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## GEOMETRIC PRINCIPLES OF IMPOSSIBLE OBJECTS

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This work presents some geometric principles that allow to manipulate the perspective of an object, thus allowing to create impossible objects, or – in more precise words – objects that are believed to be impossible when we judge them upon our habits and experiences from everyday life. Strange behavior of mentioned objects may demonstrate itself in their shape or in a dynamic observation, when the observer moves in relations to the object.

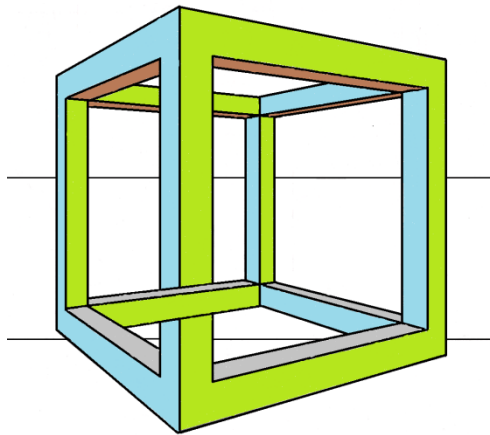


Fig. 1 An example of an impossible object, which still can be build.

One of the most characteristic properties of a perspective is the possibility for different interpretation of the projection. This is a consequence that perspective uses only one projection's plane. This may often lead to a wrong localization of points in space. According to rules of collinear perspective, every point on a straight line going through the centre of projection, will be projected at the same position on the projection's plane. This means, for such straight lines, there are infinite

number of points with their perspective at the same position. This property alone gives a huge freedom in manipulating the perspective. When the proper perspective “look” will be preserved, the author of the manipulation can predefine a chosen way of seeing the space and the object. Most objects will be recognized after an analyse of seen perspective (which – as we know – can be interpreted in many different ways) and by comparison with objects stored in a memory.

Among most popular principles that allow the creation of impossible object are:

- Principle of manipulation of the shape
- Principle of manipulation of concave / convex forms
- Principle of manipulation of visible / invisible elements

Each principle will be shortly discussed and explained on an example, showing how, according to the rules of perspective and against of our visual habits from everyday life, “impossible” objects can be created.