CIVS Newsletter

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CENTER FOR INNOVATION THROUGH VISUALIZATION & SIMULATION

PURDUE UNIVERSITY CALUMET

Giving to CIVS

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CIVS Hosts Workshop to Continue Steel Consortium Development

CIVS hosted a workshop including 40 professionals from 15 organizations to identify future needs of simulation and visualization in the steel industry and identify major challenges. The workshop was part of the ongoing CIVS project sponsored by the National Institute of Standards and Technology (NIST) to form an industry-led **Advanced Visualization and Simulation for Steel Optimization Consortium** and develop an industry-led technology roadmap to guide the industry further into the 21st century. Industry has shown enthusiastic support for the consortium and is fully on-board.

The workshop objectives were to identify future needs for steel simulation and visualization, identify major challenges that limit the use of these technologies in the steel industry, and to develop technology roadmap action plans.

This workshop together with the one held in Pittsburgh on Oct 14th, 2014 resulted in a list of 122 projects. 18 of them were identified as priority project topic in the areas of energy efficiency, environmental impacts, operation efficiency, reliability and maintenance, smart manufacturing, use of raw materials, workforce development, and workplace safety. Click here for more details.

Advanced Visualization and Simulation for Steel Optimization Consortium

The consortium development has continued in parallel with the technology roadmap and has resulted in draft membership agreement and by-laws. The Consortium Vision, Mission, and Values have been developed by steel industry leaders as follows:

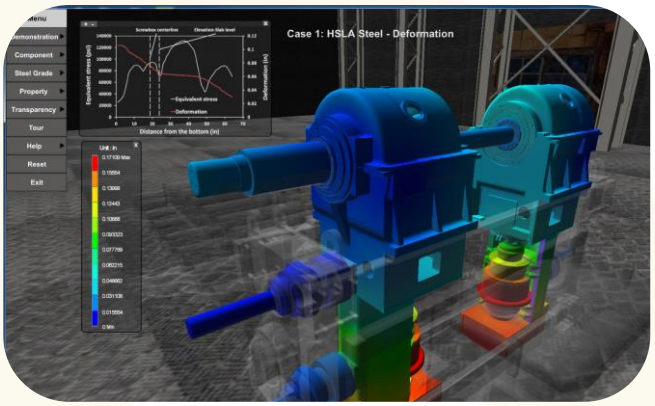
- **Vision:** To be the Institute of Choice for developing and applying advanced simulation and visualization technologies to ensure a competitive advantage for US steel manufacturing
- **Mission:** To develop and implement innovative technical solutions through the integration of advanced simulation and visualization technologies for the value chain of US steel manufacturing
- **Values:** Integrity, Effectiveness, Practical Application, and People

For more information on the consortium, e-mail civs@purduecal.edu, call 219-989-2089, or visit www.steelconsortium.org.

Selected Examples of Funded Projects

Project Title	Sponsor
CFD Modeling of a Ladle with Rotational Stirring Lances	EMS Group
Optimization of Checker Wall Design in a CO Boiler	Citgo
Interactive Incident Visualization for Steel Industry Safety Training	AIST Foundation
Active Threat Shooter	St. Margaret Health System
Design of Blast Furnace Operation Stability Monitoring Program	U.S. Steel
Investigation of Co-Injection of Natural Gas and PCI in Blast Furnace Ironmaking	Severstal
Development of Generic FCC Regenerator CFD Modeling	BP

An interactive 3D simulator for safety training in the steel industry is under development, supported by the AIST Don B. Daily Memorial Fund.

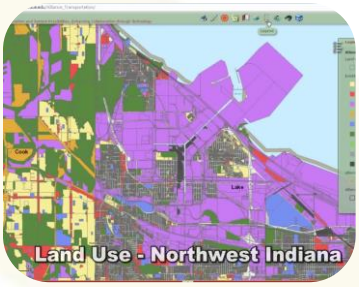


An interactive package was developed to examine simulation results showing fatigue in a vertical edger used to reduce thickness of steel slabs.

CIVS Collaborates with College of Technology on Virtual Training Modules

CIVS is working with the Purdue University Calumet College of Technology to develop online virtual training modules to support the instruction under U.S. Department of Labor Project: AWAKE. These virtual training modules, such as Mechanics, will allow participants to remotely access the training modules which are designed for self-paced learning. The online development is supported by a Purdue IN-MaC grant.

CIVS Presents at Tri-State Summit



CIVS was a major contributor at the second annual Summit on **Regional Competitiveness** held Dec 19, 2014 at the Federal Reserve in Chicago. CIVS Director Chenn Zhou spoke at the event along with collaborators and showcased projects for logistics transportation planning and human capital development. Doreen Gonzalez-Gaboyan, Outreach and Business Development Manager for CIVS and 3 students also attended. The summit addressed key areas in economic development for the Tri-State region which includes Chicago, parts of Wisconsin, and parts on Indiana.

U.S. Steel Uses Virtual Blast Furnace for Second Time with Ironmaking Academy

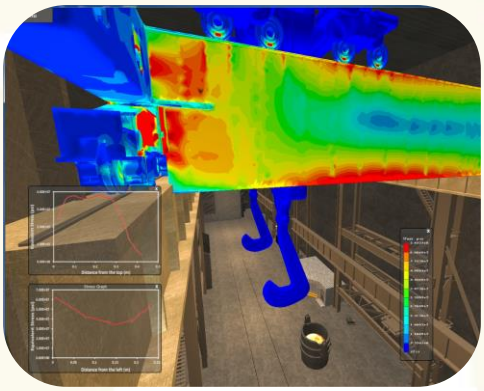
Twenty-three iron and steel industry professionals took part in virtual training at CIVS on January 28th as part of U. S. Steel's week-long Ironmaking Academy. The participants flew inside a virtual blast furnace during operation and learned details about the complex phenomena and operating conditions that control the properties of the liquid iron that is produced by one of the most energy intensive systems in the industry. This was the second year the academy has used the Virtual Blast Furnace for training. Evaluation surveys have shown positive results.

ArcelorMittal Plant Managers Think of New Applications for CIVS Technology

An auditorium full of ArcelorMittal plant managers brainstormed broader applications of CIVS technologies during a workshop held at ArcelorMittal Burns Harbor on January 15. The event generated 110 project ideas and was arranged by Plant General Manager John Mengel and Manager of Continuous Improvement Larry Fabina. A variety of high-impact simulation project results were shown through through a joint presentation by CIVS and Al Kirk and Jeff Cox of ArcelorMittal. The event also demonstrated technologies and resources available at CIVS including 3D visualization, portable virtual reality, and augmented reality technology. Project ideas from the event are currently under review for future research.

AIST Reliability Achievement Award

U. S. Steel's George Cingle III accepted the Bronze Reliability Achievement Award for "Life Prediction in Industrial Equipment", a project done with CIVS that was presented at last year's AISTech conference. The award is presented by the Association for Iron & Steel Technology to recognize iron and steel companies for unique or first in the industry reliability improvements. The project developed a methodology for simulating fatigue to predict how soon structural failure may occur in industrial equipment. A new interactive package is in development to show an example of crane fatigue within the setting of a real plant to provide context for the project.



CIVS Research Paper Featured in AIST Publication

The Center for Innovation through Visualization and Simulation (CIVS) was one of six papers to be featured in the December 2014 edition of Iron & Steel Technology. The paper used computational fluid dynamics (CFD) to study the relationship between iron ore reducibility, coke reactivity, and blast furnace operations. The paper's findings will help the iron and steel industry better understand the processes involved in the blast furnace and the effects that the different components have on those processes.

Iron & Steel Technology magazine is the monthly publication of the Association for Iron & Steel Technology (AIST) and is a technical journal for the iron and steel industry. The magazine consists of many articles and papers addressing current issues in the iron and steel industry. It also includes highlights of industry successes, professionals who help improve the industry, events, conferences, and workshops.

Student Successes - Jiaxin Hu

Jiaxin Hu began working with CIVS through his Senior Design Project "Computation Fluid Dynamics (CFD) of condenser loop at NiSource Bailey Station" which helped NiSource predict the potential issues which caused an unfilled condenser. He then continued as a graduate research assistant at CIVS and worked on applied research projects including "CFD Study of Unit 18 FGD Inlet Duct" which was awarded 1st place in the 2012 Purdue Calumet Student Research Day. He graduated from Purdue University Calumet with Master of Science in Mechanical Engineering in 2013 along with a Bachelor of Science in Chemical Engineering from Sichuan University in 2010. Jiaxin worked at Fontana Fasteners (formerly LEP Special Fasteners), part of Fontana Gruppo, one of the most important manufacturers in the fastener industry world-wide as a tooling engineer in 2013. There he has designed the tooling concepts to produce special fasteners used for assembly in Chrysler engine system. He began working for Tesla in 2014 as a manufacturing engineer supporting die cast tooling for the Model S.

Boy Scouts Learn About CIVS Technologies

Boy Scout Troop 276 from Lansing, Illinois visit CIVS on January 13 as part of a technology related badge. The troop

learned about Augmented Reality, Virtual Reality, Simulation, and 3D Printing at the Center's Immersive theater. The scouts were later quizzed about what they learned and were rewarded with 3D printed CIVS mementos.

Innovative Game Teaches Distributive Justice to Hammond High School Students

On December 5th, 2014, a group of over 80 students from nearby Hammond High School visited CIVS and took part in a unique and innovative classroom gaming experience focused on applying college-level concepts of distributive justice to real events in American history. Students worked together to make decisions on how to rectify the adverse effects of plutonium production during the Cold War, and in doing so sparked passionate and intelligent discussions on how best to distribute benefits and burdens in a society. [Click here for more details](#).

Most Influential Over 50: NWI Business Quarterly Magazine

Dr. Chenn Zhou was recognized in Retirement Living Magazine for her many contributions to innovation and technology for the Northwest Indiana region. She was honored as an "outstanding example of inspirational leadership, innovation, and service to others and the region." The article highlighted a few of her many accomplishments such as winning the Chanute Prize for Team Innovation, a Society of Innovators of Northwest Indiana award. [Click here for more details.](#)

Civil Engineering Professor Researches Groundwater with CIVS

Dr. Chandramouli Viswanathan has been collaborating with CIVS for his groundwater related civil engineering research since the Center was founded in 2009. Combining hydrology simulations of groundwater contamination and flooding data with interactive and immersive technologies at CIVS, the research has resulted in multiple innovative 3D educational modules. The current collaboration is creating a tool to examine effects of contamination in the event of an underground fuel pipeline failure.

CIVS Facts and Impacts

The following are some CIVS highlights since 2009.

- $38++ million savings for companies
- 3,100+ students used CIVS for experiential learning and virtual labs
- 87 external organizations collaborated with CIVS
- 130 completed projects
- 99 technical publications
- 412 graduate and undergraduate students employed and mentored
- 75 Purdue Calumet collaborators
- 34 student awards
- 154 national and local news
- 13,000+ local, and international visitors since October 2011

Office of Institutional Advancement – Giving to CIVS

Giving to CIVS

It begins with an opportunity to GIVE something back to a University you care about. It ends with the realization that you helped that University GROW into something even more worthwhile than before. Are you ready to be a leader and INSPIRE others? Make a gift today by visiting us at www.purduecal.edu/civs and clicking the "Give to CIVS" button. Specify "Center for Innovation through Visualization and Simulation". *For more information please contact:*
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