Statistical Analyses of Industrial Property Retirements

By

ROBLEY WINFREY, M.S.
Research Engineer

BULLETIN 125
IOWA ENGINEERING EXPERIMENT STATION

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
OFFICIAL PUBLICATION

Vol. XXXIV Dec. 11, 1935 No. 28

Published weekly by Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa. Entered as second-class matter and accepted for mailing at the special rate of postage provided for in Section 429, P. L. & R., Act of August 24, 1912, authorized April 12, 1920

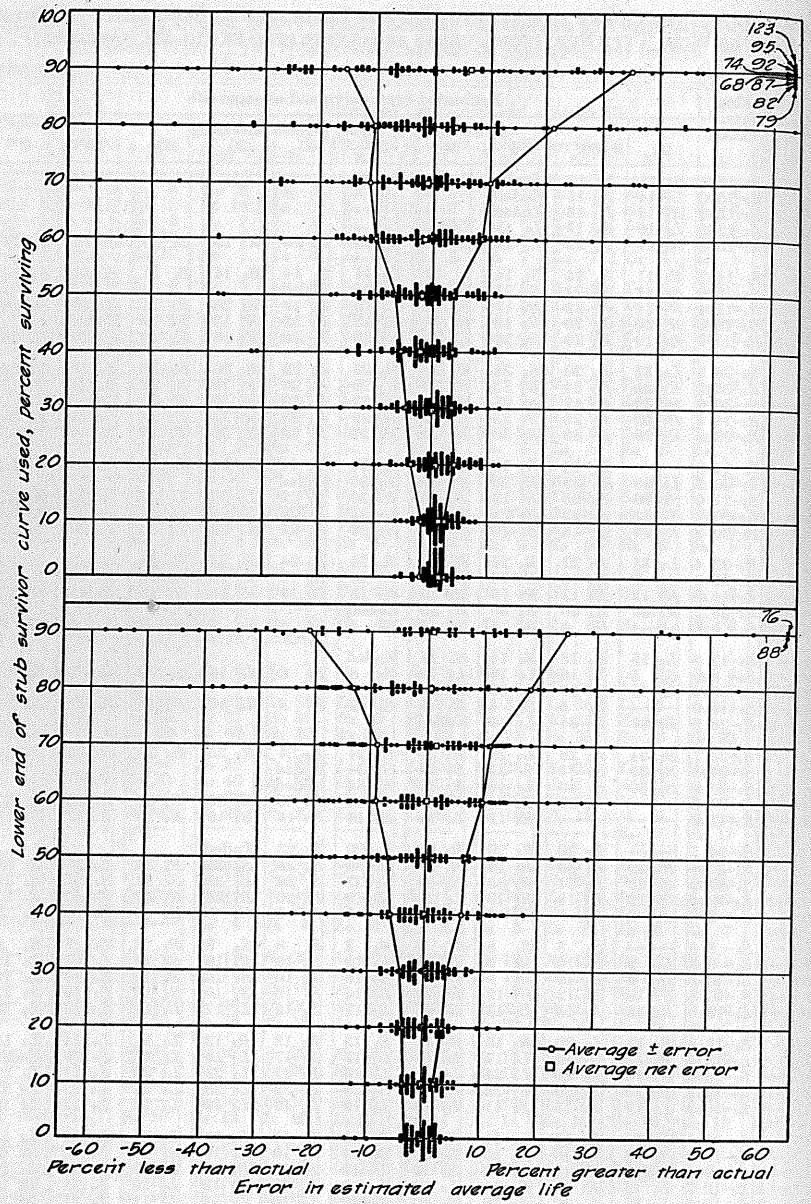

Fig. 30.—(Lower) Errors in estimating the probable average lives of the first 65 original curves by comparing stub curves of different lengths with the type survivor curves in the form shown in Fig. 29. (Upper) Same for curves 66 to 176.

and L_3, the S_1 and S_2, the R_2 and R_3, or other two adjacent curves in the same family. Another reason why the classifications are not the same is that the survivor curves for the high-modal curves are quite steep, and, therefore, these types when plotted as survivor curves appear to be about the same, except at the ends. The frequency curves emphasize the differences and are the better guides to classification.

The frequency curves are difficult to use in this method because of the scattering of the original data, which makes the location of the curve doubtful. In the case of original data well graduated, sets of the type frequency curves, plotted to definite average lives as is done in Fig. 29, were used successfully in a test similar to the two just described on a group selected from the first 65 curves. Ordinarily, this step is not warranted, for the probable average life estimated from the survivor curves is likely to be within the limits of error as controlled by the quantity and reliability of the original data.

The estimation of the probable average life of a group of units by comparing their survivor curve (completed curve or stub curve) with the type curves should not be done without the exercise of judgment in the interpretation of the original data. Any of the methods of constructing survivor curves frequently result in curves which do not exhibit regularity. An examination of the information from which the curves are calculated may show that the irregularity is produced by small groups, infrequent observations of the property, or the retirement of an unusually large number of units for a very special cause. Best practice in these instances is to smooth the data according to the path most likely to be established by regular observations on large numbers of the units and one in accordance with the most likely future rate of retirement.

When survivor curves are to be classified according to the 18 types and the probable average life determined, it is recommended that more weight be given to the middle portion of the survivor curve, say that between 80 and 20 percent surviving, than to the forepart or extreme lower end of the curve. This inner section is a result of greater numbers of retirements and also it covers the period of most likely normal operation of the property.

This method of estimating average life by comparing stub curves with the 18 type survivor curves is remarkably accurate when the many factors are taken into consideration which tend to change the curve from time to time. The simplicity of the method is also a strong recommendation for it.

An alternate method of determining the probable average life of a group of units from a stub survivor curve developed from the experience of the first units to be retired is to extend the curve by eye and judgment. Obviously, the method presented above is much to be preferred for it allows the use of judgment as well as offering the experience of the general law of distribution of retirement followed by all industrial properties.