



Six Factors that affect lifting

The NIOSH* Lifting Equation

*National Institute of Occupational Safety and Health (USA)

The National Institute for Occupational Safety and Health (NIOSH) in the USA identified factors that affected the amount of weight that could be safely lifted. It was created to help workplaces design and assess lifting and lowering tasks.

This tool recommends workplace lifting conditions under which it is believed nearly all

workers may be repeatedly exposed, day after day, without developing work-related low back and shoulder disorders associated with repetitive lifting tasks.

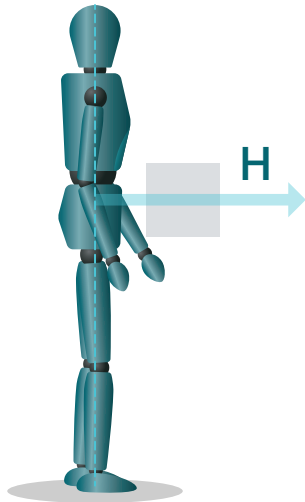
NIOSH identified six factors that influence the maximum recommended loads as the workers deviated from a perfect lifting situation.

In a perfect lifting situation the load is:

- Close in to the body,
- At waist height,
- Not moved much,

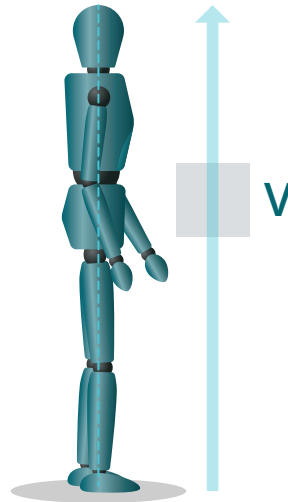
- Infrequently lifted,
- Moved with no twist, and
- Moved with a good grip on the object.

Horizontal Reach Factor



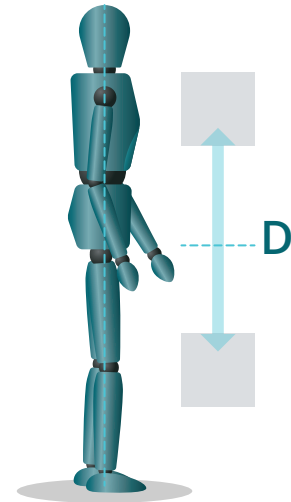
The farther out from the body the load is held, the higher the loads on the spine. This is known as the **Horizontal Reach Factor (H)**.

Vertical Height Factor



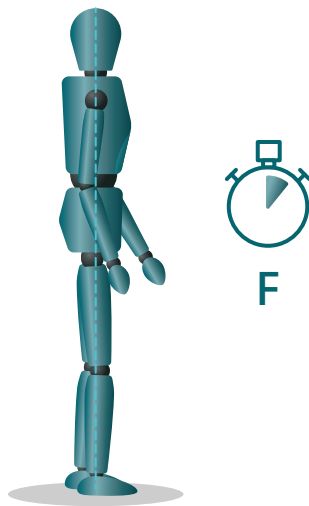
The farther the weight is lifted from the waist, the higher the loads on the spine or shoulders. This is known as the **Vertical Height Factor (V)**.

Movement Factor



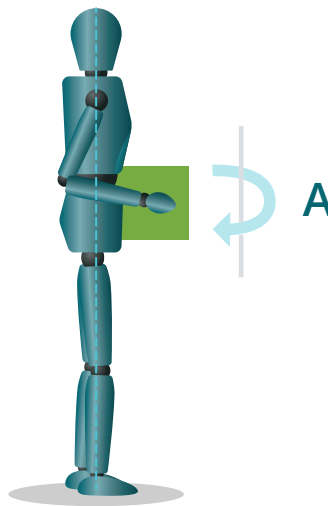
The greater the distance the weight is moved through, the higher the energy required. This is known as the **Movement Factor (D)**.

Frequency/Repetitiveness Factor



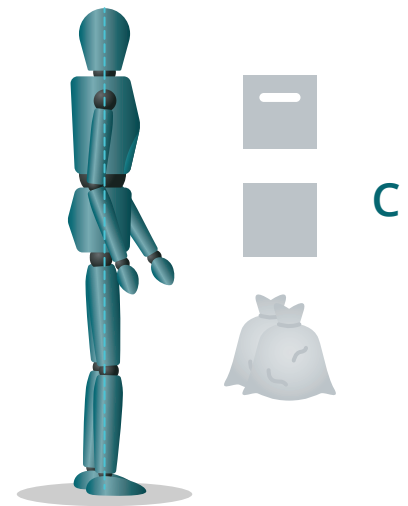
The more frequently the load is lifted and the longer it is lifted for, the higher the stress on the body. This is known as the **Frequency (or Repetitiveness) Factor (F)**.

Asymmetry/Twist Factor



The more twisted the upper body, the higher the stresses on the spine. This is known as the **Asymmetry (or Twist) Factor (A)**.

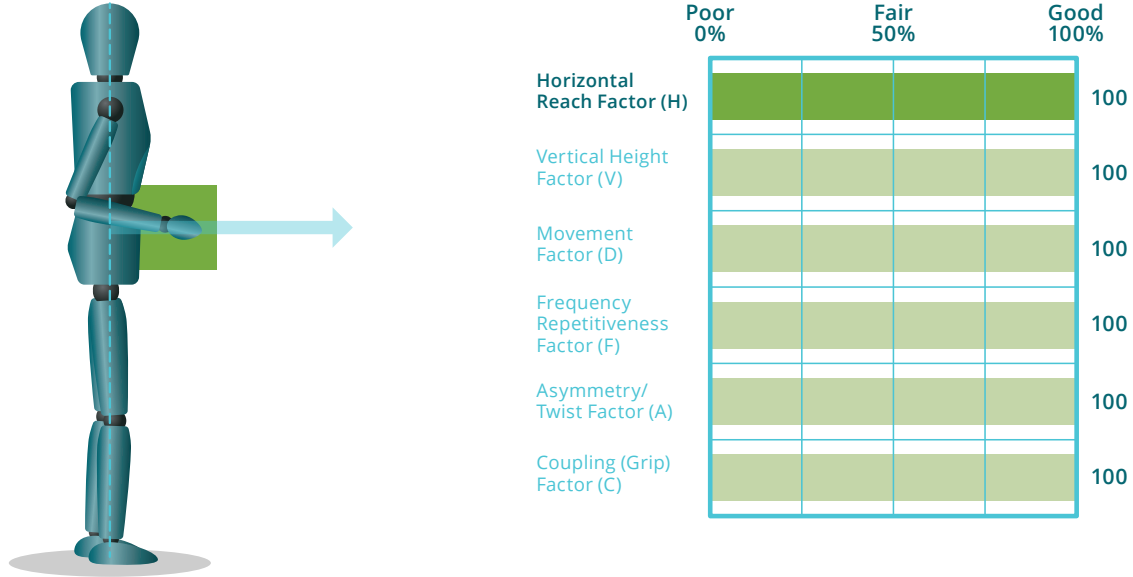
Coupling (Grip) Factor



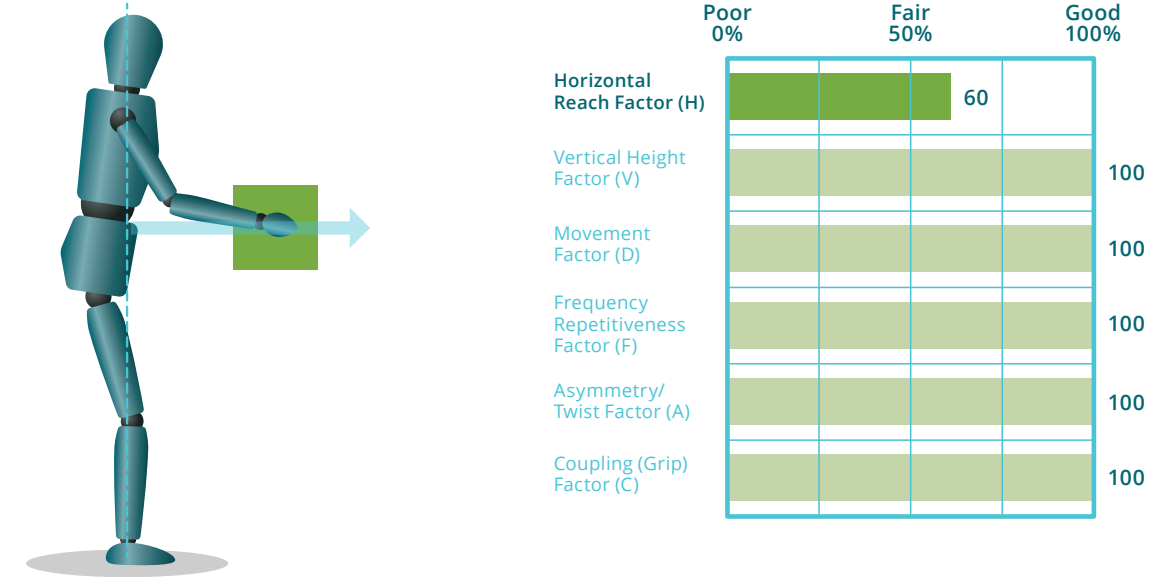
Lastly, the more awkward it is to grip the object, the higher the effort. This is known as the **Coupling (or Grip) Factor (C)**.

Example: Horizontal Reach Factor (H)

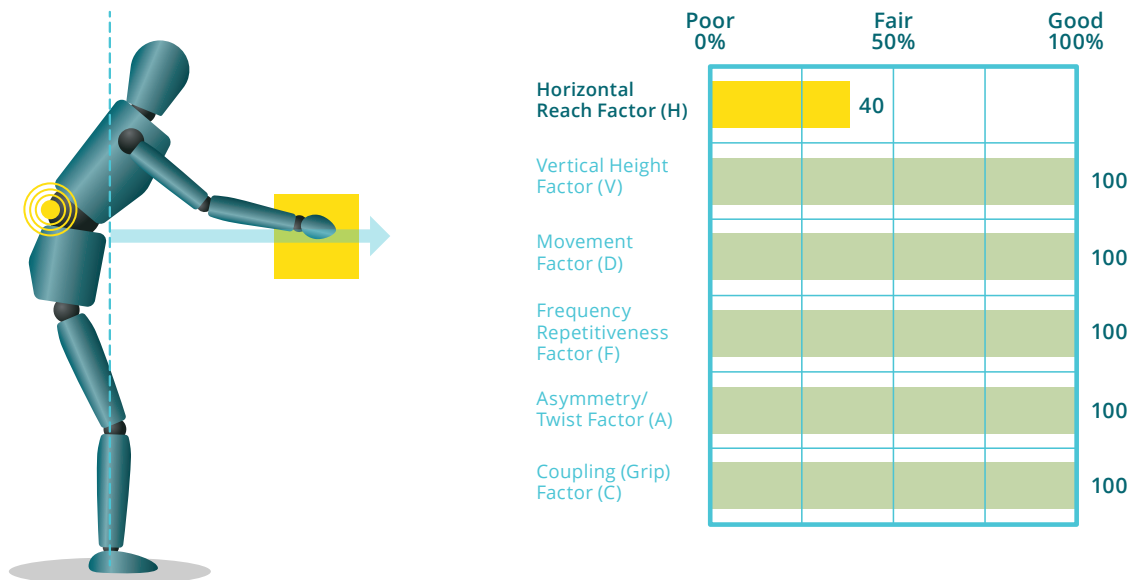
The moving bars show how each factor can reduce the recommended weight. In the ideal lifting situation, the object is close in to the belly button (100%).



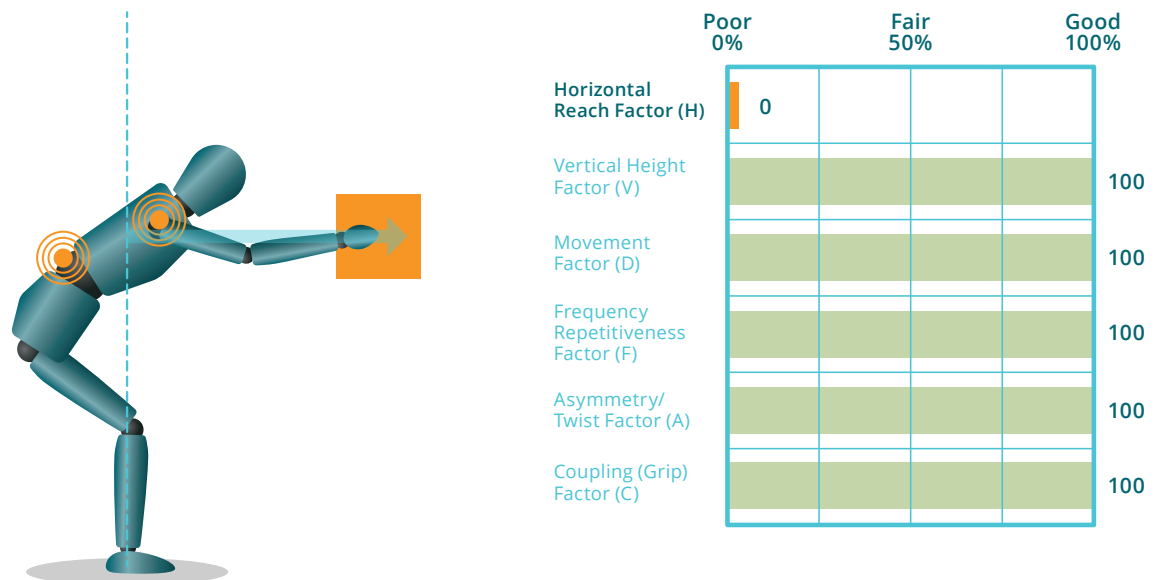
As the load is lifted farther away from the body the recommended weight drops to 60%...



...then to 40%.



When the object is at maximum forward reach the value is 0%. This means that no load should be lifted in this position.



The change in the values of each Factor can be used to:

- Help recognize or identify lifting situations where there are MSD hazards.
- Help predict the effect of changing the lifting situation by looking at how much each Factor is improved.

The actual values of the Factors can be input to The NIOSH Lifting Equation to calculate a maximum recommended weight as a part of a Risk Assessment.

By recalling the six factors when you are observing lifting and lowering, you should see lifting in a new way.

There are many resources that describe The NIOSH Lifting Equation in more detail available here, in your public Library or on-line.



For more info visit:
msdprevention.com

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