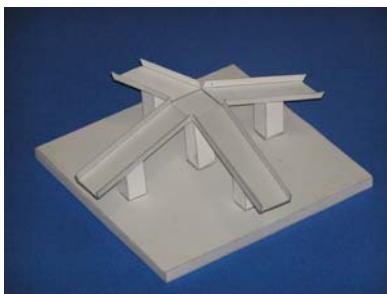


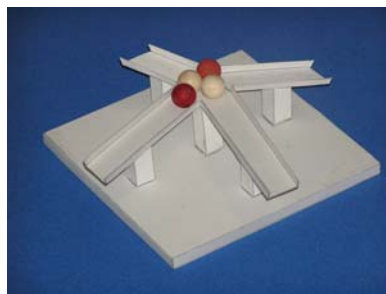
Impossible Motion “Magnet-Like Slopes”

Kokichi Sugihara

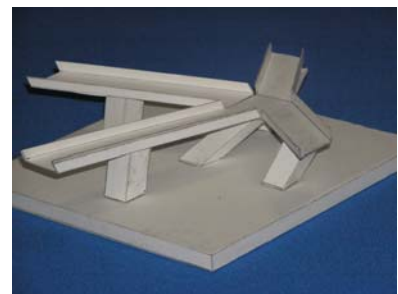
Meiji Institute for Advanced Study of Mathematical Sciences
Meiji University, 1-1-1 Higashimita, Tamaku, 214-8571, Japan
kokichis@isc.meiji.ac.jp



(a) Star-Shape Slopes



(b) Impossible Motion



(c) Another View

At first glance the solid looks like the four slopes going down in four directions as shown in (a). However, if we place wooden balls on the slopes, we observe impossible motion; the balls climb up toward the highest center just as if they were pulled by magnet as shown in (b).

The fact is that the motion is generated by the gravity. If we see this solid from another angle, as shown in (c), we can understand that the slopes go down toward the center, and hence the balls roll down to the common bottom of the slopes at the center.

This optical illusion might arise because humans tend to interpret pictures of solids as those made by right angles as much as possible. For this solid, in particular, humans tend to interpret all the five support columns being vertical and the longest column implying the highest.

This kind of optical illusion, which I named “Impossible Motion”, was discovered in my engineering research for machine interpretation of line drawings. In order to check the behavior of my software, I gave what are called “pictures of impossible objects” as the input expecting the software to judge them impossible. However, my software sometimes interprets “pictures of impossible objects” as actual solids, from which I found that some of “pictures of impossible objects” are not impossible; they can be constructed although general angles are used where they look rectangular.