

2014 Rover Challenge Course Obstacles

Obstacle #1 -- Asteroid Impact

This is a field of simulated asteroid debris (boulders) over which the rovers must navigate without avoiding the debris. The asteroid fragments range in size from 3 to 12 inches and are situated close together, touching each other. Proceed with caution.

Obstacle #2 -- Wrinkle Ridges

These ridges are produced as the crusts of moons contract when underlying material cools and shrinks. The wrinkle ridges are made of landscape timbers that are 3 inches thick, in different lengths. The ridges are all covered with crushed gravel.

Obstacle #3 -- Crater With Ejecta

This large crater is about 3 feet in diameter with a vertical height of 8 inches. Ejecta, the material thrown out of the crater on impact, are fashioned out of 2-by-4 and 2-by-6 lumber. The whole assembly is covered by gravel. Boulders are added to direct the rovers to traverse the large crater.

Obstacle #4 -- Rims of Craters

A lava flow has covered all but the rims of these older small craters, each about 2 feet in diameter and 3 to 6 inches high. The lava flow is simulated by three pieces of lumber 2-by-4, 2-by-6 and 2-by-8 stacked on top of each other. This obstacle is covered with a layer of gravel.

Obstacle #5 -- Lava Tubes

These ridges are produced when lava tubes collapse leaving bumps in the surface material. The ridges are made of varying widths of 3/4-inch plywood, stacked together and covered with gravel. They occur at different angles with respect to the direction of motion of the rovers.

Obstacle #6 -- Cometary Debris

Comets disintegrate into rocky fragments and rain down on extraterrestrial surfaces. This obstacle is a mix of impact craters surrounded by ejecta material expelled from the impact sites.

Obstacle #7 -- Crevasses

Crevasses result from cracks in the surface regolith or from erosion by liquid/molten material forming ruts in underlying material. The crevasses vary in width between 1 and 4 inches. Avoid having the rover wheels stuck in these cracks, which are 4 to 6 inches deep.

Obstacle #8 -- Steep Incline

The slope of this obstacle is perpendicular to the direction of rover traverse. The simulated lava or rock out-cropping surface is smooth. The angle of elevation of the incline is about 20 degrees. Avoid tip-over by lowering the center of gravity and by leaning to the high side of the incline. Traction will assist on this smooth surface (no gravel).

Obstacle #9 -- Lava Flow with Craters

This area surrounding the Lunar Excursion Module replica consists of asphalt lava with craters of various sizes and strewn boulders. The large crater will test the 15-inch clearance of the rovers. A turn of 360 degrees is traversed within this large crater.

Obstacle #10 -- Tilted Craters

Rovers travel up a slope and then encounter medium craters on the descending side. The slope is gentle, about 15 degrees. Boulders force the rovers to traverse the two craters. The whole obstacle is covered by gravel.

Obstacle #11 -- Erosion Bed

This ancient stream bed consists of small rounded pebbles deposited to a depth of about 6 inches. Rover wheels might sink in this smooth obstacle material. Forward momentum would assist traversing this obstacle.

Obstacle #12 -- Collapsed Fault

Shifts in underlying material cause depressions and adjacent ridges in the surface regolith. These uneven surfaces are formed by plywood inclines and declines over 2-by-4 and 2-by-6 boards on edge. The whole obstacle is covered by gravel.

Obstacle #13 -- Loose Regolith

Meteoroid collisions with extraterrestrial surfaces produce fine-grain material, difficult to traverse. Beach sand (rounded grains) simulates this material that allows wheel penetration. The depth of this simulant is 6 to 8 inches. Traction and support will be an advantage.

Obstacle #14 -- Hummocky Area

This obstacle consists of uneven terrain characterized by humps randomly positioned so that they occur first on one side of the rover, then on the other, producing twisting forces on the rover chassis. Wooden ramps covered with gravel simulate this landform.

Obstacle #15 -- Undulating Terrain

Similar to obstacle #14, this gently uneven surface is replicated by wooden ramps causing rovers to be tilted to the right or to the left as only the wheels on one side of the rover are elevated. The ramps range from 6 to 12 inches in height with gradual ingress and egress slopes, all covered with gravel.