

ABSORBENCY OF PAPER TOWELS

14. Comparing Other Characteristics of Paper Towels

In the experiment described in sections 1-13 we measured the weight of water absorbed by each of the three brands of paper towels. However, the quality of paper towels can be measured not only by determining how much fluid they can hold (absorbency), but also how fast they absorb fluid. It is also possible to describe the quality of paper towels by their strength and durability.

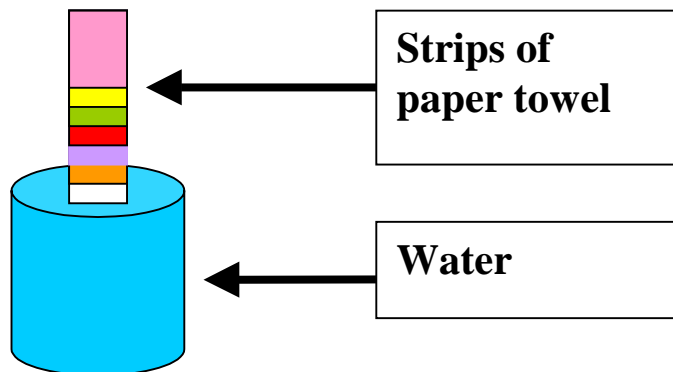
In this section we will show you how to measure the other characteristics of paper towels. You should conduct the experiment with your paper towels, collect the data, and use SPSS to draw the conclusions.

14.1 How Fast Paper Towels Absorb Water?

In order to determine how fast your paper towels absorb water, select randomly 10 sheets from each brand, use randomization to determine the order of making measurements, and then carry out the following experiment:

Cut two strips approximately 4 cm wide from each roll of towels. Fold the strip approximately 5 cm from one end. Carefully measure and mark the strips at intervals of 1 cm from the fold.

Place one strip on a track with the short section hanging down into the water glass as shown in the figure below.



Pour water into the glass quickly but carefully (do not splash water on the towel or the track). When the advancing water reaches the fold start the stopwatch. Record the times at which the water reaches each centimeter mark.

Dry the track thoroughly and repeat with the other strip of the same towel. Repeat for the other towels.

Analysis: Use SPSS to analyze the data. In particular, plot time versus distance for each of the three towels, and describe the relation between them. What statistical tools available in SPSS can be used to analyze the data? Is there sufficient difference that one could declare one brand superior to the other? State your conclusions in a form of a report.

14.2 How Strong Paper Towels Are?

In order to measure the strength of your paper towels, select randomly 10 sheets from each brand, use randomization to determine the order of making measurements, and then carry out the following experiment:

A sheet of a paper towel should be suspended 15 cm above the table. Place quarters, one at the time on top of the other quarter every five seconds until the sheet breaks. Record the number of quarters needed to break each sheet. Randomization should be used to carry out the experiment. In particular, the order of tested sheets should be determined by a random mechanism and you should not know which brand the tested sheet comes from.

Analysis: Use SPSS to obtain a graph of the cell means for each brand type versus number of quarters needed to break a sheet. Does it look that one of the brands has higher strength than the other brands? Then develop a model to examine the differences in the strength of the three brands of paper towels? What statistical tools are appropriate in this case? State your conclusions in a form of a report.