

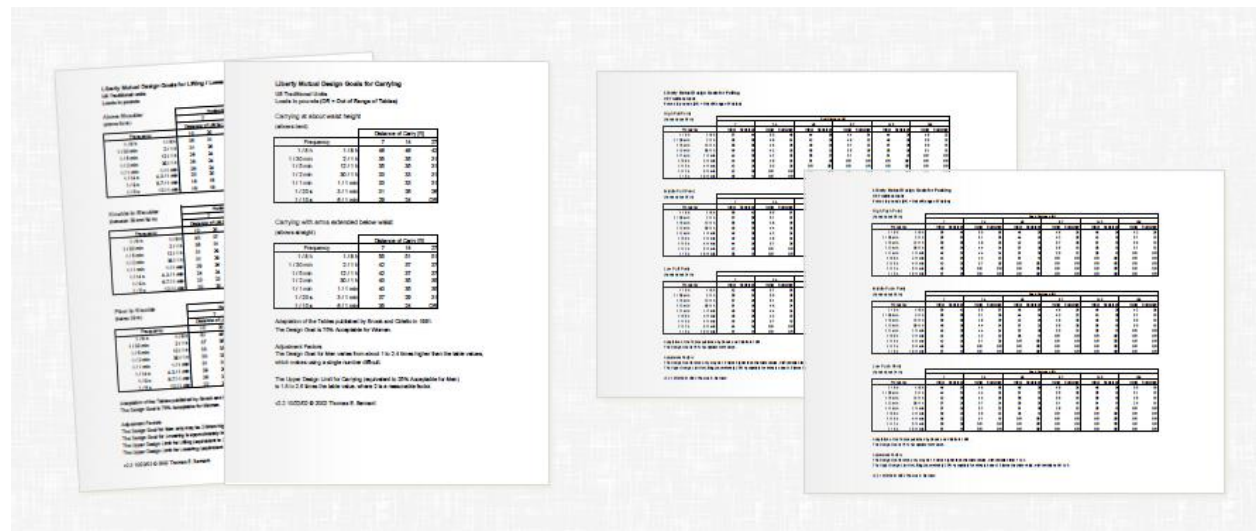
# A Step-by-Step Guide to the Snook Tables



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The Liberty Mutual MMH Tables, commonly known as “Snook Tables”, outline maximum acceptable weights and forces for the design of various manual material handling tasks. The Snook Tables are based on research by Dr. Stover Snook and Dr. Vincent Ciriello at the Liberty Mutual Research Institute for Safety. The tables provide design goals, in pounds of weight or force, that are deemed to be acceptable to a defined percentage of the population. This is done by comparing data for each of the specific manual handling tasks against the appropriate table.

The tables have been adapted by Thomas E. Bernard (University of South Florida) with some support from the OSHA Salt Lake Technical Center. This adaptation yields a design goal output for various lifting, lowering, pushing, pulling, and carrying tasks. The ErgoPlus Industrial Snook Tables Calculator is based on Bernard’s adapted tables.



Notes from Thomas E. Bernard on reported values: For design goals, 75% acceptable for women was selected as the appropriate target. In some cases,



multipliers (adjustment factors) are provided to adjust to 75% acceptable for males and to an upper limit representing 25% acceptable for men. The format and some content of the tables have been changed from the original. There was also a harmonization of frequencies in the carry, push, and pull tables that required some judgment of what the value should be. In the carry, push and pull tables, OR (out of range) is used for some combinations of frequency and distance that were not in the reported range of results.

## ErgoPlus Snook Tables Calculator

### Snook Tables (Lift/Lower)

Lift Lower Point  
Floor to Knuckle (below 29 in.)

Frequency  
1 action/5 minutes (12 actions/hour)

Horizontal Distance  
15 inches

Distance Of Lift  
20 inches

Actual Weight  
42

**CALCULATE**

### RESULTS

Risk

Risk Index	1.75
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Assessment Results

Design Goal	24.00 (lbs)
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Task Variables

Lift/Lower Point	FloorToKnuckle
Frequency	1 action/5 minutes (12 actions/hour)
Horizontal Distance	15 inches
Distance of Lift	20 inches
Actual Weight	42

**SAVE**   **CANCEL**

We have developed a cloud-based REBA calculator as a part of our ErgoPlus Industrial platform that is based on Thomas Bernard's adapted tables that can be used to efficiently determine the design goal for the task being evaluated. After task variables are collected, you will simply select from each drop-down menu for each variable. The ErgoPlus Industrial Snook Tables calculator is shown above and you can also check out the application here: [ErgoPlus Industrial](#)

## Snook Tables Calculator Outputs

The Design Goal is the primary output of the Snook Tables Calculator. The Design Goal answers the question... "Is this weight or force too heavy or forceful for this



task?" If the actual weight or force exceeds the design goal, risk reduction controls should be implemented.

A Risk Index is also calculated to provide a relative estimate of the level of physical stress and MSD risk associated with the tasks evaluated.

Risk Index = Actual Weight/Force Requirement ÷ Snook Tables Design Limit

Answers the question... "How significant is the risk?"

A Risk Index value of 1.0 or less indicates a nominal risk to healthy employees. A Risk Index greater than 1.0 denotes that the task is high risk for some fraction of the population. As the LI increases, the level of injury risk increases correspondingly. Therefore, the goal is to design all lifting jobs to accomplish an LI of 1.0 or less.

## Using the Snook Tables

To prepare for the assessment using the Snook Tables, you will first need to gather information about the job, interview supervisors and workers, and observe workers performing required manual material handling tasks. Select the tasks to be evaluated based on the most difficult and demanding lifting, lowering, carrying, pushing, or pulling tasks. For example, when evaluating lifting tasks, select tasks with the heaviest objects lifted from the most awkward positions (below knees, above shoulder, and/or farthest reach); and when evaluating pushing and pulling tasks, select the most forceful task requirements or from low or high push pull points.

## Task Variables

Task variables needed to conduct assessments using the Snook Tables:

- Weight of Object



- Force Requirement
- Lift/Lower Distance
- Hand Distance (Horizontal Hand Position)
- Hand Height
- Push/Pull/Carry Distance
- Frequency
- Lifting/Lowering Zone

Select the tasks to be evaluated based on the most difficult and demanding lifting, lowering, carrying, pushing, or pulling tasks. For example, when evaluating lifting tasks, select tasks with the heaviest objects lifted from the most awkward positions (below knees, above shoulder, and/or farthest reach); and when evaluating pushing and pulling tasks, select the most forceful task requirements or from low or high push pull points.

For each job task analyzed, the evaluator will need to collect relevant data. Measurements and data required for assessments using the Snook Tables include the following:

**Weight:** The weight of the object being lifted, lowered, or carried.

**Force:** For each pushing and pulling task evaluated, you will need to measure the amount of force required to get the item moving (initial force) and then measure the amount of force it takes to keep the item moving (sustained force).

**Lift/Lower Distance:** The distance of travel of the hands while lift or lower taking place.

**Hand Distance (Horizontal Hand Position):** The distance from the front of the body to the hands. This will normally be half the width of the object being handled unless the object is purposely held away from the body. If the load is lifted away from the body, use the NIOSH Equation technique for determining the horizontal location of the lift.



**Hand Height:** The vertical height of the hands on the object being pushed or pulled, or the height of the hands when carrying a load.

**Push/Pull/Carry Distance:** The distance the item being handled is pushed or pulled, or carried.

**Frequency:** The number of lifts, lowers, pushes, pulls or carries expressed in terms of number of activities done in 'x' seconds, minutes, or hours (as outlined in tables and our calculator input fields).

**Lift/lower zone:** The area of the body in which the lift/lower starts and finishes respectively. Take note of the position of the hands when the worker has completed the lift/lower (floor to knuckle, knuckle to shoulders, or shoulder to overhead reach)

When the task specific data does not match the values in the calculator, select the next highest table value that is closest to the actual task requirements. By selecting the next highest value for any of the specific criteria, a more conservative or protective assessment will result.

## Multiple Tasks

Many jobs require a wide variety of manual handling tasks (lifting, lowering, pushing, pulling, and/or carrying) which can be assessed as a whole using the Snook Tables. This can be done by comparing data for each of the specific manual handling tasks against the appropriate table, and then using the total frequency for all the tasks as the frequency value to determine the percentage of the population that would find the task to be acceptable.

For example, if a job requires lifting at a rate of one lift every two minutes, a push every five minutes and a carry every five minutes, the worker would do four and a half 'tasks' over five minutes, or approximately one task per minute. The evaluator can then compare the data for the lift, carry and push, against the appropriate table but use the same frequency (one per minute) for each to determine a result.



When a mixture of males and females are doing the task, the task should be designed so that it is acceptable to at least 75% of the female population, which would make it acceptable to more than 90% of the male population. Any task that cannot be performed by at least 75% of the total population should be considered for MSD prevention controls and redesign.

## Example 1: Above Shoulder Lift



### Step 1: Determine and Record Task Variables

Variables determined by the assessment:

Lift Lower Point – Above Shoulder (above 54")

Frequency – 1 action every 5 minutes (12 actions per hour)

Horizontal Distance – 10" (front of body to mid-line of hands)



Distance of Lift – 30” (lifts from cart at 25” to rack height of 55”)

Actual Weight – 32 pounds

## Step 2: Calculate Results

### Snook Tables (Lift/Lower)

Lift Lower Point	Above Shoulder (above 54 in.)
Frequency	1 action/5 minutes (12 actions/hour)
Horizontal Distance	10 inches
Distance Of Lift	30 inches
Actual Weight	32

CALCULATE

### RESULTS

#### Risk

Risk Index 1.78

#### Assessment Results

Design Goal 18.00 (lbs)

#### Task Variables

Lift/Lower Point	AboveShoulder
Frequency	1 action/5 minutes (12 actions/hour)
Horizontal Distance	10 inches
Distance of Lift	30 inches
Actual Weight	32

SAVE

CANCEL

## Example 2: Below Knee Lift



## Step 1: Determine and Record Task Variables





Variables determined by the assessment:

Lift Lower Point – Floor to Knuckle (below 29")

Frequency – 1 action every 2 minutes (30 actions per hour)

Horizontal Distance – 10" (front of body to mid-line of hands)

Distance of Lift – 30" (lifts from cart at 25" to rack height of 55")

Actual Weight – 35 pounds

## Step 2: Calculate Results

### Snook Tables (Lift/Lower)

Lift Lower Point	Floor to Knuckle (below 29 in.)
Frequency	1 action/2 minutes (30 actions/hour)
Horizontal Distance	10 inches
Distance Of Lift	30 inches
Actual Weight	35

**CALCULATE**

### RESULTS

Risk	
Risk Index	1.59
Assessment Results	
Design Goal	22.00 (lbs)
Task Variables	
Lift/Lower Point	FloorToKnuckle
Frequency	1 action/2 minutes (30 actions/hour)
Horizontal Distance	10 inches
Distance of Lift	30 inches
Actual Weight	35

**SAVE**      **CANCEL**



## Example 3: Carry



### Step 1: Determine and Record Task Variables

Variables determined by the assessment:

Carry Point – Waist Height

Frequency – 1 carry/2 minutes (30 carries per hour)

Carry Distance – 27' (front of body to mid-line of hands)



Actual Weight – 52 pounds

## Step 2: Calculate Results

### Snook Tables (Carry)

Carry Point  
Waist Height ▼ i

Frequency  
1 carry/2 minutes (30 carries/h... ▼ i

Carry Distance  
27 ▼ i

Actual Weight  
52 i

**CALCULATE**

### RESULTS

Risk

Risk Index	1.68
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Assessment Results

Design Goal	31.00 (lbs)
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Task Variables

Carry Point	WaistHeight
Frequency	1 carry/2 minutes (30 carries/hour)
Distance	27
Actual Weight	52

**SAVE**

**CANCEL**



## Example 4: Pulling



### Step 1: Determine and Record Task Variables

Variables determined by the assessment:

Pull Point – Low (Hands about 24")

Frequency – 1 Pull/2 minutes (30 per hour)

Pull Distance – 24'



Initial Force – 75 pounds\*

Sustained Force – 34 pounds\*

\*A calibrated mechanical or an electronic digital force measurement dynamometer is needed to determine the forces required for pushing and pulling tasks. See our Snook Training Guide for detailed guidance.

## Step 2: Calculate Results

### Snook Tables (Pull)

Pull Point  
Low (Hands about 24")

Frequency  
1 action/2 minutes (30 acti...)

Pull Distance  
24

Initial Force  
75

Sustained Force  
34

**CALCULATE**

### RESULTS

Risk

Risk Index	1.63	1.42
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Assessment Results

	Initial	Sustained
Design Goal	46.00 (lbs)	24.00 (lbs)

Task Variables

Pull Point	Low (Hands about 24")
Frequency	1 action/2 minutes (30 actions/hour)
Pull Distance	24
Initial Force	75
Sustained Force	34

**SAVE**   **CANCEL**



## Example 5: Pushing



### Step 1: Determine and Record Task Variables

Variables determined by the assessment:

Push Point – Middle (Hands about 36")

Frequency – 1 Push/5 minutes (12 per hour)

Push Distance – 97'

Initial Force – 24 pounds\*



Sustained Force – 15 pounds\*

\*A calibrated mechanical or an electronic digital force measurement dynamometer is needed to determine the forces required for pushing and pulling tasks. See our Snook Training Guide for detailed guidance.

## Step 2: Calculate Results

### Snook Tables (Push)

Push Point  
Middle (Hands about 36")

Frequency  
1 action/5 minutes (12 action...)

Push Distance  
97

Initial Force  
24

Sustained Force  
15

CALCULATE

### RESULTS

Risk

Risk Index	0.60	0.75
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Assessment Results

	Initial	Sustained
Design Goal	40.00 (lbs)	20.00 (lbs)

Task Variables

Push Point	Middle (Hands about 36")
Frequency	1 action/5 minutes (12 actions/hour)
Push Distance	97
Initial Force	24
Sustained Force	15

SAVE

CANCEL





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