

## SCREEN TESTING AND CONDITIONAL PROBABILITY OF SURVIVAL

Janet Myhre

Claremont McKenna College, Claremont, California

and

Sam Saunders

Washington State University, Pullman, Washington

### 1. Introduction

There have been only a few parametric models extensively examined for application to reliability; these include the exponential distribution of Epstein-Sobel (1953) and the Weibull distribution (1961). The one most widely utilized for electronic components has been the exponential model, not only because of its simple and intuitive properties but also because of the extent of the estimation and sampling procedures which have been developed from the theory. However, neither of these models is applicable to the study of screen testing.

One of the early discoveries was that mixtures of exponentially distributed random variables have a decreasing failure rate (Proschan, 1963). Thus any two groups of components with constant, but different, failure rates would, if mixed and sampled at random, exhibit a decreasing failure rate. As a consequence, the family of life lengths with decreasing failure rate certainly arises in practice and particular subsets of this family could be of great utility for specific applications, see, e.g., Cozzolino (1968). We examine one such model with shape and scale parameters  $\alpha$  and  $\beta$ , respectively, which is based upon a gamma mixture