Bricks Without Physics

Maximilian David
s1madavi 1349951
maximilian.david@uni–bayreuth.de

November 4, 2022

To eliminate the mixed interaction techniques while interacting with the bricks, the removal of all physics for the bricks was proposed. When turning off physics entirely for the bricks, by placing them into the "IgnorePhysics" layer, which was created when switching the hand models for the interaction sphere, the bricks would start floating or falling down infinitely due to not receiving physics or collisions anymore. Both these options resulted in highly unrealistic brick behavior.

To maintain a realistic brick behavior while not currently interacting with them, i.e. when they are thrown, it was decided to not turn the physics off entirely for the bricks, but just ignore any collisions while handling them. This approach still eliminates the brick glitches that were observed during the pilot studies by making picked up bricks not interact in any way with other bricks. This solves the problem of conflicting interaction techniques and simultaneously provides a realistic brick behavior while not currently handled.

Figure 1: Brick not affected by collisions

To realize the aforementioned solution, a new function "ignoreCollisions" was added to the "PlacedObject" class that all brick objects contain. This function switches the layer for the brick's game object to the "IgnorePhysics" layer, for which all collisions are ignored. To ensure that bricks only ignore collisions while they are currently handled, a call within "pickupBrick" and "releaseBrick" functions to the "ignoreCollisions" function was added. These are automatically called by SteamVR's hand system upon picking up any interactable object.

The next step in the bug fixing and development process will be the improvement of the snapping and position estimation system. This poses the most complex and challenging part of system improvement.