

BENDING



A horizontal bending machine, also known as a horizontal press brake, provides an affordable alternative to a press brake when it comes to forming small and thick workpieces. Images: Trilogy Machinery

horizontal bending machine, or a horizontal press brake, might make sense.

The machine's name provides a hint as to how it operates. Instead of vertical movement in the bending action, this machine forms metal on a machined horizontal surface. The hydraulic cylinder drives the die, and the workpiece rests against the punch—opposite from a traditional press brake, which is another benefit. The punch is floating, which allows you to form tighter U shapes, or even a box that wraps completely around the entire punch, something that is not possible with a standard press brake.

The horizontal bending machine's forming action is side to side instead of a press brake's up-and-down motion. Forming tonnages typically range between 45 and 82 tons and consolidate over an 8- to 12-in. area.

The big difference between the horizontal and vertical press brake is that the forming area is more limited in the former. Tooling can only be so tall, usually around 12 in., as the single cylinder is centered on the tooling, rather than on either side like many traditional press brakes. Anything taller than that is subject to deflection, unless some sort of support is present.

Tooling for a horizontal bending machine is similar looking to that used in a traditional press brake. Punches have sharp points and dies have openings of different widths. Multi-V dies also can be used for lighter-gauge material. Specialty tooling can be used for certain applications, such as bending to 180 degrees.

Unlike the tooling used to form thick material on that 10-ft. press brake, the tooling for the horizontal brake is much easier to handle because of its smaller size and lighter weight. Tooling changeover only takes a couple of minutes as only a few set screws need to be adjusted to remove and then replace the punch and die.

"The benefit of the HBM [horizontal bending machine] is all of the tonnage focused on a small area," said Ben Flamholz, vice president, Trilogy Machinery, the exclusive U.S. distributor of Sunrise ironworkers, horizontal benders, and processing systems. "Unlike a traditional press brake, where the tonnage may be spread over 10 ft., the HBM focuses the full force in the middle of the bend area. You don't need to worry about crowning or aligning multiple axes like you do on bigger press brakes."

Basic Forming

Flamholz said that a horizontal bending machine takes up about a 3.5- by 2-ft. space on the shop floor. It packs a lot of bending power into that small footprint, with an 82-ton machine capable of forming up to a 0.5-in.-thick by 12-in. plate.

That sort of bending power is attractive for shops that have to produce a lot of clips, brackets, and hangers—small parts made from plate.

MEET THE HORIZONTAL PRESS BRAKE

The versatility of the machine might surprise you

By Dan Davis

inevitably, a job shop has to deal with a job that isn't ideal for any piece of equipment on the shop floor.

For example, an order for 250 U-shaped brackets made from 6-in.-long, 4-in.-wide, and 0.25-in.-thick steel bar is a job that is maybe too small for a 10-ft. press brake, or too thick (requiring more tonnage) than the brake

can deliver. Many shops don't have the luxury of having a smaller brake and installing custom tooling for such parts. Because of that, a simple forming job takes up valuable production time that could instead be dedicated to more complex and profitable work.

The idea of adding a press brake for such work is attractive for many shops, but the expense of adding another brake, even a small-tonnage machine, can be a turnoff. That's where a hor-



U-shaped parts are a good fit for a horizontal bending machine's forming action.



Brackets of all sizes can be quickly formed on a horizontal bending machine.

It makes a lot of sense to find some way to form those parts without taking up time on larger press brakes.

"It seems like fabricators are looking to fill the void where they were jobbing out forming work to someone else (because they didn't have the right press brake or tooling) and now want to seek out equipment for their own production," Flamholz said.

A manufacturer of high-end residential and commercial lawnmowers uses a horizontal bender to produce the U-shaped forms that hold the two front wheels, which swivel 360 degrees. The forms are made of 3-in. flat bar, which is cut to size before being placed on the horizontal bending machine. (The part's radius made it almost impossible for a conventional press brake to do the work and was too small for a rolling-style machine.) Specialty tooling bends the bar to 180 degrees. Once the forming process is done, the part is ready for finishing and then assembly.

It's not a complicated process, but it's one that gets the job done, according to Flamholz.

A program can be created easily using the machine's controller. The only thing that the operator has to do to finalize a program is dial in the appropriate stroke distance. A machine might have a 15-in. stroke, which likely won't be needed for a job. The large stroke distance allows for a wide range of tooling to be used.

The forming speed is not fast, but it is precise. Flamholz said it can deliver accuracy of ± 0.004 in.

"You don't need a very skilled operator to do this compared to someone who needs computer training for a CNC press brake," he said.

Multibend Applications

A machine that is a suitable tool for basic forming of flat bar into shapes also has the capability for more complex shapes. The addition of a CNC backgauge helps with these multibend applications.

A manufacturer of fire extinguishers needed a solution to help fabricate wall brackets for its products. The brackets had to be substantial enough to hold the fire extinguishers off the floor, but light enough that they didn't inhibit the extinguishers from being pulled out during a fire.

The brackets started with a 2- by 30-in. piece of flat bar. It required multiple bends on the horizontal bending machine to create the bracket that would be attached to the wall and then subsequent forms to create the space to hold the fire extinguisher.

Flamholz said that an operator typically might use a tape measure prior to each forming step to ensure the correct placement of the workpiece. However, an increasing number of fabricators with multibend projects like this are using CNC backgauges.

Much like a press brake, a control on a horizontal press brake with a CNC backgauge controls its placement before each bend. That way the operator always has the part in the right place, not relying on a tape measure.

"Whether it's flat bar or something else, you want to use a gauge because it's easy to use and highly repeatable," Flamholz said.

He added that machines with backgauges, sold in 1- and 2-m formats, also come with larger touchscreen controls than machines without backgauges.

In cases where the backgauge might potentially collide with the workpiece during the bend, the horizontal bending machine features retraction capabilities, allowing the backgauge to move out of the way. When the form is completed, the backgauge moves into place for the next step in the bending process.

Specialty Options

Horizontal press brakes aren't limited to working with flat bar. Specialty tooling opens the door to a lot of other capabilities.

Flamholz said that a boat trailer manufacturer utilizes a horizontal bending machine to create a key bend in a 20-ft. section of aluminum rectangular tubing for one of its trailer lines. Relying on special tooling, the form drives into the tubing until a 30-degree bend occurs.

The die is designed in a way that the tubing doesn't ripple, which would affect the tubing's structural integrity. Flamholz described it as being "crushed" so that the correct inside radius is achieved.

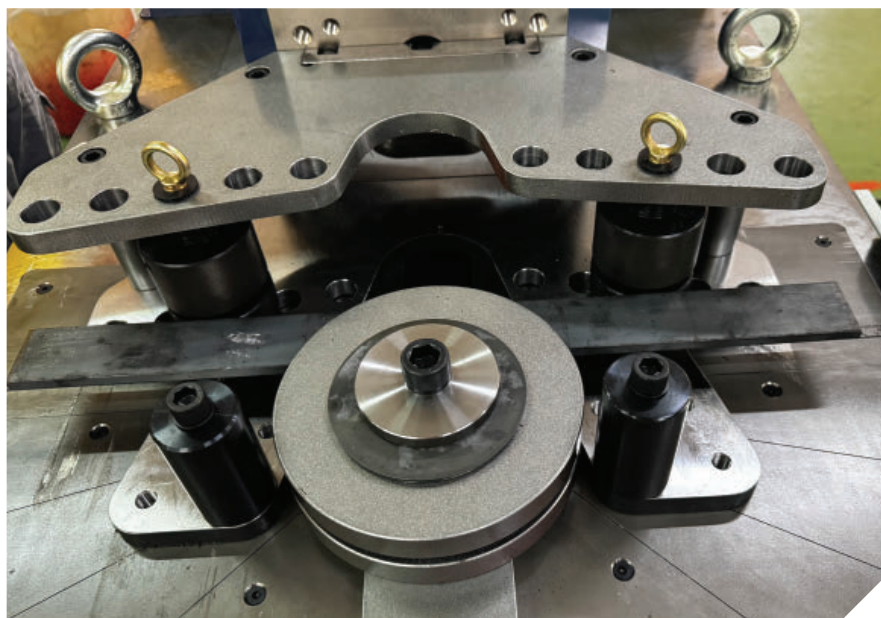
That particular bend angles the tubing towards the trailer hitch. The bend created on the horizontal bending machine sits just underneath the front of the boat and is connected to the rest of the trailer frame.

Flamholz said that he has seen a lot of different requests for special applications, and many times some creative designs for tooling can make these back-of-napkin ideas become reality.

Tube bending has been mentioned, but horizontal bending machines also are used for straightening of beams, shearing of plate, and punching holes in plate. The equipment offers an affordable alternative for tackling a variety of metal fabricating tasks. **FAB**

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Specialty tooling also can be used with horizontal bending machines.