ADVANCED VSR
www.advancedvsr.com

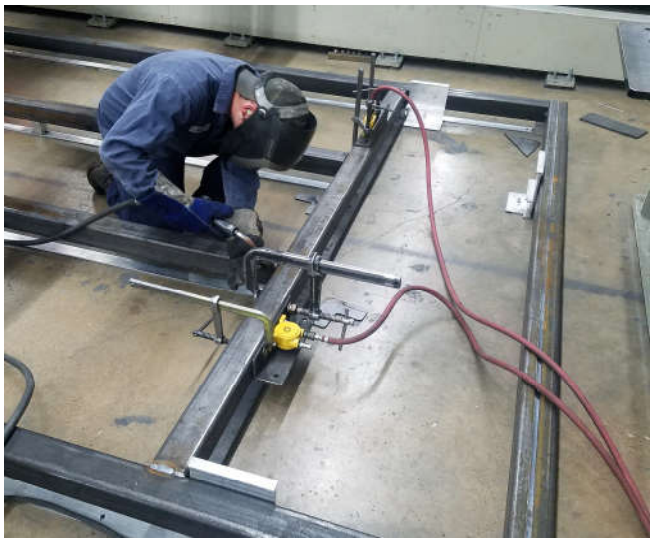
Using two vibrators with similar, but not the same speed, a complex waveform is produced that is ideal for blending a freezing weld puddle. With different vibrator orientations, this unique 3D excitation reduces the distortion caused by welding dramatically.

VDW SYSTEM POWERED BY 3D PNEUDRIVE
(PATENT PENDING)

Advanced VSR Technology's approach to to Vibration During Welding addresses several issues that electrically controlled vibration systems suffer:

- Safety issues of using an electric motor on a welding setup
- Only 2 dimensions (not 3) are excited by a single rotary vibrator
- Subjecting an electric motor to pre-heat temperatures (400 F)
- Limited speed range of electric vibrators (pneumatics can operate over much greater speed range)
- High cost of electric vibrator repair or replacement

VDW System controlling distortion of precision skids for use in robot cells for automotive industry.



Square tubing fabrication distortion was reduced by a factor of SEVEN TIMES using the 3D Pneu Drive VDW System. First welding jig for robotic assembly station suffered 7/16” / 11 mm distortion. Thereafter, VDW technology controlled distortion to less than 1/16” / 1.5 mm

Many fabrication shops face the most challenging and frequent form of welding distortion when they produce welded structures with most, if not all the welding on one side. Shrinkage on this welded side pulls this side smaller, causing preload / expansion of the opposite side, and the classic “banana” or curl of the structure along its length, or worse, turns a rectangular structure into a “saddle” or potato chip shape.

Example 1 : Making a flatter “egg-crate”

15 X 7.5 foot “egg-crate” weldment has stitch welding all on one side, the bottom in this view. If welded without the assistance of the VDW System, curling / out-of-flat results, ranging from 3/8” to 3/4”.

Using the VDW System resulted in reducing weld distortion to 1/8” or 3 mm . . . . .

. . . . . .which is a 3 to 6 fold improvement.

Example 2 : Telescoping masts for mobile drilling system

Two frames, the one on the left would be assembled into the other, can be welded with ~ 70 – 80 % less distortion, if VDW is utilized. As a result, these can be fabricated closer to net-shape, eliminating almost all straightening, while also reducing machining time.

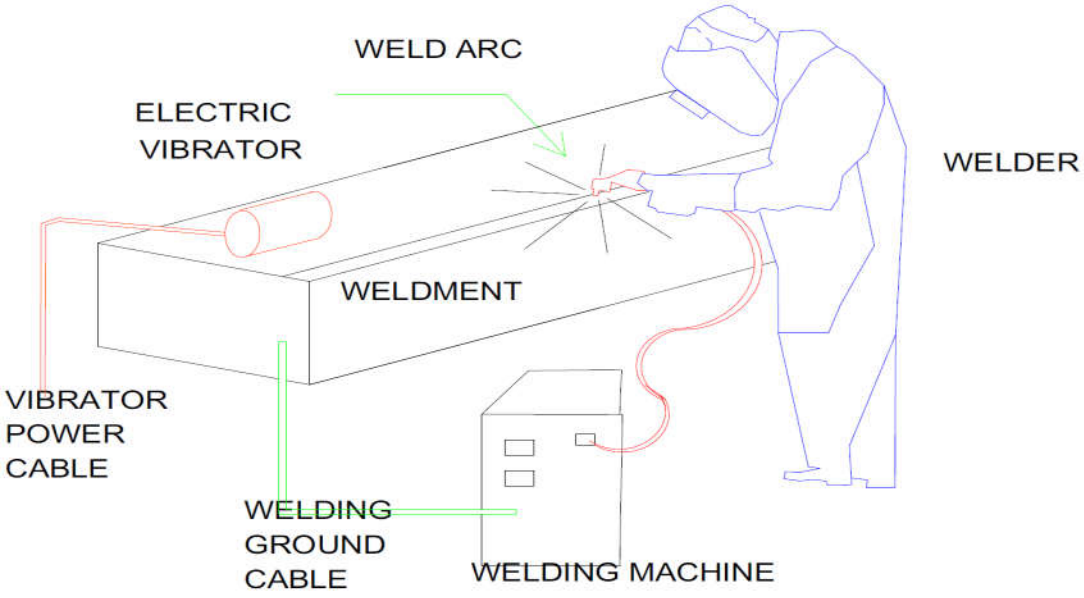
Example 3 : A tale of two flanges

Rotating weld positioner flange on left was welded without VDW. Several machining cycles were needed to obtain required flatness of 1/16" - 1.5 mm.

Flange on right was welded while using the VDW System. Only slight machine "truing" / one cycle was needed to achieve desired flatness, saving extensive machining. The flange is also stronger and stiffer, due to being almost twice as thick (see tape inset photos).

IMPROVED SAFETY

A safety risk exists if an electrically powered vibrator is used during VDW: In the event of a loss of the welding ground, the current from the welding arc would instead travel thru the vibrator's ground, located in its power cord. This cable very likely has at most twenty amp capacity, so the cable is likely to overheat, melting the insulation between the ground and power-carrying leads in the vibrator power cable. The vibrator's power cable can ignite.



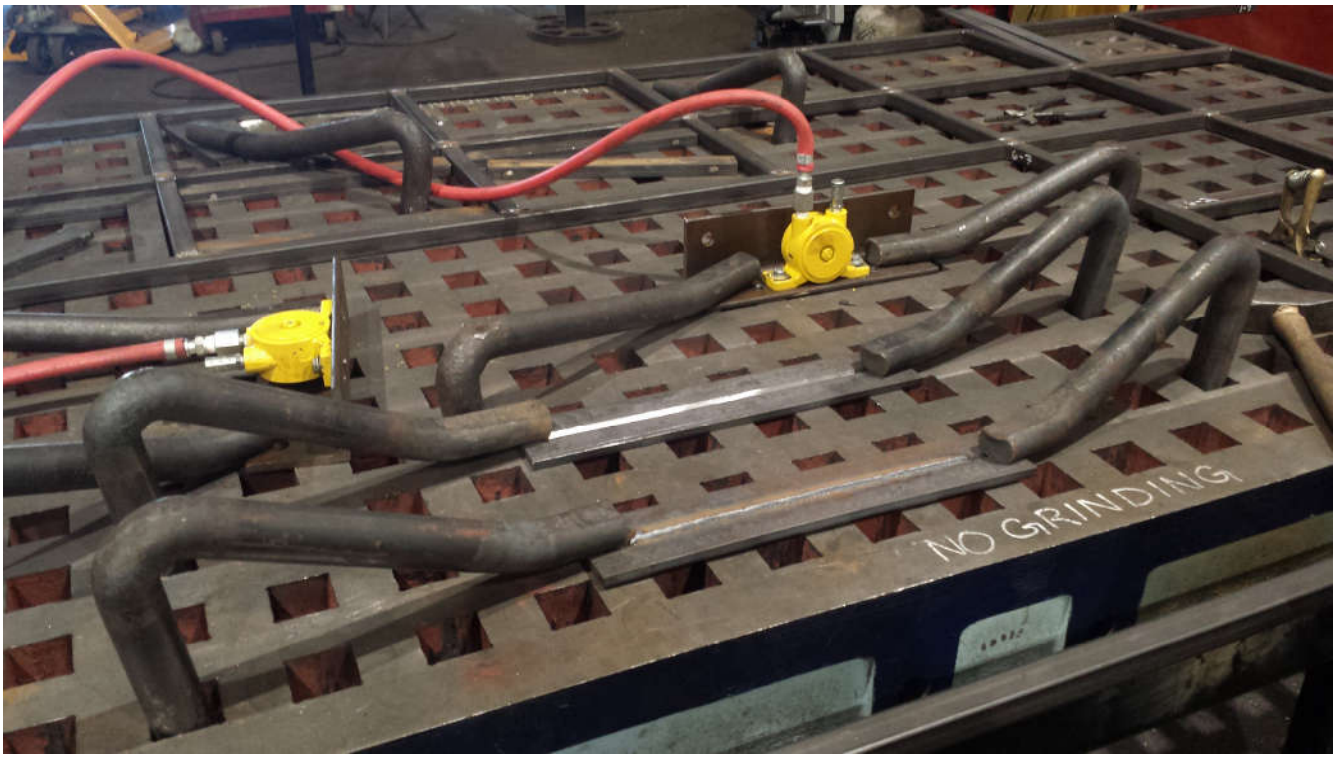
It should be pointed out that short-circuit protection, whether fuses or circuit breakers, whether located in the vibrator control box or the power line feeding it, **ARE NOT** in **this** circuit. Grounds or neutrals, as declared by the National Electrical Code, Underwriters Laboratories, and other safety regulation setting institutions, are never to be passed thru fuses or circuit breakers, since their continuous connection to ground is absolutely required for safe and proper short-circuit protection.

This is the source of ignition of fires caused by overloaded electrical circuits, whether in cables, motors or other apparatus, and is the 2nd most common cause of fires in heavy industry, the ignition of flammable liquids or gases being the only more frequent cause. This is the source of ignition of fires caused by overloaded electrical circuits, whether in cables, motors or other apparatus, and is the 2nd most common cause of fires in heavy industry, the ignition of flammable liquids or gases being the only more frequent cause. See: http://www.nfpa.org/research/reports-and-statistics/fires-by-property-type/industrial-and-manufacturing-facilities/fires-in-us-industrial-and-manufacturing-facilities

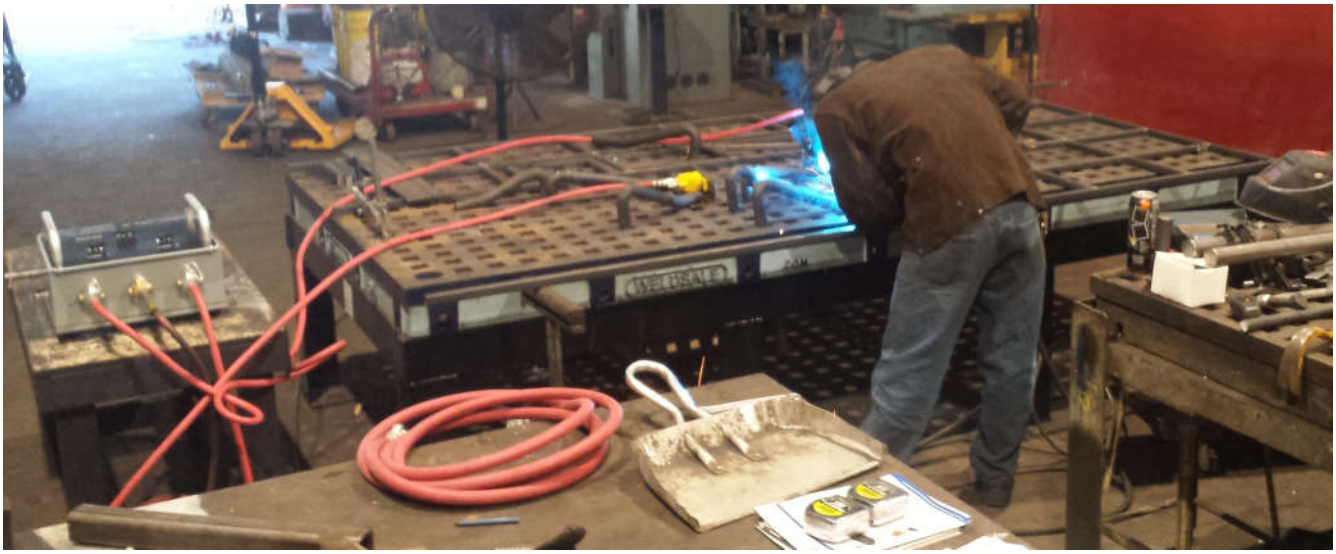
The 3D Pneu Drive System eliminates this risk entirely, by replacing the power source with air power. Furthermore, pneumatically powered vibrators can also be used in pre-heated welding setups, without the risk of damage to an electric motor.

TESTS OF 3D PNEU DRIVE VDW SYSTEM

Setup used to produce test workpieces. Mild HR steel plates with prepared / beveled surfaces are held by clamping bars. Two yellow pneumatic vibrators, one with shaft vertical, the other horizontal, mounted on steel angles, are also held down with such bars.



Another view shows the VDW test setup.



Welding taking place during vibration.

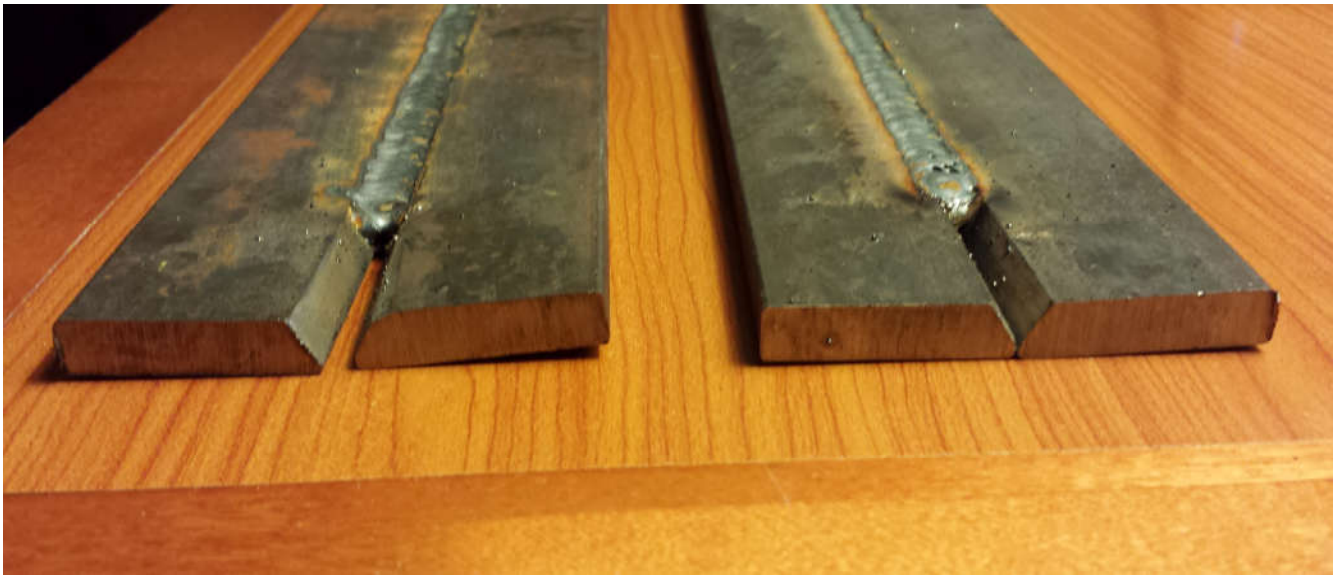
Quick-connect ports on floor of control console allow easy and fast connection to both air input and outputs.

3D Pneu Drive Console is a rugged pneumatic control suitable for fab shop use:

- NEMA 4 enclosure seals out dust, dirt, and sprayed water
- Laser-etched nameplate lettering will not peel or fade, and is easily cleaned
- Solid aluminum bar-handles protect pneumatic controls
- Standard quick-connect input and output ports
- Master air-flow + individual controls for each vibrator

TEST RESULTS

Vibrated sample on left, not-vibrated on right.



Not-vibrated test piece on left, vibrated on right.