



Popcorn Case Study Garners Rave Review

Alan Collins, who lives near Cambridge in England, sent the following review from a UK publication called *Quality News*:

"In 'Applying DOE to Microwave Popcorn' (PI Quality, July/August '93) Stat-Ease provides the ultimate example for design of experiments. The use of a popular and essentially highly controllable piece of kitchenware, a microwave oven, for use in an experiment that will provide an enjoyable by-product - popcorn, a local delicacy - shows sheer genius. A demonstration of applied quality using insight, and a local farm product, provides an electrifying example."

Stat-Ease uses this example in their **Experiment Design Made Easy** workshop. The study was originally published in the Winter 1993 Stat-Teaser. Call Stat-Ease for a reprint of this, or the *PI Quality* article.

"Experiment Design Made Easy" Workshop Goes to Orlando and Anaheim for DOE & Disney

Stat-Ease's beginning DOE workshop, **Experiment Design Made Easy**, heads south for sessions in:

- *Orlando, January 11-14
- *Anaheim, March 1-4

Discover the magic of statistics and explore the Magic Kingdom, all in one fun-filled week. The sessions will be open to all scientists, engineers and quality professionals who want to improve their productivity via factorial design.

*"Excellent presentation,
highly effective, statistics
easily understood."*

Frances Belliazere Crocram
Great Lakes Chemical

The classes will be limited to twenty students. All four presentations of **Experiment Design Made**

Easy in 1993 sold out. So don't wait to sign up.

Participants use **DESIGN-EASE** software to analyze various case studies and simulations. Participants at the Orlando **Experiment Design Made Easy** workshop will get a beta copy of version 3 for Windows, which will be used in class.

The complete 1994 schedule of workshops will soon be out. Here are Spring dates for advanced workshops:

- **Response Surface Methods for Process Optimization:** April 26-29, Minneapolis
- **Mixture Design for Optimal Formulations:** May 17-20, Minneapolis.

The Stat-Ease workshops each last 3-1/2 days, from 8 am on Tuesday to noon Friday. For all the details on location, registration, lodging and transportation, call 612/378-9449, or tollfree **800/325-9816**.

Kinley Larntz Now Editor *The American Statistician*

Kinley Larntz, who serves as developmental consultant to Stat-Ease, will soon begin a three year term as Editor of *The American Statistician*. Professor Larntz heads up the Department of Applied Statistics at the University of Minnesota. He earned his Ph.D. at the University of Chicago. Kinley has been a part of the Stat-Ease programming team from the start. He provides core tools used in the statistical computations within the **DESIGN-EASE** and the **DESIGN-EXPERT** programs.



Gina Ramponi does her holiday shipping of **DESIGN-EASE** and **DESIGN-EXPERT** software. *Happy Holidays!*

Getting Maximum Mileage from Simple Comparative Experiments

Does premium gasoline increase automobile mileage? This question becomes very timely when you consider the possibility of a federal gas tax that could approach 50¢ per gallon. Meanwhile the petroleum companies continually tout high octane gas as the solution to all our troubles. Then to confuse matters further, Ralph Nader's consumer group, "Public Citizen", claims that Americans waste \$3 billion in un-needed premium gas! Who should you believe?

This past summer I decided to grab the car by the horn and do a test. I took advantage of an ideal opportunity - a 3000 mile road trip in the family van.

Using **DESIGN-EASE** software, I laid out a randomized one-factor test plan that called for 5 repeats of each level:

- Regular gas (~87 octane)
- + Premium gas (~93 octane)

Then I loaded in the wife

and five kids, along with camping gear and about half of everything in the house that wasn't nailed down. The van, an '88 Plymouth Grand Voyager with about 90,000 miles on its Mitsubishi V6, scraped down the driveway and lumbered down the street. The pesky basset hound who lives next door easily beat us in the quarter mile to the freeway ramp. We really needed help!

To make a long (very long) story short, here's the data:

Octane	Mileage
93	21.4
87	20.0
87	20.0
93	19.2
93	No data
87	20.9
87	19.8
90 note	20.2
87	21.4
93	21.1

As usual with any experiment, all did not go precisely as planned. En route to Quebec City, I got confused about Imperial gallons versus US gallons and Canadian dollars versus US dollars, so I gave up on that tankfull. In one other instance I accidentally filled the tank with a medium octane.

These discrepancies did not affect the outcome: high octane gas produced no benefit in terms of gas mileage. The statistical results from **DESIGN-EASE** are:

- Regular 20.42 mpg± 0.37
- + Premium: 20.47 mpg±0.42

Since Stat-Ease counts a number of petroleum companies among its clients, let me hasten to add that acceleration may be improved by the premium gas, but I could not see a difference.

You may get different results, but my choice, based on a statistically designed simple comparative experiment, will be the cheaper regular gas.

Mark J. Anderson



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