Press for safety

// by Paul Sertis, customer solutions manager, Laser Safe Pty. Ltd. //

Advanced safety and performance technology makes its way into the press brake retrofit market

It is a common misconception that to make a press brake safe, it is also necessary to accept a certain level of compromise and reduction in machine functionality, productivity and performance. While this may have been the case with many of the safety products and solutions available for press brakes in the past, and still today to a certain degree, it's important to set the record straight: Sacrifices in productivity don't have to be made to keep employees safe.

Just ask anyone at the major press brake OEMs. They will all agree that it's possible to realize the benefits of enhanced machine safety while also keeping performance and productivity at peak levels. They'll also agree that safety paired with productivity happens through the use of advanced optical safety and control technologies. In the past, these technologies were only available to press brake manufacturers, but today, they're available to the retrofit market, as well.

At attention

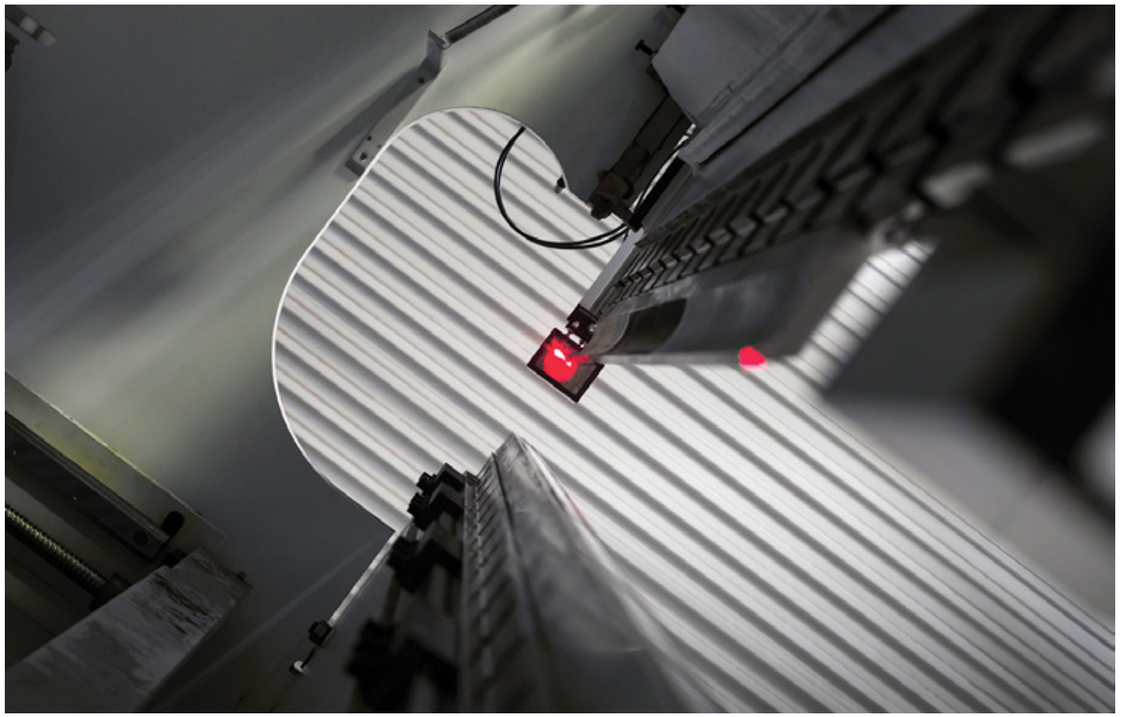
To address the needs of the retrofit market, the Sentinel Plus guarding system sets an industry benchmark for safety and performance through advanced optical processing technology. While laser-based guarding systems are not new to the U.S. retrofit market, the Sentinel Plus relies on the latest technology available.

This includes a larger block laser field that is projected along the length of the upper tooling and processed by a high-speed camera receiver with an integrated image processor. A user-friendly graphical interface magnetically fixed to the front of the press brake makes setup, mode selection and operation simple.

When a new punch is installed on a press brake, the operator simply presses the tool align button on the front of the camera receiver unit. From there, the camera automatically scans the punch to determine the tool profile and locate the punch tip, dynamically adjusting the position of the protective zone relative to the punch tip. This simplifies the setup process and ensures the protective zone is always set for the correct and optimal operation. The addition of BendShield technology means that the protective zone envelops the punch tip to provide a complete protective shield below and above the tool tip for extra protection. With its 2-mm resolution, the system can detect objects that enter the protective zone from any angle.

The system also works with non-V tooling through a dedicated "special tools" mode. This mode scans the upper tool and dynamically adjusts the size and shape of the protective zone according to the type and size of the tool. For example, radius and ›

↓ The Sentinel Plus guarding system delivers the most advanced optical protection available for press brake retrofit applications.



flattening tools with different profiles will result in different protective configurations.

Traditional approach

A common performance-related issue with many traditional retrofit laser-based guarding systems is that the machine speed-change point is determined by the machine's stopping performance. With traditional systems, the laser sensing field needs to be positioned at a sufficient distance below the punch tip to allow for any distance the machine over travels when a stop command is issued. Traditional systems also have a fixed muting point where the machine must transition from a fast closing speed to a safe speed prior to the sensing field contacting the material.

Therefore, the actual speed-change point ends up being determined by the sensing field position below the punch tip, which is directly affected by the machine's stopping performance. The greater the over travel, the higher the speed-change point. Depending on the type of guarding system and the machine stopping performance, the speed-change point can be as high as 23 mm or about 1 in.

This can result in more than two additional seconds of slow speed travel per cycle. Initially this may not sound like much, but when added up over hundreds or thousands of machine cycles, production times can increase by several hours per week.

Rapid approach

Where Sentinel Plus provides a significant advantage is through its unique RapidBend Plus performance technology, which employs a patented progressive muting process, enabling the press brake to close safely at high speed until the punch is just 2 mm above the material, irrespective of the machine overrun distance. The active protective zone is progressively muted within the camera receiver software and reduces in vertical size as it approaches the material surface. ›

↓ A large-area block laser envelops the upper tool to provide a complete protective shield.

> It's important to set the record straight: Sacrifices in productivity don't have to be made to keep employees safe.

This, coupled with dynamic overrun monitoring, maintains optical protection right down to the material surface and effectively eliminates the excessively slow travel imposed by traditional systems. RapidBend Plus can save operators up to two or more seconds per bending cycle on most press brakes, especially high-end performance machines. Savings in time and operating costs are quickly realized.

Another advantage of RapidBend Plus is that it enables higher machine productivity for flat and box profile parts. When forming box profile parts with side flanges, there are two box bending modes. These modes enable a portion of the protective zone to be temporarily blanked, allowing the machine to close at a high speed and then transition to forming speed at 2 mm. Protection at a 2-mm opening is well within the required closed tools opening of 6 mm.

Safety standards

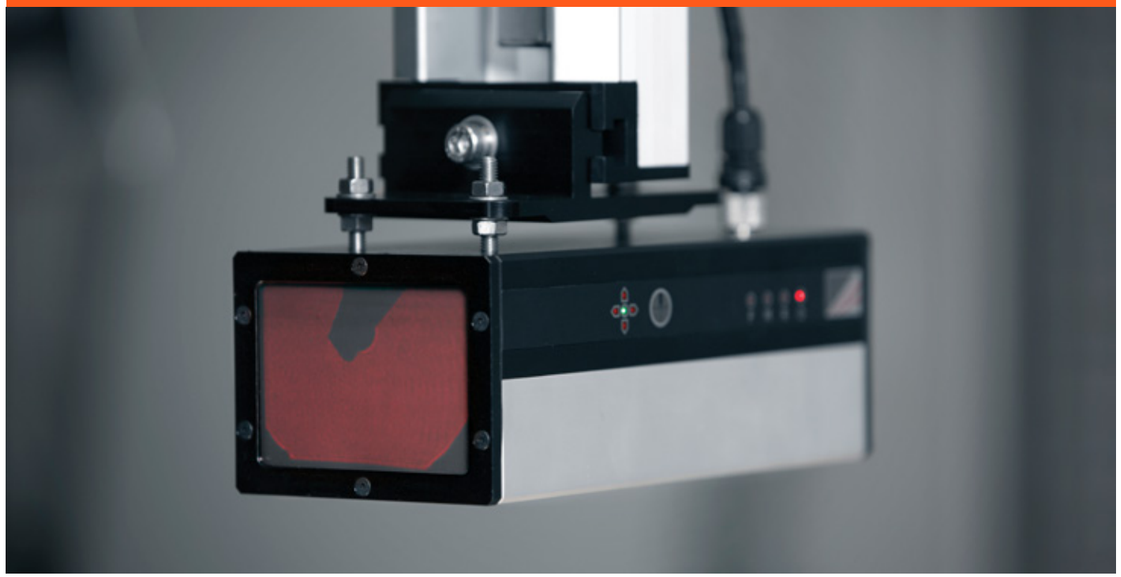
When it comes to safety, nothing can be compromised. The current ANSI B11.3-2012 press brake standard places stringent requirements on laser-based guarding systems, including the automatic monitoring of machine overrun and safe speed.

Sentinel Plus systems include advanced AutoSense technology that exceeds the minimum monitoring requirements of the B11.3 standard by providing additional real-time monitoring of the overall press brake process. The system can detect failures of the machine control and hydraulic systems that could result in unexpected movement or operation that may lead to injury.

Unlike most laser-based guarding systems where the B11.3 mandated automatic monitoring is an optional extra or must be provided through third-party devices, Sentinel Plus systems include AutoSense as standard.

Light curtains continue to be a common method of safeguarding a press brake in the United States, primarily due to operator familiarity ›

↓ Camera receiver with integrated image processor and automatic tool align feature.



↓ The Sentinel Plus interface includes a magnetic backing allowing it to be placed anywhere on the front of the press brake.

A common performance-related issue with many traditional retrofit laser-based guarding systems is that the machine speed-change point is determined by the machine's stopping performance.

and perceived lower initial cost. However, light curtains can be restrictive, are less productive, provide an overall lower level of safety and, over the long term, end up costing more than their initial outlay in terms of reduced production capacity and increased operating costs.

Light curtains also restrict an operator's access to the machine working area whereas Sentinel Plus enables unrestricted access by enabling safe high-speed operation of the press brake. This differentiator is especially useful when handling smaller workpieces.

With Sentinel Plus, the operator can safely handle parts within 20 mm of the point of operation while the machine is in high-speed operation. Additionally, operator movements are minimized. With a light curtain, the operator must continually step in and out of the protected area.

BendShield adds another level of safety not possible with light curtains by protecting against high-speed tool and material collisions should the operator make an incorrect setup. The technology also increases safety as it can detect any static objects left on the die that could otherwise result in costly tool damage and potential operator injury.

In addition to safety concerns, light curtains also require higher levels of maintenance compared to Sentinel Plus. Periodic safety inspections and stop time testing are needed to maintain continual safe operation. Conversely, the AutoSense technology ensures the press brake is always safe to operate without the need for any periodic or manual inspection.

Furthermore, without any automatic mute-point management, position monitoring or collision avoidance technology, press brakes with light curtains are typically configured with a higher muting and speed-change point of 1/4 in. (6 mm). Sentinel Plus enables a lower speed-change point and, in combination with other operating efficiencies and performance advantages, represents a significantly better long term investment.

Of course, there are still some machine applications or tooling setups where light curtains are still applicable and this is where Sentinel Plus offers users flexibility. It can be installed together with a third-party light curtain and the user can select which system to activate for a specific bend job.

The advantage in these scenarios is that Sentinel Plus will manage the light curtain mute-point setup through material position monitoring. Also, based on the configured light curtain parameters and safety distance, Sentinel Plus monitors the machine stopping performance automatically with the stop time displayed on the interface in real time.

Sentinel Plus can be retrofitted to most existing makes and models of press brakes. Custom interface packages can also be developed for certain machines that are challenging to retrofit. ■

LASER SAFE PTY. LTD. →