

Problem Set 1: Kinematics: One Dimensional Motion, Velocity and Acceleration

Design Engineering Challenge: “The Big Dig” 2.007 Contest Table Familiarization

The Spring 2004 contest table and possible machine concepts (“The Big Dig”, see <http://pergatory.mit.edu/2.007>) will be the focus of Design Engineering Challenges for this course. This real-world case will allow you to use your physics understanding to enable you to select a potential winning strategy and concept machine. The top N students from the class will be allowed to take 2.007 in the spring as freshman (they will have to take the machine shop/computer tools course 2.670 in IAP) if they so desire (only sophomores who have also taken 2.001 and 2.670 can normally take 2.007)

Explore the 2.007 website and familiarize yourself with the table’s geometry, scoring methods, and the kit contents. Play with the table and get estimates for how long it takes the balls to roll to the scoring bins if they are spun off the platter. Can you easily accelerate the platen within a fraction of a turn to get the shot-puts and/or the balls to fly off? What kinds of scoring strategies (e.g., move fast, score a lot with light mass, or move slower with big mass) do you think are most viable?

