Kennedy Space Center: Swamp Works

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SWAMP WORKS

NASA KENNEDY SPACE CENTER

Upon Arrival

I was given the unique opportunity to shadow many teams working on various projects, and decide which I wanted to take part in.

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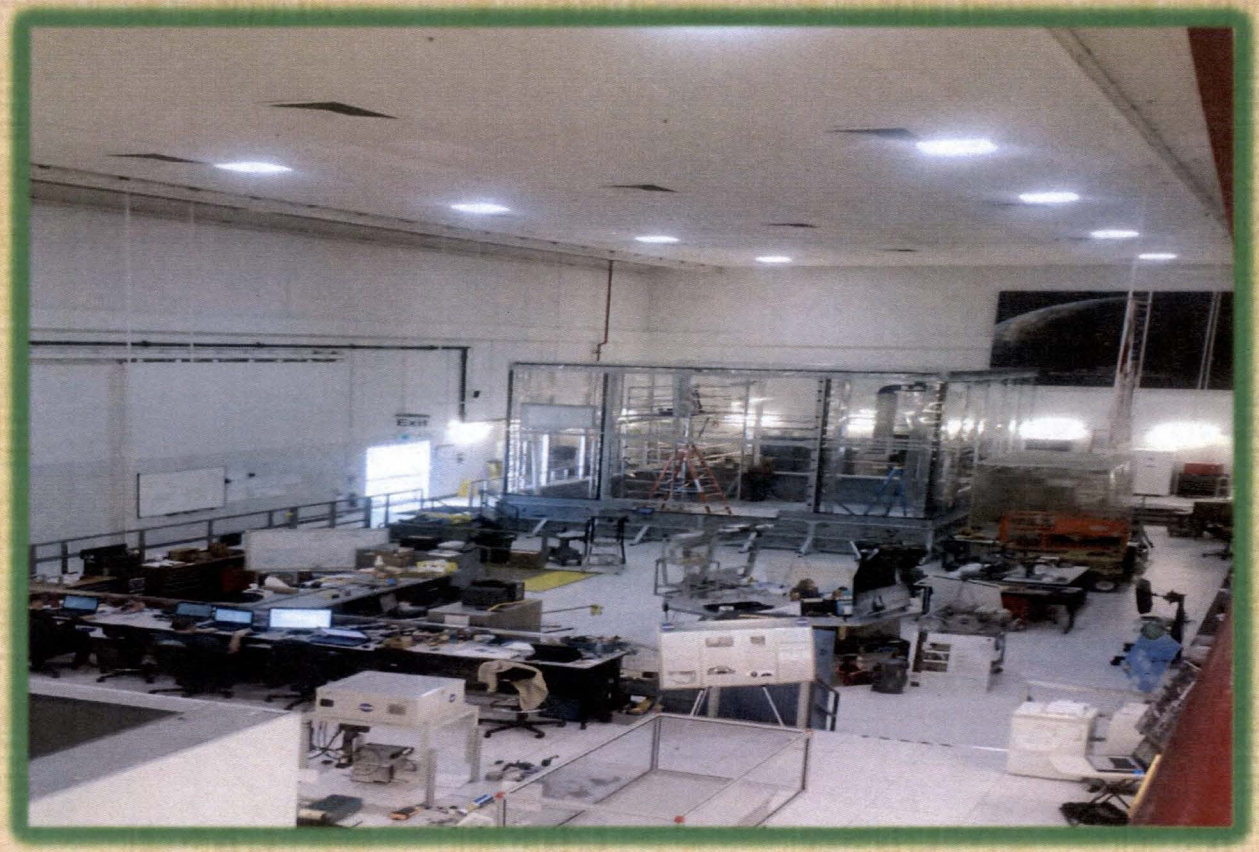
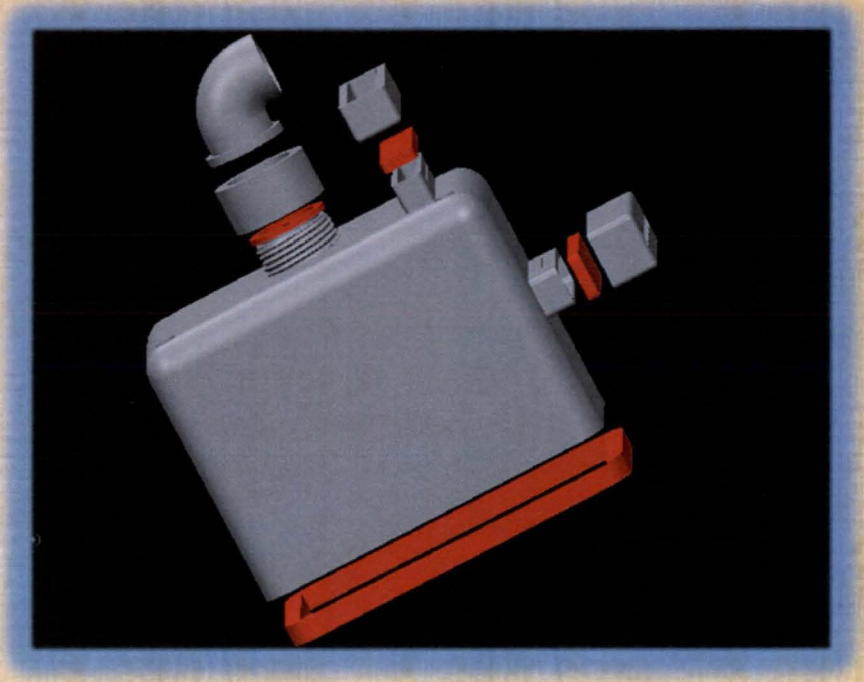


What is Swamp Works

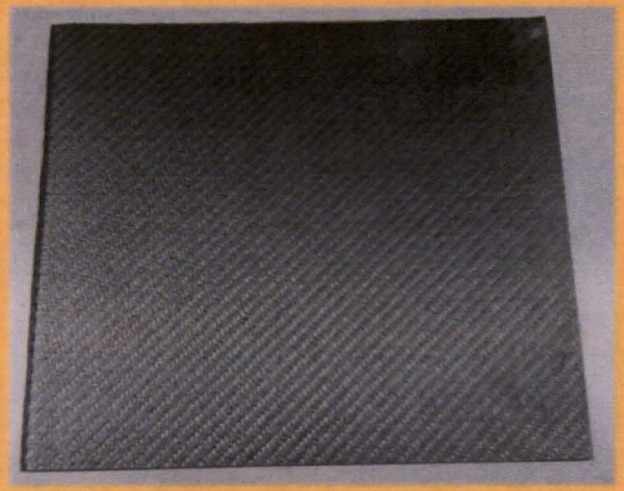
- World Class
- Dedicated
- Hardworking
- Driven
- Technological Advancement

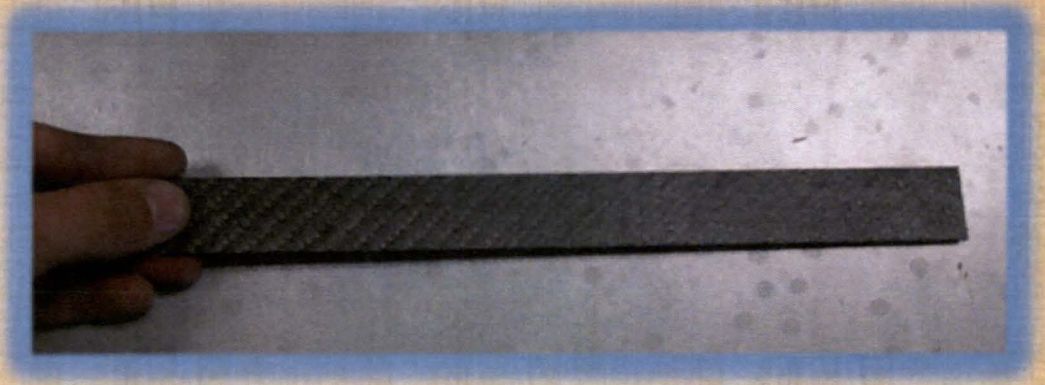
Badger



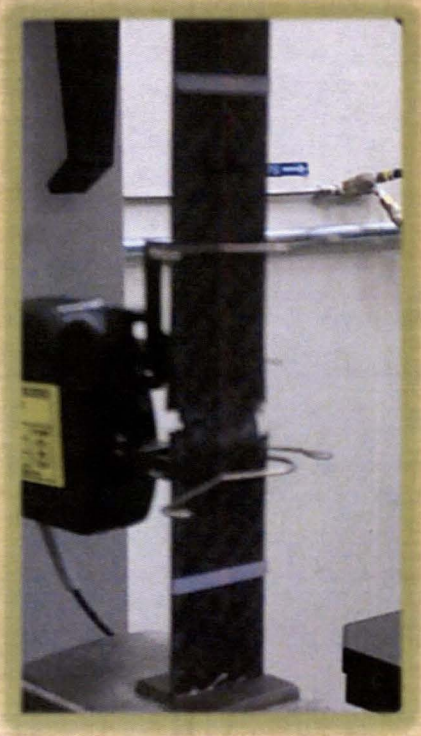
- What is Badger?
- Why Badger?
- Details

Composite Testing

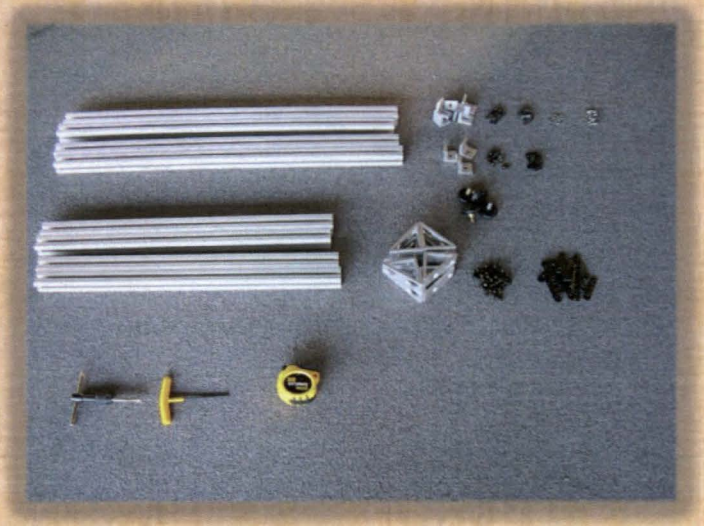




- Why composite testing?
- Future uses
- Details



Big Bin



- What is Big Bin?
- Construction materials
- Contents

Thanks and Conclusion

- Thank You

  All of the wonderful people at KSC and Swamp Works

- Photo Credits

  -Anthony DeFilippo

  -John Carelli

Kennedy Space Center: Swamp Works

When I began my internship with the Granular Mechanics and Regolith Operations laboratory (GMRO), also known as Swamp Works, I was given the unique opportunity to shadow many teams working on various projects, and decide what projects I wanted to take part in. Before I go into details of my experiences at Swamp Works, I would like to take a moment to explain what I discovered Swamp Works to be. Swamp Works is a family of hardworking, dedicated, and driven people from various backgrounds and skill sets. These people all work to advance technologies and make science fiction science fact through means of rapid prototyping. They support and encourage failure as an option when learning new things, as long as lesson learned from said failure. In fact, their motto states "Fail, Fast, Forward." What this means is, not if but when one fails he or she must do so quickly and spring forward from the failure so that his or her progress is not delayed. With this acceptance, it provided me the confidence to dive into a multitude of projects working in various fields and with a wide range of skill sets.

The first project I joined was Badger. My motivation for taking on this project was the opportunity I would have to obtain valuable experience working with 3D modeling and 3D printing technologies. Badger was a digging apparatus to be used in a highly dusty environment in a material known as Regolith. Regolith is a scientific term for the dirt or top soil found on planetary bodies. Regolith contains a large quantity of sediments less than 10ppm and as a result poses a challenge of keeping it out of any cracks and crevices. Furthermore, regolith can create high levels of electrostatic energy, which can prove damaging to sensitive electrical hardware. With these characteristics in mind, I decided to take on the task of designing and manufacturing a dust proof cover for the sensitive electrical hardware. When I began this project, I did not have the slightest idea as to how to use 3D modeling software or a means of manufacturing a viable product. As I went along with variants of the design, I became very proficient with a 3D modeling program known as CREO 2.0. Upon completion of my 3D design, I then had the task of manufacturing and having, in my hands, a usable model. To do this I had to work with additive printing technologies also known as 3D printing. Through my experiences working with Badger, I realized that 3D modeling is the focal point in much of engineering. With this in mind, I have embraced this fact and decided to further my experience with this software so that I may become a more valuable asset to any firm later in my career.

Mid-way through work with Badger, I picked up another project in which I found much interest. I had the opportunity to work side by side with a materials and composites guru in manufacturing carbon composite coupons (test strips) for performing stress, strain, and sheer analysis on. Being from a surfing, kiteboarding, and other water sport background I have always been interested in board design. With this in mind, it is no wonder why I found interest in such a project. I had the opportunity to refine Mold preparatory, composite layup, and composite curing techniques. Following manufacturing of these composite strips, I then performed various stress tests and logged my results. With these results, future teams could create lighter, stronger, and more cost effective composite structures for use in varieties of applications. After my experiences with materials and composites testing, I have obtained crucial

appreciation for detailed documentation and analysis that material sciences involve. However, as interesting as composite materials testing has been, I do not feel this is where my future career lies.

Another, more on the side, project I have been involved in is building a 626 cubic foot regolith containment chamber for doing full scale testing of robotic systems. This chamber is built of high strength aluminum scaffold materials, 80/20, and massive panels of Lexan. Once the chamber is completed, it is be filled with 120 tons of regolith and dubbed the largest regolith test chamber in the world. Through my experiences with building "Big Bin" as we called it, I discovered my demand for engaging and hands on activities.

Through all of my incredible experiences working with the Swamp Works at Kennedy Space Center; I have obtained crucial knowledge, insights, and experiences that have fuelled, shaped, and will continue to drive me toward my ultimate goal of obtaining not only a degree in Engineering, but obtaining a job that I can call a career. I want to give much thanks to all of those who mentored me along my journey, and to all who made this opportunity a reality.