Export of the Analytical model (IFC Structural Analysis View)
+ Export of volumetric geometry and material information as widely used IFC2x3 Coordination View or as the new IFC4 Reference View
+ Export of the deformed shape under any load case
+ Export of selected groups
+ DOCX Export can be started from the SSD, Report Browser and via the context menu of PLB files
+ Additional control options for the export of PLB images including a choice between formats (PNG or JPG)
+ Diverse word templates can be used to generate a uniform layout for the created documents
+ CADINP module PLBCONVERTER for the DOCX Export out of Teddy







Structural Analysis and FEA

Cross Sections and Steel Profiles

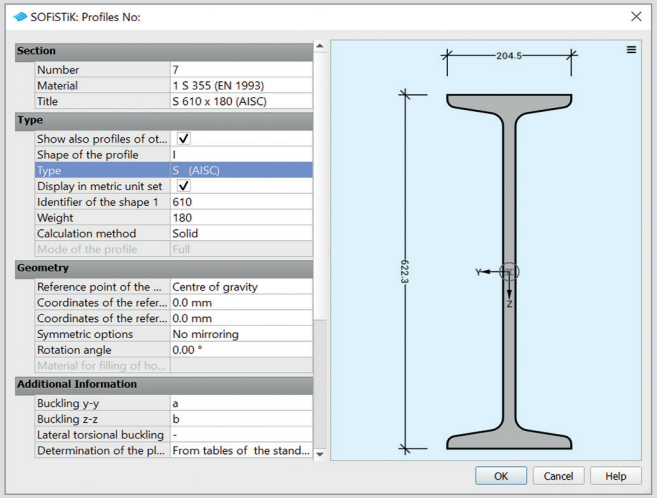
+ Improved geometry core supports e.g. multiple intersections of areas for composite cross sections
+ For all profiles of the AISC two sets of identifiers are available (identifiers in in. x lb/ft and mm x kg/m)
+ Profile selection dialog now more user-friendly with new selection option for shape of the profile and additional norm information for the profile type

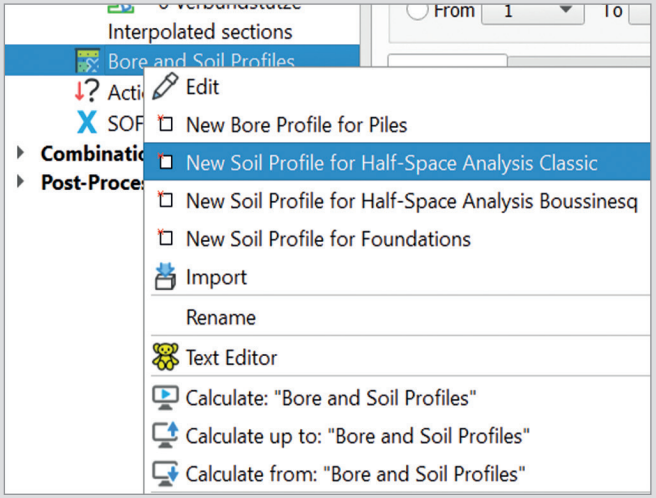
Task Bore and Soil Profiles

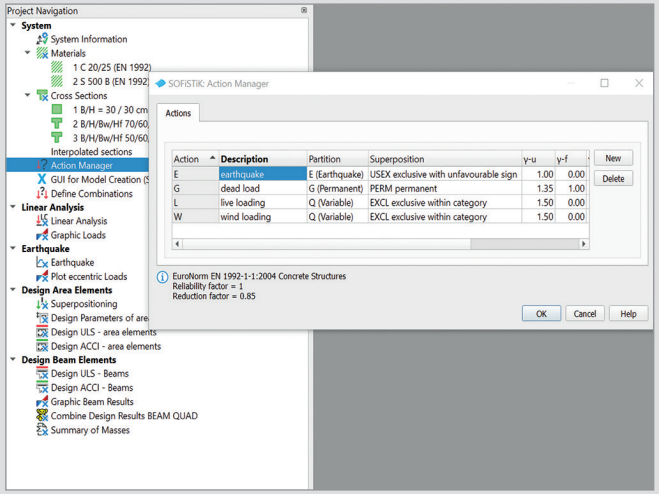
+ Separate tasks for classic Half-Space Analysis and for Half-Space Analysis according to Boussinesq
+ Self-explanatory tasks, which only require specific input for the corresponding analysis method

Action Manager in SSD

+ Actions are no longer managed in SOFiPLUS(-X) but directly in the SSD
+ Automatic synchronisation with the actions tab of the Load Case Manager in SOFiPLUS(-X)







Consistent Support of Design Elements

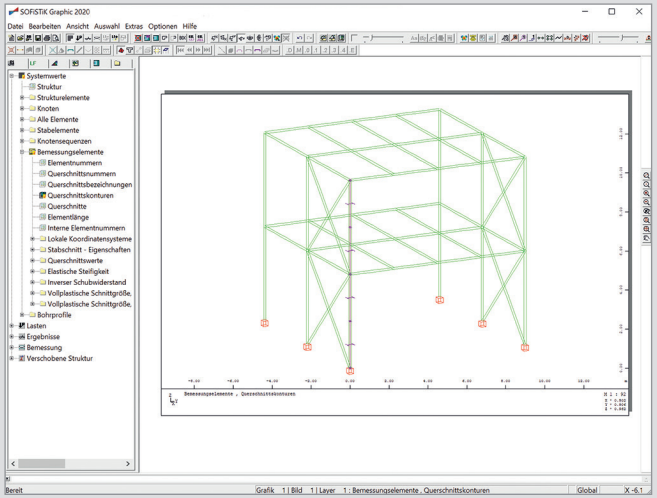
+ Flexural buckling and lateral torsional buckling checks on design elements
+ Member plots in the report give an easy overview of the boundary conditions
+ Design elements are fully integrated in all postprocessing tools, making different graphics and tables available for a detailed result documentation

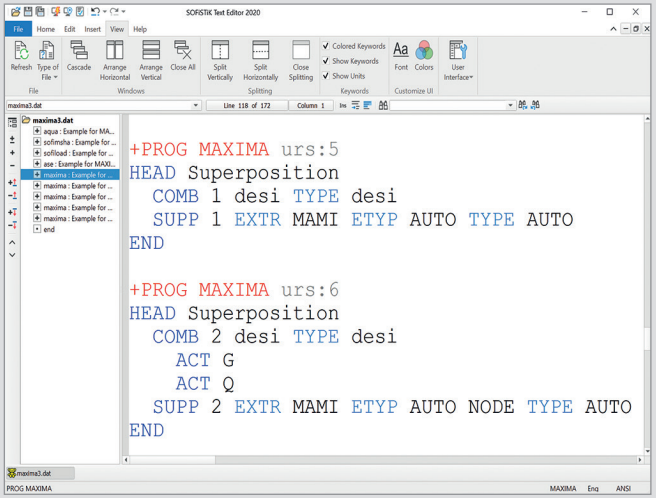
Superpositions

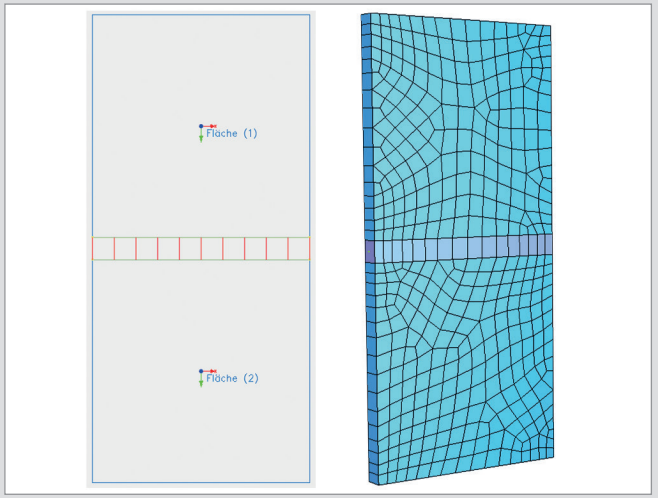
+ Superposition of equivalent stresses (von Mises) for area elements and their nodes using literals or objective functions based on corresponding stresses
+ New option AUTO for the automatic superposition of all element types available in the system and their corresponding scalar variables or of all available scalar variables for selected element types

Nonlinear Interface Elements

+ New interface elements for simulation of soil-structure interaction
+ Robust interface behavior under compression by mesh adaptive stiffness control
+ Automatic derivation of interface strength from strength properties of adjacent soil bodies
+ Limitation of shear transfer and shear plastification (Coulomb material law)
+ Limitation of tensile stress transfer accounting for possible cyclic loading characteristics







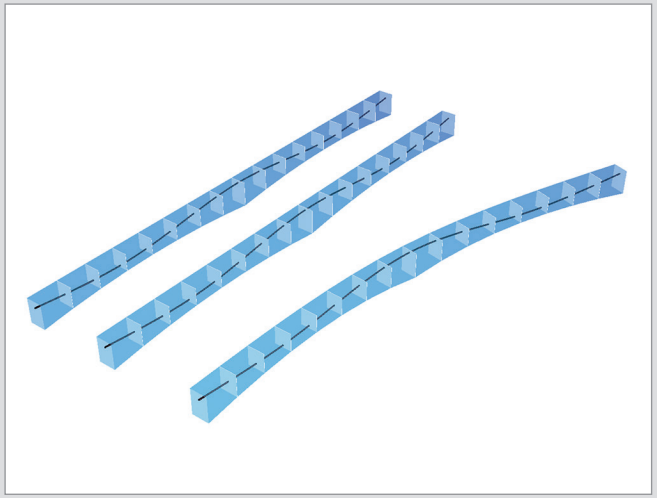
SOFiPLUS(-X)

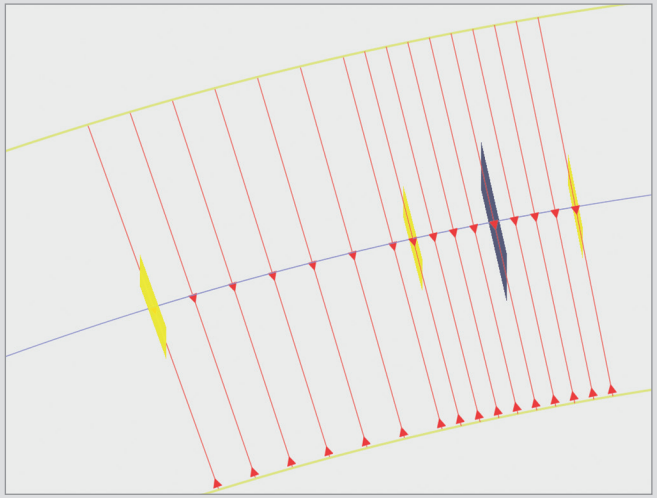
Workflow Bridges

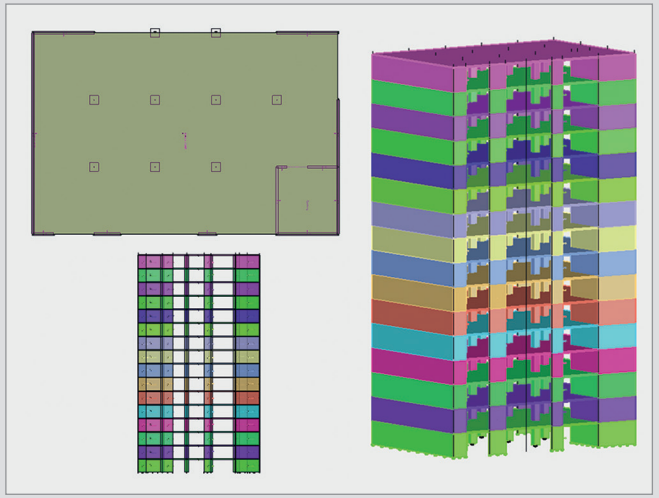
+ Tendons and beam cross sections on secondary axis follow placement rotations
+ Tendons can be copied to another axis. The newly created tendons adopt the stationing from the original axis, even when the geometry of the axes may differ.
+ Structural areas along an axis can be generated over the whole bridge length in one step
+ Elements, which recur along an axis (cross members, transverse tendons) can be copied between two placements

Structural Elements

+ Generation of nonlinear Interface Elements
+ Cut lines can now be assigned with group numbers, which can then be used in the graphical postprocessing
+ The group number of an element can be adjusted subsequently. Group numbers of different element types (e.g. structural line and structural area) can be changed in one step.



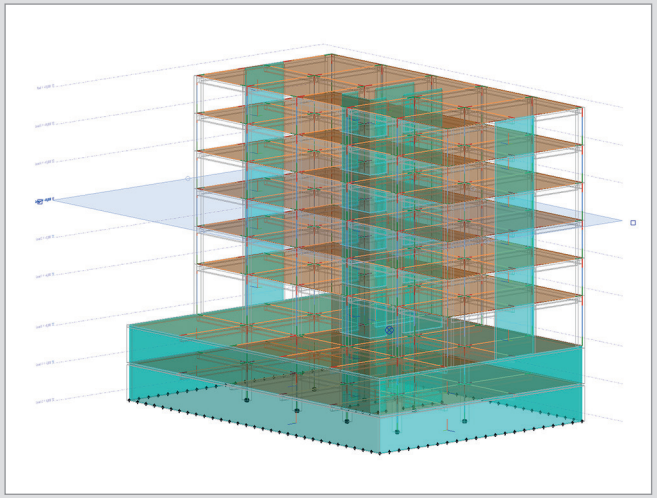


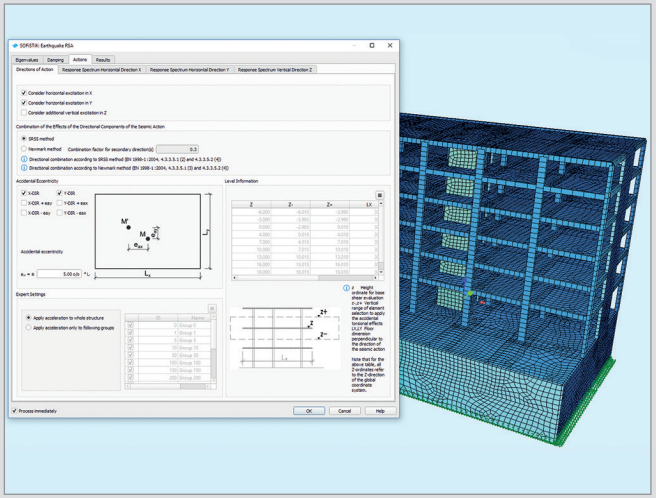


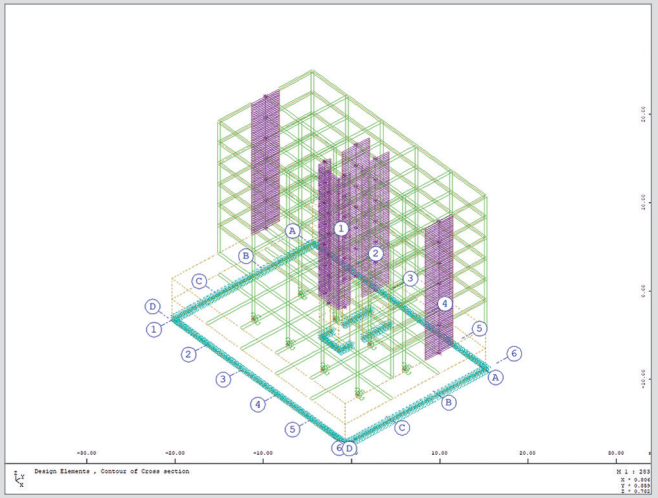
BIM Workflow Seismic Design

Ideally, the revised workflow starts out of Autodesk Revit, because model information, like storey levels, can comfortably be transferred to the SSD and be used there for further analysis. The workflow can also be started with a system definition using SOFiPLUS (-X) or a Teddy task.

+ Design of stiffening elements from Autodesk Revit
+ Design Elements can be activated for Walls in Revit for the seismic design of shear walls within the SSD
+ Wall results can be displayed as resulting beam forces
+ Storey levels of the Revit model are recognized during analysis and generate results (e.g. center of mass or rigidity)
+ SSD task for earthquake with clearer design and new option Newmark for the superposition of the main directions
+ New tasks for design under seismic loads of beam and area elements
+ Generated Design Elements and corresponding results can be further used for superpositioning, design and result evaluation







SOFiSTiK Analysis + Design with Interface to SOFiSTiK FEA

New Modelling Possibilities

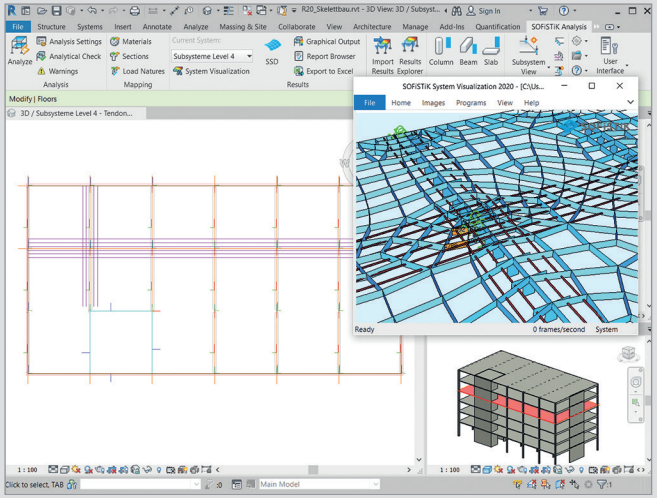
+ Tendon projections can be defined in concrete slabs in Revit for analysis and calculation in the SSD
+ Design Elements can be activated for Walls in Revit for the seismic design of shear walls within the SSD
+ A new Structural Property enables the definition of Cables and Truss elements

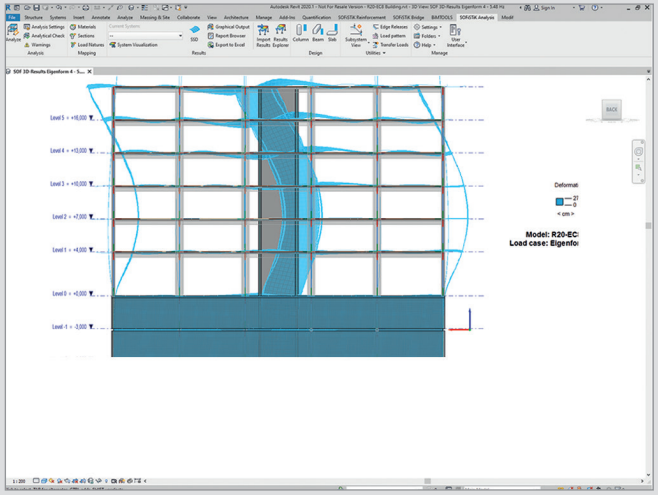
SOFiSTiK Structural Properties

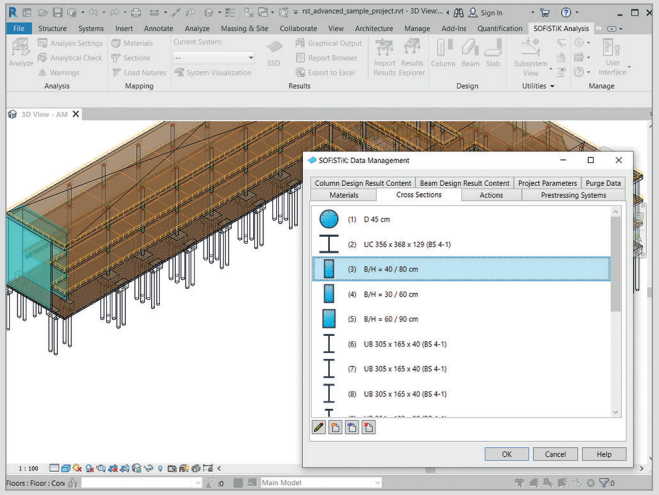
+ New SOFiSTiK Structural Properties are available for Revit Boundary Condition elements
+ A user-defined assignment of SOFiSTiK structural element numbers is now possible for Revit's analytical elements
+ Revit analytical nodes can be assigned a number to generate corresponding SOFiSTiK Structural Points for easy identification and referencing

SOFiSTiK Data Management

+ The new "SOFiSTiK Data Management" allows to control, adjust and purge SOFiSTiK related information like sections and materials saved in the Revit file
+ The user can now set the folder to be used as working directory for all SOFiSTiK-related files of the project







SOFiSTiK Analysis + Design

Improved Usability

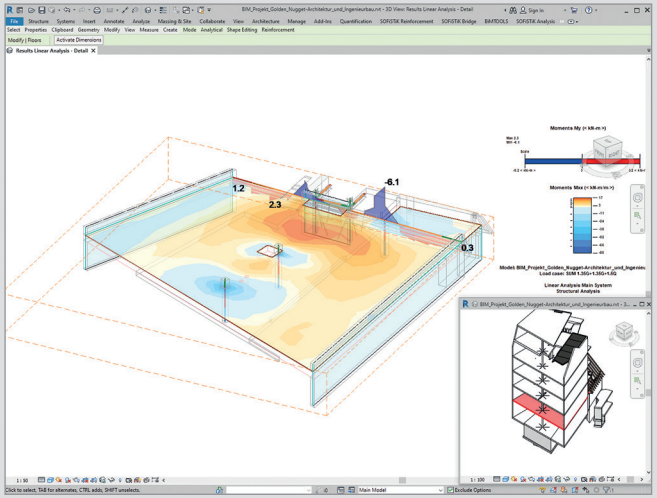
+ New command ‘Filter Loads’ enables checking and selective display of Revit loads in the model
+ Improved graphical load transfer between subsystems
+ Improved section mapping now also supports elements such as design elements (wall) cross sections or haunched beams

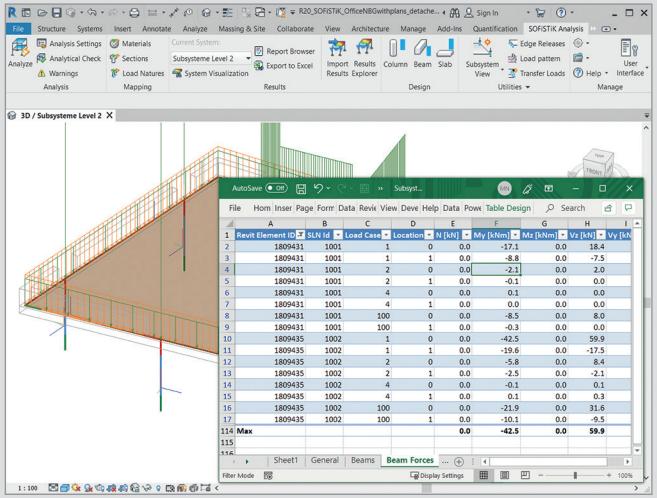
More Export Formats

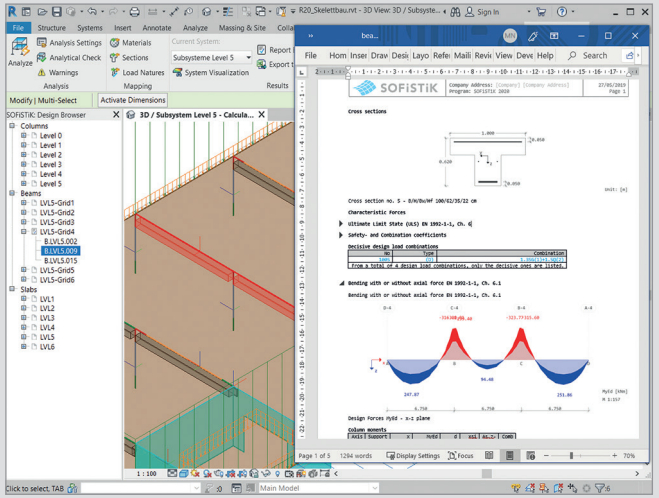
+ Easy and rapid generation of result tables using Export to Excel
+ Report Browser reports of analyses and designs (*.plb files) can be exported as Word (*.docx) files

Member Design

+ The column design dialog preview also displays the reinforcement ratio
+ The user can change the Source Database used for a Beam or Slab design
+ The user can define his own combinations for Column design and Beam design



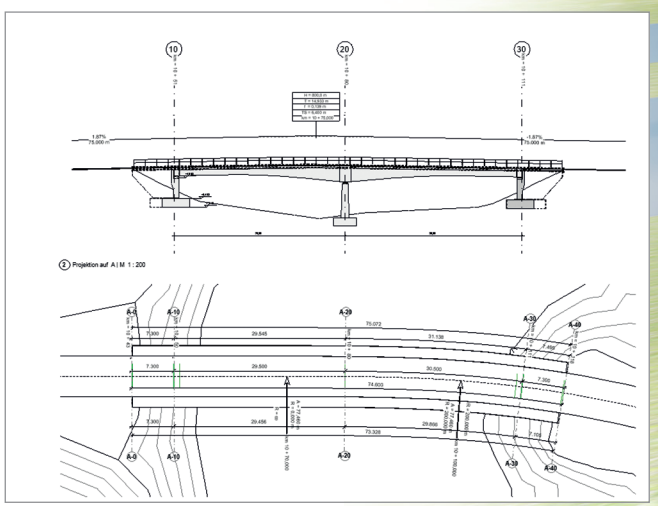


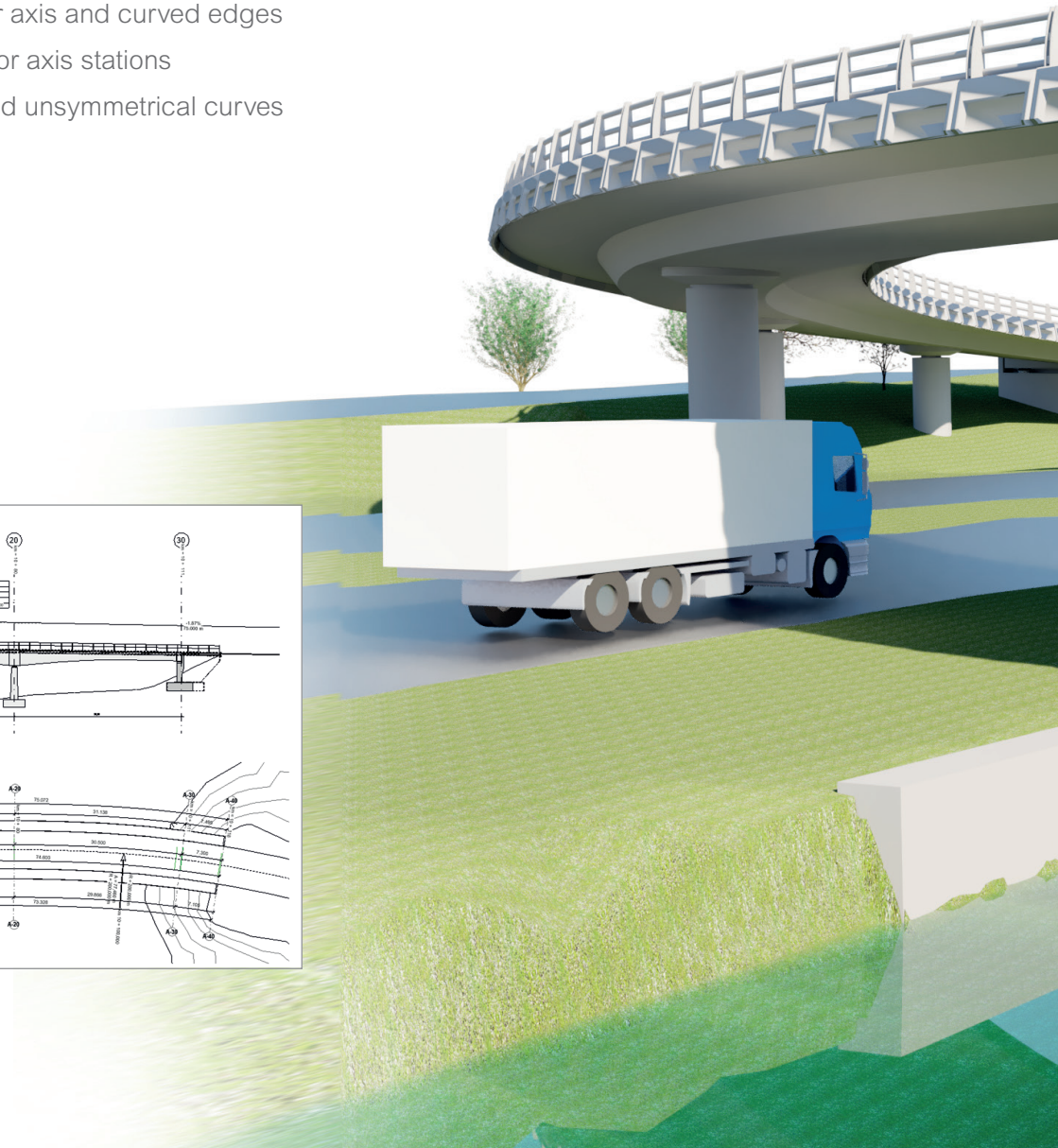


Multi Girder Bridges with the Bridge Modeler

The SOFiSTiK Bridge Modeller allows you to create parametrized bridge models in Autodesk Revit. The intuitive workflow and generic design have been expanded with additional commands for multi girder bridges.

+ New workflow for multi girder bridges
+ Creation of 3D elements along an axis according to different layout rules
+ Import of axes from external formats (e.g. LandXML)
+ Dimensioning tools for axis and curved edges
+ Annotation elements for axis stations
+ Support of circular and unsymmetrical curves for vertical alignment





Project: The American Road, Ramps 2 & 3 Bridges, Israel; Client: KEDMOR Engineers Ltd., Tel Aviv, Israel.

Reinforcement Detailing / Reinforcement Generation

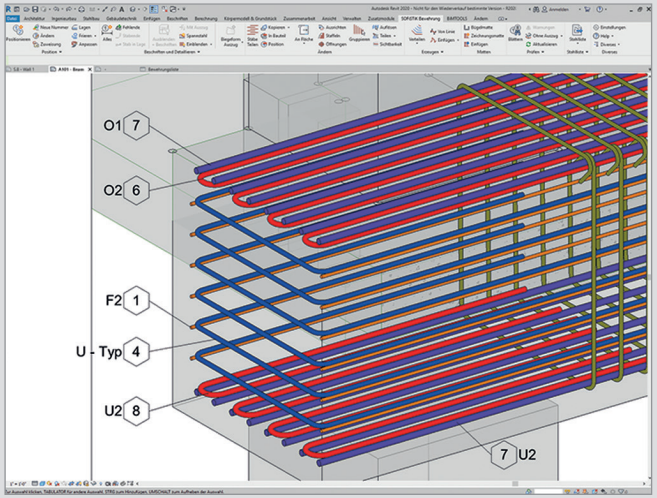
Reinforcement Detailing

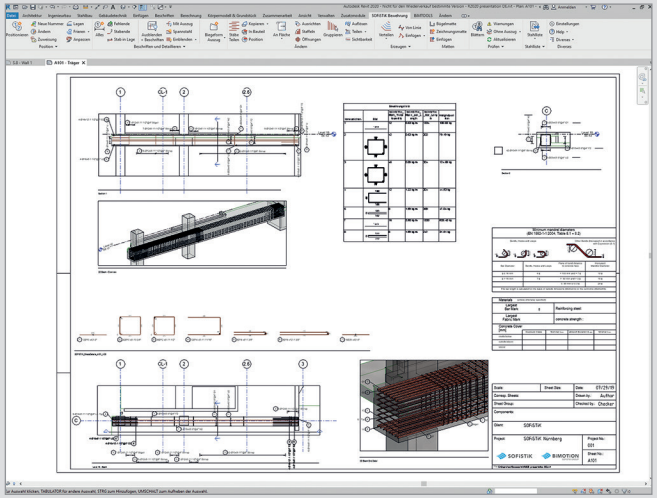
+ Unfreeze and Freeze tool supports all rebar elements and parameters with the new Freeform Rebar Technology (e.g. rebar numbering, worksets, Mass per Length and rounding override)
+ The functionalities Stretch, Trim, Move and Rotate rebars have been improved to create varying rebar sets instead of rebar container
+ Shape symbol for annotation elements
+ Improved Shape Detail options: Creation of Partial Shapes, Creation of All Shape Details
+ Extended List tool dialog to show reinforcement elements with their connected detail elements in a reinforcement browser hierarchy
+ Support of rebar coupler with automatic bar assignment
+ Rebar segment table with lengths and angles for nonstandard 2D and 3D shapes, also as parameter for DOCX bending schedule

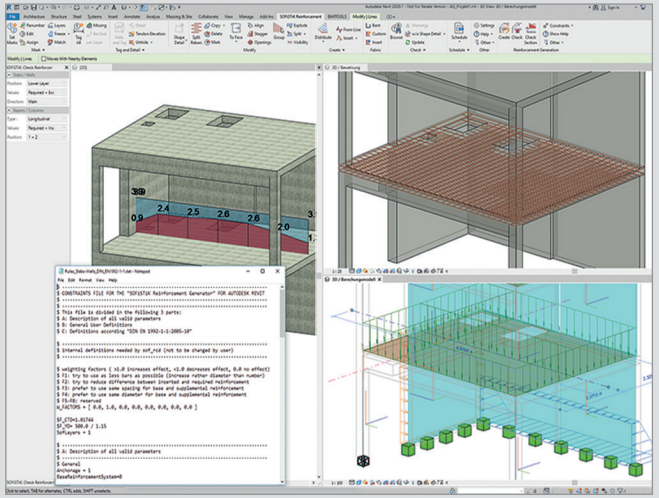
Reinforcement Generation

SOFiSTiK Reinforcement Generation generates a 3D rebar model based on design results. It allows the comparison of existing and required reinforcement for checking purposes. The generated reinforcement stays fully modifiable in Revit.

+ Import and display of analysis and design results from SOFiSTiK database (CDB) as well as from Revit Result Packages
+ Automatic generation of reinforcement bars for beams, columns, walls and slabs. Optimized for results from SOFiSTiK Analysis + Design







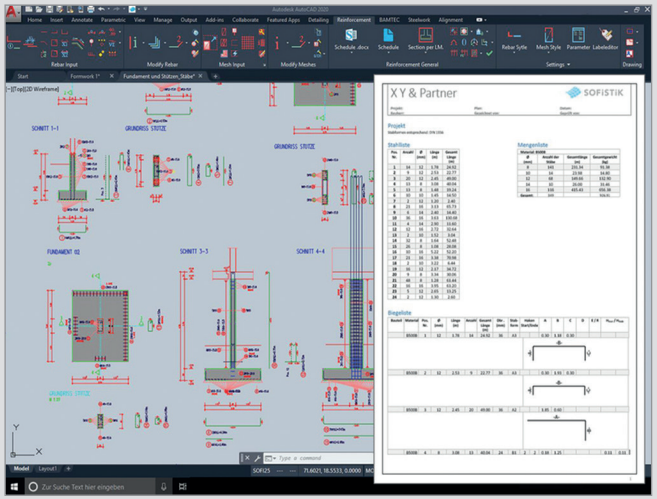
SOFiCAD (-OEM German only)

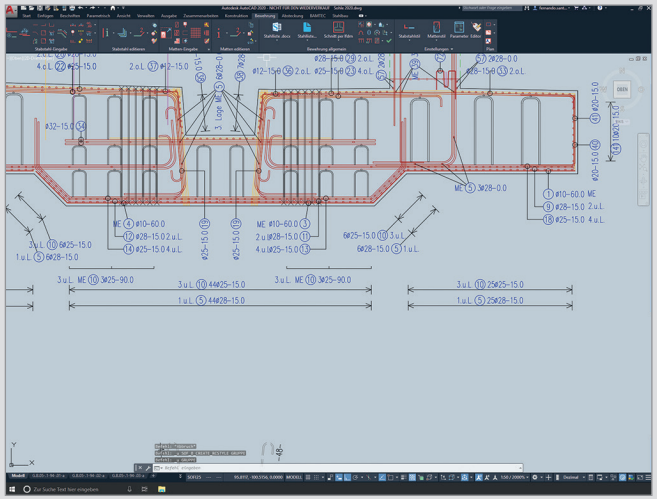
DOCX Reinforcement Schedule

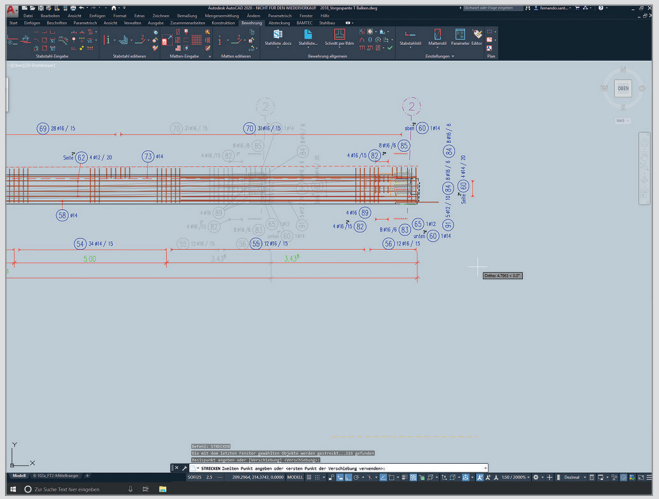
+ New DOCX reinforcement schedule as output format for Reinforcement Detailing and SOFiCAD
+ Schedule layout can be adjusted individually using templates
+ Image generation for description of bending shapes
+ Sum and difference schedules

New Reinforcement Functionalities

+ Poly-Layout: Automatic generation of multiple layouts along a polyline e.g. for complex cuts and edge reinforcement
+ Rebar-Info: Information about all used positions in the LOG-sidebar, including functionalities for finding, editing and deleting elements
+ Reinforcement-Check: e.g. for layouts without detail, quantity 0 or bending shapes with too short sides. All Information is shown in the LOG-sidebar.
+ Hand layouts can now also be modified by using the AutoCAD command STRETCH
+ Rebar details of linear layouts now create associative details for the formwork in order to modify the bending shape based on the formwork geometry.
+ Conversion process between the codes DIN and ISO now supports the bending shapes D2 and D3







Visual Programming Using Dynamo and Grasshopper

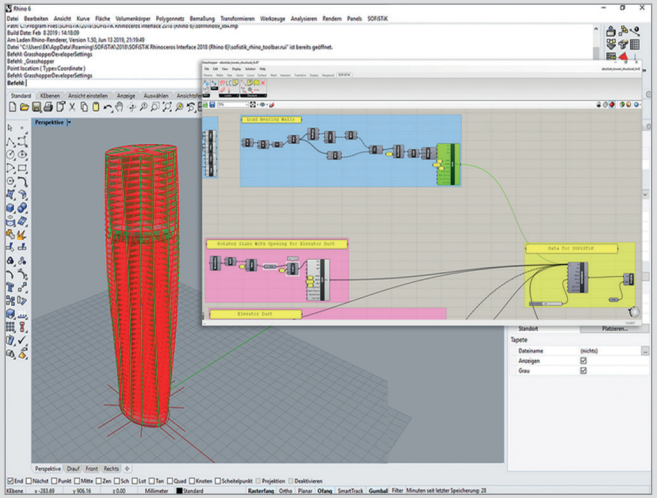
Visual programming is an easy and powerful way to implement project-specific adjustments.

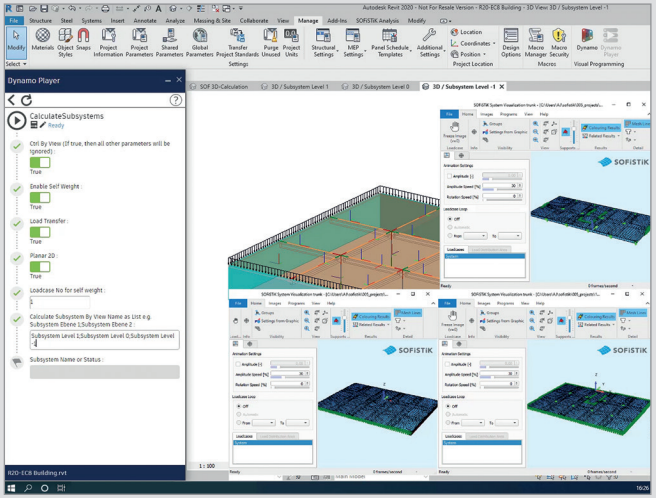
Free Grasshopper Toolbox for the parametric generation of structural elements in McNeel Rhinoceros. A SOFiSTiK license is only required for the analysis of the generated input file. Download via https://github.com/SOFiSTiK/gh_sofistik

+ Generation of geometry axis
+ Commands for structural elements
+ Load generation

Dynamo components for the evaluation of the analytical model and the further processing of SOFiSTiK results for main and subsystems in Autodesk Revit. Package Analysis + Design for 2020 via Dynamo in Revit.

+ Subsystem generation
+ Evaluation of member schedules
+ Evaluation of SOFiSTiK results
+ Example scripts for the Dynamo Player





Dynamo

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