Some Simple Principles in the Collection of Engineering and Quality Assurance Data

Whether data are to be used to monitor process stability/performance or to guide changes aimed at process improvement, there are common qualitative guidelines that are relevant. Among these are the following:

1. There must be usable operational definitions of the quantities on which data are to be gathered. Where measurements are to be taken, the measurement equipment itself must be stable/well-calibrated. Technicians must be properly trained in the meaning of the definitions and the use of any equipment involved.

2. A small or moderate amount of carefully collected and immediately used data will almost always be worth much more than even a huge amount of thoughtlessly collected or never used data.

3. It is the absolute size (rather than the relative size) of a sample and the basic process/population variability that determines the information content of a sample. (For example, a blanket "take a 10% sample" rule will sometimes over-sample and sometimes under-sample.)

4. The closer that data are taken (in time and space) to an operation whose performance they are meant to reflect, the better. (The ideal is probably data collection by well-trained process workers who have adequate time for the task.)

5. Routine data collection should be made as convenient as possible, and where feasible, any form used for data collection should make them immediately useful (without transfer, e.g., to another form or medium). The point is to get data used, not to make presentation quality displays.

6. In order to be useful in indicating sources of variation in a data set, care needs to be taken to keep track of conditions surrounding each observation (e.g. machine number, operator, etc.).

7. One must take into account psychology and politics when assigning data collection tasks. He or she who is to collect data should be convinced that their production is a help rather than a threat, and that faithful representation of a situation (rather than "good numbers") is the goal.