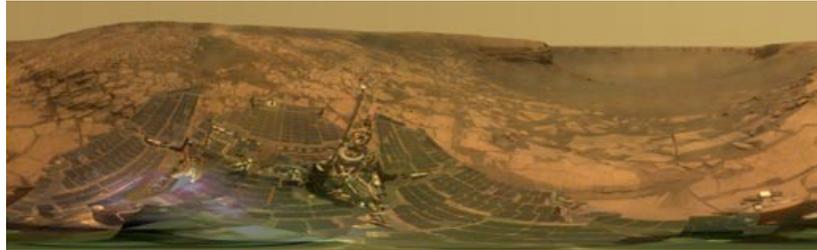


DESTINATION MOON



College name : B.K.BIRLA INSTITUTE OF ENGINEERING & TECHNOLOGY
(PILANI), RAJSTHAN,INDIA

Team name : Destination moon

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A projectile is a particle or body thrown into the space with some initial velocity at a certain angle with horizontal. The initial velocity of body has two components, horizontal & vertical. The horizontal component moves the body forward in horizontal direction & it remains constant during the motion. The vertical component moves the body vertically upwards & is affected by the acceleration due to the gravity.

The altitude is small so that the variation of acceleration due to gravity may be neglected.

There is no atmosphere on the lunar , so that the frictional resistance of air is nothing.

The angle of impact is 45 degree, because at this angle the horizontal & vertical components of device is equal.

For creating a crater , we will use twist drill machine. Twist drills are available with parallel shanks up to 16mm diameter and taper shanks up to 100mm diameter and are made from high speed steel. Standard lengths are known as jobber series twist drills, short drills are known as stub series. With the help of drill machine we can create a crater in the lunar soil . after create the crater we will impact the device in the crater at the angle b/w 60 – 80 degree.®

the device will be light weight ,mass near about 100 kg. because on the moon ,gravity is 1/6 comparable to earth. So the weight of device will be less on the moon comparable to earth.

The figure of device is shown below:-

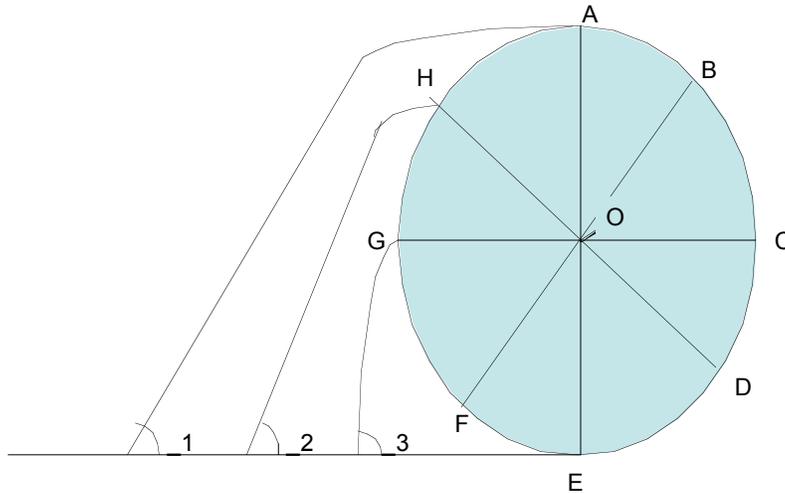
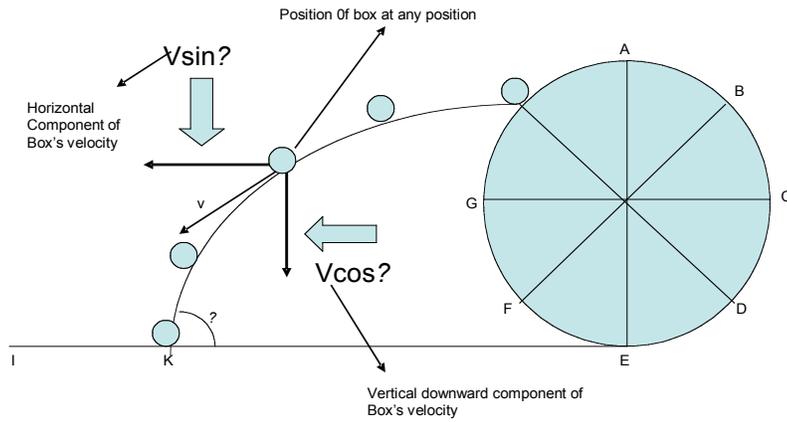


Fig 1

$$2\pi r = 2 * 3.14 * 1m = 6.28m$$

My device is circular. In this device 8 boxes are attach at the point A,B,C,D,E,F,G,H. the diameter of device is 1 meter. You can attach more boxes according to need. Circumference of the device is 6.28m. the angular velocity of device can be control with the help of motor. Velocity of boxes must be tangential at the time of projection. after attend the maximum speed , we can project the box one by one, with different angle of projection. The figure, of after project the boxes with different angle shown below:-



In this figure the point of projection is H. According to figure you can attach More boxes on the circumference of the device
 The device is use , vertically & horizontally from both position. EI is the surface of LUNAR & HK is the path of trajectory , V is The tangential velocity of the box.

The figure of box is shown below:-

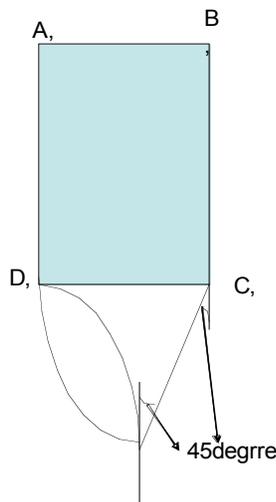


Fig:2

The design of box is something special. It is inclined at the 45 degree angle ,at two points with the horizontal. The one edge of box is sharp because , when the box hit the lunar surface, sharp edge of box is penetrate easily in the lunar surface, because the surface of lunar is hard & dry.

The impact of box with the lunar surface is indirect or oblique impact.

At the time of impac , the horizontal velocity component help for the horizontal velocity & the vertical component $V \sin \theta$ for the penetration of box in the lunar soil. We can change the value of θ at the time of projection. All the process show in

figure. We can project the boxes form any point from the circumference of device.
 For more detail see the figure.

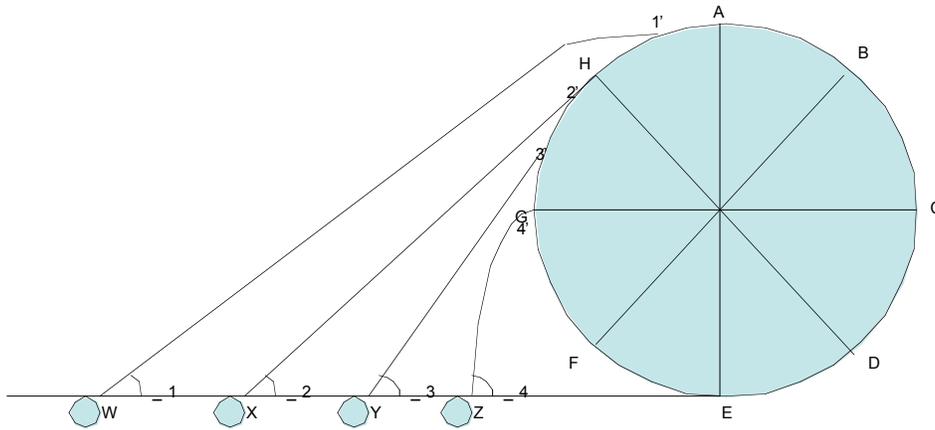


Fig: 4

Various point of projection 1', 2', 3', 4', & of impact with different angle of projection (w, _1), (x, _2), (y, _3), (z, _4)

This project is design by the students of
 B.K BIRLA INSTITUTE OF ENGINEERING & TECHNOLOGY (PILANI), JODHPUR, INDIA
 FOR the NASA (AMES RESEARCH CENTER), this project is the first time in the college or
 NASA.