

**DANIEL J. EPSTEIN DEPARTMENT OF
INDUSTRIAL AND SYSTEMS ENGINEERING**

EPSTEIN INSTITUTE SEMINAR • ISE 651 SEMINAR

***Accelerated Life Testing Plans under
Different Stress Loadings***

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ABSTRACT

Accelerated Life Testing (ALT) is designed and conducted to obtain failure observations in a short time by subjecting test units to severer than normal operating conditions and use the data for reliability prediction. Many types of stress loadings such as constant-stress, step-stress and cyclic-stress can be utilized when conducting ALT. Extensive research has been conducted on the analysis of ALT data obtained under constant stress loading. However, the equivalency of ALT experiments involving different stress loadings has not been investigated. In this paper, we provide definitions for the equivalency of test plans, general equivalent ALT plans and some special types of equivalent ALT plans are explored. For demonstration, a constant-stress ALT and a ramp-stress ALT for miniature lamps are presented and their equivalency is investigated.

**TUESDAY, AUGUST 30, 2011
ELECTRICAL ENGINEERING BLDG ROOM 248
4:00 – 5:20 PM**

Biographical Sketch:

E. A. Elsayed is Professor of the Department of Industrial and Systems Engineering, Rutgers University. He is also the Director of the NSF/ Industry/ University Co-operative Research Center for Quality and Reliability Engineering. His research interests are in the areas of quality and reliability engineering, manufacturing processes and production planning and control. He is a co-author of *Quality Engineering in Production Systems*, McGraw Hill Book Company, 1989. He is also the author of *Reliability Engineering*, Addison-Wesley, 1996. These two books received the 1990 and 1997 IIE Joint Publishers Book-of-the-Year Award respectively. He is Fellow of IIE and ASME.

Professor Elsayed has been a consultant for AT&T Bell Laboratories, Ingersoll-Rand, Johnson & Johnson, Personal Products, AT&T Communications and other companies. He served as the Editor-in-Chief of the *IIE Transactions* and the Editor of the *IIE Transactions on Quality and Reliability Engineering from 1996-2000*. Professor Elsayed is Editor of the *International Journal of Reliability, Quality and Safety Engineering* and Department Editor, Associate Editor and/or member of the editorial board of many journals.

Professor Elsayed has been involved in accelerated life testing since 1987 when he developed a reliability prediction model for the first transatlantic fiber optics cable during his sabbatical at Bell Laboratories. Since then he developed a general accelerated statistics-physics based model to predict reliability at normal operating conditions. During the last eight years, he has been extending his work to the degradation modeling area.