

Statistical Analysis of Truncated-Data Methods to Shorten Thermal-Aging Tests of Electrical Insulation

L. M. JOHNSON, F. J. CAMPBELL, AND E. L. BRANCATO

*Solid State Applications Branch
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Table 2 is a breakdown of the average percent of error for these extrapolated temperature-value estimates. The twist and motorette tests combined show the same order of increasing percent of error (method A, C, and B) that was evident in Table 1 with the nonextrapolated life values. The most striking observation here is the increase in error by a factor of 2 or 3 for the motorette tests as compared to the twist tests. This may be considered an interesting and even valuable observation but not surprising when one considers the complexity of the motorette-system test compared with the magnet-wire twist test. Figure 2 is a histogram of the frequency distribution of percent of errors for the 150 temperature values estimated from extrapolated regression lines. A comparison is given for the three methods A, B, and C as well as a breakdown for twist and motorette data. The increase in spread for the motorette values is particularly evident here.

Table 2
Average percent of error in extrapolation of the regression line applying to the life at each of three temperatures for estimating the temperature corresponding to a life of 20,000 hours

Method	Error (%)		
	Twist Tests	Motorette Tests	Tests Combined
A: median	0.47	1.36	0.92
B: probability	0.57	1.46	1.02
C: fifth failure	0.64	1.23	0.94

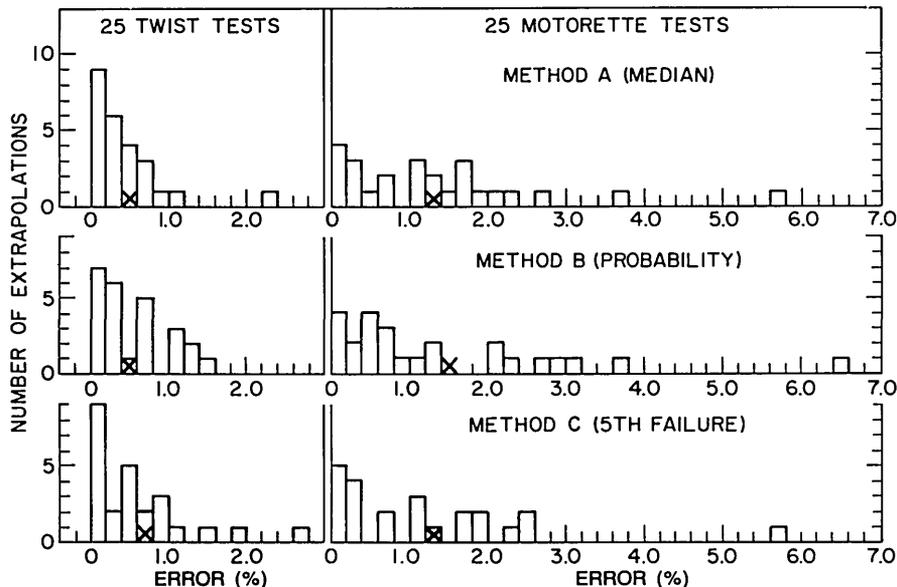


Fig. 2 — Frequency distribution of errors in extrapolations of the regression line applying to the life at each of three temperatures for estimating the temperature corresponding to a life of 20,000 hours using methods A (median of the values for the fifth and sixth failures), B (estimate from a probability plot), and C (value for the fifth failure). The symbol X along each abscissa is at the average value.

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