



## ***LOSS CONTROL ALERT***

### **Preventing low back pain injuries from material handling tasks**

Low back injuries are common and costly for many companies. These injuries have many causes including sprains and strains from overexertion, falls, material handling, and automobile accidents. In nearly 85% of all low back injuries, an objective cause for the chronic pain cannot be determined. As a result, these injuries are collectively referred to as low back pain injuries. This Everest National Insurance Company (ENIC) Alert focuses on one of the primary causes of low back pain injuries: manual material handling tasks.

Estimates show the average low back claim to be about \$8,300. When adding uninsured costs to these figures, preventing back injuries should be a major target. These uninsured costs include:

- Additional time, paperwork, and phone calls with claim adjusters, medical providers, attorneys, and injured workers;
- Lost production resulting in overtime, loss of customers, or work delays due to the loss of employees;
- Cost of hiring and training temporary labor or re-assigning and training other workers to handle the job of the injured employee until they return to full duty;
- Loss of customers, or potential customers, resulting from price increases due to higher, accident driven operating costs, insurance premiums, or an inability to competitively bid on jobs due to these costs;

Due to the many causes of low back pain, experts agree that most of us will experience some form of this injury during our lifetime. Low back injuries can have both occupational and non-occupational causes or contributing factors. A few non-occupational factors may include obesity, diet, posture, age, gender, genetics, temperament, and general fitness. Occupationally related back pain can also have numerous causes. Of those resulting from material handling tasks, studies have indicated three major factors, excessive force or weight, poor posture, and task repetition to be key contributors to occupationally related low back pain.

*Excessive force:* There is no safe weight that can be repeatedly lifted or carried without risk of injury. The National Institute for Occupational Safety & Health (NIOSH) has developed a lifting equation to allow safety professionals to design manual lifting and carrying tasks to minimize the risk of injury. According to this formula, under ideal conditions that are extremely unlikely to exist for any lifting or carrying task, workers are extremely susceptible to injury when they repeatedly lift or carry loads in excess of 50 pounds. This risk of injury increases with factors such as the distance of the weight from the body, the height of the lift, distance traveled, walking surface, extremes of posture, the grip on the load and frequency of the lifts. When these other factors are included into the NIOSH lifting equation, the amount of weight that can be repeatedly lifted and carried without risk of injury is greatly reduced.

*Posture:* Extremes in body posture when lifting or carrying materials significantly contribute to the amount of force that the body needs to produce to move the weight. The greater the degree of flexion or the more “bent over” a worker is when an object is lifted or carried, the greater the amount of the force on the lower back. As the force increases, the risk of injury increases. Lifting and carrying tasks requiring workers to twist their backs, such as lifting and moving materials to a different level or location or change direction when carrying are particularly stressful to the lower back and should be avoided.

*Repetition:* Material handling related low back pain is often stems from cumulative exposures to force or weight over time. Rarely do back injuries result from a single lifting or carrying task. They usually result from multiple lifting and carrying tasks over the years. Unfortunately, our bodies, including our back muscles, tendons, bones and disks, degenerate with age. Due to this natural degeneration what may be an acceptable weight for a healthy 25 year old worker, may pose a high risk of injury to older workers. In addition, fast paced lifting or carrying tasks such as loading or unloading materials from trucks, can also cause muscle fatigue. Tired muscles, if not rested, will begin to breakdown and are more susceptible to injury. Studies have shown that back discs, the fibrous cushions between each vertebra, sustain micro-injuries over time from repeated lifting and carrying tasks. These micro-injuries are cumulative in nature contributing to bulging or ruptured disks.

### **Preventing back pain injuries:**

As there is no simple cause of low back pain, there is no easy solution to prevent material handling related back injuries. With multiple occupational and non-occupational factors contributing to low back pain, preventing it seems like an impossible task. However, with the high cost of these injuries and overall aging workforce, there is a strong likelihood that they will increase in frequency and severity in the future. The only true solution is to minimize the occupational risk for material handling related back injuries.

Historically, training workers to adopt proper body mechanics (e.g. lift with your legs, keep back straight) to prevent back pain was the most predominate, and, if used as the sole remedy, largely ineffective solution. Recent quick fix efforts by some companies have required workers to use back belts. According to NIOSH, there is no evidence to

support or refute the effectiveness of back belts in preventing low back pain. NIOSH believes that the decision to use back belts should be a voluntary decision by both employers and employees. ENIC recommends that use of a back belt should not be a mandatory job requirement or used as the only control to prevent back injuries. If your workforce continues to wear back belts, you should remember the following points:

1. There is a lack of scientific evidence that back belts work.
2. Workers wearing back belts may attempt to lift more weight than they would have without a belt. A false sense of security may subject workers to greater risk of injury.
3. Mobility limitations imposed by back belts may reduce the elasticity of back muscles and tendons, contributing to low back pain.
4. Workers and employers should redesign the work environment and work tasks to reduce lifting hazards, rather than rely solely on back belts to prevent injury.

### **Effective Prevention Strategy:**

Today, most effective and successful results in preventing low back pain come from an ergonomic approach involving hazard identification, task analysis, and a combination of specific engineering and administrative controls. Successful employers usually involve management and workers as a team to identify high-risk tasks and develop feasible solutions to minimize the risk of injury.

ENIC recommends the following approach:

#### *Hazard Identification:*

Most lifting and carrying tasks require individual analysis to identify key risk factors and develop specific solutions in preventing low back pain. There are no quick fixes in preventing low back pain applicable to all lifting and carrying tasks. The first step is to identify and prioritize lifting and carrying tasks that present the greatest potential for injury. Identifying high-risk tasks can be fairly easy. Look at past claims, accident investigation reports or other accident records to identify these tasks. Obtain worker feedback as to those lifting and carrying tasks that they perceive as being stressful. Observe your work crews. Look for those tasks involving awkward postures, forceful exertions, heavy materials (35 lbs or greater should be a first priority) or repetition. Look for tasks that workers or crew leaders have taken some preventative actions such as frequent breaks, two-person lifting, or the use of mechanical aides such as dollies or ramps. The following chart may be beneficial in identifying tasks with high risk factors for low back pain.

**High Risk Manual Handling Tasks** – If any of these risk factors exist for the material handling tasks, the job should be selected for analysis.

- ☐ Lifting, lowering or carrying more than 35 pounds
- ☐ Lifting or lowering items with one hand or rough jerking motions to start the lift rather than a two-handed, smooth motion
- ☐ Lifting, lowering, or carrying bulky objects that cannot be held close to the body or objects that can easily shift, changing their center of gravity
- ☐ Repetitively handling materials more than 9 times per minute or 50 times in an 8 hr. work period
- ☐ Lifting or lowering between floor and waist heights
- ☐ Lifting or lowering above shoulder height
- ☐ Twisting and lifting in one motion
- ☐ Lifting or lowering away from the body's vertical centerline
- ☐ Handling slippery or difficult to grasp items
- ☐ Handling items that place pressure on the hands from thin edges such as pail handles or sheet metal edges
- ☐ Pushing or pulling carts, boxes etc. that require a jerking motion or large break-away force to get started
- ☐ Lifting or carrying items over obstructed, uneven, poorly illuminated, slippery surfaces

*Task Analysis:*

Once the material handling tasks have been identified, the next step is to examine the risk factors of force, posture and repetition that exist within each task. The purpose is to identify those risk factors that present the greatest potential for injury. Once identified, specific effective measures can be developed to minimize these risk factors. Task analysis is best performed through a team approach involving workers and management. Specialists such as ergonomic consultants can be invited to participate in these analyses.

The following checklist can be used to identify high-risk factors for material handling tasks that require corrective action. Any “Yes” response requires corrective action.

	Yes	No
Are loads too heavy for workers?	?	?
Are the loads to be lifted considered too heavy by the workers?	?	?
Are materials moved over distances greater than 5ft?	?	?
Is there more than 4-6 inches between a worker’s body and the load’s center of gravity?	?	?
Are pushing or pulling forces required to move loads?	?	?
Are pushing / pulling forces about the same or greater when mechanical aids are used?	?	?
Will mechanical handling aids reduce handling forces?	?	?
Are walking surfaces uneven, slippery, or have tripping hazards?	?	?
Are objects difficult grasp, unstable, or slippery?	?	?
Are handholds missing from loads?	?	?
When worn to lift and carry loads, are gloves torn, or slip off worker hands?	?	?
Is there enough room to maneuver?	?	?
Lifting or carrying below knuckle height and above shoulder height occurs?	?	?
Material storage areas are not adjustable requiring workers to bend to lift and lower?	?	?
Does the task require sudden movements or jerking to lift a load?	?	?
Does the task require twisting at the waist?	?	?
Does the task require extended reaching of more than 10 inches?	?	?
Is material handling performed at a high pace, more than 6 lifts per minute?	?	?
Do workers self-pace material handling tasks at a high rate?	?	?
Is help ever unavailable for heavy or awkward lifts?	?	?
Does the employee ever have an obstructed view when carrying loads?	?	?
Is preventive maintenance for mechanical handling equipment devoted to breakdown service?	?	?
Are workers trained in correct handling and lifting procedures?	?	?

### *Task Modifications:*

Deciding on the most effective methods to improve high-risk material handling tasks requires a team approach. Workers and management, acting as a team, should recommend job modifications to reduce the specific high risk factors identified in your task analysis. Recommendations should be carefully considered to avoid other hazards that may be created if adopted. Input from ergonomic consultants should be sought in making these decisions.

The following are a few basic design considerations to improve material handling tasks.

1. Eliminate the need to lift or lower manually by:
  - Increasing the weight to a point where it must be mechanically handled,
  - Palletizing materials and products, and
  - Using unit load concept (bulk handling in large bins or containers).
2. Reduce the weight of the object by:
  - Reducing the weight and capacity of the container
  - Reducing the amount of material in the container
  - Purchasing materials in smaller, lighter quantities from suppliers
  - Reducing the size or shape of the object or container
  - Providing grips or handles to reduce grip forces
  - Assigning the job to two or more persons.
3. Reduce grip forces by:
  - Providing tight fitting gloves
  - Providing grips or handles to reduce hand pressure
4. Reduce the distance of the load's center of gravity from the body by:
  - Changing the shape of the object or container so that it can be held closer to the body
  - Locating grips or handles so loads can be held closer to the body.
5. Convert load lifting, carrying, and lowering movements to a push or pull by:
  - Wheel barrels

- Slides, ramps, or chutes
  - Portable conveyors,
  - Hand trucks, and
  - Four-wheel carts.
6. Reduce the force required to push or pull by:
- Reducing size and weight of load
  - Requiring that wheels and casters on mechanical aids have (1) periodic lubrication of bearings, (2) adequate maintenance, and (3) larger diameter wheels and casters
  - Use smooth, even surfaces such as sidewalks or driveways whenever possible to transport materials.
  - Providing variable-height handles so that both short and tall employees can maintain an elbow bend of 80 to 100 degrees,
  - Replacing a pull with a push whenever possible
7. Reduce the distance of the push or pull by:
- Moving lifting and carrying tasks closer to work areas.

Recommended changes should be implemented on a trial basis and re-evaluated before making final go-ahead decisions. Feedback from workers should be obtained relative to the ease of the modified tasks and any additional changes needed. When management and workers adopting these changes are satisfied with the modifications, they should be adopted company-wide. Loss activity and worker feedback should be monitored to determine effectiveness and the need for additional changes. Modified tasks should be periodically observed to assure work is performed as designed.

### **Worker Training:**

In addition to task modifications, workers and crew leaders need to be trained on the hazards of their manual handling tasks and the work practices and equipment to prevent injuries. In addition, workers should receive training on proper body mechanics including lifting and carrying techniques to minimize the risk of injury. A few safe lifting tips for workers are included with this Alert.

Training should be provided for all new workers and those performing new jobs or material handling tasks. Training should also be provided to all workers and crew leaders when jobs are changed or modified. All workers should be periodically reminded of proper material handling work practices through regular toolbox meetings or other worker training activities.

**Claims Management:**

In the event a low back injury does occur, the best action to take is to contain the costs of the claim and initiate action to prevent similar incidents. Contact ENIC to request our Loss Control Alert on claim cost containment strategies and return to work programs.

ENIC also recommends that insureds investigate all accidents including material handling incidents to identify causal factors and actions needed to prevent recurrences. If you are interested in strengthening this element of your program please contact ENIC and request a copy of our model program or a consult with our qualified loss control staff.

Remember that ENIC offers loss control services to its policyholders to help implement and strengthen your loss prevention efforts. If you would to obtain these services or would like more information regarding these services, please call Everest National Insurance Company, Inc. at (800) 438-4375 extension 3262

Fax: (908) 604-3526 or E-Mail: [LossControl@Everestnational.com](mailto:LossControl@Everestnational.com)

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## **Safe Material Handling Tips for Workers**

The following tips are provided to assist employers in preventing material handling related injuries. They are intended to compliment employee training efforts.

### **I. Important Reminders:**

#### **1. Common injuries to the back:**

- Strain - overused or overstretched muscles
- Sprain - torn ligaments from sudden movement
- Herniated disk - loss of cushioning ability from strain or age

#### **2. Causes of back injuries:**

- Improper lifting, carrying, and moving techniques
- Overexertion
- Weak back and stomach muscles
- Overweight and potbellies
- Poor physical condition
- Poor posture, standing or sitting

#### **3. Basic Do's & Don'ts**

*Do:*

- Stand close to the load
- Keep a wide stance, and make sure your footing is solid
- Tighten the stomach muscles
- Assume the Safe Lifting Position
- Pull the load close to the body
- Lift with your legs
- Move slowly, with small steps
- Don't twist the body when carrying
- When unloading, lower the load slowly using your legs, not your back

*Don't:*

- Bend at the waist while lifting, or lift with your back
- Twist your body while lifting or carrying
- Try to lift more than you can handle
- Reach above your shoulders to lift a load
- Try to recover a falling load
- Pull a load (push instead)

### **II. Basic Lifting and Carrying Safety**

#### **1. For All Material Handling Tasks**

- Be alert for hazards

- Follow company safety rules
- Take your time and don't take chances
- Use proper lifting techniques
- Get help or mechanical assistance when needed
- Know how to operate mechanical equipment safely
- Watch out for what other workers are doing, and let them know what you're doing

## **2. Plan ahead.**

- Take the easiest, safest route - not necessarily the shortest. Choose a route that is flat, straight, and clear of debris.
- Move objects to avoid bumping into or tripping over them
- Make sure the object is stable and doesn't obstruct your view.
- If the object has sharp edges, use gloves or mechanical aids to transport it.
- If the load is too heavy don't try to lift it yourself. Get help or use a mechanical aid
- Break the load into smaller parts if possible
- Make sure there are enough people to help handle the load if needed.
- Make sure you can see when carrying the load.
- Use the right equipment in the right way.
- Make sure you can unload easily and safely
- Material handling equipment should be used for large, heavy, and awkward loads

## **3. Use Proper Lifting Techniques**

- Squat by bending at the hips and knees
- Head, shoulders, and hips should form a straight line
- Feet shoulder-width apart and turned out
- Maintain the back's natural curves - don't bend
- Stand close to the object, keep a wide stance, make sure footing is solid
- Tighten stomach muscles
- Lift with legs, not back - don't bend back, neck, shoulders
- Pull the load close to the body, grasp object firmly
- Don't twist the body - change direction with your feet first

## **4. Basic Loading Tips:**

- Bend the knees, not the back
- Stand close to the load
- Grip with hands, not just fingers
- Bring load in close to the body, with arms tucked in and weight centered
- Let your legs do the work

## **5. Basic Unloading Tips:**

- Face the spot for unloading
- Lower slowly using the legs, not the back
- Keep fingers away from the bottom and place load on surface

- If unloading on elevated surface, lower the load to the edge, then slide it back

### **III. Special Handling Tips**

#### **1. Lifting and Moving Bags or Sacks:**

- Grasp load at opposite corners
- Use legs to stand, use arms to raise load and rest on hip
- 
- Remember not to twist your body while carrying the load

#### **2. Moving Objects from High Places**

- Avoid reaching above your shoulders, use a step stool or platform
- Check to see how heavy and stable the load is
- If possible, break the load into smaller parts
- Get help if necessary
- Slide the load toward you, grip, then slide it down
- Let arms and legs do the work - make sure there's a place to put the load down

#### **3. Handling Oversized or Heavy Loads:**

- Use two-person lift.
  - o One person designated to direct the team and directs when to lift, carry, & lower
  - o Lift load together, keeping it level
  - o Carry and unload together
- Carry long objects over the shoulder-watch for ends hitting people or objects

#### **4. Using Mechanical Aids:**

- Choose the right equipment - such as curved bed for drums and barrels
- Heavier objects go on bottom, lighter objects on top - don't block the view
- If necessary, secure the load to avoid objects falling off
- Push the load with legs and upper body, knees bent, hands between upper thighs and chest
- Don't pull the load - pushing is easier

#### **5. Using Powered Mechanical Equipment:**

- Use powered equipment only if trained and authorized
- Know and observe maximum load capacities
- Don't ride or allow riders on powered equipment

## IV. Review Quiz

1. Lifting and carrying heavy materials puts the greatest strain on the
  - a) Legs,
  - b) Arms,
  - c) Back.
  - d) Neck

*(Answer: C - the back. When you lift a heavy object, the weight is centered on your low back muscles, tendons and backbones.)*

2. True or False: If you're unable to carry a heavy object by yourself, you may get a poor performance evaluation or lose your job.  
*(Answer- False. No one is expected to carry objects that are too heavy. Workers are encouraged to seek help rather than attempt to lift and carry heavy items, injuring themselves)*
3. True or False: When picking up or putting down a heavy object, it's better to bend your knees than to bend your back. *(True, This techniques uses your leg muscles, the strongest in your body and minimizes the force on your back.)*
4. True or False: When carrying a heavy load, move as fast as possible so you won't need to stop and rest. *(False, Always move slowly and rest as often as necessary. Speed increases the risk of dropping the load and being injured.)*
5. True or False: When two people are carrying a load, it's helpful if they are about the same height. *(True, This helps to keep loads level and reduces the lifting stress for both individuals.)*
6. True or False: Curved hand trucks are best for moving drums or barrels. *(True, The curved hand truck allows barrels and drums to be more stable when moving them. Using a flat surface truck for drums or barrels is dangerous.)*
7. True or False: Pushing a hand truck or dolly is easier than pulling it. *(True, Pushing anything requires less energy than pulling the same item.)*
8. True or False: Your back is more likely to be injured than any other part of your body. *(True, Due to the numerous causes for low back injuries)*
9. Besides carrying an object by hand, what are some of the other ways to lift and carry an object? *(Answer – Wheel Barrels, dollies, hand trucks, roller conveyors, other material handling aides available in your company)*
10. True or False: Back Injuries just happen, and you can't do much to prevent them. *(Answer: False, Most back injuries can be prevented by following proper work practices including the use of mechanical aides whenever possible.)*

11. True or False: An Important part of preventing back injuries is exercise and staying in good condition. (*Answer: True, People who are out of shape have a higher risk of back injuries.*)

**When reviewing the quiz**

- Select a recent material handling related accident and discuss the probable causes and injuries sustained.
- Ask workers why they should seek and get help instead of moving heavy objects by themselves. Avoiding injuries benefits both the worker and the company much more than the pain and suffering incurred by injured workers and the added cost of an injury to the company.
- Most people don't think about their backs until something goes wrong.
- Ask the group if they know of someone with a permanent back injury and use this to illustrate the importance of avoiding back injuries.