# SAFETY AUTOMATION

Cisco-Eagle

shop talk

# PEDESTRIAN-FORKLIFT SAFETY

www.cisco-eagle.com/safety-systems

# PEOPLE & FORKLIFTS DON'T MIX

## BUT PROCESSES, SYSTEMS AND TRAINING CAN MAKE IT WORK

"Forklifts' braking ability, concentrated mass and limited maneuverability combine with poor visibility and mixed use in the same areas are dangerous to people who work and walk around them. If a 'slow' forklift hits a pedestrian, the impact is similar to being struck by a car at 20 miles an hour. The accidents can frequently cause serious injuries and can be fatal. Stopping these tragedies is the heart of what I do every day and why we have a dedicated forklift safety group at Cisco-Eagle."

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—Susan, Employee-Owner Since 2010
Safety Automation Group

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# FORKLIFTS AND PEDESTRIAN INTERACTIONS MUST BE MANAGED

According to the U.S. Department of Labor, about 100 American workers are killed and another 20,000 injured by forklifts every year. If you use forklifts, consider safety technologies—especially in high-traffic or limited visibility areas.


## Why are forklifts so dangerous?

Forklifts are frightfully damaging when they hit people Preventing just one accident can help mitigate human suffering and significant costs.

## Establishing rules, zones and processes

Have you established right-of-way rules? Are those rules honored on the floor? If you don't know, the answer is probably no. Effective traffic management plans include defined pathways, steel barriers, pedestrian/forklift exclusion zones, containment fences, guard rails, speed limits, visibility mirrors and more.

## What's in this guide?

- A detailed safety process you can utilize
- Specific problem areas—intersections, docks and blind corners
- Visibility questions and solutions
- A range of technology and processes

# SAFER BY PROCESS

## A STEP-BY-STEP SAFETY PROCESS FOR FORKLIFTS AND PEDESTRIANS

"Focus on processes—the ways you segment, train, manage and work—to reduce accidents and injuries in your plant. Accidents are more likely when you don't have the necessary processes. Comprehensive plans require forethought, teamwork, buy-in and analysis. Here's how you get the ball rolling for a safer facility."

—Markus, Employee-Owner Since 2013
Safety Automation Team

shop talk

### #1: Build a cross-functional forklift safety team

Your team should be empowered by senior management. Including all stakeholders reduces conflict and results in a better solution. Be inclusive and take all viewpoints into account. A balanced team should include:

- Forklift operators
- Supervisors and foremen
- Safety & EHS personnel
- Warehousing employees

### #2: Create a baseline assessment

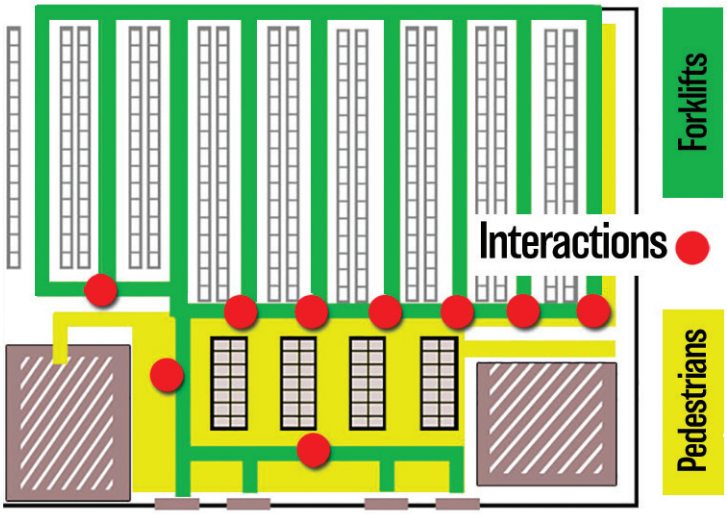
The factors should include cross-functional information that helps you determine facility-wide issues, assets and behaviors, including:

- The current condition with all background information
- Any existing controls and processes that separate people and forklifts
- What on-board controls are installed on your forklifts?
- What are the current behaviors (for drivers and pedestrians)?

### #3: Define forklift/pedestrian interactions

It's critical to understand where your pedestrians and forklifts interact. When you create a safety plan, you will segregate people from forklifts as much as possible, and then focus on interaction zones where separation it isn't possible.

To do this, print a drawing of your facility and map these mingle points. Create a color-coded visual representation of pedestrian traffic aisles and then use a different color to represent forklift areas




(in the example above, pedestrian areas are yellow, forklift lanes are green, and interaction zones are red dots). The points where pedestrians and forklifts intersect are your interaction zones. Mark and number these zones.

### #4: Define risk levels in each interaction zone

Once you've identified the at-risk areas, you should rate each of them. This risk assessment will help you prioritize each intersection or crossing and suggest a course of action to reduce the risks in that zone.

**Safety Process:** Continued on next page

# SAFER BY PROCESS

## HELPING PEOPLE AND FORKLIFTS SAFELY CO-EXIST

### #5: Implement safety upgrades

At this point, you have a team, a baseline assessment, a list of areas where people and lifts interact and a risk score for each of those areas. It's time to build a solution. These solutions can vary from zone to zone, based on the factors in your assessment.

#### Whenever possible, create exclusion zones where people and forklifts cannot mingle

Decide whether or not the zone can become an exclusion zone where interaction between people and forklifts isn't allowed. Create as many exclusion zones as possible to keep people and forklifts separated. Eliminating these shared spaces may change plant layout and routes, but the safety gains are worth the effort.

#### When separation isn't not possible, address solutions

Pay the most attention to your "mingle zones" and aisle crossings that can't be separated. This focuses your team's attention on the most urgent areas of your plant.

- **Install hard barrier controls** like guardrails, bollards or gates to create areas where people are separated from lift truck traffic.
- **Use visual controls**: measures like floor striping, signage, warning lights, mirrors or paint lines to help reinforce expected behavior and make people aware of the potential dangers.
- **Make it a process**: implement administrative controls, such as training, process improvements and new policies
- **Consider automation**: automated controls, such as warning sensors, automated gates, backup sensors, onboard speed controls, cameras and other methods for managing forklifts and pedestrians

### #6: Measure progress and make adjustments

At this point, you have made changes in the way pedestrians and forklifts interact. Over time, you'll need to asses the situation with the same criteria. If a zone remains problematic, you can focus on changes and systems to address it.

## ASSESSMENT FACTORS

- **Accident probability**: How close do forklifts and pedestrians come? What are the forklift speeds? Is visibility adequate? Are pedestrians paying attention? Are drivers looking for pedestrians?
- **Traffic levels at the interaction point**: How often do people pass through or work in the area? How frequently do forklifts run through?
- **Frequency of pedestrian/forklift conflict**: Count the number of times per day that forklifts and pedestrians intersect, or are both present in an area that lacks guardrails or physical barriers.

Once you have profiled each mingle point, it's time to address that particular point, with a plan and priority to increase pedestrian safety.

# CAN YOU GO FORKLIFT-FREE?

## PROTECT PEDESTRIANS BY REDUCING THE NUMBER OF FORKLIFTS

Powered industrial trucks are always on OSHA's top-10 violations lists. Can you make a warehouse forklift free? Maybe not, but you can minimize them. Many companies are actively working to reduce fleet size—or eliminate forklifts altogether.

### How can you move and handle pallets without them?

Try to remove forklifts from areas where people are present when possible. Exclusion zones—where either pedestrians or lift trucks are present, and the other not—are the best way.

#### Burden carriers and tuggers for intra-facility transport


Towing carts are the most versatile forklift-free pallet transport method. Tuggers can pull multiple carts and can simultaneously transport multiple pallets to more destinations. Tuggers can't lift pallets, and will require another loading/unloading method.

#### Stackers are ideal for loading/unloading trucks, moving pallets vertically


Stackers are great for short trips and pallet elevation. Use stackers where a forklift would be underutilized. Stackers can transport pallets, but aren't ideal for longer distances.

#### Pallet jacks, carts and manual methods

**Pallet jacks** move pallets safer than forklifts, but aren't suitable for elevated trailer loading or long distance transport. Use pallet jacks for tight areas, short distances and in work areas.

**Pallet dollies** are good for short range transport or manipulation, but shouldn't be considered for longer transport applications. They work best for allowing people in a work area to move and rotate big loads.

## FORKLIFT CONSIDERATIONS

Ask yourself these questions as you consider ways to separate people from industrial traffic:

- What functions are critical for forklifts? Where will you continue to use them? Where can you remove them and use alternative methods?
- Where is pedestrian traffic most frequent and how can forklifts be removed from that area?
- What are the costs of alternatives vs. ongoing forklift costs? Consider maintenance, training, and total ongoing expenses.
- Can you deal with any loss of flexibility to remove forklifts from the equation?
- Are your loads very heavy or otherwise in need of specialized handling solutions?

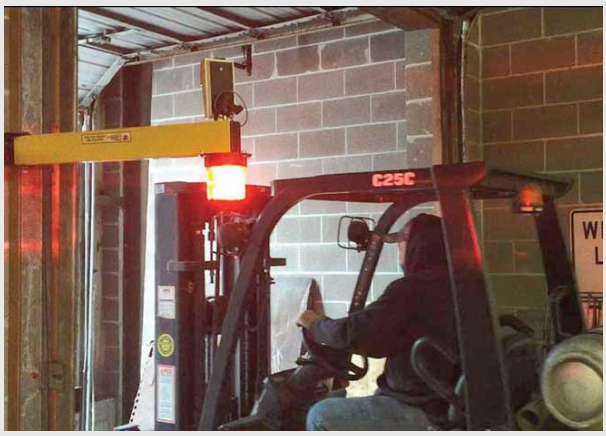
#### Conveyors are best for high throughput, lean operations, structured lines and work-in-process

Pallet conveyors excel at letting your workers build or pick pallet loads as they pass through a facility. They're often used as takeaway from a palletizer or build process, allowing basically touch-free transport for pallets after they are built. Conveyors are fixed location. If you have pallets (or other large loads) flowing through a facility from point A to point B (with or without stops between), conveyors are more efficient than carts, pallet jacks or forklifts.

# PEDESTRIAN DANGER ZONES

## DOCKS, FORKLIFTS & PEDESTRIANS

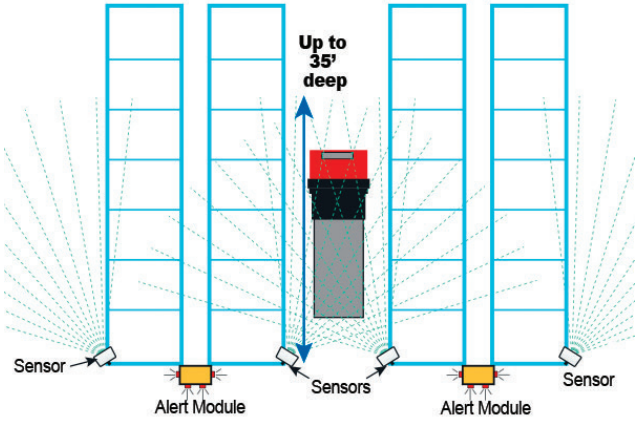
### A two-way blind spot




In an average warehouse, the docks occupy 20% of square footage and 80% of activity. When forklift drivers exit a truck, they're coming out blind into a zone behind the trailer where pedestrians can't see them. This creates a 2-way blind spot where neither party has a clear view of the other.

- Constantly train all employees who work around docks on the dangers of the trailer blind spot.
- Remove pedestrians from staging areas if possible. Place door controls outside the loading/unloading zones so people are absent from the area when possible.
- Install audible and visual warning devices on your forklifts. Warning lights and bicycle flags on both help warn pedestrians of an emerging lift. Mirrors and dock warning sensors are highly advisable to help warn pedestrians. More visibility from all angles is always better.
- Consider advanced safety systems like motion sensors, proximity scanners and radar detection.

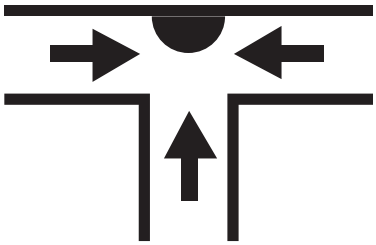
## CORNERS AND AISLES




### Intersections and corners can be dangerous

With fast-moving workers and forklifts, corners, ends of rack rows and intersections can become dangerous blind spots for pedestrians and forklifts working the area. It's critical to deal with any potential blind spots.

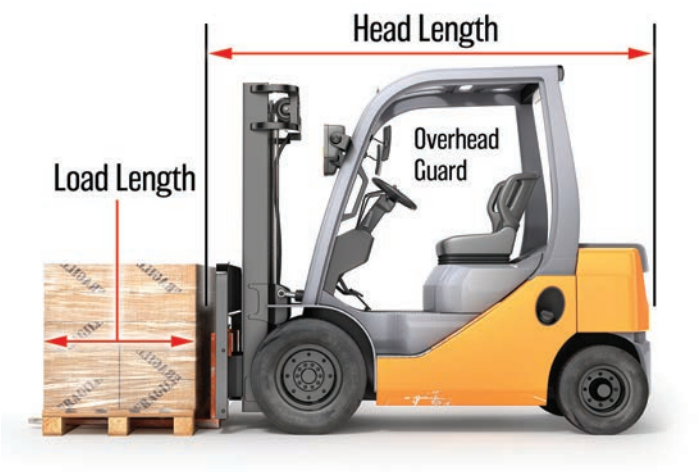
- **Be sure pedestrians and drivers are trained for safe procedures** when operating near each other. Drivers should use horns and flashing lights at corners. Pedestrians should understand the dangers and how to conduct themselves safely.
- **Facility design should discourage lingering or foot traffic near these danger points.** Don't place picking bins or carton pick areas near corners where forklifts frequently pass. Place those activities in the centers of aisles, or separated from pallet rack aisles.

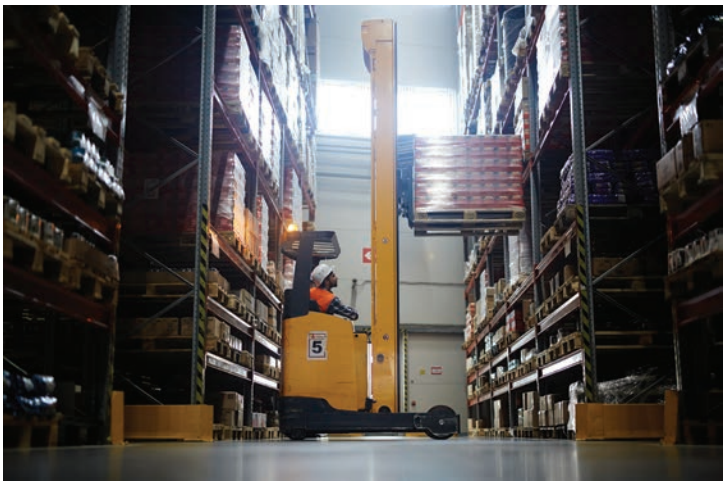


- **If possible, lightly load the last bay at the end of an aisle** so that people can see through to both the parallel and perpendicular aisles. Don't allow tall, loaded pallets or other visual obstructions to be placed at the end of a rack aisle.
- **Use the right PPE:** Bright safety vests or other attire are always recommended where industrial traffic and people mix.
- **Use visibility devices like dome mirrors or motion sensors** to alert people of forklifts and vice versa. Advanced systems like ZoneSafe can detect motion through solid walls or pallet stacks.

# FORKLIFT AISLE WIDTHS

## SPACE EFFICIENCY, PALLET RACK AND AISLES SHOULD BE EVALUATED



Since pallet rack aisles consume considerable space, they should be evaluated for functionality, space utilization and safety. Aisles are often given 12 feet rule-of-thumb because that's the minimum needed for counterbalance trucks to handle 48" pallets.

### General aisle configuration guidelines

Typical aisles for 3 or 4 wheel, counterbalance forklifts are wider than for other types of trucks. A simple rule of thumb calculation for minimum aisle width:

1. **Measure the head length:** the distance from the back of the forklift to the front of the load back rest.
2. **Measure load length:** the length of the pallet plus its load overhang.
3. **Add** these two lengths together.
4. **Add at least 12" maneuvering space:** add a minimum 6" for pallet load overhang from the rack on each side of the aisle. Wider aisles help drivers avoid backing into racks, but they eat the most space.
5. **Add all together for the minimum width** for a typical counterbalanced forklift. Remember that this is only a guide and that most forklifts come with detailed specifications on aisle widths.
6. **Be sure you know the forklift's turning radius** and make certain drivers can easily access pallets without risk of striking racks.

These calculations work for standard forklifts in selective rack applications. For narrow or very narrow aisle racks, your equipment determines aisle widths. Always consult your forklift documentation when making these determinations.

## FORKLIFT & PICKING TYPES

To fully understand whether or not you can narrow your aisles to save space, you should have a full grasp of the type of forklifts in use.

- **Sit-down counterbalanced:** when people think of forklifts, they think of this common type. It needs plenty of operating space—at least 12 feet.
- **Stand-up deep-reach:** built for narrower aisle operations of 9 to 11 feet.
- **Stand-up single-reach:** these lifts can operate in even less space than deep reach models—as little as 8 feet due to shorter forks.
- **Turret or swing-mast narrow aisle:** because the forks can pivot 90°, these lifts don't turn to face rack aisles. Aisles can be less than 5'6".
- **Narrow-aisle order picker:** uses the least space—between 4 and 5 feet—since the operator usually walks behind the lift.

# DRIVER VISIBILITY FACTORS

## FORKLIFT DRIVER VISIBILITY CAN BE IMPEDED BY LOADS, GUARDS AND OTHER OBSTRUCTIONS THAT ENDANGER PEDESTRIANS

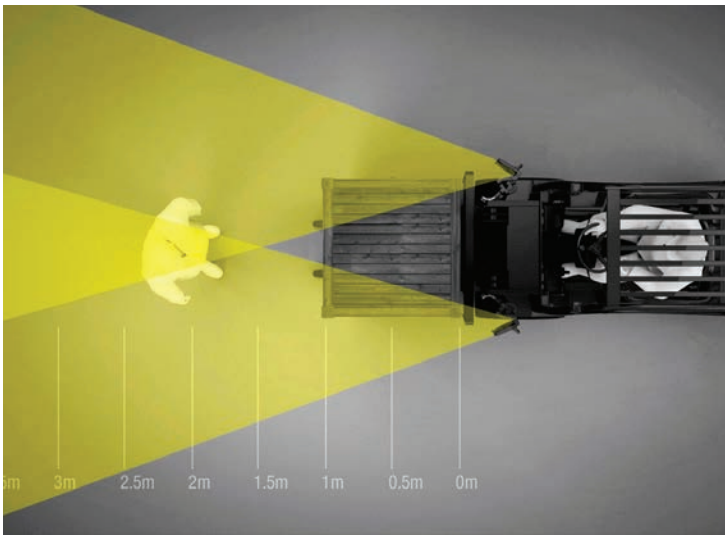
"When loaded forklifts move across a busy warehouse, visibility is a problem. According to OSHA [29 CFR 1910.178(n)(6)], drivers must 'look in the direction of, and keep a clear view of, the path of travel.' Clear obstructions, provide tools, technology and training to help drivers see clearly and keep pedestrians safe."

— Armando, Employee-Owner Since 2014
Safety Automation Team

shop talk

## IMPROVING VISIBILITY

- Use mirrors that let drivers see in front of them.
- Swivel seats and controls let drivers see behind them for easier backwards driving.
- Assign a spotter to forklifts when they travel.
- Block off all foot traffic from the forklift route. Drivers must still be aware of other obstructions.
- Cameras and monitors help the driver see what's behind them and around any carried load.
- Create traffic lanes for forklifts only, which are straight, uncluttered, guarded by heavy rails and free of pedestrians and other obstructions.
- Utilize backup detection systems that alert drivers if a person or obstruction is behind them.
- Modify loads to ensure they don't impede driver visibility. When on the forks, a typical load should be less than 72" high depending on forklift type.




### Facility environment and clutter

Driver visibility is often impaired by the way facilities are laid out. Machinery and racks create blind corners. Always separate people and traffic as much as possible, especially where visibility is low.

While there are sensors and warning devices to help cope, you should avoid these situations by separating foot and vehicle traffic as much as possible. Safety processes, sensors, gates and other methods should focus on the areas where separation isn't possible.

Drivers should never be on their phones, eat or engage in any activity that could distract their driving. Pedestrians on the floor should also be alert and aware of their own safety.

# IMPROVE DRIVER VISIBILITY

## FORKLIFT SAFETY CAMERA SYSTEMS

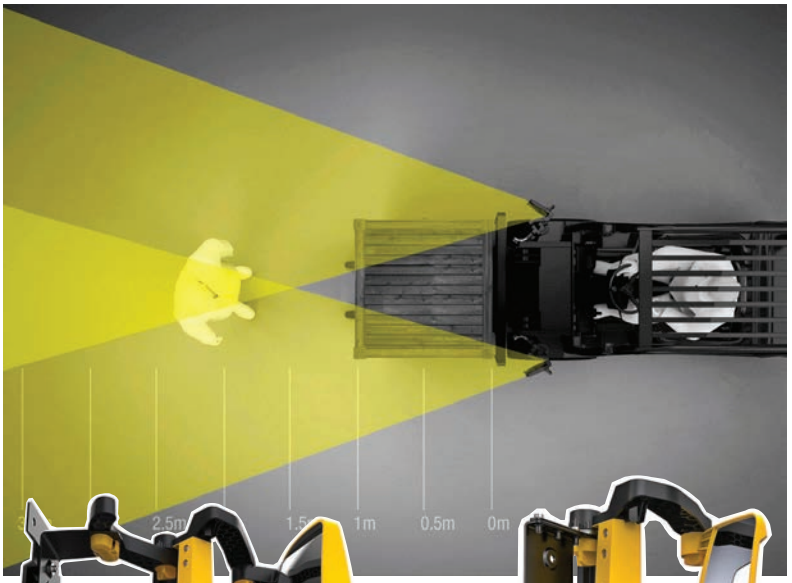
Wireless camera systems give forklift drivers better visibility of areas they typically can't see. Mount them on the back of the forklift as a back-up camera, on the overhead guard or on the carriage for fork/pallet alignment. Up to four cameras can be displayed on a single monitor to give the driver plenty of views. 7" or 9" LCD display monitors provide night vision, which provides an exceptionally clear picture.

## FORWARD PERSPECTIVE MIRRORS

Mirrors help drivers see their tines and the area in front of the vehicle for surer, safer tine placement during unloading.

Because loads can block drivers' line of sight, this helps improve safety and avoid collisions.

Mirrors require no batteries or wiring and deliver visual information in real time. Constructed from impact and shatter-resistant materials, they fold back when struck and are easily repositioned. Choose wide or narrow profile mirrors.




*Wide profile view*

*Narrow profile view*

# AISLECOP® FORKLIFT SAFETY

## AISLECOP® DETECTS TRAFFIC AND MANAGES DANGEROUS INTERSECTIONS

Visit www.cisco-eagle.com/aislecop for specs, details and resources

### Forklifts are dangerous—especially to pedestrians

According to the Department of Labor, forklifts kill someone every three days and seriously injure many more every year. **A high percentage of these accidents are pedestrian-related.** AisleCop® helps manage and separate forklifts and pedestrians at critical points.

### Don't wait for tragedy

AisleCop® makes intersections, blind/limited-visibility corners, entry doors and busy forklift aisles safer for workers on foot by controlling traffic flow. Work cells and docks are ideal for AisleCop® but any crossing or entry point can benefit.

### How it works

The highly configurable system manages traffic in conjunction with your traffic management, training and safety plans. You decide default gate positions, timing and traffic rules based on your needs.

AisleCop® uses precision motion detection and intelligent controls to manage crossings. If forklifts are present, pedestrian gates won't open; if the aisle is clear, the system deploys warning lights and audible alarms before opening. Once pedestrians are clear, the gates close behind.

You can also reverse this, and restrict forklifts by default, depending on your traffic patterns and needs.

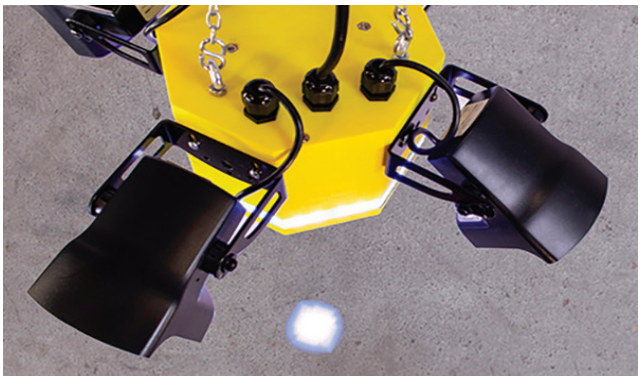
### Activation systems

AisleCop® systems operate based on motion detection, but can utilize alternative methods. Specify activation systems and configurations to suit your facility layout, traffic flow and application.

# SENSORS & ALERT SYSTEMS

## AISLEALERT INTELLIGENT WARNING SYSTEMS DETECT POTENTIAL COLLISIONS

Visit **www.cisco-eagle.com/flooralert** for videos, specs and more



AISLEALERT

### SYSTEM DETAILS

- Hanging sensor module covers an intersection or crossing point
- Includes adjustable motion sensors—2, 3 or 4 directions. 26' range. Can be mounted separately
- Light strips mounted on the module for enhanced visibility
- Tested prior to shipment
- Can be integrated with other safety automation systems

**Automated detection with highly visible flashing floor light**

Ceiling-mounted motion detection systems flash a warning light on the floor when traffic approaches from at least two directions. When the light is active, all traffic should proceed with caution. The system engages only for converging traffic to reduce false positives and increase worker confidence. Once traffic has cleared the intersection, the warning light automatically deactivates.

# COLLISION SENSORS & ALARMS

Visit www.cisco-eagle.com/sensors for dozens of sensor options, video and more

## WAREHOUSE SENSORS SEE WHERE FORKLIFT DRIVERS AND PEDESTRIANS CAN'T—AROUND CORNERS, DOWN AISLES, INTO PARKED TRAILERS AND MORE


### Warning sensors help increase situational awareness

Blind spots, corners and intersections can lead to serious accidents between forklifts and pedestrians. Intelligent warning sensors help increase pedestrian and driver awareness of oncoming traffic at dangerous intersections. By setting off bright, flashing lights, safety sensors help warn people before an accident can happen.

## AUTOMATED SENSOR MIRRORS AND SIGNS INCREASE AWARENESS

www.cisco-eagle.com/alertsafety


### Intelligent warning mirrors

These mirrors have internal microwave sensors and LED warning messages that flash to help alert workers. Choose dome and convex styles with a variety of messages and arrow indicators.

### Automated signs

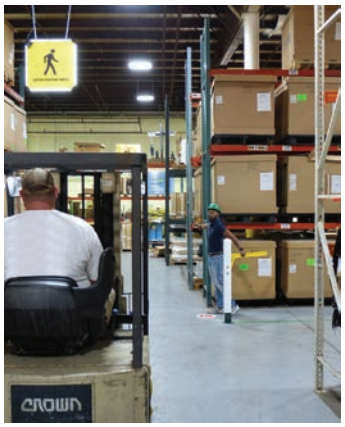
When sensors detect an object, they trigger special caution signs with directional arrows or strobe lights to warn drivers and pedestrians.

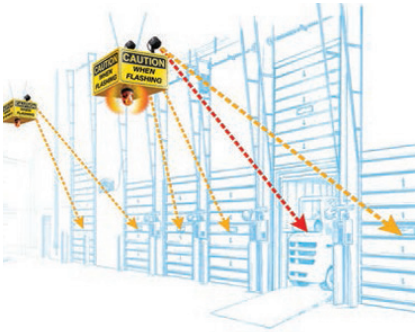


## SENSORS HELP PEOPLE MAKE BETTER DECISIONS

Sensors can be targeted at problematic areas, such as rack aisles, docks, pass-throughs, corners, traffic aisles and entryways—anywhere people and forklifts interact.

- Create awareness of oncoming traffic in hazardous areas
- Scan in 2, 3 or 4 directions
- Trigger bright, flashing lights to alert drivers and pedestrians; audio alerts available for some sensors
- Can be ordered with power cords or wired to facility power
- Mount on rack uprights, ceilings, walls, corners or other places to monitor for movement and alert people of potential danger



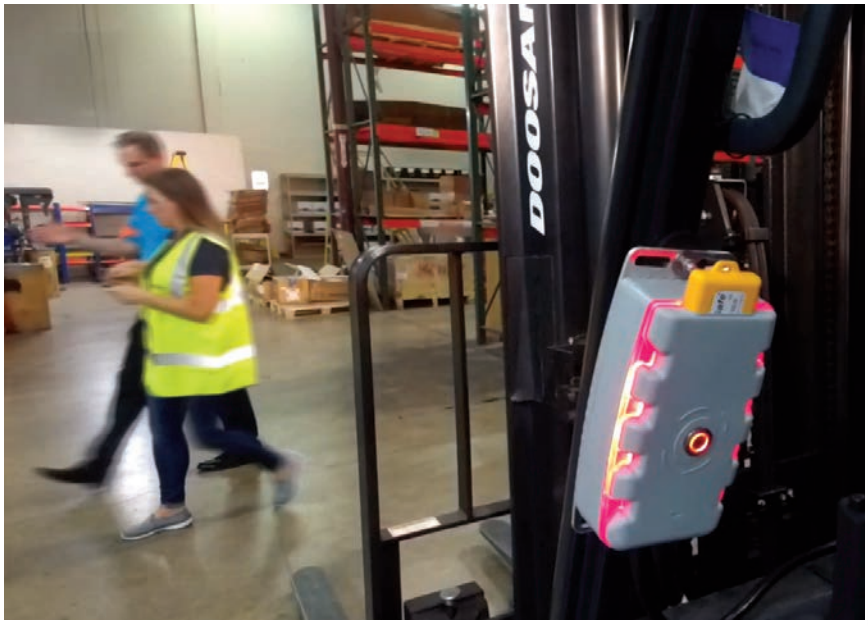
# ZONESAFE 360° WARNING

Visit www.cisco-eagle.com/zonesafe

Fixed sensors help prevent forklift/pedestrian accidents at fixed locations like rack corners or intersections, but aren't practical for every area or situation. ZoneSafe is ideal for places where you can't hang sensors or install gates. People wear transponder tags that warn nearby forklift drivers of their presence. It works anywhere in a facility without installing anything in the building.

—Scott, Employee-Owner Since 1990
Marketing Vice President

shop talk



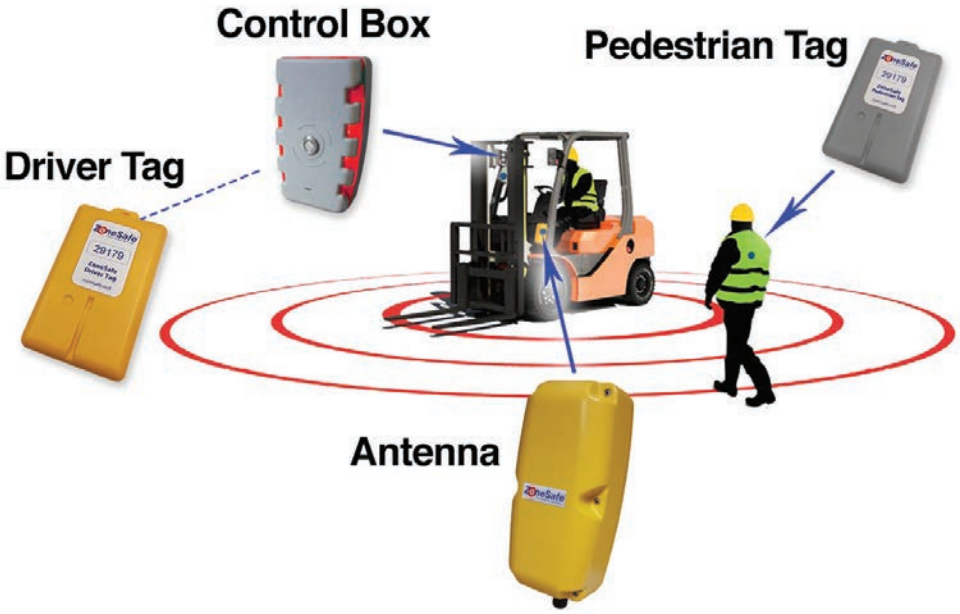
## ZONESAFE APPLICATIONS

- Pedestrian protection: pedestrians wear tags that activate the system, triggering audiovisual alarms
- Walkway alerts: warn at intersections
- Asset protection: safety cone transponders alert drivers
- Vehicle access control: gates restrict all vehicles except those with authorized transponder tags

ZoneSafe®

### ZoneSafe® detects collisions, then warns both pedestrian and driver

ZoneSafe® uses identification and detection technologies, audible alarms and flashing lights to help protect pedestrians from forklift accidents. This RFID-based system creates a 360° detection zone around equipped vehicles and alerts drivers when a pedestrian is detected. ZoneSafe® can also activate warning lights on walls, guardrail, bollards or other fixed locations.



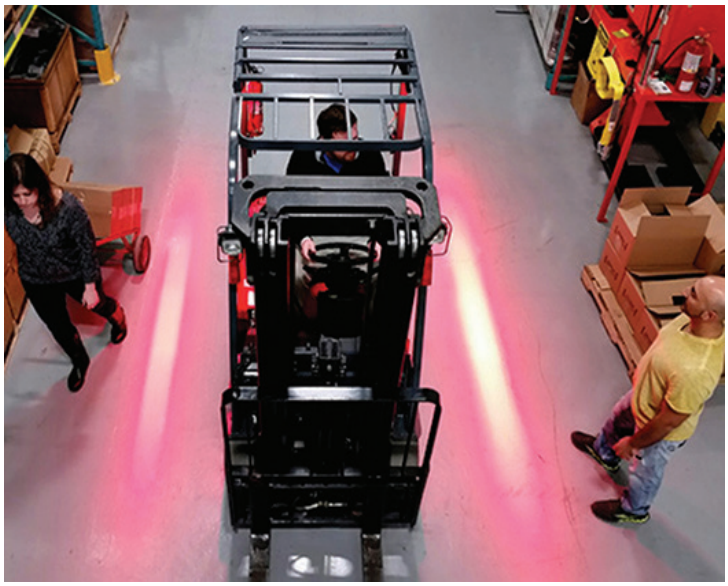
# FORKLIFT WARNING LIGHTS

## RED OR BLUE FORKLIFT WARNING LIGHTS

### Exceptionally bright lights with a lifetime warranty

Pedestrians might not see a forklift rounding a corner, emerging from a rack aisle or backing out of a trailer, but warning lights give them advance notice by projecting a super bright, 18" disc of light onto the floor as the forklift moves. Lights are wired to forklifts and draw only 7 watts of power. 12-110V voltage range means they will run on almost any standard forklift. Since they move when the lift does, lights help pedestrians understand if a forklift is moving. Mount directly onto the forklift or through a magnet mount.

Visit **www.cisco-eagle.com/bluelights** for videos and detailed information



### 180˚ Arc Lights

Help pedestrians stay out of the path of approaching vehicles they may not hear or see. These super bright, super durable LED lights cast a 180˚ light arc on the ground to indicate the danger zone in front of or behind the vehicle. For enhanced 360˚ safety awareness, mount to the front and back of your forklifts and other industrial vehicles.

## SIDE ZONE LIGHTS

### Draw the line in bright red light

Draw a high-visibility line around your forklifts with side zone lights that help people maintain safe distance. LED warning lights help lower the chances of workers getting hit by the rear end swing of a forklift. They also reduce the chances of crushed feet or other serious injuries. One light creates one line, so add another to guard both sides of your forklift. Comes with a lifetime warranty and 100,000 hour life expectancy.

# WHY CISCO-EAGLE?

Since all our employee-owners own shares and are empowered to make decisions that help our customers succeed, we go to lengths to take care of you!

—Missy, Employee-Owner Since 2013
Web Sales & Service

shoptalk

## Dedicated to Partnership

You can count on us to put in the time and energy to become your trusted partner—the people you can trust to handle your business in such a way that you won't have to worry.

## Big-Company Resources, Small-Company Service

Most companies in this industry are either small, specialized local companies or large international manufacturers. As a mid-size company, Cisco-Eagle is uniquely positioned to combine deep resources and focused customer service.

## Exceptional Service by Employee-Owners

Our employees all own shares and consider each other partners. We have an owner mindset, which means we'll work to be sure you're satisfied. Our employees stay at Cisco-Eagle twice the national average, meaning we retain key players for your future needs.

## 50 Years of Experience and Stability

Companies come and go on economic tides. With 50 years of performance, you can count on Cisco-Eagle to deliver for you today, tomorrow and in a decade.

## Relentless Customer Service

Without working with a company, it's impossible to say whether it's good at service. We release our customer ratings so you can read what real customers say about us.

## Innovative Project & System Engineering

We maintain a fully-staffed systems integration team that handles simultaneous complex material handling projects.

## Field Services Teams

Our in-house conveyor and material handling technicians are available 24/7. Few of our competitors can combine the ability to design, sell and service projects in-house.

## Warehouse Safety Systems

We help companies utilize equipment, technology and processes to increase employee safety in industrial environments.

## Documented Safety Compliance

Modern companies demand documented safety procedures for their contractors, and we offer quick compliance. We can submit detailed safety plans to comply with third-party certification services such as ISNetworld.

## Strategic Manufacturing Partnerships

Few competitors can match our buying power or influence with key manufacturers or subcontractors who can make or break a project.

## A Website for Modern Needs

Most companies see their websites as nothing more than electronic lead generators, but we provide significant informational resources, tools, downloads, videos and more.

## QUICK FACTS

- Founded in 1970 with annual sales over $100 million
- An atmosphere of individual initiative and creativity with a culture that nurtures the family lives of employee-owners
- We are all partners in Cisco-Eagle. Every employee owns shares in the company
- Multifaceted customer base in manufacturing and distribution, including most every industrial segment
- Customers in every U.S. State and over 70 countries
- Headquartered in Dallas; major offices and sales offices in multiple states

# Cisco-Eagle

50 ANNIVERSARY
1970-2020

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