

Preservation of Historic Iron and Steel Bridges and Other Metal Structures

Lansing Community College (LCC) applied for and received from the National Center for Preservation Technology and Training (NCPTT) a grant that fulfills the NCPTT Statement of Purpose: "Training activities, workshops, and curriculum development that promotes the use of new or adaptive technologies."

Through the NCPTT grant, with LCC matching funds, Lansing Community College will provide a three-day workshop, informational web-based videos, and curriculum development for ongoing training courses. In March, 2010, a three-day workshop will introduce a wide variety of interested personnel (State Historic Preservation officers, State Transportation departments, engineers, engineering students, historic bridge preservationists and others) to the restoration of historic metals using electric arc welding processes, to heat straightening of wrought iron and steel, and to the hot riveting process for replacing deteriorated rivets and replicating riveted connections. The proposed project also includes the creation of training materials (videos and a "short course") based on the workshop. Registration forms will be available by August, 2009, through LCC's website and <http://www.historicbridgerestoration.com/> . Registration will be available for the first day of lectures or for the complete three day workshop.

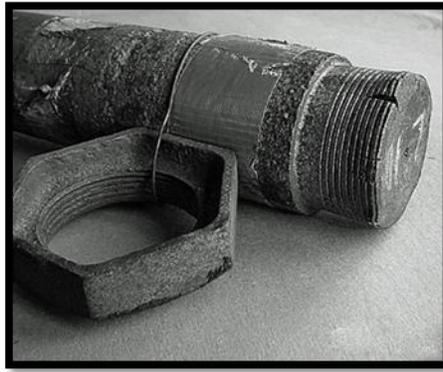
Historic wrought iron and steel truss bridges that were fabricated between 1850 and 1950 are rapidly being replaced today with new concrete or steel bridges. There is a national need for preservation expertise in preserving the original material of historic metal truss bridges and historic metal structures using both modern technology such as electric arc welding and also historic technology such as hot riveting. The Secretary of the Interior's Standards for Rehabilitation state that "deteriorated architectural features shall be repaired rather than replaced, wherever possible." Often when a historic metal truss bridge is rehabilitated historic metal is replaced with new steel because of the lack of knowledge in the restoration of historic metals. The March, 2010, workshop and the ongoing training courses at LCC are designed to begin to address this shortage of training and information critical for the restoration of historic metal structures.

Below is a tentative schedule of activities for the March 2010 Workshop, followed by photographs of some of the restoration procedures that will be demonstrated at the workshop.

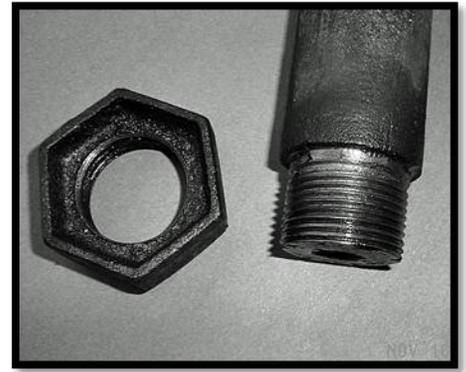
<i>First Day, Monday March 8</i>	<i>Second Day, Tuesday March 9</i>	<i>Third Day, Wednesday March 10</i>
<p>Presentations (forty five minutes each)</p> <ul style="list-style-type: none"> • MDOT "Michigan Historic Bridge Inventory" • Dr. Frank Hatfield "Engineering and Historic Metal Truss Bridges" • David A. Simmons "'The Continuous Clatter": Practical Field Riveting" • Dr. James Cooper "Historic Bridge Preservation" Luncheon Speaker • William Vermes "Design and Performance of Riveted Bridge Connections" • Dr. Dario Gasparini "Wrought Iron and Historic Steel" • Lincoln Electric Company "Arc Welding Wrought Iron and Historic Steel" 	<p>Shop lectures followed by demonstrations on each of the following processes and their applications for restoration of historic metals:</p> <ul style="list-style-type: none"> • Heating steel rivets • Rivet hammer safety • Driving rivets using field riveting equipment • Rivet hammer safety for field riveting • Pack rust removal and rivet removal • Heat straightening wrought and steel 	<p>Shop lectures followed by demonstrations on each of the following processes and their applications for restoration of historic metals:</p> <ul style="list-style-type: none"> • OFW (Oxygen Fuel Welding and Brazing) • SMAW (Shielded Metal Arc Welding) • ACA (Air Carbon Arc Gouging) • GMAW (Gas Metal Arc Welding) • FCAW (Flux Core Arc Welding)



Restoration of historic cast iron



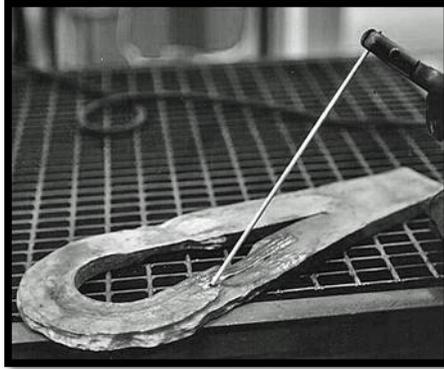
Restoration of historic threaded sections



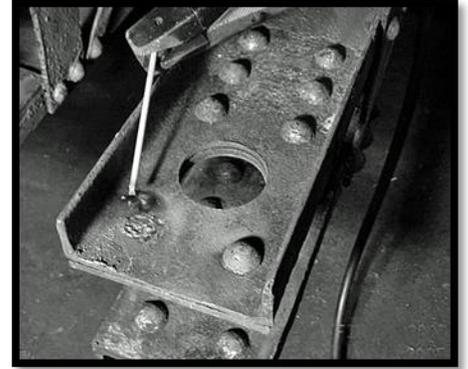
Machine welded historic metal



Arc welding procedures for welding wrought iron and historic steels



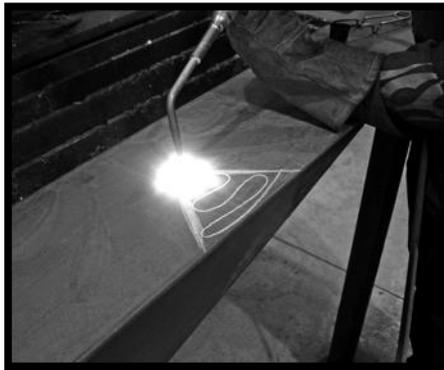
Arc welding section-loss in wrought iron and historic steels



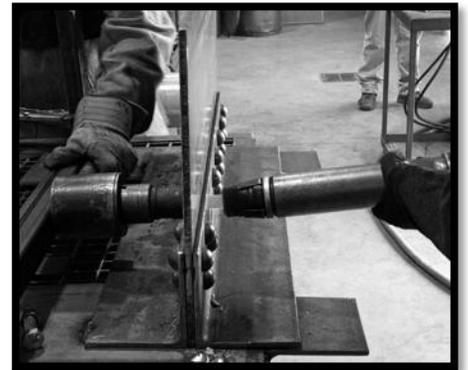
Removing rivets with the Air Carbon Arc process for rivet restoration



Removing rivets with the oxygen fuel gouging tip for rivet restoration



Heat straightening wrought iron and historic steels



Hot riveting for replacing historic rivets and replication of historic riveted structures.



Identifying pack rust issues



Pack rust removal, heating and hammering



Restoration of metal damaged by pack rust