

The ABCs of CNC

A primer on automation options for your ironworker

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If you're considering adding an ironworker, you should know not only what type of ironworker is best for your facility and end product, but also what options will offer you the productivity level you want. For this reason, you should learn about CNC controls as you investigate the ironworkers on the market today.

In today's production shops, time is critical, and money—whether it's how much of it you make or what you invest it in—is vital. For these reasons, an ironworker is a piece of equipment to consider, especially if your company saws or burns structural metal (angles, beams, and channels) or steel plates and drills holes in these sections.

An ironworker, also known as a universal punching and shearing machine, can shear and punch holes, making it useful for structural fabricators, plate fabricators, farm equipment manufacturers, truck body builders, maintenance shops, ornamental fabricators, and small welding shops—both with low and high work volumes.

If you're considering adding an ironworker, you first need to learn about not only what type of ironworker is best for your facility and end product, but also what options will give you the productivity level you need. For this reason, you also need to learn about CNC as you investigate the ironworkers on the market today.

What Is an Ironworker?

An ironworker is a single, multipurpose machine that punches, shears, notches, copes, and forms metals.

Although mechanical ironworkers were the preferred choice for years, for the past 25 years, hydraulic versions make up most of the ironworkers sold today. Hydraulic ironworkers are manufactured in two designs: single- and dual-cylinder.

Single Cylinder. Single-cylinder machines typically have three or four workstations with one foot pedal that operates all stations. Most single-cylinder machines have a punch station, angle station, and plate shear station. Some machines have a copier/notcher station.

Dual Cylinder. Dual-cylinder machines usually have five working stations:

1. Punch
2. Angle shear with single cut
3. Shear for flat plate or flat bars
4. Shear for round and square bars, which can be changed to channel or beam
5. Notcher and/or copier

Two hydraulic cylinders work the five stations. The punch and shear stations operate independently, so two operators can use the machine at the same time.

Hydraulic ironworkers have been on the market for more than 25 years. They are used in most structural and miscellaneous fabricating shops.



This full ironworker has an X-Y coordinate CNC punch positioning table and a CNC



This triple-gag punch has a hydraulic stripper mounted with an X-Y coordinate CNC punch positioning table.

CNCs

CNC punch positioning tables and CNC measuring and shearing systems are recent developments for the plate shear station. CNC punch positioning tables were introduced to the U.S. market about 10 years ago. The CNC plate feed system is about 6 years old. The following are CNC options available and descriptions of how they work

X-Y Coordinate Punching Table. Some ironworkers have an X-Y coordinate punching table with a programmable CNC. The table can be fitted to a hydraulic dual-cylinder, deep-throat ironworker or any single-station punch.

To use an X-Y coordinate punching table, you first enter the hole punching position into the control. After the X and Y guides on the table move to the first position, place the material against the guides and punch the hole. The guides then move to the next X and Y positions, and the plate is moved against the guides and the hole is punched. The guides then move to the next X and Y positions, and the process is repeated until the piece is finished. This automatic positioning eliminates manual layout and thus helps increase production, decrease labor cost, and increase accuracy.

X-axis travel (left to right) can be up to 220 inches, depending on the machine. The throat depth of the machine determines the Y-axis travel (front to back). Speed of both axes is variable.

Positioning tolerance is in the 0.003-in. range, and an RS-232 port usually is provided for downloading programs from an office PC or CAD system. This helps eliminate the chance of entering the wrong information into the control. This type of table eliminates most layout work and can punch plate, angles, channels, and some extrusions.

Manual layout causes bottlenecks in fabrication shops. When you lay out a part manually, it's slow work, and your chance for error is high. The control of an X-Y table allows you to program a part and store it for the parts you're punching at that time, as well as for future use. If your fabrication shop manufactures base plates, connection plates, and clip angles that always have the same dimensions, storing part layouts in memory can enhance productivity.

Optional Triple Punch. With an optional triple punch, you can select three different punch diameters. This can be useful for farm equipment and prefabricated building manufacturers, as well as general job shops that need more than one diameter in a part. For example, if your part has more than one hole size, you still can punch the part in one operation.

CNC Flat-Bar Feeding and Shearing System. A CNC flat-bar feeding and shearing system can be mounted on a hydraulic dual-cylinder ironworker. It shears flat bar into programmed lengths and quantities.

The flat-bar shearing system can work in combination with a CNC positioning table, allowing you to position base plates, connection plates, or brackets without laying out a single part after the plate has been sheared to the correct dimension. The flat-bar shearing system comes with an infeed conveyor and has its own controller.

The addition of the CNC punching table and the flat-bar shearing system make it possible for one person to operate a dual-cylinder ironworker.

Other Ironworker Considerations

In addition to understanding how CNCs can improve your ironworker's productivity, it's also

important to take some other basic requirements into account when you start shopping for your machine.

When choosing an ironworker, ask yourself the following:

1. What is the largest hole I want to punch?
2. What is the thickest material I will be punching?
3. What material (for example, mild steel, A36, stainless steel, grade 50) will I be punching?

Once you have answered these questions, you'll be able to choose a machine with the right tonnage to do the job.

Although most shops today have automated or are considering automating their equipment, the ironworker has been one of the last machines to incorporate automation. Knowing the options available is key to making a wise purchasing decision.