

**TDI**

**Safety @ Work**  
Division of Workers' Compensation



# Ergonomics for Baggage Handlers



**Workplace  
Program**



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# INTRODUCTION



Lifting heavy baggage into trunks, cargo holds, and other areas can lead to a high risk of **musculoskeletal disorders (MSDs)** for the thousands of porters, chauffeurs, taxi drivers, and airlines baggage handlers across the U.S. MSDs – conditions that affect the body’s muscles, joints, tendons, ligaments, or nerves – are among the most common causes of disabling on-the-job injuries.<sup>1</sup> MSDs caused by overexertion, falls on the same level, repetitive motions, and slips or trips cost U.S. companies about \$32.9 billion in workers’ compensation costs per year.<sup>2</sup>

## ***What is ergonomics?***

**Ergonomics** is the process of designing or altering a job to fit the employee. When an employee is trained to ergonomically perform their job, their work becomes safer and more efficient. It helps to prevent MSDs, reduce absenteeism, increase productivity,

and decrease the chance of high insurance premiums and medical costs.

For these reasons, employers should train their employees who handle baggage in ergonomic ways to decrease injury risks caused by:

- Bending.
- Compression or contact stress.
- Forceful exertions.
- Insufficient rest breaks.
- Improper lifting.
- Pushing and pulling.
- Repetitive motions.
- Awkward or improper postures.

Fortunately, MSDs are preventable with the following basic ergonomic lifting and baggage handling solutions.

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# Ergonomic Baggage Handling in General Industry

## Proper baggage lifting

Overexertion and awkward or improper lifting postures are common causes of injury among baggage handlers.<sup>3</sup> These ergonomic lifting techniques can reduce MSD injuries:

- **Move to meet the bag.**  
Move the body to meet the bag, rather than pulling the bag to meet the body.
- **Lift with the legs.**  
Bend at the knees and squat to lift heavy bags. Try to limit bending at the waist.
- **No twisting.**  
Never twist when lifting or carrying baggage. Point toes and the entire body in the direction the baggage should go.
- **Distribute weight evenly.**  
Instead of piling bags onto one shoulder or arm, distribute weight evenly on both sides of the body.



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- **Keep the bag close to the chest.**  
When bending to place baggage in the trunk of a vehicle or a cargo hold, keep the bag close to the chest. Let the leg muscles carry the bag's weight, not the back muscles.
- **Do not rush.**  
Move slowly and carefully. Be aware of the surrounding space to know how much room is needed. This will limit the times the baggage may have to be lifted and rearranged.



# Ergonomic Baggage Handling in the Airline Industry

## Baggage check-in

**The challenge:** Agents receive bags from passengers at a baggage check-in point. The bags are usually weighed on a scale and tagged for the destination. The agent then lifts the bags and places them on a conveyor for transport to the baggage sorting area.

### The hazards:

- Tagging and lifting the bags while bent over (Fig. 1).
- Reaching with extended arms to lift and carry the baggage (Fig. 2).
- Twisting the torso while transferring the baggage to the main conveyor, which is often several feet behind the counter (Fig. 3).
- Performing the same lifting and twisting motions repeatedly throughout the shift (Fig.4).
- Lifting excessively heavy or awkward bags (Fig. 5).
- Standing on hard floors.
- Standing in one spot for a long time.

**The solutions:** Train employees in proper ergonomic techniques:

- Minimize bending when lifting baggage by raising the height of the scales where the passengers place their baggage.
- Minimize lifting by tagging the baggage while it is on the scale, rather than lifting it to a temporary position on the floor and then lifting it again to the main conveyor.



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5

- Tag all excessively heavy baggage with a tag that reads, "heavy" to indicate that it should be handled by two or more people or with a hand truck or dolly.
- Rotate employees during a shift to reduce the amount of lifting and twisting each employee performs.
- Provide a footrest 4-to-6 inches above the floor to allow employees to alternate the leg that supports the majority of their weight.
- Provide anti-fatigue mats to employees who stand for extended periods.
- Provide stools so employees can alter their posture while working behind the counter.

## Baggage sorting areas



**The Challenge:** After check-in, the baggage is transported to a sorting area where it is organized based on the flight and destination. Employees in the baggage sorting area move bags from conveyors to carts for transport to the plane for departure, and from carts to conveyors upon arrival.

**The Hazards:** There are potential ergonomic hazards when transferring the baggage to and from the baggage carts and conveyor belts including:

*(Continued on next page)*

## Automated Solutions

Some airlines have eliminated most lifting and standing hazards in baggage check-in by installing short collection conveyors to carry baggage to the main conveyor.

- The passenger places baggage on the front end of a short collection conveyor leading to the main conveyor. The front end of the short conveyor functions as a scale. After measuring the weight, the agent activates the short conveyor to bring the bag to a position next to the agent where it is tagged. Activating the conveyor again carries the bag to the main conveyor which takes it to the bag sorting area.
- The collection conveyor is low to the floor, so employees can safely step on and over to get to their workstations. The employees never have to worry about stepping on a moving conveyor, because the conveyor is stationary when not in use.
- If a belt conveyor is not practical, a series of rollers (a roller conveyor) may be used. Although the employee must pull the baggage along the rollers, with proper training this minimizes lifting and twisting.

- Extended reaching into the cart to pull bags from the far side of the cart.
- Elevated and extended reaching with arms above the shoulder while lifting bags to elevated locations inside the cart.
- Lifting from and to the conveyor while bent over with arms fully extended.
- Repeated lifting of heavy objects from a low conveyor or the floor.
- Repeated twisting of the torso while lifting the baggage between the cart and the conveyor.

**The Solutions:** Educate employees in proper lifting techniques such as the ones below to keep the load close to and in front of the body.

- Load heavy bags close to the cart opening to minimize heavy lifts with the arms extended.
- Establish work practices (or redesign baggage carts) to prevent stacking bags above shoulder height.
- Consider redesigning new baggage carts so they are narrower to reduce the reach with extended arms.
- Grasp the bottom of the bag when loading to elevated areas rather than using the handle.
- Rotate employees out of particularly stressful tasks.
- Raise the height of the conveyor to reduce bending and lifting.
- Park the cart at an angle to minimize twisting when transferring baggage to the loading conveyor.
- Use two or more people or a lifting aid such as a hand truck or dolly when lifting bags labeled "heavy."



## Baggage loading area

**The Challenge:** In loading operations, baggage is lifted onto carts or containers. A string of filled baggage carts is then pulled by a tractor to a mobile loading conveyor parked near the airplane. The baggage handlers load the baggage from the carts onto the conveyor. The conveyor then carries the load to the door of the baggage compartment, where baggage handlers place the luggage onto the aircraft for transportation. During this process, employees often work on their hands and knees because of cramped conditions. The operation is reversed for unloading.\*

**The Hazards:** Bending, reaching, or stretching during the processes outlined below increase the risk of musculoskeletal strain.

- Repeated lifting of heavy objects from or to the loading conveyor.
- Lifting baggage with arms fully extended while bent over.
- Repeated twisting of the torso while lifting the baggage between the cart and the conveyor.
- Working in limited or confined spaces, requiring stooping, sitting, or kneeling to fit bags inside the baggage compartment.

**\* Larger airplanes often use mechanical baggage systems that do not require work in cramped spaces.**



- Consider modifying the conveyor or its placement, so it ends deeper inside the baggage compartment. (When the end of the conveyor is located on the outside edge of the door opening, it forces the handlers to reach and pull the baggage into the compartment.)
- Separate bags by weight on the baggage carts, so heavier bags can be placed on the bottom of stacks where lifting is minimized.
- Minimize the height that heavy bags are stacked so employees do not have to lift or pull with their arms

- Variable weather conditions add to the potential hazards such as slipping on wet and icy pavement while handling heavy baggage. Also, baggage can be more difficult to grasp securely when wet from rain or snow.

**The Solutions:** Train employees in the following proper ergonomic techniques.

- Park the cart at an angle to minimize twisting when transferring baggage to the loading conveyor.
- Use proper lifting techniques and lifting aids.
- Rotate employees out of particularly stressful tasks and distribute the stressful tasks equally.
- Keep walking surfaces free of ice and snow.
- Use footwear that increases traction for the conditions present.

- above shoulder height. Heavy bags should be placed on the bottom.
- Consider a two-person system where one handler retrieves the bags from the conveyor and slides them to a second handler who stacks the bags in place. This will reduce twisting while lifting.
- Handle all baggage tagged “heavy” with two or more people or with a lifting aid such as a hand truck or dolly.
- Use proper lifting techniques adapted for cramped conditions inside the baggage compartment. In cramped spaces, kneeling is preferable to stopping for lifting tasks; whereas stooping is preferable for pulling tasks.
- Wear knee pads to reduce contact trauma and abrasive injuries while kneeling on hard surfaces.

## Automated Solutions

Consider installing a mechanical “containerized” baggage system to minimize lifting.

- Rather than using standard carts, baggage for larger airplanes is often loaded directly into containers or bins specifically designed for the airplane. The bins are mechanically lifted and placed inside the baggage compartment, which eliminates the common lifting hazards associated with these tasks.
- Consider a similar system for smaller aircraft. For example, use smaller bins or tubs with a roller conveyor or overhead trolley system when moving baggage inside the baggage compartment.

## Baggage claim area

**The Challenge:** After the flight, passengers proceed to the baggage claim area where they collect their baggage. The baggage is unloaded from the aircraft and transported to the baggage claim area via conveyor belts. The baggage is then placed on a baggage carousel (a rotating conveyor belt system) and circulated for passengers to collect their bags. The carousel is usually labeled with flight numbers or destinations to help passengers locate their baggage.

**The Hazards:** Unloading and transporting baggage from the aircraft to the claim area can create ergonomic hazards such as:

- Repetitive movements, which can lead to strain and fatigue.

- Awkward postures caused by employees bending, reaching, or stretching to handle bags.
- Heavy lifting, which can lead to back injuries if proper lifting techniques are not followed.
- Restricted movement and increased risks of collisions or awkward postures caused by limited space.

**The solutions:** The best prevention is to find ways not to lift the bag. As mentioned above, if the bag must be lifted, find the best way to transport the bag without causing stress on the body.

- Avoid twisting and turning while lifting.
- Never lift from an overhead position or awkward stance.
- Avoid bending down while lifting.
- Use mechanical means to perform lifts when possible.

In conclusion, MSDs pose a serious risk to workers involved in baggage handling. MSDs can result in costly workers’ compensation claims and impact productivity. However, implementing basic ergonomic changes can help prevent these injuries. Employers should provide training on proper lifting techniques and educate employees on ways to decrease injury risks. Additionally, specific ergonomic hazards in the airline industry, such as baggage check-in, sorting areas, loading areas, and baggage claim areas, require targeted solutions to minimize the risk of MSDs. By prioritizing employee safety and implementing ergonomic measures, companies can create safer and more efficient work environments while reducing the financial burden associated with workplace injuries.

## Reference

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