Tessellation

For vaults

Weaverbird Constant Quads Split Subdivision is used. It calculates an all-quad and same-looking mesh, which is derived by adding a face for any edge to the original mesh. For the refinement the level in constant quads was set to 3 which is the maximum number of subdividing iterations for each face.

For domes

Mesh+ Weighted Loop Subdivision is based on the implementation of Weaverbirds' subdivision the Loop subdivision. It introduces the option to modify the weight of smoothing or displacement from the original vertices. For subdividing the dome's surface two loops were used.

Welding

For welding Weaverbird Join Meshes and Weld) was chosen. It returns a singular mesh object made out of a list of meshes. The new mesh is lighter meaning that the footprint of the new mesh is less than the sum of the originals. The final step before passing the data to kangaroo was to fix any inconsistencies in the directions of the mesh surfaces'. For this purpose the component Mesh Unify Normal was used.

Dynamic relaxation

Kangaroo2 was the Gh plug-in used to dynamically relax the meshes. In order to achieve a precise relaxation the following script was developed. In this definition the mesh edges are assigned a certain strength, and the anchor points are imported manually from rhino. A vertical load is applied on the mesh surface to produce the relaxed mesh. The unified mesh was imported in Kangaroo2 and the dynamic relaxation of the ceilings was done separately for each mesh.