CLBA2012
8 e 9 de novembro
Rio de Janeiro, Brasil
Associação Brasileira de Adesão e Adesivos - ABAA
Associação Portuguesa de Adesão e Adesivos - APAA
http://clba.cefet-rj.br

Adhesive Joints Mixed Mode Testing Analysis

F.J.P.Chaves[1], M.F.M. de Moura[2], L.F.M. da Silva[2], D. Dillard[3]

[1] IDMEC, Rua Dr. Roberto Frias, s/n, 4200-465 PORTO, Portugal
[2]DEMec, Rua Dr. Roberto Frias, s/n, 4200-465 PORTO, Portugal
[3] Virginia Tech, 219 A Norris Hall, Mail Code 0219, Blacksburg, VA24061

Joining materials with adhesives is a well-known technology, used since the early years of humankind. The development of new polymeric materials in the mid twentieth century brought a new evolution and applications to the adhesion science. Designing an adhesive joint requires the knowledge about the geometry and materials properties. Forecasting the failure of a joint is also very important, and it can be done with a fracture mechanics approach. Mode I and Mode II release rate energy tests are well documented [1] and widely used to characterize adhesive joints. In service, adhesive joints are loaded with a combination of the two modes with different ratios, and the characterization of mixed mode (I+II) is therefore relevant. This study analyses a test already known [2] and presents a new data reduction scheme that does not require the crack length monitoring, overcoming some difficulties associated with this process. A single specimen geometry (Double Cantilever Beam) is required to obtain the complete failure envelop. Numerical simulations done with ABAQUS are supported with experimental data, proofing the model suitability to preview the joint behaviour at the design stage.

[1] R. Campilho, Doctoral Thesis, Repair of Composites and Wood Structures, FEUP (2009)

[2] G. Fernlund & J. K. Spelt, Comp. Sci. and Techn.50 (1994) 441-449