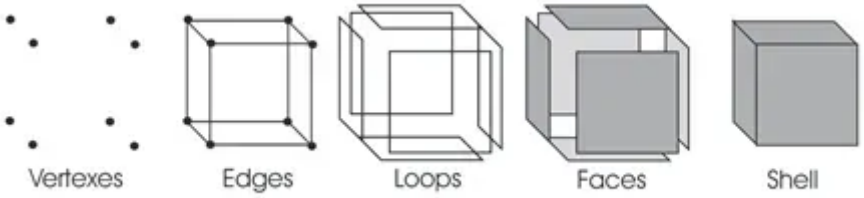
1.8 Geometry

The ability to represent three-dimensional objects with CAD programs has been around for over 30 years, starting with 2.5D functionality. To be able to represent three-dimensional objects and not just surfaces in space, BREP and CSG technologies were added. The IFC schema supports different geometry representation methods. Depending on the geometric method used, different results are obtained. The quality and method of the geometry determine whether elements can be reused in cadwork.

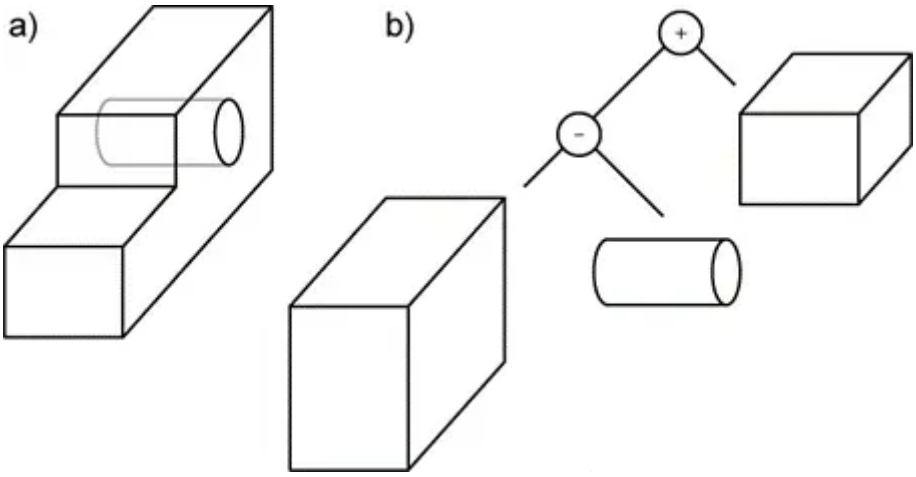
1. Explicit modeling with the B-Rep (Boundary Representation) method is a geometric method for creating any 3D geometry from boundary surfaces that completely surround an object geometry. With the B-Rep method, only the result of creating an object on boundary surfaces is saved.
2. The volume is described by the surfaces that delimit it.
3. Complex shapes are described with a high number of facets.
4. Representation of non-planar surfaces -> NURBS (non-uniform rational B-splines). This method can be used to construct free-form surfaces.



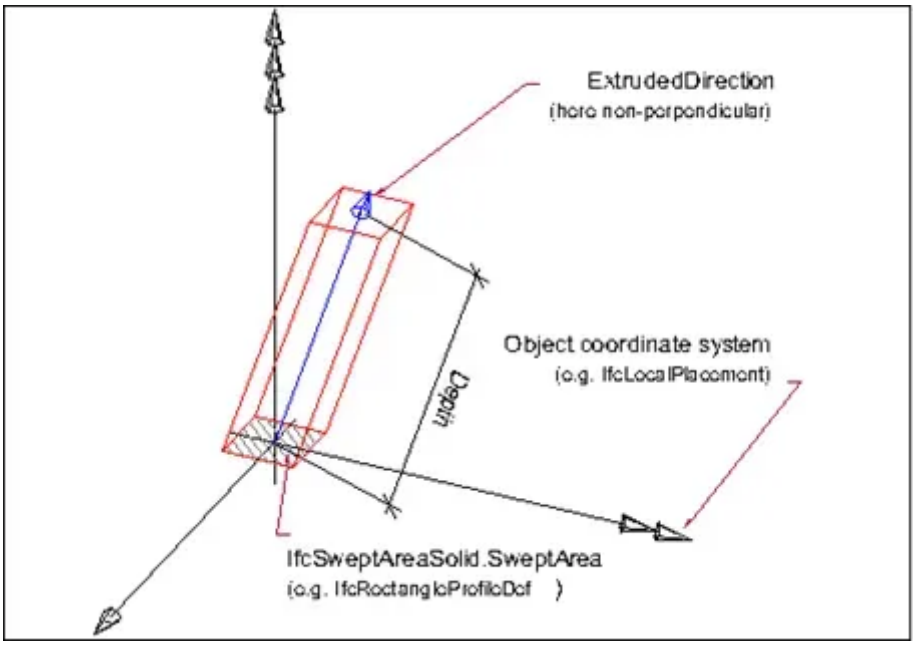
1. CSG implicit modeling ((Constructive Solid Geoemtry), Extrusions, Rotations) is a geometric method for creating any 3D geometry from operations between basic objects.
2. The volume is described by a succession of construction steps. The modeling steps leading to the result are recorded (history).
3. When converting to cadwork elements, Boolean operations are performed. The resulting geometry can be used for production, for example, if factors such as

accuracy are compatible.

4. CSG



1. Extrusion
2. The surface (Area) is extruded along a directional vector



Source: standards.buildingsmart.org