Appendix

Example 1:

The main reason for detecting early failures is that the inclusion of these observations will result in underestimating life expectancy or the reliability of the item or system. This in turn may underestimate the true quality of the product. But there are situations in which instantaneous or early failures may be desirable. For example, consider the following experiment carried by Vannman (1991). A batch of wooden boards is dried by a particular chemical process and the object of the experiment is to compare two processes as regards the extent of deformation of boards due to checking. The measure of damage to the board is the checking area x defined as $x = \dfrac{l\overline{d}}{hl_0} 100$, where l is the length of the check, $\overline{d}$ is the mean depth of the check, h is the thickness of the board area and l_0 is the length of the board. Thus x is the check area measured as percentage of the board area. The boards are dried at the same time under different schedule and under some climatic conditions. When drying boards not all of them will get the checks and a typical sample of wood contain several observations with $x_i = 0$ or $x_i > 0$ but relatively small compared to the rest of the checks. These observations will correspond to instantaneous failures or early failures. Note that the larger the number of instantaneous failures better is the process. Below is the reproduced data of Schedule 1 and 2 of Experiment 3 conducted by Vannman (1991). In both the case $n=37$.

E-3, S-1: $x_i = 0$, i=1,2,...,13 and the other positive observations arranged in increasing order are 0.08, 0.32, 0.38, 0.46, 0.71, 0.82, 1.15,1.23, 1.40, 3.00, 3.23, 4.03, 4.20, 5.04, 5.36, 6.12, 6.79, 7.90, 8.27, 8.62, 9.50, 10.15, 10.58 and 17.49.

E-3, S-2: $x_i = 0$, i=1,2,...,17 and the other 20 positive observations arranged in increasing order are 0.02, 0.02, 0.02, 0.04, 0.09, 0.23, 0.26, 0.37, 0.93, 0.94, 1.02, 2.23, 2.79, 3.93, 4.47, 5.12, 5.19, 5.39, 6.83 and 8.22.