The Stat Teaser

Dow-Corning Leaps To Head of Class

Dow-Corning researchers will be the first to get their hands on a test version 4 of **DESIGN-EXPERT** software (due for general release later this year). Stat-Ease instructor Pat Whitcomb plans to show stepwise regression, design evaluation, and other new tools in an August presentation of a **Response Surface Methods for Process Optimization** workshop. *A public session will be held in Minneapolis on October 5-8.*

Pat has practically taken up residency in Midland, Michigan. By the end of 1993 he will present the entire series of Stat-Ease workshops, including several sessions of **Experiment Design Made Easy**.

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"Best class in years!"
Tom Gray, Senior Engineer

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Dow-Corning's **Mixture Design for Optimal Formulations** workshop in November will also incorporate new techniques made possible by **DESIGN-EXPERT** version 4. *A public session will be held in Minneapolis on October 26-29.*

To schedule your Stat-Ease workshop, call **800/325-9816**.

Win Free Cap for DOE Tips Published in Stat Teaser

Do you have an inspirational success story, or an awful experience, doing design of experiments? Please pass along your practical tip to advance the state of the art. If it gets published in the Stat Teaser, we will send you a free Stat-Ease cap as shown on the left of the photograph. Fax your tip to Mark Anderson at **FAX 612/378-2152**.

"Experiment Design Made Easy" Workshop in Philadelphia this Fall -- Don't Miss it!

Stat-Ease's introductory DOE workshop, **Experiment Design Made Easy**, travels to Philadelphia on September 14. This 3½ day session will be open to all scientists, engineers and quality professionals who want to improve their productivity via factorial design. (Enrollment will be limited to twenty students.) Previous sessions in the area were restricted in-house for specific clients, such as Mobil Research (see photo below).

The **Experiment Design Made Easy** workshop continues to be extremely popular, as evidenced by the fact that the July 27-30 session in Minneapolis sold out. (Unless you hold class in a pontoon boat rigged for walleye trolling, its nearly impossible to get a group together during Summer in Minnesota!)

Participants use **DESIGN-EASE** software to analyze various case studies and simulations. Subject to availability, participants at the Philadelphia session will get a trial copy of version 3 for Macintosh or Windows, scheduled for release later this year.

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"Practical examples, excellent instructors. Great workshop!"
Tom Kosorek, Ciba-Geigy, Tarrytown, New York

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The 3½ day **Experiment Design Made Easy** workshop will begin at 8 am on Tuesday September 14, and end at noon Friday September 17. It will be held at SugarLoaf Conference Center near Temple University, on the northeast outskirt of Philadelphia. For all the details on registration, housing and transportations, call **800/325-9816** (612/378-9449).

Grateful Mobil Researchers presented a race cap to Pat Whitcomb after a DOE workshop at their New Jersey lab

STAT-EASE INC. ®

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Optimizing Formulation Performance With Desirability Functions

(Editor's note: the following article is excerpted from a paper to be presented to the 32nd Annual Conference of Metallurgists in Quebec City on August 30th. To learn more about these powerful tools, attend the 3½ day **Mixture Design for Optimal Formulations** *workshop in Minneapolis on October 26 to 29.)*

Formulators often must make tradeoffs between conflicting performance measures. The latest version of **DESIGN-EXPERT** software from Stat-Ease provides an elegant solution to this problem. The program combines multiple response measures into one objective function, called "desirability", which can then be easily optimized by standard techniques. For example, consider a material made from two primary ingredients. Assume that you want to add a cheap byproduct to the formulation, without sacrificing any of three key properties. **DESIGN-EXPERT** software can easily handle this problem. To begin with, the program supplies optimal mixture designs which can be printed in an easy-to-follow recipe format. Then DESIGN-EXPERT performs statistical analyses on the experimental results, producing predictive models, via least squares regression, for each of the responses.
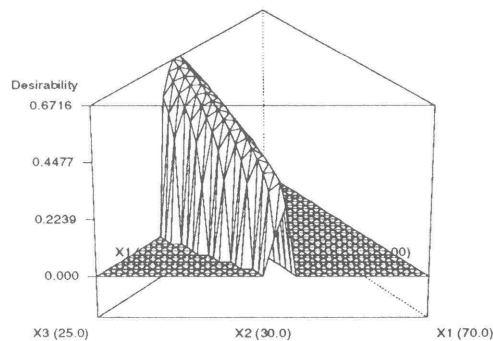
At this stage you must set a goal (minimize, maximize or aim for a target value) for each response. This typically requires a knowledge of product specifications, as well as the economics of manufacturing. Given these inputs, **DESIGN-EXPERT** assigns "desirability" functions, ranging from zero (not acceptable) to one (goal completely satisfied), to each response. The program then performs a precise numerical optimization on overall desirability.

Response: Desirability

For example, in the case under discussion, **DESIGN-EXPERT** produced a 3D plot showing the peak desirability. The analysis incorporated overall cost as a consideration, in addition to requirements on the three product properties.

For further details on optimizing formulation performance with desirability functions, call Stat-Ease at **800/325-9816** (612/378-9449).

Mark J. Anderson