Photos: Ben White and Josh Giumelli

DIY table for precision welds

Any time spent improving welding facilities in the workshop can only lead to greater productivity when repairing or building machinery. While we often tend to focus on equipment such as welders, drills and grinders, a versatile, custom-build welding table is a valuable asset for any farm workshop. By **Josh Giumelli**

Most farmers have reasonably capable fabrication facilities in their workshops. It's all part of getting things made or fixing broken equipment in a timely manner.

In the past we've looked at all sorts of welders, grinders, drilling machines and metalwork equipment for the farm workshop, but have never touched on welding tables. And while these come in all shapes and sizes, there are a few key points to consider if you are thinking of building one, or upgrading an existing table.

There are plenty of commercial welding tables on the market, but if you want something heavy and sturdily built, you will pay a lot of money.

As most farmers will have access to a decent slab of steel plate to make a tabletop, it makes a lot of sense to build your own. And the good news is we can utilise many of the accessories such as clamps and jigs designed for commercial welding tables.

The clamping system will negate the need to tack-weld jobs to the table when setting up work, leading to faster set up and no messy welds to grind smooth. Of course, there is also a vast range of magnetic clamps and angles which work very well with the welding table.

In this month's workshop article, we cover the build of a typical welding table, which can double as a multipurpose workshop bench.

There are no hard and fast rules here – there are few critical dimensions, and much of the design can be tailored to individual needs. In fact, most welding tables are built to suit the size of steel slab to hand at the time.

Our welding table has started life as a scrap piece of 12mm thick steel plate. While it will need to be cut down to size, we have checked the dimensions and the squareness of the corners to make sure the finished tabletop will be as true as possible. A minimum thickness of 10 to 12mm is probably ideal for a welding table, as the clamping accessories rely on a certain thickness to ensure they lock into the top. A thinner top can be used, but will need extensive bracing to keep it flat, and the clamping system will need securing with a nut from underneath the table. We have seen farmers with welding tables with tops as thick as 25mm, but unless you get the plate for a good price, it represents a lot of money due to the high current prices of steel.

Any scrap metal yard can cut the tabletop to size for you, but they will invariably use an oxy acetylene torch. Here we have used the nine-inch angle grinder to trim the tabletop up. While this takes longer, the cut quality is far better and we have been able to spend some time making sure everything is square beforehand. Our table has ended up with a top about 1000 x 1800mm.

A mobile welding table is certainly more versatile but will not be the best solution for everyone's needs (especially if you plan to attach a bench vice). In our case, the wheels help to get the table into the welding bay in the workshop. As an advantage, it can be used as a trolley to move heavy items in and out of the workshop, such as engines and gearboxes, as this table will double as a strip-down bench. These 150mm heavy-duty castors cost about $160 for the set and have a load rating of 450kg per wheel. The swivelling castors are lockable.

Table height is an important consideration. As a rule of thumb, aim for a top height of around 850 to 900mm. Naturally, taller tables suit taller welders. If you tend to work on a lot of large welding projects, a lower top height may be an advantage. But working down on a table set too low will quickly lead to a sore back. Our table legs have been cut from 90x90x8mm angle, taking into account the height of the castor wheels. As our wheels are 200mm heigh, our legs are 700mm long overall to give a table height of about 900mm. Mounting plates for the castor wheels have been cut from 110x8mm flat bar and drilled to suit the wheel mounting holes.

The next step is to weld the wheel mounting plates to the ends of the legs. While the positioning of the plates is not overly critical, make sure the holes have enough clearance for the bolt heads against the legs.

Check the steel plate for flatness using a known good straight edge. Most plates will sag slightly under their own weight, but this can be corrected by placing the plate flat on a concrete floor (provided the floor is flat). We are going to build our table upside down, attaching the frame directly to the plate. The frame can then be used to pick up the table and turn it over. Any heavy plate placed down on the floor can otherwise be very difficult to pick up again. If the plate has any slight curvature, place it so the ends curve up, not the middle. It will be far easier to correct later on when the table is placed the right side up.

Even this 12mm plate needs bracing underneath to prevent flex. Our table frame has been cut from 65x65x6mm angle and squared up with the table edges. The legs will be attached directly to this frame. Make sure all frame members are straight and tack into position. Note the frame is set back from the edge, not flush with it which can impede clamping. It also keeps the wheels within the footprint of the tabletop.

Our plate has a slight bow which has been placed facing down. The clearance can be checked by seeing if a thin piece of sheet metal can be slid between the frame and the tabletop. While this will be pretty simple to correct with the table upright, it means we will only weld the frame to the tabletop at the ends and not in the centre, otherwise the bow will be locked in place. When you are satisfied all is correct, weld the frame to the plate with several decent beads, avoiding the inside corners (this is where the legs will be attached).

The legs can now be attached. Rather than try to clamp them at perfect right angles, we have simply attached them with a single large tack weld on the outside corner. They can then be adjusted for right angles by bending or tapping with a block hammer and checking with a square as shown.

With the legs square they can now be fully welded in place. Place a couple of strategic tack welds on each corner of the legs where they come up against the table top and the base frame. Now weld the legs to the base frame (shown), and also on the inside to the tabletop.

Here we are adding a second frame near the base of the legs to further stiffen the table. As an advantage, this frame can be used to mount a second shelf of mesh or thin plate underneath the table for storage. We have used some lightweight 50mm angle iron.

With the main body of the table now completed, it is time to turn it over and attach the castor wheels. Given the weight of the table, it is safer to carefully flip it with a tractor on soft sand to avoid damage rather than attempt to man-handle it.

13

With the table the correct way up, attach the wheels. We have done this with the table still supported on the loader, taking care not to get underneath it.

14

If the table corners and edges are a little sharp, dress them with a grinder and a flap disc. The corners can be pretty unforgiving if you bump into them by accident.

Source:
Hare and Forbes

15

Now it is time to take our basic table and make it a whole lot more versatile by drilling some holes for a clamp attachment system. Some commercial tables (top) feature a huge amount of holes, which are probably more aimed at setting up jigs rather than simply clamping welding jobs to the table. For most of our needs we simply don't need so many holes, or want to drill them in any case. Work can be clamped to the table edge using regular G or F-clamps, so we don't need the holes too close to the edge, so they will be placed inside the frame. We have started by marking the location of the frame on the table to avoid drilling into it.

16

Our clamping system has a reach of 120mm, so a grid pattern of holes spaced at 200mm should be sufficient. In any case, we can always drill more later on if needed. Choose the straightest edge of the table and using a square, find the most accurate 90 degree corner. These will be used as a datum for laying out our holes accurately. Here we have set our first row of holes 150mm from the edge, then laid out a grid at 20mm centres. Mark hole positions and centre punch. The more accurate the holes, the better they are able to be used to help layout work, not just clamp it down.

17

The clamping system uses a 16mm hole. If the tabletop is thick enough, the clamp is simply inserted into this hole without any additional securing method. As the clamp is tightened it grips in the hole, but it needs to be drilled accurately. For this job we are using a magnetic base drill with a 16mm rota broach (annular cutter). Note the centre locating pin which is used to line up the drill with the centre punch mark.

18

The rota broach leaves an accurate hole with a reamed-like finish. Depending on the number of holes you choose to drill, this may not be the quickest of jobs, so it may be easier to do a few every now and again until the job is complete. As our table is going to be used for strip downs as well as welding, only one end of the table will be drilled with holes.

19

To finish off the table surface, we have cleaned it down with a wire cup brush in an angle grinder, then sprayed it with WD40, allowing it to soak in overnight. Any welding table in regular use probably won't have an issue with surface rust. The coating of penetrant will help stop welding spatter from sticking to the table surface.

We purchased this BuildPro kit from Hare and Forbes for $260, which includes four clamps and a range of adaptors, risers, spacers and stops (www.machineryhouse.com.au). This system is designed for a thin top table and requires adaptors to suit our 16mm holes. But this will then make it far more convenient to use as the clamps do not need to be bolted to the table. The kit is extensive and probably needs an additional article to cover all the setups it can be used for.

The key to the clamping system is the 16mm hole adaptors which simply screw to the base of the welding clamps ($22 for a pack of four).

Source: Hare and Forbes

There are a range of different style clamps available to suit the 16mm holes, including F-style clamps and quick-action clamps. The range of adapters, spacers and set-up gear is extensive and can increase the versatility of the welding table considerably.

Clamps are simply inserted into the table holes and clamped down on the work. As our holes are accurately laid out, the base of the clamps provide a locating reference so our work can be easily set to 90 degrees. The same applies for 45-degree joins.

Even the insert stop pins are handy for laying out work when using the bench holes as a reference.

These threaded risers can be used to extend the clamp height for taller work and are simply screwed into the base of each clamp leg, before reattaching the 16mm adaptor.

These magnetic rests are great for spacing work out when not all members can sit flat against the table surface. An alternative are these spacers which fit into the 16mm holes. In some cases, it may pay to raise the entire job off the table surface using these spacers, as it will allow welds to be run right down to the bottom edge without marking the table. Note that adjustable height spacers are also available.

These round material rests are ideal for setting up tube, and can also be used for angle, but there are also dedicated Vee-rests available which are more suited to angle.

POSTSCRIPT

Since building our welding table we've made a few improvements, including the addition of toolbox drawers (top) to house all of our welding clamps, jigs and accessories. A section of flat bar has also been added to one edge of the table to allow for vertical clamping of awkward jobs (bottom). In time, we will add additional holes, bisecting the 200 x 200mm grid pattern, which will give greater flexibility with clamp position and the various stops and inserts. But that is a job for another day!

NOVEMBER SALE

WE'RE COVID SAFE

Setting the standard for quality & value

HARE&FORBES MACHINERYHOUSE

www.machineryhouse.com.au

EXTENDED TRADING HRS TILL 4PM SATURDAY 13TH NOVEMBER!

METALMASTER

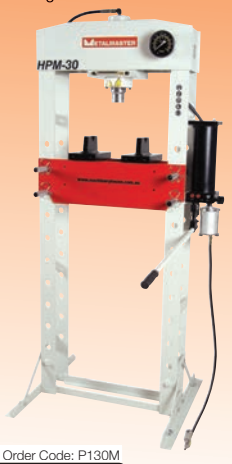
PBA-45 - Pressbrake Attachment
- 450 x 4mm capacity
- 40mm wide vee
- 50mm open height
- Spring return top die
- Steel construction

METALMASTER
Order Code: P450
$239
SAVE $36

PDS-3BS - Bearing Race & Seal Driver Set
- 10 piece bearing race & seal driver set
- 39.5 - 81mm
- Made from aluminium

Order Code: P031
$55
SAVE $11

HPM-30 - Trade Hydraulic & Pneumatic Press
- 30 Tonne
- Pneumatic / hand operation
- Robotic welded frame
- 155mm ram stroke
- 200mm horizontally sliding ram



Order Code: P130M
$1,199
SAVE $220

WT-01 - Welding Table - Fold-Up
- Huge 100kg load capacity
- 760 x 510mm table
- 790~925mm table height
- 2 x sturdy casters
- Folds flat

Order Code: W1004
$109
SAVE $32.90

PLSP150A - Spool Gun
- 150 Amp
- 9 Pin connector plug
- 4 metre cable
- 0.8mm U-groove roller
- Euro adaptor

Order Code: W181C
$418
SAVE $22

RAZOR™ 200 COMPACT INVERTER Multi-Function Welder-MIG-TIG-MMA
- 10 - 200 Amps
- 35% @ 200A duty cycle
- Digital amp display
- Includes MIG torch, regulator, arc & earth leads
- 240V / 15 amp

Order Code: W181
$1,716
SAVE $66

UNIMIG

U21001K - Auto Darken Welding Goggle & Mask
- Suits Mig, Tig, Arc, Gas, Plasma & Grinding
- 5-9, 9-13 shade with cut & grind mode
- ELITEVISION™ lens technology improves optics
- Power saving & shade memory modes
- Sensitivity & delay control for extra protection
- Includes LED headlight, hood & mask

Order Code: W1542
$170.50
SAVE $18.50

LIFTING EQUIPMENT

AET-900 - Engine Tilter
- 907kg capacity
- Adjustable tilting

Order Code: A3425

$44 SAVE $11

HGT-1T - Girder Trolley
- 1 Tonne capacity
- Suit I beams and universal beams
- Suits beam width from 64-203mm
- Complies with ASNZS1418.2

Order Code: C147

$110 SAVE $22

HS-S 1T3M - Chain Block
- 1 tonne x 3 metre
- G80 load chain
- Ball bearing load wheel
- Swivel hook

Order Code: C143

$119 SAVE $24

GDCV - Vertical Drum Clamp
- 600kg lift capacity
- Suits 205 litre drums
- Grips the drum rim
- Made from steel

Order Code: C1776

$108.90 SAVE $12.10

HC-1T - Hydraulic Engine Crane
- 1T lifting capacity
- Double action pump
- Fold up legs
- 2300mm lift height
- 6 cast steel swivel wheels

Order Code: A350

$329 SAVE $100

TPMEH500 - Mini Electric Hoist
- 0.5 Tonne 6 metre lift 0.25 Tonne 12 metre lift
- Single line 10m/min lift speed Double line 5m/min lift speed
- Automatic brake/cut off
- 900 watts, 240V motor

Order Code: H249

$330 SAVE $22

Imperial Industrial HSS Reduced Shank Drill Set
- HSS M2 grade
- 1/2" reduced shank
- 9/16", 5/8", 11/16", 3/4", 13/16", 7/8", 5/16", 1"

Order Code: D1181
$168
SAVE $30

VGP9 - 9" Drill Press Locking Clamp
- 2" jaw opening
- Quick release lever
- Swivelling jaw pad

Order Code: C103
$20
SAVE $4.20

PD-325 Pedestal Drill
- 16mm drill capacity
- 2MT spindle
- 12 spindle speeds
- Swivel & tilt table
- 1hp, 240V motor

Order Code: D592
$479
SAVE $60

XDP-1800 - Soluble Metal Cutting Fluid
- Semi-synthetic & water soluble
- Antibacterial & antifungal
- Chlorine, nitrate & silicone free
- Long lasting, low foam coolant

Order Code: S090
$44
SAVE $5.50

Superdraulic 46 Hydraulic Oil
- 20 Litre
- Improved equipment life

Order Code: O004
$99
SAVE $11

Contactless Click and Collect OR

COMPETITIVE FREIGHT RATES! *DELIVERED TO YOUR DOOR!

11_FA_011121

zip

Own it now, up to 12 months interest free

Up to the value of $10,000

**Terms & conditions apply please see website for further details*

UNIQUE PROMO CODE
3DSN21
ONLINE OR IN-STORE!

www.machineryhouse.com.au

SYDNEY	BRISBANE	PERTH	MELBOURNE
(02) 9890 9111	(07) 3715 2200	(08) 9373 9999	(03) 9212 4422
1/2 Windsor Rd, Northmead	625 Boundary Rd, Coopers Plains	11 Valentine St, Kewdale	4 Abbotts Rd, Dandenong

A family owned Australian business
Established 1930