

WELDSALE

By Paul Cunningham

In welding and fabricating shops, base material must be cut and then welded together. A large assortment of welding and cutting tables are available for this purpose. For welding, platens and T-slots are often used. Cutting equipment includes downdraft cutting tables, water tables, and plain cutting tables.

■ Why Are Platens Used?

From a manufacturing and engineering standpoint, accuracy and quality are critical in plate cutting and welding. To minimize errors and avoid rework, pieces must be cut square on the shop floor and welded to proper dimensions.

The following is a description of how platens can be used to help maintain dimensions and tolerances in the welding process.

■ Cast-Iron Platen Tables

Platens are made of cast-iron, which helps them resist warping and hold close tolerances over their useful life – typically about 40 years or more. The top surface is machined to a tolerance of ± 0.005 inch per foot. All four sides and the bottom are also machined. The tables can be used as single units or bolted together flush to form multiple platen beds.

A platen's 1½-inch square holes are aligned in rows on 3½-inch centers, allowing any clamp to be used in any square hole anywhere on the platen's surface.

On some platens, a cast-in socket is situated at the bottom of every square hole. This is used to attach bolts and tooling to the table. The head of the bolt fits in the cast-in socket on the bottom of the table, so the bolt cannot turn when the nut is tightened.

Typically, a welder lays out the weldment on the platen using the aligned square holes to aid setup. Next, using blueprints, the welder verifies measurements and clamps the parts down for final aligning. When the correct tooling is used, the flatness of the platen and the alignment of the square holes can help the welder maintain dimensional tolerances and quality.



Using welding platens and cutting tables

*Taking a look at
available equipment*

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■ Welding Platen Sizes

Welding platens are available in the following sizes: 2' x 3', 2½' x 5', 4' x 4', 5' x 5', 5' x 6', and 5' x 8'.

Since they are machined on all four sides, platens can be bolted together to provide multiple platen bed configurations. When platens are mounted on flush mount stands, they are bolted together flush, with no gaps between the edges where the platens meet. This provides an enlarged, smooth working surface. Individual platens can also be separated to make walkways between them, when required.

Platens can be bolted together in almost any configuration. Shims are available to help maintain level height across large platen beds. In large, custom-configured beds, platens are typically bolted to the stands, and the stands are bolted to the floor.

■ Traditional Tooling

The original piece of platen tooling was the gooseneck hold-down clamp (see Figure 1). This tool was commonly used for clamping down the hulls of ships as their component parts were laid out on a large platen bed surface in preparation for welding assembly.

Shipyards also used bending posts to facilitate the layout, bending, and forming of weldments. As shown in Figure 2, platens are commonly used for bending. Note the two chain falls in the photo. For some weldments, the tapered drift pin was used to block a piece of steel and keep it from moving.

Arm clamps are used to clamp down a part anywhere on the table. Each square hole on the platen's work surface can be used for tooling.

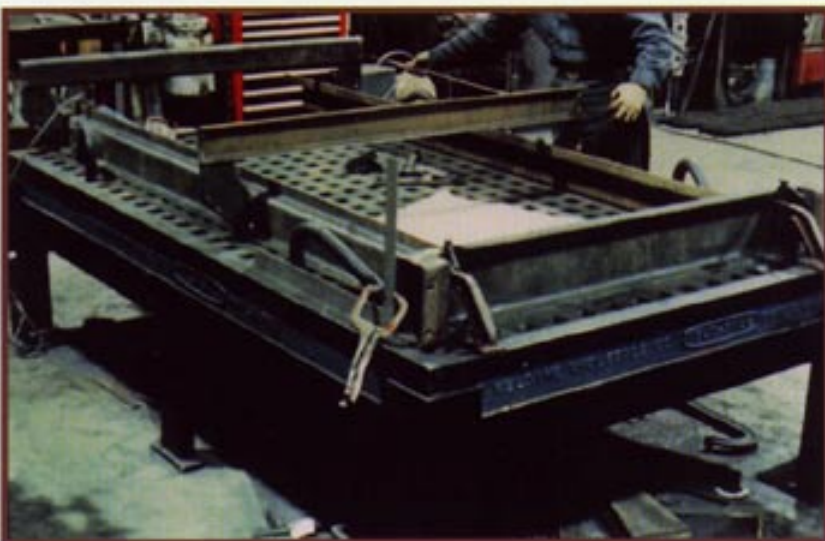


Figure 1
Shown here are gooseneck hold-down dogs and arm clamps in use on a platen. Note the welder using a tape measure with blueprints to help ensure dimensional tolerances.



Figure 2
Tapered drift pins, gooseneck hold-down dogs, and two chain falls are used on this platen for bending.

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New Tooling Developments

Quick action vertical slide clamps (see Figure 3) can be used in any square hole and allow quick vertical clamping of the weldment. The knurled and hardened round base cocks back and binds in the platen's square holes (like the gooseneck hold-down dog). Horizontal clamps can also be used.

Bolt down quick action clamps are the same as quick action vertical slide clamps, except the base bolts down into the cast-in socket on the bottom of every square hole.

Quick action toggle clamps (see Figure 4) are used for their clamp, unclamp, and reclamp feature. The knurled and hardened round base cocks back and binds in the platen's square holes.

Bolt down quick action toggle clamps (see Figure 4) are the same as the quick action toggle clamps, but they bolt down into the cast-in sockets. The threaded clamp base allows the clamp to be rotated for height adjustment.

Angle plates (see Figure 5) are machined 90-degree angles that are used as vertical stops for positioning a weldment and for squaring corners of a weldment. Figure 5 also shows an assortment of other examples of tooling.

Magnets are typically used during weldment layout and setup to position a 90-degree angle. Outside corner, inside corner, and adjustable angle magnets are common types. An adjustable magnet is used when the angle is other than 90 degrees.

Conical pyramids are used for cutting on top of the platen surface. They are cast to fit into any of the 1 $\frac{1}{8}$ " square holes.

Curtains can be used with the downdraft platen tables and also with platens to form booths and protect one welder from viewing another welder's harmful arc. Curtains around platens also reduce flying particulate from grinding operations.



Figure 3
Vertical slide clamps are used on a platen.

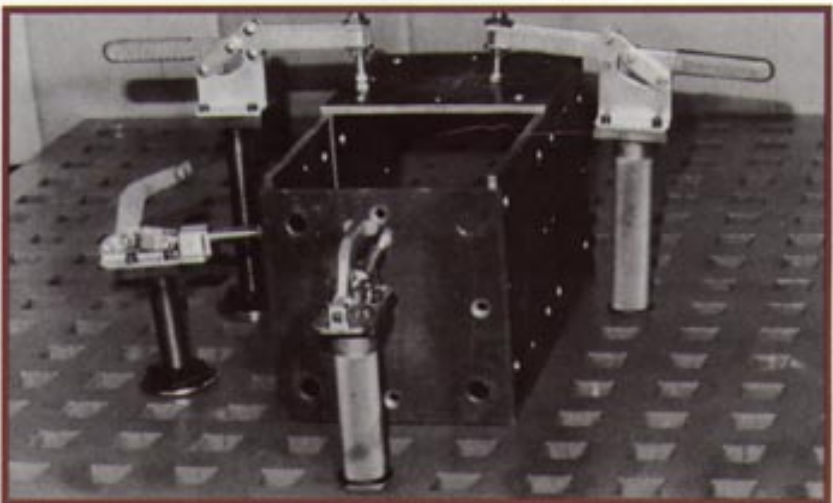


Figure 4
Shown are horizontal and vertical bolt down and quick action toggle clamps.

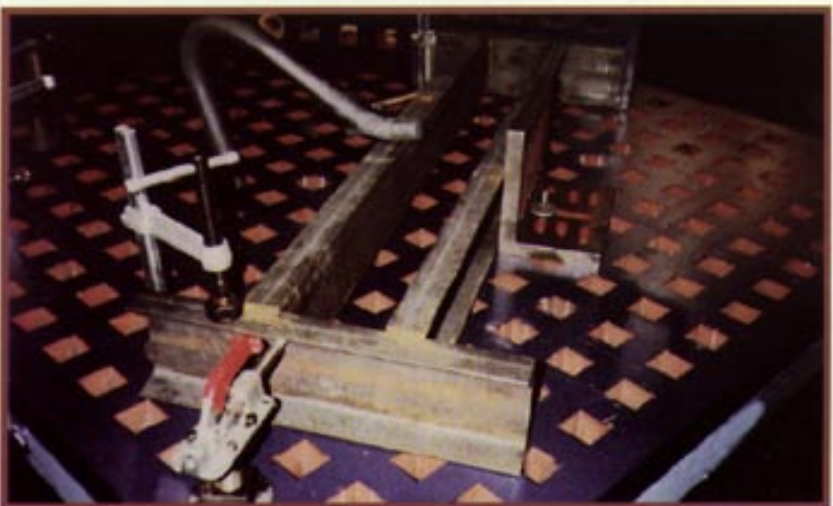


Figure 5
Shown are a 90-degree angle plate (right), gooseneck hold-down dog, toggle clamp and quick action slide clamp.

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■ Downdraft Platen Tables

The push/pull style downdraft platen table not shown has an overhead fan that pushes the smoke back toward the table. Ductwork is positioned under the platen and coupled with an exhaust fan (or air cleaner) to pull the smoke down through the platen's square holes, helping to remove smoke and particulate from the welder's breathing zone.

Following are additional reasons for downdraft platen table use:

1. The operator does not move a smoke extraction arm.
2. Source capture occurs across entire platen surface.
3. The smoke capture equipment is kept away from the welding process so it does not interfere.
4. The table complies with Occupational Safety and Health Administration (OSHA) guidelines of moving air away from the welder's breathing zone.
5. The table works with any welding and cutting process, including hand-held plasma.
6. Downdraft ductwork can be added as a retrofit option to most platens.

■ Downdraft Cutting Tables/ Flame-Clear Pyramids

Downdraft cutting tables (see Figure 6) work on the same principles as the downdraft platen tables. They are used for oxy-acetylene and plasma cutting of steel, stainless, aluminum, and other alloys. Downdraft cutting systems are commonly used for sheet metal (such as galvanized).

Flame-clear pyramids help protect the cutting table's cross supports, allow slag to blow away freely from the sheet, and help keep the sheet from welding itself to the cross supports. For certain applications, cutting tables are used without pyramids.

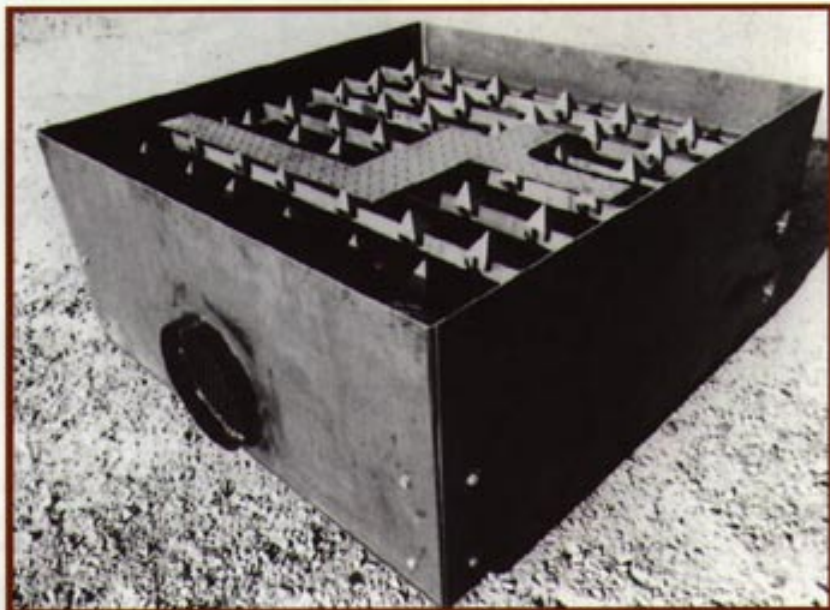


Figure 6
This downdraft cutting table has pyramids to protect the cross supports.

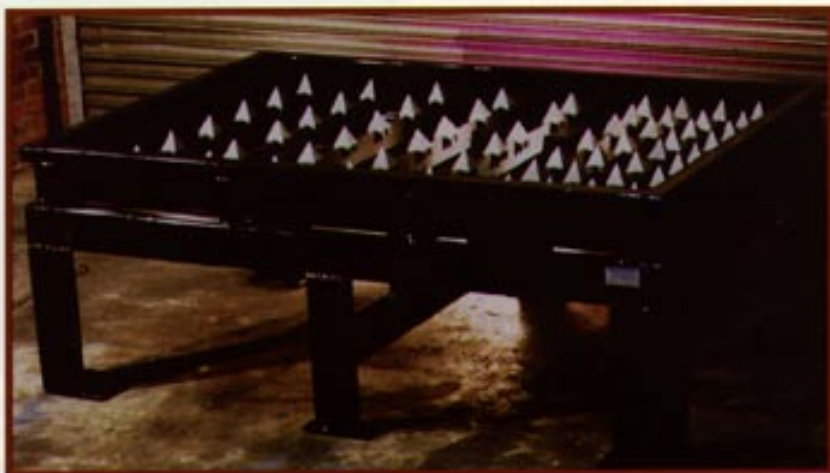


Figure 7
Water tables are used to reduce smoke and particulate in cutting.

■ Water Tables

Water tables (see Figure 7) are used predominantly with plasma cutting to help eliminate smoke and metal particulate and to reduce noise in the welder's environment. Water tables also eliminate the need for an air cleaner. Plasma cutting is typically done with the water touching the bottom surface of the plate. Occasionally, underwater plasma cutting is also performed.

■ Conclusion

A variety of tables and tooling are available for numerous welding and cutting requirements. Understanding this equipment and knowing their own application requirements can help shop personnel make the appropriate table and tooling selection. ■

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