



## Factors to Consider When Selecting an Ironworker DETERMINING WHAT WORKS FOR YOU

An ironworker is an important and versatile machine in any metal fabricating shop.

Quite often, ironworking is the first step in the manufacturing process, and one ironworker can provide enough fabricated material to keep several welders or assemblers busy.

Since its invention in the late 1800s, the ironworker's main strength has been its ability to perform a variety of operations. These machines can punch holes of various shapes and sizes through a wide range of materials. It can also shear rod, flat bar, angle iron, and channel iron in seconds and easily notch pipe, flat bar, angle or channel iron. Many ironworkers are even available with special tooling to bend, stamp, and form.

Even with the ironworker's versatility, it is possible to purchase the wrong machine — or at least not the best machine — for your application.

Important considerations for

a machine include its capacity, versatility, safety features, and quality. We'll go over each of those in detail so you can make the best choice.

### DETERMINING CAPACITY

Ironworkers typically are rated by tonnage at the punch station.

A 50-ton ironworker should punch a 1-1/4 inch hole in 1/2 inch material; a 60-ton machine should punch a 1 inch hole in 3/4 inch material; an 85-ton machine should punch a 1-1/16 inch hole in 1 inch material; and a 150-ton machine should punch a 1-7/8 inch hole in 1 inch material.

The first step, therefore, is to determine the maximum

thickness of your material so you can establish the tonnage range needed for your punching application. You must determine the maximum hole diameter you need to punch; the maximum thickness of the material to be punched; and the maximum thickness and width of the channel, angle,

and flat bar to be sheared or bent.

Because many different types of steel and ranges of hardness in mild steel exist, it is advisable to

get a machine larger than you think your everyday use requires to avoid getting a machine that is too small.

Most machines are rated for material with tensile strengths between 60,000 and 65,000

Punching Capacity by Tonnage (U.S.)		
Punching Capacity (tons)	Material Thickness (inch)	Hole Size (inch)
50	1/2	1 1/4
60	3/4	1
85	1	1 1/16
150	1	1 7/8

### Scotchman Industries

180 E US Hwy 14, Philip, SD 57567 USA · (P) 605-859-2542

info@scotchman.com · www.scotchman.com

pounds. Many mild steels have tensile strengths between 50,000 and 85,000 pounds or higher, and your machine may not have the power to punch the material at the higher end of the hardness values.

When punching hard steel, such as stainless steel, it is better to increase the estimated tonnage by 50 percent, depending on the grade of steel.

Be sure to compare the rating of the machine not only in tons, but also the diameter of the hole and thickness of material it can punch.

Beware!

### **Not all tons are created equal.**

A metric ton is actually heavier than a U.S. ton (2,200 pounds vs. 2,000 pounds). A machine rated for metric tons should be able to punch a larger hole than a machine rated on the same number of U.S. tons.

Example: 85 tons of pressure by U.S. standards can punch a 1-1/16 in. hole through 1-in. material; 85 metric tons should be able to punch a 1-5/32 inch hole though the same material thickness.

### **ASSESSING VERSATILITY NEEDS**

Ironworkers are available with different designs to enhance versatility.

For example: Scotchman manufactures 2 different styles of ironworker, a fully-integrated (European Style) and a component tool tabletop design. The main difference is that the tooling stations on fully-integrated machines are permanently built in while the component tool tabletop design allows operators to easily switch tooling in the tabletop.

If you are a structural steel fabricator, you may prefer the integrated style of machine because the available stations cover the majority of the materials you process and do not require tooling changes. These machines offer punching stations, angle shears, rod shears, notchers, and flat bar shears.

If you are a general welding, fabrication, maintenance, or structural steel fabricator who does not know what a customer will bring in the door tomorrow, you may want an ironworker that offers the capability to adapt to all customer needs. Tabletop tooling concept or our component tool tabletop design, offers a wider variety of tooling options making this style more customizable to suit your specific needs.

Tabletop ironworkers offer options such as larger press brake bending attachments, rod shears, tube shears, channel shears, pipe notchers, V notchers, picket tools, square tube shears, and a variety of custom-built tooling.

Although these machines can use a larger variety of tooling

than those with built-in stations, time is required to switch from one operation to the next. It's important to determine if a component tool or fully-integrated style ironworker is the right fit for you.

### **ADDRESSING SAFETY ISSUES**

Safety is an important factor when choosing an ironworker. Be sure to choose an ironworker that meets ANSI B 11-5 standards.

You should always examine the guarding, and make sure it can be adjusted down to within 1/4 inch from the top of the material to be punched, and to the bottom of the guard to stripper (this is an ANSI standard). This will prevent operators from placing any part of their bodies in between the material being punched and the stripping mechanism. All other stations should offer complete safeguarding as well.

For productivity as well as safety, the machine you choose should offer an infinitely adjustable stroke control to minimize machine movement, decrease the number of pinch points, and increase strokes per minute and production. This is especially important in bending applications and for special tooling for which the upstroke must be adjusted in addition to the downstroke.

Electric stroke controls offer advantages over mechanical linkage controls. Electric stroke controls have quicker cycle times and more precise stopping because they use switches that

### **Scotchman Industries**

180 E US Hwy 14, P.O. Box 850, Philip, SD 57567 USA · (P) 605-859-2542

info@scotchman.com · www.scotchman.com

# FACTORS TO CONSIDER WHEN SELECTING AN IRONWORKER

send signals to the control valve almost instantly. Machines that use mechanical linkage stroke controls must be in motion to cause the linkage to close the control valve. As the valve closes, the machine slows down and is more difficult to regulate. Safety instructions should include proper alignment of the punch and dies. Because punches & dies are hardened to 58 Rockwell, extra care must be taken when aligning the punch station.

The preferred and most widely used method of aligning the punch and die is similar to the way punch presses have been aligned for many years. This is done by bringing the punch ram to the bottom of the stroke and installing the punch and dies with the stroke down. This way, the punch already has been entered into the die, the alignment can be checked, and guards may be replaced without machine



movement.

## ASSESSING QUALITY

In trying to determine quality, consider the size of the pivot points and beam strength of the steel that is under pressure. Since your ironworker produces many tons of force, the force

must be generated and transferred through the pivot points as well as the beam.

Another good indicator of quality is how much shock is produced when the ironworker punches.

Excess shock, which can be identified by a loud popping or

*All ironworkers are equipped with flat bar shears. Some use a fixed-rake-angle shear, while others use a scissors-type shear.*

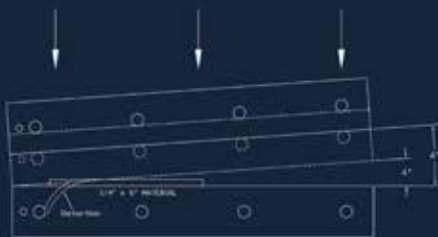
### FIXED-RAKE-ANGLE SHEAR

#### PRO

Work remains constant throughout the cut, sometimes offering larger capacity without increasing machine tonnage.

#### CON

Without the ability to vary the rake angle, the distortion of the drop piece will remain the same throughout the cut.



Fixed-rake-angle-shear

### SCISSORS-TYPE SHEAR

#### PRO

Because you can vary the rake angle of the blade, thicker material is cut closer to the pivot point and thinner material is cut further from it, minimizing distortion and increasing cut time for a faster shear cycle.

#### CON

On some manufacturers, the rake angle of the bar shear blade is adjusted by inserting and removing wedge-shaped shims above the shear blade; and this may require substantial mechanical ability and time.



Scissors-type-shear

## Scotchman Industries

180 E US Hwy 14, P.O. Box 850, Philip, SD 57567 USA · (P) 605-859-2542

info@scotchman.com · www.scotchman.com



## FACTORS TO CONSIDER WHEN SELECTING AN IRONWORKER

banging noise as the punch goes through the material, could indicate the beam or side frame is stretching and snapping back into place. Continued shock can cause welds to break, as well as other failures. Higher-quality machines control this by increasing side frame, beam, and pin size.

The hydraulic system should also be a consideration. You are buying the machine for the tons of pressure it produces, not for the motor's horsepower rating.

Some ironworkers are designed, through mechanical advantages, to produce more tonnage with less horsepower, thus making the machine more efficient. Machines with higher-horsepower motors usually operate at a higher hydraulic pressure, or pounds per square inch. This increased pressure can produce unnecessary wear on hoses, pumps, and valves.

### EQUIPMENT SUPPORT

The final key in selecting an ironworker is support. An ironworker is a piece of equipment that is made to last for many years. That being said, it is very important to be able to obtain additional optional tooling or special custom built tooling, as well as replacement parts for the machine, and support from the manufacturer for many years to come.

### A LONG-TERM DECISION

Remember: An ironworker purchase should be a well-informed, comfortable decision. Consider ease of operation, ease of financing, and ease of delivery before you buy. It is always good to know where the machine is manufactured, where the machine ships from, and how long it will take to get it up and running in your fab shop.

Evaluate your financing options — you may be able to finance directly through the manufacturer.

Before purchasing an ironworker, it is important to take the time to analyze your needs and carefully assess the features available. It will be time well spent.

### NEED MORE HELP?

For over 50 years, Scotchman Industries has been the leading manufacturer of metal fabricating equipment. Their products include a full line of ironworkers, circular cold saws, band saws, pipe notchers/grinders & measuring devices.

When you're considering your next ironworker purchase, keep Scotchman on your list. You'll be purchasing much more than a quality piece of machinery. You will receive peace of mind — from an American manufacturer.



**Scotchman**  
Metal Fabricating Solutions

