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Title: Fracture of Adhesive Bonds under Mixed Mode Loading: Experiments in a Dual Actuator Load Frame and Numerical Simulations

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Abstract:

Summary of material posted

1. Copies of refereed journal articles

Tsai, C. L., Y. L. Guan, R. C. Batra, D. C. Ohanehi, J. G. Dillard, E. Nicoli and D. A. Dillard, Comparison of the Performance of SSPH and MLS Basis functions for Two-Dimensional Linear Elastostatics Problems including Quasistatic Crack Propagation, Computational Mechanics, DOI 10.1007/s00466-012-0700-3, March 2012.

Nicoli, Edoardo, Dillard, David, Frazier, Charles E., Zink-Sharp, Audrey, Characterization of Mixed-Mode I/II Fracture Properties of Adhesively Bonded Yellow-Poplar by a Dual Actuator Test Frame Instrument, *Holzforschung*, **66**, 2012, 623-631.

Hitendra K. Singh, Abhijit Chakraborty, Charles E. Frazier and David A. Dillard, Mixed mode fracture testing of adhesively bonded wood specimens using a dual actuator load frame, *Holzforschung*, Vol. 64, pp. 353–361, 2010. DOI 10.1515/HF.2010.041

D. A. Dillard, H. K. Singh, D. J. Pohlit, and M. J. Starbuck, “Observations of Decreased Fracture Toughness for Mixed Mode Fracture Testing of Adhesively Bonded Joints”, *Journal of Adhesion Science and Technology*, **23**, 1515-1530, 2009.

2. Copies of extended abstracts of papers presented at conferences

C.L. Tsai, Y. Guan, R. C. Batra, D. C. Ohanehi, J. G. Dillard, E. Nicoli, and D. A. Dillard, “Coupled Experimental and Computational Analysis of Fracture Path Selection in PMMA Blocks,” SEM 2010 Annual Conference & Exposition on Experimental & Applied Mechanics, Indianapolis, IN, 7-10 June 2010.

o D. A. Dillard, R. C. Batra, D. C. Ohanehi and J. G. Dillard, Y. Guan, C. Tsai, K. Murray, Z. Hasnain, and G. Cruz, “Fracture of Adhesive Bonds under Mixed Mode Loading: Experiments in

- o Ranade, S., Guan, Y., Dillard, D. "Investigating the use of tapered bondline double cantilever beam (Dcb) specimens to study the effect of bondline thickness on fracture of adhesive bonds", 35th Annual Meeting of the Adhesion Society, Inc., New Orleans, LA. (February 26, 2012).
- o Guan, Y., Chen, B., Batra, R. C., Ohanehi, D. C., Dillard, D. "Revisiting 2D analysis of bridging in adhesively bonded DCB specimens", 35th Annual Meeting of the Adhesion Society, Inc., New Orleans, LA. (February 26, 2012).
- o Tsai, C. L., Guan, Y. L., Ohanehi, D. C., Dillard, J. G., Dillard, D., Batra, R. C. "Simulation of the mechanical behavior of adhesively bonded joints by using meshless cohesive segments and SSPH basis functions", 35th Annual Meeting of the Adhesion Society, Inc., New Orleans, LA. (February 26, 2012).

3. Copies of poster presentations

Dual Actuator Load Frame and Numerical Simulation," NSF CMMI Research and Innovation Conference, Atlanta, GA, 4-7 January 2011.

Y. L. Guan, D. C. Ohanehi, and D. A. Dillard, "Application of Cohesive Zone Method (CZM) in Experiment and Simulation of Quasi-Static Tests of Mix Mode Double Cantilever Beam (DCB) Bonded Joints," 34th Annual Adhesion Society Meeting, Savannah, GA, 13-16 February 2011.

4. Copies of 1-page abstracts of papers presented at conferences

Shantanu R. Ranade, Youliang Guan, Donatus C. Ohanehi, John G. Dillard, Romesh C. Batra, David A. Dillard, Double cantilever beam (DCB) specimens to study the effect of bondline thickness on fracture of toughened epoxy adhesive bonds, IUPAC World Polymer Congress, June 2012, Blacksburg.

Youliang Guan, Donatus C. Ohanehi, John G. Dillard, Romesh C. Batra, David A. Dillard, Crack path selection in epoxy adhesive bonded joints with weakened interfaces, IUPAC World Polymer Congress, June 2012, Blacksburg.

4. Reports of work completed by REU (research experience for undergraduate) participants

Katie Murray

Zaki Hasnain

Esha Kapania

Casey Costa

Derek Jones

Armanj Hasanyan

5. Source code for the meshless method to analyze failure of adhesively bonded joints