

## Preservation of Historic Iron and Steel in Bridges and Other Metal Structures



Welcoming remarks by Dr. Brent Knight,  
President of Lansing Community College

Lansing Community College welcomed visitors from around the United States and Canada to a three-day workshop on the restoration of historic metals March 8 – 10, 2010. This workshop, funded jointly by the National Center for Preservation Technology and Training (NCPTT) and Lansing Community College (LCC), introduced engineers, preservationists and craftsmen to restoration procedures through technical papers and hands-on demonstrations. The workshop was designed to give participants the knowledge and confidence necessary to recommend these procedures for the preservation of historic metals, including historic riveted truss bridges.

By 8 A.M. on March 8 most of those who had registered for the Workshop had arrived. During the next three days of lectures and hands-on demonstrations only a few unforeseen problems occurred and comments by the participants were very positive. I'd like to thank Bob Frame, Senior Historian, Mead & Hunt, Inc., for giving me permission to quote his recent email below.

*At the end of the Iron & Steel workshop on Wednesday I filled out the evaluation form and gave everything high marks, but I also wanted to give you more personal feedback.*

*I can tell you, and I've told my Mead & Hunt supervisors who paid for me to attend, that this was an excellent, informative, well-run, and overall valuable event. It has already proved useful in our company work.*

*In particular, I want to say how much I appreciated the efforts of all the staff members who led the workshop sessions. It didn't take much to figure out the key reason why the sessions were so successful: it's because all of your colleagues are not only professionals in the trades, but they are teachers at the college! They are experienced at working with diverse groups who are learning and practicing technical skills for the first time, as many of us were. I never handled a rivet hammer or a welding torch in my life, before walking into the welding lab this week. Every instructor was always patient, never dismissive, and encouraging with each of us as we wrestled with this equipment, all of which is potentially dangerous if not handled carefully. They really know how to teach, and that hands-on experience was valuable. What a rare opportunity for us historians! Please pass on my sincere thanks to each of them.*

*The evaluation form asked for suggestions on making things better. I know that anything can always be made better, but in this case I've been stumped. You all have done most everything I could think of, from great food to the CDs with excellent take-away information.*

*Finally, many thanks to you and Nan for careful attention to detail in planning and carrying out the entire event.*

Warmest regards,  
Bob

Robert M. Frame III, Ph.D.  
Senior Historian, Historic Preservation  
[Mead & Hunt, Inc.](#)  
[M & H Architecture, Inc.](#)

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The workshop opened on March 8 with technical papers from the following presenters:

*“Michigan Historic Bridge Inventory”*

**Lloyd Baldwin**

Project manager for the Michigan Historic Bridge Inventory, Michigan Department of Transportation (MDOT)

**Sigrid Bergland**

Historian, MDOT

*“Design and Performance of Riveted Bridge Connections”*

**Bill Vermes**

Project engineer for Euthenics, Inc., Cleveland, Ohio

*“Engineering and Historic Metal Truss Bridges”*

**Frank J. Hatfield**

Professor Emeritus of Civil Engineering, Michigan State University, East Lansing, Michigan

*“Wrought Iron and Historic Steel”*

**Dario Gasparini**

Professor of Civil Engineering, Case Western Reserve University, Cleveland, Ohio.

*“The Continuous Clatter’: Practical Field Riveting”*

**David A. Simmons**

Editor of *Timeline*, Ohio Historical Society, Columbus, Ohio

*“Arc Welding Wrought Iron”*

**Lon Yost**

Lincoln Electric Global Application Engineer, Lincoln Electric Company, Cleveland, Ohio

Luncheon Speaker

**James Cooper**

Professor Emeritus of History, DePauw University, Greencastle, Indiana

*“Beauty and Efficiency in Historic Hoosier Highway Truss Bridges”*



James Cooper has been engaged with surveying and documenting Hoosier historic bridges since 1979.



Bill Eggleston, Roy Bailiff, Dan Stinson, Roger Morrison, and Don Kelly (Lansing Community College welding faculty with student assistants Dan and Don) provided hands-on demonstrations.



Jeff Dever, Project Coordinator and Technician, Michigan Pneumatic Tool, Inc. talks tools with Steve Howell, Ballard Forge, Seattle, Washington

It was just past 7 A.M. on March 9 as I walked along the Lansing Community College West Campus hallway leading to the welding lab. It seemed so quiet, as if nothing was happening today. Doris Bromley from LCC's Business and Community Institute had the registration table positioned beside the Welding Lab, with everything laid out and handouts ready to distribute. Lansing Community College food service had coffee and pastries already set up in one of the classrooms. Inside the Welding Lab the staff was setting up for our first day of hands-on demonstrations, and what struck me was the relaxed pace of the work, no frantic last minute emergencies. Weeks of preparation and planning meant the primary focus would be the workshop participants. Over forty people were attending the two days of hands-on demonstrations. The participants were divided into three groups to rotate through three demonstrations: riveting, heat-straightening, and pack rust removal. Leading the rivet demonstration was Roger Morrison, riveter, assisted by Jeff Haynes, heater, and Adam Mena operating the Holder-on. Dan Garijo of National Bridge <http://www.nationalbridge.com/> led the heat straightening demonstration assisted by Bill Eggleston. Roy Bailiff led the pack rust removal demonstration assisted by Don Kelly, Pipe Fitter apprentice, and Dan Stinson, Lansing Community College student.



Roger Morrison and Adam Mena assist a workshop attendee in driving a rivet.



One of the five scholarship recipients drives a rivet



Dan Garijo demonstrates the handling of a heating torch for straightening a bent beam



Dan Garijo guides a workshop attendee in applying a heating pattern.



Vern Mesler and Roy Bailiff describe the pack rust removal method



Dan Stinson assists a scholarship recipient with hammering out pack rust.

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An important tool in the restoration of historic metals is the welding process. On the third day of the workshop the shielded metal arc (SMAW), gas tungsten arc (GTAW), and oxygen fuel (OFW) welding processes were demonstrated. Also demonstrated was the air carbon arc (ACA) and oxygen fuel cutting process to remove rivets.



Photo by: Nan Jackson  
Roy Bailiff reviews the repairs made on an 1895 cast iron flange repaired with the SMAW process



Photo by: Nan Jackson  
Bill Eggleston demonstrates welding cast iron with the GTAW process



Photo by: Nan Jackson  
Vern Mesler pad welds section loss on an early twentieth century eyebar head with the SMAW process.



Photo by: Nan Jackson  
Jeff Haynes and Don Kelly prepare for brazing cast iron



Photo by: Nan Jackson  
Roger Morrison describes the rivet gouging tip on the oxygen fuel torch

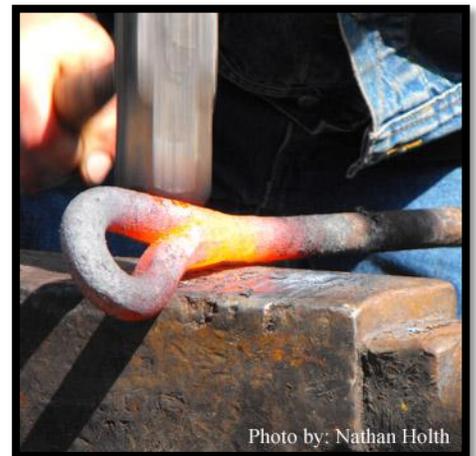


Photo by: Nathan Holth  
An added bonus to the workshop was a forge welding demonstration by Ross Brown. Here Ross hammers an eyebar to its final shape.

Our sessions finished a little early on Wednesday, the last day of the workshop, and we knew from the expressions of those who handled the rivet hammer, held the large heating torch, felt the warmth of the oxygen acetylene torch in their hands as they melted a brazing rod into the joint of two pieces of steel – and from participants' comments – that we had a successful workshop.

I would like to thank all the presenters, demonstrators and participants for contributing to the success of the workshop, what we hope will be the first of many in the preservation of historic metals.

Vern Mesler