

May 23, 2012

## Demagnetization of Pipe Ends (Manually, using a WD-Series Coil, on the Right-of-way)

After Pipe is strung on the right-of-way, the ends are typically magnetized, for a variety of different reasons. If this magnetization is severe enough ( $>10$  Gauss) it will cause Arc Bend (or Arc Blow), which causes the weld arc to move from the intended area. Blow is unpredictable to its direction or severity, and can only be compensated by a good journeyman when using a 'stick', Automatic Welders don't have a closed loop feedback system (brain) like a journeyman, so blow causes a greater degree of problems, for each hot pass.

Gauss  
Meter



Demag (Demagnetization) in the field has often been attempted by wrapping pipe ends with welding cables and striking an arc with a welder switched to an AC field. If the arc is stopped when the sin wave crosses zero, the surface of the pipe will be demagnetized (due to the skin effect of AC), however the field will quickly return to the ends and even faster to the bevel. If the arc is stopped at the maximum amplitude (positive or negative) a new magnetic field will be induced into the pipe, which may be even stronger on the surface. Magnetic Fields are easily measured with a Pocket Magnetometer (Gauss Meter).

The only reliable way to Demag the ends of the pipe is with a Reversing and Decaying DC procedure. This can be accomplished on individual ends or to 2 pipes that have been brought together (for a repair). First, we will deal with new construction where an operator has been sent ahead of the Welding Crews to Demag all pipe ends. He simply sits the appropriately sized Coil on the end of the Pipe, as illustrated to the right. Using his separate control panel, he quickly energizes the coil and induces a controlled magnetic field. He then reduces his amperage setting and reverses his field direction, again energizing the Coil. This procedure is repeated for a total of 5 to 7 times, depending on the wall thickness and diameter.



It goes without saying that the operator Demag's both ends of the pipe, before moving onto the next piece. This Demag is performed ahead of welding, by up to 3 or 4 hours. Depending upon the strength of the magnetic field in the middle portion of the pipe, the magnetic field will 'creep' back toward the pipe ends of the pipe, however it can take up to 8 hours for this to occur, so the 3 to 4 hours is a good rule of thumb.

When a repair is being done, where a new section of pipe is being added due to a cut out, the pipe ends can be done individually or butted up to one another. After the

replacement section of pipe has been cut, beveled and fitted into place, the coil can be placed onto the new section. This section is moved into place, where the Coil is slid longitudinally so the circumferential weld is in the middle of the Coil. With the Coil in position over the weld, once again, the operator energizes the coil and induces a controlled magnetic field. He then reduces his amperage setting and reverses his field direction, again energizing the Coil. This procedure is repeated for about 5 cycles, and again is dependant on the wall thickness and diameter.

When the first end of the replacement assembly is demagnetized, the Coil can be moved to the opposite end. The Demag procedure is repeated and the coil is removed, however we won't wait for 3 or 4 hours to weld, we'll weld immediately. In this situation, magnetism with creep faster into the ends of the pipe as the pipeline can be close to magnetic saturation.

This article is a basic outline, that has been prepared for operators. It is recommended that the owner's welding engineer or the contractor's welding superintendant prepare their own operating procedures for Demagnetization. As organizations become more familiar with the various parameters, of magnetism affecting welding, demagnetization will become standard practice like it is in the drilling industry.

## **Western Instruments Inc.**

**26509 Township Road 543  
Sturgeon County, Alberta  
T8t 1M1 Canada**

**Phone: (780) 459-6720**

**Fax: (780) 459-7837**

**E-mail: [info@westerninstruments.com](mailto:info@westerninstruments.com)**

**Web: [westerninstruments.com](http://westerninstruments.com)**