

♦ Rolando Herrera Mechanical Engineer herrera.rol@gmail.com
 ♦ Sheldon Miles Mechanical Engineer s08miles@yahoo.com

Introduction

Goodrich Aerostructures is an aerospace manufacturing company based in Chula Vista, California. It is a wholly owned unit of the Goodrich Corporation and was originally founded as Rohr Industries.

Goodrich Aerostructure's main product line is the design and manufacturing of aerostructures-mainly engine-related components-including engine nacelles, thrust reversers, and mounting pylons for both military and commercial aircraft. It also consults on integrating and managing its designs with the aircraft's other systems.



Aim/Purpose

To enhance our engineering fundamental and professional skills by:

- Working in a professional environment
- Undertaking new and challenging tasks
- Completing projects to the best of our abilities



An engineer working at his desk using CATIA 3-D modelling software.

Method

Several tools were used to help facilitate the completion of our tasks:

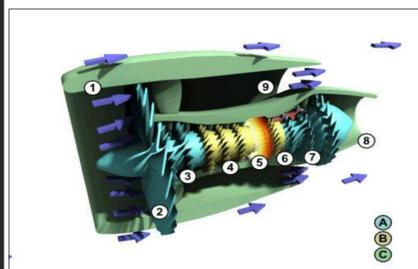
CATIA – Computer Aided Three-dimensional Interactive Application used to design and incorporate new parts

Microsoft Access – To produce, edit, and store databases for future references and creating data reports

Lean Manufacturing – Lean is a production practice that considers the expenditure of resources for any goal other than the creation of value for the end customer to be wasteful, and thus a target for elimination. As waste is eliminated, quality improves while production time and cost are reduced

Microsoft Projects – Program used to produce project timelines and milestone goals to help organize team projects in order to accomplish them on time and efficiently

Engineering Knowledge – Gaining knowledge on how an airplane's nacelle and jet turbine function and applying those principles in order to complete our tasks



A nacelle helps embrace an airplane's jet turbine as well as guide air through it.



Workers assembling a nacelle air inlet lip and fan cowl onto a jet turbine.

Results

By applying a professional and punctual attitude acquired from the Goodrich environment, we learned to:

- Produce equipment design specifications
- Review quality test specifications
- Review engineering drawings
- Document engineering drawings
- Update equipment list databases and reports
- Produce qualification test template form
- Review 3-D CAD model specifications
- Organize list of parts for the production line



A nacelle and pylon mounted on an aircraft's wing with open compartments. Equipment Engineers are in charge of all the equipment mounted both around the engine and on the nacelle.



Part of the reverse thrusters cowl and air duct assembly. The picture also shows some of the equipment that helps the nacelle system function properly and safely.

Conclusion



Design and Equipment engineers (as well as other Stress, Quality, Safety, and Systems engineers) work together to meet production goals towards developing a final product for their customer. Above is a front view of an assembled nacelle and turbine system with its cowl compartment doors opened.

The experience at Goodrich provided us with:

- Working experience in a professional environment
- Knowledge about design and testing specifications
- Designing experience in CAD parts that incorporated the design needs of the production team
- Hands on experience with new design programs



Goodrich provides nacelle systems for the Boeing 787 Dreamliner and many other aircraft. By working and collaborating together in a team environment, Goodrich is able to provide quality products to their customers.

Acknowledgements

We would like to thank everyone at Goodrich Aerostructures specially Dave Baszak, Steve Wiley, and Bob Stillie for the guidance and support.

We would like to thank our SDSU Director Theresa M. Garcia, Angeline Yang, and all of the MESA/MEP staff for all the help and support.

Lastly, we would like to thank the National Science Foundation for allowing us to be part of this great opportunity.