

Nicholas Sobocinski (B.M.E.) – Dr. Dirk Heider
University of Delaware | Center for Composite Materials | Department of Biomedical Engineering

Introduction

•The goal of my work is to automate different projects and processes within CCM in order to increase efficiency and remove human error

•So far, I have been able to do so with the I-Wrap and Fast Manufacturing Cell Programs

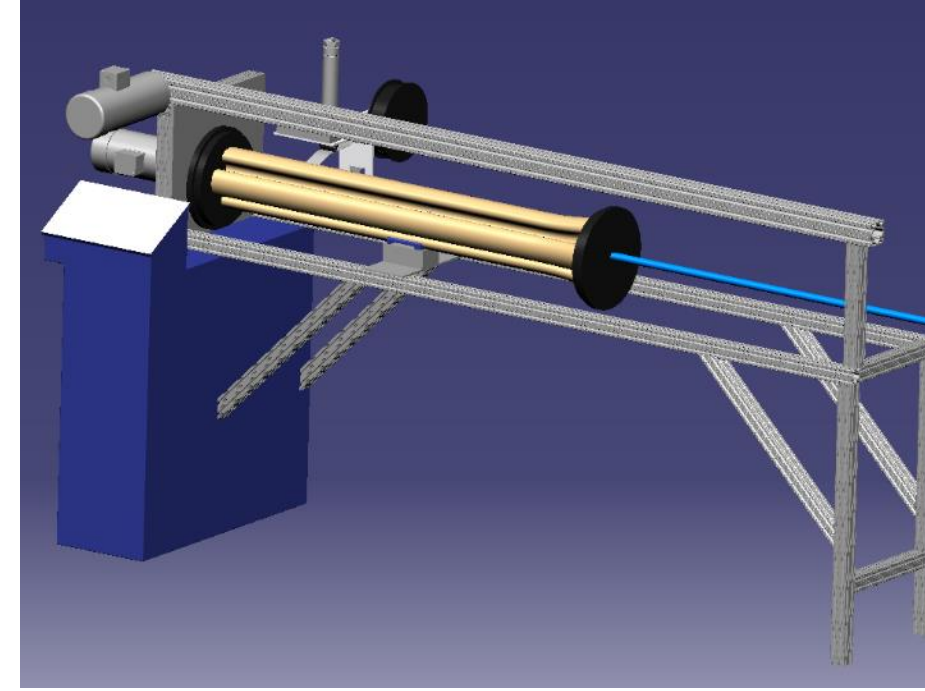


Objective

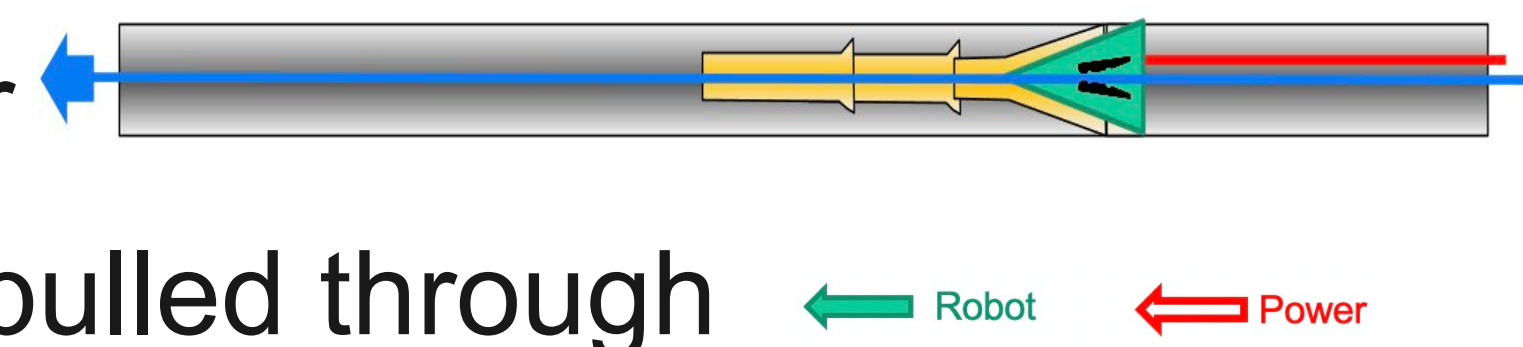
- I-Wrap
 - Build reinforced composite structure within a pipe
 - Seal leaks
 - Withstand stress strains
- Fast Mold Manufacturing Cell
 - Reduce cycle time
 - Reduce human error
 - Dramatically reduce cost

I-Wrap

- Preform
 - Expansion in pipe
 - Transportable
 - Strong quality of material
 - Handle stress strain of pipe



- Expander
 - Robot pulled through
 - Apply pressure to expand



- Winder Rehabilitation
 - New PLC and Servo Drives

- PLC Programming
 - Click

- Servo Drives Manually Configured

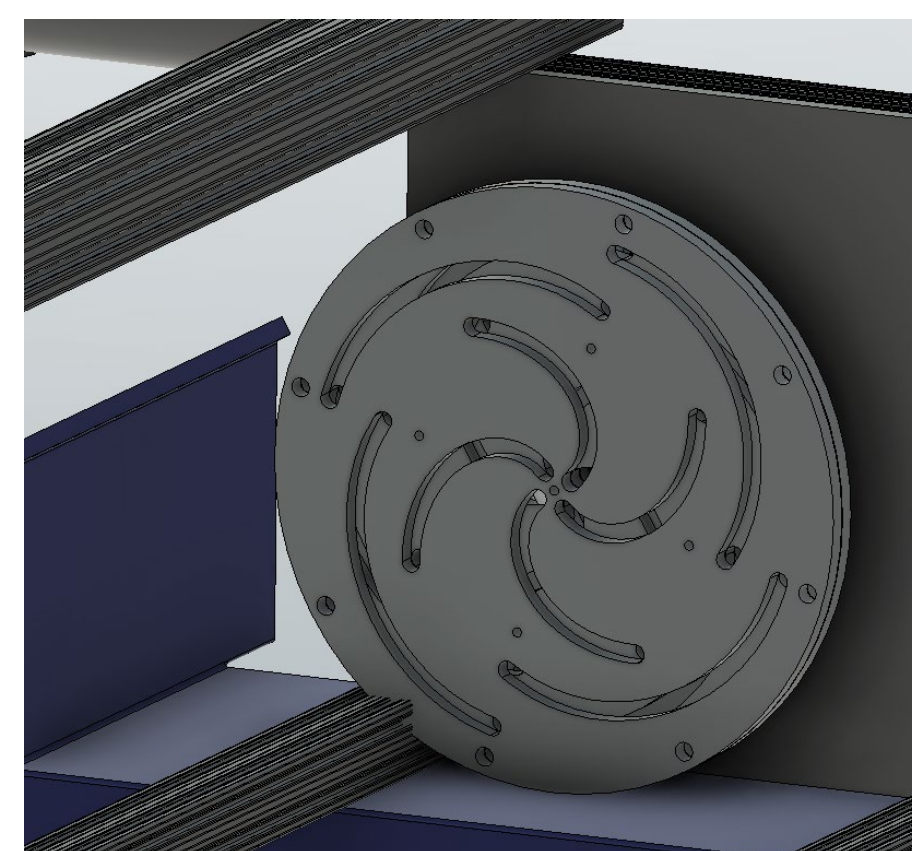
- Modbus RS485 general communications



- HMI
 - Designed using C-more
 - Modbus RS232 communications
 - Direct connection

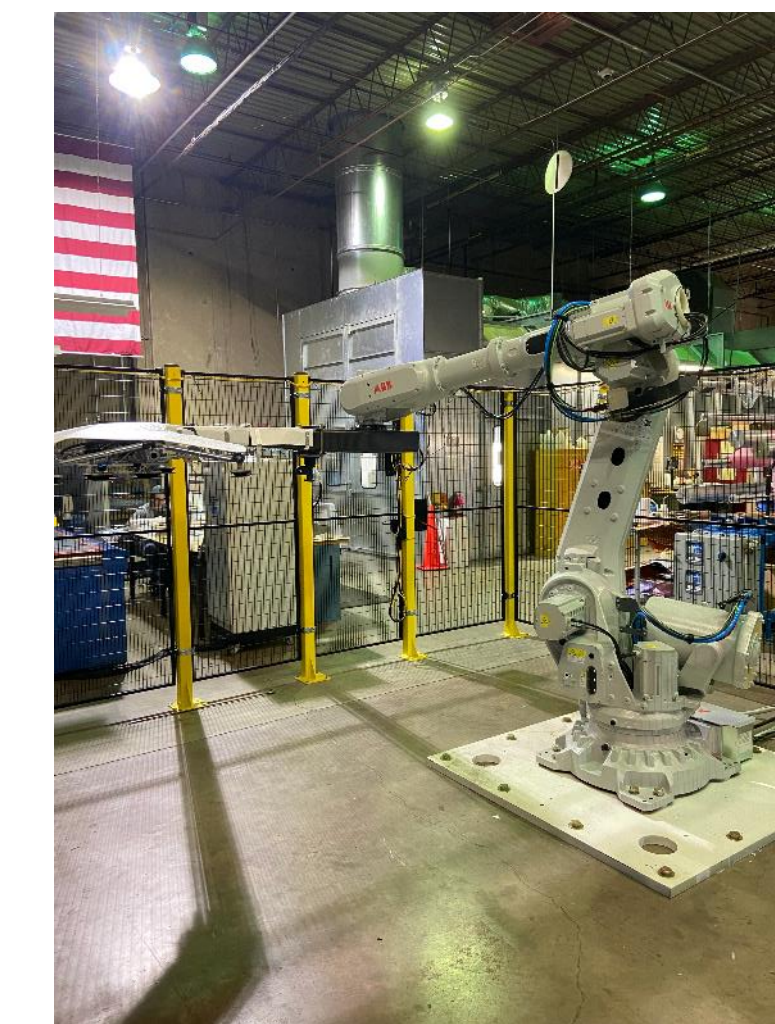
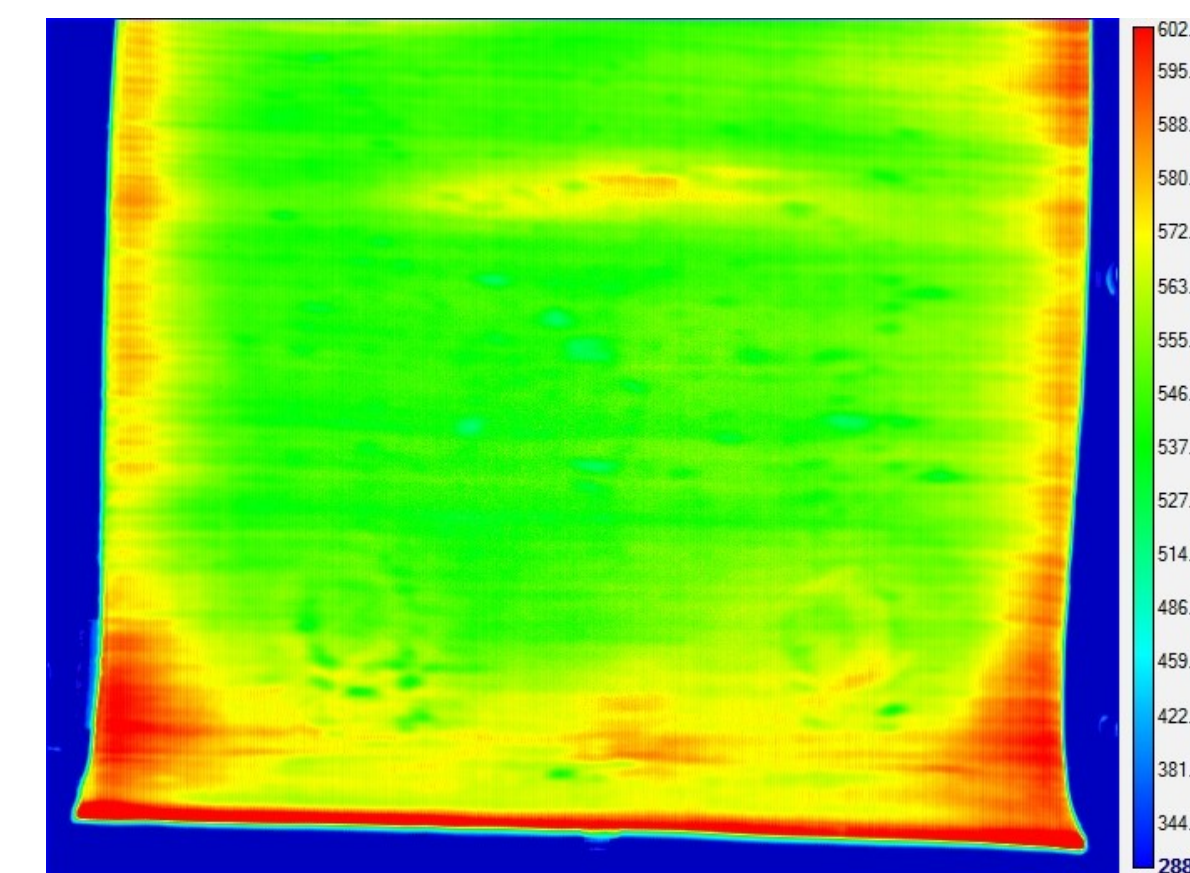
- Automated layup to create feedstock

- Mandrel design



Fast Mold Manufacturing

- Fast Homogenous heating
 - IR bulbs
 - Non-contact temp sensors
 - IR camera
- Press molding
 - Controlled heating and cooling
 - Process development (temperature and pressure)

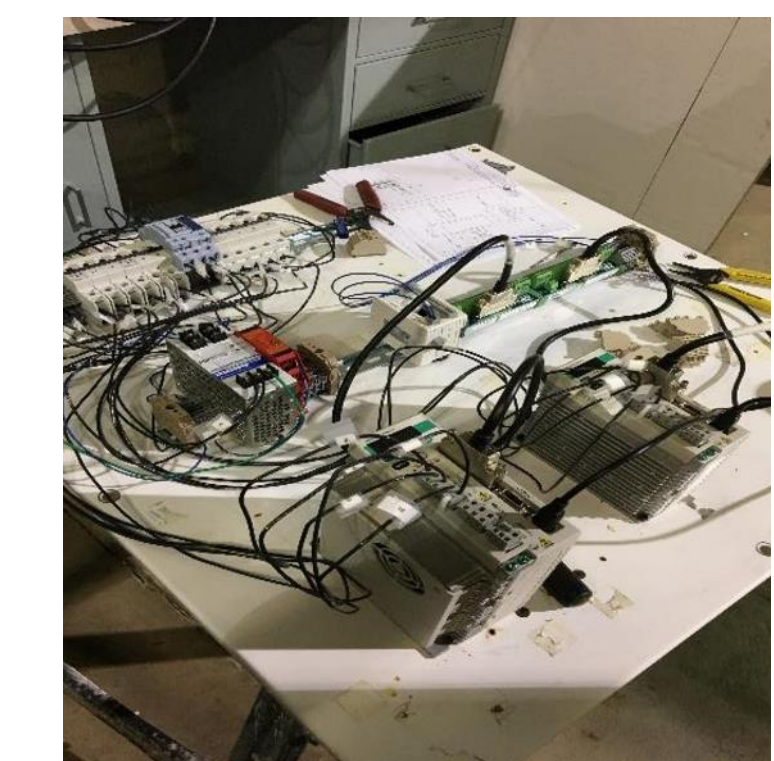


Next Steps

- I-Wrap Program
 - Material properties
 - Layup
 - Transportable
 - Expander
- Fast Mold Manufacturing Cell
 - Molds with embedded closed loop heating and cooling
 - Reduce cycle time

Conclusion

- Automation is important because:
 - Reduce cycle time
 - Reduce costs
 - Reduce human error
 - Reduce risk
- Knowledge and Experience Gained:
 - Electrical and wiring experience
 - Extensive CAD experience
 - Programming Experience
 - Machining experience
 - General hands-on experience



Acknowledgements

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