

## DuPage County Environmental, Safety, Health & Property Loss Control Program

### Material Handling Safety--Measurements

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**Purpose:** Material handling tasks are common in nearly every work environment. Unfortunately, these tasks can often be a source of workplace injuries. In the 2012 Liberty Mutual Workplace Safety Index, a disabling injury was defined as an injury that resulted in six or more days away from work. The leading cause of disabling injuries was identified as overexertion, defined as injuries caused by excessive lifting, pushing, pulling, holding, or throwing.

Various factors, such as an aging workforce and repeat injuries, can accelerate the onset of material handling injuries. Although these factors are largely out of our control, there are numerous design criteria that we should consider when rearranging an existing workstation, setting up a new workstation, or purchasing new equipment.

With a wide range of assessment tools available on the market, the analysis and design of material handling tasks can be overwhelming. Following are three simple design considerations for any material handling task. Focusing on these three aspects has the biggest impact on reducing risk for musculoskeletal disorder injuries (MSDs).

#### **Measurements to be taken:**

**Horizontal distance** is measured from the center of the operator's ankles to the hands on the load or cart. This is a measure of how far away the object is from the operator's lower back. As the horizontal distance increases, the amount of force required by the operator's back muscles also increases. The recommended horizontal reach distance is less than 12 inches. As a general rule, minimize the horizontal reach distance to a load or cart handle to minimize the required force generation for the lower back.

**Vertical height** is measured from the standing surface to the operator's hands on the object. The ideal vertical height range for material handling is 38 to 49 inches above the standing surface. This "comfort zone" applies to all of the overexertion tasks of lifting, pushing, pulling, and holding, as defined by Liberty Mutual. Staging loads or mounting cart handles within this optimal range minimizes the potential for awkward back postures while performing material handling tasks.

**Frequency** is a measure of how many material handling moves an operator does per minute. If material handling is required, the ideal frequency is 0.2 material moves per minute or 1 material move every 5 minutes. For higher repetitions, consider a frequency of less than 2 material moves per minute. Limiting the number of lifts or cart movements increases an operator's rest and recovery time between movements.

#### **Calculate Measurements:**

Input the measurements into this online calculator to determine the how much a person can safely lift over a specific time period.

**You must first convert inches to Metric measurements:**

[http://www.ccohs.ca/oshanswers/ergonomics/niosh/calculating\\_rwl.html](http://www.ccohs.ca/oshanswers/ergonomics/niosh/calculating_rwl.html)