



SANDALWOOD

Ergo Tip of the Month - December 2006

Quantifying Physical Demands: Data Collection Tips for Measuring Forces, Part 2

You may recall that in the month of April we provided tips for using a force gauge to quantify the demands of a job. However, you may not always be able to access the parts you need to measure with a force gauge.

Sometimes measuring the lift/lower, push or pull force of a part/component is not possible. Because the part cannot be fastened adequately to the end effector of the force gauge or there is no surface to push/pull against. In this case, a methodology known as *psychophysics* can be employed. The science known as *psychophysics* is a sub-discipline of psychology that deals with human perception through a connection between cognitive sensation and physical stimuli (Gescheider, 1985). It is believed that humans are able to determine physical differences based on this connection.

The force requirements of inaccessible parts can be estimated by having a worker exert what they feel is the effort required to push/pull or snap together the part. If it is a grip force that is being exerted, a grip dynamometer can be used to collect the data. If it is a push or pull, an end effector can be fastened to the force gauge that mimics the interface to the part/component that is being replicated.

Note:

- For best results, have the worker use the same grip type, gloves and arm/wrist posture as would be encountered when performing the actual task (Selan, 1994).
- Whenever possible, measurements should be taken immediately after performing the actual task, so the worker's memory of the required force is fresh (Selan, 1994).

For best results, tips 2 through 5 outlined in April's edition should also be used for data collected using the *psychophysical* methodology.

References:

Gescheider, G.A. (1985) *Psychophysics: Method, Theory, and Application*. Lawrence Erlbaum Associates, Inc., Hillsdale, New Jersey.

Selan, J. L. *Advanced Ergonomics Manual*. (1994). Advance Ergonomics Inc., Dallas, Texas

Sandalwood Enterprises is a consulting firm that specializes in Ergonomics, Process Optimization, and Information Management. The Ergo Tip of the Month is offered to our customers and friends for the benefit of the Ergonomics community.

ContactUs@Sandalwood.com—(248) 848-9500—www.Sandalwood.com