



American Welding Society
Alberta Section



The Materials
Information Society

**Edmonton
Chapter**

Joint Dinner Meeting

An Overview and Introduction to Submerged Arc Welding and Waveform Manipulation

Joel Pepin

Alberta Innovates – Technology Futures

Venue

Faculty Club – Main Floor
University of Alberta
11435 Saskatchewan Drive

Date

Thursday, March 1st, 2012

Schedule

Registration 6:00 PM
Dinner 6:30 PM
Program 7:30 PM

Abstract

The submerged arc welding (SAW) process can achieve high productivity and deep penetration, making it an important process for joining large diameter and/or thick-walled components such as pressure-vessels, linepipes, bridges, and ships. SAW typically uses direct current electrode positive (DCEP) polarity because of power source availability, good arc stability, and deep penetration. Greater deposition rates are possible with direct current electrode negative (DCEN) polarity, but can result in reduced penetration and arc stability.

Alternating current (which shifts polarity rapidly from DCEP to DCEN) has traditionally employed a sinusoidal waveform, resulting in less time at peak current (reducing wire deposition) and more time at periods of low voltage (reducing arc stability further). However, the use of a square waveform mitigates both issues in AC SAW. Additionally, modern SAW power sources allow the welding operator to manipulate waveform variables (such as balance, offset, and frequency), providing greater control over deposition rates and penetration depths.

An overview of the SAW process will be provided, as well as background information on different current polarities. Welding waveform manipulation will be introduced, and preliminary trends will be presented that relate waveform variables to both weld quality and productivity.

Biography



Joel Pepin graduated from the University of Alberta with a B.Sc. in Materials Engineering in 2005. He worked at Master Flo Valve for over two years, where he was exposed to a wide range of materials applications, including forgings, castings, specialized heat treatment operations, polymers, and metal-matrix composites. Joel returned to the University of Alberta in 2007 to earn an M.Sc. in materials engineering; his thesis project was a collaborative effort with EVRAZ Inc. NA (formerly IPSCO Steel), where he was able to focus on the effects of submerged arc welding (SAW) on micro-alloyed steels. Joel joined Alberta Innovates – Technology Futures (AITF) in the fall of 2008, and is currently a researcher in the Welding Engineering group. Joel is a former chairman of the AWS – Alberta Section, and is the current chairman of the Edmonton Association of Technical Societies (EATS).

\$25 for members of the affiliated societies (ASM, AWS, NACE, CWS, SME and CSME)

\$35 for non-members \$10 for students

RSVP to asm.edmonton@gmail.com by February 28th, 2012