

Approach to Enhance Visualization of Stress and Strain

Track Code: 61126

Categories:

- Mechanical Engineering

Keywords:

- 3D Visual Exploration
- Education
- Mechanical Engineering

Researchers at Purdue University have developed a tool to help students easily visualize stresses in truss structures through photoelastic visualization assembled truss structures. The initial plan to fabricate trusses that can be analyzed using industry-standard photoelastic means with solid cross section elements was found to be seriously lacking in the small amount of visual information available on the state and change of state of the stress in the truss elements. This difficulty stems from the difficulty of discerning color changes across large sections in the truss elements.

The results of experimental testing on an early prototype has provided roughly an order of magnitude improvement in the ability to discern stress states in photoelastically stressed elements in experiments over similar elements without the inventive feature. The idea then is to deliberately add a stress concentration, which acts to reduce the cross-sectional area of the element under test and induce a localized non-linear stress state. This non-linear stress distribution enables, under polarized conditions, enhanced visualization of the stresses in both single elements and multiple, ganged assemblies of elements.

Advantages:

- Easily incorporated into existing trusses for learning toolkits for engineering students
- Visual enhancements could allow for virtual experiments on the web
- Visually exciting output can be a basis for a series of educational toys

Potential Applications:

- Higher education
- Construction industry

People:

- Szaroletta, William K (Project leader)
- Anderson, John C

Intellectual Property:

Application Date: January 10, 2006

Type: Utility Patent

Country of Filing: United States

Patent Number: 7,430,038

Issue Date: September 30, 2008

Application Date: October 9, 2002

Type: Utility Patent

Country of Filing: United States

Patent Number: 6,985,214

Issue Date: January 10, 2006

Application Date: October 9, 2001

Type: Provisional-Patent

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

Contact OTC:

Purdue Office of Technology Commercialization

The Convergence Center

101 Foundry Drive, Suite 2500

West Lafayette, IN 47906

Phone: (765) 588-3475

Fax: (765) 463-3486

Email: otcip@prf.org