

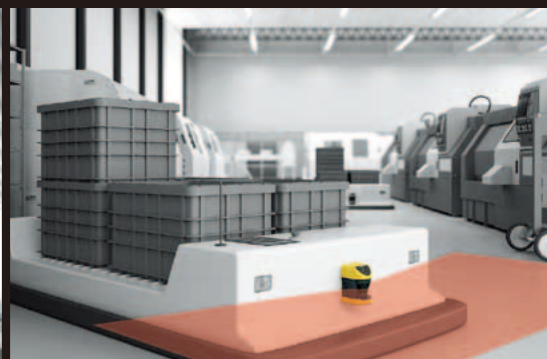
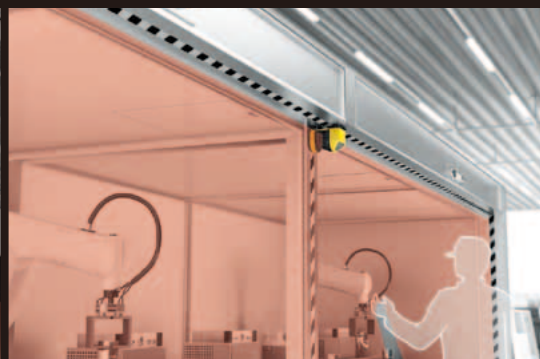
Problems Solved!

Safety Laser Scanner

Application Guide



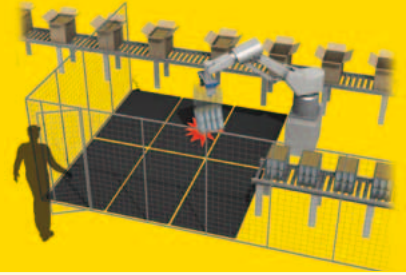
SZ Series Safety Laser Scanner



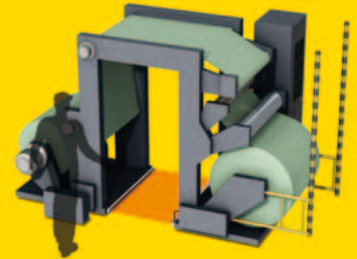
The SZ Series Safety Laser Scanner solves many troublesome safety concerns.



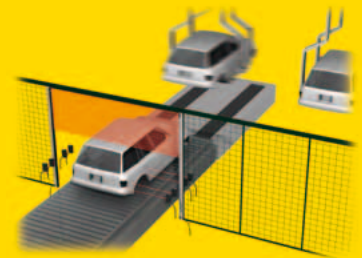
CASE 1
Palletizer



CASE 2
Winder



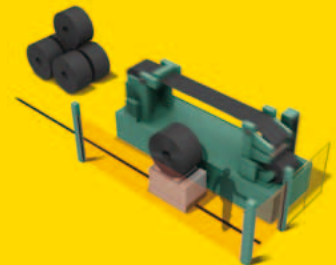
CASE 3
Lift



CASE 4
Swaging Machine



CASE 5
Automatic Guided Vehicle

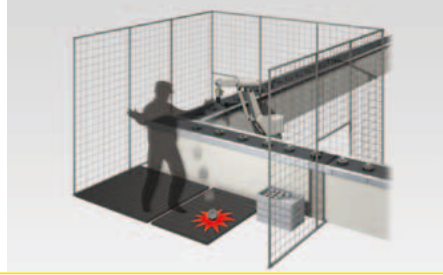


CASE 6
Special Case Palletizer



Problem:

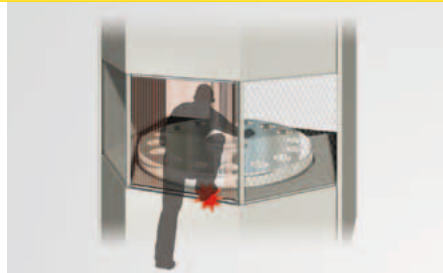
The safety mat is often damaged and must be replaced.



Solved with the SZ Series! ▶ P4

Problem:

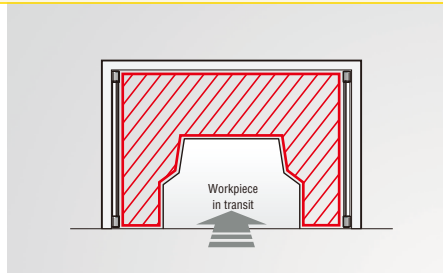
Horizontally mounted light curtains are stepped on and damaged by operators.



Solved with the SZ Series! ▶ P6

Problem:

Gate-type access is required to allow automated products to pass while protecting operators.



Solved with the SZ Series! ▶ P8

Problem:

Dirt buildup on the light curtain results in false outputs/machine downtime and costs valuable time for cleaning and repair.



Solved with the SZ Series! ▶ P10

Problem:

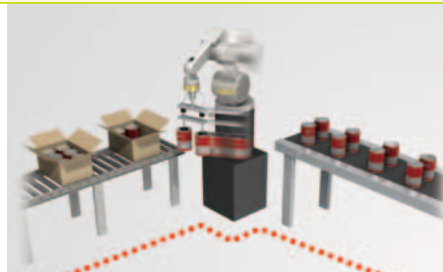
Safety device mounting equipment is in the way and hinders work efficiency.



Solved with the SZ Series! ▶ P12

Problem:

The application requires a safety sensor that can cover a wide range of areas.



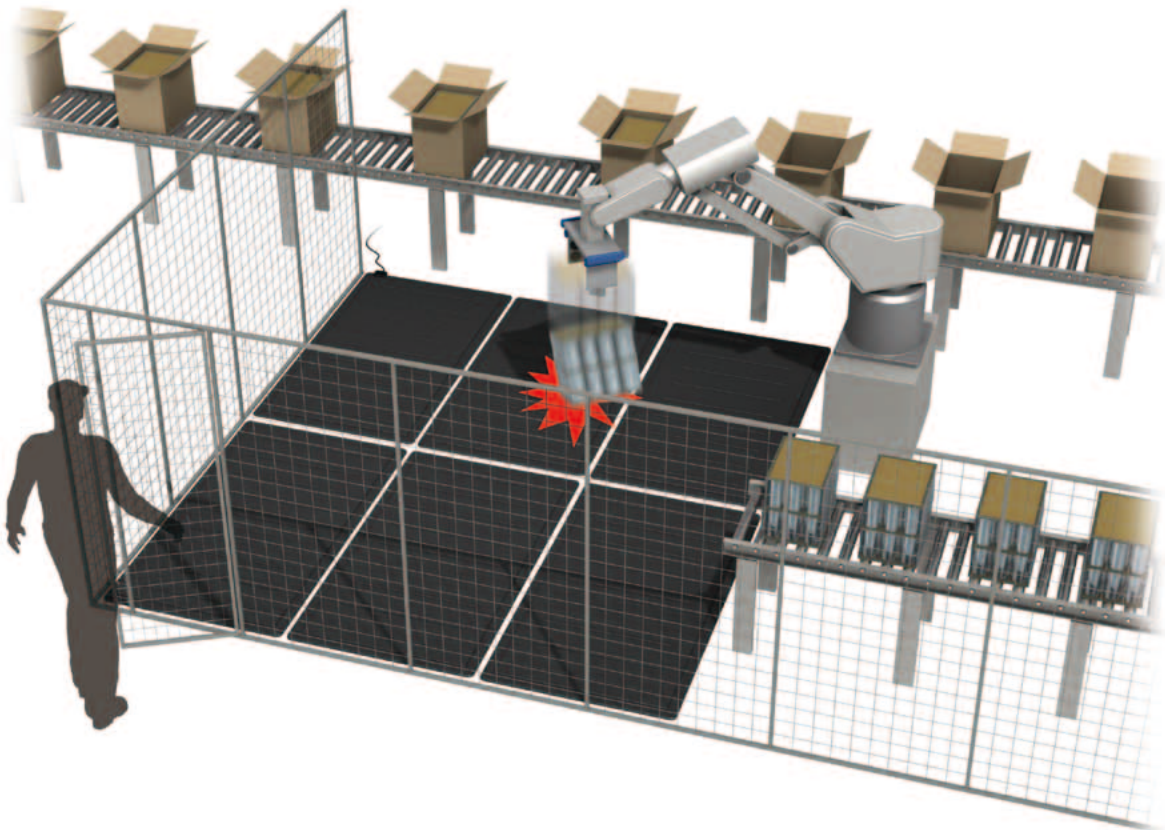
Solved with the SZ Series! ▶ P14

Problem

The safety mat is often damaged and must be replaced.

Current Solution

Safety mats are installed on the floor.



Why a safety mat was used

A palletizer is used to package products. On occasion, it fails to properly load the product and drops it. When this occurs, an operator must enter the hazardous area to remove the dropped product. Safety mats were installed to prevent accidental injury by the palletizer.

Points for improvement

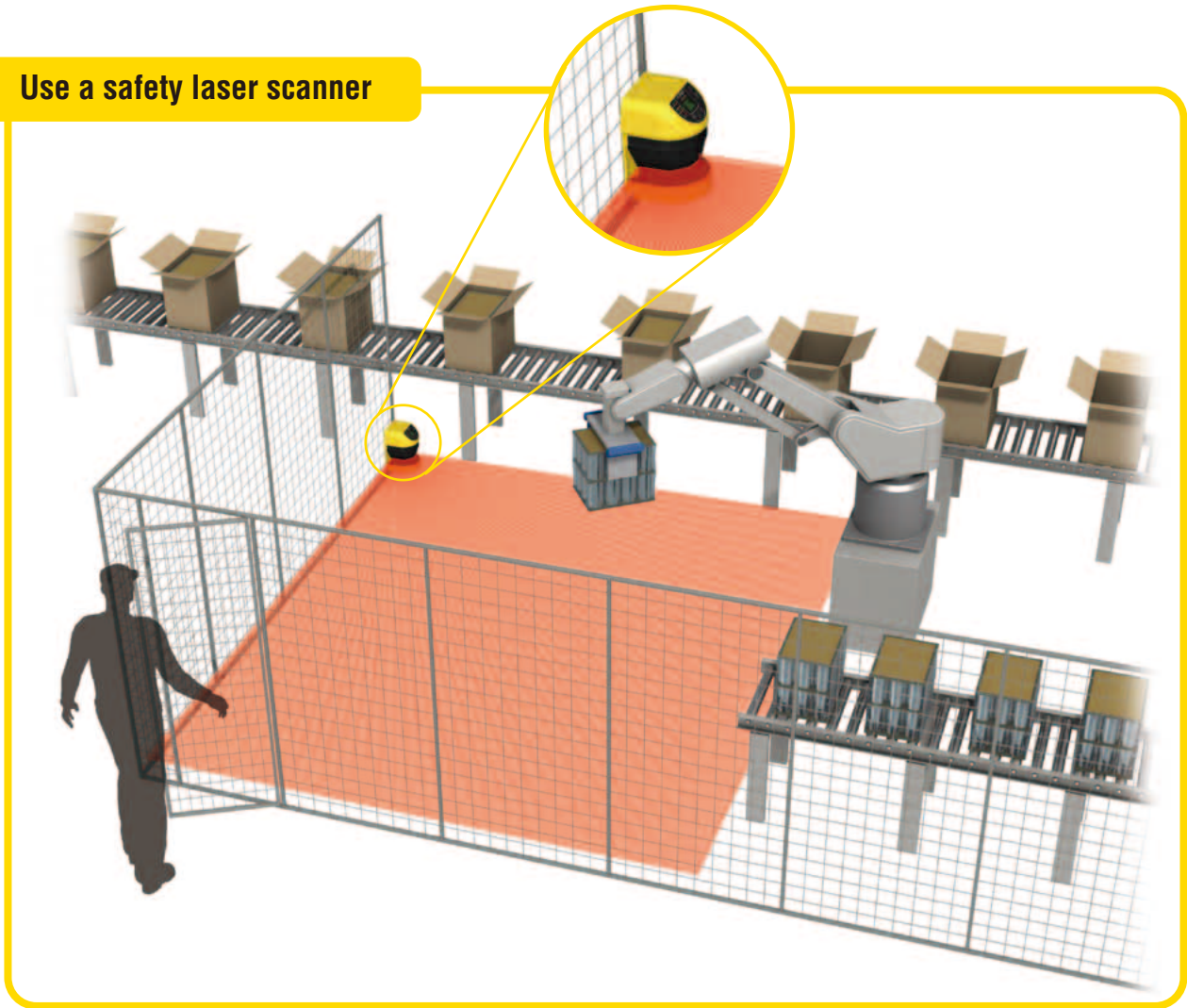
Safety mats are damaged by the impact from falling workpieces, resulting in downtime and safety mat replacement costs.



Solution

The reflective SZ Series Safety Laser Scanner protects a large area while requiring minimal installation space.

Use a safety laser scanner



Problems solved

►► **By introducing the safety laser scanner ...**

- 1 Since it relies on **non-contact detection**, there is no need to worry about damaging it with falling objects.
- 2 Since **the protection zone can be configured to any shape required**, inventory can be maintained with just one unit.
- 3 Can be easily re-configured for layout changes.
- 4 Since it is **compact and lightweight**, installation and mounting is simplified.

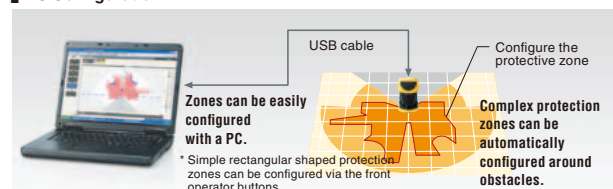
Benefits

Easy to use software allows quick and simple configuration of the protection zone. Even complicated areas can be configured by simply clicking the "auto drawing" button.

Auto Drawing Icon

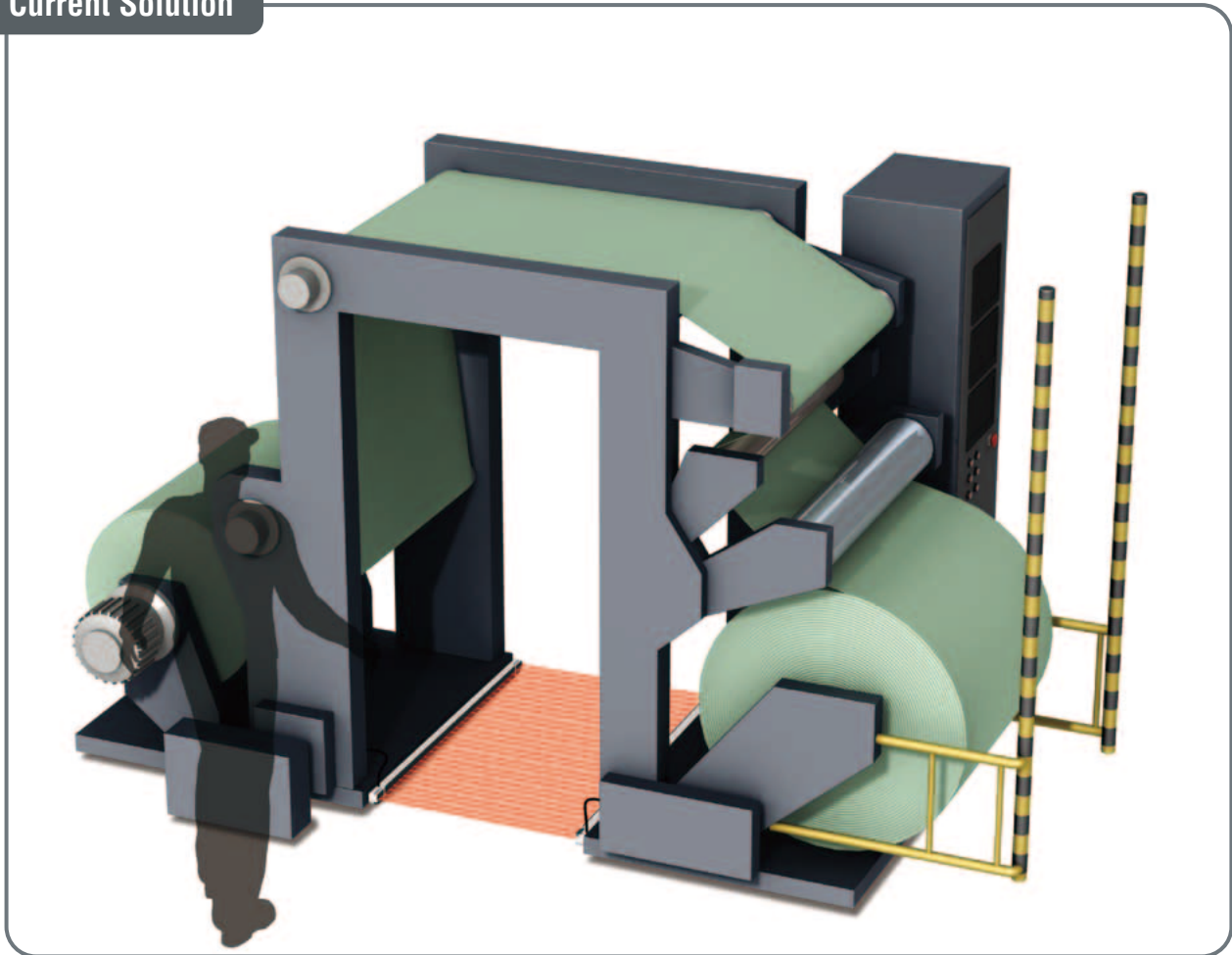


■ **PC Configuration**



Problem

Horizontally mounted light curtains are stepped on and damaged by operators.

Current Solution**Background on light curtain use**

Operators need to be around the winder to replace the reel when it finishes winding and to clean the roller. Light curtains were implemented for safety after an incident was observed where an operator was almost trapped in the machine while cleaning the roller.

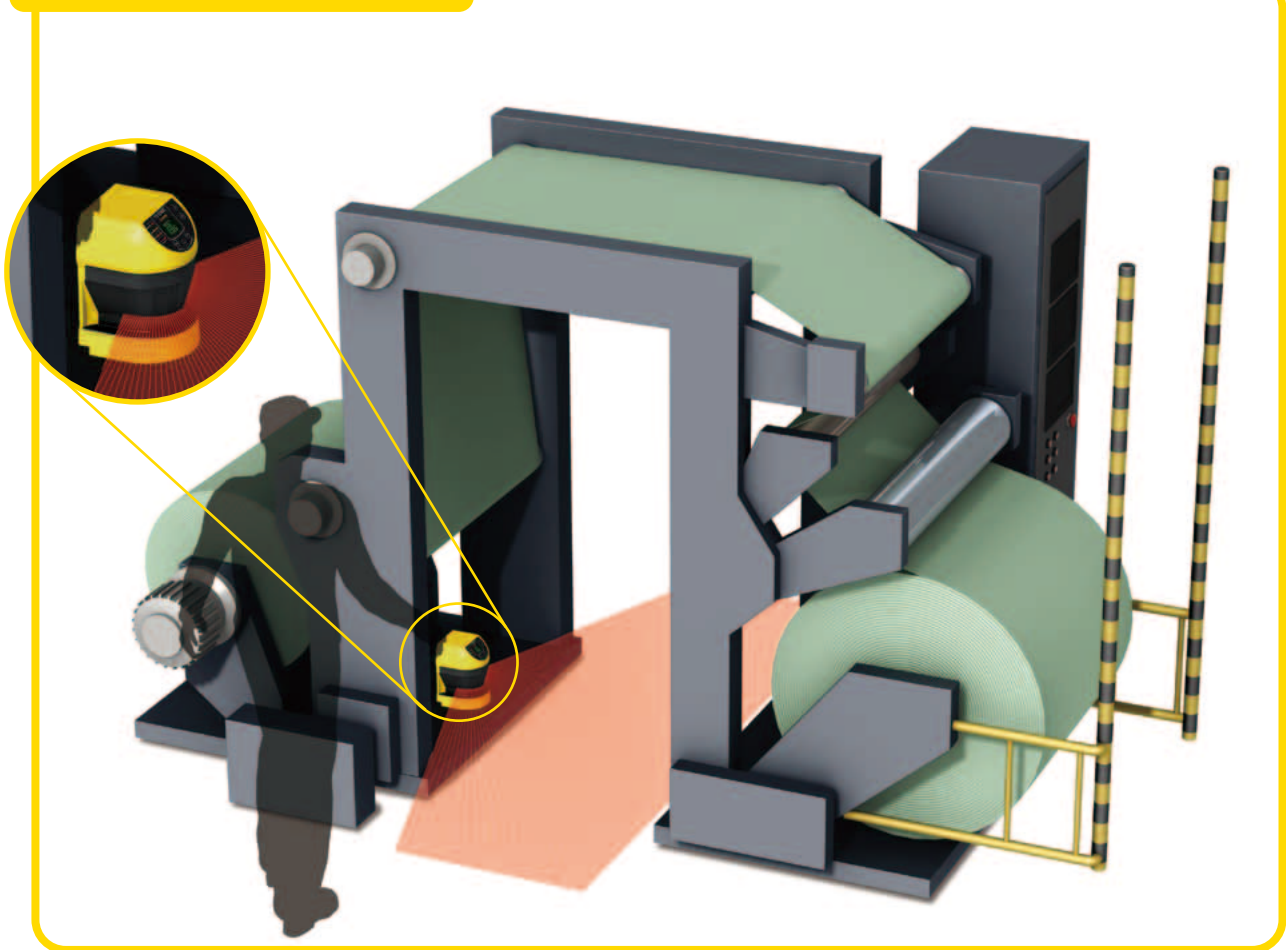
Points for improvement

Operators may step on and damage low, horizontally mounted light curtains.

Solution

The reflective SZ Series Safety Laser Scanner can be installed out of the way, while still protecting the operator.

Use a safety laser scanner



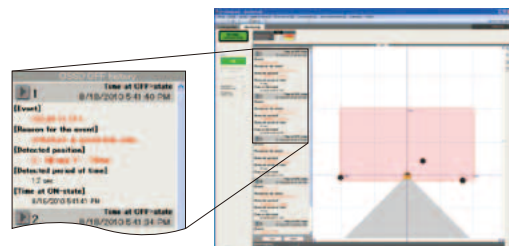
Problems solved

►► **By introducing the safety laser scanner ...**

- 1 Since it is a reflective sensor, less wiring is required, resulting in lower installation time and cost.
- 2 Because it is **compact and lightweight**, it can be installed almost anywhere.
- 3 Even **complex shaped areas** can be easily configured using the SZ Configurator software.

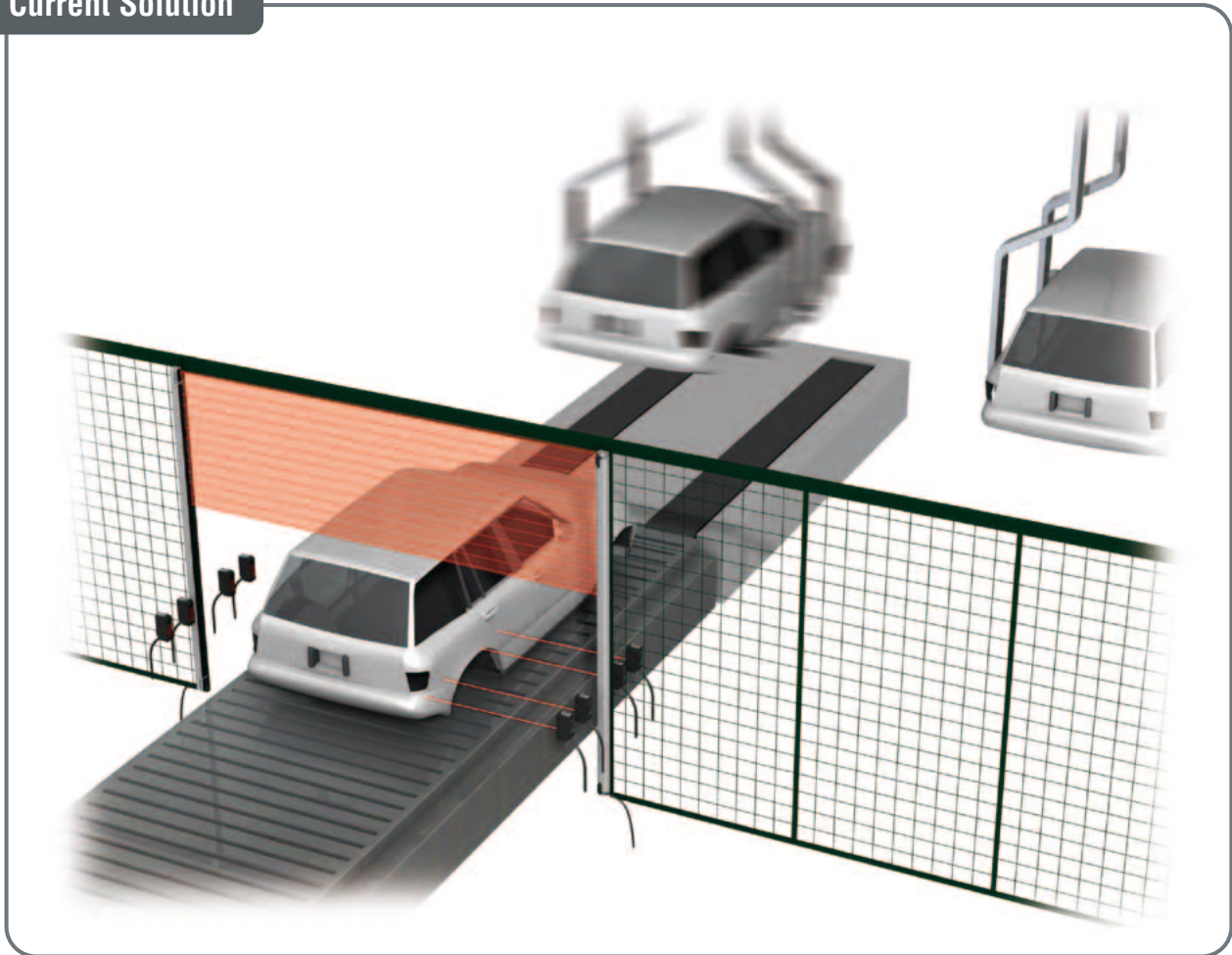
Benefits

The SZ maintains complete control, even when machine errors occur. The "OSSD OFF History function" allows you to see when, where, and how long the scanner detected an object, which can be used as a tool to analyze factors that caused the stoppage of the operation.



Problem

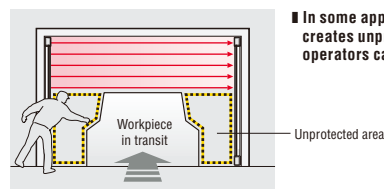
Gate-type access is required to allow automated products to pass while protecting operators.

Current Solution**Background on light curtain use**

Light curtains with muting were installed to prevent operators from stepping inside the fence and accidentally being injured by the transfer mechanism or car body.

Points for improvement

When the car body is in transit and the muting function is enabled, an operator can easily pass through to the hazardous area without being detected. In addition, the car body lifting area presented a second hazard inside the work transfer cell, which also required attention.

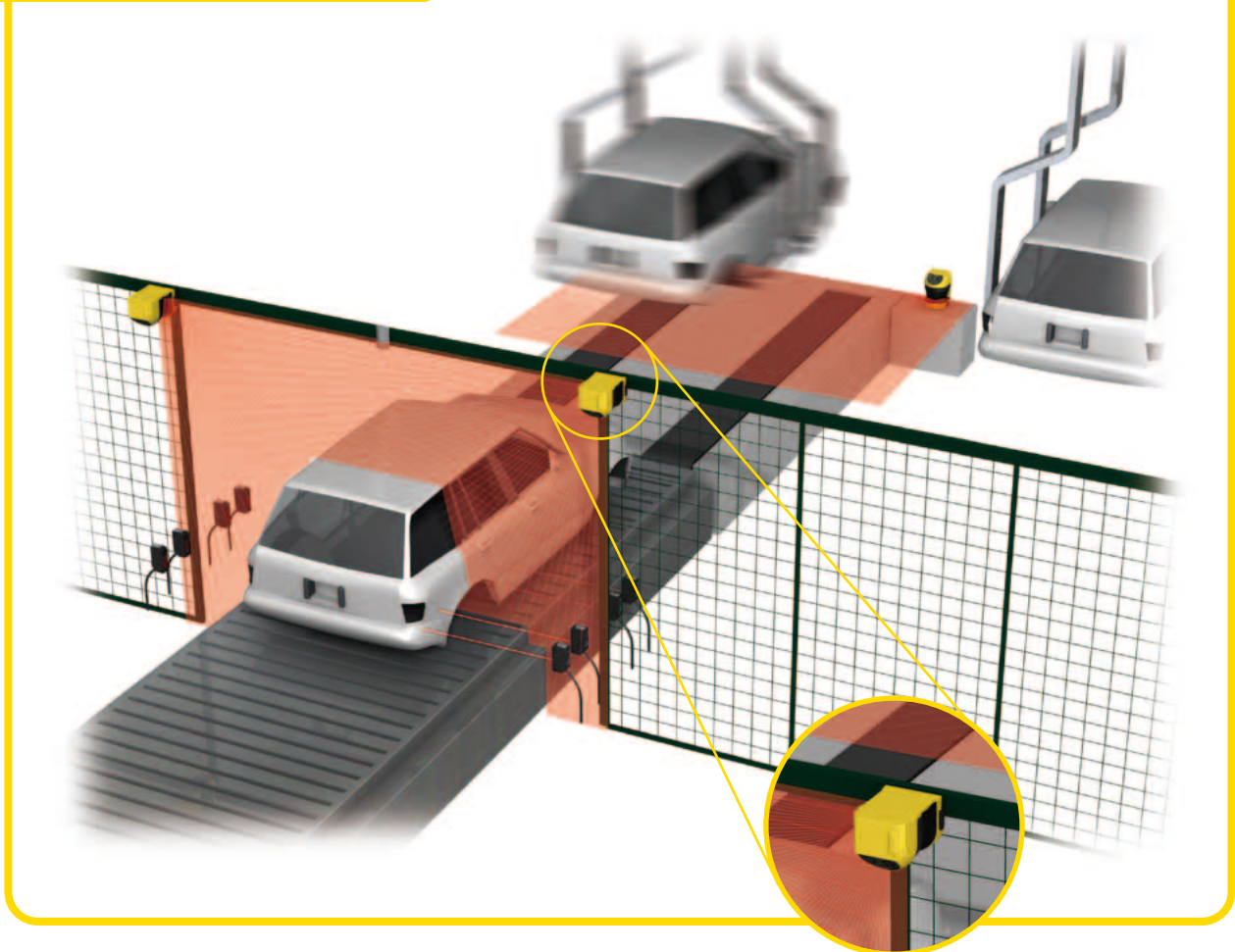


■ In some applications, the muting function creates unprotected areas where operators can enter a hazardous zone.

Solution

Unprotected areas can be minimized by installing an SZ Series Safety Laser Scanner above the gate area to be protected.

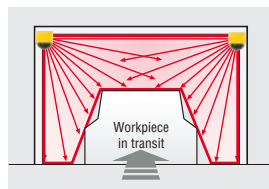
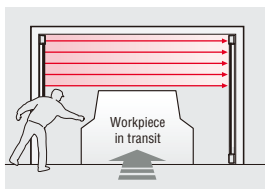
Use a safety laser scanner



Problems solved

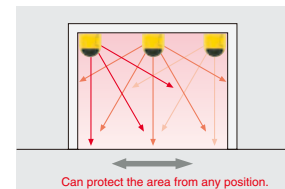
►► **By introducing the safety laser scanner ...**

- 1** It is now possible to ensure safety in previously unprotected areas when a car body is in transit.
- 2** Safety is added to the dangerous area where the car body is lifted.



Benefits

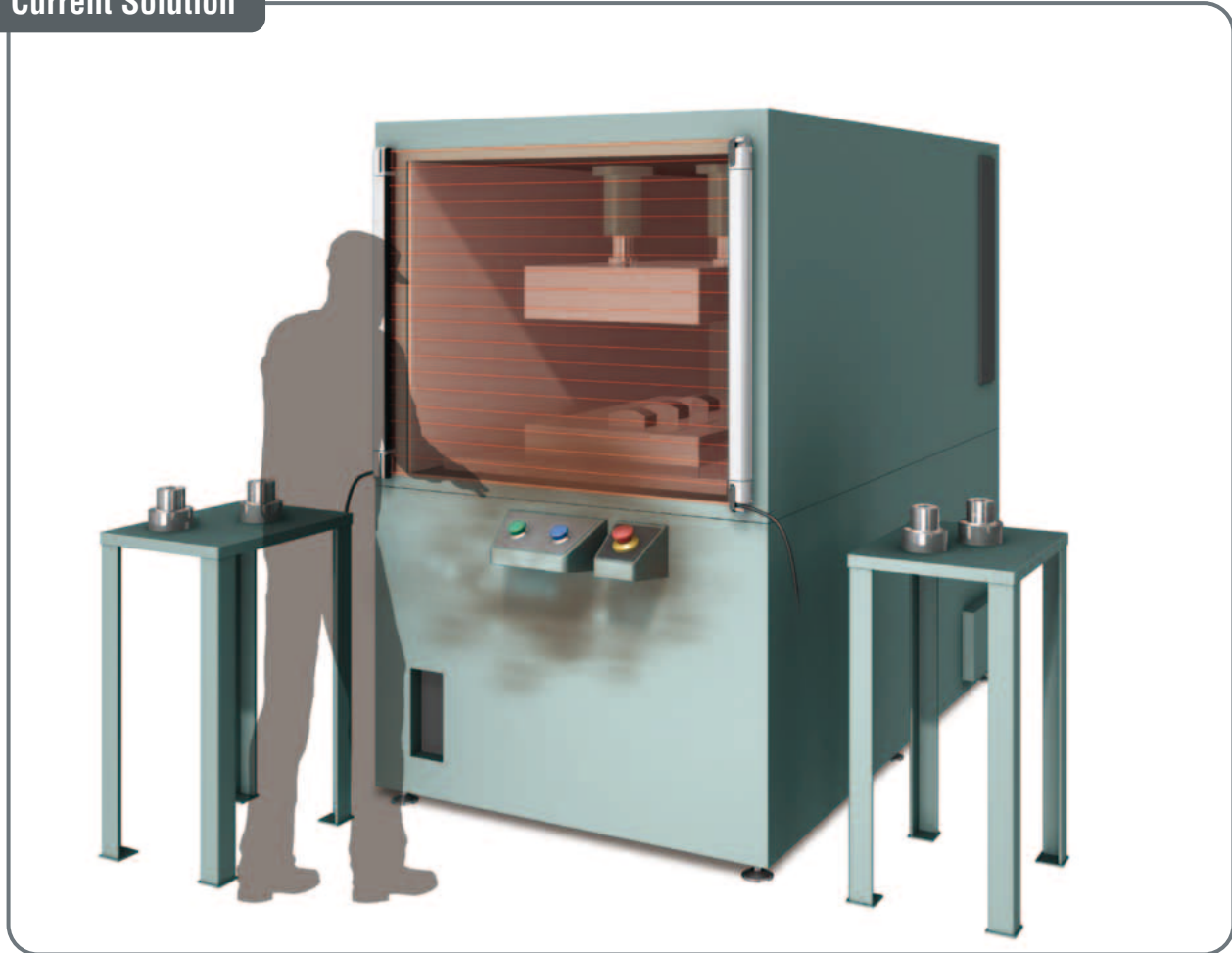
Since the protection zones can be configured in any shape, the SZ Series can be installed in a convenient location while maintaining complete protection over the desired area.



Problem

Dirt buildup on the light curtain results in false outputs/machine downtime and costs valuable time for cleaning and repair.

Current Solution



Background on light curtain use

After placing the workpiece in position, the operator presses a button to start the swaging process. Safety light curtains were installed due to the risk that the operator could be trapped in the operating area of the machine.

Points for improvement

The light curtain is exposed to buildup of grease and lubricant oil. To prevent this buildup from causing false detection and stopping the machine, the light curtain must be cleaned regularly.

Solution

The reflective SZ Series Safety Laser Scanner can be installed in a location where debris buildup is less likely to occur.

Use a safety laser scanner



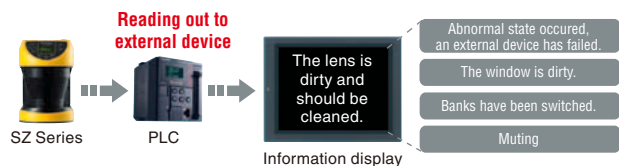
Problems solved

►► **By introducing the safety laser scanner ...**

- 1 By installing a safety laser scanner in a location where buildup is less likely to occur, maintenance hours can be reduced.
- 2 Because the SZ Series Laser Safety Scanner is so compact, it can easily be added to existing equipment with little to no modifications.

Benefits

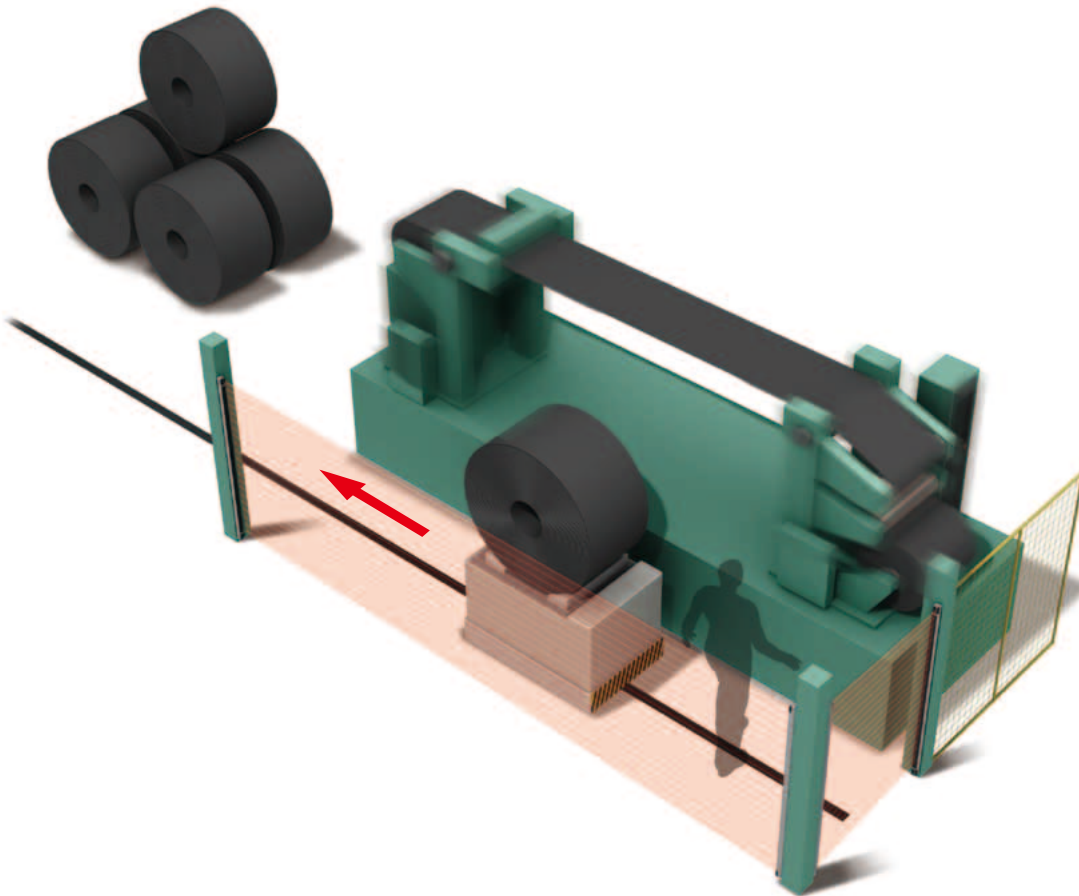
The SZ Series features a "State Information Output" function, which allows different scanner conditions, such as alarms or errors, to be read out to external devices (PLC, HMI) in real time.



* The SZ Series may produce improper signals if oily smoke enters its protection zone.

Problem

Safety device mounting equipment is in the way and hinders work efficiency.

Current Solution**Background on light curtain use**

An incident occurred where an operator was almost hit by an automated vehicle. Safety light curtains were determined to be a way to detect operator presence and stop the vehicle.

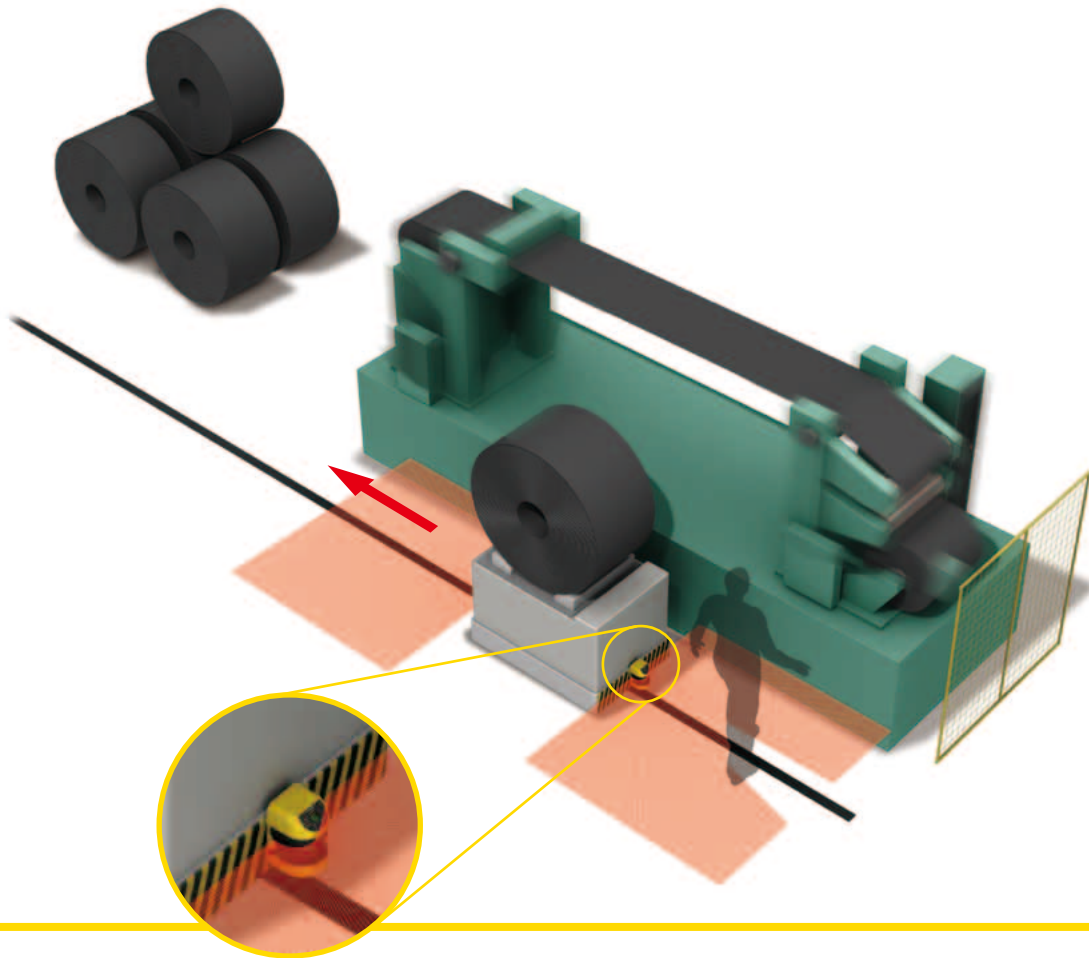
Points for improvement

Although light curtains were determined to be a legitimate solution to protect operators from the moving vehicle, work efficiency will be compromised by the mounting equipment/poles required to install light curtains here.

Solution

The SZ Series Safety Laser Scanner can be installed on automated guide vehicles to detect operator presence in its path, eliminating the need for obtrusive mounting equipment/poles required for other types of safety devices.

Use a safety laser scanner



Problems solved

►► **By introducing the safety laser scanner ...**

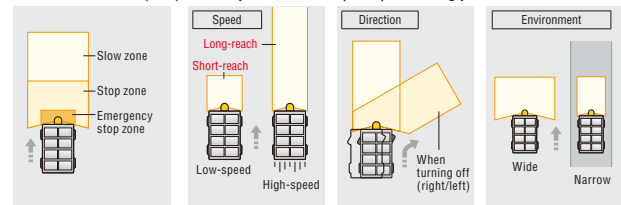
- 1 We were able to implement a security measure without putting up additional mounting equipment that would have decreased work efficiency.
- 2 Up to 16 banks and 48 zones can be configured on the SZ Series, allowing the safety zone to be adjusted according to the operating conditions.

Benefits

By using the bank switching function, one SZ Series scanner can be used to protect up to 16 different areas.

* When the SZ-16V is used.

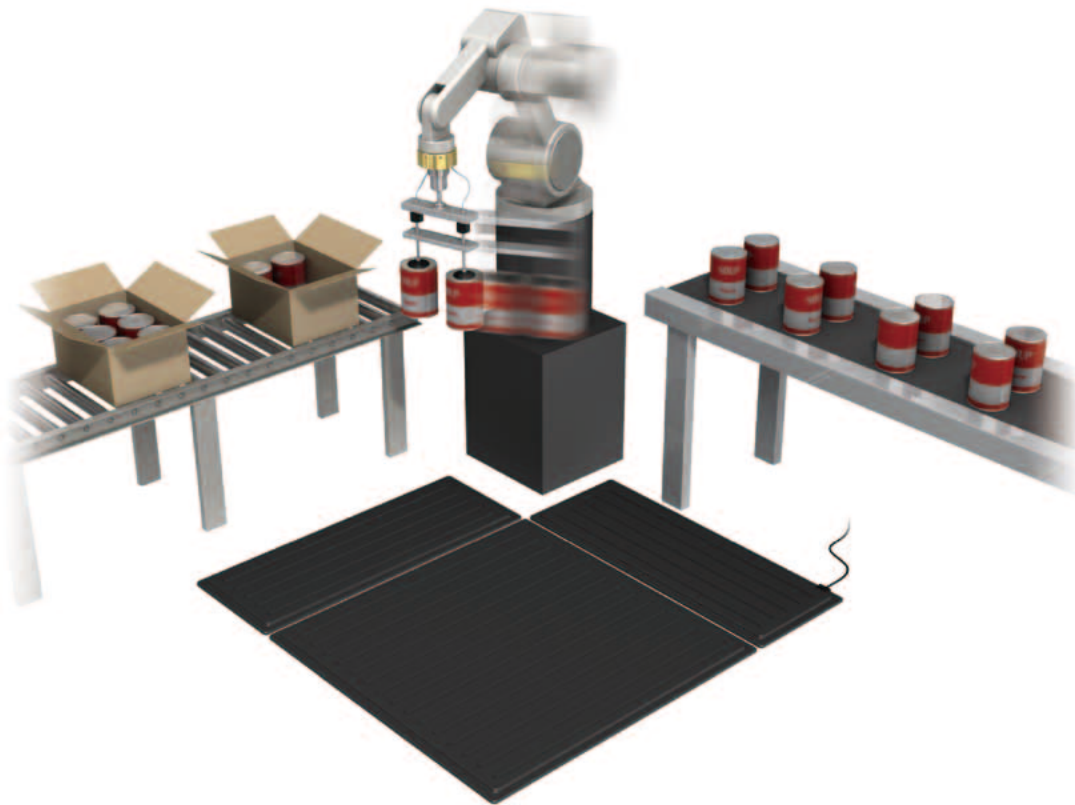
■ 3 zones for 1 zone set (bank) ■ Example of zone set (bank) switching pattern



Configure up to 48 zones according to speed/direction/surrounding conditions by using external inputs.

Problem

The application requires a safety sensor that can cover a wide range of areas.

Current Solution**Why we are considering installing a sensor**

A package was missing products because the robot failed to pick up the parts and dropped them to the floor. All packages must now be inspected every time. A more reliable and automated solution is desired.

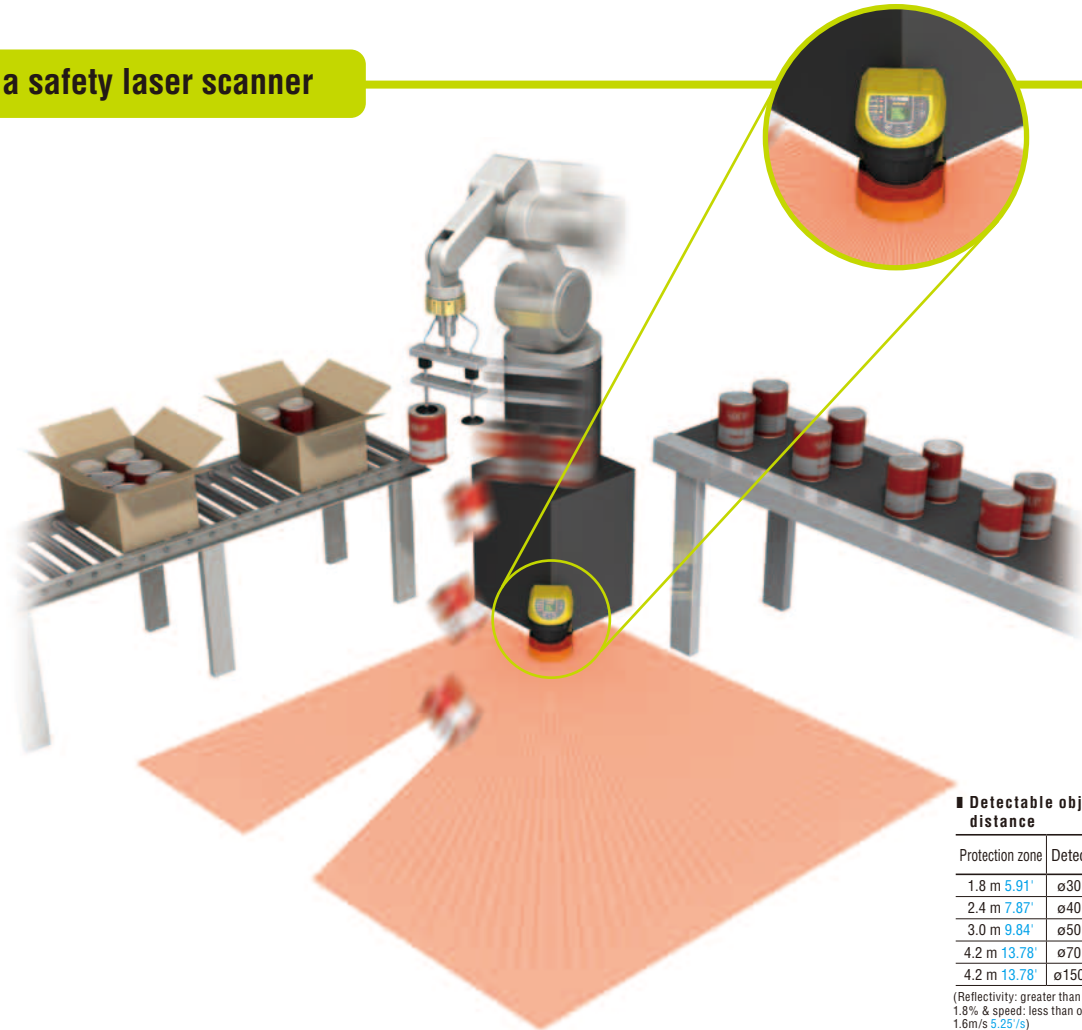
Point for improvement

A vacuum sensor was considered to monitor proper picking of the part, but it was not desirable to modify the palletizer itself. Instead, a mat switch was used, but unfortunately was not reliable when lightweight products were dropped. A sensor which will not fail to detect parts when they are dropped to the floor is desired.

Solution

The SZ Series laser scanner is unaffected by target color or shape and would be a reliable solution to guarantee detection of dropped parts.

Use a safety laser scanner



■ Detectable object by distance

Protection zone	Detected object
1.8 m 5.91'	ø30 mm 1.18"
2.4 m 7.87'	ø40 mm 1.58"
3.0 m 9.84'	ø50 mm 1.97"
4.2 m 13.78'	ø70 mm 2.76"
4.2 m 13.78'	ø150 mm 5.91"

(Reflectivity: greater than or equal to 1.8% & speed: less than or equal to 1.6m/s 5.25'/s)

Problems solved

►► **By introducing the safety laser scanner ...**

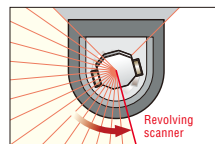
Dropped workpieces are detected, regardless of color, shape, or weight. Improper operation will now be detected immediately to prevent packaging errors and additional parts from being dropped and damaged.

Benefits

The SZ calculates the time that an emitted laser takes to return when reflected by an object. This time is used to determine the distance to the object. The sensor is not affected by the color or shape of the workpiece, allowing stable detection.



■ Distance measurement using the TOF (Time of Flight) method



■ Measurement at high resolution of 0.36° pitch

A 270° range is measured by the TOF method at a 0.36° pitch by revolving the internal reflective mirror at the speed of 30ms/revolution.


Product Lineup

■ Main unit


* Cables and hardware are not included. Select separately.

Appearance	Type	# of zone sets (# of banks)	Model	Weight
	Single-function type	1	SZ-01S	Approx. 1.6kg
	Multiple-function type	4	SZ-04M	
	Multiple-bank type	16	SZ-16V	

■ Cable (sold separately)

Appearance	Compatible	Length	Output type	Model	Weight
	SZ-01S	5 m 16.4'	PNP	SZ-P5PS	Approx. 280g
		10 m 32.81'	NPN	SZ-P5NS	Approx. 530g
			PNP	SZ-P10PS	
		20 m 65.62'	PNP	SZ-P20PS	Approx. 1040g
			NPN	SZ-P20NS	
		SZ-04M SZ-16V	SZ-16V	5 m 16.4'	PNP
10 m 32.81'	NPN			SZ-P10PM	Approx. 720g
	PNP			SZ-P10NM	
10 m 32.81'	NPN			SZ-P20PM	Approx. 1400g

■ USB Cable (sold separately)



Appearance	Name	Length	Model	Weight
	USB cable	5 m 16.4'	OP-86941	Approx. 200g

■ PC software (sold separately)




Name	Model	Weight
SZ configuration software	SZ-H1S	Approx. 80g

■ Mounting bracket (Optional)

Standard mounting bracket

Appearance	Type	Model	Weight
	Horizontal mounting bracket	OP-86935	Approx. 250g
	Vertical mounting bracket	OP-86936	Approx. 180g

Mounting bracket with angle alignment

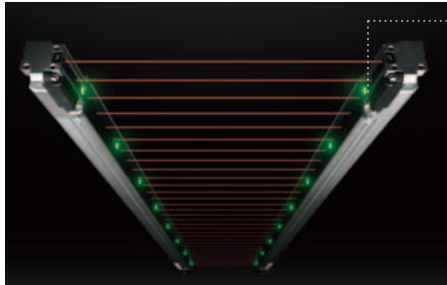
Appearance	Type	Model	Weight
	Horizontal mounting bracket with angle alignment	OP-86937	Approx. 690g
	Vertical mounting bracket with angle alignment	OP-86938	Approx. 850g
	L-shaped mounting bracket with angle alignment	OP-86939	Approx. 960g

Related Product

Safety Light Curtain

Type4 SIL3

SL-V Series



World's first

Highly-Visible Indicators

By using the Highly-Visible Indicators, operators can immediately determine whether the curtain is active, preventing situations where the beam is accidentally blocked. In addition, alignment and maintenance are simplified.

Extensive product lineup

 <p>SL-VF Series Minimum detectable object ø14 mm ø0.55"</p>	 <p>SL-VH Series Minimum detectable object ø25 mm ø0.98"</p>	 <p>SL-VFM Series Minimum detectable object ø14 mm ø0.55"</p>	 <p>SL-VHM Series Minimum detectable object ø25 mm ø0.98"</p>
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SAFETY INFORMATION

Please read the instruction manual carefully in order to safely operate any KEYENCE product.

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KA1-1012