

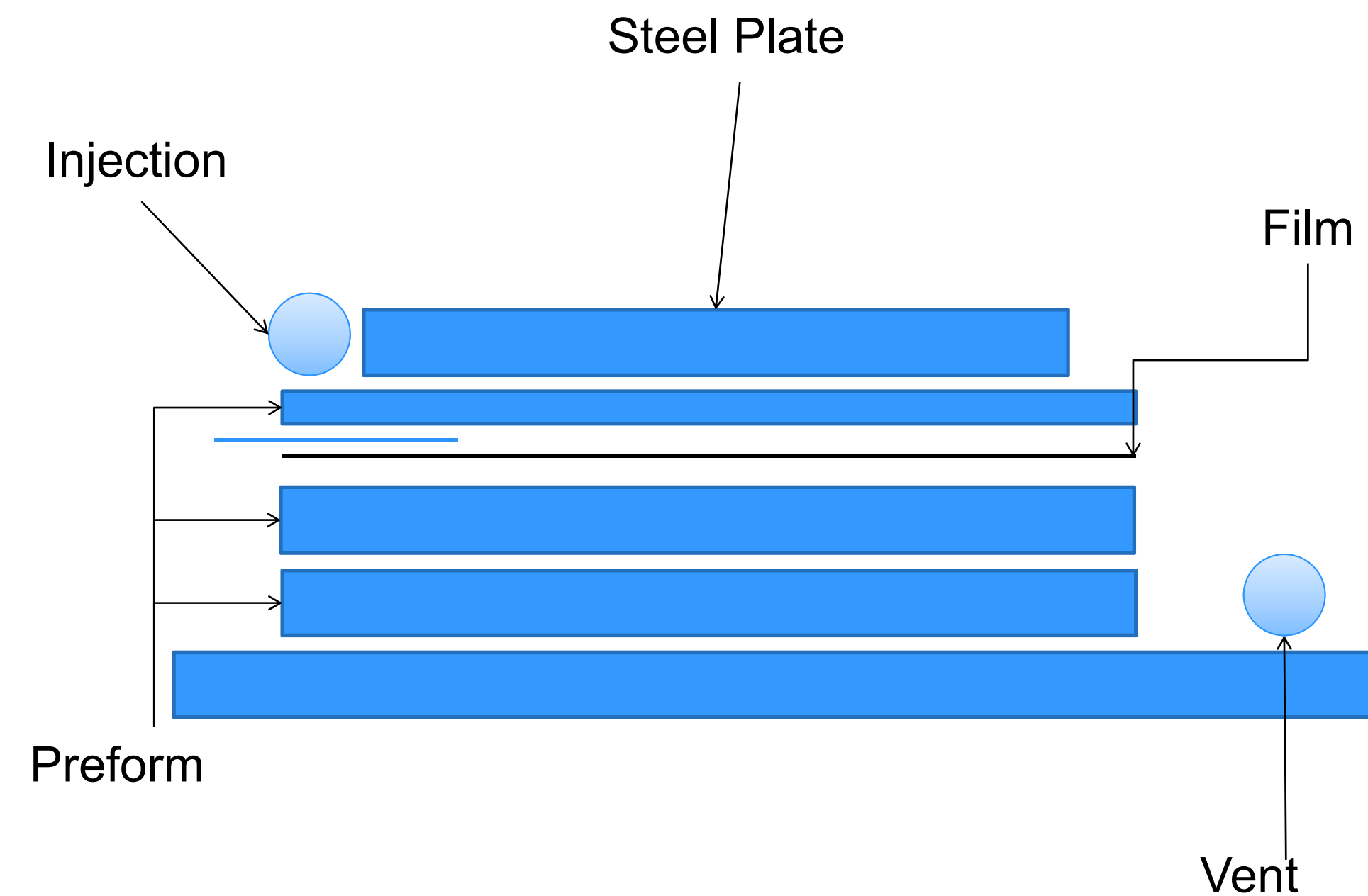
E. Banini (Intern), H. Deffor, S. Yarlagadda, R. Adkinson (ARL), T. Bogetti (ARL)

University of Delaware . Center for Composite Materials

OVERVIEW

- ◆ Create test panels using film interlayers in order to observe the bonding attributes of various films.
- ◆ Different types of interlayers and interlayer process methods were evaluated.
- ◆ The panels will be infused using Vacuum Assisted Resin Transfer Molding (VARTM).
- ◆ All Panels were infused using a flexible adherent consisting of one layer of 24 oz. E-glass (in some cases 28 oz. S-glass) and a rigid adherent consisting of two layers of 96 oz. E-glass.
- ◆ The samples are then tested according to the ASTM standard for Floating Roller Peel Test (D 3167)

EXPERIMENTAL SETUP

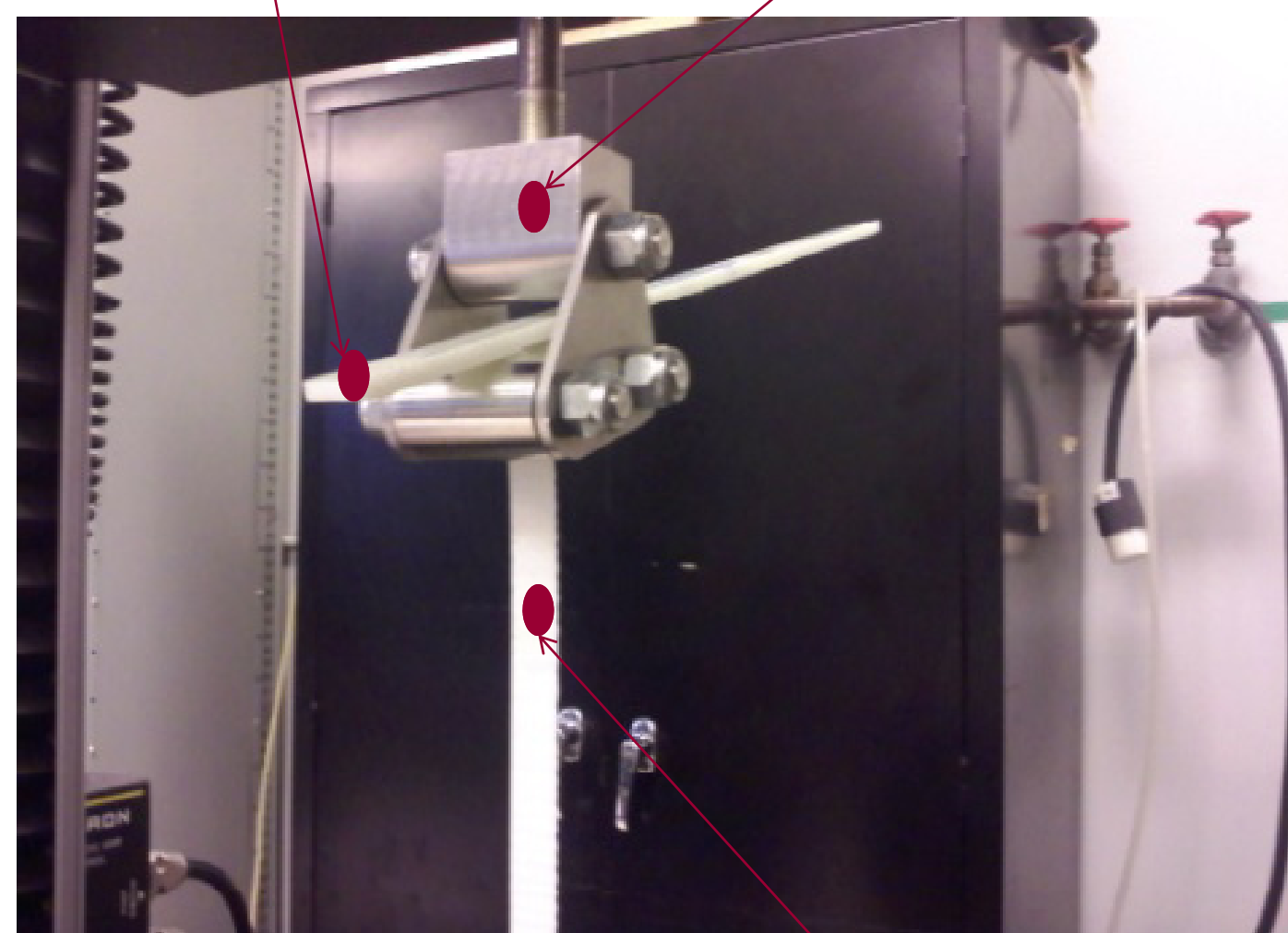


EXPERIMENT SPECIFICS

- ◆ All of the test panels were infused using Vinyl Ester 8084 (resin) or FCS 2 (resin) and one of the following interlayers.
 - ◇ 5 mil. Thick Ionomer
 - ◇ 1 mil. Thick Thermoplastic Polyurethane (TPU)
 - ◇ 1 mil. Thick Polysulfone (PSU)
- ◆ Panel Combinations
 - ◇ Vinyl Ester & TPU
 - ◇ Vinyl Ester & PSU
 - ◇ Vinyl Ester & Ionomer
 - ◇ FCS 2 & TPU
 - ◇ FCS 2 & PSU
 - ◇ FCS 2 & Ionomer

PEEL TEST SETUP

Rigid Adherent Fixture



Flexible Adherent

STRENGTH COMPARISON TABLE

Panel Name	Average Strength	Average Initial Peak
FCS2Ionomer (Post Cured)	7.07	10.14
FCS2PSU (Post Cured)	0.83	1.13
FCS2TPU28oz. (Room Temperature)	8.15	5.05
8084Ionomer (Post Cured)	1.02	1.54
8084Ionomer (Room Temperature)	1.21	1.59
8084PSU (Post Cured)	7.08	7.72
8084PSU (Room Temperature)	7.82	9.03
8084TPU (Post Cured)	7.74	8.24
8084TPU (Room Temperature)	8.8	6.71

FUTURE WORK

- ◆ In order to further test the properties of the film interlayer some fabrics are to be put into the hot press with either 5 mil. thick Ionomer or 5 mil. thick TPU.



- ◆ The fabrics will be pressed at 90 PSI at 350 F for 1 hour.

FUTURE WORK CONT.

- ◆ Panels will be made utilizing films pressed at vacuum pressure
- ◆ Panels will also be made using films of varying thickness.
- ◆ Incorporation of different resins into the testing.

ACKNOWLEDGEMENTS

Research was sponsored by the Army Research Laboratory and was accomplished under Cooperative Agreement Number W911NF-06-2-011.