

IENG301 LABORATORY 7

Experiment: Measurement and Analysis of Human Dimensions (Anthropometry) for the group of subjects in different postures.

- Objectives:**
1. To study the variability in the body dimensions for several groups of persons in different postures.
 2. To compare anthropometric measures between smallest and largest person within a group.
 3. To check whether the existing height-adjustability chairs are suitable for the groups/population.

Study Procedure:

1. With the anthropometer, take measurement of your body dimensions and record them in a systematic manner in an appropriate form. The list of specific body dimensions of industrial relevance is shown. Look at the figures in sitting and standing (erect) postures very carefully before you start measuring. These measurements should be taken jointly. Create a database by obtaining measures of all persons in your group. Data should be recorded in an appropriately designed form.
2. Determine the percentile range to be accommodated for your group. Normally, it is 5th – 95th percentile male or 5th – 95th percentile female measurements. Following the rule of “Let the small person reach and the large person to fit”. Determine the reach dimensions (5th percentile) and clearance dimensions (95th percentile) for the work situation that is being analyzed.

$$\begin{aligned}5^{\text{th}} \text{ percentile} &= \mu - 1.645(\sigma) \\95^{\text{th}} \text{ percentile} &= \mu + 1.645(\sigma)\end{aligned}$$

where; $\mu = \text{Mean}, \mu = \frac{1}{n} \sum_{i=1}^n x_i$

$\sigma = \text{Standard deviation}$

$$\sigma = \sqrt{\frac{(x_1 - \mu)^2 + (x_2 - \mu)^2 + \dots + (x_N - \mu)^2}{N}},$$

3. After you have all the above mentioned information, present a statistical summary of anthropometric data for the given work situation for the population as a whole. To conclude whether there is any significant difference in the dimensions between the groups, make use of appropriate statistical tests. This is optional, but may be important in many situations.

