

## Practical No-7

### Measurement of Soil Loss

**Aim:** To measure the soil loss using Coshocton wheel and multi divisor

**Materials required:** Collection Tank, Slot Divisor, Cistern Tank

#### **Theory:**

Multi slot divisor is useful for measuring runoff from small plots. It can measure quantity of runoff & can estimate soil loss from field. Its Design and application is very easy. Mostly used for experiment purpose.

Collection Tank:

The tank has 4 compartments of different dimensions. The dimensions of collection tank are 1.5m x 2m x 0.62m. The collection tank is provided with roof cap to avoid rain water falling into the tank. The collection tank is provided with a provision to attach slot divisor it first compartment filled with runoff water then passed to next compartment. For this purpose, compartment partition wall having openings at 30 cm from bottom of tank.



Fig.7.1 Collection Tank

Slot Divisor:

The slot divisor with 11 slots was used for experimentation, in which one was slot connected to the cistern tank. It is always provided with the odd number of slots. It is also covered with cap on its top. The middle slot connected to the cistern tank, to collect excess runoff.

Cistern Tank (Circular Drum):

It is cylindrical shaped with a lid provided to the tank. The hole is closed using rubber cork. It is installed at height of 5-10 cm from ground to avoid corrosion. It is connected with the slot divisor. The capacity of drum is 500 litres with radius of 0.42 m and height of 0.90 m.



**Fig.7.2 Cistern Tank**

Procedure of Layout:

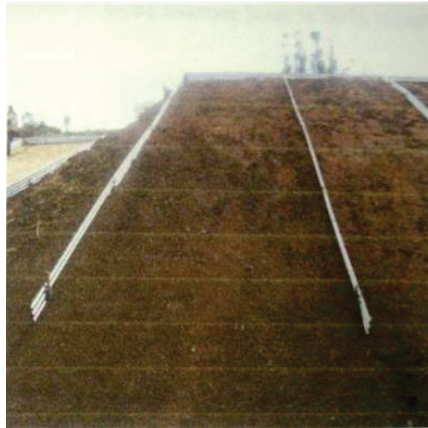
To conduct this experiment a particular place with a slope of 60% and 90% was selected. After making the area into slopes of 60% and 90%, the soil was compressed to be firm as shown figure. After compacting plot area, it was separated into 4 plots. The dimensions of plots are 15m x 4m in both the 60% and 90% slopes. The separation is done by utilizing GI sheets. The GI sheets acts as a boundary walls separating the plots and protecting soil from erosion. The runoff collection channels were constructed for each plot to collect runoff. Plots and pipes are provided to convey runoff water into tank for both 60% and 90% slopes. The collection channel is constructed of bricks using cement of 35cm height. Below the collection channel 30cm basement is provided to stabilize the channel.

### 60% slope of plot



**Fig 7.3 60% slope plot**

### 90% slope of plot



**Fig 7.4 90% slope plot**

#### Construction of Runoff Channels:

The pit was made of size 3.6m x 1.4m to install runoff tank. The cistern tank was also installed in this pit by extending the length of the pit. The collection tank installed in the pit it is divided into 4 compartments as shown in figure. Then runoff tank is connected with slot divisor to collect excess runoff into cistern tank.



**Fig 7.5 Runoff Channels**

#### Runoff Water Collection:

The runoff water collected in the compartments is calculated by measuring the height of water present. Then the runoff water is stirred well in the tank itself, so that the soil gets distributed

uniformly in water. Then runoff water is filled into two bottles of one litre each. Then these bottles are handed over in lab for analysis of soil loss.

Runoff Water Measurement:



Fig.7.6 Measuring height of runoff



Fig 7.7 water stirring of runoff water

Runoff Volume & Soil loss Calculation:

The runoff water collected in the tank is measured in the form of volume.

$$\text{i.e. } V = L \times B \times H$$

Runoff = Volume/area

$$\text{Volume(m}^3\text{)} = \pi r^2 h$$

Where r = Radius of cistern tank and h = Height of water in cistern tank

Soil loss Estimation:

Add Alum to Runoff Water  
↓  
Keep it for 24 hrs aside  
↓  
Remove water from Bottle  
↓  
Keep soil for 24 hrs at 105° in Oven dryer  
↓  
Take Dry weight of soil

$$\text{SOIL LOSS (kg/ha)} = \text{Runoff (lit)} \times \text{Soil loss(kg/lit)} \times (10000/60)$$