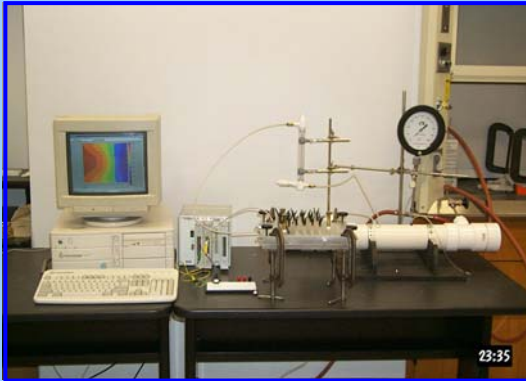
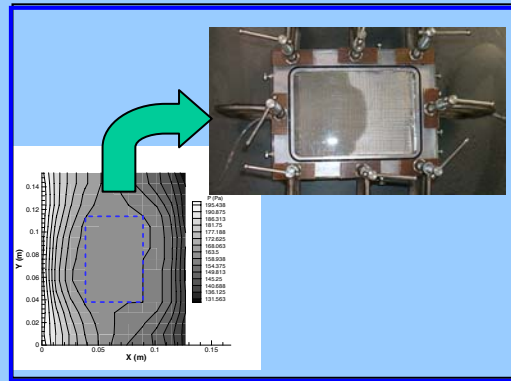


Synopsis:

GRASP — Gas-Assisted Real-time Assessment of Permeability



In-situ permeability measurement testbed



Pressure profile measurement

Background

The conventional permeability measurement method in liquid composite molding (LCM) applications, which uses liquid (oil or resin) as working fluid, only measures the average preform permeability in an off-line mode. Conventional methods cannot reveal local permeability variations of preform inside the mold – important LCM applications process quality control information. HPMI researchers developed GRASP – Gas-assisted Real-time Assessment of Permeability, a new characterization method that uses gas flow or alcohol and pressure profiles to measure whole field preform permeability in a closed mold assembly prior to the resin injection.

Goals

- Develop a novel approach for in-process, on-line whole field permeability measurements via a comprehensive investigation on gas and resin permeability of fiber preform
- Develop numerical models for whole field permeability estimations
- Prove concept of new method experimentally

Projects/Research Highlights

- Setup gas assisted whole field permeability measurement testbed
- Theoretically and experimentally investigate pressure characterization of both gas and resin fluids flowing through fibrous porous beds (preforms)
- Design and test an affordable and reusable MEMS-based sensor system for both gas and resin fluids
- Test and validate new permeability measurement technique

Benefits to Industry

- Improve part-to-part reproducibility
- Reduce manufacturing cost
- Effective process monitoring and a quality control tool for LCM processes