Advanced Materials Processing Lab

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Director: Prof. Samit Roy
Twin-Screw Extrusion Machine
Thermoplastic Pultrusion Machine
Schematic of Thermoplastic Pultrusion Machine
Pultruded E-Glass/Nanoclay/PP Nanocomposite Bars
Manufacture of Flat Composite Panels using VARTM

- Vacuum Assisted Resin Transfer Molding (VARTM)
- Fiber
  - Sized IM7 Carbon Fiber Fabric
  - Resin CYCOM® SC-780
    - VARTM Processing
Processing Equipment

- **VARTM**
  - Vacuum Assisted Resin Transfer Molding
  - Purchased VARTM kit from AirTech
  - Allows imbedded FBG in laminate during processing
Unidirectional IM7/Epoxy Laminate manufactured at UA using VARTM. 10in. x1in. coupons were machined from this panel for mechanical testing.
Vacuum Assisted Resin Transfer Molding (VARTM)
Manufacture of Composite Tubes using Filament Winding

- **Fiber**
  - Sized IM7 Carbon Unidirectional Fiber Tow

- **Resin for Filament Winding**
  - CYCOM® SC-780
    - Recommended viscosity for filament winding
Filament Winding Processing Equipment

- Filament Winding System
  - Winder
    - McLean Anderson 4-axis Super Hornet Filament Winder
  - Digital Fiber Tensioner
    - McLean Anderson ETS-4E-10
    - Integrates into Filament Winders Flexwind Machine Control software currently in use
4-Axes Filament Winder
Manufacture of Filament Wound Composite Tube using IM7/SC-780
12in x 1 in Carbon Composite Tube for Torsion-Tension Fatigue Testing
Filament Winder
Hot Press for Compression Molding
Supercritical Fluid System
Lever Arm Creep Tester w/ Chamber
32 cu-ft. Environmental Chamber
(-34 C to 190 C; 10 to 98 %RH)
Standard / Vacuum Ovens
C-Scan Equipment for Detection of Defects using Ultrasound (NDT)

- Imaging Bond Tester
- C-scan images in Resonance, Pitch-Catch and MIA modes
- Compatible with all scanners
- Compatible with Bondascope 3100
- Portable, battery operated, extensive image analysis
C-Scan Equipment for Detection of Defects using Ultrasound (NDT)