

stat teaser

Workshop Schedule

Crash Course on DOE for Sales and Marketing

November 8–9: Minneapolis, MN

A fast and practical introduction to DOE in a non-industrial setting. \$995* (\$795 each, 3 or more)

Experiment Design Made Easy

August 22–24: Minneapolis, MN
September 26–28: Philadelphia, PA
October 17–19: Minneapolis, MN
December 5–7: Anaheim, CA

Study the practical aspects of DOE. Learn about simple, but powerful, two-level factorial designs. \$1495* (\$1195 each, 3 or more)

Response Surface Methods for Process Optimization

September 26–28: Minneapolis, MN

Maximize profitability by discovering optimal process settings. \$1495* (\$1195 each, 3 or more)

Mixture Design for Optimal Formulations

August 15–17: Minneapolis, MN
October 24–26: Minneapolis, MN

Find the ideal recipes for your mixtures with high-powered statistical tools. \$1495* (\$1195 each, 3 or more)

Statistics for Technical Professionals

October 4–5: Minneapolis, MN

Revitalize the statistical skills you need to stay competitive. \$995* (\$795 each, 3 or more)

PreDOE: Basic Statistics for Experimenters (Web-Based)

PreDOE is an entry-level course for those who need to go back to the basics. See http://www.statease.com/class_pre.html for more information. \$95

*Includes a \$95 student materials charge which is subject to state and local taxes.

Attendance is limited to 20. Contact Sherry at 612.378.9449 x18 or sherry@statease.com.



ABOUT STAT-EASE® SOFTWARE, TRAINING, AND CONSULTING FOR DOE
Phone 612.378.9449 Fax 612.378.2152 E-mail info@statease.com Web Site www.statease.com

Fabulous Flying Felines

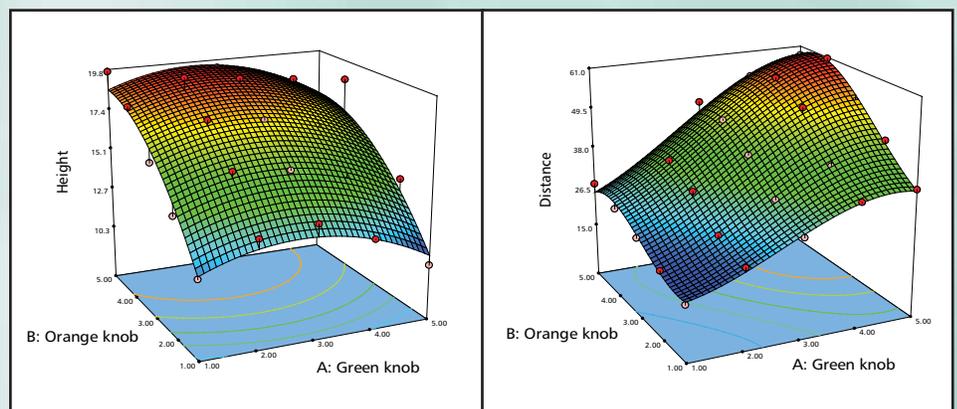
I recently discovered a nifty version of a catapult. These little "cat-a-pults" actually hurl tiny foam "cats" from one to six feet. The object is to set up as many as five catapults so that the cat from one catapult lands on the trigger plate of the next, setting it off and hurling its cat onto the next one, and on and on... until the last cat hits your final target. The "Cat-a-Pult" by Hands On Toys provides a fun opportunity for DOE because it offers two control handles for varying the height and distance of the flying feline. Watch the instructional video at <http://www.handson toys.com>.

The objective of the DOE that I ran was to build a polynomial prediction equation that would describe the behavior of the two control knobs. When you have multiple pieces of "identical" equipment, it is a general assumption that they work the same way, but there may be an off-set or differential between them. Although one machine



can be used to characterize the polynomial relationships, follow-up should be done to quantify the differences between machines.

The control knobs on the catapults were green and orange. Each knob had 5 settings, for a total of 25 combinations that would influence height and distance of the flying cat. A DOE was run to characterize this process and the 3D surface plots are shown below. Due to the inherent variability of the measure-



Figures 1a and b: 3D surface plots for Height and Distance

—Continued from page 1.



ment system, each condition was run three times. The average of the three measurements was used as a representative value for the run.

After the contours were mapped out, it was time to put these maps to use! We set up a series of three catapults and measured the distance between them. Then we referred to the contour plots and chose settings for the orange and green knobs that should fling the cats the desired distances. It worked! After a couple of minor adjustments to send the cats in the right direction, the distances were accurate and the flying felines were sent on their merry way. Next step—setting up a five catapult system that sends the cats from Wayne’s desk (the new guy) to the boss’s desk!

Shari Kraber (shari@statease.com)

Free update for DX7 users

Current users of Design-Expert should download the free update to DX 7.0.3 from the webpage: http://www.statease.com/soft_ftp.html.

This is a maintenance update that fixes some recently discovered bugs and adds a few minor features.

Features added in 7.0.3:

* Sort the design layout by any of six options by right-clicking in the upper left corner of the design layout screen

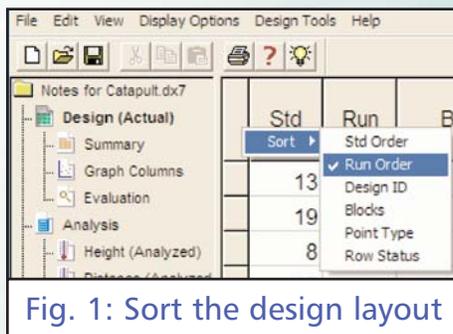


Fig. 1: Sort the design layout

* When adding blocks, choose to distribute the pre-existing center points evenly across the blocks or D-optimally, which will generally leave them in one block (See Fig. 2)

* View all supported file types in the “Open File” dialog box (no more hassles when opening a dx6 file!)

* Contour line settings are now saved automatically with graphs

Features added previously in 7.0.2:

* Specify the number of replicates when augmenting a design

* Save DX7 files in DX6 or DX7 format

* Export Effects and Diagnostics plots to enhanced metafile format (previously implemented only for Model Graphs)

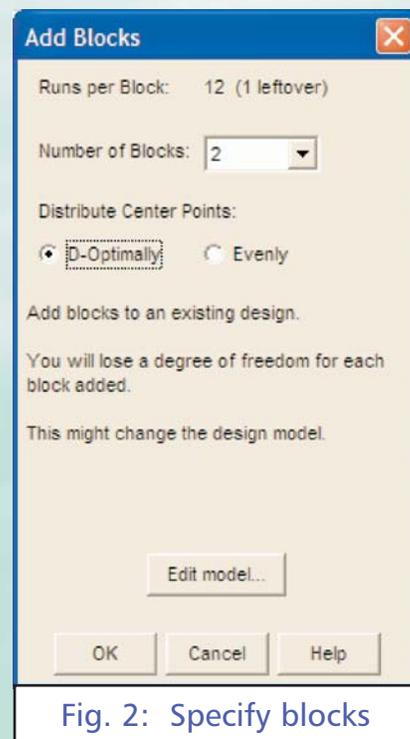


Fig. 2: Specify blocks

Where can you find us?

August 6–10 — Joint Statistical Meetings, Seattle, WA, Booth 318.

Roundtable Discussion by Wayne Adams: *“Graphical & Numerical Approaches to Selecting Effects in Two-Level Factorial Models”*

October 9–10 — MN ASQ Conference, Bloomington, MN

October 11 — National Association of Printing Ink Manufacturers Technical Conference, Ft. Lauderdale, FL
1/2 Day Mixture Design Workshop by Pat Whitcomb

October 12–13 — 50th Annual Fall Technical Conference, Columbus, OH
Talk by Shari Kraber and Pat Whitcomb: *“A Factorial Design Planning Process”*

October 25–26 — Medical Device & Manufacturing Conference, Minneapolis, MN, Booth 954

The best in DOE education!

Do you want to expand your knowledge of experimental design methods? Is the only statistic you look at the p-value? Do you know how to interpret diagnostic graphs, or do you skip over them because you aren't sure what to watch for? If you are looking for training, Stat-Ease workshops are for you. Our knowledgeable and experienced instructors teach DOE in a fun, yet effective, manner.

Stat-Ease classes focus on experimental design. Design-Expert® software is used in many of our workshops, but our emphasis is on teaching DOE, not software training. Take a look below at the variety of public and private (in-house) workshops we offer.

PreDOE—Online ONLY (See <http://www.statease.net>)

This online course teaches the basic statistics necessary to succeed in a DOE workshop. The concepts of the central limit theorem, normality, hypothesis testing, t-testing, and beginning ANOVA are presented. The course offers mini-tests to make sure that you understand the concepts and culminates with a final test. Passing the final test allows you to print a certificate with 0.6 CEU's.

Experiment Design Made Easy

PreReq: Prior stats class or PreDOE

Jump-start your DOE education by focusing on two-level factorial, fractional factorial, and general factorial (multi-level) designs. Discover why randomization, replication, and blocking are important to consider. In addition, ANOVA, diagnostic plots, and model graphs are completely de-mystified.

Response Surface Methods for Process Optimization

PreReq: Experiment Design Made Easy or equiv.

Learn how to fine-tune and optimize process settings via central composite, Box-Behnken, and D-optimal designs.



Create custom designs by adding categoric factors, multilinear constraints, or uniquely specifying the particular model terms to estimate. Analysis of Variance (ANOVA), diagnostics, and model graphs are covered in-depth, with an emphasis on multiple response optimization.

Mixture Designs for Optimal Formulations

PreReq: Prior stats class or PreDOE

Formulators will find the unique tools they need in this workshop. Mixture designs and the associated polynomials behave differently from factorials. Learn how to optimize formulations to meet customer requirements.

Statistics for Technical Professionals

Just need to brush up on current statistical tools? This workshop covers testing for equality of means, equality of variances, confidence intervals, sample size, and basic ANOVA. Both numeric and pass/fail data is discussed for each topic.

In-House Workshops

Have you been watching our public workshop schedule and wishing we would offer a course closer to home? We can come directly to you! Why should you travel away from home when we can do the traveling instead? It only takes a group of **four or more**

students to economically justify the cost of an on-site workshop. We are experienced at teaching workshops both in the United States and internationally.

In-house workshops provide a unique opportunity to work as a group on issues directly related to your own business. Building a network of people trained in DOE will provide your company with a strong foundation. Stat-Ease instructors are not only DOE experts, but most are also experienced engineers who are ready to answer your specific questions.

Public workshop for four students:

Workshop fee: \$1195 x 4 = \$4780
(includes a multi-student discount)
Travel expense: \$1500 x 4 = \$6000
(assume airfare, hotel, food, & car)
Total for four students: \$10,780

In-house workshop for 4 students:

Instructor fee for three-day class: \$5250
Per student fee: \$395 x 4 = \$1580
Instructor travel expense: \$1500
Total for four students: \$8330
(Pricing is valid if booked by 12/31/06.)

If you would like a quotation for an in-house workshop, please contact our Workshop Coordinator, Sherry Klick, at sherry@statease.com or call **612.378.9449 x18**.

Newsletter subscription preferences

08/08

Thank you for reading the Stat-Teaser newsletter. In the interest of helping the environment and making sure we only send the newsletter to those people who are interested, we request that you take a moment to let us know your subscription preferences. Please indicate below whether or not you would like to keep receiving the *Stat-Teaser* newsletter by mail. If you would prefer instead to receive an e-mail link to it via Mark Anderson's monthly e-mail newsletter, the *DOE FAQ Alert* (<http://www.statease.com/doealert.html>), please check the appropriate box below.

Be sure to include this whole page, with your address and any changes, when you fax (612.378.2152) or mail us your response. If you prefer to e-mail your preference to info@statease.com, please include your full name, address, and the client code you'll find in the upper right corner of the address field. Thank you for your interest and your help!

- Keep me on the *Stat-Teaser* newsletter mailing list.

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- Please remove me from the *Stat-Teaser* newsletter mailing list.

- Please remove me from your database completely. I am not interested in Design of Experiments (DOE).

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