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GRASSHOPPER TOOL

USER'S MANUAL

WORK PACKAGE 2
PARAMETRIC DESIGN FOR THE DECONSTRUCTION OF CONCRETE STRUCTURES

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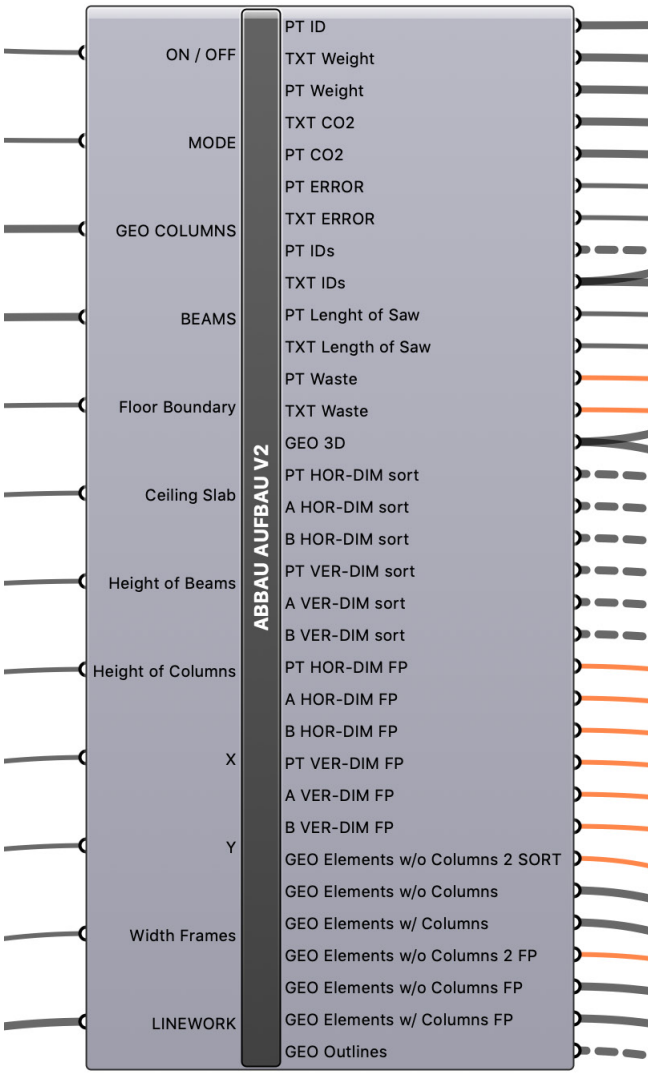
CLUSTER

All of the functions of the tool are united into one component-like cluster. For the cluster to work you need to have the following GH-Plugins installed: Pufferfish, Kangaroo2, Human.

INPUTS



OUTPUTS

WORK PACKAGE 2
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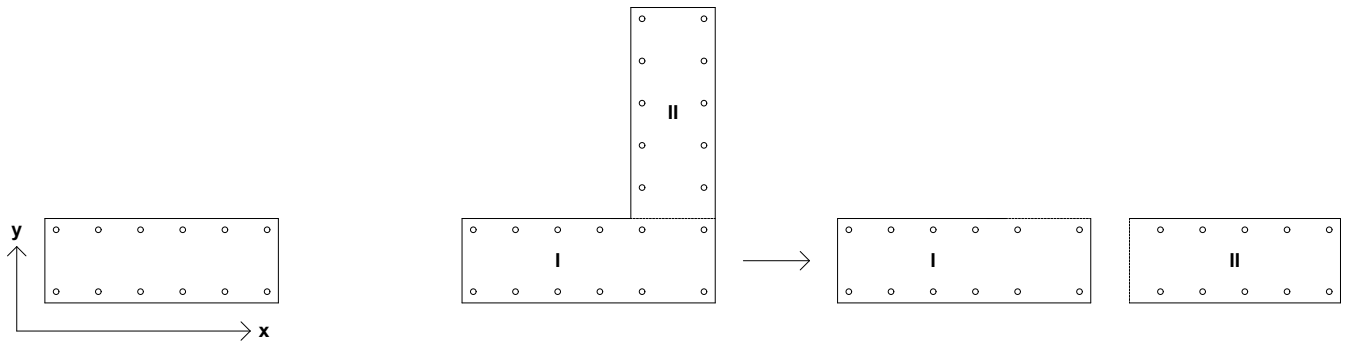
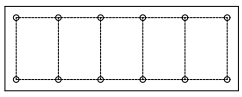
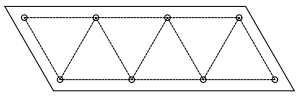
REQUIREMENTS



FLOORPLAN
- should be oriented with the long side along x-axis and short side along y-axis for best results
- if you have an L-shaped floorplan, subdivide it beforehands

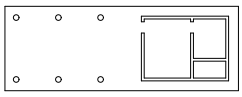


MODE 1, 2 or 3



MODE 3

COLUMNS
- should be in a regular pattern (column pairs on a rectangular grid work best for modes 1 and 2)
- if you have an irregular shape of floorplan or a non-rectangular grid, please use mode 3



MODE 3

WALLS (NO COLUMNS)
- if you have a floorplan without columns, reference the walls as beams and use mode 3
- adjust beam height to wall height

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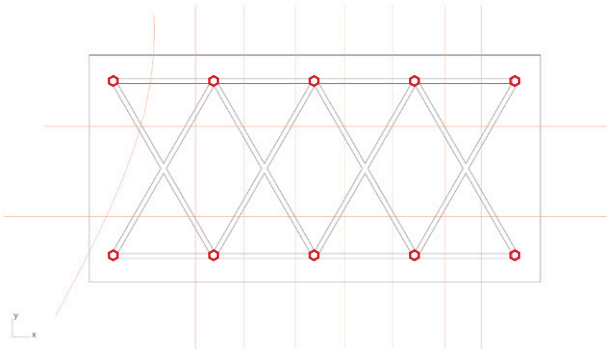
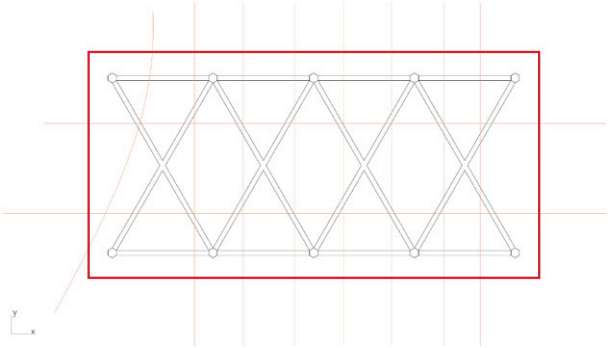
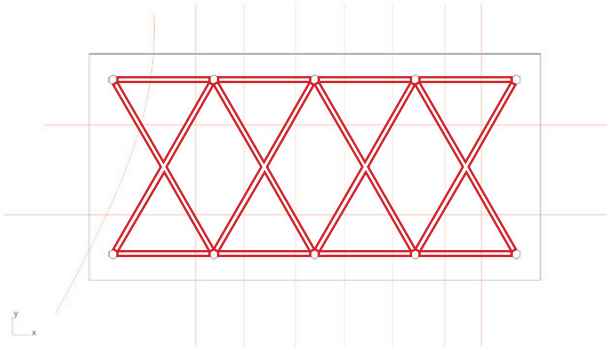
INPUT GEOMETRY



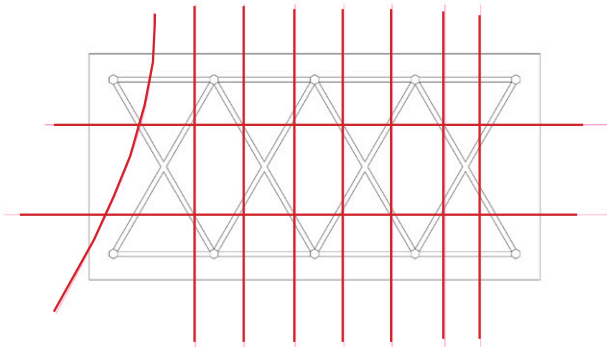
COLUMNS
2D-Geometry (Polylines, Curves)



FLOOR PLAN PERIMETER
2D-Geometry (Polyline, Rectangle)



BEAMS
2D-Geometry (Closed Polylines)



FOR MODE 3:
INDIVIDUAL CUTTING PATTERN
2D-Geometry (Lines, Polylines, Curves)

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INPUTS

ON / OFF SWITCH
Turns the cluster on and off. Recommended to turn off during assignment of new input geometry.

MODE
choose from three different cutting methods.

INPUT GEOMETRY
reference 2D-Geometry (Polylines, Curves) for columns in floorplan.

INPUT GEOMETRY
reference 2D-Geometry (closed Polylines) for outlines of beams in floorplan.

INPUT GEOMETRY
reference 2D-Geometry (1 Polyline) for perimeter of floor plan.

INPUT VALUE
enter value for slab thickness

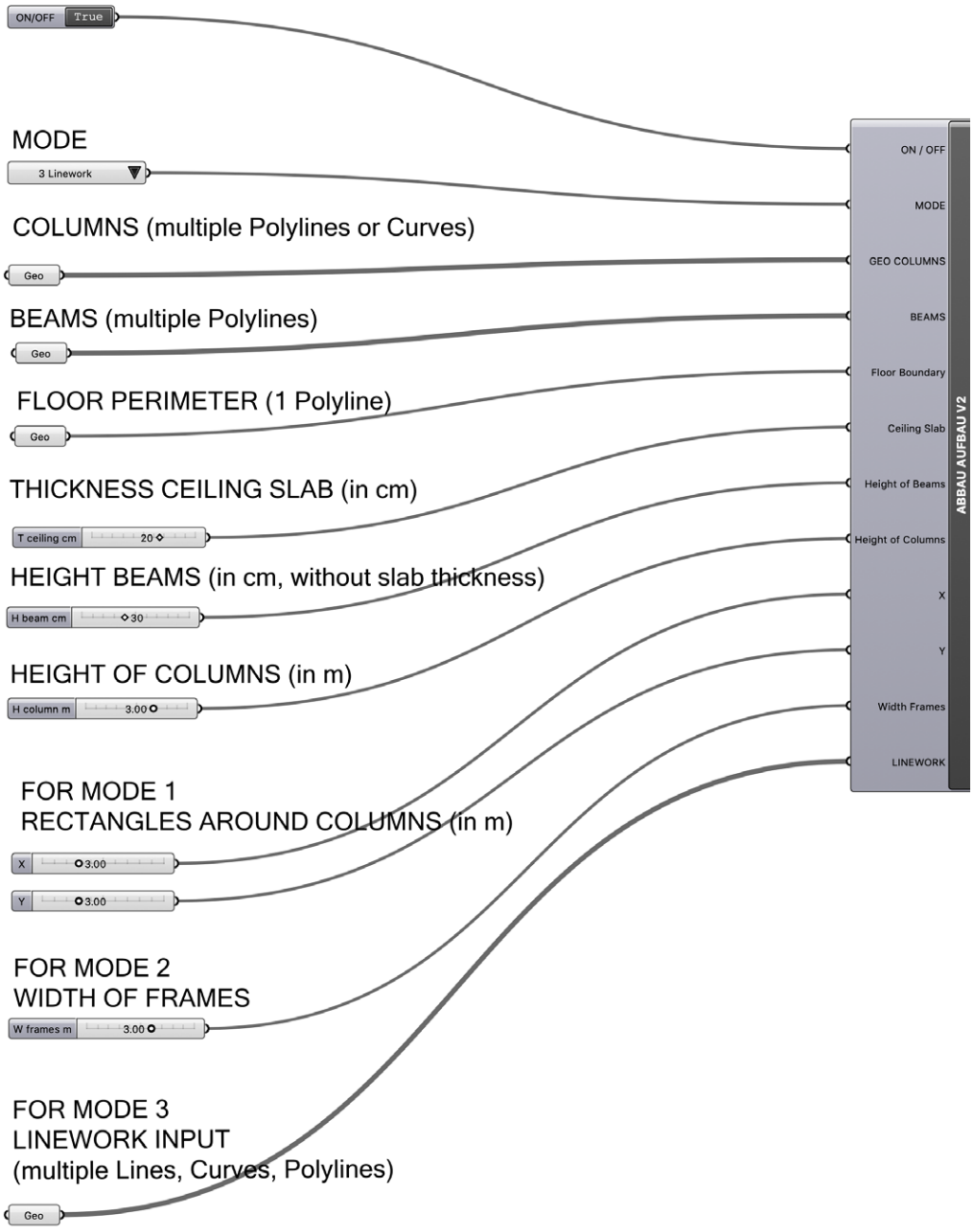
INPUT VALUE
enter value for height of beams

INPUT VALUE
enter value for height of columns

INPUT PARAMETER (MODE 1)
enter values for rectangles around columns

INPUT PARAMETER (MODE 2)
enter values for width of frames

INPUT GEOMETRY (MODE 3)
reference 2D-Geometry (Lines, Polylines, Curves) for manual cutting pattern



WORK PACKAGE 2
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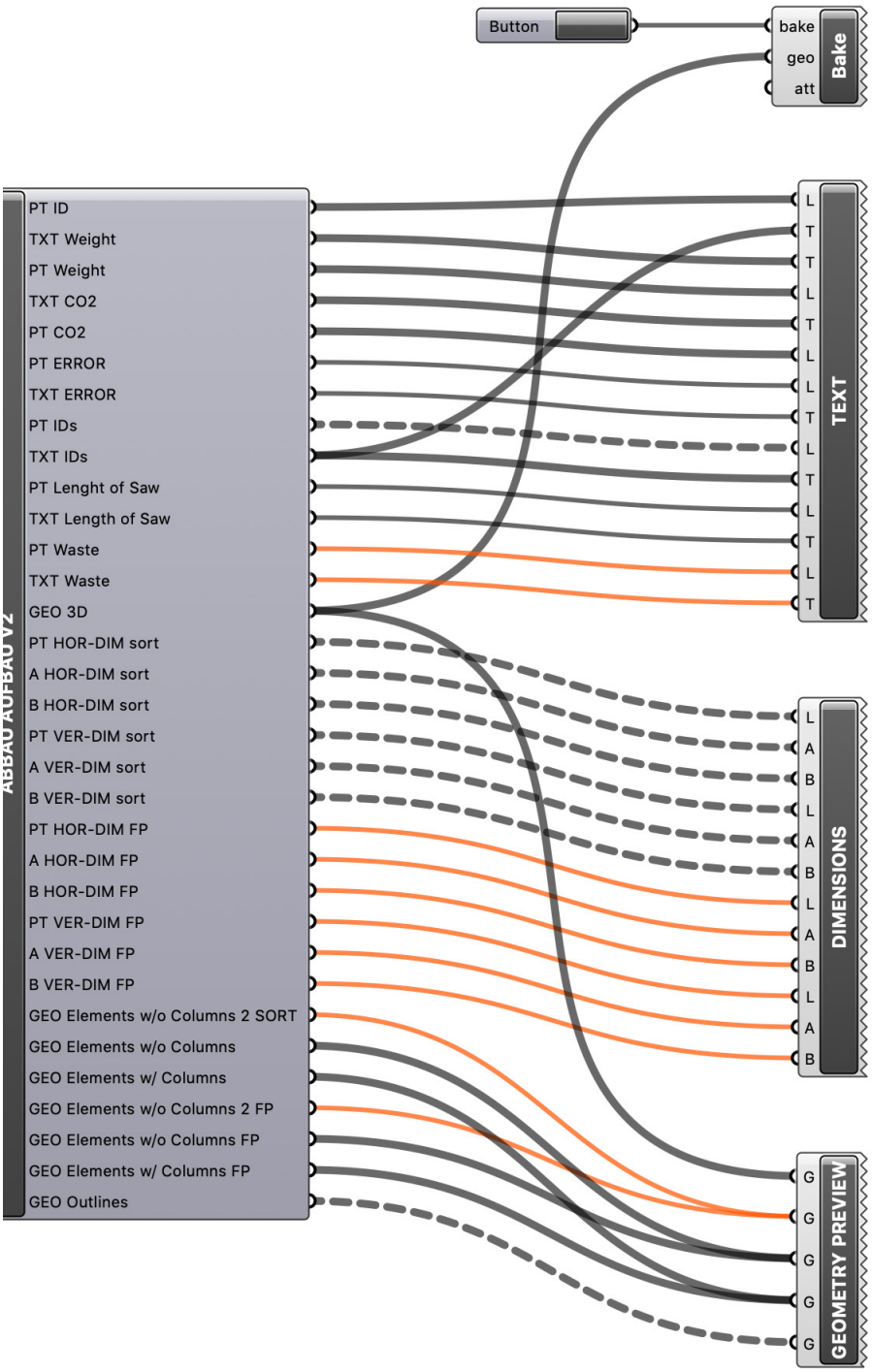
OUTPUTS



BAKE 3D-ELEMENTS
Button to bake the 3D-elements into Rhino-Breps.

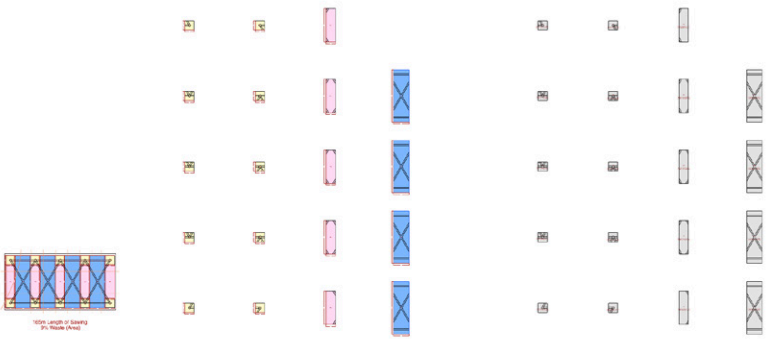
TEXT
Shows:
-IDs, Weight, embodied CO2 of each 3D-element,
- potential errors
- length of sawing
- waste percentage

DIMENSIONS
Linear dimensions of 2D-elements.

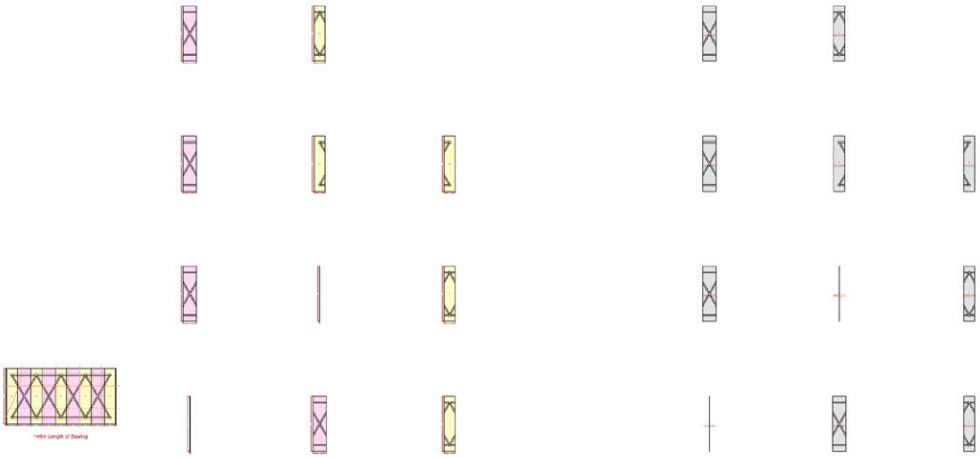
PREVIEWS
Shows previews of 2D- and 3D-elements.

OUTPUT GEOMETRY

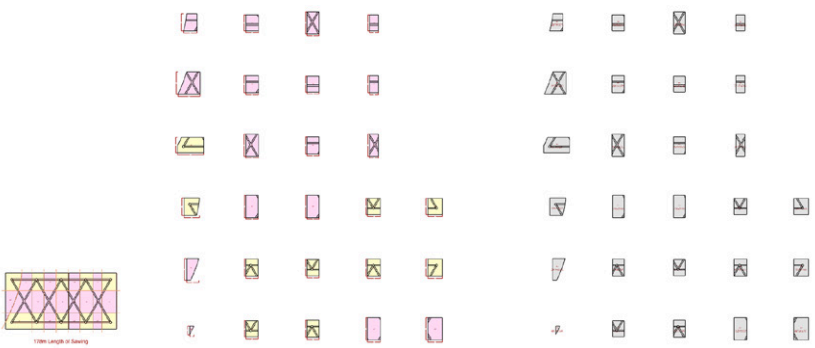
MODE 1 - COLUMN MUSHROOMS



MODE 2 - FRAMES



MODE 3 - LINEWORK (INDIVIDUAL CUTTING PATTERN)



WORK PACKAGE 2
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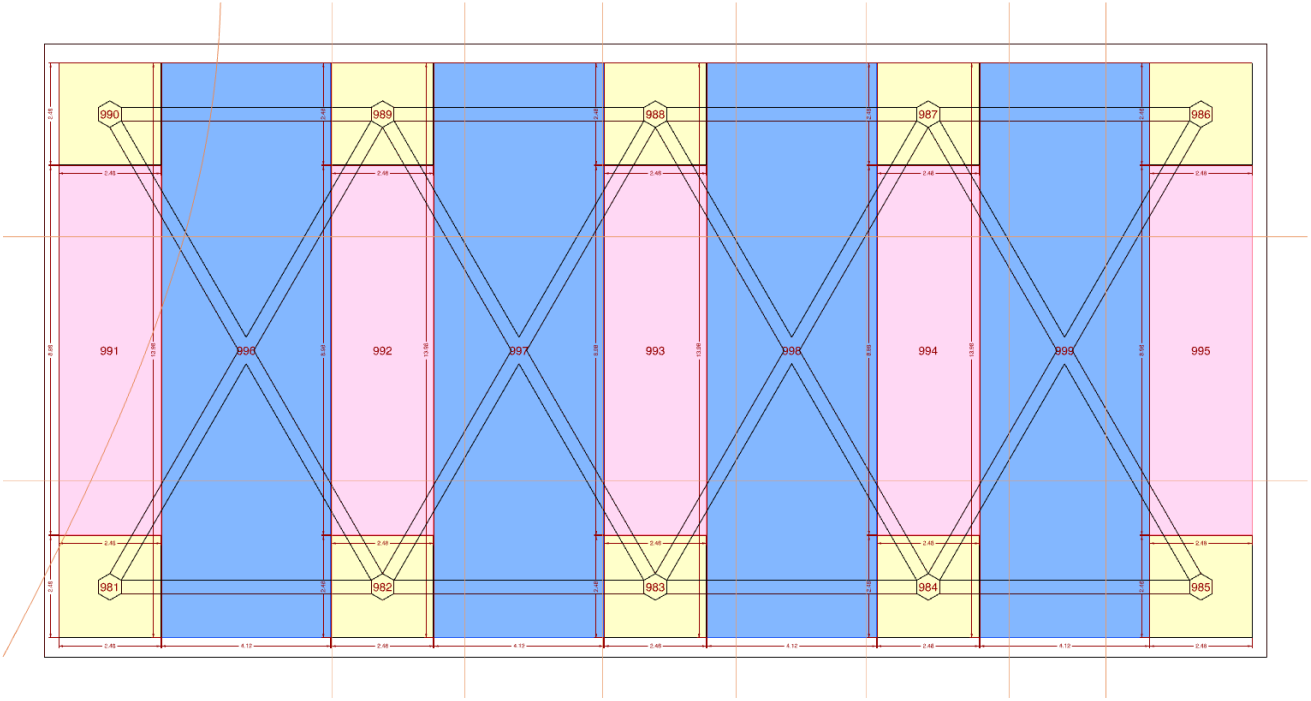
OUTPUT GEOMETRY



165m Length of Sawing
9% Waste (Area)

ORIGINAL FLOORPLAN

- Cutting pattern is displayed on original geometry
- different element types are displayed in different colors
- yellow = with column, pink = w/o column short, blue = w/o column long
- IDs are displayed on elements
- dimensions of elements and cutting patterns is displayed

- Length of sawing needed for this cutting pattern is displayed below
- potential waste area is displayed below

- potential errors (elements overlapping) are displayed below

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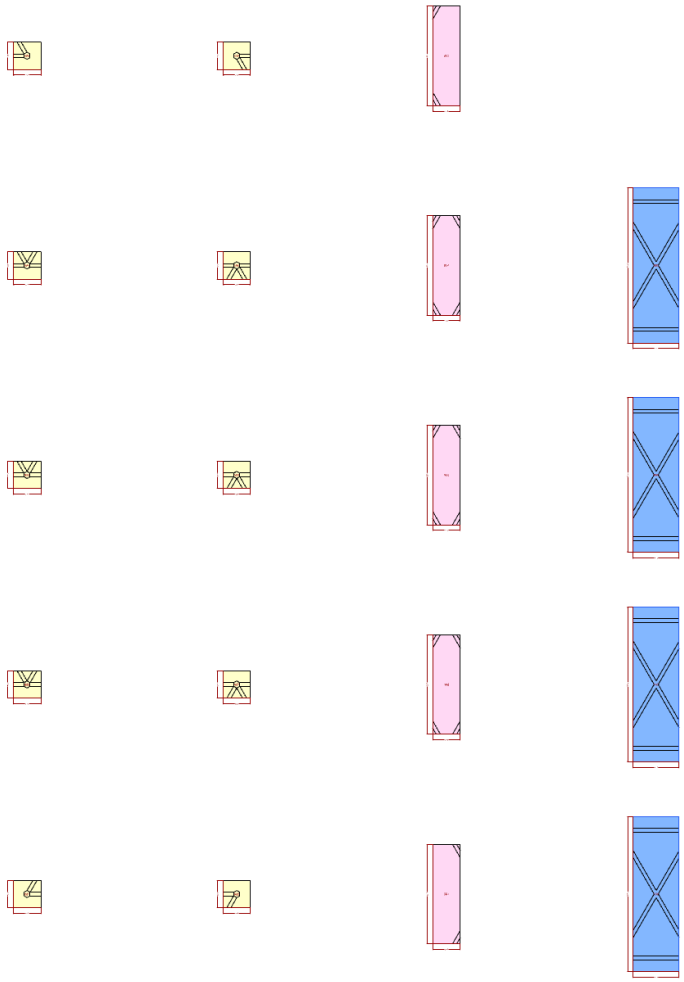
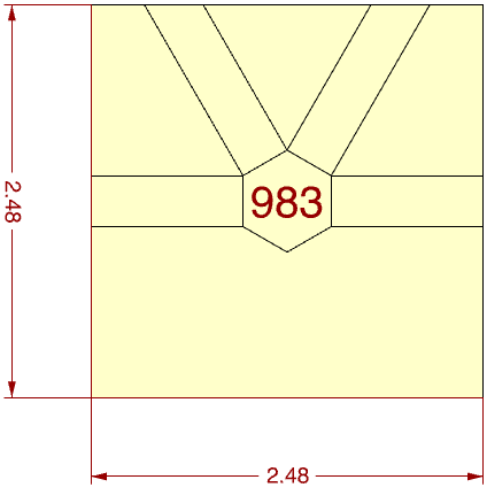
OUTPUT GEOMETRY





2D-ELEMENTS

- all elements are oriented on a grid
- elements are color-coded according to original floorplan
- geometry of columns and beams is displayed in 2D
- IDs are displayed on elements
- dimensions of elements are displayed

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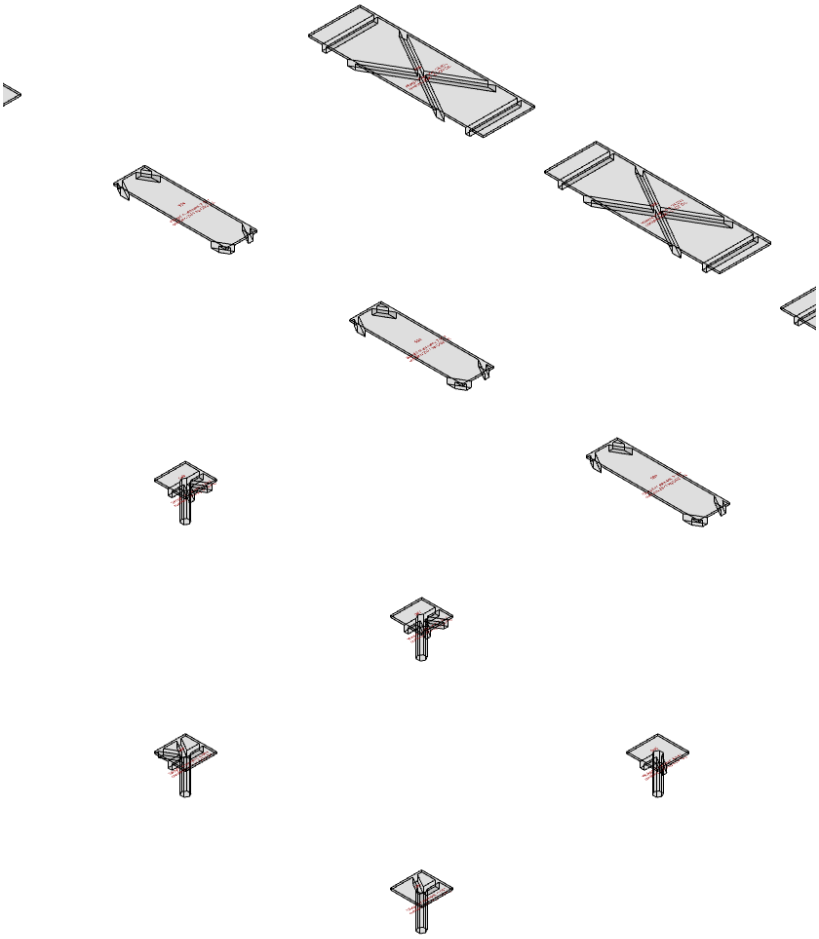
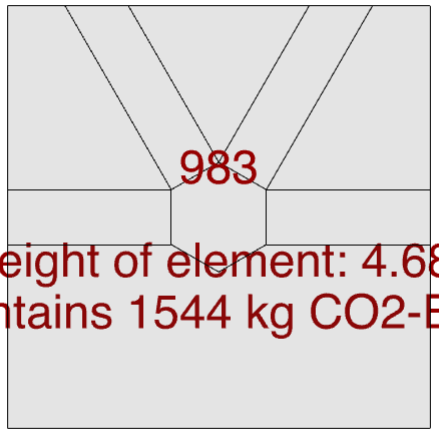
OUTPUT GEOMETRY





3D-ELEMENTS

- all elements are oriented on a grid according to orientation of 2D elements
- geometry of columns and beams is rendered in 3D (bakeable Polysurfaces)
- IDs are displayed on elements
- Weight of elements are displayed on elements
- embodied CO2-Eq. emissions per element are displayed on elements