Trends in Machine Guarding: Safety Laser Scanners Get Smaller and Smarter

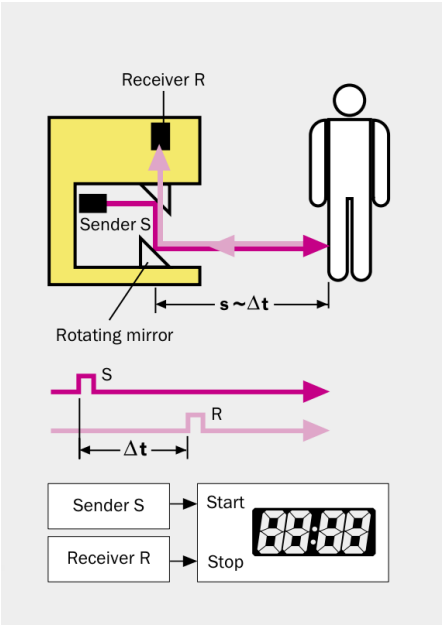
Industrial machine builders are demanding smaller and smarter safety solutions that will easily integrate into their designs. Safety laser scanners have been used for years, protecting people, machines and facilities. More recently, manufacturers have started to incorporate more automation on their equipment to reduce costs, gain efficiencies and improve operational safety.

Safety laser scanners enable non-contact monitoring of freely programmable areas in either mobile or stationary applications. They can be used in industries as diverse as automotive, packaging, and logistics.

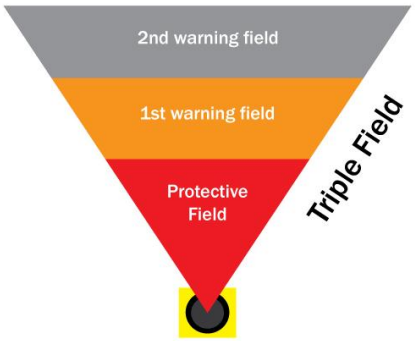
Current trends call for a smaller solution footprint and the greatest possible solution flexibility, functionality and safety. With a large number of usable monitored and protective fields in addition to their increasingly smaller size, the demand for safety laser scanners is growing for area and access protection. This trend is driven by the adaptation of new types of industrial applications.

Maximum Safety in a Compact Size

Newly introduced safety laser scanners to the industrial automation world now offer the smallest footprints on the market, combined with simple operation and flexibility – with the added potential for remote diagnostics and troubleshooting as well as performing safety control logic for the customers' entire safety system. The basic operation of a safety laser scanner uses time-of-flight measurement. Light pulses are emitted from a scanner to create a two dimensional scan of its surroundings. If the emitted light strikes an object, it bounces back and is received by the scanner. A rotating mirror spreads the light pulses out in a fan shape over an angle of up to 270-degrees. Objects within a user configured area is thus detected by the scanner. A smaller footprints means safety laser scanners can be mounted in space constrained areas



with beam detection height as low as 35 mm off ground for repeatable detection of workers' shoes and is easier and less expensive to install. For these reasons, small sized scanners are ideal for applications such as Automated Guided Carts (AGCs) or safety mat replacement in any industry. AGCs are currently demanding smaller sized scanner for the increasingly compact sized vehicles now on the market. As for safety mats, a smaller sized laser scanner offers a no wear solution, with less demanding field size requirements and can be concealed in a more compact space which can reduce the overall footprint of a machine and save on costs.



Triple Fields Sets Reduce Downtime

A triple field set is a feature now offered in some smaller sized laser scanners. A triple field set can be programmed with one protective field and two warning fields. The safety and warning fields or "zones" are freely programmable and can be changed dynamically or statically. Once an object is detected in the defined "warning zone," the scanner can initiate an output signal – an audible or visible indicator, which can be used to notify personnel in the area that they are coming too close to a hazard. Advantages of triple field sets can be found in mobile applications by using a warning field output to slow the speed of a vehicle and reducing the ware of brakes. Similarly, stationary applications can use a warning field output reduce machine speed which translates into a smaller required protective field, thus saving floor space and minimizing unwanted machine stops.

Better System Performance

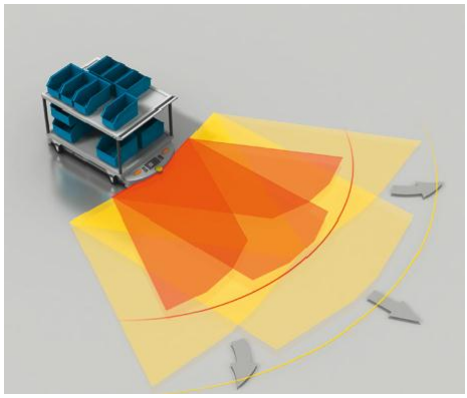
Typically, customers need a larger safety zone to move machines or vehicles fast in order to compensate for a longer braking time. If the customer's safety zone did not adapt to a changing environment of a machine, the vehicle would not be able to go around corners, or machines would require a protective field to cover all possible hazard locations. In order to use fast speed in a condensed space, users need to be able to balance safety zones to maximize productivity. The simplest and safest way to switch zones on a vehicle is using encoders. This technology has been adapted so that vehicles can do tight turns – with built in tolerance functions to maximize usability. The advantage is that speed signals are sent from the encoder into the scanner without any interaction with the vehicle control. Selecting zones safely and simply with a machine which has changing hazard zones normally wouldn't require encoders. Instead, position signals can be sent from the machine directly to the scanner and used to monitor zones based on current position of machine.

Scanner Selection Criteria

Which scanner do you choose? There are several different sizes and many variants to choose from. First and foremost, the application must stop reliably, repeatably and prior to contact when detecting a person in the hazardous area. The hazard, speed, design, environmental factors and size of the application will have a large impact on which scanner features are needed.

Safety detection range, scanner size, triple vs. dual fields, number of total fields required, contour mapping, and network connectivity also come into consideration.

A machine's speed, braking time and position will drive the safety detection range and determine whether to use a scanner that has triple vs. dual fields. An application that travels faster will require a longer safety zone and possibly more slow-down options to prevent injuries.



In addition, the size and design of the application will determine the ideal scanner size to use. The right size safety laser scanner helps ensure a streamlined looking machine and minimal costs and related downtime, due to damage, for end users.

Environmental factors, such as large open areas, ambient light, a dirty or dusty environment, or operation near shiny equipment that could cause false trips will influence the sensing and scanner features required. Choosing a safety laser scanner that is immune to these types of environmental factors will minimize last minute, expensive service costs that the end user will not want to pay.

If more intelligent feedback is needed to manage the safety system, then network connectivity is possible to access the status and diagnostics of the safety system on the application. Access can be given locally at the end user location for faster troubleshooting and minimal downtime, or remotely to the OEM's support team.

Conclusion

There are more options than ever when it comes to safety laser scanners. New features and functions are added every year that maximize productivity while ensuring safety. It is important for OEMs and end users to consult their safety solution provider when making a decision about which one to use for their application. Buy from an experienced supplier and manufacturer so you don't have to wear out the support hotline!

For more information, contact Aaron Schulke, SICK Safety Product Manager at aaron.schulke@sick.com or call 800-325-7425.