Practical use of A-BIM with generative design for modelling of a sewage system

Subject:	DEVELOPMENT OF SOFTWARE SOLUTIONS FOR CONSTRUCTION ENGINEERS
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Study year:	2020/2021

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1. Problem description

Task was to model sewage system using tools of A-BIM – algorithmically modeled geometry transformed into BIM model containing BIM parameters and features. This model can be used for maintenance and management in IFC format.

Entire modelling was to be done parametrically in Grasshopper with Rhino.Inside plugin using Revit as a host program. All the input (coordinates and dimensions) had to be done directly in Grasshopper.

2. Problem solution

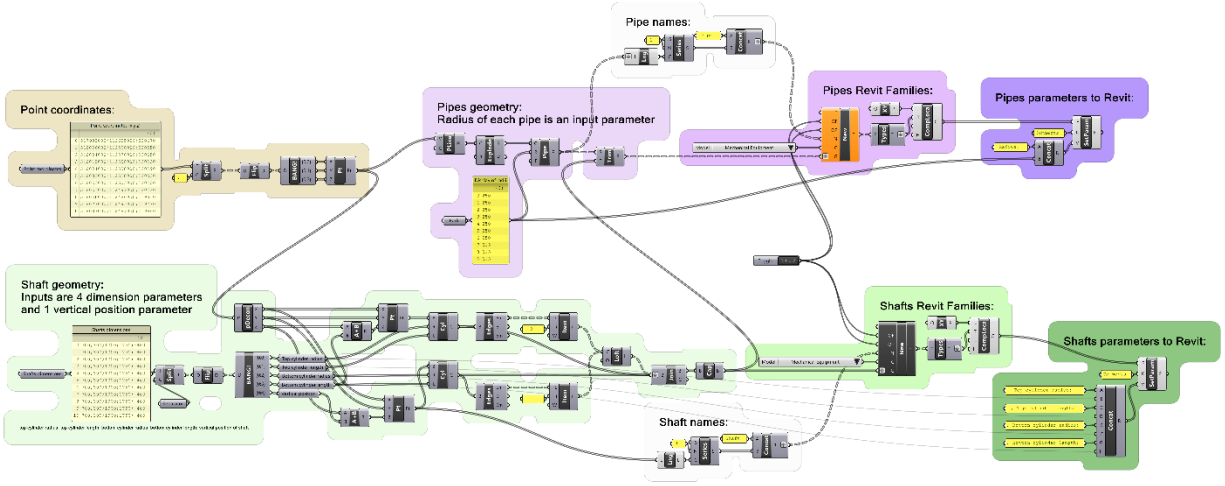

Figure 1. Algorithm of a parametric model (Grasshopper)

Point coordinates (x,y,z), set in the input table are basis for creation of shafts and are also used to automatically generate pipes between them (brown group). Radius of each pipe can be modified individually in the input node of Pipes geometry (1st purple group).

Geometries of shafts are generated from base points with four dimension parameters, and with one additional parameter for vertical deviation from base points. All parameters can be modified individually in input node in Shaft geometry (1st green group).

Geometries of pipes and shafts were consequently turned into native Revit Families (2nd purple and green group). Finally, numerical parameters of each family were pushed to Revit – radii for pipes, and radii and lengths for shafts (3rd purple and green group).

3. Graphic annex

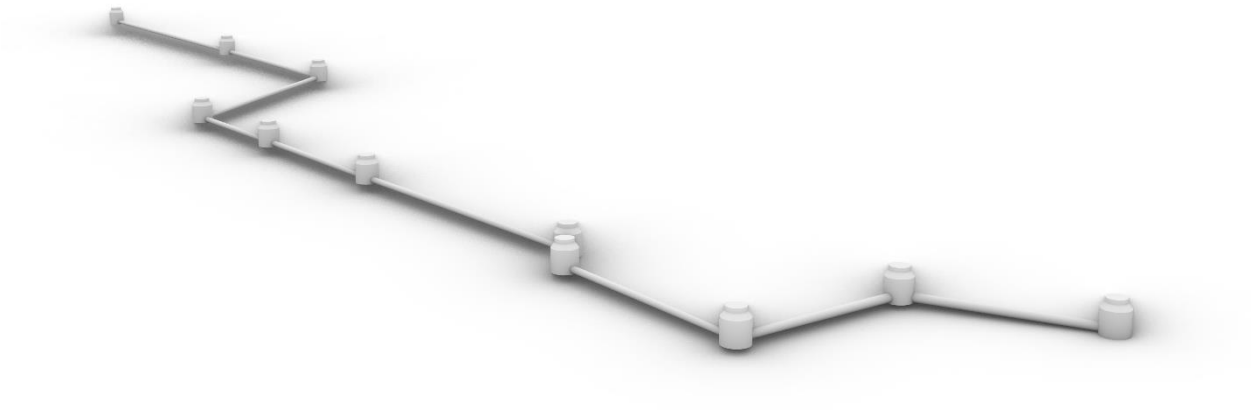

Figure 2. Perspective view (Rhino)

Figure 3. Elevation (Rhino)

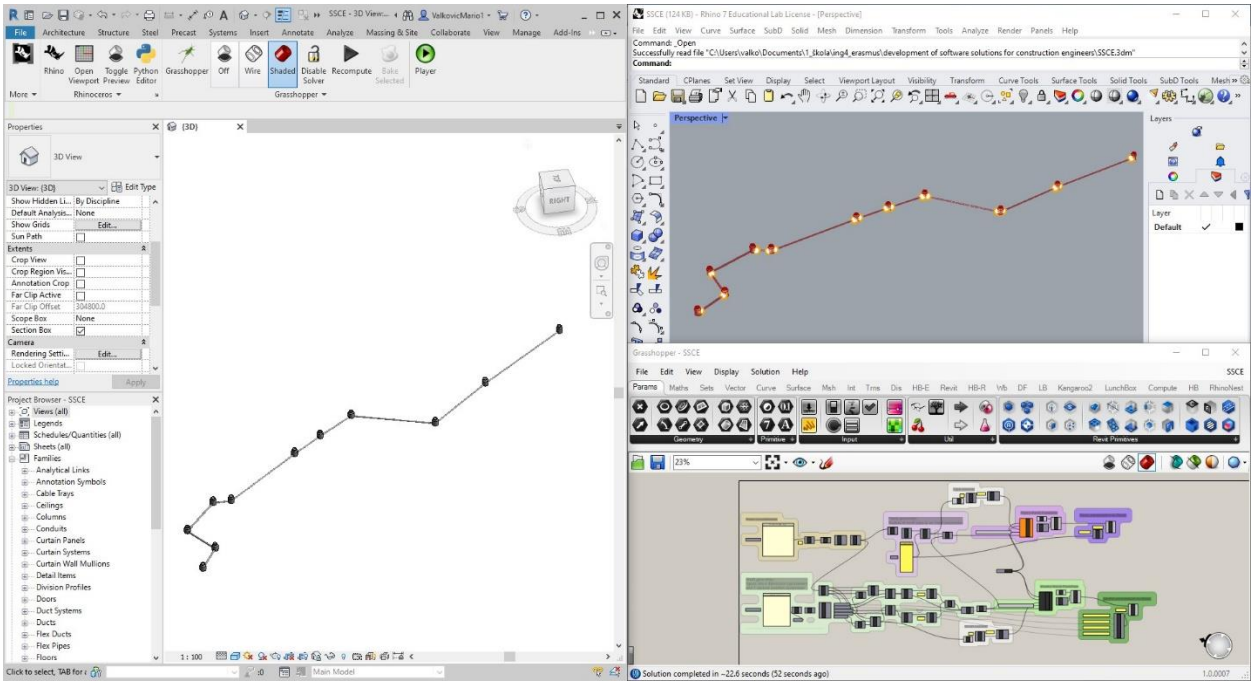

Figure 4. Revit plugin Rhino.Inside allows Rhino and Grasshopper to run inside of Revit

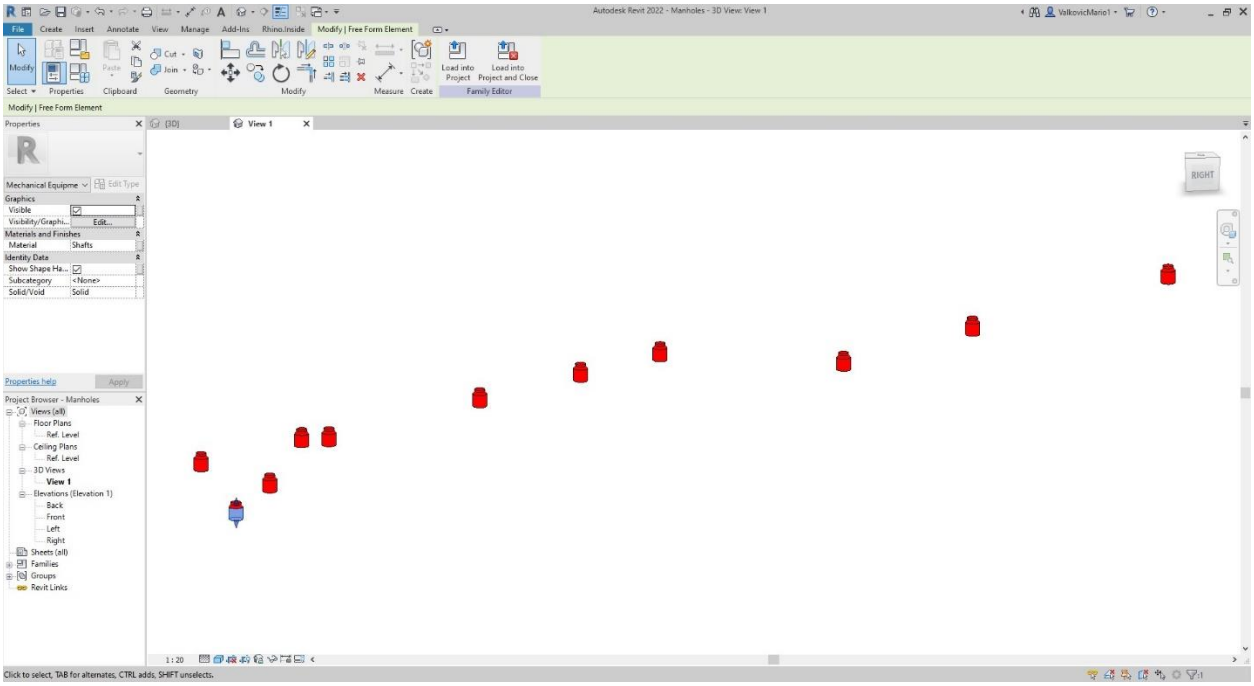

Figure 5. Shafts geometry as a Revit object (Revit)

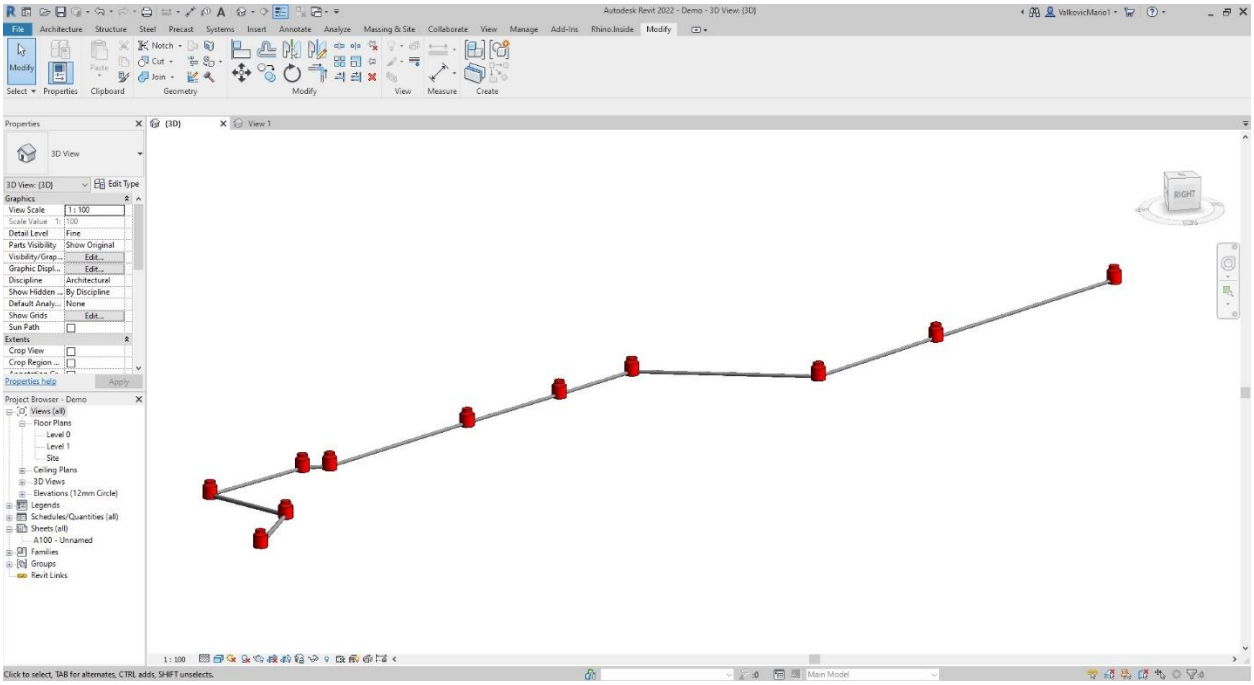

Figure 6. Shafts and pipes as a Revit Families object (Revit)

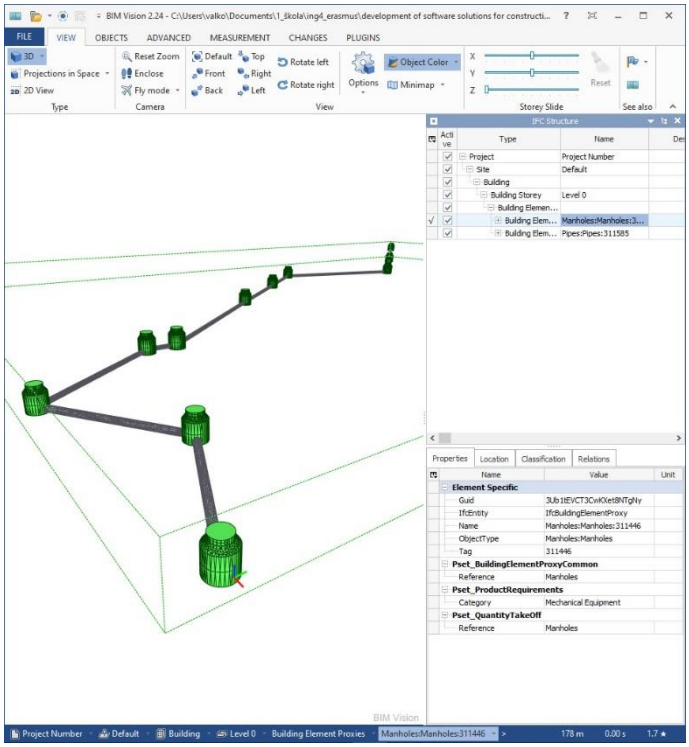

Figure 7. IFC exported from Revit – shafts (BIM Vision)

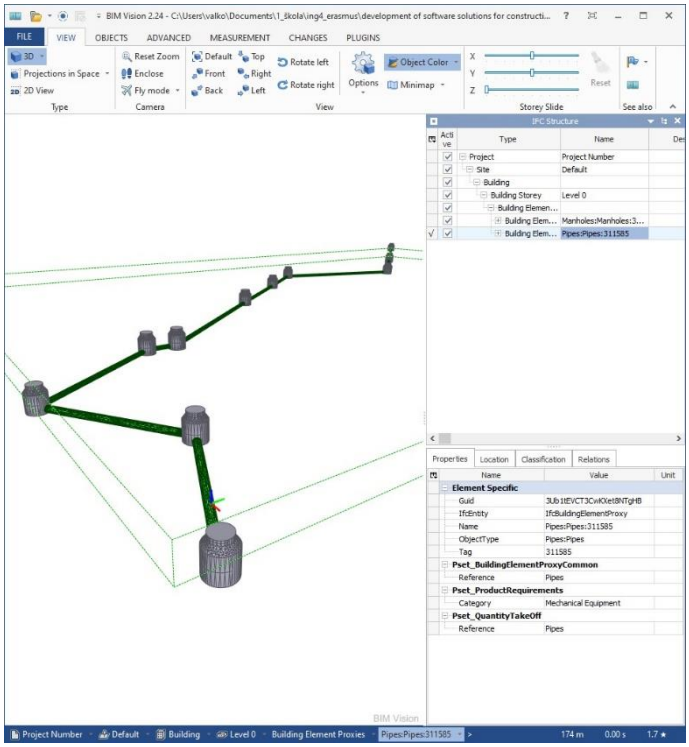

Figure 8. IFC exported from Revit – pipes (BIM Vision)