

Summer 1996

Stat Teaser

The Stat-Ease Corporation Newsletter



Coming Soon...

Experiment Design Made Easy workshops

Sept 17-20, Minneapolis MN
Oct 29-Nov 1, Philadelphia
Jan 28-31 '97, Denver, CO

Response Surface Methods for Process Optimization

Oct 8-11, Minneapolis MN
Feb 25-28 '97, Minneapolis

Mixture Design for Optimal Formulations

Oct 8-11, Minneapolis MN
Mar 18-21 '97, Minneapolis

Advanced DOE and Robust Design

Dec 10-12, Minneapolis, MN
Apr 29 - May 1, '97, Mpls.

Attendance is limited to 20 attendees. To reserve your place, please call Carol at: 800-325-9807 ext 18.

Toll Free: 8 0 0 - 3 2 5 - 9 8 0 7
Direct Dial: 6 1 2 - 3 7 8 - 9 4 4 9
Fax: 6 1 2 - 3 7 8 - 2 1 5 2

e-mail: 72752.2361@compuserve.com

ADRD a Success!

Our new Advanced DOE and Robust Design (ADRD) workshop held in July generated great reviews! Using a refined *alpha* version of our DOE v5 software, the attendees were challenged to new DOE heights.

Specific cutting-edge methods that our attendees learned include:

- Minimizing variance transmission
- Stabilizing bad residuals
- Detecting destructive outliers.

The workshop was so well received we've added an extra training date this year—December 10-12, 1996.

"Excellent information! Provides a great skill set that all engineers now and in the future will need to compete and be effective in development and manufacturing environments."

— Chris Lampiris
Sheldahl

Design-Expert in Beta release

No really! It's true. And here's what early testers are saying:

"The new program is very easy to use!"
— Carol Smith

"P.S. I LOVE THE NEW SOFTWARE!!! Keep up the GOOD WORK."
— John W. Owens, III

"Good software—I'm looking forward to commercial release."
— Cheryl Forster

"The new software is a big plus."
— K.S. Chen

We know you've wanted Design-Expert version 5 much sooner than this. Frankly, we're being very careful and perhaps too cautious, but we will release no software before its time. You'll see that version 5 is well worth the wait!

Q&AQ&AQ&A

QUESTION: Is a Small Central Composite Design sufficient with 3 factors? The design selection screen warns me about varying degrees of precision for the coefficients.

ANSWER: A 3-factor Small CCD is one of the better ones. Although not rotatable, it is symmetric. It has 15 runs—4 factorial, 6 axial, and 5 center points. If you want a minimum of runs, delete 3 centerpoints. The 12-run version does as good a job fitting

the quadratic model as any other 12-run design. The main problems are high leverages and no power to detect lack-of-fit. The quadratic should be a reasonable model and there shouldn't be any bad runs. Default alpha value for the 3-factor small CCD is 1.41. Changing it to 1 inflates the prediction error in the design space, but otherwise is okay. If you choose this design, make sure the alpha runs are meaningful.

New Spin on DOE from *Forbes** Inspires Case Study by Stat-Ease Marketers

This past spring I got a strange phone call: "Forbes Magazine says you folks make the software for MVT. What can it do for me?" I said, "That's nice of them to say. I'll be glad to help you, but what's MVT?" It turns out that MVT™ stands for multivariable testing. It's really design of experiments applied to non-manufacturing areas. In this article, I provide a case study for application of DOE to marketing. We did it, your company can too. Pass the word to your colleagues in business-related areas.

Stat-Ease maintains a house list of 15,000 clients. Every few months we mail postcard announcements for our DOE workshops. Would four-color printing enhance response? We decided to test this. Most direct mail tests stop here: They only test one factor via a split mailing. But with only a bit more effort, several factors can be simultaneously tested via two-level factorial design. So we added two other factors: size of the card and type of stock.

Our marketing guru, Rich Burnham, produced 8 different versions of the cards to cover all the two-level combinations of the three factors. These were mailed

to 8 randomly selected segments (or panels) of the mail list. To enhance response, we offered a free report for anyone who faxed the card back. The request incorporated a code to facilitate measurement. Low level is coded minus and high level plus for each factor. For example:

- - - = A: two-color, B: small card, C: thin stock

+ + + = A: four-color, B: big card, C: thick stock

plot of effects**). Evidently the technical types who we target are turned off by fancy artwork. They want the steak, not the sizzle.

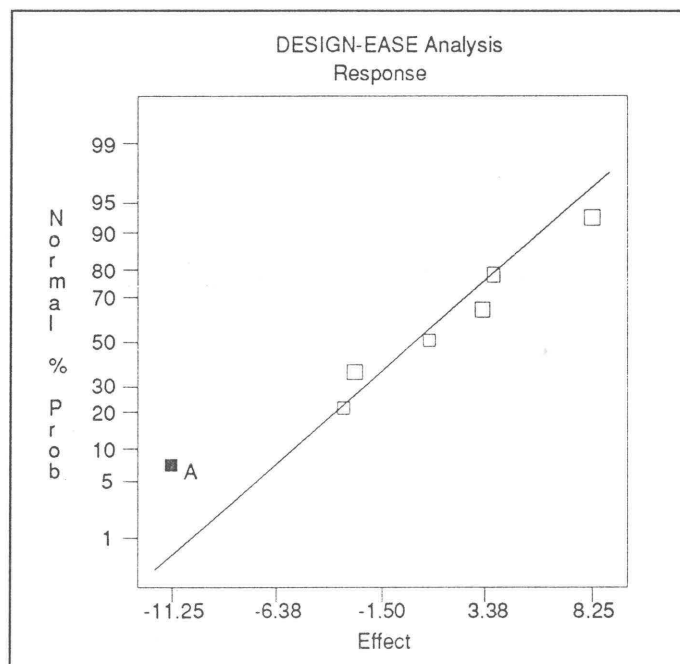
The results from our DOE will save us thousands of dollars that might have gone into fancier postcards. As we always suspected, we know for sure that it's best to keep our communications simple and to the point.

We did not find any significant interactions in this DOE, but at least we looked. Interactions often prove to be the key to success. The typical one-factor-at-a-time (OFAT) test used by marketers cannot reveal interactions. More importantly, the OFAT method is very inefficient in comparison to two-level factorials. So get after your marketing people and tell them to cut out the OFAT from their research methods. Your company can use two-level factorial DOE to become a lean, mean marketing machine.

— Mark J. Anderson

* "The New Mantra: MVT" *Forbes*, March 11, 1996

**Statistical note: although a square root transformation is appropriate for responses which are counts, it did not materially affect the outcome in this case, so I did the analysis in the original metric.



The results proved to be somewhat surprising. Clearly, our clients responded better to two-color. (Note that factor A stands out on the negative side of the normal

What
do we
read?

We asked 457 of our workshop attendees what trade magazines they regularly read:

