

# ABSORBENCY OF PAPER TOWELS

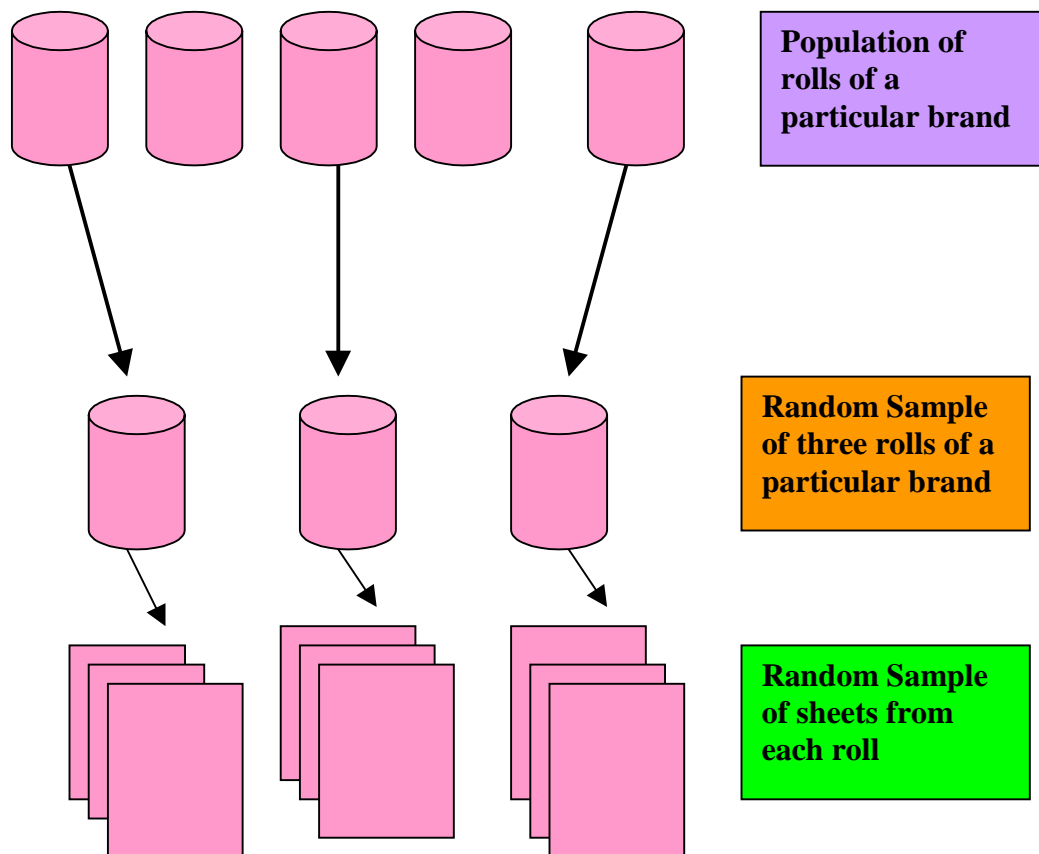
## 3. Obtaining Random Samples of Paper Towels

In order to obtain reliable conclusions about the absorbency of paper towels, we have to design the experiment very carefully. In particular, a mechanism used to select sheets should be random so that the selected sheets are representative of the corresponding populations.

### 3.1 The ideal random mechanism model

From the fact that several sheets of a brand-name paper towel have better absorbency than several sheets of another paper towel brand, on the average, we cannot infer the pattern to hold in some general populations unless a chance mechanism was employed to determine the actual selection of rolls and sheets.

In the ideal random mechanism model we select randomly the same number of rolls of each brand from the production output, and then we select randomly the same number of sheets from each roll. This mechanism guarantees that the sheets to be examined are representative of their corresponding populations.



Unfortunately, we are not able to implement the model, because we do not have any access to the production output for each brand. We will use a model that produces representative sheets under the assumption that the rolls are representative of their corresponding populations.

### **3.2 The real random mechanism model**

Can we consider a roll of paper towel purchased at a store to be representative of all rolls manufactured by a particular manufacturer? Of course, not. In order to obtain representative rolls, we would have to obtain the rolls directly in the factory with a random mechanism. The best we can do here is to obtain a roll of each brand and then test a random sample of several sheets from each roll. It goes without speaking that the tested sheets on a particular roll do not comprise a random sample from the population of all sheets of that brand. However, if we assume that the rolls purchased at a store are representative of each brand, and a random mechanism is used to select sheets from each roll, our inferences should be valid for all rolls of each brand.

We will select a simple random sample of sheets from each roll according to the following procedure:

1. Carefully tear off all the sheets on the roll. Set aside any sheets that are severely damaged in the process. Don't get in a hurry - do it right. All the undamaged sheets constitute the population. Assume that  $N$  is the number of undamaged sheets in your population.
2. With a soft-tip marking pen, number the undamaged sheets with a small number in the upper right corner of each sheet.
3. Use the table of random numbers to select randomly 15 non-repeated numbers from the set of  $N$  numbers. The selected numbers indicate the sheets from the brand population for absorbency testing.

Repeat the above steps for each brand of paper towels. The simple random samples of sheets are ready for testing.