

Enhanced EWI WeldPredictor™ Modeling Tool Added to EWI's Member Services Offerings

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EWI WeldPredictor has been incorporated into the [EWI Member Central](#) website as a new service offering to EWI members as part of their benefits package.

Background

EWI, in collaboration with the Ohio Supercomputer Center (OSC), has been developing a web-based arc weld modeling tool since 2007. Over 150 engineers worldwide have tested the prototype since its initial release in September 2007. Based on the feedback and comments of the beta user group, EWI has significantly enhanced the capability and accuracy of the model. In July 2009, EWI won the International Institute of Welding (IIW) Sossenheimer Award for Dr. Yang's work on this innovative modeling software.

Application of EWI WeldPredictor

EWI WeldPredictor enables users to evaluate "what-if" calculations quickly and easily as a tool for manufacturing process and component design optimization. The users can understand thermal cycles, microstructure, distortion, and stress evolution without performing extensive design-of-experiments. It has been used to solve real-world manufacturing problems. The analysis example manual, which can be accessed in the *EWI WeldPredictor* application, introduces several real manufacturing applications:

- Monitoring backside temperature histories during welding a bead-on-plate weld to avoid damaging the heat-sensitive element
- Monitoring backside temperature histories during welding a T-joint to avoid damaging the heat-sensitive element
- Designing a weld joint to minimize displacement on a shaft-ring weld
- Optimizing welding sequences to minimize weld distortions during welding a double-side bevel T-joint (Fig. 1)

Users will discover more applications as they use the modeling tool. User-defined part geometry is currently under development to give users more flexibility.

Capabilities

EWI WeldPredictor has been developed to predict temperature, microstructure, hardness, stress, and distortion for arc welding processes by combining the power of numerical weld modeling and high performance computational hardware. It provides users with easy access to advanced modeling tools over the internet to quickly explore various welding scenarios.

An analysis example and validation manuals are provided. When performing a simulation, an analysis report is created and can be viewed online or downloaded in PDF format. An *EWI WeldPredictor* account is automatically created on first usage based on the member's website log-in and password allowing analyzed jobs to be saved and later modified and run again.

Capabilities of the program include:

- Modeling fusion weld process: GMAW, Pulsed GMAW, Weaved GMAW, GTAW, SAW, and SMAW
- Simulating butt welding of two pipes and two plates and fillet welding of a ring to a pipe and a plate to a plate, as shown in Fig. 2.
- Designing joints with a series of weld grooves:

Bead-on-plate	J-groove	Square groove
Bevel-groove	U-groove	Single-bevel T-joint
Compound-groove	V-groove	Double-bevel T-joint

- Defining weld bead shapes, sizes, and locations based on user needs
- Depositing weld beads according to welding sequences
- Modeling dissimilar metal joining
- Selecting materials from the database and calculating an equivalent carbon content
- Determining filler materials based on the base material and welding processes
- Defining welding procedures including welding parameters, preheating temperature, and inter-pass temperature
- Simulating the constraint and cooling effect of a welding fixture
- Simulating force cooling from water and copper block
- Submitting and monitoring an analysis online

Web Browser Requirements

EWI WeldPredictor requires javascript to be enabled and a modern standards-compliant web browser capable of advanced graphics display. Please upgrade to one of the supported browsers for best results:

- Internet Explorer v7 or later
- Firefox v3.5 or later
- Safari v4 or later

You may need to adjust your screen resolution in order to show the web page correctly.

Contact Information

EWI WeldPredictor can be accessed using your log-in and password to the [EWI Member Central website](#). *EWI WeldPredictor* can also be customized for a specific applications and installed in a company intranet. Non-members can also access *EWI WeldPredictor* on a fee-per-use or annual subscription basis.

To learn more about the *EWI WeldPredictor*, please contact Yu-Ping Yang at yyang@ewi.org or call 614.688.5253. *EWI* is planning to host an online training session at the end of May 2010. If you are interested in learning how to use *EWI WeldPredictor* and understand the theory of *WeldPredictor*, please send an email to [Dr. Yang](#).

The **Ohio Supercomputer Center** is a catalytic partner of Ohio universities and industries that provides

a reliable high performance computing infrastructure for a diverse statewide/regional community. Funded by the Ohio Board of Regents, OSC promotes and stimulates computational research and education in order to act as a key enabler for the state's aspirations in advanced technology, information systems, and advanced industries. For additional information, visit <http://www.osc.edu>