

Although overhead door systems are common, they are frequently overlooked as safety hazards, even in organizations with excellent safety programs. Overlooking overhead door hazards and routine maintenance could have catastrophic consequences.

Overhead Door Hazards

The largest moving objects in many facilities, apart from vehicles, are overhead doors. They have sufficient weight and stored energy to injure people severely or fatally. Torsion springs or earlier vintage tension springs are a source of stored energy, particularly when the door is in the closed position.

The weight of a typical residential garage door is approximately 150 pounds and capable of causing severe injury, amputation, or death. Commercial overhead doors present additional challenges and potentially more severe injuries than residential garage doors, due to their heavier weight and great variation in size based upon the application.

There are two main types of industrial garage door injuries. While it is impossible to completely remove the potential for accidents, you can greatly reduce your risk of injury by inspecting and maintaining your overhead doors, being aware of your surroundings and following proper safety protocol.

Entrapment

Entrapment occurs when an industrial garage door closes on top of a person or persons. This happens as a result not of mechanical error but of operator error. There are several ways to avoid entrapment injuries:

- Do not stand or walk under an industrial garage door while it is in motion.
- Always raise industrial garage doors to the fully-open position.
- Always keep the industrial garage door in your line of vision while operating.
- Keep all industrial garage doors free from obstructions while operating.

Impact

Impact occurs in the rare event that an industrial door malfunctions and falls. This typically happens because a door has not been properly maintained. There are several ways to avoid impact-related injuries:

- Whenever possible, avoid using an industrial garage door as an entrance or exit; use “personnel doors” to enter and exit the building.
- Have regularly scheduled maintenance performed on your industrial garage door as per manufacturer’s specifications.
- Allow only trained professionals to install or repair your industrial garage door.
- Always be alert when an industrial garage door is in the “open” position.

Overhead Door Safety

When overhead door accidents occur, they can often be attributed to one of the following 3 categories: inadequate installation/adjustment, lack of routine inspections, and inadequate preventive maintenance. All three attributes are required to prevent injury and ensure personnel safety. Over time, the following deficiencies could be identified on overhead doors:

- spring tension can be improperly set or adjusted
- cables can become frayed and fail
- roller bearings can seize
- poorly secured mounting pads can come loose
- tracks can become fouled with debris

All of these hazards can be mitigated by following best practices for overhead door safety.

Standard #1: Maintenance Practices & Intervals

All door systems should be installed, inspected, and maintained in accordance with the manufacturer's specifications. This includes maintenance intervals, which can vary depending on daily usage and operating environment. If the manufacturer's specifications are not available, then the preventive maintenance program should adhere to established industry standards/best practices [e.g., Door & Access Systems Manufacturers Association].

Standard #2: Entrapment Devices

All motorized door systems should be equipped with entrapment devices to manufacturer's specifications, such as photo-eyes or sensing edges. If there are door systems equipped with older devices not current with newer, improved safety standards, modernizing should be considered where reasonably practicable, for example, upgrading to monitored entrapment devices.

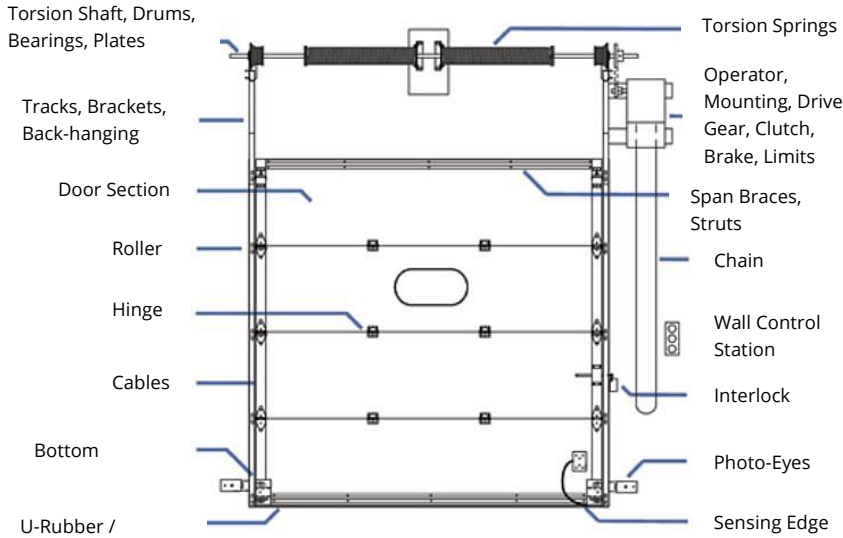
Standard #3: Documentation & Reporting

Thorough secure documentation should be maintained that details:

- maintenance and service work performed.
- Documented inspections that identify problems or deficiencies found, preferably documented with notes or photographs, corrective action recommended, and corrective action taken.
- practices and standards used to inspect and maintain doors (e.g., manufacturer's operating/maintenance manuals or similar documentation).

Inspection Guide

Sectional Paneled Overhead Door



Components

Bottom brackets anchor the lifting cables to the door. They are under significant tension from the counterweight forces of the torsion springs, and it's important they be securely fastened to the door.

Cables support the entire weight of the door and are under tension from the torsion springs. Undersized or frayed cables can break, leaving one or potentially both sides of the door unsupported. It is common for cables to need replacing several times over a door's life.

Rollers guide the door in the tracks. It is common for rollers to wear and need replacing. Failed rollers can potentially impede the free movement of the door and cause it to jam in its tracks.

Tracks, brackets, back-hanging position and support the door to the building structure. Ceiling support of the tracks, called "back-hanging" is especially important as it supports the door in the fully open position.

Hinges connect the sections of the door and allow articulation. Poorly secured or aligned hinges can cause improper door movement and damage to sections or other parts of the door system.

Span braces and struts attach across the width of the door to provide lateral stiffness. Without proper span brace support, a door can be vulnerable to "bowing" or high wind conditions, both of which can cause a door to dislodge from its tracks.

Torsion springs provide the counterbalance force to the weight of the door and possess a large amount of stored mechanical energy. Broken torsion springs cause abnormal loading on door and electric operator components. Most torsion springs are rated for 10,000 cycles-to-failure and will likely need to be replaced at least once during a door's life. It is generally not possible to determine how many cycles are left in a torsion spring by visual inspection.

Torsion shaft, drums, bearings are the mechanical and structural components of the torsion assembly. Potential problems include: failed bearings, worn shafts, misalignments, loose couplers, improperly secured brackets, and cracked drums.

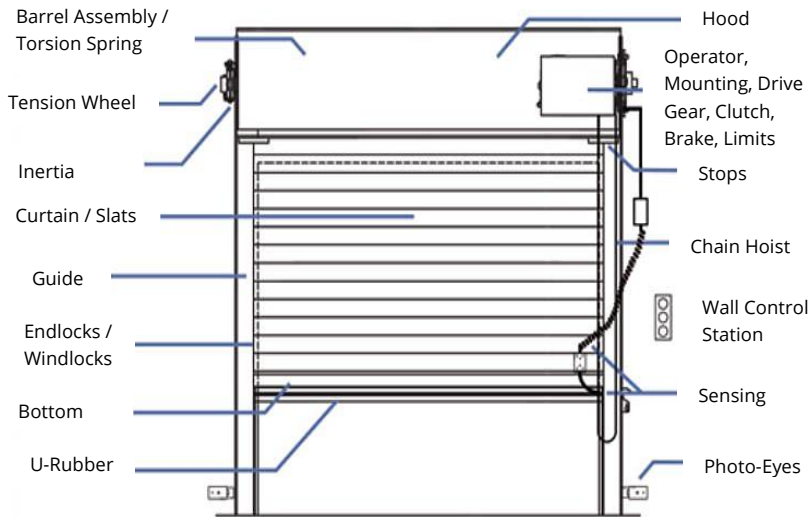
Pusher springs, bumper springs and stops prevent the door from running off the end of the tracks. Pusher springs are installed to maintain cable tension on certain door configurations.

What You Need to Know

1. Many door components, such as hinges, bearings, cables and rollers, wear, and fatigue with use, and require routine replacement. Left uncorrected, problems with smaller components can escalate into larger problems that affect the overall performance and safety of the door.
2. Sectional doors can become dangerous if the counterbalance system is compromised (e.g. lifting cables break, become unspooled from the drums, or detach from the bottom brackets). If this occurs when the door is in an open position, the door can be at risk to fall.
3. There are several accessories available for sectional doors to improve safety: safety bottom brackets, spring failure safety devices, cable tension springs. Talk to your door supplier to learn more.

Interlocks should be installed on doors with locks and motorized operators to prevent the operator from attempting to open the door when it is locked.

Rolling Steel Overhead Door



Components

Barrel assembly/torsion spring provide the counterbalance force to the weight of the door, lessening the force needed to open and close the door. The torsion spring is located inside the barrel assembly, limiting access and making visual inspections impractical. Torsion springs are typically rated 10,000 or 20,000 cycles-to-fail, making it important to track door usage to replace the spring before it fails.

Tension wheel is the component used to adjust the torsion springs balance. Adjusting the wheel will either increase or decrease tension on the door's torsion spring. The tension wheel is a direct connection to the torsion spring and possess a large amount of mechanical energy. If the tension wheel becomes loose or the mechanical connection to the spring is lost, the operator will be subject to abnormal loading.

Inertia brake prevents the door from free falling by stopping the doors movement if a maximum RPM threshold is reached. Some inertia brakes work by communicating with the operator and some physically lock the shaft in place. Inertia brakes that physically stop the shaft can only be triggered so many times before needing replacement.

Endlocks/windlocks lock individual slats into the guides. Broken or loose endlocks can interfere with door movement by catching in the guides. **Stops** physically prevent the door from running beyond the upper or lower limits. Stops are used along with limit switches to ensure the door does not overrun the guides.

Hood protects the curtain as well as shields moving components of the door from the elements. A damaged hood can interfere with the curtain and potentially damage it.

Guides are the channels in which the curtain moves. It is important the gap between guides is correct and the curtain is able to move freely. Obstructed movement due to damaged guides can exert an abnormal load on the operator.

What You Need to Know

1. Torsion springs are a critical component of the door, and special care should be taken to ensure they are tensioned properly and replaced before they fail. Most torsion springs are designed with a lifespan 10,000 or 20,000 cycles, after which they become prone to failure. Implementing a program of proactive spring replacement can reduce operational disruptions related to "emergency" spring failures.
2. Safety inertia brakes can prevent the door from suddenly falling in the event of a torsion spring failure